

The development of the
Papua New Guinea
National Health and HIV Research Agenda
2013 – 2018

October 2013

“Health, medical and clinical research shall target and address; identified priority health issues and problems in the National Health Plan and global strategies.”

– *The PNG Health Research Policy, 2012* ¹

“There is widespread acknowledgement among stakeholders of the need for a National Health & HIV Research Agenda to direct health and HIV research in PNG.”

– *The Program for Health & HIV Research Capacity Development in Papua New Guinea, 2012* ²

The development of the PNG National Health and HIV Research Agenda has been led by the *Working Group for the development of the PNG National Health and HIV Research Agenda*. Technical support to this process was provided by the Papua New Guinea World Health Organization (WHO) Country Office and the Burnet Institute. This report was written by Roderik Viergever (consultant to WHO), Geoff Chan (Burnet Institute) and Chris Morgan (Burnet Institute).

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Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
AusAID	Australian Agency for International Development
CAM	Combined Approach Matrix
CD	Communicable Disease
CHNRI	Child Health and Nutrition Research Initiative
COHRED	Council on Health Research for Development
DPH	Division of Public Health
ENHR	Essential National Health Research Methodology
GoPNG	Government of Papua New Guinea
HIV	Human immunodeficiency virus
HL	Healthy lifestyles
HRC	Health Research Council
HS	Health systems
IMR	Institute of Medical Research
KRA	Key Result Area (of the NHP)
MCDA	Multi-Criteria Decision Analysis
MRAC	Medical Research Advisory Committee
NACS	National AIDS Council Secretariat
NARI	National Agricultural Research Institute
NDoH	National Department of Health
NGO	Non-governmental organisation
NHHRA	National Health & HIV Research Agenda
NHP	National Health Plan
NHS	National HIV and AIDS Strategy
NRA	The National Research Agenda (NRA) for HIV and AIDS 2008 – 2013
PAU	Pacific Adventist University
PHHRC	Program for Health & HIV Research Capacity Development
PNG	Papua New Guinea
RAC	Research Advisory Committee
RD	Research Domain
RMCH	Reproductive, maternal and child health
RMO	Rural Medical Officer
SIA	Supplementary immunisation activity
SMHS	School of Medicine and Health Sciences
STIs	Sexually transmitted infections
TDR	The Special Programme for Research and Training in Tropical Diseases
UPNG	University of Papua New Guinea
WHO	World Health Organization

Executive Summary

In 2012, the National Department of Health (NDoH) of Papua New Guinea (PNG) initiated the development of the National Health and HIV Research Agenda 2013 – 2018 (NHHRA). The rationale behind this initiative was to support research planning under the National Health Plan (NHP) 2011 – 2020, as outlined in the PNG National Health Research Policy and the Program for Health & HIV Research Capacity Development in Papua New Guinea (PHHRC). The development of the NHHRA responds to the current lack of a research agenda for all areas of health and HIV in PNG. For HIV, research priorities have previously been defined in the National Research Agenda (NRA) for HIV and AIDS in Papua New Guinea 2008 – 2013. However, for other areas of health research, no agenda has yet been defined.

PNG's vision in strategic research planning is to develop a single high-level research agenda encompassing all areas of health and to keep this agenda up to date. Under this high-level agenda, it is envisioned that more detailed lists of strategic research priorities for specific research areas will be developed (such as for tuberculosis, cancer, HIV, child health or environmental health). This report describes the development of the first high-level, overarching agenda for health and HIV research in PNG. In addition, the development of the first list of strategic research priorities is described, for the area of HIV.

Overarching guidance for the development of the program and methods was derived from the World Health Organization (WHO) checklist on health research priority setting. A 3-stage priority setting process was used to involve a broad range of different stakeholders with regards to health and HIV research in PNG:

1. Stage One: four workshops of one day each that focused on research topic identification (the workshops took place on 1 – 4 July). Each workshop focused on identifying research topics for one Research Domain (RD):
 - RD 1 – Reproductive, maternal and child health research.
 - RD 2 – Communicable disease research.
 - RD 3 – Research on healthy lifestyles (including non-communicable diseases, health promotion, injuries, violence, nutrition, and water supply / sanitation).
 - RD 4 – Health systems research.
2. Stage Two: one workshop of two days that focused on further refinement of the research topics, research topic prioritisation and discussion of implementation of the NHHRA (the workshop took place on 15 and 16 July).
3. Stage Three: one workshop of one day that focused on developing a more detailed list of HIV strategic research priorities (the workshop took place on 17 July).

Participants in the four Stage One workshops nominated the values they felt should underlie the development of the NHHRA. Three values stood out and were found important by 30 or more participants:

- Research should focus on vulnerable populations
 - for health in general (e.g. rural populations, the urban marginalised, the elderly, orphans, people with disabilities, people with poor access to services), and

- for specific disease areas (e.g. sex workers and men who have sex with men for HIV).
- Research should help improve existing health systems, in particular to improve service delivery and help build capacity of the health workforce.
- Research should contribute to decision- and policy-making.

Furthermore, in each of the Stage One workshops participants agreed on a framework for health problems or areas of importance within each Research Domain (Table S1).

Table S1. Health problems or areas agreed upon by Stage One participants as being important to the Research Domain

Research Domain	Health problems or areas
RD 1: Maternal, reproductive and child health research	<ul style="list-style-type: none"> ● Maternal mortality and neonatal deaths ● Pneumonia mortality ● Childhood immunisation ● Sexual and reproductive health for adolescents ● Family planning ● Malnutrition in children under the age of five years
RD 2: Communicable disease research	<ul style="list-style-type: none"> ● Tuberculosis (TB) ● HIV and other sexually transmitted infections (STIs) ● Malaria ● Neglected tropical diseases (NTDs)
RD 3: Research on healthy lifestyles	<ul style="list-style-type: none"> ● Environmental Health ● Cancer ● Violence ● Mental health ● Substance abuse ● Diabetes, cardiovascular diseases and nutrition ● Disability ● Injuries
RD 4: Health systems research	<ul style="list-style-type: none"> ● Health technologies ● Health information systems ● Human resources for health ● Leadership, management and governance ● Health financing ● Inequities ● Partnerships ● Service delivery

Stage One participants brainstormed on what they felt were the most important research topics under each health problem or area. These topics were then discussed by the whole group and consensus was reached on the list of research topics that should be presented to Stage Two. During Stage Two, the list of research topics was further refined. Participants in Stage Two also scored the importance of all research topics (individually). Following this, the combined scores for each research topic were presented back to the participants for further discussion. Finally, Stage Two participants agreed a final ranked list of 60 research priorities for the NHHRA. Table S2 presents the top-20 research priorities from the final ranked list.

Table S2. Top-20 priorities from the final ranked list of research topics in the NHHRA

Rank	Domain	Research Topic
1	RMCH	Research on how community-level post-natal care interventions that are known to be effective can be best implemented in the PNG context.
2	RMCH	Research to evaluate current maternal and neonatal care practices in health facilities and in the community (e.g. partogram usage or management of low-birth weight or prematurity).
3	CD	Research on the prevalence and socioeconomic determinants of tuberculosis (TB), drug resistant TB (MDR-TB, XDR-TB) and TB/HIV co-infection.
4	HS	Quality assurance research of medicines and medical supplies along the whole supply chain, from procurement to distribution and storage.
5	HL	Research on the coverage of access to safe water and proper sanitation, especially rurally and in urban settlements.
6	HL	Research on solutions for increasing coverage of diagnosis, screening and early detection of cancer in PNG, with a view to understanding the relative burden of different cancers (e.g. breast, cervical, liver and oral cancers).
7	CD	Research on the causes of treatment failure, in particular the causes of poor adherence to treatment for TB, HIV and HIV/TB co-infection and how adherence can be improved.
8	RMCH	Research on the barriers and enablers to accessing supervised delivery in health facilities.
9	CD	Research on the magnitude and determinants of drug resistance for TB, malaria, pneumonia, meningitis, sexually transmitted infections (STIs) and HIV.
10	RMCH	Research on the serotype distribution of major pathogens causing pneumonia and meningitis and their susceptibility to antibiotics.
11	RMCH	Research on the effectiveness and feasibility of different mechanisms for introducing or scaling up coverage of new and existing vaccines (e.g. outreach or supplementary immunisation activity (SIA) or introduction of immunisation at health post level).
12	CD	Research on the size, geographical distribution and HIV- and health-care seeking behaviours of most-at-risk populations for HIV and STIs.
13	HL	Research on the cost-effectiveness and sustainability of different possible systems for safe waste disposal (including urban solid waste, waste water, medical waste and chemical waste).
14	HL	Research on the prevalence, determinants and burden of violence, especially gender-based violence, and on the effectiveness of interventions.
15	HS	Research on why there is low utilisation of health information and how this can be improved at all levels of the health system.
16	RMCH	Research on sexual and reproductive health knowledge, attitudes and practices of youth and adolescents (e.g. preventing unwanted pregnancy and STIs).
17	RMCH	Research on the prevalence of vaccine preventable diseases to inform planning and monitoring of immunisation programs.
18	HS	Research on the satisfaction of health workers with their working conditions and on solutions for improving recruitment and retention of health workers.
19	HS	Research on the factors that impact on the quality of health workforce performance.
20	HL	Epidemiological studies on the burden of different mental health problems, in particular at community level.

Legend Table S2: RMCH = Reproductive, maternal and child health research; CD = Communicable disease research; HL = Research on healthy lifestyles; HS = Health systems research.

Stage Three participants reviewed and updated the NRA. This resulted in a total of 32 HIV research topics being proposed for the period 2013 – 2018. Participants scored the importance of all research topics (individually). The combined scores for each research topic were then presented back to the participants for further discussion. Following this, Stage Three participants agreed a final list of 32 HIV strategic research priorities, to sit within the overarching NHHRA. Table S3 presents the top-10 HIV strategic research priorities as agreed by participants.

Table S3. The top-10 strategic research priorities in the area of HIV and their alignment with the Priority Areas and Strategic Priorities of the PNG National HIV and AIDS Strategy (NHS)

Research Topic	Alignment with	
	NHS Priority Area (PA)	NHS Strategic Priority (SP)
Research on geographic distribution, size estimations, high-risk practices and HIV / sexually transmitted infection (STI) serology among key affected populations.	PA1	SP1
Research on adult and paediatric HIV, STI and HIV-related opportunistic infection treatment, management, monitoring and outcomes.	PA2	SP2
Research on prevention programs and practices for sexual transmission of HIV and other STIs (including condom distribution and male circumcision).	PA1	SP1
Research on biomedical technologies in the prevention of HIV and STIs.	PA1	SP1
Research on enablers for and barriers to creating supportive and safe environments for HIV and STI prevention.	PA1	SP3
Research on HIV testing quality assurance and the implementation of HIV testing algorithms.	PA2	SP1
Research on the usefulness and impact of innovative systems to record and share information on HIV and STI clients and key affected populations.	PA3	SP1
Research on the risk of HIV and STI transmission among HIV sero-discordant couples.	PA1	SP1
Research on the lives of marginalised and most-at-risk populations.	PA1	SP2
Research on the lives of people living with HIV, their families and communities.	PA2	SP2

Participants in all workshops discussed how the health research capacity of PNG might be increased, particularly with regards to the implementation of the NHHRA. From these discussions, seven recommendations were derived:

1. The NHHRA should be broadly distributed, both nationally and internationally, and be revisited in 2018.
2. NDoH is encouraged to use the NHHRA to solicit funding for the implementation of the NHHRA and to identify key people who can lead this effort.
3. All health institutions in PNG carrying out research are encouraged to use the NHHRA for internal planning and research funding applications.
4. A health research “clearinghouse” should be established, preferably within NDoH.
5. NDoH was encouraged to review Medical Research Advisory Committee (MRAC) membership and functions, and proposals for a PNG Health Research Council (HRC), aiming for a more user-friendly system for ethics review.

6. The establishment of a national health research grants program with responsibility for allocating research funds (derived from government and development partner sources) is an important next step in implementing the NHHRA.
7. In establishing a national health research grants program, it will be important to draw on expertise gained with research funding distribution in the area of HIV in PNG, in particular through the Research Advisory Committee (RAC) of the National AIDS Council Secretariat (NACS).

Finally, several lessons were learned in undertaking this research priority setting process in PNG. In revisiting the NHHRA in 2018, particular attention should be paid to broadening the range of stakeholders involved and to improving the planning of the overall process.

The development of the NHHRA has been led by the *Working Group for the development of the PNG National Health and HIV Research Agenda*.

Chapter 1. Introduction

Background

In 2012, the National Department of Health (NDoH) of Papua New Guinea (PNG) initiated the development of the National Health and HIV Research Agenda 2013 – 2018 (NHHRA). The rationale behind this initiative was to support research planning under the National Health Plan (NHP) 2011 – 2020,³ as outlined in the PNG National Health Research Policy¹ and the Program for Health & HIV Research Capacity Development in Papua New Guinea.²

The development of the NHHRA responds to the current lack of a holistic research agenda for all areas of health and HIV in PNG. For HIV, research priorities have previously been defined in the National Agenda for HIV and AIDS 2008-2013.⁴ However, for other areas of health research, no agenda has yet been defined.

NDoH's development of the NHHRA has been undertaken in partnership with the National AIDS Council (NACS). Two key motivations underlie this partnership approach:

1. To make use of the experiences and lessons learned during the development of the National Research Agenda (NRA) for HIV and AIDS 2008 – 2013.
2. To ensure that the research priorities in the NHHRA would be comprehensive and encompass all areas of health and HIV.

Structure of the NHHRA: A high-level agenda and strategic research priorities

PNG's vision in strategic research planning is to develop a single high-level research agenda encompassing all areas of health and to keep this agenda up to date. Under this high-level agenda, it is envisioned that more detailed lists of strategic research priorities for specific research areas will be developed (such as for tuberculosis, cancer, HIV, child health or environmental health). This approach ensures a broad, inclusive vision, while simultaneously offering opportunity for more detailed research roadmaps in specific areas (Figure 1.1).

This report describes the development of the first high-level, overarching agenda for health and HIV research. In addition, the development of the first list of strategic research priorities is described, for the area of HIV. The development of the list of HIV strategic research priorities is envisaged as a stepping-stone towards the development of strategic research priorities in other research areas. The experience that has been built up in prioritising HIV research in PNG over the past years can function as an example for other areas of health research.

Goals

Two main goals were defined for the development of the NHHRA:

1. To develop a National Health and HIV Research Agenda (NHHRA) for PNG and to consider ways forward to implement the agenda.
2. To develop a list of HIV strategic research priorities and to consider how to integrate research priorities for HIV and health.



Figure 1.1. Structure of the NHHRA: A high-level, overarching research agenda and more detailed lists of strategic research priorities in specific research areas (such as tuberculosis, cancer, HIV, child health or environmental health).

Scope

The scope for the development of the NHHRA was defined as follows:

- Geographical scope: National, PNG.
- Timeframe: Priorities will be set for five years.
- Intended beneficiaries: All inhabitants of PNG.
- Target disease burden: All health problems.* In line with the PNG Health Research Policy, the focus will be on research targeting health issues and problems identified as priorities in the National Health Plan (NHP) (policy #4 in the Health Research Policy).¹ Developing a list of HIV strategic research priorities will be part of the process.
- Target audience: All organisations and individuals conducting health research in PNG; all who will have an interest in (or will be affected by) the outputs of research; the PNG NDoH; all developmental and health research partners of PNG.

Stewardship

The development of the PNG NHHRA has been led by the *Working Group for the development of the PNG National Health and HIV Research Agenda (the Working Group)*, chaired by Dr Kitur of the National Department of Health (NDoH) and Julie Airi of the National AIDS Council Secretariat (NACS). The composition of the Working Group is presented in Annex 1.

* The term “health problem” is used to refer to a major cause of ill-health or health inequity, whether actual or prospective. It includes: diseases such as HIV infection or mental illness; risks to health such as obesity, poverty, violence or climate change; and obstacles to effective systems performance, such as unsafe care or inequitable financing of health services.¹⁵

Chapter 2. Preparatory work

To inform the development of the NHHRA, background information was collected on several different aspects of health and health research in PNG. The following information was considered important for the process of identification and prioritisation of research topics:

1. The burden of different health problems in PNG, including HIV.
2. Research conducted in PNG on health and HIV.
3. National strategies on health and HIV.

Succinct summaries of the information collected are presented here below, first for the information that is relevant to all areas of health, followed by the information that specifically relates to HIV.

The health profile of PNG

A detailed overview of the health profile of PNG can be found in Chapter 3 of the National Health Plan 2011 – 2020.³ Insight into PNG's health profile can be further acquired via the country profiles produced by the Global Burden of Disease study 2010⁵ and the WHO Burden of Disease website⁶.

The National Health Plan (NHP)

The mission of the PNG National Health Plan (NHP) 2011 – 2020 is to: Improve, transform, and provide quality health services through innovative approaches supporting primary health care and health system development, and good governance at all levels.³

The NHP defines eight Key Result Areas (KRA):

- KRA 1 – Improve Service Delivery.
- KRA 2 – Strengthen Partnerships and Coordination with Stakeholders.
- KRA 3 – Strengthen Health Systems, including the Health Workforce, Financing, Information (ICT), Infrastructure, Drugs and Medical Supplies and Leadership and Governance.
- KRA 4 – Improve Child Survival.
- KRA 5 – Improve Maternal Health.
- KRA 6 – Reduce the Burden of Communicable Diseases.
- KRA 7 – Promote Healthy Lifestyles.
- KRA 8 – Improve our Preparedness for Disease Outbreaks and Emerging Population Health Issues.

Health research in PNG

Two separate reviews were commissioned in preparation for the priority-setting workshop to acquire insight into the health research portfolio of PNG. One review focused on published literature on PNG. The second review took a different approach and focused mainly on unpublished research.

An evaluation of published research on health in PNG

This excerpt is based on a review conducted by Karla Therese Sy and Manju Rani of published research from PNG since 2000.⁷

A systematic search was used to identify publications on health in PNG from January 1, 2000 to Dec 19, 2012 from the PubMed database. A total of 1559 publications were retrieved; and the abstracts were reviewed. The 884 relevant health publications were systematically categorised and classified into different fields according to the type of research, disease/topic, first author institution, and policy relevance.

There is an upward trend in the last five years in the annual volume of research published on PNG, with an average of 66 articles per year throughout the twelve years. Communicable diseases accounted for almost half of the total original research articles published (46%), followed by maternal and child health (25%). Malaria was the disease that was most often the subject of research in published articles (30%) (Figure 2.1).

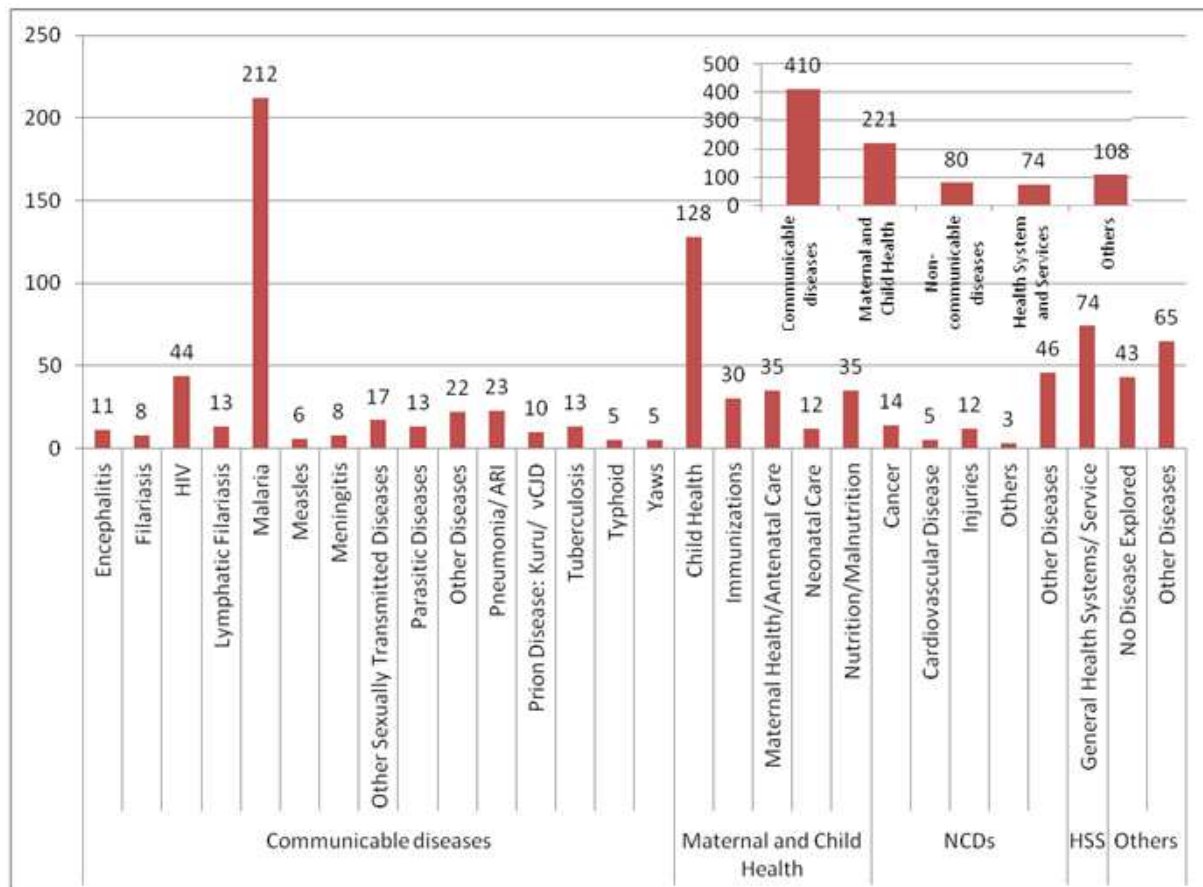


Figure 2.1. Distribution of original publications on health in PNG by research topic between 2000 and 2012

An evaluation of unpublished research in PNG

This excerpt is based on a review conducted by Russel Kitau. It identified and analysed:

- Research projects approved by the Medical Research Advisory Committee (MRAC) in 2012.
- Postgraduate student research projects approved by the University of Papua New Guinea, School of Medicine and Health Sciences, Taurama Postgraduate and Research Centre from 2010 to early 2013.

- Approved research projects that were conducted by Rural Medical Officers (RMOs) and Students in the Division of Public Health (DPH) 2007-2012.

MRAC Approved Research Projects

The MRAC received 68 research project applications for review in 2012. Of these, 11 were clinical applications, 14 pure scientific applications, 7 health systems research applications, 6 drugs and vaccine intervention applications (randomised clinical trials), 6 biomedical studies, 11 applied research projects, 1 Bio-Behavioural Survey, 1 ethnographic study, 5 pure qualitative applications and 5 mixed methods applications.

Postgraduate Student Research Projects

In total, there were 118 postgraduate student research projects approved by the University of Papua New Guinea, School of Medicine and Health Sciences, Taurama Postgraduate and Research Centre from 2010 to early 2013 (Table 2.1). Very few health systems research projects were undertaken.

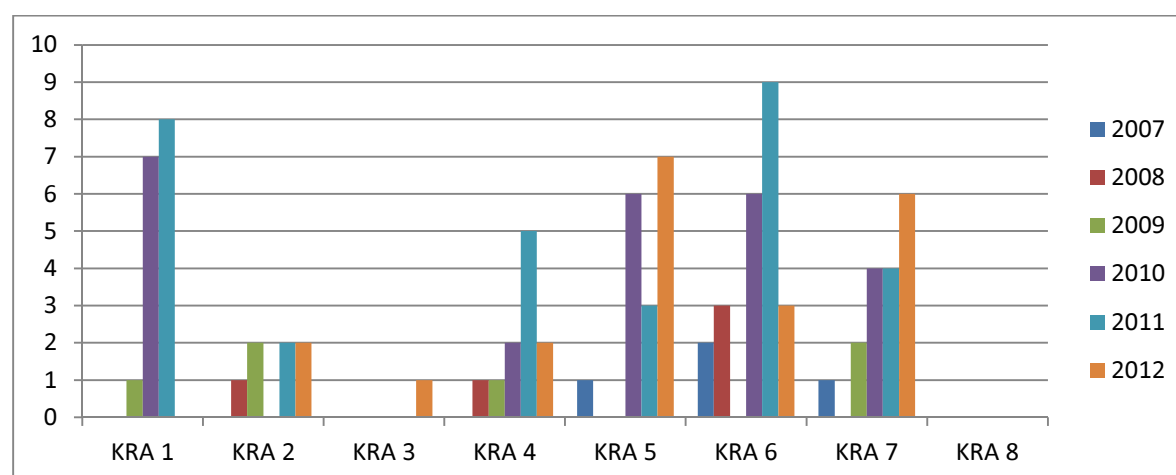
Table 2.1. All the Postgraduate Student Research Projects Approved and Conducted by staff and students at the SMHS, since 2010

Health Program					
	Communicable Diseases	Non-communicable diseases	Maternal & Child Health	Health Systems	Total
Number of projects	21	38	56	3	118
%	17.0	32.0	47.0	2.0	100

DPH RMO and Student Research Projects

Among the research projects approved and conducted by RMOs and Students in DPH from 2007 to 2012, there was a relatively equal focus on child health, maternal health, infectious diseases and healthy lifestyles (including non-communicable diseases) (Figure 2.2). Some health systems research was conducted by RMOs and students, mainly in the area of Service Delivery.

Figure 2.2. Health research projects approved and conducted by Rural Medical Officers (RMOs) categorised to the eight KRA's of the NHP



Legend Figure 2.2: In the National Health Plan (NHP) there are 8 Key Result Areas (KRAs): KRA 1 (Improve Service Delivery) KRA 2 (Strengthen Partnerships and Coordination with Stakeholders) KRA 3 (Strengthen Health Systems, including the Health Workforce, Financing, Information (ICT), Infrastructure, Drugs and Medical Supplies and Leadership and Governance) KRA 4 (Improve Child Survival) KRA 5 (Improve Maternal Health) KRA 6 (Reduce the Burden of Communicable Diseases) KRA 7 (Promote Healthy Lifestyles) KRA 8 (Improve our Preparedness for Disease Outbreaks and Emerging Population Health Issues).

HIV

Burden of HIV in PNG

Detailed information about the nature of the HIV epidemic in PNG can be found on pages 15 – 19 of the National HIV and AIDS Strategy 2011 – 2015, which outlines recent trends, as well as regional, age and sex distributions in the burden of HIV in PNG.⁸

The National HIV and AIDS Strategy (NHS)

The goal of the National HIV and AIDS Strategy (NHS) is to reduce the transmission of HIV and other sexually transmitted infections (STIs) and minimise their impact on individuals, families and communities. The strategy outlined in the NHS focuses on three Priority Areas (PAs). Strategic Priorities (SPs) are then defined for each of the Priority Areas. The PAs and their associated SPs are as follows:

1. Priority Area 1: Prevention

Strategic priority 1: Reduce the risks of HIV transmission.

Strategic priority 2: Address factors that contribute to HIV vulnerability.

Strategic priority 3: Create supportive and safe environments for HIV prevention.

2. Priority Area 2: Counselling, Testing, Treatment, Care and Support

Strategic priority 1: Scale-up HIV counselling and testing.

Strategic priority 2: Expand treatment, care & support services.

3. Priority Area 3: Systems Strengthening

Strategic priority 1: Improve strategic information systems.

Strategic priority 2: Strengthen the enabling environment for the national HIV response.

Strategic priority 3: Strengthen organisational and human capacity for coordinating and implementing the National HIV and AIDS Strategy.

Research on HIV in PNG: a systematic review

This excerpt is based on a Systematic Literature Review of HIV Research in PNG from 2009 to 2012 conducted by Reinhold Muller and David MacLaren.

Overall, 308 publications were included: 39 journal articles, 135 reports, 46 book chapters, and 88 conference abstracts.

Primary research publications were assigned to one of the three Priority Areas under the NHS and further to the next level, Strategic Priorities. Research publications show a healthy spread over all sections of primary, secondary and tertiary prevention and coverage to some extent of the system strengthening Priority Area. Of the primary research literature identified for the review:

- 47% were assigned to Priority Area 1 (Prevention).

- 35% were assigned to Priority Area 2 (Counselling, testing, treatment, care and support).
- 18% were assigned to Priority Area 3 (Systems strengthening).

Table 2.2 provides the detail of the assignment of identified primary research to the Priority Areas of the NHS.

Table 2.2. Identified primary research literature in the priority framework (according to Strategic Priorities (SPs)) of the NHS.

	Priority Area 1				Priority Area 2			Priority Area 3			
	SP1	SP2	SP3	Sum	SP1	SP2	Sum	SP1	SP2	SP3	Sum
F	24 35%	39 57%	5 7%	68 100%	5 11%	39 89%	44 100%	15 65%	6 26%	2 9%	23 100%
P+I	0	5 100%	0	5 100%	4 44%	5 56%	9 100%	0	2 50%	2 50%	4 100%
Sum	24 33%	44 60%	5 7%	73 100%	9 17%	44 83%	53 100%	15 56%	8 30%	4 15%	27 100%

Legend Table 2.2:

F = Formative Level; P+I indicates Process and Impact Evaluation Level

SP = Strategic Priority

All percentages stated in the table were rounded to the nearest natural number (and may thus not exactly add up to 100%) and refer to row percentages *within* the respective Priority Areas.

Only a limited number of research studies have been conducted into the efficacy and effectiveness of programs or interventions for HIV in PNG. Owing to the cultural and geographical diversity of PNG, local evidence must inform local planning. Hence, formative research is needed, driven by the intrinsic nature of PNG. However, since research that evaluates outcomes provides the strongest evidence for research on HIV in PNG to contribute effectively to improvements in HIV control, research must shift focus from the planning (formative) stage to the evaluation of impacts and outcomes (summative stage). From 2009 to 2012 there was a trend in publications showing an increase towards more summative research. This is an encouraging development.

Chapter 3. Methods

Methodological foundations

Overarching guidance for the development of the programme and methods was derived from the WHO checklist on health research priority setting.⁹ The methods that were applied in the workshops built on the Essential National Health Research (ENHR) Methodology developed by the Council on Health Research for Development (COHRED).^{10,11} Elements from the Child Health and Nutrition Research Initiative (CHNRI) Methodology,¹² the Combined Approach Matrix 3D (CAM 3D) Methodology¹³ and methods for Multi-Criteria Decision Analysis (MCDA)¹⁴ were also incorporated. The methods were tailored to suit the context and particular needs of the PNG health research priority setting exercise and drew on lessons learned by the National AIDS Council Secretariat (NACS) in developing the NRA in 2008 and implementing it since.

A 3-stage process

The NHHRA has two main components:

1. A high-level, overarching research agenda covering all areas of health in PNG.
2. More specific and detailed list of strategic research priorities, initially in HIV, but with the potential for other thematic areas to develop similar lists.

A 3-stage priority setting process was used to involve a broad range of different stakeholders with regards to health and HIV research in PNG in the development of these two components (Figure 3.1). Stages One and Two were used to identify and prioritise topics for the high-level research agenda covering all areas of health in PNG. Stage Three was used to develop a more specific list of HIV strategic research priorities. Broadly, the following descriptions can be given for the three stages:

1. Stage One – four workshops of one day each that focused on research topic identification.
2. Stage Two – one workshop of two days that focused on further refinement of the research topics, research topic prioritisation and discussion of implementation of the NHHRA.
3. Stage Three – one workshop of one day that focused on developing a more detailed list of HIV strategic research priorities.

Stage One

Goal

During Stage One, four workshops of one day each were held. The main goal of each workshop was to brainstorm on and identify research topics of importance for one of four Research Domains defined up front by the Working Group. The four Research Domains were chosen to align with the eight Key Result Areas of the National Health Plan (Table 3.1).³

Stage	Workshops	Goals												
Stage One	<table border="1"> <thead> <tr> <th>Research Domain 1</th> <th>Research Domain 2</th> <th>Research Domain 3</th> <th>Research Domain 4</th> </tr> </thead> <tbody> <tr> <td>Reproductive, maternal and child health research</td> <td>Communicable disease research</td> <td>Research on healthy lifestyles</td> <td>Health systems research</td> </tr> <tr> <td><i>Duration: 1 day</i></td> <td><i>Duration: 1 day</i></td> <td><i>Duration: 1 day</i></td> <td><i>Duration: 1 day</i></td> </tr> </tbody> </table>	Research Domain 1	Research Domain 2	Research Domain 3	Research Domain 4	Reproductive, maternal and child health research	Communicable disease research	Research on healthy lifestyles	Health systems research	<i>Duration: 1 day</i>	<i>Duration: 1 day</i>	<i>Duration: 1 day</i>	<i>Duration: 1 day</i>	<p>The goal of these four workshops will be to establish, for each Research Domain, a list of research topics of importance for PNG.</p>
Research Domain 1	Research Domain 2	Research Domain 3	Research Domain 4											
Reproductive, maternal and child health research	Communicable disease research	Research on healthy lifestyles	Health systems research											
<i>Duration: 1 day</i>	<i>Duration: 1 day</i>	<i>Duration: 1 day</i>	<i>Duration: 1 day</i>											
Stage Two	<p>Main priority setting workshop <i>Duration: 2 days</i></p>	<p>The goals of this workshop will be to:</p> <ol style="list-style-type: none"> 1) establish a National Health and HIV Research Agenda (NHHRA) for Papua New Guinea 2) consider ways forward to implement the agenda, taking into account the establishment of a new Health Research Council (HRC) 												
Stage Three	<p>Follow-up workshop to establish a list of HIV strategic research priorities <i>Duration: 1 day</i></p>	<p>The goals of this workshop will be to:</p> <ol style="list-style-type: none"> 1) establish a list of HIV strategic research priorities that is aligned with the National HIV and AIDS Strategy (NHS) 2) consider ways forward to integrate research priorities for HIV and health 												

Figure 3.1. Protocol for the 3-stage workshop process

Table 3.1. Mapping of the four Research Domains in the NHHRA to the 8 Key Result Areas in the National Health Plan.

Research Domain (RD)	Key Result Area (KRA) of the National Health Plan
RD 1: Reproductive, maternal and child health research	KRA 4 (Improve Child Survival) KRA 5 (Improve Maternal Health)
RD 2: Communicable disease research	KRA 6 (Reduce the Burden of Communicable Diseases) KRA 8 (Improve our Preparedness for Disease Outbreaks and Emerging Population Health Issues)
RD 3: Research on healthy lifestyles	KRA 7 (Promote Healthy Lifestyles)
RD 4: Health systems research	KRA 1 (Improve Service Delivery) KRA 2 (Strengthen Partnerships and Coordination with Stakeholders) KRA 3 (Strengthen Health Systems, including the Health Workforce, Financing, Information (ICT), Infrastructure, Drugs and Medical Supplies and Leadership and Governance).

Participants

Participants for Stage One were chosen by the representatives of NDoH and NACS in the Working Group, based on relevant expertise, knowledgeability and capacity to advance the implementation of the research agenda. Effort was made to include a broad range of stakeholders in terms of areas of health expertise, disciplines (researchers, health practitioners and policymakers) and geographical spread. For Stage One, participants were selected primarily for their technical expertise in the Research Domain for which topics were identified.

Preparatory work

Participants in Stage One were presented with the following background information to inform their discussions on research topics of importance:

- An overview of the burden of disease in PNG for the health problems of relevance to the Research Domain.
- An overview of research conducted in PNG in recent years in the area of the Research Domain.
- The sections of the NHP of relevance to the Research Domain.

Values

During each workshop, brainstorming sessions were conducted in which participants nominated the values that they felt should underlie the development of the NHHRA.* Each group wrote their nominated values on a sheet of flip-chart paper. Following the brainstorm, the values were displayed. Participants were asked to individually read the values that the groups in their workshop had nominated. If there were values that they agreed with, they were asked to place a tick on that value. The values and the number of ticks they received were documented.

At the conclusion of Stage One, the values from all four of the workshops were combined. Where values from two or more workshops were alike, these were merged and the number of ticks from each workshop were totalled for the new value. The values were divided into values that:

- 30 or more participants agreed with.
- Between 10 and 30 participants agreed with.
- Less than 10 participants agreed with.

The values that 30 or more participants agreed with and the values that between 10 and 30 participants agreed with were presented to Stage Two participants at the start of the Stage Two workshop.

Research topic identification process

It was explained to participants that the research topics could address any health problem or health area. The term “health problem” is used to refer to a major cause of ill-health or health inequity, whether actual or prospective. It includes the following: diseases such as HIV infection or mental illness; risks to health such as obesity, poverty or climate change; and obstacles to effective systems performance, such as unsafe care or inequitable financing of health services.¹⁵ Sometimes, for defining research topics, the term “health area” provided a more appropriate framework, such as with environmental health or human resources for health. To identify health

* For more information on values and why they are important see the WHO checklist on health research priority setting⁹

problems or areas of importance, the objectives in the National Health Plan (NHP) that related to each Research Domain were used to define a set of health problems or areas for that Research Domain. The set of health problems or areas was presented to participants. Then, participants discussed whether the set of health problems or areas adequately covered the significant health problems for that Research Domain. Where they felt it was necessary, the participants then added, modified or removed health problems or areas.

Once consensus on the set of health problems or areas was reached, participants nominated the number of health research topics that should be defined for each health problem or area. They were asked to take into account that their goal was to produce 10 to 15 research topics within their Research Domain and to distribute an appropriate number of topics to each health problem or area accordingly.

Following this, participants broke up into smaller brainstorm groups, and were requested to identify the most important research topics for each health problem or area. To help participants achieve a similar level of detail across all research topics, five questions were suggested to guide discussion:

1. Are we aware of the burden of disease or the magnitude of this problem in PNG?
2. Do we know what causes it or what the determinants are?
3. Do new solutions need to be developed?
4. Do we know if existing solutions are working?
5. If not, is it known how these can be improved?

These questions are based on the different types of research that can be conducted, as defined by the WHO Strategy on Research for Health.¹⁵ Participants were also given guidance on the desired level of detail for the research topics. It was explained that research topics should not be too broad – the topics did not have to cover all possible research for that health problem. However, it was also noted that research *topics* should not be too specific and that the topics should be broader than research *questions*. The focus should be on generating high-level areas of research that are currently most important for PNG to address.

A specific note was made in all workshops in regards to health systems research. In research priority setting exercises, prioritising health systems research topics can be done separately, or in conjunction with other disease-based research topics. Both of these approaches have limitations.¹⁶ Therefore, in this exercise, both possibilities were offered. The separate health systems Research Domain (RD4) deals with crosscutting health systems research topics. However, it was stressed that research topics under the first three Research Domains could contain health systems research topics, if they were of relevance only to that particular Research Domain.

Finally, the research topics developed in the smaller brainstorm groups were presented in a plenary session in each workshop. Discussion and group consensus were used to merge and further refine the outcomes from the brainstorm groups into one list of research topics of importance. During discussions on the research topics, the facilitators kept track of participants' comments on why a topic was important and other notes that participants made in relation to the topics.

Criteria

The final activity for the Stage One workshops was a moderated discussion with participants on the use of criteria. Criteria were used in the main workshop of Stage Two to help participants prioritise research topics and judge their relative importance, as is commonly recommended in priority setting exercises for health research.⁹ For the sake of acquiring a broader input on what criteria should be used, and because time was limited in the workshop of Stage Two, criteria were discussed with Stage One participants. Facilitators presented a prepared list of twenty possible criteria to participants. The criteria on this list were selected based on a review of commonly used criteria in health research priority setting exercises. Participants were then asked to use the list to:

- Rank individually the five criteria that they found most important in prioritising research topics.
- Discuss as a group which criteria should be used.
- Discuss as a group what the possible scores for each criterion should be.

Stage Two

Goals

Stage Two consisted of one workshop of two days. The main goals of Stage Two were to:

- Further refine the research topics developed in Stage One.
- Score the importance of the research topics developed in Stage One and finalise a prioritised list of these topics for the NHHRA.
- Discuss and outline proposals for how the NHHRA should be implemented.

Participants

As in Stage One, participants were chosen by the representatives of NDoH and NACS in the Working Group based on relevant expertise, knowledgeability and capacity to advance the implementation of the research agenda. Effort was made to include a broad range of stakeholders in terms of areas of health expertise, disciplines (researchers, health practitioners and policymakers) and geographical spread. However, for Stage Two, participants were sought who have a broad overview of health, health research, and other research in PNG in order to be able to judge the relative importance of different research topics. In general, health system participants in Stage Two were working at a more central level than those in Stage One.

Preparatory work

Participants in Stage Two were presented with the following background information to inform their discussions on research priorities:

- An overview of the burden of disease in PNG for all different health problems, including a critical review of Global Burden of Disease modelling, as well as data internal to PNG.
- An overview of research conducted in PNG in recent years across all Research Domains.
- An overview of the National Health Plan (NHP).³
- Relevant sections from the PNG Health Research Policy ¹ and the Program for Health & HIV Research Capacity Development in Papua New Guinea.²
- The values which participants from Stage One felt should underlie the development of the NHHR.

- The criteria which participants from Stage One considered to be most appropriate to be used for scoring the importance of research topics in Stage Two.

Research topic refinement process

Stage Two participants received briefs on the research topics that followed from Stage One and were offered the possibility of commenting on these topics before the workshop commenced. Moreover, the chairs from each of the Stage One workshops presented the research topics to the Stage Two workshop. After each presentation, the topics were discussed and further refined.

Research topic prioritisation process

The first step in the research topic prioritisation process was an anonymous individual scoring exercise. Each participant was presented with a scoring sheet that contained all of the research topics from Stage One.

Participants were asked to use their scoring sheet to:

- Score the importance of each research topic against three criteria, assigning a score of 1, 2 or 3.
- Assign a separate overall score between 1 and 5 for each research topic, based on how important they thought the topic was overall.
- Assign a weight for each of the three criteria based on their perception of the importance of each criterion relative to the others, with a total weight of 100 points to distribute between the three criteria.¹⁷
- Nominate a preference for whether the criteria; the overall score; or both the criteria and the overall score should be used in calculating the results from the individual scoring exercise.
- Note the kind of organisation they work for and their area of health expertise.

Four different variations of the scoring sheet were used, each with the same topics but in four different sequences.

Individually weighted scores were calculated from the scores on the three criteria and combined into an *average criteria-based score* for each research topic. The overall scores were also combined into an *average overall score* for each research topic. The average criteria-based scores and the average overall scores resulted in two different rankings of research topics. An algorithm was used to create a final ranking of research topics (example in Table 3.2):

- The highest rank for the research topic from the average criteria-based score rank and the average overall score rank was used as the final rank for that research topic.
- Where two research topics ended up with the same final rank, the average criteria-based score rank and the average overall score rank were added together for each topic. The topic with the highest summed rank was then ranked higher.

The final ranking from the results of the individual scoring exercise was presented back to the Stage Two participants in a plenary session. Participants then discussed and reached consensus on any changes needed to the ranking of the topics. Finally, participants were asked how the prioritised list of topics should be reported (e.g. top-10, top-20, bulleted or numbered).

Table 3.2. Example of how criteria-based scores and overall scores were combined to form a final ranking of research topics.

Score for topic (based on individual weights)	Average criteria-based score rank	Average overall score rank	Highest rank	Summed rank (tiebreaker)	Final rank
Research topic MCH 1	1	2	1	3	1
Research topic MCH 2	7	1	1	8	2
Research topic CD 1	2	11	2	13	3
Research topic HSR 5	3	4	3	7	4
Research topic HL 1	5	3	3	8	5

Legend Table 3.2: Research topic MCH 1 has a highest rank of 1 because it is ranked at 1 on average criteria-based score. Research topic MCH 2 also has a highest rank of 1 because it is ranked at 1 on average overall score. To break the tie, the two ranks for MCH 1 are added together (1+2 = 3) as are the two ranks for MCH 2 (7+1 = 8). Because a summed rank of 3 is a higher than a summed rank of 8, MCH 1 is then given a higher final rank than MCH 2.

Process for discussion on implementation of the NHHRA

A brief presentation was given on previous analyses of health research capacity and on current opportunities for development, including the Program for Health & HIV Research Capacity Development (PHHRC).² This presentation was used to lead in a moderated discussion on how the NHHRA might be implemented. This session also included discussion on how the health research capacity of PNG could be increased.

Stage Three

Goal

Stage Three consisted of a 1-day workshop. The goals of this workshop were to:

- Establish a list of HIV strategic research priorities for PNG.
- Discuss how to integrate research priorities for HIV and health.

Participants

As in Stages One and Two, participants were chosen by the representatives of NDoH and NACS in the Working Group, based on relevant expertise, knowledgeability and capacity to advance the implementation of the research agenda. Effort was made to include a broad range of stakeholders in terms of areas of health expertise, disciplines (researchers, health practitioners and policymakers) and geographical spread. However, for Stage three, participants were sought who have specific expertise on HIV research. To support an integrated approach to the development and implementation of the list of HIV strategic research priorities, some participants from Stage Three were present in workshops in either Stage One or Stage Two.

Preparatory work

Participants in Stage Three were presented with the following background information to inform their discussions on research priorities:

- An overview of the nature of the burden of HIV in PNG.
- An overview of HIV research conducted in PNG in recent years.
- The National HIV and AIDS Strategy (NHS).
- The results of the mid-term review of the National HIV and AIDS Strategy (NHS).
- The National Research Agenda (NRA) for HIV and AIDS in Papua New Guinea 2008-2013.
- The National Research Agenda (NRA) for HIV and AIDS in Papua New Guinea 2008-2013, re-structured to fit within the framework of the National HIV and AIDS Strategy (NHS).
- The NHHRA: the outcome from the Stage Two process, and in particular its links to the list of HIV strategic research priorities.

Research topic identification process

In preparation for the Stage Three workshop, the NRA⁴ was restructured by NACS to fit within the framework of the current NHS.⁸ This restructured research agenda was taken as a starting point for discussion on what the HIV strategic research priorities should be for 2013 – 2018. Participants were encouraged to consider whether there were any gaps in the list of priorities, whether research priorities had become obsolete because enough research had taken place on the topic, or whether research topics needed to be reformulated or revised.

Research topic prioritisation process

Once consensus was reached on a list of important research topics in the area of HIV, participants were asked to assess the importance of each topic by assigning it an overall score between 1 and 10. Participants' individual scores were averaged and the ensuing strategic research priorities were ranked in order of importance. This ranked list was presented back to the group. Using the ranked list as a basis for discussion, the group reached consensus on changes that needed to be made to finalise the list of HIV strategic research priorities. Participants were also asked how the topics should be reported (e.g. top-10, top-20, bulleted or numbered).

Process for discussion on implementation of the NHHRA

A moderated discussion was held to solicit participants' views on suggestions for implementing the NHHRA. In particular, the discussion focused on soliciting participants' views on how the implementation of research priorities for HIV and health can be addressed in an integrated and coordinated manner.

Chapter 4. Results

Workshops and participants

Stage One

The four Stage One workshops were held from 1 July to 4 July 2013. Each workshop ran for one day and focussed on identifying health research topics for one Research Domain. The exception to this was the reproductive, maternal and child health Research Domain. The workshop for this domain was split into two sessions: the first on 1 July and the second on 4 July. This was done so that participants who were unavailable on 1 July were still able to provide input into the development of research topics for this domain.

In total, 69 people participated in the four workshops (Annex 1). Participants included different types of policymakers (61%), researchers (29%) and practitioners (10%). 75% of participants were men, 25% women. 94% of participants were based in Port Moresby, 6% elsewhere.

Stage Two

Stage Two was conducted on 15 and 16 July 2013. The workshop focused on refining the topics from Stage One, prioritising them and discussing the way forward with regards to implementation.

In total, 37 people participated in Stage Two. Participants included different types of policymakers (57%), researchers (24%) and practitioners (19%). 59% of participants were men, 41% women. 86% of participants were based in Port Moresby, 14% elsewhere. 31 of the Stage Two participants scored the research topics. Of these, four participated in the scoring exercise only and did not participate in other activities in Stage Two.

Stage Three

Stage Three was conducted on 17 July 2013. The workshop focused on developing a list of HIV strategic research priorities.

In total, 15 people participated in the Stage Three workshop. Participants included different types of policymakers (60%) and researchers (40%). 60% of participants were men, 40% women. 73% of participants were based in Port Moresby, 27% elsewhere.

A full list of all participants in Stages One, Two and Three is provided in Annex 1.

Values

During the Stage One workshops, participants generated and endorsed the values that they felt were important in the selection and prioritisation of health research topics of importance for PNG. Table 4.1 presents all values that were found to be important by at least ten participants. These values were presented to the Stage Two participants.

Table 4.1. Values found important by at least ten participants.

Values found important by 30 or more participants	Values found important by between 10 and 30 participants
<ul style="list-style-type: none"> • Research should focus on vulnerable populations <ul style="list-style-type: none"> ○ for health in general (e.g. rural populations, the urban marginalised, the elderly, orphans, people with disabilities, people with poor access to services), and ○ for specific disease areas (e.g. sex workers and men who have sex with men for HIV) • Research should help improve existing health systems, in particular to improve service delivery and help build capacity of the health workforce • Research should contribute to decision- and policy-making 	<ul style="list-style-type: none"> • Research should be aligned with the National Health Plan (NHP) and broader government priorities • Research should focus on the most important problems in order to have the maximum benefit in reducing morbidity and mortality • Research should focus on innovation and developing new interventions • Research should be cost-effective • Research should focus on social determinants of health (such as educational, income, geographical and cultural determinants)

Criteria

Criteria were used in the main workshop of Stage Two to help participants prioritise research topics and judge their relative importance. During two of the Stage One workshops, participants were asked to discuss which criteria they felt would be most appropriate for the prioritisation process in Stage Two.

Individuals in these workshops ranked their five preferred criteria from a shortlist (the shortlist is attached at Annex 2). These individual rankings were used to generate a ranking for the workshop as a whole. In the discussions and ranking, three criteria were overwhelmingly considered to be most appropriate for developing the NHHRA:

- Magnitude of the health problem.
- Effectiveness.
- Equity.

When asked, participants in the Stage One workshops indicated that they preferred that scoring for these criteria should be kept as simple as possible, either offering two or three possible scores.

Opinions from participants in Stage One were also sought regarding the use of an *overall score* for scoring the research topics, as opposed to using *criteria* which provide partial scores for each research topic. Participants in Stage One felt there might be value in using an overall score, but that it should not replace the use of criteria and should be used in conjunction with them.

Therefore, in Stage Two, participants were asked to score the research topics on the following:

- Criterion 1: Magnitude of the health problem (Score from 1-3).

- Criterion 2: Effectiveness (Score from 1-3).
- Criterion 3: Equity (Score from 1-3).
- Overall score (Score from 1-5).

Participants in Stage Two were asked to provide preferred weights for the three criteria. The averages of the preferred weights that the participants provided were:

- Criterion 1: Magnitude of the health problem (Weight: 37%).
- Criterion 2: Effectiveness (Weight: 33%).
- Criterion 3: Equity (Weight: 29%).

Finally, participants in Stage Two were also asked to indicate whether they preferred the use of criteria, the use of an overall score, or both, to determine the score for each research topic. Almost all participants indicated that they felt that both criteria and the overall score should be used.

Health problems and areas

In each of the Stage One workshops participants agreed on a framework for health problems or areas of importance within each Research Domain. The sets of health problems or areas are based on the framework of the NHP, but were modified and added to by participants to accommodate the generation of important research topics within the Research Domain. Table 4.2 lists the health problems or areas that were agreed upon by participants within each Research Domain.

The Agenda

After agreement was reached on a set of health problems or areas for which research topics needed to be identified, Stage One participants brainstormed in smaller groups on what they felt were the most important research topics under each health problem or area. These topics were then discussed by the whole group and consensus was reached on the list of research topics that should be presented to Stage Two.

During Stage Two, the list of research topics was further refined and then individually scored on the basis of the three aforementioned criteria and the overall score. The combined scores for each research topic were then presented back to the participants for further discussion. The variance in the scores for each topic was calculated, but there were no topics with a singularly large variance, and it was therefore decided not to present participants with variances of the scores for each research topic. During participants' final revision to the ranking, four pairs of research topics were merged on the basis that they were sufficiently similar. A further three research topics were added, but these were not assigned a ranking because they had not been included in the original scoring exercise.

Several important cross-cutting themes were identified, such as the role of men in maternal and child health, the influence of laws and policies on health, and the need to differentiate 'standard' health service quality improvement from operational research questions in the health systems domain. These themes were not admitted as specific research topics, since they were considered to be included in several of the research topics on the list. Only one research topic (on mental health) was re-ranked. The re-ranked topic was promoted to a higher ranking based on the consensus of the Stage Two participants.

Following the review of research topics, and the review of the results of the scoring, Stage Two participants agreed a final ranked list of 60 research priorities for the National Health and HIV Research Agenda (NHHRA). Table 4.3 presents the top-20 research priorities from the final ranked list, with “1” being the highest priority and “20” being the lowest. The full ranking of all research topics, including participants’ views on why each research topic is important, and additional notes describing the topic, is appended at Annex 3.

Table 4.2. Health problems or areas agreed upon by Stage One participants as being important to the Research Domain

Research Domain	Health problems or areas
RD 1: Maternal, reproductive and child health research	<ul style="list-style-type: none"> • Maternal mortality and neonatal deaths. • Pneumonia mortality. • Childhood immunisation. • Sexual and reproductive health for adolescents. • Family planning. • Malnutrition in children under the age of five years.
RD 2: Communicable disease research	<ul style="list-style-type: none"> • Tuberculosis (TB). • HIV and other sexually transmitted infections (STIs). • Malaria. • Neglected tropical diseases (NTDs).
RD 3: Research on healthy lifestyles	<ul style="list-style-type: none"> • Environmental Health. • Cancer. • Violence. • Mental health. • Substance abuse. • Diabetes, cardiovascular diseases and nutrition. • Disability. • Injuries.
RD 4: Health systems research	<ul style="list-style-type: none"> • Health technologies. • Health information systems. • Human resources for health. • Leadership, management and governance. • Health financing. • Inequities. • Partnerships. • Service delivery.

Table 4.3. Top-20 priorities from the final ranked list of research topics

Rank	Domain	Research Topic
1	RMCH	Research on how community-level post-natal care interventions that are known to be effective can be best implemented in the PNG context.
2	RMCH	Research to evaluate current maternal and neonatal care practices in health facilities and in the community (e.g. partogram usage or management of low-birth weight or prematurity).
3	CD	Research on the prevalence and socioeconomic determinants of tuberculosis (TB), drug resistant TB (MDR-TB, XDR-TB) and TB/HIV co-infection.
4	HS	Quality assurance research of medicines and medical supplies along the whole supply chain, from procurement to distribution and storage.
5	HL	Research on the coverage of access to safe water and proper sanitation, especially rurally and in urban settlements.
6	HL	Research on solutions for increasing coverage of diagnosis, screening and early detection of cancer in PNG, with a view to understanding the relative burden of different cancers (e.g. breast, cervical, liver and oral cancers).
7	CD	Research on the causes of treatment failure, in particular the causes of poor adherence to treatment for TB, HIV and HIV/TB co-infection and how adherence can be improved.
8	RMCH	Research on the barriers and enablers to accessing supervised delivery in health facilities.
9	CD	Research on the magnitude and determinants of drug resistance for TB, malaria, pneumonia, meningitis, sexually transmitted infections (STIs) and HIV.
10	RMCH	Research on the serotype distribution of major pathogens causing pneumonia and meningitis and their susceptibility to antibiotics.
11	RMCH	Research on the effectiveness and feasibility of different mechanisms for introducing or scaling up coverage of new and existing vaccines (e.g. outreach or supplementary immunisation activity (SIA) or introduction of immunisation at health post level).
12	CD	Research on the size, geographical distribution and HIV- and health-care seeking behaviours of most-at-risk populations for HIV and STIs.
13	HL	Research on the cost-effectiveness and sustainability of different possible systems for safe waste disposal (including urban solid waste, waste water, medical waste and chemical waste).
14	HL	Research on the prevalence, determinants and burden of violence, especially gender-based violence, and on the effectiveness of interventions.
15	HS	Research on why there is low utilisation of health information and how this can be improved at all levels of the health system.
16	RMCH	Research on sexual and reproductive health knowledge, attitudes and practices of youth and adolescents (e.g. preventing unwanted pregnancy and STIs).
17	RMCH	Research on the prevalence of vaccine preventable diseases to inform planning and monitoring of immunisation programs.
18	HS	Research on the satisfaction of health workers with their working conditions and on solutions for improving recruitment and retention of health workers.
19	HS	Research on the factors that impact on the quality of health workforce performance.
20	HL	Epidemiological studies on the burden of different mental health problems, in particular at community level.

Legend Table 4.3: RMCH = Reproductive, maternal and child health research; CD = Communicable disease research; HL = Research on healthy lifestyles; HS = Health systems research.

A list of HIV strategic research priorities

The review of the previous HIV research agenda by participants in Stage Three resulted in a total of 32 research topics being proposed for the period 2013 – 2018. These 32 research topics were individually ranked based on an overall score. The combined score was presented back to participants for discussion. This discussion to develop a final ranking for the HIV strategic research priorities resulted in the following:

- Four strategic research priorities were moved to a lower position in the list of priorities, including two that were moved out of the top-10.
- Two strategic research priorities were moved to a higher position in the list of priorities so that they were included in the top-10.

Following this, Stage Three participants agreed a final list of 32 HIV strategic research priorities. Participants proposed that in the list of HIV strategic research priorities, the top-10 should be reported as distinct from the other strategic research priorities. Moreover, it was agreed that the topics should be presented in the order in which they were discussed at the workshop, but that an explicit numerical ranking should not be assigned to any of the strategic research priorities. Table 4.4 presents the top-10 HIV strategic research priorities as agreed by participants. The full list of HIV strategic research priorities is appended in Annex 4.

Table 4.4. The top-10 strategic research priorities in the area of HIV

Research Topic	Alignment with	
	NHS Priority Area (PA)	NHS Strategic Priority (SP)
Research on geographic distribution, size estimations, high-risk practices and HIV / sexually transmitted infection (STI) serology among key affected populations.	PA1	SP1
Research on adult and paediatric HIV, STI and HIV-related opportunistic infection treatment, management, monitoring and outcomes.	PA2	SP2
Research on prevention programs and practices for sexual transmission of HIV and other STIs (including condom distribution and male circumcision).	PA1	SP1
Research on biomedical technologies in the prevention of HIV and STIs.	PA1	SP1
Research on enablers for and barriers to creating supportive and safe environments for HIV and STI prevention.	PA1	SP3
Research on HIV testing quality assurance and the implementation of HIV testing algorithms.	PA2	SP1
Research on the usefulness and impact of innovative systems to record and share information on HIV and STI clients and key affected populations.	PA3	SP1
Research on the risk of HIV and STI transmission among HIV sero-discordant couples.	PA1	SP1
Research on the lives of marginalised and most-at-risk populations.	PA1	SP2
Research on the lives of people living with HIV, their families and communities.	PA2	SP2

Chapter 5. Implementation

Past reviews of health research capacity needs and potential resources available

During 2012, a consultant team reviewed previous studies on health research capacity needs in PNG, including:

- A Thematic Evaluation of AusAID Support to PNG Research Institutions.¹⁸
- The Draft Independent Progress Report documenting Research Support to the PNG Institute of Medical Research.¹⁹
- The PNG Universities Review.²⁰
- A range of assessments containing health sector planning documents by the Government of Papua New Guinea (GoPNG) and its development partners, most importantly the National Health Research Policy, developed by the NDoH in 2010 and published in 2012.¹

This review was presented during the Stage Two workshop to aid discussion and included notes on research capacity gaps including identified needs for: stronger national health and HIV research leadership and processes for knowledge translation; clearer national research priorities; more research-capable institutions and researchers; and more access to domestic and international funding.

The Stage Two workshop noted the NDoH Health Research Policy strategies that promote:¹

- One single national health sector research coordination body – the PNG Health Research Council (HRC), with two sub-committees (for health systems and medical research).
- Training of health personnel in research methodology and its application.
- A secretariat within NDoH that possesses appropriate qualifications to effectively coordinate and implement research policy.
- Health research targeting identified priorities, including identified priorities in the NHP.
- PNG HRC as custodian of research findings.
- Ownership of all research findings, documents and specimens by GoPNG.
- Accessibility and dissemination of findings.
- A national system for database coordination.
- Monitoring and research branch responsibilities.

The 2012 consultant review was in support of the design of an AUD24M PNG-Australia aid initiative, the Program for Health & HIV Research Capacity Development (PHHRC) in PNG, which was agreed upon by GoPNG and AusAID earlier in 2013.² This provided support for the development of the NHHRA, and also can provide funding for a number of activities (described more fully in the PHHRC design ²) that could support implementation of the NHHRA, including:

1. A strengthened Health Research Unit in NDoH.
2. Implementation of the PNG Health Research Policy.
3. A health and HIV Research clearinghouse.
4. A national small grants and partnerships program.
5. A national large grants program.

The Stage Two workshop also noted the following global trends:

- Research capacity development is an increased priority within WHO Health Systems programs (demonstrated in WHO's support to this NHHRA process) and in AusAID programs (demonstrated by AusAID's support to this NHHRA process; by a specific grant for support to research functions at the UPNG School of Medicine and Health Sciences that was included in an AusAID grant (HECS II), due to commence in January 2014; and by a targeted grant to the PNG Institute of Medical Research (IMR), which includes provision for research quality improvement officers (not yet implemented) who could support some of the aspirations discussed below).
- There are increased global commitments to:
 - Mapping and tracking health research.²¹
 - To advocacy to increased funds for research.
 - To increase the usage of health systems research methods such as those proposed by the Alliance for Health Policy and Systems Research.²²
- International non-governmental organisations (NGOs) and other development organisations working in PNG are increasingly prioritising operational research.

The Stage Two workshop participants welcomed these developments as providing a basis for increased development of research capacity in PNG, including implementation of the NHHRA.

Discussions during workshops on the need to increase research capacity

During the Stage One workshops, many participants noted in side discussions the need in PNG for:

- Improving linkages and data between NDoH and institutions with good research capacity.
- A national health research clearing house, that incorporates the NHHRA.
- Research in PNG to be presented in PNG forums, including forums allowing for presentations that would not otherwise meet international journal requirements.
- Research proposal assessment and review (in particular ethics) processes that are faster, more frequent and provide more feedback.

Participants noted the need to increase research capacity as an integral part of all health sector activity. The need for more widespread, program-oriented, small-scale research was emphasised, especially in districts, as well as improved utilisation of research outcomes at that level. Initiatives such as the SORT IT program by the Special Programme for Research and Training in Tropical Diseases (TDR) might help to support increased capacity for research at district-level, as well as the local utilisation of health information for planning and monitoring.²³

During the Stage Two and Three workshops many of these points were echoed. Participants identified the need for clarity in the roll-out of a national Health Research Policy to ensure the sequence and flow of submissions to provincial research committees, various other ethics review committees (e.g. within universities or PNG IMR), and a new HRC. There was general consensus that any new arrangements should be designed so that they streamline approval procedures, not make them more complex. Improving mutual recognition between ethics review bodies could be one means to support this.

Human resource needs were raised by many, including the need for senior academic staff to review proposals and to provide supervision of students undertaking research. A new PNG HRC would draw on the same pool of expertise as that currently engaged in the NDoH Medical Research Advisory Committee (MRAC) and the NACS's Research Advisory Committee (RAC). Partnerships between universities and institutions within PNG, and with other countries, will be needed to support this. For these partnerships to work, there needs to be clarity about counterpart funding arrangements, that is: what activities that partner institution funds will and will not support. Contributions from the National Agricultural Research Institute (NARI), the University of Technology and the Pacific Adventist University (PAU) all provided alternative models of support to internal research programs. NARI mentioned to use a national priority-setting process similar to that used for this NHHRA.

Other points of discussion revolved around how to support and develop young researchers through:

- Partnerships and secondments.
- Short courses on methods and data analysis.
- Support for writing up reports for publication.

Incorporation of research capacity development activities into every research proposal was seen as essential based on the experience of the HIV research funding program. PNG currently has no internal post-graduate scholarship program, but should be encouraged to develop this. The group noted the potential for dissemination provided by the unique nature of the PNG Medical Symposium, including its increasing breadth of participants beyond doctors to other professions.

There was a strong call for the NDoH to provide some seed money to kick-start the implementation of the NHHRA and to take ownership of the agenda. There was a general desire that the NHHRA enable students, supervisors and researchers to better target their research proposals, and increase their chance of receiving funding.

Finally, it was noted that on many of the topics in the NHHRA research has already been undertaken in PNG. The question is: where are the gaps? Within a research topic, what are currently the most pertinent research questions? It was noted that literature reviews could help identify such gaps. Although research has not been comprehensive, a lot has been done in PNG, there is a need to take that into account and not duplicate efforts.

Discussion on integration of HIV research with health research more generally

The groups identified the need to clarify arrangements between the HIV research program under NACS and future health research developments.

Participants noted that they felt there is value in having both an overall NHHRA for all health areas *as well as* a specific list of HIV strategic research priorities, as portrayed in Figure 1.1 describing the overall structure of the NHHRA. It was noted that this is likely also true for other health areas. Two key reasons for this sentiment were given:

1. That it is important for HIV research policies to specifically support HIV policies.

2. That it is important not to lose momentum in terms of what has been achieved in the area of HIV research in recent years (especially also with regards to the capacity that has been built up in the management of research funds in the area of HIV).

Mainstreaming HIV into health was felt to be important, and the NHHRA was considered a good starting point to move the health research capacity of the country forward in the area of health. In the past, the area of HIV has received comparatively more attention than other areas of health. Consequently, HIV research in PNG has been able to mature more in terms of capacity for research funding distribution. Experience in HIV research funding distribution and grants management (through the RAC) should be used to develop similar mechanisms for health research overall. Suggestions from these Stage Three discussions about how this can be achieved have been included in the Implementation Recommendations section below.

NHHRA Implementation Recommendations

These recommendations have been derived from the moderated discussion in the Stage Two workshop and are supplemented with suggestions from the Stage Three workshop.

1. Publish, disseminate and (at an appropriate time) revisit the NHHRA

- NDoH is encouraged to publish the finalised NHHRA and seek support to broadly distribute the NHHRA to other research stakeholders in PNG, as well as to international stakeholders.
- There should be a PNG Medical Symposium presentation on the NHHRA process and a continuing relationship between the NHHRA and the Symposium.
- The NHHRA is intended to provide guidance on research priorities for five years. Therefore, in 2018 the current NHHRA will need to be evaluated and updated. As part of the revision in 2018, a review of research conducted in PNG from 2013 to 2018 should be commissioned, to identify what areas of the 2013 NHHRA have been addressed, what gaps remain, and what new gaps have emerged. The NHHRA Working Group should consider the potential value of a mid-term impact review.
- It was suggested that as part of “clearinghouse” functions, as identified in the Program for Health & HIV Research Capacity Development,² annual reports could be created by NDoH and the Working Group that include the identification of gaps in the NHHRA that are not receiving research attention.

2. NDoH leadership of the NHHRA

- The group proposed a report to the NDoH Senior Executive (perhaps comprising this report) on the NHHRA, including discussion on how to strengthen capacity of the NDoH Health Research Unit, including ethics review and approval mechanisms, as well as funding distribution mechanisms (specifically grants programs).
- The NDoH was encouraged to use the NHHRA to solicit funds from within NDoH, including an application for seed money, and to apply for funds from AusAID (as part of the PHHRC) and other development partners, in particular to set up a health research funding distribution mechanism (see below “Establishing a national research grants program”).
- NDoH was encouraged to identify key people in NDoH and elsewhere who can lead the work noted below, including planning for the expansion of research capable staff, funded by external partner support if necessary (the PHHRC mentions the

availability of funding for operational support to establish a funding distribution mechanism²).

3. Use of the NHHRA by all health institutions

- All health institutions in PNG carrying out research should be requested to make use of this NHHRA in reviewing their own research activities and plans.
- PNG IMR noted that it will use of the NHHRA in internal planning, and other universities represented committed to taking the NHHRA to the appropriate authorities.
- The NHHRA could be seen as a research extension of the National Health Plan and should aid institutions by adding credibility to external applications for research funding.

4. Establish a health research clearinghouse

- A health research “clearinghouse” should be established, preferably within NDoH. A clearinghouse resembles recent international suggestions to establish “National Observatories on Health R&D”.²¹
- The functions will need further clarification but could include:
 - Collecting in one place all health research activities
 - Synthesising research findings and making them available to policymakers, practitioners and other researchers
 - Analysing where research activity and funding is being directed and reporting on gaps in the NHHRA that are not being addressed
 - Reporting to a new HRC, when established
- The establishment of a clearinghouse could precede other work (such as that for a Health Research Council).
- It is likely to require hiring of a dedicated staff member to start the process.

5. Streamline and harmonise national ethics research review processes

- NDoH was encouraged to review MRAC membership and functions, and proposals for a PNG HRC, aiming for a more user-friendly system for ethics review. In particular, it was felt that:
 - There is a need to streamline ethics review processes and harmonise mutual recognition of approvals across various institutions in PNG. A ratification mechanism is currently used by MRAC. For research proposals that have been reviewed and approved by the ethics review board of university, hospital or the PNGIMR, the MRAC will automatically ratify the research proposal. However, it was noted that such ethics review boards are not of consistent quality across all such institutions. The problem of inconsistent quality of ethics review boards could be partly solved by establishing minimum standards for ethics review boards.
 - Rigour in ethics review processes is important but efficiency and timeliness of review are also important considerations that need to be balanced. In some participants' experience, it was felt that there are too many administrative barriers to getting prompt approval for research. In

particular, the number of committees that a research proposal needs to pass through for review delays the timely processing of research proposals.

- It was noted that the RAC does not have the same ratification mechanism as MRAC. Currently, the RAC still conducts its own review of research proposals, even if the proposal has already been granted approval by a different ethics review board. It was suggested that RAC could adopt a ratification mechanism that is similar to the one the MRAC uses.
- Ethics review should be conducted more frequently than is currently the case, for MRAC and for other bodies.
- Participants made recommendations with regards to membership of ethics review committees, which were the same as recommendations for membership of funding proposal review committees (see recommendation 6).

6. Establish a national research grants program

- Stage Two workshop participants agreed that development of a body such as the HRC with responsibility for allocating research funds (derived from government and development partner sources) was an important step. The notes below consolidate discussions on this point and some notes represent comments rather than recommendations.
- Stage Two and Stage Three workshop participants noted that ideally ethics approval and funding distribution should be separate processes, managed by separate organisations and led by different people. However, given the current limits on research capacity in PNG this might be difficult and Stage Three participants noted that the RAC has operated with these two functions combined for several years. During the establishment of a new mechanism for research funding and ethics review, discussion should continue on whether these processes should be coordinated by separate committees.
- For ethics review functions and funding proposal review function, different meeting frequencies might be appropriate.
- In terms of membership, participants recommended that the new review committees for either ethics review or research funding distribution should include:
 - People who have the technical expertise to conduct reviews of proposals.
 - People who have the time to do so.
 - People who have experience with this in PNG – there are enough people who can do this and have done so in the past.
- The success of a funding distribution mechanism depends on funding support, and the NDoH was encouraged to examine the recent GoPNG and AusAID commitments in this area, including the PHRC and the government's allocation of several million Kina that has been allocated to a small- and a large-grants funding scheme.²

7. Transfer lessons from HIV grants management experiences

- Participants from Stage Two and Three noted the importance of drawing on staff with expertise gained in NACS's RAC work, and on the documentation of standard procedures developed through that process. Specific suggestions included:

- Building capacity for a health research funding distribution mechanism will start with human resource capacity. One proposal is for someone who has technical expertise with funding distribution mechanisms, for example within the RAC, could be employed in NDoH. This person can then work with the NDoH Health Research Unit, to help set up a funding distribution mechanism for health.
- Review RAC documents when developing mechanisms, standards and standard operating procedures that guide the workings of a HRC. The RAC documents could be used as a basis for the operation of any newly established funding mechanism.
- Participants noted that the RAC should initially co-exist with any new funding distribution mechanism for all areas of health. The current practice of biomedical HIV proposals being referred to MRAC (and the new HRC), with social science proposals assessed by RAC, is likely to continue, at least until the new HRC is more fully established. Participants noted that the RAC functions well: were it to be dissolved too soon, there would be a loss of its established capacity. Although it might ultimately be beneficial to combine RAC functions with funding distribution and ethics approval functions for health overall, phase out should be gradual.

Chapter 6. Lessons learned

The development of a national health research agenda is a process that requires adequate preparation, involves many different actors and, ideally, makes use of standardised methodologies for research topic identification and prioritisation. The end-product should be transparently reported and followed by well-planned implementation, evaluation and revision. Several lessons were learned in undertaking this research priority setting process in PNG. Where possible these lessons should be used to guide and improve the process for revision of the NHHRA in 2018.

1. Inclusiveness

All the workshops that were conducted as part of the development of the NHHRA were well attended and included a diverse range of stakeholders. Although specific efforts were made to include a range of stakeholders in terms of health areas of expertise, disciplines (researchers, health practitioners and policymakers) and geographical spread, in the future consideration could be given to an even broader range of stakeholders. Specifically, consideration should be given to greater involvement of:

- Women.
- Health system clients (or their representatives) and the broader community.
- More health practitioners and researchers (as opposed to policymakers). Greater involvement of researchers was considered to be particularly important for Stage One during which research topics are identified.
- Practitioners representing private practices.
- Faith-based organisations involved in health services delivery.
- Non-governmental organisations involved in implementation and research.
- Participants from outside Port Moresby, in particular from rural parts of the country.
- Key international research collaborators.

2. Planning

The Working Group for the revision to the NHHRA should be formed well in advance of the deadline for revision – at least 18 months before the end-product is needed would be advisable. Any technical consultants engaged should be involved as early as possible. These two measures should support improved planning of the overall process and could have several benefits:

- *More lead time to secure the involvement of key actors:* Early engagement with and involvement of all stakeholders could provide a basis for stronger and broader participation in workshops and in the process overall.
- *More options for engaging with stakeholders:* Methods for achieving broader involvement of different groups of stakeholders might include pre-workshop surveys among a wider range and greater number of stakeholders. Early commencement of the revision process would allow time to develop, test, distribute and analyse such surveys.
- *Expansion of preparatory work:* In preparation for the priority setting process, information was collected on the health status of the country, research conducted in PNG to date and on the relevant policy frameworks to which the NHHRA should be aligned (the NHP and the NHS). Additional information on the workings and structure of the

health system and the health research system would be beneficial as part of a future research priority setting process in PNG, in particular given the challenges that remain in terms of increasing the research capacity of the country.¹¹ Furthermore, with more time, it might be possible to circulate briefs on health problems and a situation analysis of health research in advance of any workshops or surveys. This would allow participants in the process time to familiarise themselves with key information that they could use in setting priorities.

- *Greater time for feedback and achieving consensus:* When planning the revision of the NHHRA, more time should be taken between Stage One (research topic identification) and Stage Two (research topic refinement and prioritisation). In the process that led to the development of the NHHRA, this time was used to get external feedback on the list of developed research topics. However, time for this was limited (one week). More attention could be paid to sharing the list of research topics to a wider audience at this stage, which would increase further the overall legitimacy of the research agenda. Alternatively, an intermediate workshop could be held with the express purpose of reviewing the Stage One research topics prior to the scoring exercise.
- *Improving alignment between the NHHRA and more detailed lists of research priorities in specific areas:* In developing the list of HIV strategic research priorities, Stage Three participants found it difficult to align the research topics they identified with the research topics on HIV that had followed from the workshop on communicable disease research that was conducted in Stage One. In the future, it might be useful to conduct any research priority setting workshops for specific research areas, such as HIV research, before the development of the overarching, high-level NHHRA, so they can inform the topics in the NHHRA (rather than vice-versa).

Chapter 7. References

1. *Health Research Policy: A Guide to doing Health Research in Papua New Guinea*. Papua New Guinea Department of Health; 2012.
2. *Draft Program for Health & HIV Research Capacity Development in Papua New Guinea*. 2012.
3. *National Health Plan 2011–2020 Volume 1 Policies and Strategies*. Government of Papua New Guinea; 2010.
4. *National research agenda for HIV and AIDS in Papua New Guinea 2008-2013*. PNG National AIDS Council; Government of Papua New Guinea
5. The Institute for Health Metrics and Evaluation (IHME) at the University of Washington, Global Burden of Disease Study 2010. GBD PROFILE: PAPUA NEW GUINEA. 2012. Available at: http://www.healthmetricsandevaluation.org/sites/default/files/country-profiles/GBD_Country_Report_-_Papua_New_Guinea.pdf.
6. WHO Global Burden of Disease (GBD): Disease and injury country estimates. Available at: http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/.
7. Sy KT, Rani M. *A very preliminary rough analysis of published research in PNG in last 12 years*. World Health Organization (WHO) - Western Pacific Region; 2013.
8. *Papua New Guinea National HIV and AIDS Strategy 2011-2015*. Port Moresby: PNG National AIDS Council; Government of Papua New Guinea; 2010.
9. Viergever RF, Olifson S, Ghaffar A, Terry RF. A checklist for health research priority setting: nine common themes of good practice. *Health research policy and systems*. 2010;8(1):36. doi:10.1186/1478-4505-8-36.
10. Okello D, Chongtrakul P, The COHRED Working Group on Priority Setting. *A Manual for Research Priority Setting using the ENHR Strategy*. Lausanne; 2000.
11. *Essential National Health Research and Priority Setting : Lessons Learned*. Council on Health Research for Development (COHRED); 1997.
12. Rudan I, Arifeen S El, Black RE. *A New Approach for Systematic Priority Setting In Child Health Research Investment*. Dhaka: Published by Child Health and Nutrition Research Initiative (CHNRI); 2006.
13. *The 3D Combined Approach Matrix: An improved tool for setting priorities in research for health*. Geneva: Global Forum for Health Research; 2009.
14. Baltussen R, Niessen L. Priority setting of health interventions: the need for multi-criteria decision analysis. *Cost effectiveness and resource allocation : C/E*. 2006;4(1):14. doi:10.1186/1478-7547-4-14.
15. *WHA document A63/22: WHO's role and responsibilities in health research: Draft WHO strategy on research for health*. 2010.

16. Ranson MK, Bennett SC. Priority setting and health policy and systems research. *Health research policy and systems / BioMed Central*. 2009;7:27. doi:10.1186/1478-4505-7-27.
17. Mullen PM. Public involvement in health care priority setting: an overview of methods for eliciting values. *Health Expectations*. 1999;2(4):222–234. doi:10.1046/j.1369-6513.1999.00062.x.
18. Fargher J, Kiap W. Thematic Evaluation of AusAID Support to PNG Research Institutions: Thematic Evaluation Report. Port Moresby: AusAID; 2011
19. Fargher J, Kiap W, Matainaho T. *Research Support to the PNG Institute of Medical Research: Draft Independent Progress Report*. Port Moresby: AusAID; 2010.
20. Garnaut R, Namaliu R. *PNG Universities Review: Report to Prime Ministers Somare and Rudd*; 2010.
21. Røttingen J-A, Regmi S, Eide M, et al. Mapping available health R&D data: what's there, what's missing and what role for a Global Observatory. *Lancet*. 2013:Epub ahead of print, 17 May 2013.
22. Gilson M. *Health Policy and Systems Research: A Methodology Reader*. Geneva: Alliance for Health Policy and Systems Research, World Health Organization; 2012.
23. SORT IT operational research and training. Available at: <http://www.who.int/tdr/capacity/strengthening/sort/en/>. Accessed July 23, 2013.

Annex 1. The Working Group and participants

The Working Group for the PNG National Health and HIV Research Agenda

The Working Group for the development of the PNG National Health and HIV Research Agenda consisted of nine members (Table A1.1).

Table A1.1. Working Group members

Name	Organisation	Function
Ismael Urarang Kitur	National Department of Health (NDoH)	Co-chair
Julie Airi	National AIDS Council (NACS)	Co-chair
Anna Irumai	National Department of Health (NDoH)	Member
Paik Tade	National Department of Health (NDoH)	Member
Wilfred Kaleva	National AIDS Council (NACS)	Member
Paulinus Sikosana	World Health Organization (WHO)	Member
Gertrude N'Dreland	AusAID	Member
Carmel Ryan	AusAID	Member
Prudence Borthwick	AusAID	Member

The Working Group was supported in the development of the NHHRA by the Papua New Guinea World Health Organization (WHO) Country Office and the Burnet Institute, through AusAID support. Assistance was provided by Roderik Viergever (consultant to WHO), Geoff Chan (Burnet Institute), Chris Morgan (Burnet Institute) and Russel Kitau (consultant to WHO).

Full listing of participants

Stage One

All participants in the four workshops of Stage One are listed below (Table A1.2). The left column (RD1 – RD4) designates which workshop was attended:

- RD 1: Reproductive, maternal and child health research (1 and 4 July).
- RD 2: Communicable disease research (2 July).
- RD 3: Research on healthy lifestyles (including non-communicable diseases, health promotion, injuries, violence, nutrition, and water supply / sanitation) (3 July).
- RD 4: Health systems research (4 July).

Table A1.2. List of participants in Stage One

Research Domain	Name	Designation	Division/Branch
RD1	Dr Job Hawap	TA	Child Health, NDoH
RD1	Dr Lahui Geita	TA	Women's Health, NDoH
RD1	Dr Sibauk Bieb	Executive Manager	Public Health, NDoH
RD1	Professor Glen Mola	Gynaecologist	SMHS, UPNG
RD1	Mr Maluo Magaru	TA	School Health, NDoH
RD1	Mr Gerard Sui	Manager	EPI, NDoH
RD1	Dr Norbert Rhelis	TA	WHO
RD1	Dr Siddatta Datta	TA	WHO
RD1	Professor John Vince	Deputy Dean	SMHS, UPNG
RD1	Edward Waramin	TA	Adolescents Youth, NDoH
RD1	Elisabeth Kendrun	Nursing School	SMHS, UPNG
RD1	Dr William Pomat	Researcher	PNG IMR
RD1	Dr Laura Guarenti	Consultant	WHO
RD1	Dr Urarang Kitur	Manager PM&RB	NDoH
RD1	Paik Tade	Research Officer PM&RB	NDoH
RD1	Mr Maluo Magaru	TA	School Health, NDoH
RD2	Mr Namarole Lote	Manager	ART Data, NDoH
RD2	Edilson Yano	Technical Officer-Vaccine Preventable Disease	Disease Control, NDoH
RD2	Dr Paul Aia	Manager- TB	Disease Control, NDoH
RD2	Mr Leo Makita	Manager-Malaria	Disease Control, NDoH
RD2	Dr Herolyn Nindil	Regional Medical Officer TB	Disease Control, NDoH
RD2	Mr Berry Ropa	Manager-Disease Surveillance	Disease Control, NDoH
RD2	Dr Margeret Kal	Regional Medical Officer TB	Disease Control, NDoH
RD2	Wendy Houinei	Technical Officer-Neglected Tropical Diseases	Disease Control, NDoH
RD2	Dr Matupi Apaio	Chief Dentistry	Port Moresby General Hospital
RD2	Dr Peniel Boas	Cordinator-HIV Care & Treatment	Disease Control, NDoH
RD2	Dr Jacob Kisomb	Coordinator-HIV/TB Collaboration	Disease Control, NDoH
RD2	Dr Rabindra RA	TA – Malaria	WHO
RD2	Dr Sibauk Bieb	Manager - Public Health	NDoH
RD2	Dr Urarang Kitur	Manager PM&RB	NDoH
RD2	Elizabeth Piskipo	Lecturer - community health	SMHS, UPNG
RD2	Fabian Ndenzako	MO/HIV	WHO
RD2	John Deli	Technical Officer - Malaria	NDoH
RD2	John Moni	Research Officer - TB Leprosy	NDoH
RD2	Paik Tade	Technical Officer PM&RB	NDoH
RD2	Russel Kitau	Head of Public Health	SMH, UPNG
RD2	Shalala Ahmadora	TA - TB and Leprosy	WHO
RD2	Veronica Samof	Research information officer	NACS
RD2	Wilfred Kaleva	HIV Research adviser	NACS
RD2	William Pomat	Research Fellow	IMR
RD3	Rose Kavanamur	SEHO	NDoH
RD3	Helen Palik	Technical Officer - HIV Nutrition	NDoH
RD3	Paik Tade	Research officer	NDoH
RD3	Louis Samiak	Lecturer	SMHS, UPNG
RD3	Elizabeth Piskupe	Lecturer community health	SMHS, UPNG
RD3	William Pomat	Research Fellow	IMR

RD3	Dr Urarang Kitur	Manager PM&RB	NDoH
RD3	Russel Kitau	Head DPH	SMHS, UPNG
RD3	Ray Kangu	Program Officer - Water	NDoH
RD3	Dr James Naipao	Chief ENT	Port Moresby General Hospital
RD3	Theodore Magno	TA	WHO
RD3	Mr Ken Neyakawapa	TA	Sustainable Development Climate Change Impact, NDoH
RD3	Mr Joel Kolam	Manager	Environmental Health, NDoH
RD3	Rosemary Robert	Technical Officer- Alcohol and Substance Abuse	Disease Control, NDoH
RD3	Mr Lindsay Piliwas	Manager	Health Promotion, NDoH
RD3	Mr George Otto	Manager	Cancer Unit Services, NDoH
RD4	Professor John Vince	Deputy Dean	UPNG
RD4	Mr Ken Wai	a/Executive Manager	Strategic Policy, NDoH
RD4	Charles Kaprangi	TA – Governance	Govern Comm Board, NDoH
RD4	Ms Jonila Kepas	Manager	Pharmaceutical Services, NDoH
RD4	Agnes Pawiong Pukakia	TA	HS Policy, NDoH
RD4	Dr Paulinus Sikosana	TA	WHO
RD4	Mrs Unjim Kim	TA – EMT	WHO
RD4	Melkior Taminza	TA	NHIS, NDoH
RD4	Dr Merrilyn Mathias	Manager	National Blood Services, NDoH
RD4	Bibi Miere	TA CLI	PSSB, NDoH
RD4	William Pomat	Research fellow	IMR
RD4	Dr Urarang Kitur	Manager PM&RB	NDoH
RD4	Berry Ropa	PO SER	NDoH

In the main text, aggregated numbers are presented for types of participants (discipline, sex, city) for the four workshops overall. The aggregated numbers per workshop are presented here below:

Table A1.3. Aggregate numbers of participants for each of the four workshops of Stage One.

Stage One workshop	Date	Participants
RD1: Reproductive, maternal and child health research	1 July and 4 July 2013	n = 16 (Policy = 9 Researcher = 7 Practitioner = 0 ; Men = 12 Women = 4 ; From Port Moresby = 15 From elsewhere = 1)
RD2: Communicable disease research	2 July 2013	n = 24 (Policy = 11 Researcher = 7 Practitioner = 6 ; Men = 18 Women = 6 ; From Port Moresby = 23 From elsewhere = 1)
RD3: Research on healthy lifestyles	3 July 2013	n = 16 (Policy = 10 Researcher = 5, Practitioner = 1 ; Men = 13 Women = 3 ; From Port Moresby = 15 From elsewhere = 1)
RD4: Health systems research	4 July 2013	n = 13 (Policy = 12 Researcher = 1 Practitioner = 0 ; Men = 9 Women = 4 ; From Port Moresby = 12 From elsewhere = 1)
Total	1 to 4 July combined	n = 69 (Policy = 42 Researcher = 20 Practitioner = 7 ; Men = 52 Women = 17 ; From Port Moresby = 65 From elsewhere = 4)

Stage Two

All participants in the Stage Two workshop are listed below (Table A1.4).

Table A1.4. List of participants in Stage Two

Name	Designation	Division/Branch & Organisation
Ms Elva Lionel	Deputy Secretary	NHP & CS
Dr Urarang Kitur	Manager	PM&RB, NDoH
Mr Lindsay Piliwas	Manager	Health Promotion
Dr Lucy John	Manager	Disease Control
Mr Paik Tade	Senior Research Officer	Research & Monitoring
Anna Irumai	a/TA	Research & Monitoring
Dr Goa Tau	Executive Manager	Medical Standards
Ms Vicky Wari	Manager- Non Communicable Diseases	Disease Control
Mr Ken Wai	a/Executive Manager	Strategic Policy
Dr Paulinus Sikosana	TA	WHO
Mr Joseph Lipu	Manager	HRM
Dr Varage Laka	Manager	Workforce Standards & Accreditation
Dr P. Jeyaranthan	Dean of Science, University of Goroka & Deputy Chair of RAC	University of Goroka
Mrs Aketa Tiaon-lentak	Dean of Health Sciences, Pacific Adventist University	Pacific Adventist University
Professor Peter Siba	Director	PNGIMR
Dr Norah Omot	National Agriculture Research Institute	NARI
Dr Wilfred Kaleva	HIV Research adviser	NACS
Ms Julie Airi	NACS Research Manager	NACS
Eimi Kaptigau	President	PNG Nursing Association
Russell Kitau	Head of Public Health, School of Medicine and Health Sciences	UPNG
Dr Laldas	Chief Medical Officer	University of Technology
Vali Kero	Manager MSPD	NDoH
Bibi Miere	Technical Adviser - CLI, PSSB	NDoH
Andrew Valley	Deputy Director Science	PNGIMR
Veronica Samof	Research Officer	National AIDS Council Secretariat
Joel Kolam	Manager Environmental Health Branch	NDoH
Dr Paul Ain	TB Program	NDoH
Bangan John	Scientist, CPHL	NDoH
Sebastian Robert	Project Officer - Gender and Men's Health	NDoH
Rosemary Robert	Technical Officer - Alcohol and	NDoH

Substance Abuse		
Melchior Taminza	Technical Adviser – NHIS	NDoH
Dr Angela Kelly	Researcher	PNGIMR
Tau Nauna	STI	NDoH
Dr Lloyd Ipai*	Chief Physician	Port Moresby General Hospital
Professor Glen Mola*	Obstetrician and Gynaecologist	Port Moresby General Hospital
Dr Goiba Tienang*	Chief Psychiatrist	Port Moresby General Hospital
Evelyn Lavu*	CPHL	NDoH

* Only participated in scoring of the research topics

Stage Three

All participants in the Stage Three workshop are listed below (Table A1.5).

Table A1.5. List of participants in Stage Three

Participant	Position and Institution
Dr P. Jeyaranthan	Dean of Science , University of Goroka & Deputy Chair RAC
Dr Angella Kelly	Researcher, PNGIMR
Dr Jennifer Litau	Dean of Humanities Pacific Adventist University & RAC Member
Professor Andrew Vallely	Deputy Director IMR
Dr Norah Omot	National Agriculture Research Institute
Mr Philip Tapo	Deputy Director Prevention NACS
Fabian Ndenzako	WHO
Mr Paik Tade	Research Officer, Research and Monitoring Branch
Agnes Gege	M&E, NACS
Steven Terrell-Perica	Country Director, CDC
Dr P.K. Laldas	Chief Medical Officer, University of Technology
Dr Wilfred Kaleva	HIV Research Advisor RCU
Dr Urang Kitur	Manager Research and Monitoring Branch Health Department & Co Chair
Julie Airi	Manager Behavior Research and Information RCU NACS & Co Chair
Anna Irumai	Research Officer, Research and Monitoring Branch

Annex 2. Brief on health research priority setting criteria

This brief was presented to Stage One participants as part of their discussion on the most appropriate criteria for scoring the importance of health research topics in Stage Two.

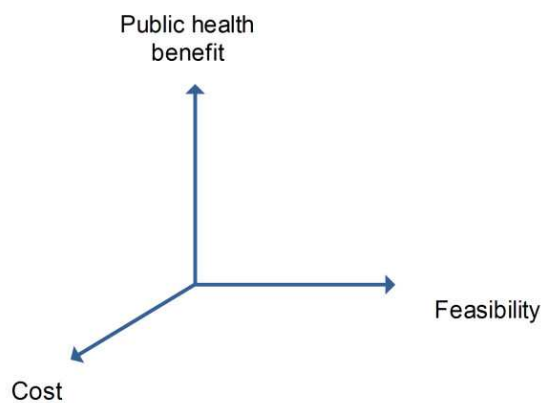
Why use criteria in research priority setting processes:

Criteria are used to help with scoring the importance of different research topics based on different dimensions (such as effectiveness, cost, feasibility, equity).

Criteria should be:

1. Mutually exclusive, i.e. not overlapping in what they assess.
2. Inclusive, i.e. covering all of the important aspects of a health research topic.
3. Well defined, with cut-off points identified for each criterion.

Commonly, criteria fall along one of the following three axes:



A review

A review of criteria that are often used in research priority setting processes is presented in Table A2.1.

Table A2.1. List of criteria that can form the basis for discussion about which criteria to use at the stakeholder workshops

Axis	Criterion	Definition	Suggested levels
Public health benefit <i>Should we do it?</i>	Ethical acceptability	Can research on this topic be expected to be ethically and morally acceptable?	3 There are no foreseeable ethical and/or moral problems 2 It is a sensitive issue, but not necessarily ethically unacceptable 1 There are serious ethical and/or moral objections against this research topic.
	Size of the knowledge gap	How adequate is any available research-based information on this topic?	3 There is currently no knowledge on this topic and new knowledge will be very useful. 2 There is some knowledge on this topic and new knowledge will be moderately useful 1 Much knowledge is already available on this topic and this research will not add much to the knowledge base.
	Equity	How much would research on this topic contribute to better equity in the population?	3 The research is likely to provide the most benefit to sub-groups in the population with poor health expectations or with poor access to health services. 2 The research is likely to provide equal benefit to all segments of the population in PNG. 1 The research is likely to provide the most benefit to sub-groups in the population with good health expectations and good access to health services.
	Magnitude of the health problem	How severe is the problem or the burden of the disease that the research topic addresses? For diseases, think in terms of prevalence, incidence, morbidity and mortality? For health systems topics, think in the size of the maleficent effects of the system problem?	3 The magnitude of the problem / the burden of the disease that this research topic addresses is large 2 The magnitude of the problem / the burden of the disease that this research topic addresses is moderate 1 The magnitude of the problem / the burden of the disease that this research topic addresses is small
	Effectiveness	How effective is the research on this topic expected to be in reducing the burden of disease or solving the problem?	3 Research on this topic is expected to be very effective in reducing the magnitude of the problem or the disease burden 2 Research on this topic is expected to be moderately effective in reducing the magnitude of the problem or the disease burden 1 Research on this topic is expected to have little effectiveness in reducing the magnitude of the problem or the disease burden
	Responsiveness to the PNG National Health Plan	How much does the research topic respond to the PNG National Health Plan?	3 This research topic responds directly to one of the objectives or strategies of the PNG National Health Plan 2 This research topic partially responds to one of the objectives or strategies of the PNG National Health Plan 1 This research topic does not respond to any objectives or strategies in the PNG National Health Plan
	Community concern	How much demand is there from the community for action on this research topic?	3 Community concern is high 2 Community concern is moderate 1 Community concern is low or non-existent
	Impact on research capacity	Will research on this topic have an impact on the research capacity of the country?	3 I expect there will be a high impact on the research capacity of the country 2 A moderate impact 1 Little or no impact
	Economic impact	Will research on this topic result in cost savings for the country or in cheaper interventions?	3 The chance of cost savings is high 2 There is a moderate chance of cost savings 1 I do not expect there to be much chance of cost savings because of research on this topic

	Impact on partnership building	How large are the chances that research on this topic will promote partnership building, across disciplines and/or different research stakeholders?	3 Research on this topic is very likely to include partnership building and multi-stakeholder collaboration 2 Research on this topic will likely include some partnership building and multi-stakeholder collaboration 1 I do not expect there to be any partnership building or multi-stakeholder collaboration as part of research on this topic
Feasibility <i>Can we do it?</i>	Capacity of the health and research systems to undertake the research	How adequate is the capacity of the health and research systems to undertake the research in terms of available skills, infrastructure, support systems, mechanisms and resources?	3 Research on this topic can be easily undertaken within the capacity of the PNG health system and research system 2 There might be some problems with undertaking research on this topic due to the capacity of the PNG health system and research system 1 There will be serious problems with undertaking research on this topic due to the capacity of the PNG health system and research system
	Likelihood of funding	How likely is it that the project will receive funding?	3 I think it is likely that this project will receive funding. 2 it is possible that this project will receive funding 1 it is doubtful that this project will receive funding
	Implementation	What are the chances that recommendations that come out of research on this topic will be implemented?	3 The chances of implementation of the research findings are good. 2 The chances of implementation of the research findings are moderate. 1 The chances of implementation of the research findings are small.
	Political support	How large is the expected political support for research on this topic?	3 I expect that political support will be strong. 2 I expect that political support will be moderate. 1 I expect that political support will be weak.
Cost <i>What will it cost?</i>	Cost	How much will it cost to conduct and finish one or more research projects that adequately address this topic?	3 The expected costs are low 2 The expected costs are moderate 1 The expected costs are high
	Time	How much time will it take to conduct and finish one or more research projects that adequately address this topic?	3 A little amount of time – results will be available soon 2 A moderate amount of time 1 A lot of time – it will take long before results are available

Criteria that are combinations of other criteria were left out of this table.

Examples:

- Health impact (effectiveness + magnitude of the health problem).
- Cost-effectiveness (cost + effectiveness).
- Urgency (magnitude of health problem + trend in magnitude + usefulness).

Annex 3. Research priorities in the NHHRA

In this Annex, all research topics that emerged from Stages One and Two are presented. In the first section of the Annex, the full ranked list of 60 research priorities is presented. In the second part of this Annex that follows it, the research topics are presented ranked per Research Domain, including participants' views on why each research topic is important, and additional notes describing the topic.

List of ranked research priorities

The final ranked list of research priorities that followed from Stages One and Two is presented in Table A3.1.

Table A3.1. The final ranked list of 60 research priorities for all areas of health in the NHHRA

Rank	Research Domain	Research Topic
1	RMCH	Research on how community-level post-natal care interventions that are known to be effective can be best implemented in the PNG context.
2	RMCH	Research to evaluate current maternal and neonatal care practices in health facilities and in the community (e.g. partogram usage or management of low-birth weight or prematurity).
3	CD	Research on the prevalence and socioeconomic determinants of tuberculosis (TB), drug resistant TB (MDR-TB, XDR-TB) and TB/HIV co-infection.
4	HS	Quality assurance research of medicines and medical supplies along the whole supply chain, from procurement to distribution and storage.
5	HL	Research on the coverage of access to safe water and proper sanitation, especially rurally and in urban settlements.
6	HL	Research on solutions for increasing coverage of diagnosis, screening and early detection of cancer in PNG, with a view to understanding the relative burden of different cancers (e.g. breast, cervical, liver and oral cancers).
7	CD	Research on the causes of treatment failure, in particular the causes of poor adherence to treatment for TB, HIV and HIV/TB co-infection and how adherence can be improved.
8	RMCH	Research on the barriers and enablers to accessing supervised delivery in health facilities.
9	CD	Research on the magnitude and determinants of drug resistance for TB, malaria, pneumonia, meningitis, sexually transmitted infections (STIs) and HIV.
10	RMCH	Research on the serotype distribution of major pathogens causing pneumonia and meningitis and their susceptibility to antibiotics.

11	RMCH	Research on the effectiveness and feasibility of different mechanisms for introducing or scaling up coverage of new and existing vaccines (e.g. outreach or supplementary immunisation activity (SIA) or introduction of immunisation at health post level).
12	CD	Research on the size, geographical distribution and HIV- and health-care seeking behaviours of most-at-risk populations for HIV and STIs.
13	HL	Research on the cost-effectiveness and sustainability of different possible systems for safe waste disposal (including urban solid waste, waste water, medical waste and chemical waste).
14	HL	Research on the prevalence, determinants and burden of violence, especially gender-based violence, and on the effectiveness of interventions.
15	HS	Research on why there is low utilisation of health information and how this can be improved at all levels of the health system.
16	RMCH	Research on sexual and reproductive health knowledge, attitudes and practices of youth and adolescents (e.g. preventing unwanted pregnancy and STIs).
17	RMCH	Research on the prevalence of vaccine preventable diseases to inform planning and monitoring of immunisation programs.
18	HS	Research on the satisfaction of health workers with their working conditions and on solutions for improving recruitment and retention of health workers.
19	HS	Research on the factors that impact on the quality of health workforce performance.
20	HL	Epidemiological studies on the burden of different mental health problems, in particular at community level.
21	HL	Research on new, effective solutions to reduce the societal and health impact of alcohol abuse, betel nut and marijuana.
22	HS	Research to evaluate the effectiveness of health management reforms, especially the Provincial Health Authority, in particular looking at regional differences.
23	CD	Research on the causes of ineffective detection of HIV/TB co-infection, in particular on low coverage of HIV testing in TB patients.
24	CD	Research on demand- and supply-side determinants of coverage of TB diagnostics and their use in the assessment of TB treatment outcomes.
25	RMCH	Research on demand for, access to and quality of preventative and curative interventions to combat pneumonia at the community level, including integrated approaches to common childhood illnesses.
26	HS	Research on capacity for financial management in the health system, particularly at health facility, district and Local Level Government levels.
27	HS	Operational research on usage patterns and health facility requirements for medicines and other medical supplies, in particular at peripheral health facilities.
28	HS	Research on what churches are present in hard-to-reach populations and how the health services can collaborate with these churches to increase access to health care in remote rural areas and hard-to-reach urban areas.
29	CD	Epidemiological studies to map malaria and other vector-borne diseases including the impact of social, economic and climate changes on their burden.

30	HL	Research on knowledge and health seeking behaviour of people for common cancers.
31	HS	Research on the knowledge and attitudes of communities that facilitate their engagement with and support to health and health research programs (such as vaccinations), including participation as volunteers (such as for blood donation).
32	HS	Evaluation of the health impact of the rollout of community health posts.
33	CD	Research on the causes, determinants and burden of hospital acquired infections (especially for MDR-TB).
34	RMCH	Research on locally appropriate solutions to overcome barriers to delivery and uptake of family planning.
35	RMCH	Research on innovative and sustainable ways to improve maternal and child nutrition.
36	HS	Research on why some health outreach activities are effective and others are not (in particular with regards to differences between regions and organisations).
37	RMCH	Research on the burden of different maternal and child health problems at community level.
38	HS	Research on existing gaps in health workforce capacity to conduct surveillance and monitoring.
39	HL	Research on what services are effective for prevention and treatment of nutritional issues in communities and health facilities.
40	RMCH	Research on the influence of religious organisations and personal beliefs on sexual and reproductive health practices in the population.
41	HS	Research on the barriers and enablers to collaboration between health and other government departments at all levels of government.
42	HL	Research on the availability and quality of mental health services in communities and in health facilities.
43	RMCH	Research on the causes and burden of peri-natal deaths and still-births in supervised and unsupervised deliveries.
44	HL	Research on the burden, determinants and societal implications of different physical and intellectual disabilities (e.g. blindness, disabilities caused by accidents, congenital disabilities, disabilities caused by disease and disabilities caused by substance abuse).
45	HS	Research on the social implications of the establishment of industries, in particular extractive industries, and especially implications for women and children.
46	HS	Research on funding flows (in particular from donor agencies) to different health areas and health service providers, to assess the degree of alignment with national health priorities and to identify potential duplication of efforts.
47	HS	Research to investigate the most appropriate solution (such as insurance or endowment funds) for subsidising equitable universal access to health care, and to investigate the impact of the "free primary health care and subsidised specialist care policy" on user fees and access to, utilisation of and quality of health services.
48	HL	Research on the causes of inadequate capacity to manage diabetes at health facilities, particularly at the primary health care level.
49	CD	Research on the burden and distribution of emerging infections, re-emerging infections and neglected tropical diseases (NTDs) (e.g. yaws, buruli ulcer, leprosy, lymphatic filariasis, dengue, soil transmitted helminthiases).
50	CD	Research into new and effective ways of diagnosing neglected and emerging infections in patients presenting with fever.
51	CD	Research on the most effective and economical ways to deliver mass drug administration for neglected tropical diseases (NTDs), particularly yaws and lymphatic filariasis.

52	CD	Research on uptake of malaria and other vector-borne disease prevention methods, in particular the use of treated mosquito nets.
53	HL	Evaluation of the effectiveness of current road safety interventions (e.g. road safety awareness campaigns and traffic checks).
54	HL	Research on what health service provisions exist for people with disabilities, who is providing them and how effective they are.
55	RMCH	Research on abortion practices, their determinants, burden and impact.
56	RMCH	Research on why school based health services are not being implemented.
57	HL	Research on the incidence and determinants of workplace and marine injuries.
Not ranked	RMCH	Research on elimination of mother-to-child transmission of syphilis and other infections.*
Not ranked	CD	Research to understand and reduce STI prevalence in general populations, the community burden and broader impacts.*
Not ranked	HL	Research on the burden of and risk factors for lifestyle diseases such as diabetes, cardiovascular and cerebrovascular disease and chronic lung diseases.*

Legend Table A3.1: RMCH = Reproductive, maternal and child health research; CD = Communicable disease research; HL = Research on healthy lifestyles; HS = Health systems research.

* This topic was developed by participants in Stage Two and was not formally scored.

List of research topics ranked by Research Domain

In this second part of the Annex, the research topics are presented ranked by Research Domain (Tables A3.2 – A3.5). There is one table for each Research Domain (RD):

- RD 1: Reproductive, maternal and child health research (Table A3.2).
- RD 2: Communicable disease research (Table A3.3).
- RD 3: Research on healthy lifestyles (including non-communicable diseases, health promotion, injuries, violence, nutrition, and water supply / sanitation) (Table A3.4).
- RD 4: Health systems research (Table A3.5).

The tables contains six columns that describe from left to right:

1. The rank of the research topic within the Research Domain.
2. The rank of the research topic on the overall NHHRA, across all Research Domains.
3. The health problem or area under which the research topic was defined.
4. The research topic.
5. Participants' notes on why the research topic is important and other notes describing the topic.
6. The Objective or Key Result Area from the NHP to which the research topic corresponds.

Table A3.2. Research topics in Research Domain 1: Maternal, reproductive and child health research

Rank within domain	Over all rank	Health problem / area	Research Topic	Why is this topic important? / Notes	NHP alignment
1	1	Maternal mortality and neonatal deaths	Research on how community-level post-natal care interventions that are known to be effective can be best implemented in the PNG context.	<p>At present, there is a lack of post-natal care services at health facilities and a lack of policies and programs for post-natal care in communities.</p> <p>Participants felt that the main area of need for this topic is operational research to find ways to implement known solutions in ways that are appropriate to the PNG context.</p>	4.3
2	2	Maternal mortality and neonatal deaths	<p>Research to evaluate current maternal and neonatal care practices in health facilities and in the community (e.g. partogram usage or management of low-birth weight or prematurity).</p>	We have little knowledge on the extent to which life-saving interventions for maternal and neonatal care are being used in health facilities and in communities. Operational research is needed to evaluate current practices in these areas.	4.3, 5.2
3	8	Maternal mortality and neonatal deaths	Research on the barriers and enablers to accessing supervised delivery in health facilities.	<p>Health facilities, in particular most provincial hospitals, are under-utilised in relation to birth services. In addition, utilisation patterns suggest that provincial hospitals and church health services are preferred to other government health facilities for these services.</p> <p>Why are some services used more than others? Research into the factors that determine demand for and utilisation of supervised delivery services is needed. One particular area of concern is the effect of user fees on utilisation. There is no systematic record of what user fees are charged and how these might influence health facility utilisation.</p>	5.2

				<p>It was noted that this research topic should include both demand- and supply-side barriers and enablers.</p> <p>It was noted that the role of men in this process is an important aspect.</p>	
4	10	Pneumonia mortality	Research on the serotype distribution of major pathogens causing pneumonia and meningitis and their susceptibility to antibiotics.	In order to effectively address pneumonia in PNG, more information is needed on the biological aetiology of pneumonia (to inform prevention and cure). It is noted that this topic is linked to the communicable disease topic on the magnitude and determinants of drug resistance.	4.2
5	11	Childhood immunisation	<p>Research on the effectiveness and feasibility of different mechanisms for introducing or scaling up coverage of new and existing vaccines</p> <p>(e.g. outreach or supplementary immunisation activity (SIA) or introduction of immunisation at health post level).</p>	There are different ways in which immunisation coverage could be scaled up. There is disagreement on what constitutes the best mechanism or approach to do so. Research is especially needed on what is the most feasible mechanism or approach.	4.1
6	16	Sexual and reproductive health for adolescents	Research on sexual and reproductive health knowledge, attitudes and practices of youth and adolescents (e.g. preventing unwanted pregnancy and STIs).	In order to know how to address sexual and reproductive health issues in adolescents, we first need to know what the current practices of adolescents are, in particular with regards to birth control and the prevention of STIs.	5.4
7	17	Childhood immunisation	Research on the prevalence of vaccine preventable diseases to inform planning and monitoring of immunisation programs.	There is a need for measuring health indicators prior to the introduction of vaccines, as well as afterwards, in order to assess the quality and effectiveness of vaccine programs. This will allow for establishing a baseline before vaccines are introduced, such as for pneumococcal vaccine, and for monitoring progress on child health indicators for vaccines that have already been introduced, such as for HiB, hepatitis B and measles. In particular, sero-prevalence studies are important.	3.4 , 4.1 , 6.4

				It was noted that in some cases there is also a need to conduct such studies to assess a need for PNG to roll-out a vaccine. E.g. there is currently no information on what the need is for roll-out of rota vaccine in PNG.	
8	25	Pneumonia mortality	Research on demand for, access to and quality of preventative and curative interventions to combat pneumonia at the community level, including integrated approaches to common childhood illnesses.	<p>Pneumonia is the disease which causes the most deaths in PNG. There is a need to evaluate existing interventions to combat pneumonia, in particular at the community level. Such evaluations will require research on why such interventions are currently not reaching the children that need them, including issues of demand, access and quality.</p> <p>In particular, appropriate recognition of symptoms and care-seeking by care-givers was noted as important.</p>	4.2
9	34	Family planning	Research on locally appropriate solutions to overcome barriers to delivery and uptake of family planning.	<p>Low utilisation of family planning services is a problem in PNG. Many of the barriers to delivery and uptake are known. Effective ways of overcoming these barriers, whether cultural, geographic or social need to be explored.</p> <p>It was noted that the role of men in this process is an important aspect.</p> <p>It was also noted that this research topic has a critical link to national population policies.</p>	5.1
10	35	Malnutrition in children under the age of five years	Research on innovative and sustainable ways to improve maternal and child nutrition.	<p>Maternal and child nutrition constitute important problems in PNG. Research is needed on new, innovative and sustainable ways for improving maternal and child nutrition status.</p> <p>Participants discussed the need for collaboration with the Department of Primary</p>	4.4

				<p>Industry to research what crops can be grown that would improve nutrition and in which geographical areas they could be grown.</p> <p>It was noted that a good way to start work on this research topic would be to investigate what solutions that are internationally known to be effective are appropriate for the PNG context and to test those solutions.</p>	
11	37	Cross-cutting MCH	Research on the burden of different maternal and child health problems at community level.	<p>In order to inform policy making in the area of child health more and better information is needed on maternal and child health indicators. There is a particular need for better information on the burden of maternal and child health issues in the community. Participants noted that a key area of research under this topic is research on new ways to measure maternal mortality.</p>	General – all maternal and child health, 3.4, 6.4
12	40	Sexual and reproductive health	Research on the influence of religious organisations and personal beliefs on sexual and reproductive health practices in the population.	Faith-based organisations are seen as having a strong influence, and in many instances a negative influence, on the sexual and reproductive health practices in the population. Research that documents the nature and impact of this influence is necessary to advocate for change.	5.4
13	43	Maternal mortality and neonatal deaths	Research on the causes and burden of peri-natal deaths and still-births in supervised and unsupervised deliveries.	<p>Still-birth is likely to be underreported in PNG and the causes of still-birth are poorly understood. Information on the causes and burden is needed both for advocacy and to identify what interventions are needed.</p> <p>Syphilis was specifically mentioned as a disease with a very high burden in PNG. Research is needed to uncover whether syphilis is an important cause of still-birth, which would suggest that syphilis screening ante-natally is</p>	4.3

				inadequate in PNG.	
14	55	Maternal mortality and neonatal deaths	Research on abortion practices, their determinants, burden and impact.	Very little is known on different abortion practices, their determinants, and the extent to which these are used. In addition, the burden of health issues related to abortion practices is not known, as well as their impact on the individual and the health system.	Key Result Area 5
15	56	Cross-cutting MCH	Research on why school based health services are not being implemented.	Participants indicated that coverage of school health services is low. Research is needed to identify why this is the case. School based health services were viewed as including the defined school health services package (e.g. immunisation, school based treatment) but also health promotion. With regard to the sexual and reproductive health education curriculum, it would be useful to know whether sexual and reproductive health is being taught, and if not, why not.	General – all child health, 5.4
Not scored	Not scored	Maternal mortality and neonatal deaths	Research on elimination of mother-to-child transmission of syphilis and other infections.*	Elimination of mother-to-child transmission of syphilis has received increasing attention in PNG. There is likely to be common questions with other peri-natally transmitted infections such as, hepatitis B and HIV.	4.3, 6.3

* This topic was developed by participants in Stage Two and was not formally scored.

Table A3.3. Research topics in Research Domain 2: Communicable disease research

Rank within domain	Over all rank	Health problem / area	Research Topic	Why is this topic important? / Notes	NHP alignment
1	3	Tuberculosis	Research on the prevalence and socioeconomic determinants of tuberculosis (TB), drug resistant TB (MDR-TB, XDR-TB) and TB/HIV co-infection.	<p>Research is needed to uncover the disease burden of TB and to help identify risk factors such as poverty, illiteracy, indoor air pollution and overcrowding. It is particularly important that such data are acquired on paediatric TB.</p> <p>It was noted that in terms of prevalence and socioeconomic determinants the provincial border areas are of particular importance.</p> <p>It was noted that indoor air pollution is likely an important cause of tuberculosis, as well as other respiratory diseases such as pneumonia and ultimately COPD.</p>	6.2
2	7	Tuberculosis	Research on the causes of treatment failure, in particular the causes of poor adherence to treatment for TB, HIV and HIV/TB co-infection and how adherence can be improved.	<p>Existing information indicates that treatment outcomes for TB are not good. Research is needed to understand why treatment outcomes are not good and how they can be improved. Research should take into account that causes of poor adherence might differ between paediatric and adult populations.</p> <p>It was noted that this topics includes the impact of various TB control strategies, for example DOTS and the STOP TB strategy.</p> <p>It is also likely that there is considerable variability in the quality of clinical management of TB/HIV co-infection. We need to learn more about the extent and nature of this variability</p>	6.2

				by researching treatment outcomes.	
3	9	Cross-cutting Communicable Diseases	Research on the magnitude and determinants of drug resistance for TB, malaria, pneumonia, meningitis, sexually transmitted infections (STIs) and HIV.	Drug resistance is a problem in PNG, yet little is known about the scale of this problem. Research is needed to address this knowledge gap.	Cross-cutting Key Result Area 6
4	12	HIV and other sexually transmitted infections (STIs)	Research on the size, geographical distribution and HIV- and health-care seeking behaviours of most-at-risk populations for HIV and STIs.	Little is known about the size of the most-at-risk populations for HIV and STIs, the geographical distribution of these populations, and if and how they access health services. Size here is intended as size estimations.	6.3
5	23	HIV and other sexually transmitted infections (STIs)	Research on the causes of ineffective detection of HIV/TB co-infection, in particular on low coverage of HIV testing in TB patients.	There is very low coverage of testing in this cohort. Research is needed to find out how to strengthen testing and improve coverage.	6.3
6	24	Tuberculosis	Research on demand- and supply-side determinants of coverage of TB diagnostics and their use in the assessment of TB treatment outcomes.	There are few data on treatment outcomes for TB measured using TB diagnostic tools. In addition, TB is under-diagnosed. Research is needed to identify both demand- and supply-side reasons for under-diagnosis and the lack of assessment of treatment outcomes using sputum microscopy and other diagnostic tools.	6.2
7	29	Malaria	Epidemiological studies to map malaria and other vector-borne diseases including the impact of social, economic and climate changes on their burden.	<p>More data are needed on the prevalence and burden of malaria in PNG. It was noted that studies should include mapping of the different parasite species that cause malaria. It was also noted that this was specifically needed in the Highland provinces.</p> <p>Participants expected that social, economic and climate change will have an impact on transmission of malaria and other vector-borne diseases. Research in this area would help to establish the problems arising from such changes in transmission.</p>	6.1

				<p>With regards to malaria specifically, it was noted that in the next decade, certain regions in the Pacific may move towards elimination of malaria. This might mean a shift in aetiology towards <i>p. vivax</i> and have implications for control. Creating the evidence base for moving towards elimination will be important.</p>	
8	33	Cross-cutting Communicable Disease	<p>Research on the causes, determinants and burden of hospital acquired infections (especially for MDR-TB).</p>	<p>Poor infection control measures in the design of health facilities and health services is a serious concern. Practices such as putting HIV patients in the same ward as TB patients have been observed. Such practices are a concern in relation to a number of diseases, but particularly for MDR-TB.</p> <p>Data on the burden and determinants of hospital acquired infections are important to advocate for and effect change in the design of services and facilities.</p>	Cross-cutting Key Result Area 6
9	49	Neglected tropical diseases	<p>Research on the burden and distribution of emerging infections, re-emerging infections and neglected tropical diseases (NTDs) (e.g. yaws, buruli ulcer, leprosy, lymphatic filariasis, dengue, soil transmitted helminthiases).</p>	<p>There is a lack of specific programs for neglected tropical diseases in NDoH. Information is needed on what diseases exist and what their geographical distribution is in PNG, so that programs can be developed to address them.</p> <p>This also applies to emerging and re-emerging infections, such as cholera or chikungunya.</p> <p>It was noted that for the different diseases that fall under this research topic, the research requirements are quite different. Leprosy and yaws, for example, are almost eliminated, and it will be important to measure if they reappear. Hence monitoring is the key requirement for these diseases.</p>	Key result area 6 (no specific objective for NTDs)

				<p>Leprosy and lymphatic filariasis are an important cause of disability.</p> <p>Research for emerging infections and NTDs should be formulated in line with the specific characteristics and research needs of each disease.</p>	
10	50	Neglected tropical diseases	Research into new and effective ways of diagnosing neglected and emerging infections in patients presenting with fever.	Clinical diagnosis of malaria means that patients with fever may be misdiagnosed and treated for malaria. Furthermore, when RDT results are negative there are no additional diagnostic tools to evaluate if NTDs are present. Ways of testing whether NTDs, other neglected infections or emerging infections are implicated in clients presenting with fever are needed.	Key result area 6 (no specific objective for NTDs)
11	51	Neglected tropical diseases	Research on the most effective and economical ways to deliver mass drug administration for neglected tropical diseases (NTDs), particularly yaws and lymphatic filariasis.	Mass drug administration is a proven method for delivering drugs for NTDs. Research is needed on the most effective and economical ways of doing this in PNG. In addition the research topic on magnitude and determinants of drug resistance is linked to this topic.	Key result area 6 (no specific objective for NTDs)
12	52	Malaria	Research on uptake of malaria and other vector-borne disease prevention methods, in particular the use of treated mosquito nets.	Mosquito nets are an effective intervention to malaria and are available. However, utilisation of treated nets is low. Research is needed on the causes of the low levels of utilisation to identify strategies to improve utilisation.	6.1
Not scored	Not scored	HIV and other sexually transmitted infections (STIs)	Research to understand and reduce STI prevalence in general populations, the community burden and broader impacts.*	PNG is known to have a very high prevalence of STIs in all types of populations. These have a range of health impacts, both short term and long term on affected individuals. Better understanding of the burden and impact is important to national control programs.	6.3

* This topic was developed by participants in Stage Two and was not formally scored.

Table A3.4. Research topics in Research Domain 3: Research on healthy lifestyles

Rank within domain	Over all rank	Health problem / area	Research Topic	Why is this topic important? / Notes	NHP alignment
1	5	Environmental health	Research on the coverage of access to safe water and proper sanitation, especially rurally and in urban settlements.	There is no data on number of households with access to safe water and proper sanitation coverage. Routine reporting systems have failed to produce this information. Research in this area will help with identifying the locations that are most in need of improvements in water supply and sanitation.	7.2
2	6	Cancer	Research on solutions for increasing coverage of diagnosis, screening and early detection of cancer in PNG, with a view to understanding the relative burden of different cancers (e.g. breast, cervical, liver and oral cancers).	There is concern that services for detection of cancer are not sufficiently available in PNG. There is need for research on how to expand coverage of these services into more health facilities. A preference for services at more facilities rather than a focus on the highest quality services at a few tertiary facilities was expressed. This may include research leading to the establishment of a national cancer registry and broader availability of timely histopathological diagnosis. It was also noted that in conjunction with strengthened reporting, this could lead to a better knowledge of the burden of cancers in PNG. Also discussed was that rather than try to consider all cancers, there should be a focus on the most common cancers in PNG (breast, cervical, liver and oral cancers).	7.4
3	13	Environmental health	Research on the cost-effectiveness and sustainability of different possible systems for safe waste disposal (including urban solid waste, waste water, medical waste and chemical waste).	Nationally, safe disposal of waste is a major problem. There are currently no interventions that effectively address this. Consequently,	7.2

				<p>there is a need for new solutions to this problem. However, it is not known which of the conceivable systems is the most cost-effective and sustainable option for PNG.</p> <p>It was noted that it was important to take into account geographical differences with regards to this topic.</p>	
4	14	Violence	Research on the prevalence, determinants and burden of violence, especially gender-based violence, and on the effectiveness of interventions	<p>There is a need to establish the national prevalence of violence and gender-based violence, its regional variations, and its impact on individuals and the health system.</p> <p>Recently legislation has been put in place to address the issue of violence against women. The effectiveness of legal action, and other interventions that address violence against women, is likely influenced by different cultural factors. Research on those factors is needed in particular, to understand how violence against women can be curbed most effectively through legislation and other interventions.</p>	7.1
5	20	Mental health	Epidemiological studies on the burden of different mental health problems, in particular at community level.	<p>Knowledge of the burden of different mental health problems in PNG is limited. Epidemiological studies could help address this knowledge gap. Particular emphasis should be given to the burden of mental health problems at community level.</p> <p>It was noted that assessing the burden should also include measuring the social impact of mental health issues.</p>	7.4
6	21	Substance abuse	Research on new, effective solutions to reduce the societal and health impact of alcohol abuse, betel nut and marijuana.	Marijuana, betel nut and alcohol lead to a range of health and social problems. Research is needed to develop appropriate solutions and support policy development.	7.1

				Tobacco was deliberately omitted as it was felt that international data and policies could be used. In addition, there are already studies of tobacco consumption in PNG underway.	
7	30	Cancer	Research on knowledge and health seeking behaviour of people for common cancers.	This was discussed in reference to breast cancer in particular, but more generally, it was felt that research into knowledge of and health seeking behaviour for cancers is needed to inform the design of interventions that would result in increased treatment seeking. However, cervical, liver and oral cancers, for example, are also of interest. There needs to be a clear link to diseases with feasible treatment options in the PNG context.	7.4
8	39	Diabetes, cardiovascular diseases and nutrition	Research on what services are effective for prevention and treatment of nutritional issues in communities and health facilities.	This research was intentionally defined broadly to cover nutrition related-conditions including diabetes and cardiovascular disease. "Prevention and treatment" were also intended broadly to include community awareness programs and health facility services such as nutrition units.	7.4
9	42	Mental health	Research on the availability and quality of mental health services in communities and in health facilities.	The nature and extent of coverage of mental health care services in PNG is not well understood. This includes curative, rehabilitation and community support services. One specific area that participants were interested in was the extent to which there is tracking, monitoring and follow-up of mental health patients between different levels and service points within the health system. Participants also noted that this topic should include evaluation of the planned roll-out of Community Mental Health Centres.	7.4

10	44	Disability	<p>Research on the burden, determinants and societal implications of different physical and intellectual disabilities</p> <p>(e.g. blindness, disabilities caused by accidents, congenital disabilities, disabilities caused by disease and disabilities caused by substance abuse).</p>	No data are available on the burden, determinants and societal implications of a range of different disabilities.	7.4
11	48	Diabetes, cardiovascular diseases and nutrition	Research on the causes of inadequate capacity to manage diabetes at health facilities, particularly at the primary health care level.	Complications from diabetes due to inadequate management of this condition are a concern. At the same time, health workers have received training in management of NCDs as part of their pre-service training. Research is needed into why this has not resulted in good management of diabetes at lower levels of the health system.	7.4
12	53	Injuries	<p>Evaluation of the effectiveness of current road safety interventions</p> <p>(e.g. road safety awareness campaigns and traffic checks).</p>	<p>There are interventions in place to address the important issue of road safety. However, we do not know how effective these interventions are in addressing the problem.</p> <p>Workshop participants noted that to improve road safety in PNG collaboration between different actors, in particular the different responsible government departments, needs to be increased.</p>	7.1
13	54	Disability	Research on what health service provisions exist for people with disabilities, who is providing them and how effective they are.	<p>Different NGOs are likely providing services throughout the country. However, little is known on the services that are currently available for different groups of people with disabilities, and on how effective these services are in supporting people with disabilities.</p> <p>The workshop participants also noted that centralised disability policies are much needed for different areas, such as the health services, education and infrastructure.</p> <p>Hence, the results from research on this topic</p>	7.4

				may help with identifying service gaps and needs, and may aid in advocacy efforts to ensure that disability policies are developed.	
14	57	Injuries	Research on the incidence and determinants of workplace and marine injuries.	Although incidence data are available on the number of road injuries and related mortality, there are no such data for workplace and marine injuries.	7.1
Not scored	Not scored	Cross-cutting	Research on the burden of and risk factors for lifestyle diseases such as diabetes, cardiovascular and cerebrovascular disease and chronic lung diseases.*	International modelling and clinical experience from within PNG suggest these diseases pose a major burden. There is a need to bring together existing data sources such as surveys on non-communicable disease, sentinel sites monitored by IMR and hospital discharge data.	7.4

* This topic was developed by participants in Stage Two and was not formally scored.

Table A3.5. Research topics in Research Domain 4: Health systems research

Rank within domain	Over all rank	Health problem / area	Research Topic	Why is this topic important? / Notes	NHP alignment
1	4	Health technologies	Quality assurance research of medicines and medical supplies along the whole supply chain, from procurement to distribution and storage.	<p>Lacking availability of safe medicines is a significant barrier to effective health service provision in PNG. The quality of medicines is a concern, both with regards to procurement (e.g. of counterfeit or sub-standard medicines) and with regards to sub-standard distribution and storage practices. Participants noted that the “Good distribution and storage practice standards” are now available and that evaluation of how distribution and storage comply with these standards is needed.</p> <p>Participants noted that an impact evaluation is being conducted as part of the roll-out of the 100% medical kit. However, it was felt that more research is needed to improve the quality of procurement, distribution and storage for when the 100% medical kit program is phased out.</p>	1.1, 3.3
2	15	Health information systems	Research on why there is low utilisation of health information and how this can be improved at all levels of the health system.	<p>There is poor utilisation of health information at all levels of the health system by policy makers and health practitioners. Research is needed to identify the causes and possible solutions to this problem. There is a need to examine how evidence can better inform policy and practice. Initiatives such as TDR’s SORT IT program can support increased capacity of local utilisation of health information for planning and monitoring.²³</p> <p>Better use of clinical data sources such as hospital discharge data is needed to better</p>	6.4, 3.4

				understand PNG's burden of disease, for example in non-communicable disease, and to inform policy and practice.	
3	18	Human resources for health	Research on the satisfaction of health workers with their working conditions and on solutions for improving recruitment and retention of health workers.	<p>Health worker recruitment and retention is a problem in a range of settings (rural, urban (PMGH), remote) in PNG. Research is needed on how satisfied health workers are with their working conditions, for example with: their salaries; the timeliness of their salary payments; leave arrangements; training possibilities; quality of housing; availability of schooling for children; availability of different health technologies in the workplace; career pathways; and career opportunities.</p> <p>Such research may provide insights into how recruitment and retention of health workers may be improved.</p>	1.3, 3.2
4	19	Human resources for health	Research on the factors that impact on the quality of health workforce performance.	<p>High quality health workforce performance is critical for the quality of the overall health system. Research on the factors that impact on the quality of the health workforce performance in PNG is needed, e.g. job satisfaction, existence of standards, adherence to standards, and training. There is a need to examine the use of quality assurance tools, and the National Health Service Standards in particular, in supporting improved quality of health worker performance.</p> <p>It was noted that research in PNG had shown that when patients feel ill-treated they may not return for treatment (e.g. a follow-up appointment for immunisation). Patient satisfaction with treatment should be viewed as an important aspect of the quality of health</p>	1.3, 3.2

				<p>workforce performance.</p> <p>Also, SOPs are often not followed, which impedes effective health workforce performance. Research is needed on why health workers are not following SOPs, so that this problem can be addressed. The impact of National Health Service Standards or other quality frameworks was also noted to be important to this research topic.</p>	
5	22	Leadership, management and governance	Research to evaluate the effectiveness of health management reforms, especially the Provincial Health Authority, in particular looking at regional differences.	<p>The establishment of Provincial Health Authorities is a significant health management reform that will be expanded to more provinces over the next five years. Another reform of note is the central restructuring of NDoH.</p> <p>The effectiveness of this reform, and other health management reforms should be evaluated. More specifically, the effectiveness of the reforms in different provinces should be examined and determinants of greater or lesser effectiveness identified.</p>	3.5, 3.6
6	26	Health financing	Research on capacity for financial management in the health system, particularly at health facility, district and Local Level Government levels.	<p>Participants felt that a large cause of ineffective health service management might be the lack of health workforce capacity to manage finances. Research is needed to investigate the size and nature of this problem, in particular on the adherence to standards for the acquittal and accountability for funds.</p> <p>The sub-national levels of the health system were suggested as priorities. At these levels it was suggested that there may be gaps in knowledge of what funds are available, how funds can be accessed, and in capacity to use</p>	3.1

				funds.	
7	27	Health technologies	Operational research on usage patterns and health facility requirements for medicines and other medical supplies, in particular at peripheral health facilities.	<p>Research of this nature would help forecasting about what medical supplies are needed where and in which numbers. This is needed to assess rational use of medicines and to better match procurement and distribution to what is needed.</p> <p>It was noted that the generation of such knowledge would be of value both to pull (i.e. the regular medicines procurement and distribution system) and push mechanisms (e.g. the 100% medical kit).</p>	1.1, 3.3
8	28	Partnerships; Inequities	Research on what churches are present in hard-to-reach populations and how the health services can collaborate with these churches to increase access to health care in remote rural areas and hard-to-reach urban areas.	There are parts of the country where there are no health services, particularly in remote rural areas and hard-to-reach urban areas. Although there are no health services in these areas, there are often churches. Churches might represent an opportunity for increasing the reach of health service provision for two highly marginalised populations in PNG (people in remote rural locations and in hard-to-reach urban settlements). Research is needed on precisely what churches are present in these regions and how the health system can collaborate with these churches to increase access to health care.	1.1, 1.2, Key Result Area 2
9	31	Service delivery	Research on the knowledge and attitudes of communities that facilitate their engagement with and support to health and health research programs (such as vaccinations), including participation as volunteers (such as for blood donation).	Health programs are known to have experienced problems with the roll-out of health interventions such as vaccinations. Equally, it has proven difficult to find volunteers to participate in health programs and health research. Research is needed on the knowledge and attitudes of communities that cause these difficulties.	7.3
10	32	Service	Evaluation of the health impact of the rollout of community health	Community health posts are a new approach to	1.1, 1.2

		delivery	posts.	improving the reach of health services in PNG. Since this is a new program, research is needed to evaluate the effectiveness of the program. Participants noted that the program has not been rolled out throughout the entire country yet. Consequently, if such evaluations were conducted early in the roll-out, the results of the research could be used to optimise further roll-out.	
11	36	Service delivery	Research on why some health outreach activities are effective and others are not (in particular with regards to differences between regions and organisations).	There are differences in the effectiveness of outreach programs throughout the country, both between different organisations, and between different regions. Research is needed on why some outreach services are effective, and others are not, so that outreach services as a whole can be strengthened in the country.	1.1, 1.2
12	38	Health information systems	Research on existing gaps in health workforce capacity to conduct surveillance and monitoring.	There are weaknesses in health surveillance and monitoring. It is suspected that this is because of insufficient capacity in the health workforce. Research will help to identify the areas in which capacity needs to be improved. This includes research on improving recording of underlying causes of death and accuracy of hospital discharge data.	6.4, 3.2, 1.3, 3.4
13	41	Partnerships; Leadership, management and governance	Research on the barriers and enablers to collaboration between health and other government departments at all levels of government.	Collaboration between multiple government agencies is important to achieve progress on health issues. Research that identifies obstacles to government collaboration and ways to overcome these obstacles is needed so that more effective collaboration can be achieved. A number of levels of government were discussed in developing this topic. At the	3.5, 3.6, Key Result Area 2

				national level collaboration is considered weak. At the district level it is not known how effective district management teams are in collaborating on allocating resources for health.	
14	45	Inequities	Research on the social implications of the establishment of industries, in particular extractive industries, and especially implications for women and children.	When large industries are established in regions in PNG, there is an influx of both domestic and foreign workers to those regions. This has a host of societal implications, in particular for women and children. Although some research has been conducted on HIV prevalence in this context, research on the broader societal implications has not taken place yet and is needed.	1.1
15	46	Health financing	Research on funding flows (in particular from donor agencies) to different health areas and health service providers, to assess the degree of alignment with national health priorities and to identify potential duplication of efforts.	Funding comes into the country in different health areas. Such funding does not necessarily go to the areas of greatest need and may be driven more by outside interests than by what is needed in PNG. In addition, there may be overlap and duplication in health efforts between different health service providers, due to a lack of coordination among different health service providers. There is a need for research on all funding flows in the country to all different health areas and service providers, to assess alignment with national health priorities, aid effectiveness, and to identify potential duplication of efforts.	3.1
16	47	Health financing	Research to investigate the most appropriate solution (such as insurance or endowment funds) for subsidising equitable universal access to health care, and to investigate the impact of the "free primary health care and subsidised specialist care policy" on user fees and access to, utilisation of and quality of health services.	This research topic was raised in relation to the "free primary health care and subsidised specialist care policy". In particular, participants noted that this policy has been enacted and will need to be implemented. Therefore, research is needed to help identify an appropriate model for providing subsidies to disadvantaged groups so that they do not need	1.1, 3.1

				<p>to pay user fees in order to receive care. Insurance was suggested as a possible model. Another model that was mentioned was the use of an endowment fund to reimburse health facilities for services provided to patients who are eligible to receive free or subsidised care.</p> <p>As it is rolled out, research is needed to identify whether it is successful in abolishing informal user fees and making primary health care free. If user fees for primary health care services are removed, it will be important to monitor the effect on primary health care demand and supply.</p>	
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Annex 4. HIV strategic research priorities

In this Annex, the full list of HIV strategic research priorities that emerged from Stage Three is presented (Table A4.1). The research topics are presented in order of ranked importance under each Strategic Priority of the PNG National HIV and AIDS Strategy (NHS).

Table A4.1. Full list of HIV strategic research priorities, structured to the Priority Areas and Strategic Priorities of the PNG National HIV and AIDS Strategy (NHS)

Research Topic
Priority Area 1: Prevention
Strategic Priority 1: Reduce the risks of HIV transmission
Research on geographic distribution, size estimations, high-risk practices and HIV / sexually transmitted infection (STI) serology among key affected populations.
Research on prevention programs and practices for sexual transmission of HIV and other STIs (including condom distribution and male circumcision).
Research on biomedical technologies in the prevention of HIV and STIs.
Research on the risk of HIV and STI transmission among HIV sero-discordant couples.
Research on modes of exposure.
Research on prevention of parent to child transmission programs.
Research on awareness programs.
Research on the role of penile modification, injecting practices and other emerging transmission routes.
Strategic Priority 2: Address factors that contribute to HIV vulnerability
Research on the lives of marginalised and most-at-risk populations.
Research on gender norms and gender-based violence.
Research on the role of religion and personal beliefs in prevention, treatment, care and support.
Research that pilots evidence-based programs on drugs and alcohol.
Research on HIV and STI risk and vulnerability in young people and children.
Research on mobility and migration.
Strategic Priority 3: Create supportive and safe environments for HIV prevention
Research on enablers for and barriers to creating supportive and safe environments for HIV and STI prevention.
Research on cultural practices that are enablers or barriers to the spread of HIV.
Priority Area 2: Counselling, testing, treatment, care & support
Strategic Priority 1: Scale-up HIV counselling and testing
Research on HIV testing quality assurance and the implementation of HIV testing algorithms.
Research on access to and experiences of HIV counselling and testing for key affected populations.
Research on the implementation and outcomes of provider initiated counselling and testing.
Strategic Priority 2: Expand treatment, care & support services
Research on adult and paediatric HIV, STI and HIV-related opportunistic infection treatment, management, monitoring and outcomes.
Research on the lives of people living with HIV, their families and communities.
Research on health seeking behaviour of people living with HIV.

Research on health system capacity to expand and integrate HIV treatment, management and monitoring.
Research on the maturation of people living with peri-natally acquired HIV.
Priority Area 3: Systems strengthening
Strategic Priority 1: Improve strategic information systems
Research on the usefulness and impact of innovative systems to record and share information on HIV and STI clients and key affected populations.
Research on methods for ascertaining mode of exposure.
Research on the monitoring, evaluation and surveillance system.
Strategic Priority 2: Strengthen the enabling environment for the national HIV response
Research on economics, leadership and the political environment.
Research on the effects of the HAMP Act.
Research on the impact of criminal law as it pertains to sex work and male-to-male sex.
Research on the organisational and human capacity for coordinating and implementing the NHS.
Research on the impact of the HIV epidemic on sectors and civil society.