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# 1 Executive Summary

The Australian Partnership for Preparedness Research on Infectious Disease Emergencies (APPRISE) is seeking to shape and finalise its future role and research priorities to help prevent, prepare for, and rapidly respond to the threat of future pandemics and highly transmissible emerging infectious diseases.

APPRISE engaged Nous Group (Nous) to facilitate and support its engagement with stakeholders to support this process in a highly complex health environment.

This report summarises the results of this consultation process and provides some observations and recommendations for APPRISE on how it can position itself to have the greatest possible impact on our preparedness and ability to respond to infectious disease emergencies.

## 1.1 The Government funding is to develop capacity to prevent, prepare for, and rapidly respond to the threat of infectious diseases

The National Health and Medical Research Council (NHMRC) is investing \$5 million in funding for a Centre of Research Excellence (CRE) in Infectious Disease Emergency Response Research.

This acknowledges a lesson learned from recent infectious disease outbreaks about the importance of having a nationally coordinated research strategy for infectious disease outbreaks.

### **APPRISE has been established to bring together leading experts in infectious disease research**

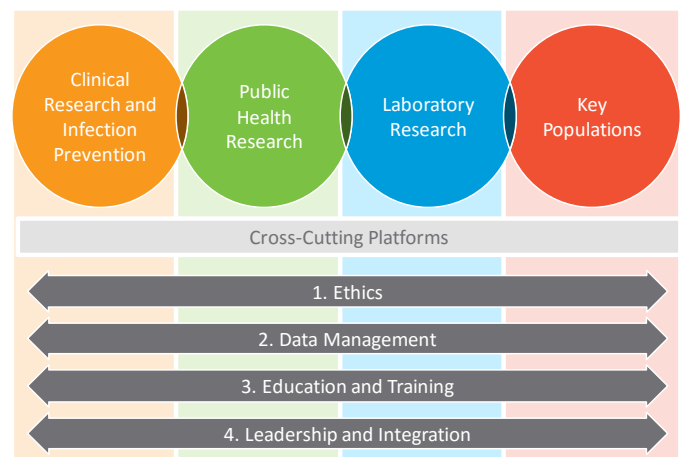
APPRISE is a geographically-dispersed national consortium that brings together Australia's leading experts in clinical, laboratory and public health research in key disciplines impacting on emergency responses to infectious diseases. A list of all APPRISE Chief Investigators and Associate Investigators is provided in Appendix A.

It is seeking to establish a nationally integrated research platform that will provide the ability for Australia (and the region) to deliver a coordinated, effective, and evidence-based response to outbreaks across different sectors, including the community, health sector, and at Australia's borders.

APPRISE has been designed to foster partnerships that embed research into emergency response and improve our capacity. It is seeking to put in place research partnerships and protocols with its key stakeholders that will ensure its activities have national benefit and improve the ability of our systems to respond in times of emergency.

### **Investigators proposed a framework to structure APPRISE's future activities**

In its funding submission to the NHMRC, the APPRISE consortium proposed a framework comprising four key pillars and four cross-cutting platforms based on their collective expertise and stakeholder input on the pathogens that are of highest risk and have the most substantial potential health impact.



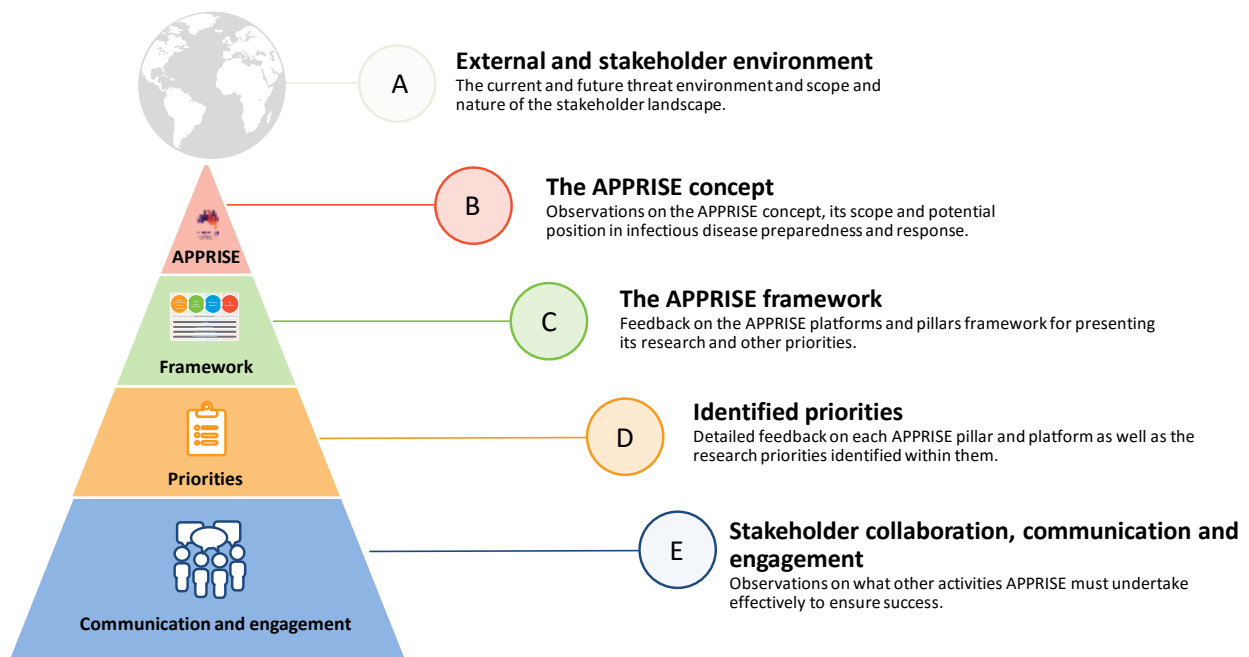
Within each pillar and platform, investigators identified a set of research priorities.

### NHMRC has asked APPRISE to test its proposed approach and future priorities with stakeholders

As a requirement of its funding from the NHMRC, APPRISE has been asked to consult widely with stakeholders to help shape and finalise its priorities for future research and associated activities. Working with Nous, a stakeholder consultation program was designed to capture perspectives and expertise from a diverse range of stakeholder groups.

A program of interviews and workshops was held with stakeholders between January and May 2017. Additional detail on the methodology adopted is provided in Section 2.3 and Appendix B. The results of this stakeholder consultation program are presented in this report using the framework outlined in Figure 1.

Figure 1: Structure for stakeholder feedback



## 1.2 The environment for infectious disease research is complex and evolving

Infectious diseases are spreading faster and emerging at an unprecedented rate. These new and emerging threats require:

- a coordinated research effort that draws across disciplines and jurisdictions, and
- researchers and key groups to work together more effectively and collaboratively.

The network of relevant stakeholders with a connection to infectious disease in the event of an outbreak is enormous, diverse and far-reaching. Response will not be solely the province of the health sector. This stakeholder network combines a mix of sub-networks and individuals with different areas of focus. While there may be some overlap and commonality of expertise, in some cases the interests of these stakeholder groups will only rarely intersect. In this environment, effective infectious disease preparedness and response requires whole-of-system thinking as in the event of a serious outbreak of

infectious disease, there will be few areas of society who will not play a role in response and infection control.

As a result of this complex network of stakeholders, planning for infectious disease emergencies is extremely difficult. Australia operates in a federated model for infectious disease emergency preparedness and response where governments utilise a range of collaborative structures with different areas of focus.

In this context, it is difficult to identify the threats that will be of highest risk to public health. Each stakeholder will have their own views on threats and priorities for focus and investment. This was evident from stakeholder consultations where participants held varying views on the research areas that should be prioritised.

Similarly, reaching agreement on priorities for research to support infectious disease preparedness and response is a difficult challenge. This creates an opportunity for APPRISE to play a central role in setting the agenda for research on infectious disease preparedness and response and deliver lasting impact through its results.

### 1.3 Stakeholders identified opportunities for sustained impact

Stakeholders were highly engaged and provided extensive feedback during the consultation program on a range of issues, including:

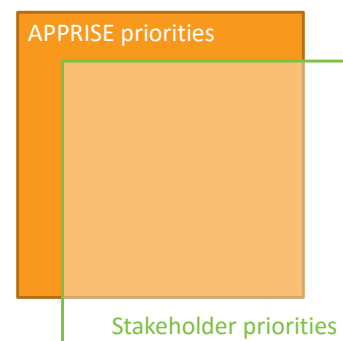
- the APPRISE concept
- its proposed framework and research priorities, and
- the way APPRISE will need to operate to be successful.

Nous' overall observation from the stakeholder consultation project is that the priority activities proposed by APPRISE have a high level of commonality with the views obtained from stakeholders.

Stakeholders indicated a high level of agreement with the importance of the priorities APPRISE had already identified for its research and associated activities.

In addition, a number of stakeholder suggestions for APPRISE areas of future focus were activities the investigator team had already intended to include in their scope of work.

A summary of their feedback is provided below.



#### **Stakeholders support the APPRISE concept but are unclear on its scope and how it will operate**

Consultations demonstrated that stakeholders are generally supportive of the concept of APPRISE and recognise its potential to improve infectious disease preparedness and response. While stakeholders are not yet clear on the full scope of APPRISE and how it will operate, they are generally open to APPRISE having a broad focus so long as it does not result in unnecessary duplication.

Stakeholders noted that there are now a number of CREs with a remit to conduct research on issues relating to infectious disease (including PRISM<sup>2</sup>, CREID, ISER and the Hot North). As a result, participants emphasised the importance of APPRISE coordinating with existing CREs, researchers and networks. They were pleased to hear that APPRISE leaders were involved with multiple CREs and could ensure cooperation and avoid overlap.

Many stakeholders stressed that APPRISE's research should be embedded in a strong understanding of Australia's federated health system, including different jurisdictional contexts, as this had been an area of concern with some previous research in this environment.

Finally, some non-research stakeholders expressed concerns about the potential value of research to their work including:

- where pure research was prioritised over applied research, and
- where research is driven by the imperative to publish rather than translate for impact.

They stressed a view that infectious disease research should focus on the overall outcomes and benefits it can deliver when translated to improve policy and practice.

### **Stakeholders had mixed views on APPRISE's pillars and platforms framework**

During the stakeholder consultation project, stakeholders initially found it difficult to interpret the APPRISE framework for structuring its research activity. Many stakeholders identified the overlap in research activities between the research pillars and found this confusing.

APPRISE investigators viewed this overlap between research pillars and platforms as an area of strength because researchers would be compelled to build networks, share research knowledge and maintain an awareness of the need for their research to translate and have a system-wide impact.

Stakeholders strongly supported the focus on key populations in the APPRISE approach noting that the involvement of these population groups were a crucial part of our response to infectious disease threats. Given its importance, some stakeholders suggested the key populations work would more sensibly be a cross-cutting platform.

Some of the gaps stakeholders identified in the APPRISE approach included:

- behavioural and applied research
- a 'One Health' approach to addressing infectious disease threats
- international responses
- private sector engagement.

Stakeholders also felt the APPRISE cross-cutting platforms could have a stronger focus on:

- partnerships and collaboration, and
- research translation.

A number of options for how APPRISE could adapt its framework for organising its research and activities are proposed for consideration at Section 5.3.

### **Stakeholders felt the list of research priorities was ambitious and suggested several research areas for focus**

In consultations, many stakeholders observed that the list of research priorities identified by the APPRISE investigators was comprehensive and probably ambitious. They suggested that by focussing on too many areas APPRISE ran a risk of not having a significant impact in many of them.

(It is important to note in this context that APPRISE is not receiving funding to tackle all of these research topics, but rather its funding will support its coordinating infrastructure and networking activities. It will be seeking to leverage other sources of research funding to fund these research priorities.)

Despite this feedback, stakeholders did not object to any of the proposed priorities and suggested additional focus areas against each of the pillars and platforms.

Stakeholders emphasised the importance of mutually-beneficial collaboration with a wide range of stakeholders to achieve these priorities. A detailed discussion of stakeholder feedback on APPRISE’s research priorities is included in this report at Section 5.4.

**A number of success factors for APPRISE were identified**

APPRISE will need to deliver high quality research to justify the NHMRC’s investment in this CRE.

However, the stakeholder consultation program also clearly reiterated that this by itself will not be enough to have a sustained impact on improving infectious disease preparedness and response in Australia and the region.

To deliver sustained impact, APPRISE will also need to address a number of important activities and success factors in the near future.

Networks and collaboration	
✓	<p><b>Productive and mutually-beneficial collaboration with stakeholders to achieve the research priorities</b> APPRISE cannot achieve the research priorities alone, and collaboration with other researchers and stakeholders will enhance the quality and breadth of research outcomes. It is important that collaboration benefits all parties involved, to ensure stakeholders are willing and motivated to collaborate.</p>
✓	<p><b>Research embedded in an understanding of local health systems and service delivery contexts</b> Infectious disease preparedness and response is deeply affected by the social, political and service delivery context in which it takes place. This context varies considerably between states and territories, as do the infectious disease threats in their jurisdictions. It is important that APPRISE’s research is underpinned by a strong understanding of local health systems and other contextual factors that impact on preparedness and response. This requires consultation with local public health officials, key populations and others.</p>
✓	<p><b>Effective coordination with Australian and international research centres and networks</b> Stakeholders recognised the need for better coordination between researchers, particularly to avoid duplication and waste of resources. APPRISE should seek to align with the processes, policies and standards of local and international research networks.</p>
Communication	
✓	<p><b>Clear communication with stakeholders, including on APPRISE’s scope and ongoing research activities</b> Stakeholders have shown a strong appetite for being kept informed about APPRISE. Effective communication strategies are also important to avoid misconceptions or confusion about APPRISE among stakeholders, and to garner their ongoing support.</p>
Research translation	
✓	<p><b>A priority focus on research translation into policy and practice</b> Translation of research outcomes is of paramount importance to stakeholders. APPRISE needs to plan, monitor and report on translation and communicate translation outcomes to stakeholders. Translation should not just focus on publication in high impact journals but on tangible changes to policy and practice.</p>

These key success factors are the subject of the Sections 6, 7 and 8 of this report.

## 1.4 Recommendations are proposed based on the feedback

Following the conclusion of the stakeholder consultation program, Nous facilitated a workshop with APPRISE investigators to inform them of the feedback received and suggestions for how they could adapt their approach and priorities for the future.

At this session, APPRISE considered the feedback of stakeholders in detail. It is anticipated APPRISE will continue to review the feedback presented in this report before finalising their proposed priorities for research to the NHMRC in June 2017.

A number of recommendations are offered for APPRISE based on:

- stakeholder feedback received over the course of the program, and
- Nous' overall observations from working with APPRISE and stakeholders.

#### **Recommendation 1**

APPRISE should review the role and re-align the membership of its Expert Reference Group post consultations to focus on strategies that:

- i) incorporate a broader group of stakeholders that can connect into the diverse networks involved with infectious disease preparedness and response; and
- ii) strengthen the sustainability of the APPRISE network beyond the life of the currently funded CRE.

#### **Recommendation 2**

APPRISE should identify and prioritise which networks it will engage with directly in pursuit of achieving its objectives.

#### **Recommendation 3**

APPRISE should finalise the key messages on its purpose and how it will work with stakeholders to deliver its desired outcomes.

#### **Recommendation 4**

A communications strategy should be developed which summarises the key messages about APPRISE and how these will need to be tailored and communicated to various stakeholder groups.

#### **Recommendation 5**

APPRISE should work closely with CDNA (and similar public health groups) to identify opportunities to align research and translation priorities as much as possible.

#### **Recommendation 6**

APPRISE should consider conducting detailed research into the barriers and success factors for translation in the infectious disease research environment.

#### **Recommendation 7**

APPRISE should confirm and actively promote its approach to translating research that will have an impact on infectious disease preparedness arrangements and response activities.

## 2 Introduction

The control of infectious disease is a critical aspect of Australia's public health system.

Recent outbreaks of Middle East respiratory syndrome, Ebola and Zika viruses, and the 2009 influenza pandemic highlighted that 'the threat of deadly infectious disease outbreaks happening closer to home is very real'<sup>1</sup>. The NHMRC's recent \$5 million funding for a CRE in Infectious Disease Emergency Response Research, is a significant investment to developing Australia's capacity to prevent, prepare for, and rapidly respond to the threat of future pandemics and highly transmissible emerging infectious diseases.

The NHMRC funding enabled the establishment of the APPRISE CRE to bring together Australia's leading experts in clinical, laboratory and public health research in key disciplines impacting on emergency responses to infectious diseases.

Nous was engaged to support APPRISE to engage with stakeholders to shape its future role and research priorities in the highly complex health environment.

This section briefly describes:

- an overview of APPRISE and its background including its guiding framework for proposed research and associated activities
- an overview of this stakeholder consultation project and its purpose
- Nous' project methodology, and
- the purpose and structure of this report.

### 2.1 APPRISE brings together leading experts in infectious disease response

#### **The need for a coordinated approach to research has been identified**

New and emerging infectious diseases have highlighted the need to develop Australia's capacity to respond to potential pandemics and other infectious disease emergencies. The Australian outbreak of H1N1 influenza ('swine flu') pointed to the gaps and challenges in logistics and governance in dealing with a pandemic<sup>2</sup>. As identified in the Review of Australia's Health Sector Response to Pandemic (H1N1) 2009<sup>3</sup> and the National Framework for Communicable Disease Control<sup>4</sup>, a coordinated strategy is critical for research and response to infectious disease outbreaks.

A key challenge to developing this coordinated research strategy is the distributed knowledge and research of experts across clinical, laboratory, and public health disciplines, and government bodies, academic institutions and other organisations.

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<sup>1</sup> Multimillion dollar grant to boost Australia's response to infectious disease outbreaks, News, Doherty Institute, 1 July 2016, <http://www.doherty.edu.au/news-events/news/multimillion-dollar-grant-to-boost-australias-response-to-infectious-diseas>

<sup>2</sup> Is Australia prepared for the next pandemic, Medical Journal of Australia, 17 April 2017, [https://www.mja.com.au/system/files/issues/206\\_07/10.5694mja16.01451.pdf](https://www.mja.com.au/system/files/issues/206_07/10.5694mja16.01451.pdf)

<sup>3</sup> Review of Australia's Health Sector Response to Pandemic (H1N1) 2009, Lessons Identified, Department of Health and Ageing, 2011, <https://www.health.gov.au/internet/publications/publishing.nsf/Content/review-2011-l/%24File/lessons%20identified-oct11.pdf>

<sup>4</sup> National Framework for Communicable Disease Control, Department of Health, 2014, <http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-nat-frame-communic-disease-control.htm>

### **APPRISE is seeking to develop this coordinated approach**

APPRISE is the first national consortium of its kind to bring together Australia's leading experts, institutions and research networks to address the key components required for a rapid and effective emergency response to infectious diseases. The aim of APPRISE's multi-disciplinary, geographically dispersed team is to coordinate and conduct high impact research to detect, prevent and manage infection threats. A nationally integrated research platform will aim to provide the ability for Australia to deliver a coordinated, effective, and evidence-based response to outbreaks across different sectors, including the community, health sector, and at Australia's borders.

APPRISE is not receiving NHMRC funding to tackle all of these research topics, but rather the funding will support its coordinating infrastructure and networking activities to link research. Many of its researchers are already engaged in funded research and APPRISE will be seeking to leverage other sources of funding to fund these research priorities.

APPRISE's overarching goals are to:

- establish a sustainable, national, multi-disciplinary research team, which links existing and new national and international networks, to undertake infectious diseases emergency response research of the highest quality and impact
- develop a cohesive research strategy for emergency response to infectious diseases across clinical, laboratory and public health domains, guided by ongoing consultation with key stakeholders
- generate and implement the best evidence for emergency responses to infectious diseases through capacity building and training and rapid, effective communication with front line health workers, policy makers and consumers.

APPRISE's work will inform Australia's response to:

- new pathogens that might emerge in Australia
- new pathogens that might emerge outside Australia, and
- existing pathogens that become of concern locally or regionally through changed circumstances (for example increases in vector-borne diseases in Northern Australia).

APPRISE is closely connected with other CREs with an interest in infectious disease research as a result of common researchers and joint memberships.

### **APPRISE has been designed to foster partnerships that embed research into emergency response and improve our capacity**

The importance of research that is embedded in, and responsive to, requirements of health services has been recognised consistently in recent years including:

- the Review of Australia's Health Sector Response to Pandemic (H1N1) in 2009
- the Strategic Review of Health and Medical Research (the McKeon Review) in 2012
- the National Framework for Communicable Disease Control (2014).

APPRISE has been designed to be consistent with this model and is seeking to put in place research partnerships and protocols (endorsed as priorities by its key stakeholders) that will ensure:

- research is undertaken for national use
- information is provided to support response decision making that is beyond the capacity of public health units to gather

- pre-configured information sharing arrangements ensure that this information is available in a timely manner to be synthesised with other relevant data sources, and
- research is an ongoing iterative process to improve practice.

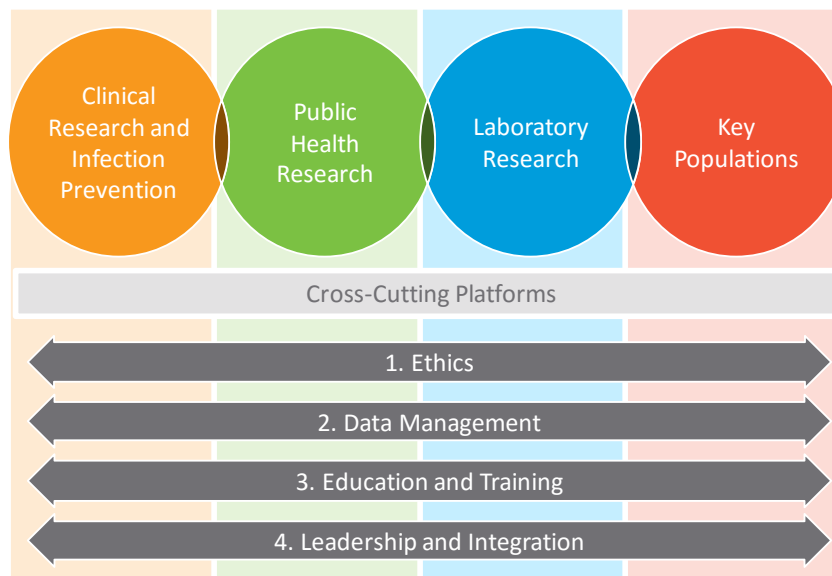
### A framework has been proposed to structure APPRISE activity

APPRISE has proposed a framework to organise its work. This framework proposes four key pillars and four cross-cutting platforms (see Figure 2).

The first three pillars represent the core disciplines of Clinical, Public Health and Laboratory research. The fourth pillar, Key Populations, focuses on research responses relevant to populations in Australia that are at higher risk of contracting infectious diseases.

The four cross-cutting platforms provide support and infrastructure in ethics, data management, education and training and leadership and integration. A key goal of the leadership and integration platform is to ensure close collaboration and synergies of the CRE with key related researchers, institutions and policy makers across Australia and internationally.

Figure 2: APPRISE's key pillars and cross-cutting platforms



APPRISE has proposed a set of research priorities for each pillar and platform. These priorities are based on expert and stakeholder advice on the pathogens that are of highest risk and have the most substantial potential health impact. This includes influenza viruses, Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV), Middle East Respiratory Syndrome Coronavirus (MERS-CoV), and haemorrhagic viruses such as ebolavirus (EBOV).

Appendix C includes more detailed descriptions of the proposed pillars, platforms and priorities.

## 2.2 APPRISE is testing its proposed priorities with stakeholders

The focus for APPRISE in its first year of funding is to establish its national priorities for research. This requires the input of stakeholders in the Australian infectious disease emergency system to inform and

shape research priorities. This is a special requirement for APPRISE, which is the first CRE to pursue a consultation program to inform its priorities.

Nous was engaged by APPRISE to coordinate and conduct stakeholder consultations to canvass views from leading experts across the vast health landscape.

The objectives of these stakeholder consultations were to:

- test the research priorities proposed by APPRISE investigators (detailed in Appendix C)
- build a foundation for ongoing collaboration and engagement between APPRISE and relevant researchers, institutions, networks and stakeholders, and
- gain expert advice and input to ensure APPRISE's research is embedded in, and responsive to, the requirements of health services and policy makers.

The consultation process was overseen by an Expert Reference Panel, which was established at the outset of this project to assist with the identification of key stakeholders for consultation and the best methods for engaging them.

Nous consulted with a broad cross-section of stakeholders during this project, including representatives of the following groups:

- Commonwealth, state and territory government officials
- academic researchers
- educators
- general practitioners
- laboratories
- animal health stakeholders
- refugee health advocates
- Indigenous health workers, and
- the private sector.

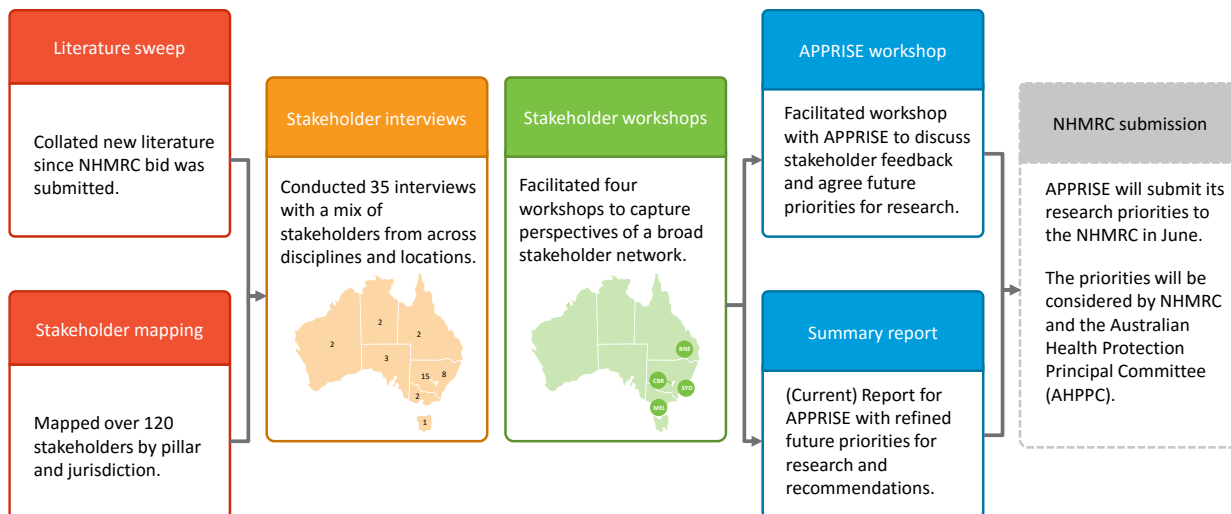
Nous sought advice and recommendations from these stakeholders on research activities and protocols, training opportunities and pathways, collaborative partnerships and cross-sectoral linkages that should be prioritised. A summary of the feedback from stakeholders is outlined in this report.

Based on this feedback, APPRISE will propose its final research priorities to the NHMRC, accompanied by this report.

## 2.3 Our methodology captured perspectives and expertise from a diverse stakeholder group

Nous conducted this project between January and May 2017. The project incorporated a high-level literature sweep, a stakeholder mapping activity, a series of stakeholder interviews and workshops and a final workshop with APPRISE to inform the development of this Summary Report. An overview of the project's key activities and outputs is depicted in Figure 3.

Figure 3: Key activities and outputs



Nous' detailed project methodology is provided in Appendix B.

## 2.4 This report summarises stakeholder feedback and provides recommendations for future activity

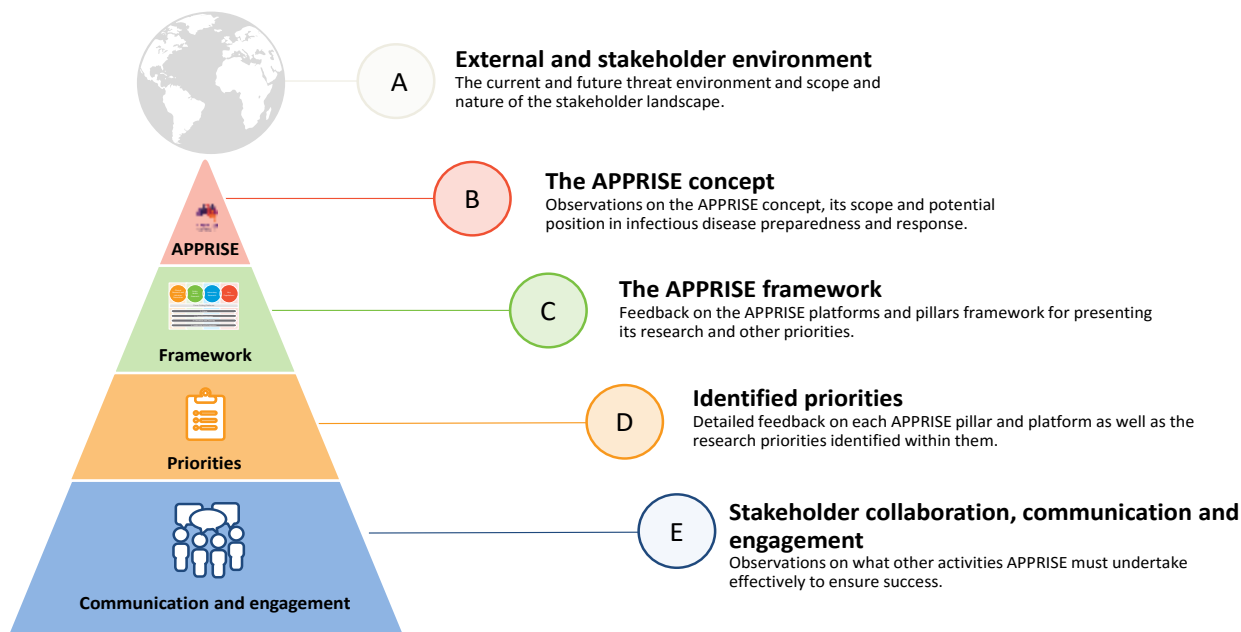
This report provides a summary of the feedback from stakeholder consultations.

Nous has also included recommendations for APPRISE to consider with respect to:

- its future approach to building networks and collaborating with stakeholders (Section 6)
- its engagement with stakeholders via two-way communication to learn and inform (Section 7)
- ensuring its high-quality research is translated to have an impact in infectious disease preparedness and response (Section 8).

The structure for the remainder of this report is depicted in Figure 4.

Figure 4: Key sections of this report



### 3 The context for infectious disease emergency preparedness and response

This section briefly describes the complex external context in which APPRISE operates, including the current and future threat environment. Section 4 below describes APPRISE's stakeholder landscape.

#### **New and emerging infectious diseases require a coordinated research effort that draws across disciplines and jurisdictions**

Infectious diseases are spreading faster and emerging at an unprecedented rate. Rapid population growth, political instability, climate change and widespread international travel have resulted in rapid shifts in the distribution of people, wildlife and agriculture. A single outbreak in one part of the world can now become a threat elsewhere in only a few hours<sup>5</sup>. The challenges associated with responding to, and containing, an outbreak were highlighted in the 2009 H1N1 influenza pandemic, which quickly reached Australia's shores.

Infectious diseases such as H1N1 influenza, Ebola and SARS have received significant attention and research due to their recent emergence. However, future public health threats are just as likely to be caused by pathogens that are currently unknown. Globally, at least one new infectious disease has been identified each year since the 1970s<sup>6</sup>.

The difficulty of identifying the threats that will be of highest risk to public health was evident from stakeholder consultations. Stakeholders held varying views on the research areas that should be prioritised. In some cases, this may have been because of their geographic locations; in others, a result of their areas of focus and specialisation.

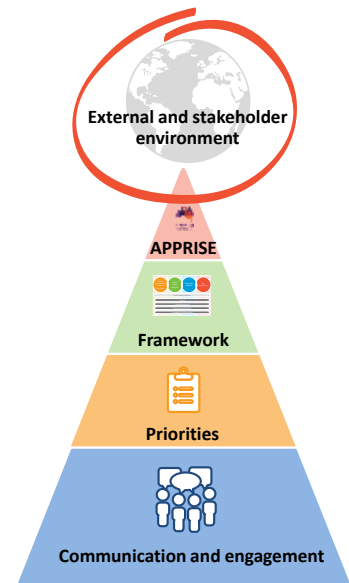
A common theme from stakeholders was that antimicrobial resistance was a significant issue requiring consideration for the future. Bioterrorism was also identified as a potential emerging threat, with online 'recipes' for preparing dangerous pathogens easier to access<sup>7</sup>.

To effectively protect Australia from new and emerging infection threats, NHMRC has recognised the need for a national platform to integrate research across disciplines and organisations.

#### **Planning for an effective emergency response to a pandemic is complex**

Australia operates a federated model for infectious disease emergency preparedness and response. This enables each state and territory to tailor its response to threats specific to their region. For example, Northern Australia is at particular risk of endemic and imported pathogens due to its location and climate.

However, previous experience demonstrates that infectious diseases can very rapidly cross state and territory boundaries. For example, the 2009 H1N1 influenza pandemic reached states and territories at



<sup>5</sup> Global health threats in the 21<sup>st</sup> century, 2007, <http://www.who.int/whr/2007/overview/en/index1.html>

<sup>6</sup> Global health threats in the 21<sup>st</sup> century, 2007, <http://www.who.int/whr/2007/overview/en/index1.html>

<sup>7</sup> Biological and chemical terrorism: Strategic plan for preparedness and response, 2000, <https://www.cdc.gov/mmwr/preview/mmwrhtml/rr4904a1.htm>

different times, leading to staggered and varied responses from each jurisdiction<sup>8</sup>. The lack of a coordinated national approach presented missed opportunities to learn from other jurisdictions to gain a better understanding of the evolving situation and draw on evidence-based practice.

Stakeholders raised some of the governance and logistical challenges related to infectious disease preparedness and response in Australia. For example, stakeholders noted that jurisdictions have limited resources to respond to infectious disease emergencies. It is particularly difficult for jurisdictions to gain national support for threats that are only present in their region.

Stakeholders also identified Australia's reliance on foreign production capacity for vaccines as a risk for our country in the event of large scale future outbreaks. Our inability to meet potential demand locally would leave us reliant on overseas stakeholders and subject to their priorities.

Frontline health practitioners that were interviewed were particularly concerned about Australia's capacity to coordinate a national response to a large-scale infectious disease emergency. While the Communicable Diseases Network Australia (CDNA) supports national coordination and advice on communicable disease surveillance, prevention and control, Australia's ability to respond to an infectious disease emergency is limited by the lack of an integrated platform for decision making and its linkages to a research network that can provide evidence to support these decisions.

Stakeholders identified, consistent with the 2009 Review of Australia's health sector response to pandemic (H1N1)<sup>9</sup>, that data sharing and synthesis within and between jurisdictions and internationally is critical to improving the precision and speed of public health responses.

APPRISE provides the opportunity for national coordination of research efforts across jurisdictions and integration of different disciplines and areas (e.g. animal health and human interface, food borne diseases and biosecurity). Stakeholders often expressed a desire for a 'OneHealth' approach to be adopted when framing our preparedness and responses to infectious disease threats.

### **Stakeholders are cognisant of approaches elsewhere**

Many stakeholders made reference to the United States' model for infectious disease where the Centres for Disease Control and Prevention (CDC) is a national health protection agency that provides a coordinated approach to infectious disease research and response to infectious disease outbreaks.

The CDC has an annual budget of more than \$12 billion and more than 13,000 staff. Almost 85% of CDC's domestic funding is provided directly to state and local entities to detect and control disease, prevent the leading causes of death, and prepare for health threats.<sup>10</sup>

This differs from Australia's federated model where the states and territories have primary responsibility for infectious disease detection and control, and work collaboratively to develop best practice approaches (the Series of National Guidelines or 'SoNGs') and share knowledge in the event of infectious disease outbreaks.

In Australia, there is currently no national approach to infectious disease research which is currently diffuse across multiple jurisdictions and research centres.

While the merits of a national CDC model are beyond the scope of this project, the concept of a national approach to identifying research requirements is particularly relevant to the APPRISE concept.

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<sup>8</sup> Is Australia prepared for the next pandemic, Medical Journal of Australia, 17 April 2017, [https://www.mja.com.au/system/files/issues/206\\_07/10.5694/mja16.01451.pdf](https://www.mja.com.au/system/files/issues/206_07/10.5694/mja16.01451.pdf)

<sup>9</sup> Review of Australia's Health Sector Response to Pandemic (H1N1) 2009, Lessons Identified, Department of Health and Ageing, 2011, <https://www.health.gov.au/internet/publications/publishing.nsf/Content/review-2011-l/%24File/lessons%20identified-oct11.pdf>

<sup>10</sup> <https://www.cdc.gov/about/organization/strategic-framework/index.html>

### **The context for funding health research in Australia is evolving**

In Australia, the context for funding medical research is evolving with the establishment of the Medical Research Future Fund (MRFF) which was established in 2015. The MRFF is providing grants of financial assistance to support health and medical research and innovation, with the objective of improving the health and wellbeing of Australians.<sup>11</sup>

In 2016-17, over \$65 million will be injected into a range of research programs to fuel new discoveries and the translation and commercialisation of research ideas.

The inaugural Australian Medical Research and Innovation Strategy 2016-2021 and the accompanying Australian Medical Research and Innovation Priorities 2016-2018 set the initial direction for research to be funded by the MRFF.<sup>12</sup>

While APPRISE is not receiving direct funding from the MRFF, it will need to remain aware of this evolving environment for the future funding of medical research and how its research priorities are set given that infectious disease researchers within the APPRISE network will be seeking funding for their research activities into the future.

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<sup>11</sup> <http://health.gov.au/internet/main/publishing.nsf/Content/mrff>

<sup>12</sup> <http://health.gov.au/internet/main/publishing.nsf/Content/mrff>

## 4 The stakeholder environment

This section describes the scope and nature of the stakeholder environment for APPRISE.

### **The threats posed by infectious diseases highlight the need for researchers and key groups to work together more effectively and collaboratively.**

The network of stakeholders that will have a connection with infectious disease preparedness and response is extensive. This was acknowledged by APPRISE in its application to the NHMRC and confirmed by the stakeholder mapping exercise for this project and in stakeholder consultations, which uncovered even more stakeholders that will have a connection.

APPRISE has a significant task in collaborating and engaging with the vast network of stakeholders involved in infectious diseases preparedness and response. This includes bringing together the views and expertise of public health practitioners, clinicians, diagnostic laboratory staff, general and at-risk communities and jurisdictional and federal agencies to define the research agenda for the next four years and implement it successfully to deliver an impact.

A high-level overview of some of the stakeholders in this environment is provided in Figure 5 on the following page.

The levels of interest and understanding of APPRISE will vary markedly across these stakeholder groups. APPRISE will need to understand the different drivers and benefits of collaboration with each stakeholder group to ensure sustained engagement and buy-in from the network of stakeholders. A sophisticated approach to stakeholder engagement will help generate mutual benefits for all participants.

APPRISE investigators currently have a variety of links (both direct and indirect) with stakeholders across these networks, but as an organisation in its early stages APPRISE is yet to generate a strong level of recognition and awareness across the stakeholder landscape.

While the majority of stakeholders were positive about establishing a national network, consultations highlighted the need for APPRISE to invest in clearly defining and communicating its intent and boundaries. Part of this task will be to explain how APPRISE is differentiated from, and will work with, other CREs with an interest in infectious disease (see Section 5.1).

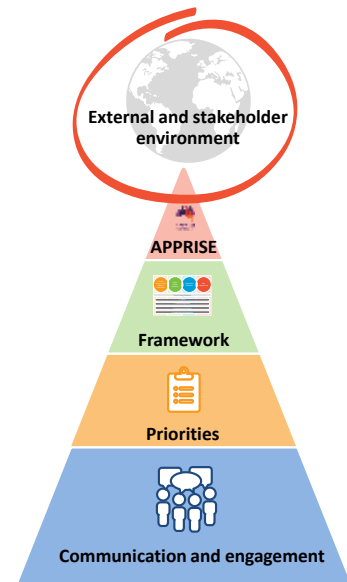
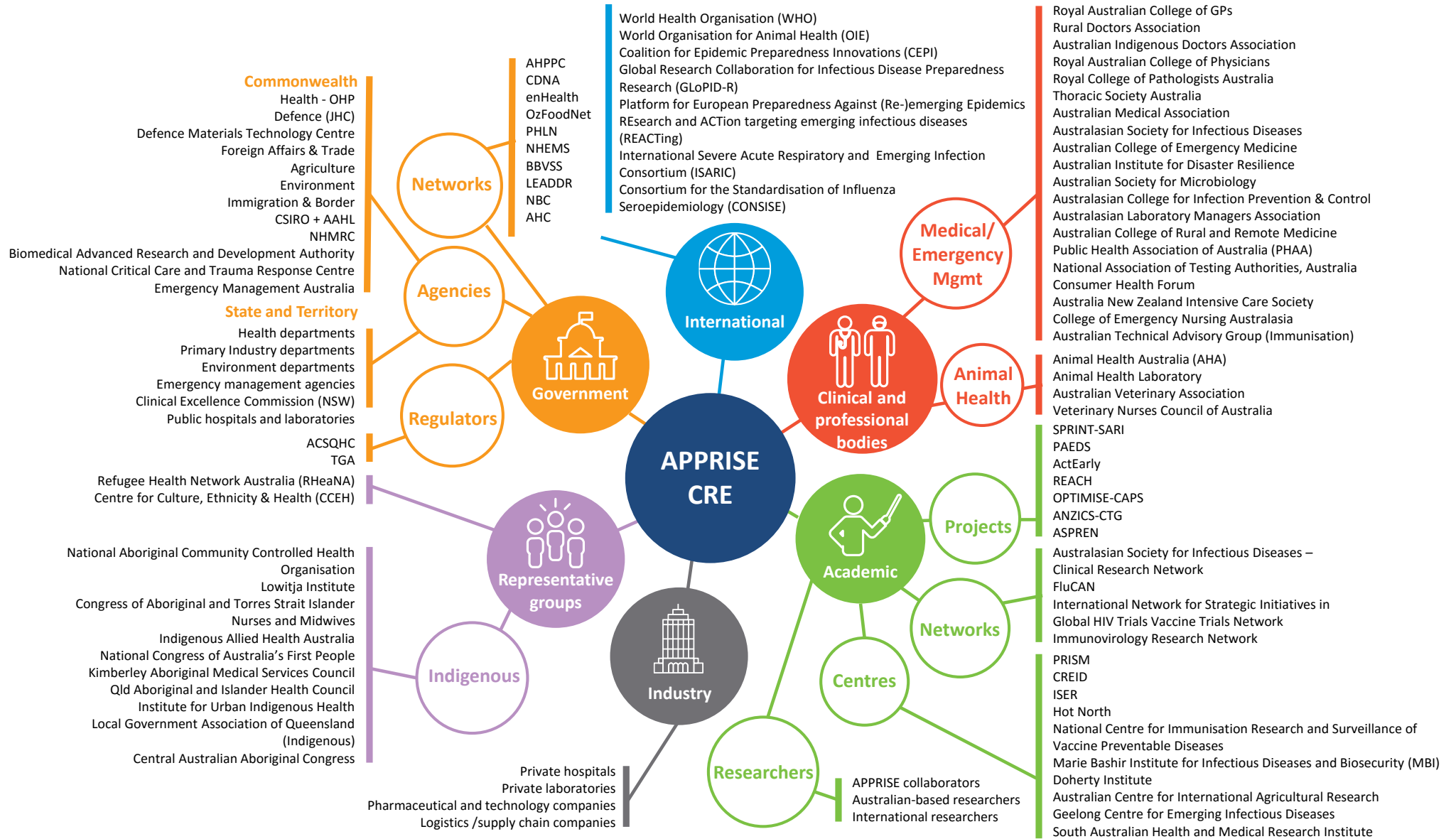


Figure 5: APPRISE stakeholder groups and networks



## 5 Stakeholder feedback

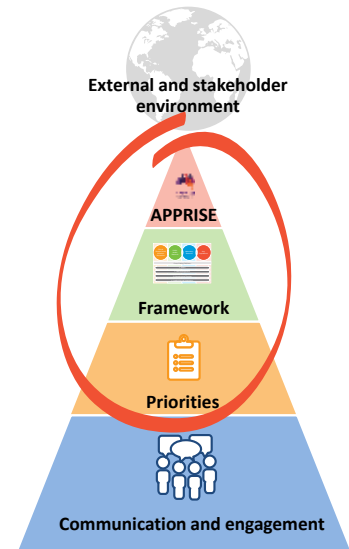
This section summarises the feedback from stakeholders on APPRISE and its research priorities from the interviews and workshops. The section also provides a summary of the preliminary observations of APPRISE investigators to this stakeholder feedback at the APPRISE consolidation workshop held following the completion of stakeholder consultations.

This section focuses on stakeholder feedback across the following areas:

- **The APPRISE concept** – observations on the APPRISE concept, its scope and potential position in infectious disease preparedness and response
- **The APPRISE framework** – feedback on the APPRISE platforms and pillars framework for presenting its research and other priorities
- **Identified priorities** – detailed feedback on each APPRISE pillar and platform as well as the research priorities identified within them

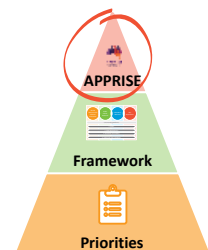
Sections 6, 7 and 8 provide some analysis of stakeholder observations and feedback on how APPRISE can engage and communicate with stakeholders and work with them to ensure research is translated to deliver impact.

Detailed stakeholder feedback is provided in Appendix D.



### 5.1 Stakeholders support the APPRISE concept but are unclear on its scope and how it will operate

This section discusses stakeholder observations on the APPRISE concept, its scope and potential role in infectious disease preparedness and response.



#### **Stakeholders are generally supportive of the concept of APPRISE and recognise its potential**

Most stakeholders supported the overall concept of APPRISE, provided it operates effectively and produces research that can be translated into improved policy and practice (see Section 8 for further discussion on translation). They recognised that the current research landscape for infectious disease is fragmented and could see the potential benefits of research that is coordinated across disciplines and locations in Australia.

Several stakeholders identified the CDC in the United States as a best practice model of a nationally led, collaborative approach to research. CDC is also a national response body, which enables strong alignment between research and policy needs.

While they recognised that the CDC model was not applicable in the federated context of Australia, they supported the idea of a national body to coordinate research on infectious diseases emergencies in line with key threats and needs in Australia and the region.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Agreed on the need for nationally-coordinated research on infectious diseases emergencies in Australia. They discussed the CDC model and acknowledged that while the Australian context is different to the US, there are opportunities to learn from the CDC model on how to lead coordinated research that focuses on areas of national need.
- Acknowledged the need to understand the policy and service delivery context for infectious disease preparedness and response at the national and jurisdictional levels.

**Stakeholders are not yet clear on the scope of APPRISE and how it will operate, but are generally open to APPRISE having a broad focus**

Despite supporting the overall concept of a national, multi-disciplinary research body, many stakeholders were unclear on the specific scope and functions of APPRISE. They asked for more information on the intent and boundaries of APPRISE, including its plan for the future.

While they were unclear on the scope, stakeholders welcomed the opportunity to contribute to discussions on the priorities of APPRISE through the interviews and workshops. They encouraged APPRISE to continue consulting stakeholders as it further defines its scope and functions.

Stakeholders were open to a broad focus for APPRISE. They supported the idea of APPRISE being the primary research body responsible for leading and coordinating multi-disciplinary research on infectious disease emergencies in Australia. They supported APPRISE's inclusion of research on infectious disease threats in the Asia-Pacific within its scope acknowledging that a global focus is required for optimal preparedness and response.

Stakeholders noted the challenges of operating a multi-disciplinary CRE with researchers across the country. APPRISE requires robust processes and governance arrangements to prevent fragmentation and ensure coordination between its researchers. Stakeholders asked for more information on how APPRISE would operate and ensure meaningful collaboration between researchers and those responsible for preparing for and responding to emerging infectious disease.

**Compiling the latest research for stakeholders**

In addition to primary research, several stakeholders saw a role for APPRISE in compiling and synthesising the latest research on infectious disease emergencies so it is readily accessible to public health officials, clinicians and other frontline responders. APPRISE could present this research through its website or other online mechanisms that are readily accessible to its stakeholders.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Acknowledged the need to better communicate the intended scope and functions of APPRISE. They emphasised that the intention was for APPRISE to become the primary national research body responsible for conducting and coordinating multi-disciplinary research on both preparedness and response.
- Noted that a key objective of the stakeholder consultation process was to seek stakeholder views on the optimal scope and role for APPRISE in order to contribute to improved preparedness for and responses to infectious diseases emergencies.

**Stakeholders emphasised the importance of coordinating with existing researchers and networks**

Stakeholders noted that there are several other CREs focused on infectious disease research across Australia. There are also research centres, health organisations and policies and protocols at the international level for infectious disease preparedness and response. Many stakeholders were unclear on how the multiple CREs in this space would coexist and sought assurances that cooperation will occur and duplication will be avoided.

Stakeholders said that for APPRISE to be successful, it was critically important to coordinate and not duplicate the work of other researchers and organisations. They were encouraged to see that several APPRISE Chief Investigators and Associate Investigators were also members of other researcher centres, providing opportunities for research collaboration. Stakeholder views on collaboration and networking are discussed further in Section 6.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Clarified it was their strong intention to coordinate with other CREs as well as other research bodies and individual researchers.
- Recognised the risk of duplication and the importance of effective communication and coordination, particularly given the large number of researchers and stakeholders working in the infectious diseases space.

**Stakeholders stressed that APPRISE’s research should be embedded in a strong understanding of Australia’s federated health system, including different jurisdictional contexts**

Government stakeholders emphasised the importance of understanding Australia’s health system and the broader service delivery context for infectious disease preparedness and response. This requires an understanding of how Commonwealth, state and territory and local health systems and service providers work together to develop policy and deliver services. It is also important to consider the barriers in the health system that impact the ability to translate research outcomes into improved policy and practice.

Stakeholders expressed concern that researchers often fail to fully understand or tailor their research to reflect this context, leading to research that has little relevance to real-world practice. If the APPRISE concept is to be successful and produce research that can be translated into policy and practice, its research must be cognisant of, and relevant to, the way health systems operate at the national level and in each jurisdiction.



“(APPRISE) needs to demonstrate some practical benefits to states/territories. This can happen through producing tools or assistance that aid emergency response, not just research outputs.”



“There needs to be recognition of where expertise sits in smaller states. Dealing with this will allow APPRISE to push for a more national approach.”

Some stakeholders also raised concerns that APPRISE was too focused on the Eastern seaboard. They encouraged greater engagement with Northern Queensland, the Northern Territory and Western Australia where the infectious disease threats and the health service context differs considerably.

**There is some scepticism among non-researchers on the value of research to their work**

A selection of stakeholders expressed concern that research (in some cases) appears to be conducted for academic purposes with limited benefit to policy and practice. This sentiment reflected a degree of scepticism among some towards academic research more broadly and the extent to which it is of value to frontline responders.



“Part of the job needs to be convincing a political constituency that (APPRISE’s) role is relevant... so we need to translate this to policy. You need politicians to care. You need people and the community behind this as well.”

However, stakeholders also recognised the importance of a strong evidence base to inform improvements to policy and practice, and to optimise and continually improve Australia’s preparedness

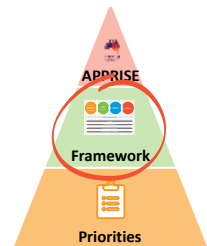
and response to infectious disease. They called for a clearer articulation on what tangible outcomes would be delivered through APPRISE research. Stakeholders encouraged APPRISE to maintain a strong focus on research translation throughout its work, to ensure research investments yield positive outcomes to preparedness and response efforts.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Agreed with stakeholders on the critical importance of research translation to the success of APPRISE. They saw a clear role for APPRISE in providing research to policy makers and service providers in a format that enables them to translate research into policy and practice.
- Noted that research translation was a growing priority for major funders, such as the NHMRC and MRFF.
- Noted that advocacy and communication were critical for research translation.

## 5.2 Stakeholders had mixed views on APPRISE's pillars and platforms framework

This section discusses stakeholder feedback on the APPRISE platforms and pillars framework for presenting its research and other priorities.



### **Stakeholders initially found the overlap between pillars confusing, however APPRISE sees this as a strength**

Several stakeholders expressed confusion over the pillar and platform framework and why APPRISE research priorities were presented in this way. They noted that in practice, research cuts across clinical, laboratory and public health fields. Similarly, during an infectious diseases emergency, clinicians, laboratory scientists and public health officials work collaboratively in the response effort. Stakeholders noted that key populations in particular were a research area that cut across all the pillars.

When Nous explained that the research pillars were design to overlap and complement each other, stakeholders felt more comfortable with the approach but still requested further information on how the framework would operate in practice. Some stakeholders also suggested amendments to the framework which are discussed further below.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Emphasised that the research pillars were not intended to be mutually exclusive but that research conducted under the pillars would overlap. They saw this as a key strength of the pillar and platform framework and an enabler of multi-disciplinary and nationally collaborative research.
- Recognised the need to better communicate this intention to stakeholders in their presentation of the pillar and platform framework.
- Were open to considering different ways to present their research priorities.

### **Stakeholders strongly support the focus on key populations; with some suggesting this should be a cross-cutting platform**

There was strong support from stakeholders for the focus on key populations particularly the inclusion of Aboriginal and Torres Strait Islander populations and populations in the Asia Pacific region. Stakeholder comments on the specific research priorities for this pillar are discussed in more detail in Section 5.4.

Several stakeholders suggested that key populations should be a cross-cutting research focus in the APPRISE pillar/platform framework. They offered two key reasons:

1. A focus on key populations should be embedded in each of the pillars, as well as each of the cross-cutting platforms, and
2. Key populations as a pillar did not logically fit with the other research pillars which focus on the type of research (clinical, public health and laboratory).

While some stakeholders questioned the logic of including key populations as a pillar, they all agreed it was more important to keep key populations in the APPRISE framework, even if it stays as a pillar.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Strongly agreed with stakeholder views that key populations should be a priority area of focus. They clarified that the reason why they included key populations as a separate pillar was to ensure it received adequate attention and funding.
- Affirmed that the intention is that research conducted under the key populations pillar would intersect with activities under each of the other pillars as well as the platforms.

**Stakeholders felt the research pillars should have a stronger emphasis on behavioural and applied research, 'One Health', international responses and private sector engagement**

In response to the proposed research pillars, stakeholders felt there should be a stronger focus on the following areas:



**Behaviour and applied research:** Stakeholders said there was a need to include behavioural and applied research to compliment the biomedical research because it is a significant issue in preparedness and response. Stakeholders also made a number of suggestions for increasing the emphasis on behavioural and applied research in the research priorities (see Section 5.4).



**'One Health':** Some stakeholders advocated for a more explicit 'One Health' approach in the APPRISE pillar and platform framework. They acknowledged that APPRISE necessarily focused on human transmission as an NHMRC-funded organisation but encouraged a greater focus on multi-disciplinary research on zoonoses, noting that these account for around 60 per cent of pathogens that can infect humans. Stakeholders also suggested increasing the emphasis on One Health in the research priorities (see Section 5.4).



**Infectious disease threats in the Asia Pacific:** Some stakeholders suggested there should be a greater emphasis on international response and preparedness, over and above the key population pillar. A number said this was important as diseases in the region pose a direct threat to people in Australia. Others said there was a human rights imperative to support research on infectious diseases that potentially affect many thousands of people in our region.



**Private sector engagement:** Stakeholders were unclear about the future role of the private sector and whether APPRISE will connect up with the development of products (such as vaccines). They suggested APPRISE should better plan and articulate how they will work with the private sector. There was also a suggestion to map which industries and companies APPRISE could engage with.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Acknowledged that APPRISE has a stronger focus on biomedical research than behavioural and applied research.
- Agreed to it was important to include behavioural and applied research methods, particularly in research on key populations but also across all areas of preparedness and response.
- Agreed on the importance of research on zoonoses and infectious disease threats in the Asia-Pacific and confirmed that these would be a focus.
- Recognised the need to seek opportunities for private sector engagement.

## Stakeholders felt the cross-cutting platforms should have a stronger focus on partnerships and collaboration, as well as research translation

In response to the cross-cutting pillars, stakeholders felt there should be a stronger focus on the following:



**Partnerships and collaboration:** While noting that APPRISE is intended to be a collaborative research body, stakeholders felt that this could be expressed more explicitly in the cross-cutting platforms.



**Research translation:** In line with comments on the APPRISE concept (see Section 5.1), several stakeholders called for a stronger commitment to research translation in the APPRISE pillar/platform framework.

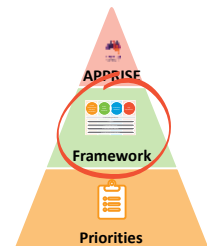
### At the APPRISE consolidation workshop, APPRISE investigators:

- Agreed on the importance of partnerships, collaboration and research translation.
- Confirmed that APPRISE has a number of strategies for partnerships, collaboration and translation but agreed they needed to better communicate these strategies to their stakeholders.
- Indicated they would consider how to better reflect these areas through the pillar/platform framework and research priorities.

## 5.3 While the current framework is comprehensive, there are alternate frameworks to consider

Stakeholders generally agreed that the pillar/platform framework covered the main areas of research in infectious disease emergencies, noting that there are some areas that could have stronger emphasis (see above). However, they also suggested some modifications to improve the pillar/platform framework.

Nous has synthesised feedback from stakeholders to identify three options for addressing stakeholder feedback on the pillar/platform framework.



### Option 1

#### Keep the current pillar/platform framework but improve the way it is communicated

(noting this framework has been approved by the NHMRC and informed the development of APPRISE's governance structure)

Specifically, APPRISE should better communicate:

- the intentional overlap between the pillars, how this supports multi-disciplinary research and why it is a strength of APPRISE
- the rationale for key populations as a research pillar to ensure it receives strong attention and funding (which stakeholders generally accepted)
- how it will support behavioural research, a 'OneHealth' approach and international research
- how it will support partnership, collaboration and translation

### Option 2

**Minor modifications to the pillar/platform framework to reflect stakeholder feedback**, including consideration of:

- categorising the key populations pillar as a cross-cutting pillar or platform
- adding a pillar on behavioural research
- renaming the 'Leadership and Integration' platform 'Partnerships, Collaboration and Translation'.

### Option 3

#### Significant modifications to the pillar/platform framework to reflect the different stages of an emergency management response.

This was suggested by stakeholders in two of the workshops and aligns with common practice in the emergency management sector more broadly. Under this option, APPRISE would have the same cross-cutting platforms but modify the research pillars to fit within the following structure (noting the cyclical relationship between them)

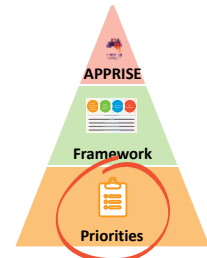


#### At the APPRISE consolidation workshop, APPRISE investigators:

- Were open to suggestions for modifying the pillar/platform framework. They noted that APPRISE will cover the areas of emphasis suggested by stakeholders but recognised they needed to communicate better.
- Agreed it was important to better communicate the pillar/platform framework to stakeholders to ensure a clear understanding the research focus of APPRISE and reassure stakeholders that critical areas for focus will be covered.
- Noted they had considered an emergency management response approach (as per Option 3 above) when developing the pillar and platform framework but decided to use the current framework as it better reflects the way research is conducted on infectious disease emergencies. They felt the emergency management approach was better suited to an operational context with a strong focus on management, response and recovery.

## 5.4 Research priorities are ambitious and there are potentially more

In its funding submission to the NHMRC, APPRISE outlined a number of priority areas for research and associated activity under each pillar and platform. This section provides feedback on each APPRISE pillar and platform as well as the research priorities identified within them.



#### Stakeholders felt the list of research priorities was comprehensive but ambitious

Several stakeholders commented on the very broad range of priorities under the pillars and platforms and said it would be challenging to achieve all of them. It was suggested that APPRISE could narrow its priority activities to focus on delivering greater impact in some key aspects of preparedness and response.

However, when prompted for feedback stakeholders often added new priorities.

Some stakeholders also acknowledged that a broad focus was appropriate if APPRISE is to become the primary national body for coordinating research on infectious disease emergencies. They suggested that APPRISE regularly review and update its list of research priorities to ensure it remains relevant.

Stakeholders also discussed the sequencing of the research priorities. Stakeholders said APPRISE should identify which research priorities it would focus on first, considering their relative importance and which priorities had potential to build credibility and showcase how APPRISE will operate as a national, multi-disciplinary and collaborative research centre.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Acknowledged that the list of research priorities was extensive but clarified that this was because they involved more 40 chief investigators and associate investigators across Australia.
- Confirmed their intention to collaborate with other researchers.
- Agreed on the need to identify priorities to focus on in the first instance to build rapport and achieve early results for that contribute to preparedness and response.

**Stakeholders emphasised the importance of mutually-beneficial collaboration with stakeholders to achieve the priorities**

If APPRISE is to keep a broad list of research priorities, stakeholders stressed the importance of collaboration with researcher organisations, relevant government agencies, health care organisations, communities and other stakeholders to achieve them. It was suggested that APPRISE should pursue an ongoing long-term relationship with the CDNA and AHPPC in particular.

Collaboration is important for conducting quality research but also for consolidating research funding. Stakeholders stressed that collaborative research and shared funding arrangements needs to demonstrate value to all parties, not just APPRISE. Specifically, APPRISE needs to be able to demonstrate the benefits of research collaboration to potential partners and ensure these benefits are realised.

Stakeholders from the Aboriginal and Torres Strait Islander health sector said collaboration is particularly important for research on key populations, which requires multi-disciplinary and mixed methods approaches to research. It was suggested that APPRISE could work together with multiple CREs on how they will engage with and design solutions for Indigenous communities.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Agreed with stakeholders on the importance of collaboration and acknowledged the need to ensure collaboration is of mutual benefit to APPRISE and its partners.
- Were positive about the idea of working with other research bodies to support collaborative and coordinated engagement in Aboriginal and Torres Strait Islander communities.

**Stakeholders suggested a number of additional focus areas against the pillars and platforms; they did not object to any of the proposed priorities**

Stakeholders provided comments on the research priorities under each pillar and platform (Appendix D). Stakeholders identified a number of perceived gaps in the list of priorities proposed by APPRISE but they did not explicitly object to any of them.

While several stakeholders said APPRISE needed to further prioritise and narrow its list of priorities, there was very limited feedback from stakeholders on the relative level of importance of the priorities. However, the suggestions on additional focus areas provide a strong indication of the priorities of different stakeholder groups.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Carefully considered stakeholder feedback on the research priorities
- Acknowledged the additional focus areas proposed by stakeholders
- Noted that in many cases, APPRISE did intend to cover these areas and recognised that APPRISE needs to better communicate this to stakeholders.

Table 1 and Table 2 summarise comments from stakeholders on APPRISE's proposed priorities for the pillars and platforms (as outlined in its NHMRC funding application).

These priorities are listed in Appendix C.

Table 1: Summary of stakeholder comments on the priorities for each research pillar

Topic	Summary of stakeholder feedback
<b>Pillar 1: Clinical Research and Infection Prevention</b>	
<b>Infection prevention and social, cultural and community factors</b>	<ul style="list-style-type: none"> <li>◦ <b>Infection prevention in communities is about understanding the circumstances of communities, not just best practice. Communities vary greatly in terms of need, resources and barriers to infection prevention.</b> It is important that research on community settings takes into account that communities are very different across Australia. For example, infection prevention in a city is very different to a remote Aboriginal community where people lack access to basic hygiene and sanitation products.</li> <li>◦ <b>There needs to be a stronger focus on infection prevention in the priorities, including research on cultural and social factors.</b> This includes a stronger focus on mitigation strategies and research on behavioural factors and cultural factors that impact on disease transmission. Some stakeholders stressed that there is often a lack of understanding among clinical researchers of the cultural factors that impact on infection prevention. Infection prevention should cover research on vectors and pathogens, including surveillance and control of mosquitos.</li> </ul>
<b>Biobanking</b>	<ul style="list-style-type: none"> <li>◦ <b>Biobanking is a priority. APPRISE needs to clarify if it will use an existing facility or establish a new one.</b> Several stakeholders agreed that support for a biobank was important for clinical research. They said APPRISE should determine whether it is optimal to establish a new biobank or partner with an existing facility, noting the considerable resources involved.</li> </ul>
<b>OneHealth</b>	<ul style="list-style-type: none"> <li>◦ <b>There needs to be a stronger focus on clinical research and infection control at the animal-human interface.</b> Several stakeholders felt that the current priorities focus too heavily on humans and medical settings. They noted that over 60 per cent of infectious diseases are zoonotic and these need a stronger focus in clinical research and infection control.</li> </ul>
<b>Regulation and jurisdictional issues</b>	<ul style="list-style-type: none"> <li>◦ <b>Researchers need to consider legal, regulatory and jurisdictional issues that affect the data and ethics processes.</b> Legal, regulatory and jurisdictional requirements for clinical data can inhibit research and cross-jurisdictional collaborations. APPRISE should seek to assist researchers to better understand and manage these requirements.</li> </ul>
<b>Near real time understanding of public health threats</b>	<ul style="list-style-type: none"> <li>◦ <b>APPRISE researchers should aim for near real time understanding of emerging public health threats.</b> There a need for near real time understanding of emerging public health problems by researchers, and that these are scoped fully between public health practitioners and researchers. Threats should be scoped fully between public health officials, clinicians and researchers</li> </ul>
<b>Pillar 2: Public Health Research</b>	
<b>Social and qualitative research</b>	<ul style="list-style-type: none"> <li>◦ <b>There should be a greater emphasis on social research and qualitative methods, such as Participatory Action Research.</b> This is particularly important for public health research involving Aboriginal and Torres Strait Islander communities and other key populations. Social research should cover first responders, including health workers and people who work with animals.</li> </ul>
<b>Connections between researchers, public health officials and clinicians</b>	<ul style="list-style-type: none"> <li>◦ <b>A priority is improving connections between public health researchers and public health officials, both for longer term research studies and during an outbreak. This includes DFAT and overseas officials.</b> Stakeholders stressed that it was critically important for public health researchers to understand the work of public health officials and vice versa so they can better align and seize opportunities to collaborate and solve problems together.</li> </ul>
<b>Evaluation of past interventions</b>	<ul style="list-style-type: none"> <li>◦ <b>There should be a stronger focus on evaluations and research on past public health interventions.</b> This is vital in public health. Researchers should also identify how evaluation findings can inform changes in practice. This should include research on governance to support a response, and higher level (non-medical) determinants of delayed and ineffective responses to outbreaks in Australia and overseas. This should also include community-based interventions.</li> </ul>

Topic	Summary of stakeholder feedback
Surveillance	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should include a greater focus on risk factor surveillance</b>, in addition to disease surveillance.</li> <li>◦ <b>Stakeholders suggested the following sequencing for surveillance:</b> <ol style="list-style-type: none"> <li>1. Identify existing surveillance (animal/human)</li> <li>2. Identify gaps in surveillance</li> <li>3. Research existing public health notifications and how to integrate gaps.</li> </ol> </li> </ul>
Logistics	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should include a stronger focus on logistics</b>, to understand 1) how to minimise the time taken from recognition of a possible case to provision of lab diagnosis confirmation and 2) opportunities in the community to collect laboratory samples and movement of samples.</li> </ul>
Antimicrobial drug resistance	<ul style="list-style-type: none"> <li>◦ <b>There are mixed views on whether APPRISE should focus on antimicrobial surveillance, use and resistance.</b> Some stakeholders believe there should be a greater focus on antimicrobial drug resistance while others felt that there have been multiple taskforces set up to address it already.</li> </ul>
Learnings from emergency management	<ul style="list-style-type: none"> <li>◦ <b>Public health researchers should engage and learn from the emergency management sector.</b> This includes research and evaluations on disaster preparedness and response for cyclones, floods and other emergencies.</li> </ul>
Culture-independent diagnostic tests	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should research the surveillance impacts of culture-independent diagnostic tests.</b> These tests can significantly improve diagnosis in GP practices and other settings, however there is a need to monitor the impact and ensure these tests feed into surveillance systems.</li> </ul>
<b>Pillar 3: Laboratory Research</b>	
Preparing laboratories before an outbreak	<ul style="list-style-type: none"> <li>◦ <b>There should be a greater focus on preparing laboratories in advance so they can rapidly respond during an outbreak.</b> Improved protocols and streamlines processes are needed for rapid laboratory research during a response.</li> </ul>
Harmonisation and communication	<ul style="list-style-type: none"> <li>◦ <b>Multiple stakeholders said there should be a greater focus on harmonising processes, practices and logistics of laboratories across Australia, in line with national and international laboratory networks and standards.</b> This includes harmonisation and standardisation of quality assurance, point of care testing and next generation and whole genome sequencing. APPRISE should coordinate with the Public Health Laboratory Network (PHLN) in particular. There should be a greater emphasis on the coordination of networks and logistics to transport specimens efficiently across jurisdictions.</li> <li>◦ <b>This pillar should include a focus on improving communication between laboratories, clinicians and public health clinicians.</b> This is critical before, during and after an infectious disease response.</li> </ul>
OneHealth	<ul style="list-style-type: none"> <li>◦ <b>New deployable tests should include testing of animals (domestic and wildlife) and feed back to outbreak responses.</b> APPRISE should develop processes to ensure deployable tests are rapidly fed back to responders during an emergency.</li> </ul>
Private sector engagement	<ul style="list-style-type: none"> <li>◦ <b>There should be a greater emphasis on collaboration with industry, including overseas companies.</b> This is important to enable the development, commercialisation and supply of vaccines and treatments, as well as laboratory equipment and technology. The limited size of the Australian market necessitates collaboration with overseas companies.</li> </ul>

Topic	Summary of stakeholder feedback
<b>Biobanking</b>	<ul style="list-style-type: none"> <li>◦ <b>Biobanking is important but APPRISE should seek to use and enhance existing facilities and collections.</b> Stakeholders said biobanking was important and encouraged a long-term focus of biobanks but they said APPRISE should not seek to ‘reinvent the wheel.’ They encouraged APPRISE to enhance existing biobanking facilities, such as NCIRS and ACHZ.</li> </ul>
<b>Specimen collection</b>	<ul style="list-style-type: none"> <li>◦ <b>Specimen collection is too focused on emergency responses and should support long-term collection of samples.</b> Stakeholders suggested separating collections into (1) an emerging disease, (2) ongoing long-term surveillance.</li> </ul>
<b>Non-vector borne pathogens</b>	<ul style="list-style-type: none"> <li>◦ <b>There should be a greater focus on non-vector borne pathogens.</b> For example, safe handling protocols need to cover non-vector borne pathogens such as Lyme disease and similar pathogens.</li> </ul>
<b>Pillar 4: Key Populations</b>	
<b>High priority and cross-cutting</b>	<ul style="list-style-type: none"> <li>◦ <b>This pillar is a high priority and cuts across all areas of research. APPRISE should consider making it a cross-cutting pillar.</b> Several stakeholders questioned why key populations were a separate pillar when it intersects with all areas of research.</li> </ul>
<b>Other population groups</b>	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should include several other population groups under this pillar, accommodate the diversity within key population groups and recognise that key populations change depending on the nature and location of a disease outbreak.</b> Other key populations include the elderly, pregnant women, people with disabilities and people that are newly arrived from overseas (e.g. travellers, refugees, international students, migrants).</li> <li>◦ <b>APPRISE should consider the gendered aspects to infectious diseases, particularly in relation to Asia-Pacific preparedness and response.</b> Researchers need to better understand the profile of women and girls, their higher risk status in pandemics as well social structures/work that they're undertaking and access to decision making. This is particularly important in developing countries in the Asia-Pacific, where infectious disease outbreaks have a disproportionate impact on women.</li> <li>◦ <b>APPRISE needs to consider front line workers.</b> This includes, GPs, Emergency Departments' staff, ambulance workers, people who work with animals and animal products, and other essential services. These workers are highly vulnerable during an outbreak.</li> </ul>
<b>Partnership approach and communication</b>	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should adopt a partnership approach and meaningfully engage and consult Indigenous and other key populations.</b> This is particularly important for Aboriginal and Torres Strait Island communities, who can be mistrusting of health research because it often results in little to no benefit for their community. APPRISE needs to consider how Indigenous people and Aboriginal Medical Services will be part of research and conduct research from a strengths-based approach.</li> <li>◦ <b>APPRISE should seek to involve community champions from key populations in their research and link with existing networks that represent and work with key populations.</b> Community champions and networks can play a critical role in research design and in communicating information to key populations before, during and after a response. It is important to build these relationships early, so that they can be rapidly deployed in an emergency.</li> <li>◦ <b>APPRISE should research the most effective forms of messaging and communicating with vulnerable populations in times of outbreak</b> (e.g. through community networks or social media)</li> </ul>
<b>Social and behavioural research</b>	<ul style="list-style-type: none"> <li>◦ <b>This pillar should include social and behavioural research, and could even be renamed as such.</b> This includes research on how to best communicate and change behaviour of key populations during an outbreak. It was suggested that APPRISE should build on the public health testing pyramid to understand the behaviour of different populations in responding to emergencies.</li> </ul>

Topic	Summary of stakeholder feedback
Indigenous participation	<ul style="list-style-type: none"> <li>◦ <b>APPRISE needs to show how Indigenous people can participate in and benefit from research.</b> Indigenous people are often mistrusting of health research because there are often little or no benefits to the community. APPRISE needs to reframe the discourse and 1) consider how Indigenous people are part of the research and 2) ensure that the research is reported from a strengths-based perspective.</li> </ul>
Pre-approved ethics and other processes	<ul style="list-style-type: none"> <li>◦ <b>There should be a greater emphasis on establishing ethics approval processes, governance structures and network capacity for outreach before an outbreak to enable rapid response and research.</b> This is important to enable researchers and responders to rapidly access key populations during an outbreak.</li> </ul>
Capacity development	<ul style="list-style-type: none"> <li>◦ <b>'Capacity building' should be renamed 'capacity development' and focus on sustainability and ownership of outcomes.</b> This terminology is contemporaneous and recognises that key populations have agency and exiting capacities. Capacity development should aim for key populations to have ownership of their capacity and sustain outcomes in the long-term.</li> </ul>

Table 2: Summary of stakeholder comments on the priorities for each cross-cutting platform

Topic	Summary of stakeholder feedback
<b>Platform 1: Ethics</b>	
Stakeholder support	<ul style="list-style-type: none"> <li>◦ <b>Stakeholders were generally supportive of the priorities in this platform.</b> They particularly supported facilitation of urgent ethics approvals and research to anticipate societal concerns and responses.</li> </ul>
Key populations	<ul style="list-style-type: none"> <li>◦ <b>APPRISE needs to consider ethical processes and guidelines for conducting research in key populations.</b> For example, APPRISE should seek to engage Aboriginal ethics committees and research bodies (such as the Aboriginal Health and Medical Council, NSW) and follow existing ethics guidelines.</li> </ul>
Urgent ethics approvals	<ul style="list-style-type: none"> <li>◦ <b>Facilitation of urgent research ethics approval is a high priority.</b> Several stakeholders felt this was critical for rapid research during, and in the aftermath of, an emergency. One opportunity identified was the value in developing an expedited universal ethics approval that can be used in times of outbreaks to save valuable time.</li> </ul>
Political determinants of responses	<ul style="list-style-type: none"> <li>◦ <b>Identification of policy issues should include research on the political determinants of disease outbreaks and responses.</b> This was a lesson learned from the slow responses to Ebola in West Africa where senior health decision makers failed to influence politicians to act until the outbreak had spread significantly.</li> </ul>
OneHealth	<ul style="list-style-type: none"> <li>◦ <b>This platform should include engagement between infectious disease and animal health organisations and decision makers.</b> This includes the National Centre for Emerging and Zoonotic Infectious Diseases (CDC) and Chief Veterinary Officer.</li> </ul>
Engagement with health workers	<ul style="list-style-type: none"> <li>◦ <b>There is a need for engagement with healthcare managers and clinicians on preparedness and response.</b> Without adequate engagement, clinicians may resist change. They are more likely to be cooperative and supportive if they feel they have ownership of, and are a partner in, the research.</li> </ul>
Private sector engagement	<ul style="list-style-type: none"> <li>◦ <b>There is a need to consider the impact of disease preparedness and response on small businesses.</b> This particularly important for businesses with marginal returns and businesses in regional and remote areas.</li> </ul>

Topic	Summary of stakeholder feedback
<b>Platform 2: Data Management</b>	
<b>Processes for rapid research</b>	<ul style="list-style-type: none"> <li>◦ <b>A critical priority is developing data management processes that enable rapid research during an emergency.</b> This may require approvals in advance, protocols and data access arrangements, particularly across jurisdictions.</li> </ul>
<b>Minimising burden of data collection</b>	<ul style="list-style-type: none"> <li>◦ <b>It is important to identify and define what data is necessary to collect and share, noting the resources and time involved.</b> Data collection requires considerable resources and can pose a burden on data collectors, such as clinicians, community organisations and other frontline responders. It is important to consider which data is required and use existing datasets.</li> </ul>
<b>Building the evidence base</b>	<ul style="list-style-type: none"> <li>◦ <b>Data collection is critical to measure outcomes and build the evidence base for change in practice.</b> According to one stakeholder, “you can’t change what you can’t measure.” Evidence, informed by robust data, is critical to convince public health officials, clinicians and other decision makers to change and improve practices.</li> </ul>
<b>Data infrastructure</b>	<ul style="list-style-type: none"> <li>◦ <b>There is a lack of infrastructure, warehousing and national data standards for data on infectious disease emergencies.</b> This inhibits research, undermines the quality of data and leads to fragmented data collections. Many data systems are out of date. APPRISE should encourage the standardisation and modernisation of data in the sector.</li> <li>◦ <b>Computer systems should be able to link jurisdictional data as well as data from animal health.</b> There is a need to link consistent data systems between jurisdictions, as well as animal to public health.</li> </ul>
<b>Data sharing</b>	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should encourage and facilitate the sharing of data, with consideration of data governance issues.</b> This includes data sharing between sectors and research facilities (e.g. laboratories and universities). It is important for APPRISE to consider data governance issues where data can be shared between researchers and government.</li> </ul>
<b>Learning from Australia and overseas</b>	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should seek data on overseas emergencies and learnings on data management.</b> There are many lessons learned in data management from overseas emergencies. APPRISE should seek to adapt overseas learnings and best practice to the Australian context. Data on overseas emergencies can also inform preparedness research in Australia.</li> <li>◦ <b>APPRISE should also learn from Australian data networks and organisations,</b> including the Australian Biosecurity Information Network, Animal Health LEADDRE network system.</li> </ul>
<b>Reporting on Aboriginality</b>	<ul style="list-style-type: none"> <li>◦ <b>There is a need to strengthen data and reporting on Aboriginality and include Indigenous people in data analysis.</b> Currently, this information is often missing from clinical and other data, inhibiting research. APPRISE should support data protocols to collect data on Aboriginality. Indigenous people should also be involved in data analysis and interpretation.</li> </ul>
<b>News media reporting</b>	<ul style="list-style-type: none"> <li>◦ <b>There is a need to reframe the way data is reported to the media on key populations to promote strengths-based reporting.</b> APPRISE should consider how it reports data to the media to support strengths-based reporting on infectious disease emergencies in Indigenous communities and other key populations.</li> </ul>
<b>OneHealth</b>	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should encourage the sharing of animal and human surveillance data.</b> Chief Medical Officers and Chief Veterinary Officers in particular need close links for surveillance data. There was a suggestion to replicate the animal health LEADDR network system for Public Health Networks.</li> </ul>
<b>Private sector engagement</b>	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should consider how to share data with the private sector.</b> Industry has data that can be used in research and data from research can also inform product development for private companies.</li> </ul>

Topic	Summary of stakeholder feedback
<b>Platform 3: Education and Training</b>	
<b>Translation through training</b>	<ul style="list-style-type: none"> <li>◦ <b>Research translation is meaningless unless it enables ‘implementation’ into changed practice – including through training.</b> Stakeholders felt strongly that education and training was important to ensure the translation of research into practice. APPRISE should translate research into improved protocols for laboratory and health workers through ongoing frontline training engagement.</li> </ul>
<b>Universities and the future workforce</b>	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should engage universities to support the future workforce, including medical, nursing and veterinary students.</b> The current priorities focus mainly on professionals already in the field. APPRISE should seek to influence the future workforce and inform the education of university students and early career professionals.</li> <li>◦ <b>The Master of Applied Epidemiology (MAE) is valued and should be work closely with APPRISE.</b> A number of stakeholders encouraged APPRISE to work closely with the MAE program which is valued highly in the infectious disease community. There are potentially a range of opportunities for APPRISE and MAE students to collaborate in infectious disease activities and APPRISE will be an organisation of interest to current and future MAE graduates.</li> <li>◦ <b>The sector is missing disease control specialists who are trained in disease transmission, surveillance, database and analysis of data.</b> This is a priority training need.</li> </ul>
<b>Existing training in Australia and overseas</b>	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should complement and not duplicate existing training programs.</b> This includes Australian funded training through CAIAR, DFAT, AusAID and regional groups (FAO APHCA, OIE, regional offices, WPRO) and the Charles Perkins Centre.</li> </ul>
<b>Research skills of health workers and applied research</b>	<ul style="list-style-type: none"> <li>◦ <b>There should be a stronger focus on developing the research skills of health workers and ‘frontline staff’ (rather than academics).</b> Stakeholders felt that academics already had opportunities to improve their research skills and that the greater priority was improving the research skills of health workers, public health officials and others involved in emergency response and preparedness.</li> <li>◦ <b>APPRISE should support training in applied research and integrated work learning for researchers.</b> APPRISE should promote applied research and support researchers to conduct work placements with frontline responders.</li> </ul>
<b>Emergency response exercises</b>	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should consider cross-disciplinary emergency response exercises with researchers, health workers and others.</b> Some stakeholders suggested that APPRISE support exercises that mimic how research would be conducted during an outbreak. There have been no exercises in the last 20 years that have covered all areas of response across all levels and all jurisdictions. APPRISE can learn from the 2008 Avian Flu exercise, which relieved pressure during the 2009 outbreak.</li> </ul>
<b>Education for Indigenous staff</b>	<ul style="list-style-type: none"> <li>◦ <b>This platform should include training for Aboriginal health workers and public health education for Indigenous people.</b> Indigenous health workers and Aboriginal Medical Services should be engaged and have access to training. There is also a need for public health education for Indigenous people to encourage them to visit medical services when they are unwell.</li> </ul>
<b>Education on Aboriginal health research</b>	<ul style="list-style-type: none"> <li>◦ <b>Researchers, health workers, public health officials and others need training in Aboriginal health research.</b> It is important that researchers and front line responders receive training in ethical guidelines for conducting Aboriginal health research and that these guidelines are embedded in everyday practice.</li> </ul>

Topic	Summary of stakeholder feedback
Vaccines	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should consider supporting an Australian Vaccine Institute (like the Jenner Institute).</b> This institute could involve researchers from other institutes and aim to develop fast tracked vaccines and therapeutics.</li> </ul>
<b>Platform 4: Leadership and Integration</b>	
Partnerships, collaboration and translation	<ul style="list-style-type: none"> <li>◦ <b>Stakeholders implied that this platform should be renamed to focus on partnerships, collaboration and translation.</b> They felt that this would demonstrate a stronger commitment to translation and a partnership approach in research and collaboration with existing research networks and bodies. Some expressed concern that the term leadership implied a focus on building the careers of individual researchers as leaders in their field, rather than supporting preparedness and response.</li> <li>◦ <b>APPRISE should seek to conduct research through a partnership model across sectors, jurisdictions and countries.</b> This includes partnerships with governments, universities, healthcare services, community organisations and the private sector in Australia and in other countries in the region. In particular, APPRISE should develop mechanisms for community participation and collaboration for key populations and other community groups.</li> </ul>
Translation into policy/practice versus academic publications	<ul style="list-style-type: none"> <li>◦ <b>Translation should focus on the impact of research on disease preparedness and responses, and less on journal publications.</b> Stakeholders felt strongly that APPRISE should focus on how research will impact on preparedness and responses, rather than academic outcomes. Several stakeholders expressed the view that publication in high impact journals is an inadequate measure of research outcomes that may benefit individual researchers but has little impact on practice.</li> </ul>
Engagement with government	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should maintain an ongoing dialogue with national and state departments of health, the AHPPC and CDNA.</b> This engagement should seek to: (1) ensure researchers are engaged in public health issues, (2) ensure policy makers and service providers are aware of APPRISE's approach, and (3) develop ways to embed research into public health practice, to make both research and public health most relevant and effective.</li> <li>◦ <b>There is an opportunity to engage with the Department of Defence on the Medical Countermeasures Initiative.</b> There may also be funding opportunities for collaborative research.</li> </ul>
Translation of existing research	<ul style="list-style-type: none"> <li>◦ <b>There is a need to focus translating existing research that has not been translated into practice (not just new research).</b> Stakeholders emphasised that substantial research exists but that it is lost in academic publications and has not been translated into practice. APPRISE should not just focus on new research, but seek to review and translate existing research.</li> </ul>
Ethical leadership	<ul style="list-style-type: none"> <li>◦ <b>APPRISE should promote ethical leadership in research and emergency preparedness and response.</b> This requires the incorporation of community values into research, preparedness and response before the next emergency. Ethical considerations include the fair allocation of resources, media involvement and communication with the public during a response.</li> </ul>
Commercialisation	<ul style="list-style-type: none"> <li>◦ <b>There should be a greater focus on commercialisation of novel discoveries.</b> This includes engaging private industry to commercialise vaccines, treatments, equipment and other novel discoveries.</li> </ul>

## 5.5 Stakeholder feedback identified success factors for APPRISE

The stakeholder consultation processes revealed several factors that will contribute to the overall success of APPRISE as a national, multi-disciplinary and collaborative CRE. These success factors are summarised in Table 3.

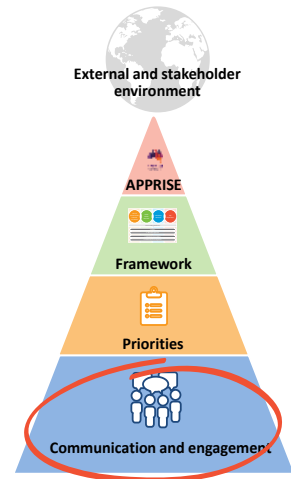
Table 3: Success factors for APPRISE

Networks and collaboration	
✓	<p><b>Productive and mutually-beneficial collaboration with stakeholders to achieve the research priorities</b> APPRISE cannot achieve the research priorities alone, and collaboration with other researchers and stakeholders will enhance the quality and breadth of research outcomes. It is important that collaboration benefits all parties involved, to ensure stakeholders are willing and motivated to collaborate.</p>
✓	<p><b>Research embedded in an understanding of local health systems and service delivery contexts</b> Infectious disease preparedness and response is deeply affected by the social, political and service delivery context in which it takes place. This context varies considerably between states and territories, as do the infectious disease threats in their jurisdictions. It is important that APPRISE's research is underpinned by a strong understanding of local health systems and other contextual factors that impact on preparedness and response. This requires consultation with local public health officials, key populations and others.</p>
✓	<p><b>Effective coordination with Australian and international research centres and networks</b> Stakeholders recognised the need for better coordination between researchers, particularly to avoid duplication and waste of resources. APPRISE should seek to align with the processes, policies and standards of local and international research networks.</p>
Communication	
✓	<p><b>Clear communication with stakeholders, including on APPRISE's scope and ongoing research activities</b> Stakeholders have shown a strong appetite for being kept informed about APPRISE. Effective communication strategies are also important to avoid misconceptions or confusion about APPRISE among stakeholders, and to garner their ongoing support.</p>
Research translation	
✓	<p><b>A priority focus on research translation into policy and practice</b> Translation of research outcomes is of paramount importance to stakeholders. APPRISE needs to plan, monitor and report on translation and communicate translation outcomes to stakeholders. Translation should not just focus on publication in high impact journals but on tangible changes to policy and practice.</p>

## 6 Stakeholder networks and collaboration

Effective engagement of stakeholders will be critical to the sustained success of APPRISE.

This section summarises the views of stakeholders and provides Nous' findings and recommendations on how APPRISE can best engage and collaborate with its network of stakeholders.



### 6.1 APPRISE could leverage existing networks to collaborate with stakeholders

A key requirement for APPRISE in delivering its remit for the NHMRC is to foster collaborative networks that will help it achieve its mission and goals.

Effective networks and collaboration are essential for APPRISE's ability to deliver high quality research and ensure it is translated to have lasting impact on infectious disease preparedness and response.

#### 6.1.1 APPRISE has been created in a network rich environment

APPRISE has been created in a complex and diverse stakeholder environment which was introduced in Section 4.

In this environment, there are a wide a range of existing stakeholder networks that span a variety of fields; each having a connection to infectious disease preparedness and response.

Within each of these networks there will be a series of relationships between individual experts and practitioners.

These networks can differ markedly in their characteristics including:

- geographic composition
- size
- strength
- discipline
- participants
- level of formality, and
- purpose.

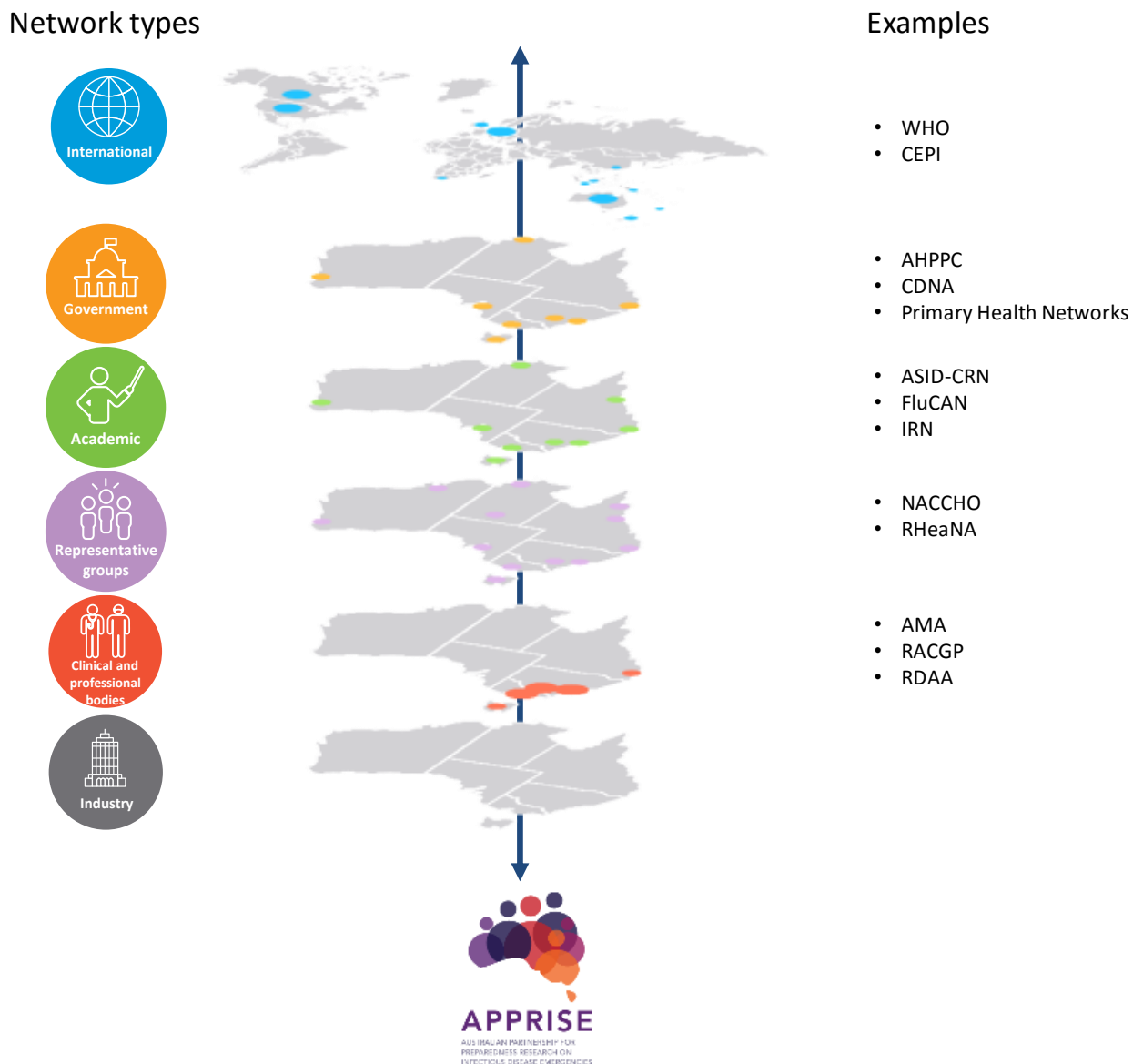
Some examples of these networks are provided in Figure 6.

#### **APPRISE is unique in the research environment**

In the academic research environment, APPRISE is unique in its truly national footprint. While other CREs have a presence in multiple states; only APPRISE covers the entire nation.

APPRISE is also distinguished from other CREs by its requirement to foster collaborative networks and consult broadly with stakeholders in setting its future priorities for research and associated activities.

Figure 6: Examples of networks relevant to APPRISE



### 6.1.2 These networks do not often join up naturally given their diversity

In this diverse and far-reaching stakeholder environment, each stakeholder network (and its members) will have different areas of focus. While there may be some overlap and commonality between stakeholder networks and their areas of expertise, in many cases the interests of these stakeholder groups will not intersect.

Each network and its stakeholders will also have a different level of connection to infectious disease and the work of APPRISE and consequently varying levels of interest in its work.

#### Effective infectious disease preparedness and response requires a whole-of-system approach

In the event of a serious outbreak of infectious disease, there will be few areas of society who will not play a role in response and infection control. Response will not be solely the province of the health

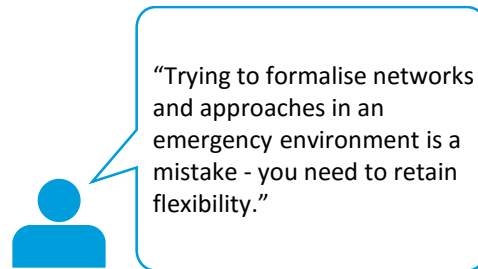
sector but will extend to other sectors such as police and emergency services, education, border control, community services and transport (to name a few). In most cases, infectious disease outbreaks will require a global effort with stakeholders from these fields across multiple countries.

This is a field where all of these diverse stakeholder groups will need to be engaged, understand their roles and have access to information on best practices to manage and mitigate the impacts on Australia, the region and the world in the event of an outbreak.

As a result, it is imperative for APPRISE to create a greater level of connection between these stakeholder groups through its activities.

Stakeholder consultations identified mixed views on the level of connectivity between stakeholders in the current environment.

For example, while some stakeholder committees and networks have demonstrated a strong level of collaboration between their own members, they do not enjoy the same levels of connection and collaborative problem solving with stakeholders in related fields.



In addition, Nous has observed that some networks are highly dependent on personal connections and relationships rather than formal structures. While this works in Australia as a relatively small community of interest, it can have limitations when knowledge transfer is critical.

APPRISE has an opportunity to play a leadership role in linking up some of these diverse networks for the benefit of our overall preparedness and response through its research and associated activities. The leadership role is critical to maintain and build existing relationships and extend the formality sufficiently to ensure the knowledge capture and transfer.

Rather than establish a new formal network for its field of focus, APPRISE can have an impact by joining up these pre-existing networks and making them aware of each other and how they need to interact in the event of an infectious disease emergency.

Linking up stakeholders across disciplines in a way that hasn't been done before is also more consistent with a 'OneHealth' approach which was highlighted and advocated by stakeholders during consultations.

### 6.1.3 APPRISE will need to identify the best way to foster collaboration and act as a connector

In this complex and diverse environment it will be impossible and impractical for APPRISE to actively engage with all of these stakeholder networks in depth.

APPRISE must identify where it needs to invest its time and effort to build the connections and relationships necessary to support improvement in infectious disease preparedness and response.

Similarly, the stakeholder representatives we spoke with in consultations would like to learn more about the future intentions of APPRISE so they can assess how to engage in the future. All stakeholders across the broader landscape will not engage automatically, as they have differing levels of proximity to the work of APPRISE and limits on their time and resources.

In many cases, APPRISE will need to demonstrate the value it will provide stakeholders to compel their participation. It will need to demonstrate and deliver clear value in order to get value in return.

The APPRISE investigator team has developed extensive personal links into many of these networks over time which can be used as a foundation for the CRE to build upon in the future. However, in other areas these personal links are not as strong or do not yet exist.

A key challenge for APPRISE will be to leverage these personal networks and relationships to create a broader international network; a whole that is greater than the sum of its parts.

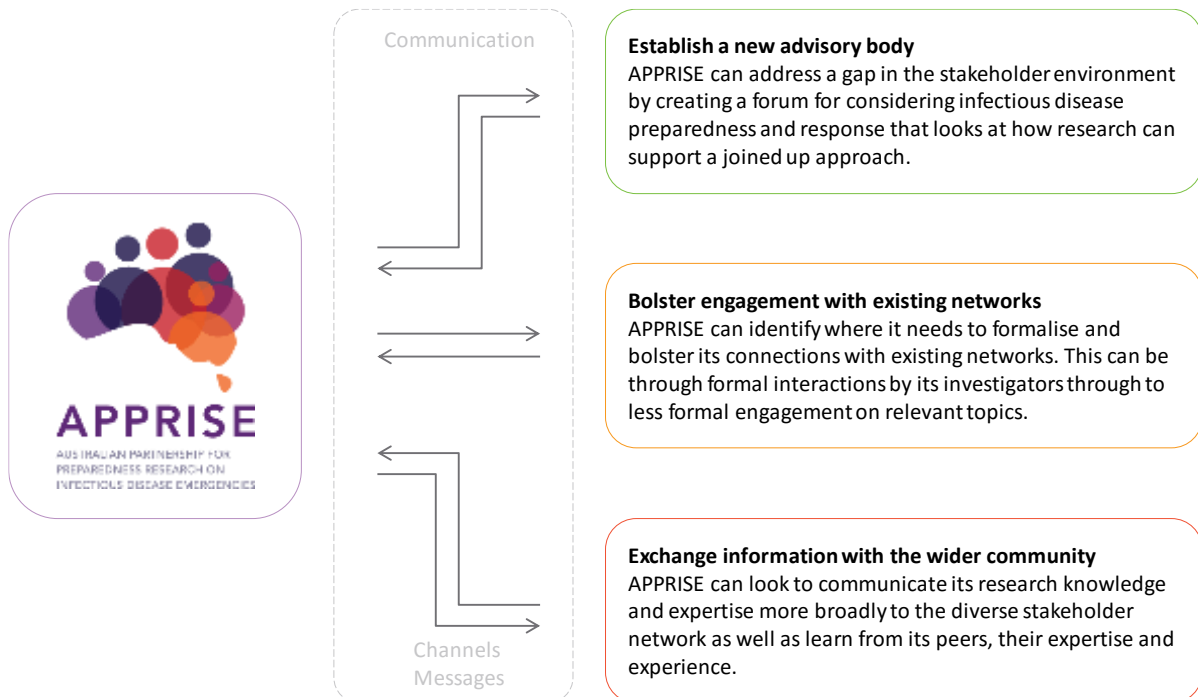
#### 6.1.4 A three-tiered approach can help APPRISE focus on greatest impact

To structure and prioritise its stakeholder engagement and collaboration activities, APPRISE can consider a three-tiered approach.

This three-tiered approach is outlined in Figure 7 which also acknowledges that at each tier APPRISE will need to consider the information and value it provides to each stakeholder group as well as the value and information it can gain from these interactions.

Additional description of these three tiers is provided below.

Figure 7: Three-tiered approach



The communications channels and messages APPRISE uses with each tier will be important and are discussed further in Section 7.

##### **Establish a new advisory body**

APPRISE established an Expert Reference Group to provide oversight and advice for this stakeholder consultation project that incorporated a range of stakeholder perspectives and disciplines. Membership of the Expert Reference Group is outlined at Appendix E.

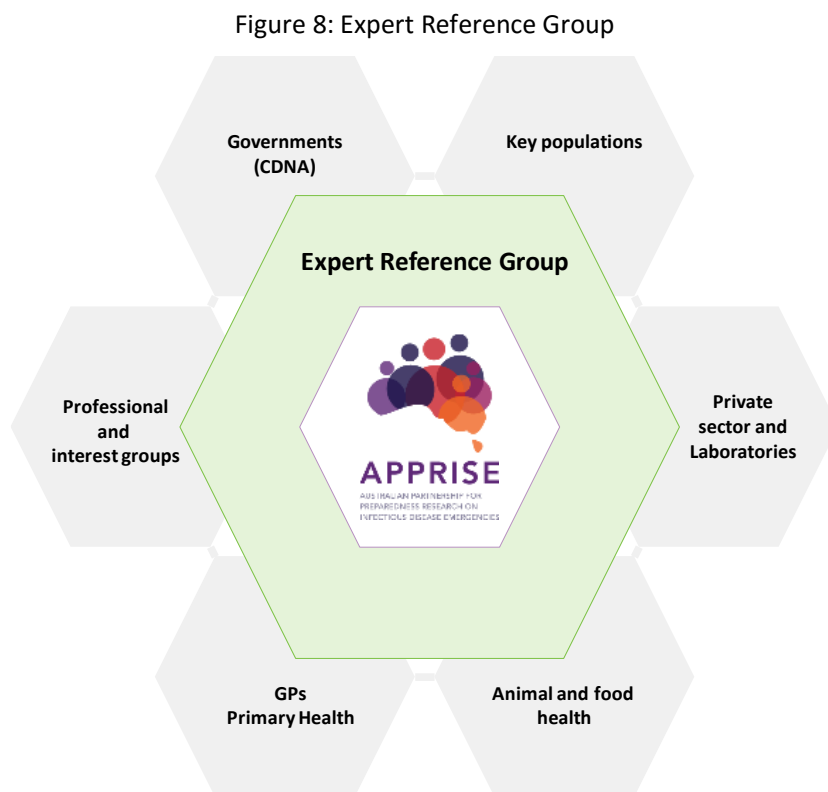
As discussed, there is an opportunity for APPRISE to create a forum that connects a diverse group of stakeholders with important roles to play in infectious disease preparedness and response that are not typically or currently joined up. A diverse network of stakeholders with an interest in how research can

enhance infectious disease emergency preparedness will be novel and potentially unmatched in other areas of research.

It is recommended that APPRISE look to review and expand the membership of the Expert Reference Group for this project to encompass a range of representatives from stakeholder groups and disciplines that play an important role in infectious disease preparedness and response.

In addition to providing expert advice to APPRISE and its investigators, this group could also be tasked with communicating key information on APPRISE and its work out to their networks.

A visual representation of this Expert Reference Group, its representation and how it might connect to a broader stakeholder network is provided in Figure 8. It is important to note that this diagram demonstrates a selection of stakeholder representation and is not intended to be exhaustive.



Nous suggests that as a minimum this group should include representatives of:

- the government public health network (such as a CDNA representative)
- other government agencies (in disciplines such as agriculture and primary industries, border control, foreign affairs, security and defence)
- the primary health environment – including general practitioners and nurses
- hospital workforce (such as infectious disease physicians)
- the national laboratory network (such as a PHLN representative)
- a mix of research disciplines (including behavioural research)
- the key populations groups identified by APPRISE
- relevant networks that would encompass more of a 'OneHealth' approach – such as animal and wildlife, food and environmental health networks

- representatives of key professional associations (such as Colleges and Societies), and
- the private sector.

APPRISE should develop explanatory material for this Expert Reference Group to outline how it will operate and the expectations of its members.

### **Bolster engagement with existing networks**

APPRISE should seek to identify and prioritise the networks it needs to engage with to:

- help *set the agenda* for its priority research and associated activities – both with policy setters and policy influencers
- help it *deliver high quality research* to improve infectious preparedness and response
- *translate* relevant research into impact; either in the policy or delivery spheres, and
- ensure the *ongoing sustainability* of its research work and momentum in its collaborative approaches for the future.

It should seek to engage with these networks in the best form possible to achieve its objectives and provide value that enhances overall preparedness and response across the country and internationally.

This could encompass a range of activities and forms of communication which are discussed in further detail below.

At all times in these engagements, APPRISE should seek to identify where it can:

- provide value to those it engages with, and
- leverage value from the participation of these stakeholders from other networks

to achieve its mission and objectives.

### **Exchange information with the wider community**

There is an opportunity for APPRISE to improve communication more broadly across its stakeholder environment with respect to infectious disease preparedness and response (this is discussed in further detail in Section 4). This includes the wider research, public health and emergency response community and stakeholders across associated infectious disease fields (e.g. animal and food-borne diseases).

By developing a plan for how it will communicate with stakeholders (see Section 7 below), APPRISE can proactively position itself as an authoritative voice on how research can enhance infectious disease preparedness and response.

#### **Recommendation 1**

**APPRISE should review the role and re-align the membership of its Expert Reference Group post consultations to focus on strategies that:**

- incorporate a broader group of stakeholders that can connect into the diverse networks involved with infectious disease preparedness and response; and**
- strengthen the sustainability of the APPRISE network beyond the life of the currently funded CRE.**

## **6.1.5 There are a range of ways APPRISE can engage with stakeholder groups**

Historically, there has been a range of ways that researchers have sought to engage stakeholders to inform their research as well as communicate their results.

APPRISE has envisaged it will engage with stakeholders using a range of mechanisms. Some of these are summarised in Figure 9.

Figure 9: Mechanisms to engage with stakeholders

Expert Reference Panel and APPRISE taskforces	Guideline development with key professional societies	Engagement with national health advisory groups
Collaboration with industry partners including commercialisation	Annual APPRISE scientific meeting and focused workshops	Research publication and presentation at local and international conferences
Scientific presentations to targeted stakeholder groups	Social, mainstream and online media engagement	Regular formal reporting to key national and international advisory committees

APPRISE has already started utilising some of these approaches. For example, it hosted a workshop with a range of stakeholders from across Australia in December 2016 to clarify Australia’s capacity to address the emergence of Zika virus (ZIKV) and to identify research gaps. The workshop focussed on four key areas – entomology, virology, public health and clinical diagnostics.

During consultations, stakeholders provided feedback based on their experience in other fields and areas of interest on:

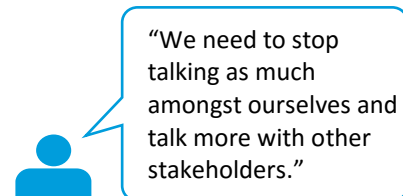
- areas where there would be value in APPRISE focusing its engagement effort, and
- how they would like to engage with APPRISE.

These are outlined below.

### Potential focus areas for APPRISE engagement

Areas identified by stakeholders where APPRISE could focus its engagement efforts included:

- fostering strong links into the existing government public health networks under the auspices of the Australian Health Protection Principal Committee (AHPPC) and its sub-committees:
  - Communicable Disease Network Australia (CDNA)
  - Public Health Laboratory Network (PHLN)
  - the Environmental Health Standing Committee (enHealth)
  - the National Health Emergency Management Standing Committee (NHEMS), and
  - the Blood Borne Viruses and STI Standing Committee (BBVSS)
- connecting with associated disease stakeholders and networks such as:
  - relevant government agencies – such as agriculture and primary industry agencies, security and border agencies, foreign affairs, defence and regulatory bodies
  - relevant networks – such as OzFoodNet, the National Biosecurity Committee (and its sub-committees) and Wildlife Health Australia.





- some stakeholders identified the need for stronger linkages between public health officials and what is happening in front line service provision; in hospitals, general practice and other parts of the primary health system.
- developing and sharing a consolidated map of all the relevant stakeholders related to infectious disease preparedness and response so stakeholders can better understand the environment.
- playing a leading role in the evaluation of responses post-outbreak and identifying lessons learned as well as the design, conduct and evaluation of exercises where preparedness and response arrangements are tested.
- while some examples were seen of strong intrastate networks with positive working relationships between governments, universities and the local health system, evidence of the learnings from these relationships being shared more broadly across the country were much less common.
- a need to effectively engage with our region and beyond to help global efforts to prepare for, and respond to, infectious disease threats and outbreaks.
- the importance of staying connected with the Masters of Applied Epidemiology program (at the ANU) and its network of graduates who play prominent roles in public health, infectious disease research and response.

Most of these focus areas and stakeholder groups were identified as important by APPRISE in its submission to the NHMRC. In this respect, it was pleasing to see such a high level of commonality in the stakeholder groups that APPRISE should engage.

### Suggested methods for stakeholder engagement

Figure 10 outlines some of the mechanisms stakeholders identified where APPRISE could provide value.

Figure 10: Methods for stakeholder engagement

 <p><b>Holding events and creating environments where stakeholders can learn</b></p>	<ul style="list-style-type: none"> <li>• Holding <b>workshops</b> with stakeholders on areas of interest and/or concern</li> <li>• Interactive <b>meetings, teleconferences and webinars</b> on priority topics and research findings</li> <li>• Holding <b>informal meetings</b> with key stakeholders when the opportunity presents as investigators travel around the country</li> <li>• The conduct of fora and <b>roadshows</b> around the country to share information on APPRISE, its research and other activities</li> <li>• Facilitating <b>rotations</b> where APPRISE PhD students and researchers can learn and share skills in public laboratory environments</li> </ul>
 <p><b>Sharing resources and providing feedback mechanisms</b></p>	<ul style="list-style-type: none"> <li>• Periodic <b>email circulars</b> to update people on the latest research activities, findings and practical applications</li> <li>• A <b>website</b> where researchers and other stakeholders could learn what research is happening in infectious disease and response related areas across Australia and abroad</li> <li>• Sharing <b>research data</b> to help inform other work and build the evidence base to inform</li> <li>• Sharing <b>case studies</b></li> <li>• Develop and <b>share guidelines</b> with stakeholders to help inform practitioners' responses to infectious disease threats</li> <li>• Provide <b>feedback mechanisms</b> for stakeholders when engaging so they can engage with APPRISE and its investigators</li> </ul>

These suggestions for engagement activities also have a great deal of overlap with APPRISE's identified methods for engagement. Where possible, the APPRISE team should seek to test new methods of engaging to see what resonates well with stakeholders and how these can be improved.

**At the APPRISE consolidation workshop, APPRISE investigators:**

- acknowledged that its investigator group held strong personal relationships with relevant stakeholder networks and that these had to be strengthened for APPRISE as a whole
- noted the importance of them individually playing a lead role in their local jurisdiction on behalf of APPRISE
- identified that their partnerships could influence the setting and shaping of the national agenda, effective translation and the ongoing sustainability of APPRISE's work.

**Recommendation 2**

**APPRISE should identify and prioritise which networks it will engage with directly in pursuit of achieving its objectives.**

Nous suggests that APPRISE should prioritise its networking efforts in the first instance with the following stakeholder bodies:

- CDNA
- an Indigenous network (such as the Lowitja Institute)
- an animal health network (such as AHA)
- an environmental health network (such as enHealth)
- a primary health / GP network (such as the Royal Australian College of GPs), and
- PHLN.

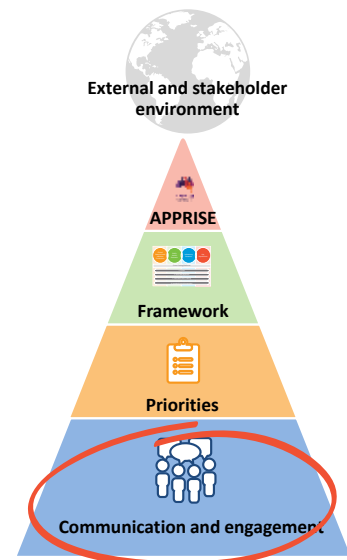
This is not to suggest that other stakeholder networks are not important. APPRISE will need to engage more broadly over time but these networks provide a useful starting point that can be used refine APPRISE's approach to engagement before expanding it to other priority stakeholder groups.

## 7 Communication

To improve its ability to enhance infectious disease preparedness and response through its research and translation, APPRISE will need to be adept at communicating its messages to stakeholders.

This will require clear and frequent communications with stakeholders in all areas of its activity.

This section of the report summarises the views of stakeholders on communication and provides Nous' findings and recommendations on how APPRISE can effectively communicate with its stakeholders to help achieve its aims.



### 7.1 Clear communication and adapted messages are required

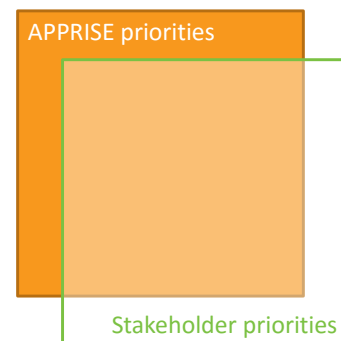
Nous' overall observation from the stakeholder consultation project is that the priority activities proposed by APPRISE have a high level of commonality with the priorities identified by stakeholders.

Stakeholders indicated a high level of agreement with the importance of the priorities APPRISE had identified for its research and associated activities.

In addition, a number of stakeholder suggestions for APPRISE areas of future focus were activities the investigator team had already intended to include in their scope of work.

Therefore, while APPRISE will consider all of the stakeholder suggestions for adapting its priority activities outlined in this report; equally (and perhaps more) important will be the need for APPRISE to clearly communicate to its stakeholders in future:

- what it will do
- what it won't do, and
- how it will work with stakeholders to deliver its objectives and activities.



#### 7.1.1 Stakeholders want clarity on the intent and boundaries of APPRISE

During the project's consultations, stakeholders were keenly interested in APPRISE and were looking for clear guidance on its intent and the boundaries of the activities it would undertake through until 2021.

The consultations uncovered a great deal of positive intent and goodwill on the behalf of participants who are keen to participate and ensure APPRISE is successful.

As discussed in Section 5, stakeholder workshops provided participants with:

- indicative summaries of the desired outcomes each research pillar and cross-cutting platform of work is seeking to achieve, and
- the scope of research activities designed by investigators to deliver these outcomes.

When presented with this level of information, stakeholders developed a stronger appreciation of the proposed scope of APPRISE and its activities. However, during consultations a number of areas remained unclear for stakeholders and led to requests for clarification.

This feedback on the scope of APPRISE was outlined in Section 5.

### 7.1.2 Communication in general could improve

A consistent message from stakeholders during the consultation program was that there are currently weaknesses and gaps in how information is communicated between various stakeholders relating to infectious disease outbreaks and response.

This was expressed in two ways:

- weaknesses in how communication occurs between researchers, policy makers and responders across the health sector (and also more broadly), and
- weaknesses in how governments currently communicate with the wider community on infectious disease awareness and response.

These two areas of weakness are discussed in more detail below.

#### **Weaknesses in communication between infectious disease stakeholders**

Consultations during this project heard that there was an opportunity to improve communications between all stakeholders involved with infectious disease preparedness and response. This included stakeholders from across the wide spectrum of participants; from researchers, to public health officials and health and emergency workers across the country (and the wider region).

This overall perspective was informed by stakeholders identifying several examples. These are summarised below.

- There is a level of disconnect between government health officials and the infectious disease research community. This currently manifests in several ways including:
  - public health officials not being aware of relevant infectious disease research being undertaken nationally (and internationally) across academic institutions
  - some stakeholders have a perception from reading research outputs that some researchers do not have a strong understanding of the practical operations of the health system, and
  - concerns that many researchers do not seek to engage with stakeholders in the health system early on when designing research activities.
- Stakeholders identified weaknesses in how communication currently occurs across Australia's jurisdictions, particularly in the event of infectious disease outbreaks.
- Stakeholders noted that communication has improved with Aboriginal and Torres Strait Islander communities during disease outbreaks, but that there is still much room for improvement.
- Stakeholders identified that communication between laboratories and infectious disease researchers across the country could be enhanced.
- Some stakeholders expressed concern about a lack of visibility of how consistently and how well messages that are communicated across jurisdictions are then passed through to local health systems and their health workforces.

- A view was expressed that there is currently a gap in understanding in Australia between the public health environment, the clinical environment and basic science that must be addressed by better communication.

### **Weaknesses in communication on infectious disease with the community**

Communication with the public is an essential component of our infectious disease preparedness and infection control in the event of any outbreaks.

Government stakeholders identified that the public health sector has an important role communicating with the community on infectious diseases, but that there was not currently a nationally coordinated media platform or response mechanism for most infectious disease threats. This absence was even more apparent for lower order but important diseases identified by stakeholders.

In this environment, where stakeholders identified the importance of communication with the community there were several challenges identified for communicating effectively on infectious disease matters.

Stakeholders identified difficulties in communicating the importance of infectious disease preparedness and response in times of outbreak and ensuring decision making was based on robust evidence. (The most commonly cited example was the use of thermal scanners at airports during the 2009 swine flu pandemic.)

One participant expressed a view that in the current environment where people have greater access to information than ever before and more information sources, people are turning away from science and relying more and more on unverified sources of information on health issues.

In this environment, it is more important than ever for the public health system to present clear and unequivocal advice on infectious disease threats and appropriate responses in the event of outbreaks.

There is an opportunity for APPRISE to:

- inform debate on appropriate infectious disease communication arrangements (and supporting governance arrangements) through its research activities, and
- add to the evidence base supporting the communication of key infectious disease messages by public health stakeholders.

### **7.1.3 Stakeholders seek different information from different channels**

A key challenge for APPRISE in communicating its objectives and scope will be the diverse nature of stakeholders it is seeking to engage through its activities.

As discussed in Section 4, the stakeholder environment for infectious disease preparedness and response is inherently complex.

#### **Each stakeholder group will have different reasons for connecting with APPRISE**

Within this environment, APPRISE will need to work and communicate with a large number of stakeholder groups that have different priorities and areas of interest. Each will want to hear different information from APPRISE on its priorities, activities and working arrangements.

An indicative sample of some of these stakeholder interests and information needs is provided in Table 4.

Table 4: Sample of stakeholder interests

	Stakeholder example	The value they will seek from APPRISE	The value they can bring to APPRISE
	<b>Researchers</b>	Information on how they can work with APPRISE or access its research and networks.	APPRISE will seek input from relevant researchers on its research priorities and projects.
	<b>Laboratories</b>	Public and private laboratories will seek information from APPRISE on what it is learning through its research and how this can enhance laboratory work.	Laboratories can work collaboratively with APPRISE researchers to investigate infectious disease threats and outbreaks and share skills.
	<b>GPs</b>	GPs will seek to understand best practice in responding to infectious disease outbreaks in their local settings.	GPs can assist APPRISE with the application of front line response practices and provide input to studies on infectious disease and its response in community settings.
	<b>Public health officials</b>	Health officials will want to understand cost effective solutions for preparedness and response and the effectiveness of their actions.	Officials can provide guidance on emerging priorities, practical workings of the health system and translation implications.
	<b>Aboriginal and Torres Strait Islander health workers</b>	Aboriginal and Torres Strait Islander health workers will want to be actively involved in designing community suitable responses to infectious disease outbreaks.	APPRISE researchers will want Indigenous health workers to help co-design infectious disease preparedness and response tools that are tailored to the cultural needs of their communities.
	<b>Animal health stakeholders</b>	Will want to share information and research insights on infectious disease preparedness and response, particularly at the animal-human interface.	Animal health stakeholders can work with APPRISE on common challenges and share knowledge on response and infection control with animal transmission implications.
	<b>Private pharmaceutical companies</b>	Companies are likely to seek to work with APPRISE and build on its research to develop vaccines and other products for commercial purposes.	Companies can provide APPRISE with data and perspectives on the development of vaccines and other products and the practical considerations of bringing these to market through established supply chains.
	<b>Government regulators</b>	Regulators will have an interest in how APPRISE research can broaden their knowledge, improve practices and inform regulatory settings in their fields of interest.	Regulators can provide advice to APPRISE on the regulatory impacts and implications for their research projects and share information on their activities.
	<b>Community citizens</b>	In the event of infectious disease outbreaks, people will likely seek additional information from trusted sources. APPRISE can be a source of this information alongside the public health system.	Citizens will be important participants in clinical studies and trials by APPRISE researchers and can bring the consumer's perspective to research and translation questions.

It will be important for APPRISE and its investigators to understand the specific needs of this diverse network of stakeholders when communicating the results and benefits of its research and how these can be applied to improve our overall preparedness and response.

### **Different stakeholders will prefer to access APPRISE communications through different channels**

This diverse group of stakeholders in the community will access information:

- from different sources
- via different channels, and
- at different times.

Examples of this diversity in how information is communicated and consumed include:

- most stakeholders indicated they were busier than ever and struggled to find the time to remain abreast of the latest research developments in this space. They indicated a range of ways in which they like to consume information from email newsletter summaries, to blogs and websites and informal meetings when relevant experts were in their location. Time consuming activities like reading full reports or attending symposia were less appealing.
- there is currently an over-emphasis on the use of social media channels like Twitter to disseminate information, which is directed to younger people. They indicated a need for the use of more traditional 'information' channels for older people.
- people in rural and remote communities will communicate through different channels than their urban peers, particularly for Aboriginal and Torres Strait Islander communities. These communities will often access information through word of mouth and radio still remains one of the most effective communication channels for reaching people in these locations.
- international student groups who often fly into Australia from overseas transport hubs will access information from their ethnic student cohorts rather than formal health channels. This presents risks that these groups may not be reached through traditional channels and inaccurate and/or misleading information may be passed through these networks.

In this complex environment, it will be harder than ever for researchers and health officials to effectively reach everyone in the community, and particularly 'at risk' stakeholder groups.

There is a need to ensure accurate messages around infectious disease threats and responses are being communicated in a timely manner and through channels that will reach the stakeholder groups you are trying to inform.

#### **At the APPRISE consolidation workshop, APPRISE investigators:**

- Acknowledged that their messaging will need to differ for each different stakeholder group.
- Stressed the importance of using the right language in communicating with stakeholders.
- Noted that it was important to explain that APPRISE funding does not cover its full range of research activities and it will need to leverage research funding from other sources.

### **7.1.4 The APPRISE offer and benefits should be tailored**

In this environment, it will important for APPRISE to quickly refine its messages around its purpose and what it will do in the coming years.

As discussed, there is a high level of commonality between the priorities identified by APPRISE investigators and those identified by stakeholders.

However, a key challenge for APPRISE is the need to communicate and engage effectively so there is a common understanding of the benefits that can be realised by APPRISE and its wider network of stakeholders involved with infectious disease preparedness and response.

### **Recommendation 3**

**APPRISE should finalise the key messages on its purpose and how it will work with stakeholders to deliver its desired outcomes.**

APPRISE should seek to refine its existing messages on its purpose and how it will work.

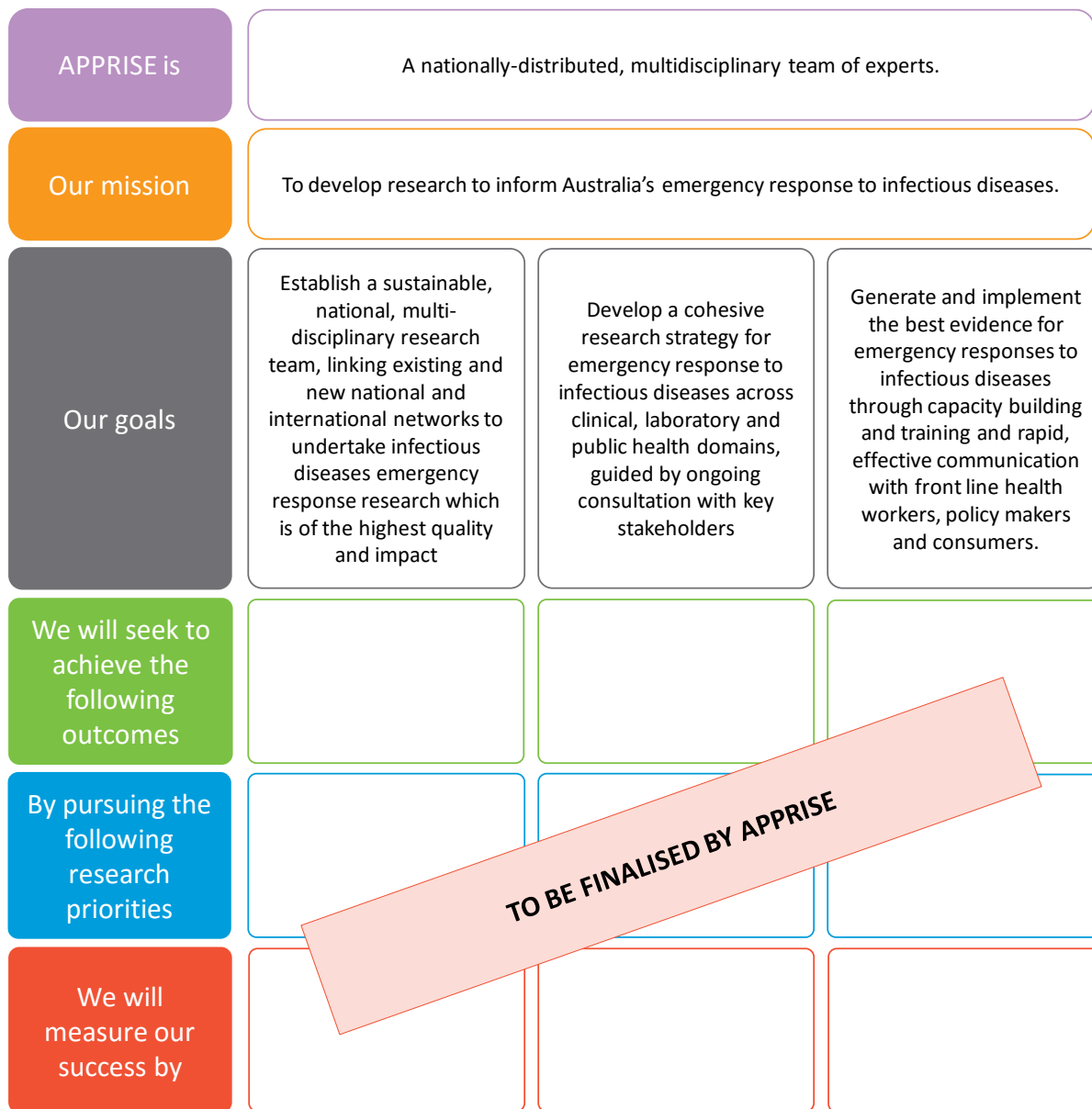
This should occur to:

- provide greater clarity around the scope of APPRISE and its activity
- take account of stakeholder feedback and any subsequent decisions it makes to adjust its approach and priority areas of focus
- identify the outcomes APPRISE is seeking to achieve
- outline how it will measure its success over the life of its funding period.

A suggested framework for how APPRISE's key messages can be structured and communicated is summarised in Figure 11.

APPRISE could use this framework as it develops and finalises its outcomes, priorities and measures of success over the coming months.

Figure 11: Framework for APPRISE'S key messages



The final summary picture of what APPRISE is, what it is seeking to achieve and how, can then underpin its communications with stakeholders into the future.

Following the conclusion of consultations with stakeholders for this project, the APPRISE investigators were presented with a summary of stakeholder feedback at a full day workshop.

At this workshop, the APPRISE team was asked to identify some of the key messages it would communicate to stakeholders when describing the Centre of Research Excellence.

A selection of some of the key messages identified by the APPRISE team is presented in Table 5. These messages can be refined and expanded upon in future.

Table 5: Indicative messages on the value APPRISE will create

Stakeholders	Key messages
<b>General messages</b>	“APPRISE is funded by the NHMRC to bring together leading Australian researchers to enhance our ability to respond to infectious diseases. It will undertake research, education and training to achieve this and to ensure capacity is sustained.”
	“APPRISE is the Australian network helping to facilitate, coordinate and communicate research in infectious disease preparedness and response.”
	“APPRISE can go through the ‘wish list’ of what we wished we had in the last pandemic to make sure we have it for the next emergency.”
	“We are a national group with expertise in infectious diseases and we’re coming together to know how to be best prepared for pandemics. We will do this through research and translation that helps the whole community. We’re going to get runs on the board early with tangible and visible work. We’ll also work on longer-term priorities.”
	“Infectious disease emergencies are like fires. APPRISE is like a fire drill, finding what information we need to minimise the threat.”
<b>For clinicians</b>	<p>“We will provide answers to you on questions such as:</p> <ul style="list-style-type: none"> <li>◦ How bad is the infectious disease outbreak?</li> <li>◦ What patients should I expect to see presenting?</li> <li>◦ How will I respond?”</li> </ul>
<b>For Indigenous populations</b>	“We want to work with your communities to make sure there is no ‘gap’ in health outcomes”
<b>For governments and Ministers</b>	“Infectious disease outbreaks are likely in the future and will have a high impact for the health system and the economy. APPRISE will help reduce these health and economic impacts.”
	“We are a ‘shop front’ selling capacity in research on how we prepare for, and respond to, infectious disease emergencies.”

#### Recommendation 4

**A communications strategy should be developed which summarises the key messages about APPRISE and how these will need to be tailored and communicated to various stakeholder groups.**

After finalising its key messages, APPRISE should develop a communications strategy to guide how it will communicate to its wide stakeholder network in the future.

The purpose of the communications strategy should be to ensure the right information on APPRISE and its activities is communicated to stakeholders, at the right time.

Through strategic communications APPRISE can:

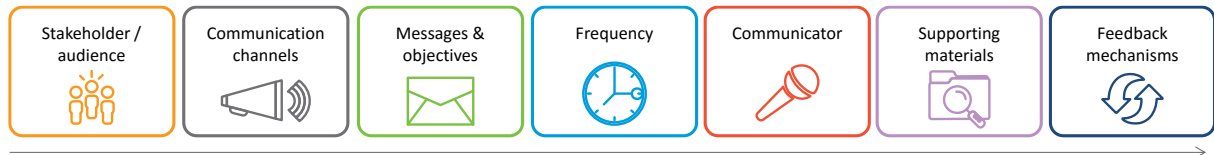
- deliver clear, understandable and consistent messages around all aspects of its work,
- provide a sufficient level of information for stakeholders, so that they understand what APPRISE does and doesn’t do, and
- create a dialogue around infectious disease preparedness and response that engages the wide variety of stakeholders with a role in this environment.

A proactive approach to communication can provide consistent information to address any stakeholder concerns and foster trust in APPRISE and its program of research and associated activities for the future.

This communication strategy should indicate who APPRISE will communicate with, why, how and when.

A summary of the information that can be included in a communications strategy is provided in Figure 12.

Figure 12: Elements of a communication strategy



There is an opportunity for APPRISE to play a leadership role in improving communication across the infectious disease preparedness and response environment.

APPRISE can seek to promote communication that is:

- timely
- evidence based
- transparent, and
- tailored to the way stakeholders want to receive their information.



“One area of opportunity is around communication arrangements in the case of an emergency. This is a risk area where there is an opportunity for some 'soft' research.”

APPRISE and its investigators can seek to achieve this in three ways:

- a) **By setting an example through its own communications** – through delivering transparent communications with all stakeholders, that is tailored to best meet their needs and based on high quality research evidence.

It is noted that effective communication will be a critical ingredient in the effective translation of research to improve practice.

- b) **By conducting research on the effectiveness of communications** in infectious disease preparedness and response in Australia and overseas.

Research can seek to explore in greater detail the effectiveness of communication in the local context including what works well and what doesn't. This can be compared to approaches elsewhere to identify lessons and areas for improvement.

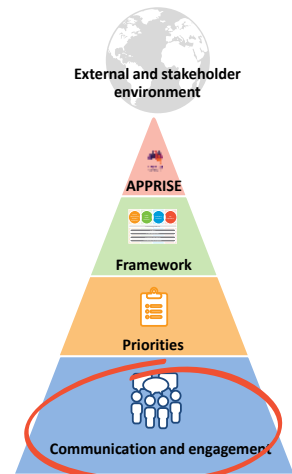
- c) **By becoming a respected voice** in public (and private) discussions on infectious disease preparedness and response that is underpinned by the experience of the APPRISE investigator team and their high-quality research evidence.

An additional suggestion made by one stakeholder was for APPRISE to engage a person with extensive experience and connections working in the health environment to assist with communications. This person could act as a liaison between the CRE and health stakeholders to forge relationships and foster a common understanding between stakeholders about the importance of research in times of outbreak and the intricacies of health departments during these events.

## 8 Translation of research outcomes

The ability of APPRISE to translate high quality research into improvements in infectious disease preparedness and response in Australia and beyond will be another critical factor in its ability to achieve its objectives and be acknowledged as a successful investment by the NHMRC.

This section of the report summarises the views of stakeholders on research translation and provides Nous' findings and recommendations on how APPRISE can position itself to maximise its impact through the translation of high quality research that enhances infectious disease preparedness and response.



### 8.1 Translation is currently ad hoc with mixed success

Stakeholders confirmed the importance of balancing pure research with utility in infectious disease research during consultations for this project. A heavy emphasis on one aspect of research at the expense of the other was likely to lead to missed opportunities to improve infectious disease preparedness and response and hinder stakeholder engagement.

#### **Research translation in this field is patchy**

In the current environment, stakeholders observed that the translation of research into practical changes and benefits has been mixed.

Several positive examples of research translation were identified by stakeholders that have occurred at the local levels within jurisdictions. Stakeholders were typically complementary of relationships between health departments, hospitals and university researchers within their jurisdictions.

On a national scale, there was less evidence of infectious disease research work being translated to improvements in policies or practices. One observer noted that jurisdictions will adopt different approaches as they each have different areas of focus based on their local circumstances and priorities.

#### **Weaknesses in translation can undermine our ability to respond in times of emergency outbreaks**

Some stakeholders identified the current weaknesses in translation as being a significant risk factor for the existing network's overall ability to respond to infectious disease emergencies.

As Australia does not have a strong culture of research translation in this field, our ability to respond will be dictated by global capacity, where we are on the receiving end of global vaccination products that are developed for the world. If a serious pathogen is identified in Australia first, some had concerns about the ability of our local market (and its supply chains) to respond effectively.

#### **Opportunities exist to translate existing research**

Stakeholders suggested that APPRISE should also look more broadly than its own research as a target for translation to improve policy and practice in infectious disease preparedness and response. Researchers suggested there is a body of existing research that has potential for translation that has not had the attention or resources devoted to reaping its potential benefits.

APPRISE investigators will have a strong sense of research in this field that has this potential.

## 8.2 Factors impeding translation were identified

Stakeholders identified a range of challenges and barriers that are contributing to the mixed record of translating infectious disease research into improvements in policy and practice.

### **An absence of national priorities for research on infectious disease preparedness and response is impeding translation**

The field of research on infectious disease preparedness and response does not have a clear national set of priorities or guidance indicating where research, including translation effort, should be focused.

As a result, this typically leaves researchers to work on priorities that are identified locally in their jurisdictions or that they identify themselves based on their experience and communications with stakeholders across the network.

Nous' hypothesis is that this absence of research priorities may be due to a range of factors such as:

- infectious disease preparedness and response being a 'system' challenge rather than solely the province of the health sector – which makes national coordination and leadership challenging
- with responsibility for infectious disease preparedness and response sitting in the public health sphere it competes with a range of other health priorities for funding and attention
- jurisdictions have limited resources to allocate to infectious disease activities, including surveillance and response, so research is afforded less priority, and
- there does not appear to be a culture of public health officials working at a national level with the research community to identify and address priorities.

During consultations with public health officials, they were often able to identify historical examples of infectious disease challenges which would have benefited from having additional research and translation capacity available at the time. These were left unaddressed without the resources and capacity available to address them. While public health officials had ideas for research and translation priorities, there is an opportunity for these to be advocated more strongly to researchers.

This absence of national research priorities has a flow on impact for translation, as public health officials are critical stakeholders for translating research in jurisdictional health systems.

This gap between the public health system and the research community is one APPRISE can help bridge.

#### **CDNA recently shared its Strategic Plan for 2017-2019**

Near the conclusion of this project, CDNA shared its new Strategic Plan for 2017-2019 (which was endorsed by the AHPPC on 12 May 2017) with the project.

The plan sets out CDNA's objectives and strategic priorities for the next two years and is based on the principles outlined in the National Framework for Communicable Disease Control and its implementation plan. The plan outlines two principal objectives, four strategic priorities and strategies to achieve them.

Perhaps tellingly, the Strategic Plan does not make explicit reference to APPRISE or other CREs but it does identify the importance of evidence-based policies in determining Australia's preparedness and response to communicable diseases.

Our review of the Strategic Plan identifies that many of the priorities and strategies of CDNA align with those of APPRISE. As a result, there are likely to be many opportunities for the work of APPRISE to explicitly contribute to the objectives of the CDNA over this period.

### **Research and its translation has been an afterthought in outbreaks**

The infectious disease response environment is one that deals with time critical challenges and a sensitive climate. Health (and other) systems must respond quickly and carefully to identify and contain infections.

In this climate, health officials must investigate disease-related emergencies rapidly in collaboration with a range of stakeholders including other jurisdictions, laboratories, doctors, vets, hospitals, health and emergency services (to name a few). Pressure will be increased by interest from Ministers and the media. In times of outbreaks, hospital environments can be unwelcoming environments for researchers.

Officials will seek data and evidence from stakeholders to inform rapid response. In these situations, activity occurs more rapidly than typical research work. As a result, public health officials have historically been more inclined to coordinate with researchers after the time critical period of response has passed.

For example, researchers have been involved in post-outbreak evaluations and associated research.

APPRISE is seeking to put in place research protocols, ethics approvals and sample collection and analysis processes prior to outbreaks – using the knowledge from existing routine testing that can have surge capacity.

Practitioners are sceptical about the ability to do this but highly supportive of the idea if it can be achieved.

### **Stakeholders identified systemic barriers to research translation**

In consultations, stakeholders suggested there were several systemic barriers to the translation of research in the infectious disease environment.

Some of the barriers identified by stakeholders related to resourcing. Resource scarcity in jurisdictions is resulting in little appetite for trialling new approaches and a preference for proven interventions and practices. In addition, it is leading to concerns from some that conflicts over scarce resources will result in resources being diverted away from translation activities

Finally, while there are examples of publicly funded research with an emphasis on translation in the health space<sup>13</sup>, government health officials will have less incentive to assist in practical research translation where they have not invested directly in that research (particularly at the national level).

An example was provided from the animal health space to illustrate this dynamic. It was explained that much of the research in this field is translated by peak bodies and primary producers as research is funded by joint-funded R&D organisations where producers have a direct financial interest in outcomes being achieved.

Concerns around data sharing and privacy implications impeding translation activity were also raised by participants.

Stakeholders suggested there is an opportunity for APPRISE to research and consider the wide range of systemic barriers to achieving translation and policy impact.

### **Research does not always seek to identify the outcomes it is seeking to achieve**

During consultations, a number of stakeholders observed that research is often conducted without a clear picture of the outcomes it is seeking to achieve, particularly through translation.

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<sup>13</sup> The NSW Ministry of Health indicated it has grants for translational research.

These stakeholders often posed a “so what” question in relation to some of the research priorities that have been identified by APPRISE. They were keen to understand what practical impact or outcomes APPRISE was seeking to deliver from its research activities.

An inability to clearly articulate the outcomes research is seeking to achieve will inhibit its chances of gaining attention and an investment of time from stakeholders to assist with its translation into practice.



“Any research findings that APPRISE can come up with need to be able to convert into some simple, practical advice that we can direct and make a decision on. Firm and clear recommendations. We recommend you do X.”

It will be important for APPRISE to articulate how it can influence and improve our region’s overall preparedness and response through its research and translation to gain support and cooperation.

### **Research settings place little emphasis on rewarding translation**

Stakeholders across the health system and infectious disease community more broadly will seek to make decisions and change practices having reliance on sound evidence. Establishing credible evidence to support change is by its nature a lengthy process.

The generation of high quality research takes time, as does the peer review process, to ensure it can be used reliably by practitioners to adapt their practices to achieve better outcomes and improve preparedness and response. Once this research is published and presented to stakeholders, it requires additional time to gain acceptance and implementation in health (and other) systems.

As a result, there is a natural challenge for researchers to shape changes in practice when their results will not typically be available until challenges have subsided.

In addition, the achievement of lasting impact and change in the health environment is not the only driver of research activity. Stakeholders identified that the research environment does not always reward the achievement of translation outcomes and rather has a focus on outputs such as publications and citations.

## **8.3 Historical examples of translation success and failure point to success factors**

During consultations, stakeholders identified a range of examples of research that:

- had been successfully translated to deliver improved practice in infectious disease preparedness and response, and
- had failed to realise any practical benefits.

These examples revealed a series of common success factors and pitfalls that can be used by APPRISE to help shape its research and translation activities and maximise its chances of delivering sustained impact.

A summary of these success factors and pitfalls is provided in Table 6.

Table 6: Translation success factors and pitfalls

✓ Translation success factors	✗ Translation pitfalls
<ul style="list-style-type: none"> <li>✓ <b>Strong research plans supported by pre-approved protocols and adequate funding</b> <ul style="list-style-type: none"> <li>◦ Well-designed and focused research plans with a clear strategy for translation from the beginning</li> <li>◦ Pre-approved research protocols enabled rapid research</li> <li>◦ Use of years of accumulated research and data sets</li> <li>◦ Open sharing of research methods</li> <li>◦ Lessons learnt from overseas and previous outbreaks</li> </ul> </li> <li>✓ <b>Effective collaboration with public health officials</b> <ul style="list-style-type: none"> <li>◦ Research done in tandem with the public health response</li> <li>◦ Ability to follow people from hospitals to homes</li> <li>◦ Use of 'experts' on the ground to support research</li> </ul> </li> <li>✓ <b>Effective engagement with stakeholders and industry</b> <ul style="list-style-type: none"> <li>◦ Early and thorough consultation with stakeholders</li> <li>◦ Use of existing and new networks, leading to the expansion of networks</li> <li>◦ Effective involvement of industry</li> </ul> </li> <li>✓ <b>Effective engagement with key populations</b> <ul style="list-style-type: none"> <li>◦ Use of Action Research to improve research practices and involve communities in research</li> <li>◦ Improved understanding of and use of media to communicate with key populations</li> <li>◦ Community clearly understood the response</li> </ul> </li> <li>✓ <b>Utilisation of capacity building opportunities</b> <ul style="list-style-type: none"> <li>◦ Researchers ensured strong capacity building opportunities for research students, key populations and other stakeholders</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>✗ <b>Poor research processes and lack of practical solutions</b> <ul style="list-style-type: none"> <li>◦ Lengthy research/ethics approvals meant the epidemic was almost over by the time research happened</li> <li>◦ Impractical solutions proposed by researchers</li> <li>◦ Failure to maintain the community of practice after the response</li> </ul> </li> <li>✗ <b>Poor engagement with politicians and the public</b> <ul style="list-style-type: none"> <li>◦ Failure to convince politicians and the public on the evidence</li> <li>◦ Political pressure – e.g. thermal scanners – politicians need to be seen to do something but we needed to communicate better the lack of evidence for this practice</li> <li>◦ 'Pandemic' fatigue among politicians and the public</li> </ul> </li> <li>✗ <b>Lack of a coordinated response</b> <ul style="list-style-type: none"> <li>◦ Disconnected responses between Dept. of Defence, Animal Health, Dept. of Health and researchers</li> </ul> </li> <li>✗ <b>Poor communication with stakeholders</b> <ul style="list-style-type: none"> <li>◦ Lack of tailored communication for different stakeholders</li> </ul> </li> <li>✗ <b>Poor engagement with key populations</b> <ul style="list-style-type: none"> <li>◦ Failure to address cultural issues</li> <li>◦ Failure to tailor communication to key populations</li> </ul> </li> <li>✗ <b>Failure to engage the private sector</b> <ul style="list-style-type: none"> <li>◦ Failure to understand priorities of private industry</li> </ul> </li> </ul>

**At the APPRISE consolidation workshop, APPRISE investigators:**

- Acknowledged the need to consider how research could be designed and socialised to maximise its chances of being translated to improve preparedness and response.
- Considered strategies for how they could improve the translation of their research into:
  - policy making activities
  - enhancing our preparedness
  - better response to infectious disease outbreaks.
- Identified that their existing relationships were strongest in, and therefore most able to influence, the policy making environment.

## 8.4 APPRISE can adopt strategies to increase its translational impact

Based on the evidence collected in stakeholder consultations, there is a need to take different approaches to achieving impact through research translation.

APPRISE has a challenge to do things differently than they have been done in the past and address some of the practical and cultural barriers that are currently impeding success in this area.

There is an opportunity for APPRISE to help build a stronger culture of collaboration across its stakeholder networks to enhance its overall efforts to improve infectious disease preparedness and response through translatable research.

A series of recommendations are proposed for APPRISE consideration.

### **APPRISE must work closely with public health officials to identify priorities for translation**

It is important for APPRISE to work with stakeholders to identify the priorities for research and translation and this stakeholder consultation project is an important first step in this direction.

While the wider stakeholder environment has offered useful feedback to help APPRISE shape its priorities, to have an impact through translation, stakeholders from the public health system will play a key role.

Research activities that align with the priorities of public health stakeholders are much more likely to attract support for translation than research perceived to have less importance.

As public health officials write policies, can rapidly change guidelines when there is an emergency and conduct evaluations following outbreaks they have more influence over government practice than clinicians in this environment.

Similarly, research with potential national benefits will attract greater interest from these officials and enable them to work together on translation strategies.

Therefore, connections at the national level with CDNA (and similar bodies such as PHLN, OzFoodNet and enHealth) will be crucial in this environment.



“It is the jurisdictions that should identify the priorities for researchers.”

### **Recommendation 5**

**APPRISE should work closely with CDNA (and similar public health groups) to identify opportunities to align research and translation priorities as much as possible.**

The recent finalisation of the CDNA Strategic Plan (for 2017-19) and the submission of APPRISE research priorities to NHMRC (and the AHPPC) present a timely opportunity for the two groups to discuss areas of potential research priority and collaboration for the future.

There may be opportunities through this relationship for joint activities and investment in priority research topics that can have immediate implications for preparedness and response.

### **There is an opportunity for research to be conducted into systemic translation barriers**

As identified by stakeholders in consultations there are currently a range of systemic and cultural barriers to the successful translation of research.

APPRISE can seek to build on these observations to conduct research on:

- what the barriers are to effective translation
- what are the factors that lead to effective translation in this environment.

Research in this space has the opportunity to identify what works effectively in other fields of health, and behavioural, research that can be applied in the infectious disease environment.

APPRISE can work with other CREs on this topic to identify common issues and themes across the country and help with consistency in the future.

#### **Recommendation 6**

**APPRISE should consider conducting detailed research into the barriers and success factors for translation in the infectious disease research environment.**

#### **APPRISE should give greater emphasis to communicating its approach to research translation**

A number of stakeholders during the consultation process identified that research translation is not mentioned explicitly in APPRISE's current pillars and platforms framework.

Given the growing emphasis for governments in funding research that will translate rapidly into results, it is worth APPRISE considering how it can emphasise its plans to ensure research translates into improvements in practice.

#### **Recommendation 7**

**APPRISE should confirm and actively promote its approach to translating research that will have an impact on infectious disease preparedness arrangements and response activities.**

There are a number of ways APPRISE can demonstrate the importance it is applying to research translation including:

- explicit mention of translation activity in its pillars and platforms framework (or similar presentation of how it will conduct its work)
- a strong emphasis on identifying the outcomes research is seeking to achieve, including translational impact, and how these will be measured and reported, and
- prioritising the research it will seek to translate immediately with its stakeholders.

## 9 Conclusion

The stakeholder consultation program has been a successful activity for eliciting the views of stakeholders of the future role of APPRISE and its priorities for research and associated activities.

Stakeholders valued the opportunity to provide input to APPRISE and its consideration of some of the key challenges facing Australia (and the world more broadly) on the best ways to prepare for and respond to infectious disease emergencies.

While some stakeholders expressed reservations and scepticism about what can be achieved by APPRISE given existing barriers and cultural practices, they were open to being involved.

As APPRISE finalises its research priorities for the coming years it will be important for the CRE to:

- work collaboratively with a range of stakeholder networks to provide a joined-up perspective on the research required to strengthen our capacity to address infectious disease threats
- provide clear and tailored communications to stakeholders, as well as actively listen to their perspectives, to enhance the value and impact of its work, and
- work closely with key stakeholders to drive the effective translation of research into sustainable impact that improves preparedness and response.

### Overview of recommendations

#### Recommendation 1

APPRISE should review the role and re-align the membership of its Expert Reference Group post consultations to focus on strategies that:

- i) incorporate a broader group of stakeholders that can connect into the diverse networks involved with infectious disease preparedness and response; and
- ii) strengthen the sustainability of the APPRISE network beyond the life of the currently funded CRE.

#### Recommendation 2

APPRISE should identify and prioritise which networks it will engage with directly in pursuit of achieving its objectives.

#### Recommendation 3

APPRISE should finalise the key messages on its purpose and how it will work with stakeholders to deliver its desired outcomes.

#### Recommendation 4

A communications strategy should be developed which summarises the key messages about APPRISE and how these will need to be tailored and communicated to various stakeholder groups.

#### Recommendation 5

APPRISE should work closely with CDNA (and similar public health groups) to identify opportunities to align research and translation priorities as much as possible.

#### Recommendation 6

APPRISE should consider conducting detailed research into the barriers and success factors for translation in the infectious disease research environment.

#### Recommendation 7

APPRISE should confirm and actively promote its approach to translating research that will have an impact on infectious disease preparedness arrangements and response activities.

## Appendix A APPRISE Investigators

Table 7 provides the names and institutions of the APPRISE Chief Investigators and Associate Investigators.

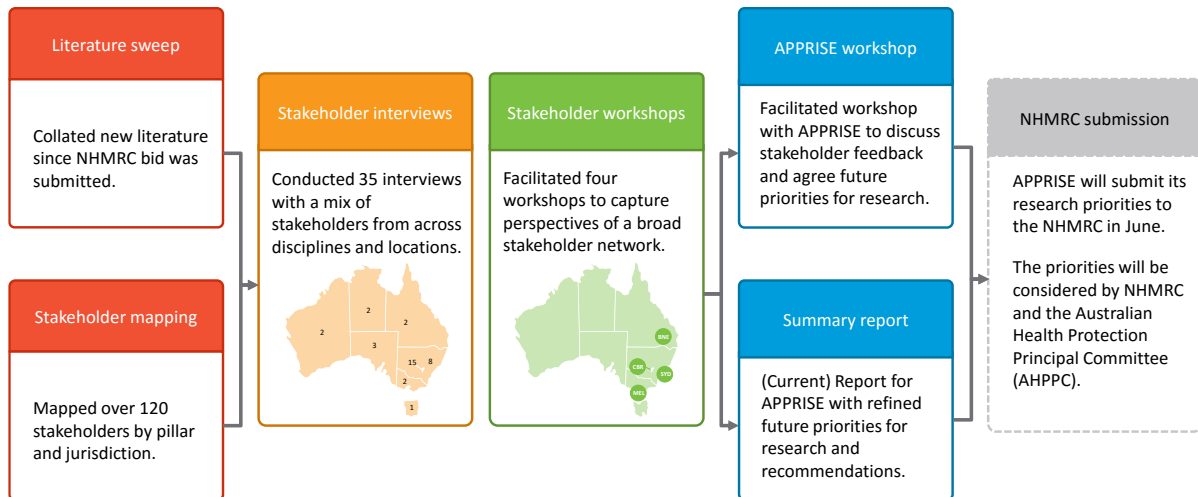
Table 7: APPRISE Chief Investigators and Associate Investigators

Name	Institution
<b>Chief Investigators</b>	
Sharon Lewin	University of Melbourne
Tania Sorrell	Westmead Millennium Institute
Jodie McVernon	University of Melbourne
Steve Webb	University of Western Australia
John Kaldor	University of New South Wales
Ross Andrews	Menzies School of Health Research, Charles Darwin University
Allen Cheng	Monash University
Lyn Gilbert	University of Sydney
David Smith	Pathwest Laboratory Medicine
Soren Alexandersen	Deakin University
<b>Associate Investigators</b>	
David Paterson	University of Queensland
Nigel Stocks	University of Adelaide
Peter Massey	James Cook University
Angus Dawson	University of Sydney
Kristine Macartney	The Children's Hospital at Westmead
David Irving	Australian Red Cross Blood Service
Stephen Lambert	University of Queensland
Adrian Miller	Griffith University
Scott Ritchie	James Cook University
David Anderson	Burnet Institute

## Appendix B Methodology

Figure 13 provides a detailed description of Nous' methodology for the project, including key project activities, number and type of stakeholders consulted and the format of stakeholder consultations.

Figure 13: Key activities and outputs



Nous conducted the project between January and May 2017. The project involved a high-level literature scan, extensive stakeholder interviews and workshops, and a final workshop with APPRISE to inform the Summary Report.

Each key activity is described in additional detail below.

### Literature sweep

Nous conducted a high-level scan of the literature to gain an understanding of the current and emerging areas of research on infectious diseases in Australia and internationally.

This literature sweep combined:

- summarising the literature reference in the APPRISE funding submission to the NHMRC, and
- calling on APPRISE investigators to identify additional literature of relevance, both:
  - that was not referenced in the initial submission, and
  - that had been published between 2015 and 2017; the intervening period since the APPRISE submission was lodged.

This sweep included a high-level review of communicable disease control policies, pandemic preparedness plans and relevant national policy documents.

The areas of research were mapped to APPRISE's four pillars and platforms to identify the number of articles, or extent of research that had been conducted for each pillar and platform. This provided an overall view of the research landscape to inform subsequent stakeholder mapping and was summarised for APPRISE pillar and platform leaders to assist in their future activities.

## Stakeholder mapping

Guided by the literature scan, Nous identified and mapped stakeholders against the pillars (and platforms to a lesser extent) as well as jurisdictions.

Special consideration was given to key populations, such as Indigenous Australians and people from CALD communities, to ensure there was representation for these groups.

## Stakeholder engagement

Nous developed a stakeholder engagement program to determine the methods for consultation that would ensure a representative cross-section of views.

Based on the stakeholder mapping activity, Nous then tested its proposed consultation approach with the APPRISE Executive and Expert Reference Group.

Nous worked with APPRISE to agree to a two-tiered approach:

- a. **Interviews** (N=35) with stakeholders across clinical research, public health, laboratory research, and key populations.
- b. **Workshops** (N=4) in Sydney, Melbourne, Brisbane and Canberra to bring experts and stakeholders together to share and discuss their views.

The location of workshops was determined based on the concentration of stakeholders in these cities. Stakeholders in other cities could dial in to these workshops if they were unable to attend in person.

A diverse range of stakeholders participated in interviews and workshops, including:

- Commonwealth, state and territory government officials
- academic researchers
- general practitioners
- laboratory representatives
- animal health
- refugee health
- educators
- Aboriginal and Torres Strait Islander health workers
- private sector.

See Appendix F for a detailed list of stakeholders.

Nous developed facilitation guides for interviews and workshops to explore stakeholders' views on:

- APPRISE's role and its proposed research pillars and platforms
- APPRISE's proposed research priorities
- strategies and mechanisms for ongoing collaboration, engagement and translation of research outcomes into changes in health policy and service delivery.

## Workshop with APPRISE

Nous conducted a workshop with APPRISE to present the findings from stakeholder consultations.

The workshop brought together Chief Investigators and Associate Investigators to:

- discuss stakeholder views on the APPRISE concept, framework and proposed research activities

- identify where APPRISE efforts should be prioritised based on the input
- determine how APPRISE could best communicate its future direction
- develop strategies for APPRISE to build and foster collaborative networks, effectively translate its research, and develop workforce capability.

The insights from the workshop were used to inform Nous' Summary Report to APPRISE.

### **Report for APPRISE**

The findings from stakeholder consultations and the APPRISE workshop were synthesised into a Summary Report (i.e. this report).

The report presents feedback from stakeholders and provides Nous' insights and recommendations for APPRISE to consider in establishing and sustaining a truly national network for improved policy making, preparedness and response to infectious diseases.

APPRISE will use this report as a foundation to submit its research priorities to NHMRC in June 2017.

### **Submission of APPRISE response to NHMRC**

With this Nous' report, APPRISE will submit its proposed research priorities to NHMRC in June 2017.

The priorities will be considered by NHMRC and the AHPPC and will impact a final decision by NHMRC to confirm APPRISE's funding for the remaining years of its agreement.

# Appendix C The APPRISE pillars and platforms and research priorities

## C.1 Pillars

APPRISE has four pillars that organises its work: clinical research and infection prevention; public health research; laboratory research; and key populations (see Figure 14). The proposed outcomes and research priorities for each pillar are described below.

Figure 14: APPRISE’s four key pillars

Clinical Research & Infection Prevention	Public Health Research	Laboratory Research	Key Populations
<ol style="list-style-type: none"> <li>1. Development of protocols for urgent studies of interventions and outcomes in the event of a pandemic, nested within established global networks</li> <li>2. Participating in other relevant hospital and community based trials networks</li> <li>3. Development of research protocols for new diseases through existing clinical surveillance systems.</li> <li>4. Optimise infection prevention in the healthcare setting</li> <li>5. Optimise infection prevention in the community setting with real-time evaluation of ethics, attitudes and behaviours.</li> <li>6. To rapidly activate collection of biological samples</li> <li>7. To establish systems for national and international data co-ordination and information sharing</li> </ol>	<ol style="list-style-type: none"> <li>1. Enhanced case finding</li> <li>2. Community based surveillance studies</li> <li>3. Test denominator reporting</li> <li>4. Serosurveillance</li> <li>5. Surveillance at the animal-human interface</li> <li>6. Collaborative research with other sectors and agencies</li> </ol>	<ol style="list-style-type: none"> <li>1. Establish national capacity for specimen collection needed for diagnostic and pathogenicity studies</li> <li>2. Building diagnostic capacity in non-reference laboratories and point of care settings</li> <li>3. Developing safe handling protocols for new and potentially dangerous pathogens</li> <li>4. Strengthening animal-human health collaboration for assessment of epidemic risk</li> <li>5. Improving vector surveillance</li> <li>6. Developing tools for pathogen discovery and understanding transmission</li> </ol>	<ol style="list-style-type: none"> <li>1. Asia-Pacific</li> <li>2. Indigenous</li> <li>3. CALD/Immigrant communities</li> <li>4. Front-line workers</li> </ol>

### C.1.1 Clinical Research and Infection Prevention

The Clinical Research and Infection Prevention Pillar seeks to establish pre-approved observational and interventional study protocols and infection prevention practices that can be activated in the event of an infectious disease emergency. These protocols and practices will integrate with existing international networks and provide standardised clinical data.

#### Proposed outcomes

- Clinical trials are integrated within existing clinical research networks
- Pre-approved observational and interventional study protocols are established
- Novel infection prevention training strategies are evaluated

## Proposed research priorities

### **1. Development of protocols for urgent studies of interventions and outcomes in the event of a pandemic, nested within established global networks**

APPRISE will support the development of protocols for research studies conducted during a pandemic response. This includes pre-approved protocols that address ethical, legal and regulatory issues in advance of a disease outbreak. Protocols will cover different types of research studies and harmonise with global networks.

### **2. Participating in relevant hospital and community based trials networks**

APPRISE will collaborate with a range of networks of infectious disease physicians to support and enhance clinical trials in hospitals and community settings. This priority includes the development of protocols for clinical trials during disease outbreaks.

### **3. Development of research protocols for new diseases through existing clinical surveillance systems.**

APPRISE will support the development of research protocols for clinical surveillance systems. This will support periodic observational studies and the rapid conduct of clinical surveillance during an outbreak. Research protocols should align with global protocols, standards and definitions.

### **4. Optimise infection prevention in the healthcare setting**

This priority seeks to address controversies and barriers to infection prevention practices in healthcare settings. APPRISE will conduct range of research activities in collaboration with health workers, clinicians, administrators and policy makers. This includes scenario based qualitative research, multidisciplinary response modelling and training programs for health workers.

### **5. Optimise infection prevention in the community setting with real-time evaluation of ethics, attitudes and behaviours**

This priority aims to inform best practice to reduce transmission in community settings, including businesses, schools and households. This priority overlaps with Pillar 2: Public Health and Platform 1: Ethics.

### **6. Rapidly activate collection of biological samples**

This priority focuses on developing bio-banking capabilities to support timely and efficient collection of samples for future studies. This priority overlaps with Pillar 3: Laboratory Research.

### **7. Establish systems for national and international data coordination and information sharing**

APPRISE will engage with local and international networks to support and coordinate the sharing of data and information. This priority overlaps with Platform 2: Data management.

## C.1.2 Public Health Research

The Public Health Pillar seeks to optimise disease surveillance and reporting practices between and during infectious disease emergencies to guide appropriate responses. This optimisation will involve enhanced cross-sector collaboration between diagnostic laboratories, surveillance networks and organisations working at the animal-human interface.

### Proposed outcomes

- Serosurveillance is optimised in line with global best practice
- Diagnostic test denominator reporting is improved

- Opportunities are identified for surveillance at the animal-human interface.

## Proposed research priorities

### 1. Enhanced case finding

APPRISE will develop protocols to support the collection of diagnostic and serologic specimens from cases identified by public health officials in households, schools and other settings. These protocols will focus mainly on case findings in the initial stage of a disease outbreak.

### 2. Community based surveillance studies

This priority aims to understand the incidence and severity of seasonal outbreaks and the course of individuals through the health system. APPRISE will seek to model the potential for near real-time community based surveillance during emergency infection events. APPRISE will collaborate with other research groups to conduct 'proof of concept' studies and link administrative datasets.

### 3. Test denominator reporting

This priority is focused on making a business case for sustained practice in national test denominator reporting. It requires major cross-sectoral effort (particularly with laboratories) to prove need and address barriers to routine reporting (e.g. through changes to laboratory accreditation standards). This priority overlaps with Pillar 3: Laboratory Research.

### 4. Serosurveillance

This was identified as a critical research deficiency in the Review of Australia's Response to Pandemic (H1N1) 2009. The priority focuses on developing a comprehensive national resource for serosurveillance to assess population susceptibility (in support of the 2017 Pandemic Plan). This priority overlaps with Pillar 4: Key Populations.

### 5. Surveillance at the animal-human interface

APPRISE will develop protocols for serologic assessment of zoonotic infection in humans exposed to a confirmed animal source. This will focus on people at highest risk, including farmers, animal workers and veterinarians. APPRISE will also perform pilot studies of emerging infections in farmers, working with relevant farmer and health organisations. This priority overlaps with Pillar 4: Key Populations.

### 6. Collaborative research with other sectors and agencies

This priority is focused on supporting non-medical organisations that may need to respond to the first cases of a new disease. APPRISE will develop adaptive protocols for these organisations that focus on operational planning and response.

## C.1.3 Laboratory Research

The Laboratory Research Pillar seeks to develop novel diagnostic tests for known and emerging pathogens and improve access to testing in remote areas. Significant emphasis on the development of a national biobank will facilitate research in this area, as will fostering links between animal and human health.

### Proposed outcomes

- A national biobank for PBMC, plasma and organisms is established
- Improved diagnostics are developed for new organisms and access is improved for remote areas
- Links are fostered between animal and human health.

## Proposed research priorities

### 1. Establish national capacity for specimen collection needed for diagnostic and pathogenicity studies

APPRISE will invest in building national capacity and skills to store appropriate, curated samples and clinical information in an emergency response to an infectious disease. APPRISE will support a national laboratory network to enable specimen identification, processing and storage during an emergency response. This priority overlaps with Pillar 1: Clinical Research and Infection Prevention.

### 2. Building diagnostic capacity in non-reference laboratories and point of care settings

APPRISE will develop technologies to conduct diagnostic tests with deployable equipment (based on existing tests for influenza) and establish new tests for point-of-care and remote areas services. This will enhance rapid responses to disease outbreaks. This priority overlaps with Pillar 1: Clinical Research and Infection Prevention and Pillar 2: Public Health.

### 3. Developing safe handling protocols for new and potentially dangerous pathogens

This priority aims to improve the effectiveness of inactivation protocols for potentially dangerous pathogens so that testing can be conducted outside laboratories where safe to do so. APPRISE will develop a program to rapidly evaluate pathogen inactivation strategies.

### 4. Strengthening animal-human health collaboration for assessment of epidemic risk

In the early phase of an epidemic, prevalence in an animal reservoir may far exceed that in humans. This priority focuses on using this opportunity for live pathogen studies. Such studies can include test development and validation, and animal trials of vaccines and therapeutic agents.

### 5. Improving vector surveillance

This priority focuses on developing new molecular methods and high quality nucleic tests for detecting and characterising vectors and viruses. This will support high throughput, reliable and consistent detection of these agents.

### 6. Developing tools for pathogen discovery and understanding transmission

This priority focuses on the development of new tools for discovering and understanding transmission pathways of pathogens. This includes next generation sequencing and whole genome sequencing. APPRISE will support the appropriate use of these tools in epidemics and capacity building in bioinformatics for the future workforce.

## C.1.4 Key Populations

The Key Populations Pillar seeks to work together with populations including Aboriginal and Torres Strait Islander people who have been specifically severely affected by previous infectious disease pandemics but omitted from preparedness plans. The pillar will work on establishing a model for meaningful engagement with key populations, strengthening capacity and adapting research protocols for use within those populations.

### Proposed outcomes

- A model for meaningful engagement with key populations is established
- Research protocols are adapted for use in Aboriginal-controlled health services
- Capacity is strengthened among key populations and those responsible for preparing for and responding to infectious disease outbreaks in key populations.

## Proposed key populations

1. Asia-Pacific populations
2. Aboriginal and Torres Strait Islander communities
3. CALD/Immigrant communities
4. Front-line workers.

## Proposed research priorities

### 1. Networks for surveillance, clinical trials and outbreak response

This priority focuses on addressing opportunities and gaps among relevant networks. This includes networks with a current or potential role in infectious disease emergency response amongst key populations in Australia and internationally. For each network, APPRISE will:

- describe the structure, function and reporting mechanism
- identify research opportunities that can be translated into practice and how Australia can be involved in the network.

### 2. Capacity building for infectious disease emergencies in our region

This priority focuses on addressing opportunities and gaps in capacity building for infectious disease emergency in our region. APPRISE will describe the organisations involved (in Australia and internationally), including duration, funding mechanisms, outcomes and current status. APPRISE will then develop communications and capacity building models in consultation with these organisations.

### 3. Sources of information on infectious disease emergencies

This priority focuses on addressing opportunities and gaps in sources of information on infectious disease emergencies. APPRISE will consider and develop case studies on the mechanisms by which Australian health officials obtain, interpret and process information on potential emergencies.

## C.2 Platforms

APPRISE has four cross-cutting platforms that enable the successful delivery of each pillar. These include: ethics; data management; education and training; leadership and training (see Figure 15). The proposed outcomes and research priorities for each platform are described below.

Figure 15: APPRISE’s four cross-cutting platforms

Ethics	<ol style="list-style-type: none"> <li>1. Facilitation of urgent research ethics approvals</li> <li>2. In depth literature review</li> <li>3. Identification of major policy issues for future outbreaks</li> <li>4. Anticipating healthcare professionals’ concerns</li> <li>5. Anticipating societal concerns and responses</li> </ol>
Data management	<p><b>Why, and with whom, will information be shared:</b></p> <ol style="list-style-type: none"> <li>1. Timely exchange, synthesis, interpretation and reporting of emerging data</li> <li>2. Share with the research community, clinicians, jurisdictional public health units and the Australian Government Office of Health Protection</li> <li>3. Share to inform ‘responses adaptable to the severity of the disease, disease patterns and geographical distances in spread’</li> </ol> <p><b>How information will be shared:</b></p> <ol style="list-style-type: none"> <li>4. Through conventional methods and in partnership with the National Medical Research Data Storage Facility (a recently funded e-infrastructure project)</li> </ol> <p><b>How information will be used:</b></p> <ol style="list-style-type: none"> <li>5. To inform government, health services and community understanding of the nature of the outbreak, the effectiveness of interventions and the best strategies for disease control.</li> <li>6. To inform urgent decisions on: <ul style="list-style-type: none"> <li>What measures should be implemented</li> <li>For whom should they be implemented</li> <li>When should measures be started and stopped</li> </ul> </li> </ol>
Education and training	<p><b>APPRISE Doctoral and Early Career Researcher (ECR) Academy</b></p> <ol style="list-style-type: none"> <li>1. PHD stipends</li> <li>2. Collaboration and exposure to other disciplines/sectors</li> <li>3. Skills and professional development</li> <li>4. Supervisor and peer mentoring programs</li> <li>5. Training in knowledge dissemination and translation.</li> </ol> <p><b>Health workforce development/professional advancement</b></p> <ol style="list-style-type: none"> <li>6. Enhancement of existing training platforms</li> <li>7. Infection prevention and control</li> <li>8. Disaster response</li> <li>9. Involvement of cross-sectoral stakeholders in the annual CRE conference and skills workshops</li> </ol>
Leadership and integration	<p><b>Research translation and implementation</b></p> <ol style="list-style-type: none"> <li>1. Publication of findings in high-impact journals</li> <li>2. Presentation of findings in local, state, national and international meetings</li> <li>3. Development of national guidelines through professional societies</li> <li>4. Assessing the implementation of national guidelines;</li> <li>5. Active engagement with public policy health makers</li> <li>6. Commercialisation of novel discoveries</li> </ol> <p><b>Promoting the CRE’s activities to the wider community</b></p> <ol style="list-style-type: none"> <li>7. Scientific presentations and publications by and to public health professionals at national/international meetings</li> <li>8. Regular presentations to policy makers/advisory groups</li> <li>9. Social (including Twitter, blogs), mainstream and online media to promulgate research outcomes with interpretive commentary, to more effectively inform and interact with end-users, including the community</li> <li>10. Annual scientific meeting</li> </ol>

## C.2.1 Ethics

Research ethics is challenging in infectious disease emergencies, particularly when there is limited and rapidly changing evidence and inadequate preparedness. The ethics platform seeks to provide a firm ethical basis for emergency disease preparedness and responses. The platform will work on developing targeted recommendations on ethics processes, regulations and guidance for professionals, healthcare organisations and public health authorities.

### Proposed outcomes

- Urgent research approvals are facilitated in a timely and effective manner
- Major policy issues for future outbreaks are identified
- Targeted recommendations on ethics are developed for different professional groups, areas of health care and levels of political authority

### Proposed research priorities

#### 1. Facilitation of urgent research ethics approvals

This priority focuses on developing ethics frameworks to support timely and effective research approvals. Such frameworks will address surveillance protocols, quality review, audit, program evaluation, governance principles for sample collection, storage and usage, and urgent research protocols during an infectious disease emergency.

#### 2. In-depth literature review

APPRISE will identify lessons learned from others during research outbreaks through a review of scientific, government and other key reports, media articles, blogs and social media.

#### 3. Identification of major policy issues for future outbreaks

APPRISE will conduct semi-structured interviews with key decision makers during previous outbreaks. The interviews will seek to understand prior experience, identify potential problems and develop proposed solutions to major policy issues.

#### 4. Anticipating healthcare professionals' concerns

This priority seeks to define the ethical and legal basis and limits of health care professionals' 'duty of care' and the relevant expectations and responsibilities of patients, health care professionals and employer organisations. APPRISE will undertake qualitative and quantitative research with health care professionals, health administrators and policy makers.

#### 5. Anticipating societal concerns and responses

This priority focuses on research into societal values and the limits of acceptability around contentious interventions with potential social and economic impacts, such as school closures. This research will be conducted through discrete choice experiments, citizen juries and other methods. It aims to explore public attitudes and perceptions of risks, communication problems and trigger points for acceptable or unacceptable outcomes.

## C.2.2 Data management

This platform seeks to promote the timely exchange, synthesis, interpretation and reporting of data. This includes existing and emerging data from the research community, clinicians, jurisdictional public health units and the Australian Office of Health Protection. Effective data management aims to inform

responses that are adaptable to the severity of the disease, disease patterns and geographic distances spread.

### Proposed outcomes

- Timely exchange, synthesis, interpretation and reporting of emerging data is improved
- National e-infrastructure initiatives are supported to include data on infectious disease emergencies
- Data custodians are supported to securely store, publicly describe, share and use data\
- Access to analysis and linkage tools is improved

### Proposed research priorities

#### **Why, and with whom, will information be shared:**

APPRISE proposes to prioritise the following:

1. Timely exchange, synthesis, interpretation and reporting of emerging data
2. Sharing of information with the research community, clinicians, jurisdictional public health units and the Australian Government Office of Health Protection
3. Sharing information to inform 'responses adaptable to the severity of the disease, disease patterns and geographical distances in spread'

#### **How information will be shared:**

APPRISE proposes to prioritise the following:

4. Information sharing through conventional methods and in partnership with the National Medical Research Data Storage Facility (a recently funded e-infrastructure project)

#### **How information will be used:**

APPRISE proposes to prioritise the following:

5. Use of research outcomes and information to inform government, health services and community understanding of the nature of the outbreak, the effectiveness of interventions and the best strategies for disease control.
6. Use of research outcomes and information to inform urgent decisions on:
  - What measures should be implemented
  - For whom should they be implemented
  - When should measures be started and stopped

## C.2.3 Education and training

To predict and respond effectively to infectious disease emergencies, Australia must maintain a well-trained workforce that encompasses academic experts across a range of disciplines, officials and technical specialists within government departments, and health leaders within the community sector. This platform seeks to support interdisciplinary and cross-sectoral training for these groups to provide them with the necessary skills and experience to conduct, support and translate research. It also seeks to integrate research training and specific curricula into health workforce development.

## Proposed outcomes

- Academics have increased opportunities to improve their research skills and experience and capacity to engage in knowledge dissemination and translation
- Public health officials and community leaders have the necessary skills and experience to support research and translate research outcomes into improved policies and practices
- Health workers have the necessary skills and experience to utilise the most up to date technologies and practices in infectious diseases responses

## Proposed research priorities

### Stakeholder engagement and consultation

APPRISE will consult stakeholders to scope current training activities and solicit the views of key stakeholders on future training needs. Proposed priorities include:

1. Scoping of current training activities
2. Auditing of post-graduate courses and subjects with direct relevance to emergency responses to infectious diseases
3. Consultations with government, community organisations and professional bodies to ascertain training needs and how efforts might be coordinated
4. Establishment of a workforce steering committee with APPRISE researchers and key stakeholders
5. Development an education and training plan

### APPRISE Doctoral and Early Career Researcher (ECR) Academy

APPRISE will provide stipends, training and networking opportunities for PHD students, early career researchers and other academics from a range of disciplines. This aims to promote cross- disciplinary thinking and collaboration throughout researchers' careers. It also seeks to fill a present gap between master's level and public health training programs and skills development for a mature workforce.

Proposed priorities include:

6. PHD stipends
7. Collaboration and exposure to other disciplines/sectors
8. Skills and professional development
9. Supervisor and peer mentoring programs
10. Training in knowledge dissemination and translation

### Health workforce development/professional advancement

APPRISE will support curriculum development, research training and workforce preparedness for infectious disease emergency responses. Proposed priorities include:

11. Enhancement of existing training platforms
12. Infection prevention and control
13. Disaster response
14. Involvement of cross-sectoral stakeholders in the annual APPRISE conference and skills workshops

### Sustainability plan

APPRISE will continue to embed research into emergency response to infectious disease in workplaces and seek competitive/commissioned research funds to sustain research. Proposed priorities include:

15. Making the business case for systems improvement by demonstrating improved health outcomes
16. Training of a better credentialed, prepared and forward looking workforce and cadre of policy makers

17. Ensure that PhD students and early career researchers are mentored to become future research leaders
18. Securing ongoing competitive grants through the NHMRC, Wellcome Trust, European Union grants, National Institute of Health (NIH), Gates Foundation and other sources
19. Establishment of industry partnerships in data management, diagnostics and therapeutics

## C.2.4 Leadership and integration

This platform seeks to promote leadership, integration and translation of research on emergency responses to infectious diseases. It aims to promote and facilitate cross-disciplinary research and research collaborations across disciplines and locations (including with international researchers and organisations). APPRISE researchers will identify and develop new partnerships and collaborations in Australia and internationally. They will actively seek to transfer research outcomes into health policy and engage the wider community in research activities.

### Proposed outcomes

- APPRISE researchers are recognised as leaders in their fields and cross-disciplinary research
- New research collaborations are developed with national and international researchers and organisations
- Research outcomes are translated into policy and practice

### Proposed research priorities

#### **Governance structure and communication**

APPRISE will develop a robust governance structure and communication procedures to facilitate leadership and collaboration between researchers. Proposed priorities include:

1. Development of a rigorous management structure and procedures that supports effective collaboration across the disciplines and locations

#### **Research translation and implementation**

Implementation of outputs to effective policy requires ongoing engagement between researchers, clinical and public health practitioners, policy makers and communities. Proposed priorities for research translation and implementation include:

2. Publication of findings in high-impact journals
3. Presentation of findings in local, state, national and international meetings
4. Development of national guidelines through professional societies
5. Assessing the implementation of national guidelines
6. Active engagement with public policy health makers
7. Commercialisation of novel discoveries

#### **Promoting APPRISE's activities to the wider community**

APPRISE will seek to promote its activities to a range of target audiences nationally and internationally, including researchers, relevant health professionals, policy makers and consumers. Proposed priorities for communication strategies include:

8. Scientific presentations and publications by and to public health professionals at national/international meetings
9. Regular presentations to policy makers/advisory groups

10. Social (including Twitter, blogs), mainstream and online media to promulgate research outcomes with interpretive commentary, to more effectively inform and interact with end-users, including the community
11. Annual scientific meeting for all professionals and related policy makers

## Appendix D Detailed feedback from stakeholders

Table 8 provides additional detail of some of the commentary obtained from stakeholders during interviews and four stakeholder insights workshops.

Table 8: Key themes from stakeholder consultations

APPRISE Concept
<p><b>Recurrent responses from stakeholders</b></p> <p>Stakeholders identified that it is not clear what is APPRISE's overarching aim and goal - the "so what". Stemming from this, what is their 4-year plan - what will be different in 4 years' time than now? This answer needs to be simplified and straight forward, with a clear key focus.</p> <p>Stakeholders identified that APPRISE may be well positioned to overcome the obstacles associated with the federated model. APPRISE should use their operation in every state and territory to get a sense of standardised legislation.</p> <p>With the opportunity to consider the detail of research activities being proposed, most participants were generally supportive of the APPRISE concept and its proposed direction.</p> <p>Many participants were eager to promote their own areas of interest and research ideas.</p> <p>Many stakeholders are unclear on how the multiple CREs in this space will coexist and are seeking assurances that cooperation will occur and duplication will be avoided.</p> <p>Stakeholders are unclear about the future role of the private sector and whether APPRISE scope will connect up with the development of products (such as vaccines). As such, APPRISE should better articulate how they will work with the private sector.</p>
<p><b>Responses from individual stakeholders</b></p> <p>There are some cultural perceptions about academic research and what drives researcher activity that will need to be overcome by demonstrating sustained impact.</p> <p>APPRISE is very medically orientated (human transmission) but 65% of infectious diseases comes from animals. Need to look at threat from animal to human transmission, including wild animals and animals brought in illegally. While APPRISE has a human focus as per the NHMRC grant, animal disease must also be a priority.</p> <p>This sector has a role in domestic communications and this is critical in the political landscape and the current pressures. Part of the job needs to be convincing a political constituency that their role is relevant and researchers aren't always best placed, so we need to translate this to policy. You need your politicians to care. You need people and community behind this as well.</p> <p>APPRISE needs to be wary of state-based rivalry which could frustrate process. There needs to be recognition of where expertise sits in smaller states. Dealing with this will allow APPRISE to push for a more national approach.</p>
APPRISE Pillars and Platforms Framework
<p><b>Recurrent responses from stakeholders</b></p> <p>The level of overlap between the activities within the pillars and platforms is creating some confusion.</p> <p>Suggested change: key populations being more appropriate as a cross-cutting platform.</p> <p>Multiple stakeholders indicated that if it is intending to be a long-term flagship CRE, APPRISE should have a long term ongoing relationship with CDNA and AHPPC and policy makers so there's an ongoing discussion on what are the government's priorities and also so that APPRISE can provide feedback to government on their research findings. APPRISE should facilitate ongoing dialogue and feedback between government and researchers.</p>
<p><b>Responses from individual stakeholders</b></p> <p>Suggested change: a need to include behavioural and applied research to compliment the biomedical research because it is a significant issue in preparedness and response</p> <p>Suggested change: the need to consider the wide range of systemic barriers to achieving translation and policy impact</p> <p>Suggested change: the advocacy of a more explicit 'One Health' approach</p> <p>Suggested change: greater emphasis on international response (over and above the key population pillar)</p> <p>Suggestion: operational performance is missing - it should be the foundation and a KPI.</p> <p>How does APPRISE develop a mechanism by which interested private sector people can come in and discuss collaboration? Suggestion: mapping of the interventions that are available and which industries APPRISE can be involved in.</p>

A challenge for APPRISE is identifying what isn't in place.

APPRISE will need to demonstrate some practical benefits to states/territories. This can happen through producing tools or assistance that aid emergency response, not just research outputs.

CDNA needs a formal way of taking ideas to APPRISE. This would likely be most effectively achieved through a regular embedded relationship.

The vertical pillars make more sense than the cross-ways ones.

APPRISE should take advantage of opportunities to collaborate with stakeholders, such as the Rural Medicine Australia conference in October 2017 which has a whole day devoted to research.

On the website, APPRISE doesn't have a strong profile on the web yet – there is a need to brand APPRISE as a multi-sector multi-jurisdictional centre.

APPRISE needs to ensure the research is grounded in reality (which is how the health system operates and the role of states and territories).

One aspect that APPRISE should consider is what is the best model for national governance of emergency response to health emergencies?

#### Priority Activities - General Comments

##### Recurrent responses from stakeholders

A strong overall message we heard was that APPRISE's list of priorities was too broad and too ambitious.

Multiple stakeholders suggested that APPRISE could narrow its priority activities to focus on delivering greater impact in preparedness and response.

Conversely, when prompted for feedback stakeholders often added new priorities, as can be seen below.

Multiple stakeholders identified that key populations should be a cross-cutting theme rather than a pillar.

##### Responses from individual stakeholders

There is a need to refine the APPRISE priorities and unpack them a bit.

Potential for replication across the pillars has some pros (validation) and cons (overlap and repetition).

Stakeholders are struggling to link the priorities to tangible outcomes – want a clearer articulation on what will be delivered through the research.

There is concern that APPRISE will not be business as usual for researchers, they'll want to see more clearly how they will work together and the tangible outcomes they'll achieve.

Given its collaborative approach, APPRISE should focus on the networks that they establish. Some areas it's easier to say than do when you need to protect your work and IP, but we're seeing more and more of unis collaborating on projects and sharing information. Is this more recognition of where the expertise sits in Australia (e.g. malaria goes here) and people are emerging in different fields.

What's missing is a pillar supporting Australia's intrinsic capacity in terms of (pharmaceuticals) supportive industry that underpins being able to respond to an emergency. There is currently no one doing an analysis of the capability and capacity in Australia. That would be an area to APPRISE to investigate, with a view that if we don't have the ability for Australia to manufacture and be self-sufficient we need to at least minimise the dependence on overseas partners then that won't work very well.

What is missing is recognition of how the health system works and the central role of state and territories in preparedness and response. It is the health system that should be driving research (not the other way around).

What is missing are tools to help for better decision making or better policies. E.g. if you have a vaccine available, how might you use the vaccine? It can help to have something in place that is agreed at the Minister level or at least at a lower level as a basis. Some work could happen here to develop some generic tools. Not so much in the face of an outbreak, as the data is constantly changing, but are useful in times of peace to model different scenarios.

#### Clinical Research and Infection Prevention

##### Comment on pillars

##### Recurrent responses from stakeholders

Infection prevention in communities is about understanding the need and circumstances of different communities; not just best practice.

There needs to be a stronger focus on infection prevention in the priorities.

##### Responses from individual stakeholders

Stakeholders suggested the sequencing is prevention first.

As it stands, the clinical research are all *after* responses - this is inconsistent with a view to prevent infection.

The key issue is not best practice but barrier to engagement or implementation, and conflicts over access to resources. This needs to be done in advance otherwise resources will be taken by maldistribution according to influence hierarchies.

There needs to be a stronger focus on clinical research and infection control for zoonosis. Currently, this is being done manually and is a huge stress on resources.

APPRISE researchers need to ensure that they are not duplicating research that is already happening internationally with no value add (e.g. there is a lot of overlap in Zika research).

#### Comment on additional areas

##### Recurrent responses from stakeholders

Biobanking with a long-term focus is a priority brought up by multiple stakeholders. APPRISE needs to clarify if it will use an existing biobanking facility or establish a new one. If there is a new one, APPRISE will need to circulate its definition, purpose, reason for being. Stakeholders suggest there is no need to reinvent the wheel, see NCIRS and ACH2.

There should be industry involvement through collaboration with pharmaceutical companies' development and researchers of novel drugs/vaccines/interventions.

Multiple stakeholders identified that there should be more research into understanding the extent of 'behavioural' factor in disease transmission, as it is a massive challenge in public health.

##### Responses from individual stakeholders

Research is needed on cultural and social factors that impact on infection prevention, especially in remote areas with complexities (e.g. communities that don't have access to water and soap).

There is a need to enable computer systems to link consistent data systems between state to state, animal to public health.

There is a need to strengthen preparedness before the border by working with overseas partners (pre-border, Asia-Pac collaboration, pre-flight rapid diagnostic/surveillance tools, in-flight surveillance tools, arrival).

Researchers need to consider legal, regulatory and jurisdictional issues that affect clinical data and ethics processes.

There should be consideration of human and animal interface (e.g. PPE for vets, infection control practices).

Is threat assessment missing, and should it fall under this pillar? The problem is, this falls into looking at pathogens constantly and you need to be looking at risk factors.

Current guidelines don't take cultural factors and transmission into account. When developing new protocols, Indigenous people should be involved (whether it is through AHMRC and/or consultation with the targeted community).

The impact of social media is unclear but has some impact - anti-vaxxers used Facebook and twitter to grow - there should be research into this.

There needs to be applied research assessing current response capacity, what it is during exercises, and what it is during real outbreaks.

Exercises are important; however there has been no exercise in the last 20 years that has covered all areas of response across all levels and all jurisdictions. One of the better exercises was the 4 day Avian Flu exercise held in 2008, which relieved pressure during the 2009 outbreak.

What is important is ensuring homogeneity, as variance of performance will be important. The Commonwealth might put out guidelines but it is unclear if follow up is being achieved.

APPRISE should also be involved in food frequency surveillance, as we do not currently know is 'normal' as previous data is not representative of current population habits. Information on where people have shopped and seasonal variations would also provide useful data.

## Public Health Research

### Comment on pillars

#### Recurrent responses from stakeholders

Stakeholders suggested the following sequencing for surveillance:

1. Identify existing surveillance (animal/human)
2. Identify gaps in surveillance
3. Research existing public health notifications and how to address gaps

A priority is improving connections and removing barriers between public health researchers, public health officials and DFAT, both for longer term research studies and during an outbreak. These bodies need better alignment to be able to seize opportunities to collaborate and solve problems together.

Some stakeholders believe there should be a greater focus on antimicrobial surveillance, use and resistance. Conversely, other stakeholders feel that it is the "new thing" and there have been multiple taskforces set up to address it already.

#### Responses from individual stakeholders

Research in Australia currently does not sufficiently state the goals / outcomes that the research is trying to achieve

There should be a greater emphasis on social and behavioural research and qualitative methods, such as Participatory Action Research. APPRISE needs to develop an understanding of why issues exist, numbers don't always tell a story.

There should be a stronger focus on evaluations and research on public health interventions.

A focus on only "disease surveillance" reflects *prisoner of the proximate*. Rather, APPRISE also needs to include risk factor surveillance.

APPRISE may be able to encourage data sharing between different sectors, however they will likely be sensitivity around labs handing research to universities.

Why is there a narrow focus to serology? If national, need to consider trade implications (livestock etc).

Not clear why surveillance at the animal/human interface is important, as we haven't had many "epidemics" of zoonotic disease in Australia in the past (arboviruses excepted)

Overall focus of APPRISE appears to reflect research directed at biomedical issues rather than at higher level determinants e.g. global economy, global power and capitalism. These impact on both risk of EIDs as well as promptness, efficiency and effectiveness of response and recovery phases of epidemics.

APPRISE appears to compartmentalise national risks/priorities and regional/global needs – "An outbreak anywhere is an outbreak everywhere".

#### Comment on additional areas

##### Recurrent responses from stakeholders

Ensure that there is a near real time linked understanding of emerging public health problems by researchers, and that these are scoped fully between public health, practitioners and researchers.

Logistics should be added as a priority, 1) to understand how to minimise the time taken from recognition of a possible case to provision of lab diagnosis confirmation and 2) opportunities in the community to collect laboratory samples and movement of samples.

##### Responses from individual stakeholders

APPRISE should research the surveillance impacts of culture-independent diagnostic tests.

Public health researchers should engage and learn from the emergency management sector.

APPRISE needs to develop pathways to link with overseas agencies doing similar work. All should ideally use the same protocols.

APPRISE should fund engagement days where exercises are provided, involving many levels of public health.

APPRISE should seek to further engage NT and WA (first points of entry) as it is currently too NSW-centric and unfocussed.

Where does offshore surveillance (especially near neighbours) fit?

There should be research into higher level (non-medical) determinants of delayed and ineffective responses to outbreaks in Australia and internationally.

There should be research into governance and response to epidemics, including governance to support international responses.

A national surveillance system would be useful, particularly from a viewpoint of seeking uniformity in data.

There should be research into prevention and treatment technologies (e.g. adjuvants, vaccines, therapeutics).

There should be research into implementation (and its barriers). Questions to be researched include: Why are research results or evidence informed practices/policies related to medical and non-medical interventions not being implemented effectively? Why are non-medical interventions to prevent/control epidemics a) not being given the priority they deserve or b) being ignored?

APPRISE could address the deficiency in research in 'toxin mediated food poisoning'

APPRISE should do work in the currently disorganised and unfocussed area of stopping disasters 'in hospitals' (complicated by federalism). APPRISE should look for a moderate cost solution to raise standards and awareness.

There should be an APPRISE pilot to compare training in general states of preparedness, which has implicit ACSQHC support (which focuses on emergency and ICU areas).

#### Laboratory Research

##### Comment on pillars

##### Recurrent responses from stakeholders

Multiple stakeholders identified should be a greater focus on harmonising processes, practices and logistics of laboratories across Australia, in line with national and international laboratory networks and standards.

There should be a greater emphasis on collaboration with industry, including overseas companies. This is particularly important because Australia doesn't have much capacity to manufacture pharmaceuticals domestically.

#### Responses from individual stakeholders

There should be a greater focus on preparing laboratories in advance so they can rapidly respond during an outbreak, including through streamlined protocols and processes.

Specimen collection is too focused on emergency responses and should support long-term collection of samples.

Safe handling protocols need to build on what we have to cover vector and non-vector borne pathogens.

There should be recognition of national, regional and global laboratory networks and standards (OIE/FAO/WHO).

In relation to building diagnostic capacity in non-reference labs, there is a need for standardisation and reporting for P.O.C. testing, particularly in remote settings (i.e. how will the information feedback across into an outbreak response)

One stakeholder believes animal risk is overstated.

#### Comment on additional areas

##### Recurrent responses from stakeholders

Understanding of transmission pathway should include molecular epidemiological analysis samples in near-real time.

Multiple stakeholders flagged that there needs to be research into live pathogen studies (e.g. models of human disease, characterisation of newly identified agents/strains, focus on vaccine development/therapeutics for control of disease in animals is questioned)

##### Responses from individual stakeholders

There is a need to improve communication between laboratories, clinicians and public health officials.

Health Care workers and infection prevention bodies must inform needs based methods and research into barriers (this will reduce multidrug resistant organism transmission and healthcare-associated infections in the meantime).

A priority should be being ready to start research ASAP.

APPRISE should map interventions needed, and whether they are available or not, to inform priorities for clinical trials and infection prevention. Then, APPRISE should engage relevant private sector companies as that they are also part of the solution.

APPRISE should develop and implement innovative training methods "in situ" to improve HCW's understanding and responsiveness - have a more rules based compliance.

To ensure developing diagnostic tests are usable, APPRISE should work with the private sector.

APPRISE should reframe the discussion as "who needs the tests most?" This should inform how it is designed and developed - for example, so that Indigenous people get access to and benefit from it.

APPRISE should educate and improve the logistics of lab diagnostics to minimise time between symptom onset and lab diagnosis.

New deployable tests should include priority zones (field/point of care tests) as well as testing of animals (domestic and wildlife) and feed back to outbreak responses.

There should be recognition of national policy on export of samples for testing for animal pathogens.

There needs to be reflection on lessons learned from the Australian Biosecurity CRC.

APPRISE should seek to understand, evaluate and develop community based interventions to reduce the transmission of antibiotic resistant organisms.

APPRISE should advise DFAT on priorities for research into laboratory technologies as well as services accessible/required in developing countries.

#### Key Populations

##### Comment on pillars

##### Recurrent responses from stakeholders

This pillar is a high priority and cuts across all areas of research. APPRISE should consider making it a cross-cutting platform.

APPRISE should expand this definition to include several other population groups under this pillar, including the elderly (including isolated elderly), pregnant women, people with disabilities, homeless individuals, international students and people newly arrived from overseas.

##### Responses from individual stakeholders

APPRISE also needs to consider travellers, as they often link in to what is happening globally from a disease emergence perspective.

One stakeholder emphasises the gendered aspects to infectious diseases. They believe researchers need to better understand the profile of women and girls, their higher risk status in pandemics, social structures/work that they're undertaking and access to decision making.

APPRISE needs to consider front line workers, especially GPs, Emergency Departments, ambulance workers and other essential services (vets, vet nurses, wildlife carers, wildlife rangers, meat inspectors, meat workers). Each will require different models of engagement. The front-line workers are arguably a different population, and they are more vulnerable. They relate to implementation and shouldn't just fall under key populations.

APPRISE should ensure representation and engagement of key populations across all the pillars and platforms.

'Capacity building' should be renamed 'capacity development'.

Aboriginal health should be a research priority.

#### Comment on additional areas

##### Recurrent responses from stakeholders

Since communities know what works, APPRISE should seek to involve community champions from key populations in their research and link with existing networks that represent and work with key populations.

##### Responses from individual stakeholders

This pillar should include social and behavioural research, and could be renamed as such.

APPRISE should adopt a partnership approach and meaningfully engage and consult Indigenous and other key populations.

APPRISE must accommodate the diversity within key population groups and recognise that key populations change depending on the nature and location of a disease outbreak.

In light of diversity within key populations, there should not be a view to create only one applicable model, but rather a set of principles and strategies.

APPRISE must be mindful of the term "at-risk" as it may vary depending on the outbreak (e.g. horse owners). Care should be taken to not create fear by pre-supposing.

In rapid research processes, APPRISE must expect and anticipate a large amount of peer-to-peer misinformation.

APPRISE should research the most effective forms of messaging and communicating with vulnerable populations in times of outbreak (e.g. RenRen to communicate with Chinese international students)

APPRISE should do the above to establish a robust network capacity to outreach to marginalised populations before the outbreak.

Capacity building/development should focus on sustainability and ownership of outcomes.

Capacity building/development should build on what exists now e.g. Australian funded, CAIAR, DFAT, AusAID and regional groups (FAO APHCA, OIE, regional offices, WPRO), Charles Perkins Centre.

APPRISE should undertake ethical/qualitative research to understand needs and communication barriers to conveying Public Health messages in certain communities

APPRISE needs to invest in engagement - respectful, thoughtful engagement needs to be embedded from the start, not put in as an add on or afterthought.

APPRISE should seize opportunities to use cultural approaches to advance early warning and diagnosis to optimise early treatment as a public health response.

APPRISE could support a mobile bio contaminant lab that would be dropped into remote Australia as a safe field lab/hospital/quarantine.

APPRISE should build on the public health testing pyramid to understand the behaviour of different populations in responding to emergencies.

APPRISE should look to create culturally sensitive plans for management of mass fatalities (e.g. how to handle an infectious dead body when religious and social factors come into play)

##### General comments on cross-cutting platforms

Is 'one health' relevant (in light of AMR and food-borne diseases)?

APPRISE needs to engage with animal health (e.g. OIE, Australian Chief Vet Officer, CCUD)

APPRISE should reflect on lessons learned from surveillance tools (e.g. IBIS, UK/Canadian systems)

There is opportunity for funding via Defence (DTSG Medical Countermeasures Initiative)

Frequently, recommendations are not being implemented and the issues reappear (communication, collaboration across disparate agencies, siloing, sharing information, lack of agreed protocols, multi-jurisdictional outbreak guidelines, lack of clarity of who is in charge in these cases)

First focus should be on supporting those responding to outbreaks. If there is no infrastructure for this, APPRISE should look to build it.

Exercises are a way of ensuring collaboration, research can support whether it is working or not.

## Ethics

### Recurrent responses from stakeholders

APPRISE needs to consider ethical processes and guidelines for conducting research in key populations.

APPRISE needs to anticipate societal concerns and responses, which includes exploring reported and actual compliance with various types of measures (e.g. absenteeism)

### Responses from individual stakeholders

Stakeholders were generally supportive of the priorities in this platform.

There should be a greater emphasis on establishing ethics approval processes, governance structures and network capacity for outreach to enable rapid response and research.

Facilitation of urgent research ethics approval is a high priority. APPRISE should consider having in advance some degree of generic ethics approval for real-time research during responses for a very fast-tracked process.

Identification of policy issues should include research on the impact of political forces on responses to disease outbreaks.

This platform should include engagement between infectious disease and animal health organisations and decision makers.

This platform requires research in needs for engagement of HCW in preparedness and response. This should focus on doctors who have the power to resist unless they feel like the response aligns with their own processes, who often refuse to change behaviours or want their own thing.

To understand best practice, APPRISE should not just rely on literature but actively consult with other governments for lessons learned.

There is a need to consider the impact of disease preparedness and response on small businesses, as primary healthcare professionals will be concerned about this.

APPRISE should add collaboration between health workers in different setting and cadres to facilitate urgent research ethics approvals. There is a need for engagement with healthcare managers and clinicians in preparedness and response (who may otherwise resist change).

APPRISE needs to consider 1) the ethics of prioritising research to strengthen the fire brigade to protect Australians versus prioritising research to act on the non-biomedical determinants of emerging diseases - particularly those where policies increase EID risks in the region 2) ethics of excluding research on political determinants of EIDs and slow responses to Ebola in West Africa and failure of senior health decision makers to influence politicians of need to act on these.

One stakeholder believes the most pragmatic solution is centralised ethics with flexible renew times.

## Data Management

### Recurrent responses from stakeholders

Data collection is critical to measure outcomes and build the evidence base for changes in established practice.

### Responses from individual stakeholders

A critical priority is developing data management processes that enable rapid research during an emergency. While the Commonwealth has reporting obligations about emergency responses, it is limited.

It is important to identify and define what data is necessary to collect and share, noting the resources and time involved.

It is important for APPRISE to look to those data governance issues where data can be shared between researchers and government. It can be done and it is an issue that assists in greater collaboration

There is a lack of infrastructure, warehousing and national data standards for data on infectious disease emergencies.

APPRISE should seek data on overseas emergencies and learnings on data management. It should consider how timely interchange of information can be achieved in a regional sense and across borders and responders.

There is a need to strengthen data and reporting on Aboriginality and include Indigenous people in data analysis.

APPRISE should invest in engagement to understand the effectiveness of 'interventions' and how it can inform Aboriginal communities.

There is a need to reframe the way data is reported to the media on key populations to promote strengths-based reporting.

APPRISE should encourage the sharing of animal and human surveillance data.

APPRISE should consider how to share data with the private sector.

APPRISE should seek lessons learned on data management, analysis and sharing from Australian Biosecurity Information Network (ABIN).

APPRISE should look at lessons learned from animal health LEADDR network system, and consider whether it could be replicated for Public Health networks.

APPRISE should look to build some tools for data management. Currently, there is no platform for information

sharing. While there are IT security concerns, there is also the issue of individuals lacking basic software skills.

APPRISE may be able to tackle the Commonwealth's current challenge of collecting data for its notifiable disease system

Use of data and data management across all of health and everywhere is important. The only *national* e-health system in Australia is through defence, and the amount of information and data they receive is overwhelming. APPRISE needs to actively manage the data, through "health knowledge management" to have a dashboard of capability and preparedness.

APPRISE should encourage data collection that are more nuanced than "outside major cities" - rather, data could be sorted into regional, rural and remote, or sorted by locality.

#### Education and training

##### Responses from individual stakeholders

APPRISE needs to be mindful of the differences in the two workforces (research workforce and health workforce) when looking to address education and training issues.

Research translation is meaningless unless it enables 'implementation' into changed practice – including through education and training.

APPRISE should engage universities to support the future workforce, including medical, nursing and veterinary students.

There should be a stronger focus on developing the research skills of health workers and 'frontline staff' (rather than academics).

APPRISE should consider cross-disciplinary emergency response exercises with researchers, health workers and others, which mimic real life.

This platform should public health education for Aboriginal people, training for Indigenous health workers and training in Aboriginal health research for researchers and health staff.

The Master of Applied Epidemiology is critical and should be promoted and enhanced.

APPRISE should consider the potential value of public education and training in relation to existing risks and healthy management of risks as well as during pandemics/epidemics.

APPRISE should consider researchers working in practice areas, including laboratories and public health to increase the exchange of knowledge and share perspectives.

APPRISE should support training in applied research and integrated work learning.

APPRISE should consider supporting an Australian Vaccine Institute (like the Jenner Institute).

APPRISE needs to build education and training into the centre of their activity, to address the structural problem of the way public health units are set up (lots of doctors and nurses do Masters degrees, which make them expensive to employ).

APPRISE is operating in a complex education climate. The sector is missing disease control specialists who are trained in disease transmission, surveillance, database and analysis of data. There is no comprehensive training suite anywhere online.

APPRISE should respond to the identified need for a common education program. A PhD career researchers academy has been identified as a common need, to enable specialising based on linked to other centres and the wider system.

APPRISE needs to consider what value it is adding in this space. The sector often sees short courses/fly ins (which have their own value but are hard to show impact), but there is need to look at embedding things so that they actually bring about change in the health system.

To overcome resourcing issues, APPRISE should advocate that we need to resource smarter rather than relying on more and more people money. APPRISE could conduct economic modelling to prove that investment in this area has this effect from an economic health perspective.

#### Leadership and integration (incl. translation)

##### Recurrent responses from stakeholders

Multiple stakeholders implicitly or explicitly implied that this platform should be renamed to focus on partnerships, collaboration and particularly, translation.

There is a need to focus on translating existing research that has not been translated into practice (not just new research).

##### Responses from individual stakeholders

One stakeholder believes that it is a mistake to try to formalise networks and approaches in an emergency environment - flexibility is key and needs to be retained.

APPRISE should seek to conduct research through a partnership model across sectors, jurisdictions and countries.

Translation should focus on the practical impact of research on disease preparedness and responses, and less on journal publications.

APPRISE needs to ensure that leaders are not just government appointed. Both community and Indigenous leaders need to be part of this.

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APPRISE should maintain an ongoing dialogue with national and state departments of health, the AHPPC and CDNA.

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APPRISE should promote ethical leadership in research and emergency preparedness and response.

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There should be a greater focus on commercialisation of novel discoveries.

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There is an over-emphasis on twitter, blogs etc. There are over-directed against younger people and 'older' people. This is not information media but social media. There needs to be more focus on the 'information' aspect of media, both online and traditional.

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Aboriginal people are often mistrusting of health research because it has often reported on problems with little to no benefit to the community. APPRISE needs to reframe the discourse. It will do better if it considers how Indigenous people are part of the research and that the research is reported from a strengths-based perspective. Aboriginal communities have the right to self-determination and empowerment.

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Need a strong emphasis on reporting of outcome measures of people's research - i.e. measuring how translational research is. Should set research goals related to outcomes/translation.

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Any research findings that APPRISE can come up with need to be able to convert into some simple, practical advice that can be directed and make a decision on. Firm and clear recommendations e.g. we recommend you do X.

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APPRISE should include engagement of stakeholders within and outside of the health domains. Important to think about consumers and the public in general. In emergencies these are critical to successful response.

## Appendix E Expert Reference Group

APPRISE convened an Expert Reference Group to oversee the design and conduct of this stakeholder consultation program.

Membership of the Expert Reference Group included:

Member	Organisation	Role
Jeannette Young (Chair)	Department of Health (Qld)	Chief Health Officer, QLD
Jenny Firman	Department of Health (Cth)	Health Principal Medical Advisor
Kerry Chant	Department of Health (NSW)	Chief Health Officer, NSW/ Chair BBVSS
Craig Dalton	University of Newcastle	Public health physician, senior lecturer and director <a href="http://www.flutracking.net">www.flutracking.net</a>
John Kaldor	Kirby Institute	Professor of Epidemiology APPRISE Chief Investigator
Bart Currie	Menzies School of Health Research	Professor in Tropical and Emerging Infectious Diseases Director RHD Australia
Ben Howden	Doherty Institute	Director, Microbiological Diagnostic Unit Public Health Laboratory
Adrian Miller	Griffith University	Professor of Indigenous Research
Charles Milne	Victoria State Government	Victorian Chief Veterinary Officer

Nous would like to thank the group for its guidance and input over the course of the project.

## Appendix F List of stakeholders

APPRISE and Nous would like to thank the following stakeholders for giving their time to share their views and expertise on infectious disease preparedness and response.

Table 9: Stakeholders who participated in the interviews

Name	Organisation
Adj Prof Kathy Meleady	Australian Commission for Safety and Quality in Health Care
Professor John Turnidge	Australian Commission for Safety and Quality in Health Care
Robert Herkes	Australian Commission for Safety and Quality in Health Care
Assoc Prof Christine Phillips	Australian National University
Dr Martyn Kirk	Australian National University (MAE Convener)
Ms Jennifer Herz	Biointelect Pty Ltd
Dr Mark Veitch	Communicable Disease Network Australia (Chair)
Dr Robyn Martin	Department of Agriculture and Water
Ms Julianne Cowley	Department of Foreign Affairs and Trade
Dr Craig Dalton	Expert Panel Member
AVM Tracey Smart	Joint Health Command
Dr Victoria Ross	Joint Health Command
Prof Tania Sorrell	Marie Bashir Institute for Infectious Diseases and Biosecurity, Westmead Institute for Medical Research, University of Sydney (CI)
Prof Lyn Gilbert	Marie Bashir Institute for Infectious Diseases and Biosecurity, Westmead Institute for Medical Research, University of Sydney (CI)
Prof Allen Cheng	Monash University (CI)
Margaret Curran	Office of Health Protection
Terry Phelan	Office of Health Protection
Christina Boricha	Office of Health Protection
Joel Willis	Office of Health Protection
Katrina Knope	Office of Health Protection
Rebecca Newton	Office of Health Protection
Gary Lumb	Office of Health Protection
Dr Jeremy McAnulty	NSW Health
Dr Vicki Krause	NT Centre for Disease Control
Mr Peter Markey	NT Centre for Disease Control
Mr John Bates	Public Health Laboratory Network (Chair)
Dr Heidi Carroll	Queensland Health
Peta Rutherford	Rural Doctors Association of Australia
Dr Ann Koehler	SA Health
Mr Mark Cannadine	SA Health
Dr Louise Flood	SA Health
Ms Alison McMillan	VIC Department of Health
Dr Paul Armstrong	WA Health
Mr John Heslop	WA Health

Table 10: Stakeholders who participated in the workshops

Name	Organisation
Dr Marlina Kaezmareh	ACT Health
Fiona Kimber	ACT Health
Peter Dagg	Animal Health Australia
Sally Corinaldi	Australian Animal Health Laboratory
Mike Nunn	Australian Centre for International Agricultural Research
A/Prof Martyn Kirk	Australian National University
A/Prof Mahomed Patel	Australian National University
A/Prof Christine Philips	Australian National University
Helen Faddy	Australian Red Cross Blood Service
David Paterson	Australian Society for Infectious Disease Clinical Research Network
Jennifer Herz	Biointelect Pty Ltd
Brett Sutton	Burnet Institute
Professor Dominic Dwyer	Centre for Infectious Diseases and Microbiology, Westmead Hospital
Sam Hamilton	Department of Agriculture
Irani Thevarajan	Doherty Institute
A/Prof Alison	Health Disaster Nominee
Kristy Crooks	Hunter New England Health (Aboriginal Health)
Kylie Taylor	Hunter New England Health (Aboriginal Health)
Virginia Hope	Institute of Environmental Science and Research, New Zealand
Phillip Mills	James Cook University
Gemma Robertson	James Cook University
Ross Andrews	Menzies School of Health Research, Charles Darwin University
Lisa McHugh	Menzies School of Health Research, Charles Darwin University
Dr Jef Hammond	NSW Department of Primary Industries
Dr Jeremy McAnulty	NSW Ministry of Health
John Bates	Public Health Laboratory Network
Dr Karina Kennedy	Public Health Laboratory Network
Dr Kari Jarvinen	Queensland Health (Public Health Physician)
Brian Montgomery	Queensland Health (Medical Entomologist)
Toni McLean	Queensland Health Communicable Diseases Unit
Andrew van den Hurk	Queensland Health Forensic and Scientific Services
Greg Devine	QIMR Berghofer Medical Research Institute
Dr Gordana Rasic	University of Melbourne
Dr Keith Chappell	University of Queensland
Paul Young	University of Queensland
George Milne	University of Western Australia
Michael Watson	Valera, A Moderna Venture
Dr Penny Burns	Western Sydney University
Prof Lyn Gilbert	Marie Bashir Institute for Infectious Diseases and Biosecurity, Westmead Institute for Medical Research, University of Sydney
Dr Nerina Harley	World Health Organisation