





HEALTH SECURITY INITIATIVE FOR THE INDO-PACIFIC REGION

PROVISIONAL STRATEGIC FRAMEWORK 2019 -22

1 EXECUTIVE SUMMARY

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1 EXECUTIVE SUMMARY

This Strategic Framework guides the investment of resources and a linked suite of programs under the Australian Government's Health Security Initiative for the Indo-Pacific region (the Initiative). The goal of the Initiative is:

To contribute to the avoidance and containment of infectious disease threats with the potential to cause social and economic harms on a national, regional or global scale.

Funding of \$300 million has been allocated to the Initiative over the five years to mid-2022 from Australia's international development assistance budget. Following the launch of the Initiative in October 2017, investment priorities were progressively established during 2018 with reference to the central international normative frameworks for assessing public health capacity, and on the basis of consultations with partner governments, regional, international and non-governmental development organisations engaged in the provision of health security assistance, and key Australian research and operational agencies active in the field of infectious disease prevention, detection and response. This framework is also based on reviews of evidence and practice from Australia's long history of support for infectious disease management.

Country and multi-country investments under the Initiative are concentrated in Southeast Asia, Papua New Guinea (PNG) and the Pacific island countries, and fall under one or more of three overarching objectives:

Anticipate: To help countries assess their infectious disease threats and capacity deficits, and equip themselves with appropriate policy and regulatory arrangements, particularly with respect to access to medicines and vector control technologies.

Avert: To mitigate infectious disease threats through support for improved infection prevention and control; vector control; and surveillance with respect to infectious diseases, immunisation coverage and treatment-resistance in pathogens and vectors.

Arrest: To build capacity to detect and respond to infectious disease outbreaks through laboratory strengthening; targeted public health workforce development; and support for improved outbreak detection and management.

Threat mitigation activities under the "Avert" objective are supported in PNG, Timor-Leste and the Pacific island Countries; detection and response activities under the "Arrest" heading are supported across Southeast Asia and the Pacific. The totality of activities under each objective is intended to recognise the importance of adopting a One Health approach to capacity-building in health security—that is, an approach that reflects the zoonotic origins of most emerging infectious disease threats and works at the interface between human and animal health.

In addition, investments in enabling partnerships are providing expertise, financing and support to key multilateral, regional and whole-of-Australian-government partner organisations to further the above objectives and ensure Australia's full engagement in global health security processes, including the Global Health Security Agenda and the World Health Organisation's Asia-Pacific Strategy for Emerging Diseases and Public Health Emergencies.

Program performance assessment arrangements for the Initiative will seek to measure Australia's contribution to the achievement of partner country progress towards sustainable infectious disease prevention, detection and response capacity relative to the core capacities described in the World Health Organisation's (WHO) International Health Regulations 2005 (IHR) and related capability assessment frameworks, including the World Organisation for Animal Health's (OIE) Performance of Veterinary Services (PVS) framework.

2 BACKGROUND

2.1 Foundation elements of the Initiative

The Initiative as launched in late 2017 included six specific and substantial commitments:

- a \$75 million Product Development Partnerships (PDP) Fund to support portfolio investment in research and development for drugs, diagnostics and vector control technologies relevant to malaria, tuberculosis and other infectious diseases;
- a \$20 million contribution to the World Health Organization's Health Emergencies Program to strengthen its capacity to assess countries' compliance with the 2005 International Health Regulations (IHR), monitor infectious disease threats and support national and regional responses to outbreaks;
- a \$16 million "Stronger Systems for Health Security" applied health systems research grants program, with proposals to be jointly selected by DFAT and the National Health and Medical Research Council (NHMRC);
- a \$17 million regional regulatory strengthening partnership between DFAT and Australia's national medicines regulatory authority, the Therapeutic Goods Administration;
- a new Health Security Corps within the Australian Volunteers program, which would see up to 20 Australian public health specialists placed in capacity-building roles in Southeast Asia and the Pacific each year; and
- a whole-of-government Indo-Pacific Centre for Health Security within the Department of Foreign Affairs and Trade, with a mandate to deliver the above commitments, develop a strategic program of further investments to strengthen regional health security, and pursue the interests of Australia and the Indo-Pacific region in relevant multilateral processes and fora.

In addition, two relatively small ongoing activities were "grandfathered" into the Initiative – funding for the Asia Pacific Leaders Malaria Alliance (APLMA), and for a research consortium led by Menzies School of Health Research in Darwin to address challenges posed by malaria and drug-resistant tuberculosis in Indonesia, Papua New Guinea (PNG) and Malaysia. A second and similar research grant, to a consortium led by James Cook University, was announced at the launch of the initiative but is not included above owing to its scale.

The foundation commitments listed above were fully implemented by mid-2018. Further detail on the allocation of resources to partners under these commitments is provided in Section 4 below.

2.2 The Centre

The Centre for Health Security (the Centre) was operational from the day of the Initiative's launch and fully staffed by early 2018. It is staffed by a mix of DFAT officers, specialised contractors and secondees from other government agencies—the Department of Health's Office of Health Protection (OHP), the Department of Agriculture and Water Resources, the Australian Centre for International Agricultural Research (ACIAR), the NHMRC, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), and the Malaria and Infectious Diseases Institute of the Australian Defence Force. In delivering foundation commitments and in scoping further investments (see below), the Centre has coordinated closely with other relevant parts of DFAT, including its Health Policy and Health and Education Funds Branches, the innovationXchange and a range of bilateral health programs.

In addition to its programming work, the Centre has stepped up Australia's engagement and leadership within international health security fora. In January 2019, Australia joined the Steering Committee of the Global Health Security Agenda (GHSA), a major platform established in 2014 to foster global progress in health security. With co-chair Finland, Australia has re-positioned the associated global Alliance for Health Security Cooperation to focus on assisting countries to fill key capacity gaps, refresh its membership and work plan, and strengthen its secretariat. The Centre is also a major sponsor of the first Global Health Security Conference, to be co-convened by University of Sydney and Georgetown University in Sydney, June 2019.

The Centre has established a ten-member Technical Reference Group as a source of advice on guidance on strategic and technical issues. This body meets every six months, and individual members are frequently called upon for perspectives on specific questions. A Government Reference Group meets with the same frequency and provides an opportunity for senior officers of all organisations represented in the Centre to track progress and provide input on future directions.

2.3 Scoping for further investments

In order to communicate the aims of the Initiative and scope priorities for further investment at the country and regional levels, the Centre fielded high-level scoping missions to a selection of countries in Southeast Asia and the Pacific in the first half of 2018. The Pacific scoping team visited Solomon Islands, Fiji, PNG and Samoa, and consulted with the heads of health agencies from other Pacific Island Countries at their annual meeting. The Southeast Asian scoping team visited Indonesia, Myanmar, Laos, Cambodia, and Vietnam to scope bilateral needs, and Thailand and the Philippines to consult with regional and international organisations. They also met with members of the evaluation team who undertook the 2017 Office of Development Effectiveness (ODE) *Evaluation of DFAT's Pandemics and Emerging Infectious Disease Portfolio 2006-2015.*¹ The teams produced detailed regional and country-level reports. The regional reports were published, as were some of the country reports—where permission was provided by partner governments.

Accounting for differences between the health security challenges and capacities of the two regions, broad areas of common need were identified, namely laboratory capacity, public health workforce capacity, infection prevention and control, policy and operational coordination, disease and immunisation surveillance, vector control and outbreak response. In line with Joint External Evaluation (JEE) findings for many countries in Southeast Asia, that region's capacity deficits were greatest in relation to outbreak response, surveillance and the management of zoonotic disease threats. The Pacific Island Countries, by contrast, face fewer zoonotic disease threats and have the greatest deficits in relation to infection prevention and control and workforce capacity. PNG is a mixed case, with threats and needs characteristic of both regions.

On completion of the country-oriented scoping missions, the Centre commissioned a further thematic scoping report on the theme of workforce development, in recognition of the fundamental constraints imposed by limited public health workforce capacity in both Southeast Asia and the Pacific. This report, which was published, addressed training needs and options, priorities for the placement of long-term experts, and the capacities required for more effective regional outbreak response.

2.4 Domestic and international consultation

In parallel with the country and regional scoping work described above, the Centre undertook wide-ranging consultations to gauge the capacities and priorities of potential international and domestic partner organisations. At the international level, dialogue was undertaken with all key actors in global and regional health security, including the WHO and OIE, the UN Food and Agriculture Organisation (FAO), multiple US government agencies, the World Bank, the Asian Development Bank, the ASEAN Secretariat, the Bill and Melinda Gates Foundation, the United Kingdom's Fleming Fund, the New Zealand government, the Pasteur Institute and a range of NGOs and private sector organisations.

Consultations with Australian domestic stakeholder organisations were undertaken in two stages. First, in late 2017 and early 2018, the centre engaged with a range of federal and state government, research, non-government and private sector institutions and networks to introduce the Initiative and seek their perspectives on investment priorities. Later in 2018, thematic consultative workshops were held in Melbourne, Sydney, Canberra and Cairns to discuss investment priorities specifically relating to laboratory strengthening, disease modelling, disease surveillance, immunisation, vector control, and infection prevention and control. In addition, organisations involved in international outbreak response were convened to discuss

¹. That evaluation pointed to achievements in strengthening infectious disease surveillance, laboratories, leadership and governance for infectious diseases, attention to gender issues, and public health functions of the human and animal health workforce. However, it noted that ongoing health threats have highlighted the fragility of these gains and the slow progress in the implementation of the IHRs.

how the Initiative could strengthen the capacity of Australia and the region to respond to disease outbreaks of national, regional and global significance.

2.5 Early-mover activities

Beyond the foundation activities already described, the Centre moved quickly to develop a small number of high-priority "early mover" activities arising from scoping work and consultative processes.

In early 2018, the Centre partnered with Australia's field epidemiology training program at the Australian National University to establish the ASEAN-Australia Health Security Fellows Program, subsequently announced at the March 2018 ASEAN-Australia Special Summit. The Centre has taken early measures to strengthen the strategic planning and management capacity of the PNG Institute of Medical Research, a key partner institution in that country.

Partnership agreements have been negotiated with the Australian Animal Health Laboratory in Geelong to work with counterpart laboratories in Asia, with OIE to assess and strengthen country capacity to manage zoonoses, with WHO's Global Outbreak Alert and Response Network to improve outbreak response capacity in the Indo-Pacific region, with the UN Food and Agriculture Organisation's Bangkok office to strengthen the coordination of veterinary training, with the Australian Centre for International Agricultural Research (ACIAR) to support operational research on the detection and control of zoonotic disease threats, and with the iXc-supported organisation Tupaia for the further development and roll-out of its data aggregation and visualisation platform as an aid to decision-makers.

The Initiative has also supported a multi-year funding contribution to the global Coalition for Epidemic Preparedness Innovations (CEPI) which was established in 2017 to accelerate the development of vaccines for emerging infectious diseases.

While the Initiative is primarily intended to build regional capacity to prevent, detect and respond to infectious disease outbreaks, it also made early contributions to two complementary global outbreak response financing mechanisms—the World Bank's Pandemic Emergency Financing Facility (\$9.5 million) and WHO's Contingency Fund for Emergencies (\$4 million). In addition, the Centre established a pilot program to provide stipend support to Australian outbreak responders where needed. Such support was provided for the first time to facilitate an Australian response to the 2018 circulating vaccine-derived polio outbreak in PNG.

2.6 Requests for proposals

Having put in place the six commitments announced at the time of the launch, and additional early-mover commitments, the Centre developed in late 2018 and early 2019 two broad requests for proposals for country-level work—one valued at up to \$25 million for proposals relating to threat mitigation activities in PNG, Timor-Leste and the Pacific Island Countries; the other valued at up to \$28 million for proposals relating to detection and response activities across the wider Southeast Asia and Pacific region. The principal components of these requests correspond to the objectives detailed in the strategic framework below. It is intended that partner organisations, or consortia, will be selected on the basis of demonstrated capability and broad activity concepts, and that detailed work plans will then be developed through dialogue between the Centre and partners. Consequently, this strategic framework will be updated to incorporate additional detail in the latter part of 2019.

3 STRATEGIC FRAMEWORK, 2019-22

3.1 Health security in the Indo-Pacific

The Initiative aims to contribute to the avoidance and containment of infectious disease threats with the potential to cause social and economic harms on a national, regional or global scale.² The geographic focus of country-level activity is on Southeast Asia, PNG and Pacific Island Countries.

Our region is a hotspot for emerging infectious diseases. Many countries have weak surveillance and containment systems for human and animal health diseases and are therefore vulnerable to highly pathogenic infectious diseases. A major disease outbreak could have severe health and economic implications with loss of life and disruption to regional trade, tourism and development.

Countries are also facing the growth of antimicrobial resistance (AMR), which threatens to undo decades of medical advancement in the fight against high-burden bacterial and parasitic diseases. Other exacerbating challenges include climate change, rapid population growth and urbanisation. Health systems need not only to deliver better services, but also to be more resilient to the emergence of epidemic-prone and drug-resistant diseases. For this reason, health security is often described as the flip-side of Universal Health Coverage.

A stable and economically productive region is in Australia's national interest. Preventing and reducing the occurrence of major disease outbreaks benefits both human and animal health, protects the environment, and helps to prevent serious negative impacts on national and regional economies. Australia has a demonstrated capacity to prevent, detect and rapidly respond to public health threats. With significant expertise in field epidemiology, laboratories, drug development, surveillance and control of zoonoses, the 2017 WHO-led voluntary JEE³ report noted that Australia is in a position to proactively support other countries in the Indo-Pacific region to achieve their core capacities under the 2005 International Health Regulations (IHR).

The Initiative supports the objectives of Australia's *Foreign Policy White Paper*, which highlights the importance of managing health security risks in the region; DFAT's current development policy framework, *Australian aid: promoting prosperity, reducing poverty, enhancing stability*; and DFAT's *Health for Development Strategy 2015-2020*, which emphasises the need for health security responses to address emerging infectious diseases across the Pacific and Southeast Asia. It seeks to capitalise on Australian whole-of-government capacity in health security, in line with the *National Framework for Communicable Disease Control* which recognises that an integrated approach is needed across government in order to support regional engagement to mitigate potential epidemics. The Initiative also reflects DFAT's approach to innovation which is founded on the three pillars of "experimenting, partnering and learning".

Based on the Centre's regional scoping work and the domestic and international consultations taken in the course of late 2017 and 2018, three principal objectives and one enabling objective have been defined for the Initiative (refer Table 1 on the following page).

² Within the Initiative, health security is defined as reduced vulnerability to acute public health events - mainly existing and emerging infectious diseases with epidemic potential, and drug resistant strains of these diseases.

³ WHO Joint External Evaluation website (https://www.who.int/ihr/procedures/joint-external-evaluations/en/).

Table 1: Overarching program logic for the Initiative

GOAL	To contribute to the avoidance and containment of infectious disease threats in the Indo-Pacific with the potential to cause social and economic harms on a national, regional or global scale									
OBJECTIVES	ANTICIPATE	AVERT	ARREST							
	To help countries assess their infectious disease threats and capacity deficits, and equip themselves with appropriate policy and regulatory arrangements, particularly with respect to access to medicines and vector control technologies	To mitigate infectious disease threats through support for improved infection prevention and control; vector control; and surveillance with respect to infectious diseases, immunisation coverage and treatment-resistance in pathogens and vectors	To build capacity to detect and respond to infectious disease outbreaks through laboratory strengthening; targeted public health workforce development; and support for improved outbreak detection and management.							
	ENABLE: To provide expertise, financing and support to key multilateral, regional and who Australian-government partner organisations in support of the above objectives									

The core of the Initiative is the provision of national and regional support for capacity building in health security in Southeast Asia, PNG and the Pacific Island Countries, within the framework outlined above.⁴ This recognises the critical importance of building national ownership for sustainability, aligning investments with identified country priorities and pre-agreed bilateral aid investment plans, tailoring interventions to the diverse capacities and threat environments of our partner countries, and concentrating resources for impact.

The Initiative's investment priorities will necessarily differ between PNG, Timor-Leste and the Pacific Island Countries, on the one hand, and the larger countries of Southeast Asia, on the other hand. Activities supported under the "Anticipate" objective—namely support for the conduct of capacity assessments, the preparation of consequent health security action plans, the adoption of appropriate polices, laws and regulations, and the improvement of national health information systems—will be broadly similar in both of these sub-regions. Such activities will largely be delivered through partnerships funded under the "Enabling" objective, such as with WHO, OIE and Australia's TGA. Activities under the "Arrest" objective will span the two sub-regions but take substantially different forms in each; activities under the "Avert" objective will be undertaken only in PNG, Timor-Leste and the Pacific Island Countries.

3.2 Investment principles

Investments under the Initiative are selected and implemented in accordance with a handful of guiding principles, as follows. These are additional to the cross-cutting principles that guide all aid investments, which are addressed further below.

Health security is a regional public good. The Initiative's approach to country-level assistance reflects the fact that health security is a regional and global public good. It matters to partner governments, but in many cases the benefits of health security investments at the country level are not fully captured by the country

⁴ The Anticipate/Avert/Arrest framework maps directly onto the Prevent/Detect/Respond framework that is used to structure the JEE country capacity assessment tool, with "Avert" equivalent to "Prevent" and "Arrest" covering both "Detect" and "Respond". Because the JEE tool focuses only on country capacities, and also omits or arbitrarily classifies certain country capacities, the "Anticipate" pillar is here introduced to cover prerequisites for health security not reflected or not well situated in the JEE framework, such as product development, strategic planning and high-level risk assessment. In the JEE framework, legislation sits under the "Prevent" heading but cuts across prevention, detection and response; in the framework here presented, legislation sits under the Anticipate heading. Beyond first points of entry, vector control capacity is absent from the JEE framework; in the framework presented here it sits under the "Avert" heading.

concerned. They often extend beyond a country's borders, to the wider region or the world as a whole. This has two important consequences. The first is that countries have a strong case for external assistance for health security until they reach a more advanced stage of development and are better able to contribute to the production of regional and global public goods. The second is that country-level assistance, while needing to be tailored to national needs, priorities and circumstances, must be provided in such a way as to achieve cross-border synergies. Thus the Initiative is seeking to pursue similar priorities in similar ways across a number of countries, while tailoring assistance as appropriate. In countries where priorities are very specific to local circumstances, bilateral health programs may be a more appropriate source of assistance.

Endemic diseases are entry points for action on epidemic-prone diseases. Health security is often narrowly defined as only including emerging infectious diseases, or re-emerging diseases in the case of drug resistance. However, endemic diseases including dengue, HIV/AIDS, malaria and tuberculosis can also provide entrypoints to engage with governments on health security, and through which to build systematic capacity. The Initiative will work to combat endemic diseases that have an impact on national or regional health security, and assist to build core capacities that could be utilised in the fight against other infectious diseases.

Australia's world-leading health security expertise should be exploited. The Initiative is not tied to Australian sources of technical expertise. Nevertheless, Australia has a high-functioning public health system, strong regional linkages and a globally recognised capacity in surveillance, diagnosis, modelling and research and development in the field of infectious diseases, including zoonotic diseases. The Initiative will therefore seek to leverage Australia's strengths wherever possible to enhance regional health security.

Health security cannot be achieved without a One Health approach. Approximately 75% of newly emerging infectious diseases are zoonoses that result from various anthropogenic, genetic, ecologic, socioeconomic and climatic factors. One Health is an approach that recognises the health of people is connected to the health of animals and the environment. Across the Indo-Pacific, capacities to diagnose, treat and control animal health concerns are particularly weak and present major threats to human health. The Initiative will emphasise efforts to strengthen animal health systems and also enhance collaborations between human health and veterinary sectors.

Interventions must support international objectives while achieving country ownership. While the Initiative operates within and measures itself against the capability frameworks established by WHO and OIE, including the legally binding International Health Regulations 2005, no health security interventions can be effective without strong partner government support and ownership. The Initiative's early investments, and this framework, have been developed in close consultation with regional governments, and future interventions will be developed in an equally collaborative fashion. As the Initiative is a composite of global, regional and national investments, the totality of all investments affecting any given country will be reflected in rolling Country Investment Summaries.

3.3 Principal strategic objectives

The three principal strategic objectives of this framework are further elaborated below.

3.3.1 Anticipate

Activities under this objective aim to help countries assess their infectious disease threats and capacity deficits, and equip themselves with appropriate policy and regulatory arrangements, particularly with respect to access to medicines and vector control technologies. These activities are supported by enabling partnerships with WHO and OIE for capacity assessment and development, policy, legislative and regulatory development, and national planning; with Product Development Partnerships for the trialling and adoption of new disease control technologies; with Australia's TGA for support to National Medicines Regulatory Authorities to build capacity and accelerate the registration of new disease control technologies; and with Tupaia for the roll-out of its health data aggregation and visualisation platform. In all these cases, our investments are building on the mandates, track records and regional relationships of longstanding partner organisations.

Australia's investment in product development, including vaccine development, is notably large, accounting for over one-quarter of the total resources of the Initiative. This reflects the major impacts that effective new vaccines, drugs, therapeutics and diagnostics can have on the burden of infectious disease in developing countries, as well as Australia's recent history as a substantial supporter of several major PDPs. With the advent of the Initiative, Australia's support for PDPs is increasingly focused on how their work can contribute to ameliorating the major health security threats in the Indo-Pacific region, through product selection, trials and post-registration assistance to ensure equitable product access for target populations. TGA's work in the region dovetails with that of the PDPs by ensuring that appropriate regulatory pathways and processes are in place for new products of major global health significance.

3.3.2 Avert

Analysis of the findings of WHO-led Joint External Evaluations and other relevant assessments points to a substantial difference between the infectious disease threat reduction capacity of Southeast Asian countries as compared with PNG, Timor-Leste and Pacific Island Countries. In general, the countries of Southeast Asia face the greatest capacity deficits in areas relating to detection and response, including the rapid aggregation of syndromic and event-based surveillance data, reliable laboratory diagnosis, the depth of the field epidemiology workforce, risk communication and the coordination of outbreak response.

By contrast, Papua New Guinea, Timor-Leste and the Pacific Island Countries face equally challenging capacity deficits across the full spectrum of health security core capacities spanning prevention, detection and response. This grouping of countries faces significant threats to health security from existing, emerging and re-emerging infectious diseases including malaria, tuberculosis (TB), dengue fever, childhood diarrhoea, acute respiratory infection, and various vaccine-preventable diseases (VPD) not already mentioned. Their ability to manage these threats is limited by the small scale and low complexity of their health systems and the geographic dispersion of their populations. The threats are aggravated by the effects of climate change and water scarcity. In addition, the evolving non-communicable disease (NCD) crisis in these countries is tied to their limited infectious disease control capacity through the emergence of AMR in bacteria occurring in diabetes-related infections, and also through the heavy reliance on international surgical services for Pacific island nationals.

As a strong focus of Australia's *Health for Development Strategy 2015-2020*, the Pacific region and Timor-Leste already receive a level of national and regional capacity building support in areas touching on infectious disease prevention, including the surveillance of vaccine-preventable diseases and immunisation coverage, vaccine quality, infection prevention and control (IPC) and vector control. The Initiative provides an opportunity to capitalize on and extend existing activities in order to achieve a greater concentration of effort, improved cross-country coordination of assistance, and ultimately better outcomes for infectious disease prevention. Focusing the Initiative's resources on prevention in these countries, rather than spreading it across Southeast Asia and the Pacific, is an important prerequisite for achieving lasting impact.

The three areas of focus under this principal objective are as follows.

3.3.2.1 <u>Surveillance</u>

Effective national surveillance to monitor the occurrence of infectious diseases, the extent of immunisation coverage and the emergence of treatment-resistance in pathogens and vectors is a critical element of any national public health system.

While vaccine acceptance is generally high across the region, countries perform variably and sometimes poorly relative to their immunisation coverage targets (especially at sub-national levels). Several countries in our region have recently experienced outbreaks of measles, diphtheria and, in the cases of PNG and Indonesia, circulating vaccine-derived polio virus disease. Antimicrobial and insecticidal resistance is a growing threat in parts of the region. Drug-resistant tuberculosis is creating a significant public health burden in PNG, Indonesia, the Philippines and elsewhere; drug-resistant malaria is spreading in the Greater Mekong Sub-region, and the Pacific island countries are vulnerable

to the importation of drug-resistant bacterial infections via international medical referral arrangements.

Joint External Evaluations and national self-assessments across the Indo-Pacific region have highlighted the need for improved surveillance, as well as the need better to link surveillance systems with national field epidemiology training programs (FETPs) and national incident management systems. Achieving better communication between human and animal health information systems has also consistently been identified as a challenge. In order to meet the JEE target for demonstrated capacity related to routine public health surveillance, a functioning surveillance system with quality assurance should be in place at central and intermediate levels. Other attributes that should be in place are appropriate timeliness for reporting, electronic reporting tools, linkages between human and animal health information systems, and capacity and systems for regularly aggregating and analysing data.

3.3.2.2 Infection prevention and control

Chronic disease, offshore medical referrals, bacterial contamination, sub-optimal antimicrobial use and AMR are inextricably linked in the Pacific. Pacific governments are well aware of the consequent health security threats, most notably the danger of importation of pathogens including antimicrobial resistant organisms.

In PNG, for example, there is widespread multi-drug resistant TB and occasional cases of extensively drug-resistant TB (XDR-TB), with sporadic cases and occasional clusters of MDR-TB in some other countries. In Timor-Leste, the TB case detection rate is estimated to be low and antimicrobial susceptibility testing (AST) is rarely performed.

Functional infection prevention and control committees exist in some countries (e.g. Fiji) but not in others. At a regional level, SPC's Pacific Infection Control Network (PICNET) was previously a strong mechanism for infection control in the region, but it is now largely inactive. The Pacific Open Learning Health Network (POLHN), which includes infection control modules, has good usage rates despite the internet connectivity constraints across the region, but would benefit from further development.

3.3.2.3 <u>Vector control</u>

In the Pacific region, PNG, Solomon Islands and Vanuatu continue to experience malaria transmission. PNG has the most intense transmission with all four human malaria parasites circulating. Although significant progress in malaria control was made in PNG until 2014, when national malaria prevalence dropped below one per cent, the country is now experiencing a substantial resurgence in malaria prevalence owing both to health system deficiencies and entomological factors. There is extensive evidence, cited by WHO, that much of the success to date in controlling malaria is due to vector control, and that vector control is the only intervention that can reduce malaria transmission from very high levels to close to zero.⁵

The incidence of dengue fever in the Pacific has risen in recent years owing in part to increased urbanisation accompanied by poor water and sanitation services, which has provided breeding environments for the disease's primary vector, the *Aedes aegypti* mosquito (also a vector of the Zika, chikungunya and yellow fever viruses, and of the parasites that cause lymphatic filariasis). Poor surveillance means that there are no reliable estimates of the number of dengue cases occurring each year. Both endemic and epidemic transmission occurs, although this varies by country. Large outbreaks can affect a number of countries in the region at once and a high proportion of the population. An outbreak of dengue serotype 2 in Fiji in 2013-14, for example, reportedly affected approximately 20 per cent of the population.

Outbreaks of chikungunya have been reported in the Pacific region since 2012 but it is believed that the virus may have been present in PNG for much longer. The first recorded human outbreak of Zika

⁵ See <u>http://www.ivcc.com/who-malaria-fact-sheet</u>.

virus occurred in Micronesia in 2007 and subsequent outbreaks have spread throughout the region and beyond (notably between 2013-2017 when Zika spread across the Americas). Ross River Virus is also believed to circulate in some areas. While several Pacific countries have succeeded in eliminating lymphatic filariasis as a public health problem, it remains endemic in nine countries/territories.

In Timor-Leste, the malaria control program has achieved reductions in incidence through improved surveillance, prevention and treatment strategies. Dengue outbreaks occur annually with limited data describing the epidemiology and disease control strategies. There were also outbreaks of chikungunya in 2016.

Investments in practical vector control activities through this Initiative will complement two existing, R&D-oriented investments in vector control. The Initiative already supports the Innovative Vector Control Consortium (\$18.75 million over five years) to develop new chemical vector control products, including residual sprays, impregnated bednets and outdoor traps, that work safely, effectively and address the growing problem of insecticide resistance. Some of these products are likely to be trialled in PNG and/or other Pacific Island Countries. In addition, DFAT has committed funding of up to \$18 million, principally through the innovationXchange, to the World Mosquito Program (WMP) for an operational research program aimed at blocking transmission of the dengue virus by infecting vectors with *wolbachia* bacteria. DFAT funding supports WMP trials in Fiji, Kiribati and Vanuatu.

New investments in vector control will also complement existing support under the Initiative for the regional coordination of vector control efforts by the Vector Control Working Group of the Asia Pacific Malaria Elimination Network, which is hosted by the Singapore-based Asia Pacific Leaders Malaria Alliance (APLMA). DFAT has committed \$10 million to APLMA over five years, alongside a similar level of funding from the Bill & Melinda Gates Foundation.

Bednet distribution and other vector control activities are supported by the Global Fund to Fight AIDS, TB and Malaria across the PNG, Timor-Leste and the Pacific Island Countries, with particular emphasis on PNG, Solomon Islands and Vanuatu. Intermediary delivery organisations include national malaria programs, Rotarians Against Malaria, and local civil society organisations. Additional vector control assistance provided under the Initiative will complement Global Fund support and seek opportunities to increase the impact and sustainability of that support, including through improved vector surveillance, strengthened entomology training and other workforce development measures, and better regional networking of vector control programs.

3.3.3 Arrest

Southeast Asia, by contrast with most of the Pacific, has very large populations in high-density areas. Most Southeast Asian countries have intensive livestock production industries. The combination of high population density with the large-scale movement of people and livestock increases opportunities for the rapid spread of infectious diseases, including zoonotic diseases, within countries and across borders. Both emerging and existing infectious diseases pose threats. Although malaria is generally declining, resistance to artemisininbased combination therapy has been found in Cambodia, Laos, Myanmar, Thailand and Vietnam jeopardising medical progress in treating malaria.

While there is variation in health system capacity across Southeast Asia, health programs are typically underfunded and it is particularly common for there to be insufficient financial and human capacity to fulfil core health security functions, especially at sub-national levels. Inter-sectoral collaboration and coordination is mostly weak. The weaknesses tend to be greatest with respect to IHR core capacities relating to disease detection and response.

Cambodia, Laos, Indonesia, Myanmar, Philippines, Thailand, Timor-Leste and Vietnam have undertaken Joint External Evaluations (JEEs) in the 2016-18 period to assess their core capacities with respect to the International Health Regulations. In Cambodia, Laos, Indonesia, Myanmar, Thailand and Vietnam, these evaluations particularly highlighted weaknesses in emergency preparedness and response, anti-microbial

usage, risk communications, and points-of-entry procedures. Key national challenges identified in the JEEs are further summarised in the regional and national scoping mission reports that informed this framework.

The three areas of focus under this principal objective are as follows.

3.3.3.1 Laboratory strengthening

Credible and accessible laboratory services capable of producing reliable results in a timely manner are the cornerstone of investigating potential public health events of national, regional and international concern. Early detection and management of disease outbreaks can only be accomplished if responsive laboratory systems are in place.

Many of the Australian public health laboratories that form the membership of the Public Health Laboratory Network (PHLN) of Australia already have linkages with counterpart laboratories in the region, and a capacity and desire to strengthen these linkages. The Centre for Health Security has had multiple interactions with PHLN as a group and with individual member laboratories in order to build an understanding of their capabilities and interests. In addition, the Centre has already negotiated a multi-year funding agreement with the Australian Animal Health Laboratory (AAHL) in Geelong to extend assistance to key laboratories in Indonesia, Myanmar and elsewhere in Southeast Asia, in recognition of AAHL's unique position as a major BSL-4 facility (one of only six high-containment animal research facilities in the world) and a national strategic asset.⁶

International sources of laboratory strengthening assistance including the Asian Development Bank, the UN Food and Agriculture Organisation, the Pasteur Institute, the UK's Fleming Fund and the Merieux Foundation are active in both Southeast Asia and/or the Pacific. Assistance provided under the Initiative will seek to complement, build upon and leverage assistance from such other sources, with a view to ensuring that key public health and veterinary diagnostic laboratories in our region of focus are better able to detect outbreaks close to source or else rapidly refer unidentified pathogens to regional laboratories of higher capable under formal reference arrangements.

3.3.3.2 Workforce development

A skilled public health workforce is critical to a country's capacity to detect and respond to disease outbreaks. Field epidemiology training programs (FETPs) have been developed in many countries over the past forty years to provide health workers at various levels with the skills they need to conduct surveillance of infectious diseases, assess risks and investigate and respond to outbreaks. Emergency management skills are also needed for staff of disease-oriented Emergency Operations Centres (EOCs). First cases will often occur in rural areas or urban peripheries, highlighting the need for skilled personnel and well-equipped facilities at the sub-national level.

Almost all countries in Southeast Asia and the Pacific face public health skills gaps in their capacity to detect, identify and respond to disease threats, and to coordinate at the animal-human interface in the case of zoonoses. There is insufficient educational and training capacity to produce the number of graduates required to meet future health security needs. There are also problems in the distribution and retention of trained field epidemiologists, as well as serious deficits in other key public health skills, including public health leadership.

The Centre for Health Security has engaged extensively with global and regional field epidemiology training programs and networks to assess opportunities for strengthening workforce development. One significant early investment has already been launched—the ASEAN-Australia Health Security Fellows program, which enables the participation of selected scholars from ASEAN countries in

⁶ Laboratories are classified at one of four Biosafety Levels. A BSL-4 laboratory is a very high-security facility appropriate for work with biological agents that could easily be aerosol-transmitted within the laboratory and cause severe to fatal disease in humans for which there are no available vaccines or treatments. A BSL-3 laboratory is also quite a high-security facility, used for the handling of microbes that can cause serious and potentially serious disease via inhalation.

Australia's world-class, Masters-level applied epidemiology training program (while ensuring that the bulk of their fieldwork is undertaken in their home countries).

A second investment has also been made in upgrading PNG's FETP via the Stronger Systems for Health Security applied health systems research funding round in 2017-18. And the Centre is working closely with the US Centres for Disease Control and Prevention and WHO to further improve the quality of FETPs at national and regional levels through a strengthened global network of FETPs and an increased consensus on standards and competencies. Opportunities are also being discussed between the Centre and US-CDC to provide joint Australian-US support to broader public health training programs in Southeast Asia.

Southeast Asia's two FETP networks, SAFETYNET and the ASEAN+3 FET Network, will be fully engaged in future Australian programs of support for FETP development, as will the regional field epidemiology training programs operated by Fiji National University in association with the Pacific Community.

In recognition of the centrality of workforce development in improving health security across the region, and also in view of its links with our laboratory strengthening and outbreak management objectives, CHS commissioned work to develop a broad *Health Security Workforce Investment Program* in 2018.⁷ This emphasises the need for a systems approach to building workforce capacity and recommends that the focus of Australian investment at the country and multi-country level should be on developing the capacity of personnel, institutions and coordination networks.

The relevant capacities are primarily in the areas of laboratory diagnostics and management, epidemiology, surveillance data collection and analysis, disease emergency response, infection prevention and control (IPC), vector control, and related management and leadership for coordinated national and regional approaches. Assistance modalities include training at several levels; the placement of long-term personnel, including Health Security Corps deployees; with international organisations, health ministries and technical agencies; and associated financial assistance. This scoping report is available as a resource document to organisations developing proposals in response to requests for proposals described above.

3.3.3.3 Outbreak detection and management and Health Emergency Operations

The effective detection and management of outbreaks and other health emergencies requires strong health systems. Whole-of-government engagement and coordination is critical for strengthening public health emergency operations, including linkages between the human and animal health sectors.

For outbreak detection and management, relevant thresholds for outbreak detection from routine surveillance should be established, along with processes for assessing risks, and functional event-based surveillance systems. Processes for rapid reporting of outbreaks (particularly those constituting a potential Public Health Emergency of International Concern) are required, for escalation to an Incident Management System (IMS).

A functioning Emergency Operations Centre (EOC)—connected to trained, multi-sectoral rapid response teams and real-time bio-surveillance laboratory networks and information systems—is needed to meet the JEE target of a coordinated emergency response within 120 minutes of the identification of a public health emergency. WHO's 2015 *Framework for Public Health Emergency Operations Centres* (PHEOC) underlines the need to integrate traditional public health services into an emergency management model with coordinated response capacity. As well as staff and effective information and communication systems, PHEOCs require appropriate IMS that are regularly exercised. This is a challenge in all countries for health ministries outside emergencies, when health systems often struggle with existing burdens and managers are reluctant to divert resources for a possible non-event.

⁷ (refer: <u>https://indopacifichealthsecurity.dfat.gov.au/publications/workforce-design/</u>).

In developing countries, a promising strategy for building EOC capacity without diverting resources from existing health burdens is to support dual-function EOCs. In particular, where countries have adopted national malaria elimination objectives, as in many countries in Southeast Asia and the Pacific, an EOC can provide services to a national malaria program as its "day job" while also being strengthened to activate in response to outbreaks of other emerging or resurgent infectious diseases. An EOC that continuously operates is more likely to attract and retain capacity than one that is activated only rarely in response to unpredicted health emergencies. And EOCs of this kind can also build on and amplify the impact of sustained investment in malaria by donors over the past decade.

In many countries, it will be more appropriate to focus on systems and processes for the coordination of outbreak response (including but not limited to the context of malaria case management) without necessarily investing in a central administrative unit. Such systems and processes might operate at the national or sub-national levels, or in a more distributed fashion. The key objective is to ensure that all arms of a country's detection and response apparatus, and in particular its public health workforce and diagnostic infrastructure, are working in as coordinated and timely a fashion as possible.

3.4 Cross-cutting themes

The selection, implementation and evaluation of investments under Initiative must recognise and respond to the following factors:

- gender matters for health security across the whole spectrum of possible interventions, ranging from the development of target product profiles for new drugs or diagnostics, to the design of community-level prevention and preparedness activities, to the assessment of risks posed by livestock management techniques, to the selection of training targets and curriculum for public health workforce development and leadership programs;
- the various manifestations of climate change—increasing temperatures, changing rainfall patterns, rising sea levels and the increasing frequency and severity of extreme weather events—tend to amplify or alter infectious disease risks in tropical and sub-tropical regions, contributing to the increased frequency and geographic spread of vector-borne diseases such as malaria, dengue and Zika virus disease;
- infectious diseases leave a durable legacy of disability that is often overlooked once an outbreak is brought under control or a disease becomes endemic, and people with disabilities, who account for about 15 per cent of the global population, are also disproportionately more likely to be marginalised in health security prevention, response and recovery efforts; and
- while responsibility for the provision of health security, as a public good, rests primarily with the public sector at the national and international level, public-private partnerships are a fundamental prerequisite for progress in the development of new vaccines, drugs, diagnostics and other disease control tools; for effective national disease surveillance; and sometimes also for the effective distribution of medical supplies and services in poorer and more remote areas.

These cross-cutting factors will be addressed on both an activity and whole-of-Initiative basis. In workforce development activities, for example, this will include ensuring training programs and adviser roles are available to both women and men, that barriers to participation are identified and that course content is developed or updated to cover inclusion principles where appropriate. Requests for proposals will require partners to directly address cross-cutting factors.

3.5 High-level performance assessment

Monitoring and evaluation arrangements for the Initiative will operate at both the Initiative and activity levels. A draft Performance Assessment Framework (PAF) is at Appendix 4. The PAF is intended to capture the Initiative's high-level outcomes and indicators. A two-person standing review and evaluation panel has been constituted to work with Centre staff to develop an integrated Monitoring, Evaluation and Learning Framework (MELF) to assess progress and aggregate activity results. Through an annual planning process, Centre staff are working with panel members to identify monitoring priorities, assign resources and ensure learnings are reflected in future activities. The MELF guides annual reporting to internal and external stakeholders, including the Technical Reference Group.

3.6 Management of risks and safeguards

Overall, the Initiative has been assessed as low risk. Across investments, risks have been identified with more detailed mitigation strategies. Risks will be managed in accordance with processes guiding DFAT and the aid program.

4 ANNEX 1: PERFORMANCE ASSESSMENT FRAMEWORK

4.1 Program Logic

programs

GOAL To contribute to the avoidance and containment of infectious disease threats in the Indo-Pacific region with the potential to cause social and economic harms on a national, regional or global scale.

IMPACT INDICATORS 0.1 Countries are better prepared to prevent, detect and respond to health emergencies 0.2 More people are better protected from health emergencies									
End of Program Outcome 1 1. Partner countries are better equipped to anticipate infectious disease threats	AVERT End of Program Outce 2. Partner countries have impro and capability to avert disease t	AVERT ARREST End of Program Outcome 2 Partner countries have improved capacity d capability to avert disease threats.				ENABLE End of Program Outcome 4 4. There are regional and global partnerships to assist partner countries in anticipating, averting and arresting infectious disease threats and outbreaks.			
Intermediate Outcomes 1.1 HSI activities have contributed to improved information systems for public health decision making in partner countries. 1.2 HSI activities have contributed to improved access to and use of evidence for policy and decision-making to strengthen preparedness for disease threats in partner countries. 1.3 HSI activites have contributed to the development, trialling and/ or registration of new or modified drugs, diagnostics, vaccines or vector control tools for use in partner countries.	Intermediate Outcome 2.1 HSI activities have contribut skills, systems and resources for prevention and control in partne 2.2 HSI activities have contribut access to vector control skills, to in partner countries. 2.3 HSI activities have contribut surveillance systems in partner	have contributed to improved dresources for infection ontrol in partner countries. have contributed to improved control skills, tools and data es. have contributed to improved ems in partner countries.		Intermediate Outcomes 3.1 HSI activities have contributed to strengthened laboratory systems to support testing of priority pathogens in partner countries. 3.2 HSI activities have contributed to strengthened emergency operations centres to manage outbreaks and public health emergencies in partner countries. 3.3 HSI activities have contributed to strengthened human resource capacity in health security in partner countries		Intermediate Outcomes 4.1 CHS engages influentially with key national, regional and multinational partners in health security.			
What we will invest in Information and data systems Operational research Medical product development Product Regulation 	What we will inves Infection prevention and co Vector control Surveillance systems	t in ntrol	• La • In op • W	What we will invest in aboratory systems strengthening cident management and emergency preations centres orkforce development		What we will invest in Regional, multinational and Australian partnerships 			
Assumptions: Contextual Factors: • Programs are relevant and valued by partner countries • Funding available to the HSI • Programs are well integrated with or complementary to other partner activities • The commitment of partner governments									

· Programs are well integrated with or complemtnary to other parnter activites The HSI outcomes will be sustained beyond CHS involvement

CHS will have ongoing capacity and expertise to effectively manage the HSI and its

- The availability of a game-changing new drug/ vaccine/ diagnostic
 The appearance of a new health security actor/ partner with the potential for significant political/ financial influence
 - The pattens of disease or new emerging infectious diseases

4.2 Outcome Statements and Evaluation Questions

HSI Theme			Outcome statements		Evaluation questions
	GOAL		To contribute to the avoidance and containment of infectious disease threats in the Indo-Pacific region with the potential to cause social and economic harms on a national, regional or global scale.	EQ 0	How and to what extent has the Health Security Initiative (HSI) contributed to the avoidance and containment of infectious disease threats in the Indo-Pacific with the potential to cause social and economic harms on a national, regional or global scale?
	Impact Indicator	0.1	Countries are better prepared to prevent, detect and respond to health emergencies	EQ0.1	Are countries better prepared to prevent, detect and respond to health emergencies?
	Impact Indicator	0.2	More people are better protected from health emergencies	EQ0.2	Are more people better protected against health emergencies?
	End of program outcome	1	Partner countries are better equipped to anticipate infectious disease threats.	EQ1	To what extent are partner countries and their regions better equipped to assess their infectious disease threats, capacity deficits, and to prepare for those threats as a result of HSI activities? How and to what extent has the HSI contributed to this improvement?
	Intermediate Outcome	1.1	HSI activities have contributed to improved information systems for public health decision making in partner countries	EQ1.1	How and to what extent have HSI activities contributed to improved partner country capacity in information systems for public health decision making?
ANTICIPATE	Intermediate Outcome	1.2	HSI activities have contributed to improved access to and use evidence for policy and other decision- making to strengthen their response to disease threats in partner countries	EQ1.2	How and to what extent have HSI activities contributed to strengthened capacity and relationships within partner countries to effectively provide (accessible, usable, timely) data for decision-making to policy makers/expert panels?
	Intermediate Outcome	1.3	HSI activities have contributed to the development, trialling and/or registration of new or modified drugs, diagnostics, vaccines and vector control tools for use in partner countries.	EQ1.3	How and to what extent have HSI activities have contributed to improved regulatory systems and the development, trialling and/ or registration of new drugs, diagnostics, vaccines and vector control tools?
	End of Program Outcome	2	Partner countries are have improved capacity and capability to avert infectious disease threats	EQ2	To what extent do partner countries have improved capability to detect & mitigate infectious disease threats as a result of HSI activities? How and to what extent has the HSI contributed to this improvement?
AVERT	Intermediate Outcome	2.1	HSI activities have contributed to improved skills, systems and resources for infection prevention and control in partner countries	EQ2.1	How and to what extent have HSI activities contributed to improved skills, systems and resources for infection prevention and control in partner countries?
	Intermediate Outcome	2.2	HSI activities have contributed to improved access to vector control skills, tools and data in partner countries	EQ2.2	How and to what extent have HSI activities contributed to improved vector control skills, tools and data in partner countries?

	Intermediate Outcome	2.3	HSI activities have contributed to improved surveillance systems in partner countries	EQ2.3	How and to what extent have HSI activities contributed to improved timeliness, completeness and use of surveillance systems in partner countries?
ARREST	End of Program Outcome	3	Partner countries have improved capacity and capability to arrest infectious disease threats.	EQ 3	To what extent can partner countries demonstrate improved capacity and capability to detect and respond to infectious disease outbreaks? How and to what extent has the HSI contributed to this improvement?
	Intermediate Outcome	3.1	HSI activities have contributed to strengthened laboratory systems to support testing of priority pathogens in partner countries	EQ3.1	How and to what extent have HSI activities contributed to strengthened laboratory systems, better laboratory quality management and greater capability for detection and early management of priority outbreaks?
	Intermediate Outcome	3.2	HSI activities have contributed to strengthened emergency operations centres to manage outbreaks and public health emergencies in partner countries	EQ3.2	How and to what extent have HSI activities contributed to strengthened national emergency operations centre planning, testing and evaluating to manage outbreaks and public health emergencies in partner countries?
	Intermediate Outcome	3.3	HSI activities have contributed to strengthened human resource capacity in health security in partner countries	EQ3.3	How and to what extent have HSI activities contributed to strengthened human resource capacity in health security?
ENABLE	End of program outcome	4	There are regional and global partnerships to assist partner countries in anticipating and averting infectious disease threats and arresting infectious disease outbreaks.	EQ 4	To what extent can partner countries demonstrate that they have the financial support and partnerships in place to enable them to anticipate and avert infectious disease threats and to arrest infectious disease outbreaks?
	Intermediate outcome	4.1	CHS engages influentially with key regional, national and multinational partners in health security	EQ4.1	How and to what extent does CHS influence key regional, national and multinational partners in health security?

4.3 Evaluation Questions, Indicators and Data Collection

HSI Theme		Evaluation questions		Indicator	Indicator source	How the data will be collected
	0.1	Are countries better prepared to prevent, detect and respond to health emergencies?	0.1.1.1	Joint External Evaluation Index	Joint External Evaluation (JEE)	* WHO will collect this data, but possibly outside of HSI timeframe
	0.2	Are more people better protected against health emergencies?	0.2.1.1	WHO Health Security Index	13th program of work WHO Impact Framework	*WHO will collect this data, but possibly outside of HSI timeframe
	1.1	How and to what extent have HSI activities contributed to improved partner country capacity in information systems for public health decision making?	1.1.1	Use of electronic tools	JEE D.2.2	*Annual monitoring and evaluation reports from Tupaia, Pacific Infectious Disease Prevention (PIDP), ASEAN- Pacific Infectious Disease Detection and Response (APIDDaR) programs.
			1.1.2	Analysis of public health data	JEE D.2.3 - customised from "surveillance data" to "public health data"	*Annual monitoring and evaluation reports from Tupaia, PIDP, APIDDaR programs.
ANTICIPATE	1.2	How and to what extent have HSI activities contributed to strengthened capacity and relationships within partner countries to effectively provide (accessible, usable, timely) data for decision-making to policy makers/expert panels?	1.2.1	Partner countries have assessed, adjusted and aligned their domestic legislation, policies and administrative arrangements in all relevant sectors to enable compliance with the IHR	JEE P.1.1	*Annual monitoring and evaluation reports from Stronger Systems for Health Security partners, One Health for Health Security partners, PIDP, APIDDaR programs.
	1.3	How and to what extent have HSI activities have contributed to improved regulatory systems and the development, trialling and/ or registration of new drugs, diagnostics, vaccines and vector control tools?	1.3.1	Number of drugs that have been fully trialled and are ready for registration by one of the Product Development Partnerships.	DFAT Product Development Partnerships Final Evaluation	*Annual report from Product Development Partnerships
			1.3.2	Number of new diagnostics and tools developed by one of the Product Development Partnerships that have bene fully trialled and are ready for registration	Developed for use by the HSI	*Annual report from Product Development Partnerships

			1.3.3	Number of new drugs, diagnostics or tools that have been registered by National Regulatory Authorities in partner countries	Developed for use by the HSI	*Annual monitoring and evaluation report from Regulatory Strengthening Program.
	2.1	How and to what extent have HSI activities contributed to improved skills, systems and resources for infection prevention and control in partner countries?	2.1.1	Effective multisectoral coordination on AMR	JEE P.3.1	*Annual monitoring and evaluation reports from PIDP and ACIAR programs.
			2.1.2	Surveillance of AMR	JEE P.3.2	*Annual monitoring and evaluation reports from PIDP and ACIAR programs.
			2.1.3	Infection Prevention and Control	JEE P.3.3	*Annual monitoring and evaluation reports from PIDP and ACIAR programs.
AVERT	2.2	How and to what extent have HSI activities contributed to improved vector control skills, tools and data in partner countries?	2.2.1	Standards for professions and careers in vector control and public health entomology in place	WHO Integrated Vector Management (IVM) indicator 5	*Annual monitoring and evaluation reports from PIDP and ACIAR programs.
			2.2.2	Number and percentage of staff trained in IVM	WHO Indicators for IVM Indicator 8	*Asia Pacific Leaders Malaria Alliance (APLMA) annual report
			2.2.3	Epidemiological surveillance system on vector-borne diseases in place	WHO IVM Indicator 9	*World Mosquito Program (WMP) annual report
	2.3	How and to what extent have HSI activities contributed to improved timeliness, completeness and use of surveillance systems in partner countries?	2.3.1	Coordinated surveillance systems in place in the animal health and public health sectors for zoonotic diseases/ pathogens identified as joint priorities	JEE P.4.1	*Annual program data from ADEPPt, PIDP programs
			2.3.2	Surveillance systems	JEE D.2.1	*Annual program data from ADEPPt, PIDP programs

			2.3.3	Use of electronic tools	JEE D.2.2	*Annual program data from ADEPPt, PIDP programs
			2.3.4	Analysis of surveillance data	JEE D.2.3	*Annual program data from ADEPPt, PIDP programs
	3.1	How and to what extent have HSI activities contributed to strengthened laboratory systems, better laboratory quality management and greater capability for detection and early management of priority outbreaks?	3.1.1	Laboratory testing for detection of priority diseases	JEE D.1.1	*Annual monitoring and evaluation report from APIDDaR programs
			3.1.2	Specimen referral and transport system	JEE D.1.2	*Annual monitoring and evaluation report from APIDDaR programs
			3.1.3	Effective national diagnostic network	JEE D.1.3	*Annual monitoring and evaluation report from APIDDaR programs
			3.1.4	Laboratory quality system	JEE D.1.4	*Annual monitoring and evaluation report from APIDDaR programs
ARREST	3.2	How and to what extent have HSI activities contributed to strengthened national emergency operations centre planning, testing and evaluating to manage outbreaks and public health emergencies in partner countries?	3.2.1	Emergency Response coordination	JEE R.2.1	*Annual monitoring and evaluation report from APIDDaR programs
			3.2.2	Emergency Operations centre capacities procedures and plans	JEE R.2.2	*Annual monitoring and evaluation report from APIDDaR programs
			3.2.3	Emergency exercise management programme	JEE R.2.3	*Annual monitoring and evaluation report from APIDDaR programs
	3.3	How and to what extent have HSI activities contributed to strengthened human resource capacity in health security?	3.3.1	An up-to-date multisectoral workforce strategy is in place	JEE D.4.1	*Annual Monitoring and evaluation reports from ADEPT, APIDDaR programs

			3.3.2	Human resources are available to effectively implement IHR	JEE D.4.2	*Annual Monitoring and evaluation reports from ADEPT, APIDDaR programs
			3.3.3	In-service trainings are available	JEE D.4.3	*Annual Monitoring and evaluation reports from ADEPT, APIDDaR programs
			3.3.4	FETP or other applied epidemiology training program is in place	JEE D.4.4	*Annual Monitoring and evaluation reports from ADEPT, APIDDaR programs
ENABLE	4.1	How and to what extent does CHS influence key regional, national and multinational partners in health security?	4.1.1	Summits, Clubs and Organisations: Membership in Select Summits, Diplomatic Clubs and Regional Intergovernmental Organisations	Lowy Institute Power Index: Diplomatic Influence: Multilateral Power	*Collected annually by Centre for Health Security (CHS) staff
			4.1.2	Institutional Voting Shares: Average Voting Shares by subscribed capital in major health security development banks and financing organisations?	Lowy Institute Power Index: Diplomatic Influence: Multilateral Power	*Collected annually by CHS staff
			4.1.3	UN Capital Contributions: Net Capital contributions to UN Health Security bodies (WHO, OIE, FAO, World Bank), share of global total	Lowy Institute Power Index: Diplomatic Influence: Multilateral Power (modified)	*Collected annually by CHS staff *Annual data available through Global Burden of Disease
			4.1.4	Foreign Assistance (Global): Annual Overseas Development Assistance (ODA) and Other Official Flows (OFF) in Health Security	Lowy Institute Power Index: Economic diplomacy: Economic relationships (modified)	*Collected annually by CHS staff *Annual data available through Global Burden of Disease

5 ANNEX 2: ACRONYMS

AAHL: Australian Animal Health Laboratory

ACIAR: Australian Centre for International Agricultural Research

ADEPPt: Accelerating the Development of Evidencebased Policy and Practice in Papua New Guinea

ADIC: Australian Dairy Industry Council

ADFA MIDI: Australian Defence Force Academy Malaria and Infectious Diseases Institute

AMR: Anti-microbial resistance

APIDDaR: ASEAN-Pacific Infectious Disease Detection and Response

APLMA: Asia Pacific Leaders Malaria Alliance Secretariat

APMEN VWG: Asia Pacific Malaria Elimination Network Vector Working Group

ARC: Australian Red Cross

ASEAN: Association of Southeast Asian Nationals

AVI: Australian Volunteers International

ANU: Australian National University

BES: Beyond Essential Systems

BI: Burnet Institute

BMGF: Bill and Melinda Gates Foundation

CHS: Centre for Health Security, Australian Department of Foreign Affairs and Trade

CPHL: Central Public Health Laboratory, Papua New Guinea

DAWR: Australian Department of Agriculture and Water Resources

DFAT: Australian Department of Foreign Affairs and Trade

DFAT PNG Post: Australian Department of Foreign Affairs and Trade Papua New Guinea Office

DWU: Divine Word University, Papua New Guinea

ECU: Edith Cowen University

EIMB: Eijkman Institute for Molecular Biology

FAO ECTAD : Food and Agriculture Organization of the United Nations Emergency Centre for Transboundary Animal Diseases

FIND: Foundation for Innovation New Diagnostics

FNU: Fiji National University

GHSA: Global Health Security Agenda

GIGH: The George Institute for Global Health

GMU: Gadjah Mada University, Indonesia

HNEH: Hunter New England Health, Australia

HPB: Health Policy Branch, Australian Department of Foreign Affairs and Trade

IMR: Institute of Medical Research, Papua New Guinea

IFRC: International Federation of the Red Cross and Red Crescent Societies

IHR: International health Regulations

IP: Institute Pasteur

IPC: Infection Prevention and Control

IVCC: Innovative Vector Control Consortium

IXC: Innovation Exchange, Department of Foreign Affairs and Trade, Australia

JCU: James Cook University

JEE: Joint External Evaluation

LEADDR: Laboratories for Emergency Animal Disease Diagnosis and Response, Australia

LSHTM: London School of Hygiene and Tropical Medicine

Menzies SHR: Menzies School of Health Research

MMV: Medicines for Malaria Venture

MOH: Ministry of Health (various countries)

MPU: Medicine and Pharmacy University, Vietnam

MU: Monash University

NAQIA: National Agriculture, Quarantine and Inspection Authority, Papua New Guinea

NCCTRC: National Critical Care and Trauma Response Centre, Australia

NDOH PNG: Papua New Guinea National Department of Health

NIHE: National Institute of Hygiene and Epidemiology, Vietnam

NIAH: National Institute of Animal Health, Thailand

NIHRD: National institute of Health Research and Development, Indonesia

NRL: National Referral Laboratory, Papua New Guinea

NUS CORE: National University of Singapore Centre for Regulatory Excellence

OIE: World Organisation for Animal Health

PDP: Product Development Partnerships

PHAMA: Pacific Horticultural and Agricultural Market Access Plus Program

PHCDF: Papuan Health and Community Development Foundation

PHE: Public Health England

PIDP: Pacific Infectious Disease Prevention

PMGH: Port Moresby General Hospital

PPHSN: Pacific Public Health Surveillance Network

QEH: Queen Elizabeth Hospital, Malaysia

RAM: Rotarians Against Malaria

RAHO: Regional Animal Health Office, Vietnam

SAFETYNET: South East Asia Field Epidemiology and Technology Network

SEARO: South East Asia Regional Office, World Health Organisation

SHS: Specialist Health Services

SMU: Sebalas Maret University, Indonesia

SSHS: Stronger Systems for Health Security

SU: Sydney University

TB: Tuberculosis

TEPHINET: Training Programs in Epidemiology and Public Health Interventions Network

TGA: Therapeutic Goods Administration

TGH: Taskforce for Global Health

UMelb: University of Melbourne

UMS: University Malaysia Sabah

UNE: University of New England

UNSW: University of New South Wales

UON: University of Newcastle

USAID: United States Agency for International Development

USCDC: United States Centres for Disease Control and Prevention

UPNG: University of Papua New Guinea

WB: World Bank

WEHI: Walter and Eliza Hall Institute

WHO: World Health Organisation

WMP: World Mosquito Program

WPRO: Western Pacific Regional Office, World Health Organisation