

**Submission to the**  
***2012 Strategic Review of Health and***  
***Medical Research***

James Cook University

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## Executive Summary

James Cook University's location, and interest in rural, remote, Indigenous and tropical health, sets the university apart from other universities in Australia and enables JCU to offer a unique perspective on the strategic direction of health and medical research in Australia.

This submission outlines the major health needs that health and medical research can address in northern and regional Australia: rural and remote health; Indigenous health and *Closing the Gap*; the intersection between communicable and non-communicable diseases; and Australia's health security and biosecurity.

Review questions are also addressed and *six recommendations* are offered for the 10-year strategic health and medical research plan:

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<b>1. Increase public health research investment to direct research activity and research benefit to areas of higher disease burden and health workforce need, including:</b>	<b>1.1</b>
<b>a. Develop a public health research framework to identify patterns of disease;</b>	<b>2.2C</b>
<b>b. Tailor funding mechanisms to recognise socio-economic and geographic variability in disease burden;</b>	<b>1.1, 2.2C</b>
<b>c. Visibly align research priorities to the disease burden profile across Australia and to the National Priorities for Health; and</b>	<b>2.2C</b>
<b>d. Align research priorities with areas of recognised health workforce need.</b>	<b>2.2A</b>
<b>2. Increase health and medical research investment to improve Indigenous health, including:</b>	<b>1.2</b>
<b>a. Empower Indigenous researchers; and</b>	
<b>b. Integrate Indigenous health research priorities as a high priority within the overarching NHMRC research priorities.</b>	<b>2.2C</b>
<b>3. Better coordinate research priorities and research funding mechanisms across the interrelated disease groups of communicable and non-communicable diseases (NCDs), including leverage of our first-world health and research systems to address the high burden of communicable and NCDs internationally within our geographical region.</b>	<b>1.3</b>
<b>4. Increase the capacity of health and medical research to properly manage Australia's health security and biosecurity threats.</b>	<b>1.4</b>
<b>5. Build the health and medical research capacity in regional areas, including:</b>	<b>2.2A, 2.2D</b>
<b>a. Increasing investment to regional research infrastructure; and</b>	
<b>b. Increasing the geographical diversity of funding review panels.</b>	
<b>6. Fund translational research foremost according to principles of public benefit, not only according to recognised commercialisation opportunities.</b>	<b>2.2D</b>

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## Introduction

James Cook University (JCU) welcomes the opportunity to make a submission to the Strategic Review of Health and Medical Research.

JCU's world-class research generates new knowledge and understanding to meet the challenges facing the peoples of the tropics. JCU's location, and interest in rural, remote, Indigenous and tropical health, sets it apart from other universities in Australia, enabling it to offer a unique perspective on the strategic direction of health and medical research (and research training) – particularly as this relates to regional Australia and the broader Asia-Pacific region where JCU has significant engagement.

This submission is structured into three sections: 1. Key considerations for health and medical research in northern and regional Australia; 2. Matters for review and review questions; and 3. Recommendations for the 10 year strategic health and medical research plan. To frame the matters for review and the review questions, this submission first outlines the issues of central importance in health and medical research in northern and regional Australia, which includes rural, remote, Indigenous and tropical Australia as well as our Asia-Pacific neighbours. These issues represent the major health needs that research can address in this region. Both sections 1 and 2 provide the background and rationale for the six recommendations.

The matters for review most closely aligned with the focus of our submission, and which we would emphasise to the review panel as central to the review, are matters 12 and 13:

Matter for review 12: *The degree of alignment between Australia's health and medical research activities and the determinants of good health, the nation's burden of disease profile and national health priorities, in particular 'closing the gap' between Indigenous and non Indigenous Australians.*

Matter for review 13: *Opportunities for Australia's health and medical research activities to assist in combating some of the major barriers to improved health globally, especially in the developing world.*

## 1. Key considerations for health and medical research in northern and regional Australia

This section outlines the key considerations for health and medical research in our northern region and regional Australia – this includes rural, remote, Indigenous and tropical Australia as well our near neighbours in the Asia Pacific.

The **key issues** relevant to health and medical research in our northern region and regional Australia are:

- The patterns of disease in the Australian population represent a continuum related to socio-economic status and other social determinants, meaning a higher disease burden in rural, remote and Indigenous Australia. (See 1.1 and 1.2)
- The persistent health disparities between Indigenous and non-Indigenous Australians are still reflected in a significant life expectancy gap of 12 years for men and 10 years for women. (See 1.2)
- The intersection between communicable and non-communicable diseases (NCDs) is contributing to the higher disease burden experienced in rural and remote areas and within the Indigenous population, and is also resulting in the ‘double burden’ of communicable and NCDs which is seen in most developing countries, including our near neighbours. (See 1.3)
- Australia is susceptible to many of the same tropical infectious diseases which are highly prevalent in other tropical countries (including our close tropical neighbours), and the threat posed by these diseases to our health security and biosecurity is growing. (See 1.4)

### 1.1 Rural and remote health

Almost one third of Australians live in rural and remote areas and these people are at risk of poorer health status, shorter lives, higher rates of accident and injury, greater levels of illness, and lower rates of certain medical treatments (see Figure 1).<sup>1</sup> People living outside major cities are more likely to be admitted to hospital for conditions that could have potentially been prevented through the provision of non-hospital services and care (‘potentially preventable hospitalisations’ – Figure 2).<sup>2</sup>

Figure 1: Mortality ratios compared with Major Cities, by remoteness area 2004-2006 (AIHW, 2010)<sup>3</sup>

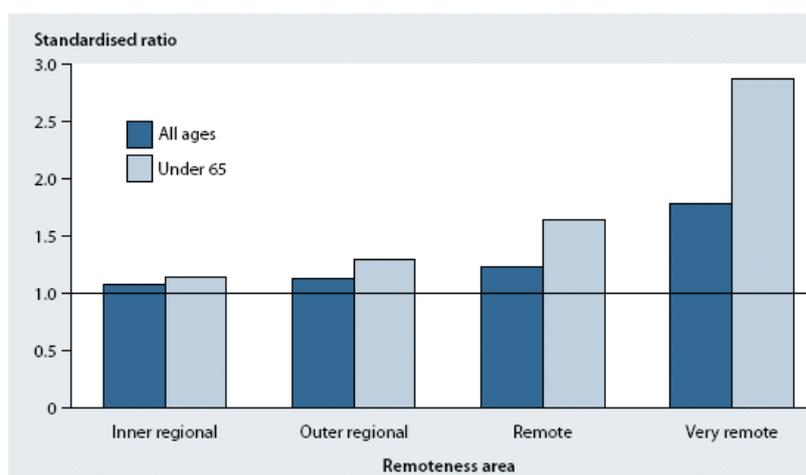
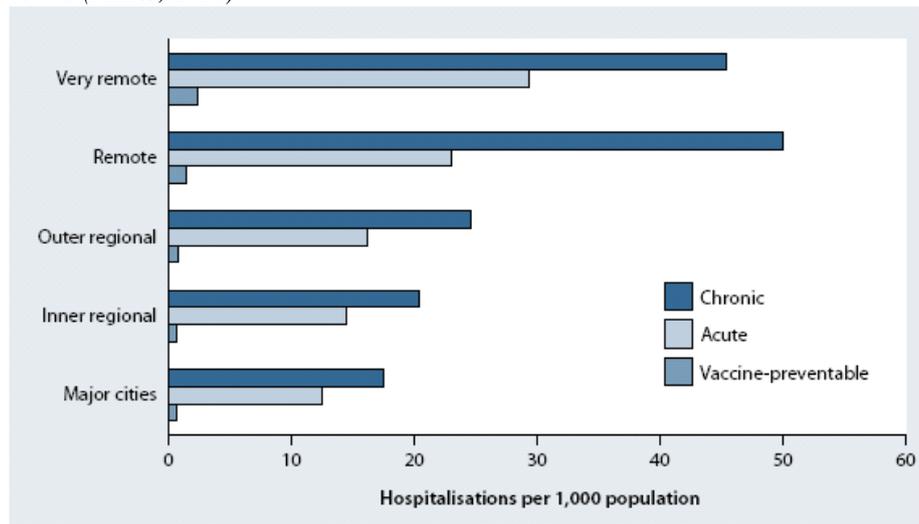


Figure 2: Rates of potentially preventable hospitalisations by broad categories, by remoteness area of usual residence, 2007–08 (AIHW, 2010)<sup>4</sup>



*Vaccine-preventable conditions include influenza, bacterial pneumonia, tetanus, measles, mumps, rubella, pertussis and polio. Potentially preventable acute conditions include dental conditions; dehydration/gastroenteritis; ear, nose and throat infections; convulsions and epilepsy; cellulites; kidney infections; pelvic inflammatory disease; and appendicitis. Potentially preventable chronic conditions include diabetes complications, chronic obstructive pulmonary disease, angina, congestive heart failure, asthma and iron deficiency anaemia.*

Given the markedly higher prevalence of chronic, acute and vaccine-preventable disease in rural, remote and Indigenous Australia, health and medical research investment which is more closely aligned with patterns of disease burden will greatly benefit rural, remote and Indigenous Australia.

## 1.2 Indigenous health and Closing the Gap

*'Indigenous Australians suffer an overall burden of disease that is 2.5 times that of the total Australian population...This indicates a very large potential for health gain' (Australian Institute of Health and Welfare, 2010)<sup>5</sup>*

The significant health disparities between Indigenous and non-Indigenous Australians are still reflected in a significant life expectancy gap (12 years for men and 10 years for women).<sup>6</sup> Hospitalisation rates for cardiovascular disease are much higher for Indigenous Australians than the rate for non-Indigenous Australians (1.7 times higher during 2007-09)<sup>7</sup> and respiratory diseases are more prevalent, with more than one-quarter of Indigenous Australians reporting some form of respiratory disease in 2004–05.<sup>8</sup> Statistics on renal failure and cancer show similar disparities. The incidence rate for end-stage renal disease for Indigenous Australians more than doubled between 1991 and 2008, from 31 to 76 per 100,000 people, and Indigenous Australians were 3 times as likely to have been diagnosed with cervical cancer, and 1.6 times as likely to have been diagnosed with lung cancer, than non-Indigenous Australians in 2003-07.<sup>9</sup>

There are still many gaps in our knowledge and further investment in health and medical research in Indigenous health can improve health status by informing policy and investment decisions. Increased research investment for Indigenous health will enable innovative research initiatives, such as current research which is addressing the lack of application of molecular and genetic technologies to the investigation of major diseases affecting Indigenous health. In addition, the set-up to study the pathophysiological aspects of many chronic diseases is already established, and existing small-scale clinical studies can provide a starting point for scale-up to larger investigations. Indigenous health research needs to be community-driven, and this can occur most effectively within a distributed

medical research workforce that is able to form genuine and effective partnerships with the local populations.

### **1.3 Intersection between communicable and non-communicable diseases**

Worldwide, the incidence rate of non-communicable diseases (NCDs) including cancer, diabetes and hypertension is increasing, resulting in the ‘double burden’ of communicable and NCDs which is seen in most developing countries – including our near neighbour Papua New Guinea.<sup>10</sup> The need for better coordination of planning and implementation across the two disease groups is supported by the evidence that NCDs and communicable diseases share many underlying health system barriers to improving quality of care and prevention strategies – and this is particularly relevant for diseases that are directly related to each other, such as diabetes and tuberculosis (TB).<sup>11</sup> People with diabetes have a 2-3 times higher risk of TB than people with no diabetes, diabetes can worsen the clinical course of TB, and TB can worsen glucose control in people with diabetes.<sup>12</sup>

Research on the intersection between tropical infectious diseases and NCDs is not only relevant to developing countries – it is of increasing importance globally. In Australia, the very high rates of non-communicable diseases mean that Indigenous Australians are at increased risk of many tropical infectious diseases.

### **1.4 Australia’s health security and biosecurity**

Health and medical research has an important role to play in addressing the growing threats posed by tropical infectious disease. Australia is susceptible to many of the same tropical infectious diseases that are highly prevalent in other tropical countries (including our close tropical neighbours), and the reality of the increasing disease threat has been demonstrated by several recent zoonotic outbreaks that have had a substantial impact on health security in Queensland. Hendra virus, Australian Bat Lyssavirus and equine influenza have resulted in deaths and substantial public health expenditure. Dengue now occurs throughout the year, no longer limited to the wet months, and its incidence has tripled since the early 1990s. Other examples of some of the more significant diseases that have affected Australia include Menangle virus, abalone herpes virus and Japanese encephalitis. Of further concern is the emergence of new strains of diseases that are resistant to existing drugs and treatments. Multi-drug resistant tuberculosis – new strains of TB that are resistant to the range of previously effective drugs – presents a serious concern and is contributing to the global resurgence of the disease.

It is far easier and more cost-effective to deal with infectious disease threats before they become epidemics. However, a coordinated approach to the surveillance and detection of disease incidents is desperately needed in Australia to manage these threats, including mechanisms to ensure that the effort remains relevant to specific disease threats and control. To this end, health and medical research relevant to emerging infectious diseases is essential – enabling the effective surveillance and control necessary to prevent and manage outbreaks. For example, the partnership of James Cook University with Queensland Health has led to several innovations for the control of dengue. From 2000-2011, the Dengue Fever Management Plan has successfully prevented dengue from becoming endemically established in north Queensland despite 35 different outbreaks and a record number of imported cases into the region. The collaborative dengue surveillance and control program has potentially saved Queensland from epidemics totalling tens of thousands of cases, and costing over \$100 million.<sup>13</sup>

## 2. Matters for review and review questions

### 2.1 Matters for review

The matters of review most closely aligned with the focus of this submission, and which we would emphasise to the panel as central to the review, are matters 12 and 13:

Matter for review 12: *The degree of alignment between Australia's health and medical research activities and the determinants of good health, the nation's burden of disease profile and national health priorities, in particular 'closing the gap' between Indigenous and non Indigenous Australians.*

Matter for review 13: *Opportunities for Australia's health and medical research activities to assist in combating some of the major barriers to improved health globally, especially in the developing world.*

### 2.2 Review questions

#### **A. *Why is it in Australia's interest to have a viable, internationally competitive health and medical research sector? (Terms of Reference 1 and 6)***

The central place of higher education in modern Australia is buoyed by its ability to, among many other things, support a highly productive and professional labour force, generate new knowledge and develop new applications of knowledge through exchange and transfer with industry and society.<sup>14</sup> Building health and medical research capacity is absolutely essential in establishing Australia's knowledge economy, and this will no doubt be emphasised in many submissions to this Review.

JCU emphasises that it is in Australia's interest to build its health and medical research capacity in regional areas. A local research base improves diagnostic capabilities, provides an academic environment for local training and retention, and enables research to be better grounded in, and defined by, issues of relevance to the local environment and disease profile. One way to achieve greater regional focus would be for the NHMRC to increase the geographical diversity of its funding review panels.

#### **B. *How might health and medical research be best managed and funded in Australia? (Terms of Reference 2, 3 and 7)***

The funding, institutional arrangements and governance of health and medical research in Australia need to be structured so as to ensure that research is aligned with the patterns of ill-health across our community and with the National Priorities for Health (see response to C below). Overall, we endorse the National Rural Health Alliance's calls for health and medical research to be better linked to areas of greatest health need, which necessitates boosting and assuring the resource base for researchers focussed on rural, regional and remote Australia.<sup>15</sup>

Private sector support can be an important starting point for health and medical research initiatives, and partnerships between universities and the private sector need to be encouraged and supported through additional government support. For example, JCU's studies on the genetics of Multiple Sclerosis originally arose from a project funded by the Sugar Valley Lions Club, and was subsequently funded through ARC Linkage funding with the Lions Clubs as a partner. It is currently funded by the Lions Club, ARC and NHMRC, and involves a network of collaborations involving groups in Hobart, Melbourne, Sydney and Townsville. This research is contributing important knowledge to enable the prediction of disease and provide new therapeutic opportunities.

#### **C. *What are the health and medical research strategic directions and priorities and how might we meet them? (Terms of Reference 5, 12 and 13)***

*'There is an increasing expectation from the Australian community for health and medical research to deliver improvements in health' (NHMRC, 2010-2012 Strategic Plan)*

In order for the NHMRC to deliver on this expectation, there needs to be a greater focus on the structure, process and outcomes of health and medical research investment. Research investment needs to be explicitly aligned with the patterns of ill-health across our community, and this necessitates a public health framework for research investment in order to identify (and target research investment towards) areas of higher disease burden. One mechanism might be for the NHMRC to establish a public health research committee to ensure an appropriate public health framework for research investment.

In addition, there is scope for closer alignment of research funding with the National Research Priority of *Promoting and Maintaining Good Health* (and its four associated priority goals), and the National Priorities for Health (NPH). The NPH represent eight disease areas which have been identified by the Federal Government as contributing significantly to the burden of illness and injury, and which have potential for health gains and reduction in the burden of disease:

1. arthritis and musculoskeletal conditions;
2. asthma;
3. cancer control;
4. cardiovascular health;
5. diabetes mellitus;
6. injury prevention and control;
7. mental health; and
8. obesity.<sup>16</sup>

Five of these areas relate directly to chronic diseases as recognised in the National Chronic Disease Strategy<sup>17</sup> (asthma, cancer, diabetes, cardiovascular disease and arthritis), and a further one (obesity) is a common modifiable risk factor for chronic disease.<sup>18</sup> Given the increasing importance of chronic disease across Australia and the world, including a higher burden of chronic disease in rural, remote and Indigenous Australia, better alignment of health and medical research investment with the NPH will lead to significant health gains.

A specific recommendation regarding Indigenous health research priorities is that they be integrated as a high priority within overarching NHMRC priorities, not as a standalone set of priorities as is currently seen in the secondary NHMRC roadmap document: *NHMRC Road Map II: A Strategic Framework for Improving the Health of Aboriginal and Torres Strait Islander People through Research*.

**D. How can we optimise translation of health and medical research into better health and wellbeing (Terms of Reference 4, 8, 9, 10 and 11).**

Translational research needs to be funded and supported foremost according to principles of public benefit, not only according to recognised commercialisation opportunities. Following from the principles outlined under A, translational research which is grounded in, and defined by, issues of relevance to the local environment and disease profile will lead to the most public benefit. In order to translate research findings into patient health and economic benefits, adequate facilities are required to carry out clinical trials and related studies. Currently, research infrastructure is lacking in regional areas and investment to build this capacity is urgently needed.

Australia can learn from the approach taken by research institutions internationally in bringing together multidisciplinary researchers around translational research. For example, the Engineering and Physical Sciences Research Council (EPSRC) in the UK conducts ‘sandpits’ workshops to drive lateral thinking and radical approaches to addressing particular research challenges.<sup>19</sup> Run over 5 days, the workshops involve a highly multidisciplinary mix of participants (usually 20-30), some being active researchers and some being potential users of research outcomes. Funding is then allocated to the outputs of the sandpit.

### 3. Recommendations for the 10 year strategic health and medical research plan

<b>1. Increase public health research investment to direct research activity and research benefit to areas of higher disease burden and health workforce need, including:</b>	<b>1.1</b>
<b>a. Develop a public health research framework to identify patterns of disease;</b>	<b>2.2C</b>
<b>b. Tailor funding mechanisms to recognise socio-economic and geographic variability in disease burden;</b>	<b>1.1, 2.2C</b>
<b>c. Visibly align research priorities to the disease burden profile across Australia and to the National Priorities for Health; and</b>	<b>2.2C</b>
<b>d. Align research priorities with areas of recognised health workforce need.</b>	<b>2.2A</b>
<b>2. Increase health and medical research investment to improve Indigenous health, including:</b>	<b>1.2</b>
<b>a. Empower Indigenous researchers; and</b>	
<b>b. Integrate Indigenous health research priorities as a high priority within the overarching NHMRC research priorities.</b>	<b>2.2C</b>
<b>3. Better coordinate research priorities and research funding mechanisms across the interrelated disease groups of communicable and non-communicable diseases (NCDs), including leverage of our first-world health and research systems to address the high burden of communicable and NCDs internationally within our geographical region.</b>	<b>1.3</b>
<b>4. Increase the capacity of health and medical research to properly manage Australia's health security and biosecurity threats.</b>	<b>1.4</b>
<b>5. Build the health and medical research capacity in regional areas, including by:</b>	<b>2.2A, 2.2D</b>
<b>a. Increasing investment to regional research infrastructure; and</b>	
<b>b. Increasing the geographical diversity of funding review panels.</b>	
<b>6. Fund translational research foremost according to principles of public benefit, not only according to recognised commercialisation opportunities.</b>	<b>2.2D</b>

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