

**Health care financing challenges in the Pacific: priority setting
and resource allocation**

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University.

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Thesis by compilation and declaration

This research is presented as a thesis by compilation in accordance with the Australian National University's procedures as set out in the University's Procedure: Higher degree by research – thesis by compilation and thesis by creative works.¹

1. In accordance with those procedures I confirm the following. I was the lead researcher and lead author of the following articles, all of which were written during the course of this thesis and all of which have been published,² as summarised in the table below:

Title of article where I was lead or sole author	Names of authors as they appear in the publication	Name of journal or publication	Chapter in this thesis
The challenges of health financing in five South Pacific countries	Ian Anderson, Susan Ivatts, Aparnaa Somanathan, and Benjamin Rolfe	<i>Asian-Pacific Economic Literature</i> , 28: 29-46. 2014	Chapter 2
Health Financing Options for Samoa: Challenges and Opportunities	Ian Anderson.	World Bank <i>Health Nutrition and Population Discussion Paper Series</i> . 2013 Report Number 89506 ³	Chapter 3
The costs and affordability of drug treatments for type 2 diabetes and hypertension in Vanuatu	Ian Anderson, Amanda Sanburg, Howard Aru, Len Tarivonda, Susan Ivatts, Rufina Latu, Jacob Kool	<i>Pacific Health Dialogue, the Journal of Community Health and Clinical Medicine for the Pacific Region.</i> , 19: 1. 2013	Chapter 4
The implications of aging on the health systems of the Pacific Islands: challenges and opportunities	Ian Anderson, Wayne Irava	<i>Health Systems & Reform</i> . 2017. Volume 3	Chapter 5
How can health ministries present persuasive	Ian Anderson, Blerta Maliqi, Henrik Axelson,	<i>Bulletin of the World Health Organization</i> , 94: 468-74. (2016)	Chapter 6

¹ Available at https://policies.anu.edu.au/ppl/document/ANUP_003405

² Paragraph 6, paragraph 8 and paragraph 10 of the *Procedures* refers.

³ This paper has been revised prior to inclusion in the thesis to incorporate additional and original research findings on the cost of dialysis treatment for (mainly) diabetes to the Government of Samoa. See the start of Chapter 3 for further discussion.

Title of article where I was lead or sole author	Names of authors as they appear in the publication	Name of journal or publication	Chapter in this thesis
investment plans for women's, children's and adolescents' health?	Mikael Ostergren		

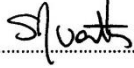
2. I have contacted all co-authors and asked the lead co-author to confirm the extent of my leadership role and contribution in the research and writing of each article. The signed statements by each lead co-author are attached. ⁴
3. The thesis forms a cohesive body of research including an Introduction, linking text to establish the relationship between one chapter and the next, and a Conclusions chapter.⁵
4. I have retained the original journal formatting, as originally published, for Chapters 4,5 and 6 as permitted under paragraph 13 of the *Procedures*. The formatting of Chapter 2 and Chapter 3 has been brought into line with the rest of the thesis for reasons explained at the beginning of those chapters.
5. As required under paragraph 19 of the *Procedures*, I have obtained written confirmation from each of the publishers that there are no copyright or other restrictions that would preclude the inclusion of my published articles included in this thesis.


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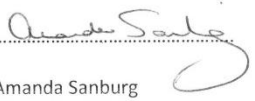
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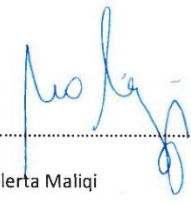
⁴ Paragraph 11 of the *Procedures* refers.

⁵ Paragraph 4 of the *Procedures* refers.

Chapter details	Candidate's contribution to research and authorship	Signature of second listed author on behalf of subsequent authors
<p>Chapter 2: "The challenges of health financing in five South Pacific countries."</p> <p>Published in <i>Asian-Pacific Economic Literature</i>, 28: 29-46. 2014.</p> <p>Authors, in the order that they appear in the published article: Ian Anderson, Susan Ivatts, Aparnaa Somanathan, and Benjamin Rolfe.</p>	<p>IA reviewed and analysed the 5 documents, and other online statistical data bases, and then did the first and all subsequent drafts of the article including the tables and graphs. IA wrote 2 of the World Bank reports on which this article was based (health financing challenges in Samoa, and Vanuatu). SI, AS, and BR provided additional health financing data and references to draw on, and provided advice and several constructive suggestions for strengthening the argumentation in each iteration of the drafting, all of which were accepted by IA.</p>	 Susan Ivatts

Chapter details	Candidate's contribution to research and authorship	Signature of second listed author on behalf of subsequent authors
<p>Chapter 5: "The implications of aging on the health systems of the Pacific Islands: challenges and opportunities."</p> <p>Published online in <i>Health Systems & Reform</i> on 30 June 2017.</p> <p>Authors, in the order that they appear in the published article: Ian Anderson, Wayne Irava.</p>	<p>IA led the original research and did the first and all subsequent drafts, including the majority of graphs and tables. WI provided substantive data and updates with respect to demographic trends in Fiji; policy initiatives with respect to ageing in Fiji; and trends in overseas referrals for selected countries.</p>	 21-Aug-2017 Wayne Irava

Chapter details	Candidate's contribution to research and authorship	Signature of second listed author on behalf of subsequent authors
<p>Chapter 4: "The costs and affordability of drug treatments for type 2 diabetes and hypertension in Vanuatu"</p> <p>Published online in <i>Pacific Health Dialogue, the Journal of Community Health and Clinical Medicine for the Pacific Region.</i>, 19: 1. 2013</p> <p>Authors, in the order that they appear in the published article: Ian Anderson, Amanda Sanburg, Howard Aru, Len Tarivonda, Susan Ivatts, Rufina Latu, and Jacob Kool.</p>	<p>IA led the research and did the first and all subsequent drafts. AS, as Acting Chief Pharmacist in Vanuatu at the time, provided the pharmaceutical data (with permission of Government of Vanuatu) and provided detailed advice on the typical drug regime for a diabetes and hypertension patient in Vanuatu. SI advised on the broader health financing policy implications for Vanuatu given its macroeconomic settings. HA and LT provided a Government of Vanuatu perspective on the findings and conclusions. RL and JK provided input and advice based on WHO experience in preventing and reducing NCDs, particularly in the Pacific.</p>	 Amanda Sanburg

Chapter details	Candidate's contribution to research and authorship	Signature of second listed author on behalf of subsequent authors
<p>Chapter 6: "How can health ministries present persuasive investment plans for women's, children's and adolescents' health?"</p> <p>Published in <i>Bulletin of the World Health Organization</i>, 94: 468-74. (2016)</p> <p>Authors, in the order that they appear in the published article:</p> <p>Ian Anderson, Blerta Maliqi, Henrik Axelson, and Mikael Ostergren.</p>	<p>IA led the original research and did the first and subsequent drafts, including the majority of graphs and tables. BM provided extensive advice and input from a WHO perspective including on the importance of and international trends with respect to women's children's and adolescent's health. HA provided a detailed annex based on National Health Account data on expenditure on maternal and child health. BM, HA and MO all provided useful input in terms of drafting suggestions.</p>	 <p>.....</p> <p>Blerta Maliqi</p>

Preface and acknowledgements

This thesis is the product of four beliefs that I have. First, I believe that sound public policy is an essential determinant for what Keynes referred to as the ability for all people to “to live wisely, agreeably and well” (1) in society. Second, I believe that research and evidence can help shape public policy. Third, I believe that there are particular and substantive public health and public financing challenges occurring in the Pacific, especially as a result of the rise of non-communicable diseases; that there are affordable and feasible public policy interventions that can avert the worst aspects of those challenges; but that the issues are getting insufficient attention in the international literature. Fourth, at a personal level, I believe in the importance of life-long learning and contributing to knowledge and policy irrespective of age.

I began the research when I was a part time Ph D candidate at Curtin University (Ph D candidacy approval date of 19 February 2010). Due to my then Ph D supervisors retiring and / or leaving Curtin University I formally withdrew from the Ph D course in May 2015 and transferred the Ph D to the Crawford School of Public Policy at the ANU in September 2015. Further details on this transfer are available on request.

I have several people to thank for the support and encouragement that they have provided to me in submitting this thesis.

I begin with thanking my academic supervisors, all of whom taught me in different ways to become more academically rigorous and critical. I thank my first supervisors at Curtin University, Professor Sandra Hopkins and Dr BK Tan. I also thank my subsequent supervisors when I transferred to the Crawford School of Public Policy at the ANU: Professor Stephen Howes (Chair of the supervising panel); Professor Jaya Dantas, Professor of International Health / Postgraduate Research Coordinator School of Nursing, Midwifery & Paramedicine, Curtin University of Technology; and Dr Matthew Dornan, Development Policy Centre, ANU.

I also thank my co-authors all of whom supported the research directions and processes I suggested in the articles now contained in this thesis, and contributed in several various ways to the content and quality of articles published. My co-authors are, in the order

they appear in the Chapters: Ms Susan Ivatts, Dr Aparnaa Somanathan, and Dr Benjamin Rolfe (Chapter 2); Dr Amanda Sanburg, Mr Howard Aru, Mr Len Tarivonda, Susan Ivatts, Dr Rufina Latu, and Dr Jacob Kool (Chapter 4); Dr Wayne Irava (Chapter 5); and Dr Blerta Maliqi, Mr Henrik Axelson, and Dr Mikael Ostergren (Chapter 6).

I thank the Government of Samoa and the Government of Vanuatu for permission to use data collected to be published (Chapter 3 and Chapter 4). I also thank the World Bank for agreeing to let me publish the data collected and the analysis made.

I thank all those who provided comments on the various articles which make up this thesis, including anonymous peer reviewers. I also thank those who participated in the final thesis seminar at the Crawford School on 30 August 2017 and who provided comments there. I thank the two independent thesis examiners, who remain anonymous to me, for their helpful and constructive suggestions. While I have tried to take all comments into account, I also take responsibility for all remaining errors.

I thank the administrative staff at the Crawford School for their guidance and support, including in particular Tracy McRae and Dr Megan Poore. I thank the numerous and always-helpful librarians at Chifley Library, ANU. I thank the Australian Government for the scholarship that enabled me to undertake this research as a student at the ANU. I thank Ms Amy Jindaphan and Dr Rani Kerin of Capstone Editing, Canberra, which assisted in the formatting of the thesis

Finally, I thank my wife, Nola Anderson, and our daughter, Claire, and son, James, and their own families, for the continued support and encouragement they provided over the past years of researching and writing this thesis. I also thank my parents, Hector and Desolie Anderson, for their commitment and sacrifices to my education as a young person.

1. Keynes JM. Economic possibilities for our grandchildren. *Essays in persuasion*: Springer; 2010. p. 328.

Abstract

As explained in the Introduction, Pacific Islands Countries (PICs) have some of the highest rates of Non-Communicable Diseases (NCDs) in the world, and also face severe fiscal constraints. The original research contained in this thesis by compilation aims to address knowledge gaps, and help PIC governments respond to the emerging NCD crisis.

Chapter 2 investigates the health financing options available to governments in five PICs. The share of government expenditure going to health in these countries is already some of the highest in the world. Most options available to middle-income countries globally to increase the fiscal space for health are unavailable, or inappropriate, to PICs. Improving allocative and technical efficiency in existing government health expenditure is the most feasible option left for PICs.

Chapters 3 and 4 use two case studies to better understand the budgetary pressures that, given the above fiscal constraints, NCDs will increasingly impose in the Pacific and to raise fundamental questions about the cost-effectiveness and sustainability of health financing in the Pacific. Chapter 3, as well as re-considering the fiscal options of Chapter 2 in the context of Samoa, finds that dialysis treatment per patient in Samoa is twelve times the GDP per capita, user fees cover just 1.6% of the program, and two-thirds of patients die within two years. Chapter 4 investigates the cost to government of purchasing drugs to prevent and treat diabetes and hypertension in Vanuatu. Government pharmaceutical costs rise in large, step-wise, patterns as diabetes or hypertension progressively becomes more severe. About 20% of the population in Vanuatu has three or more risk factors for acquiring diabetes, but only 1.3% of the total population could be treated with insulin before the total Government drug budget for the country was fully spent.

Chapter 5 finds that, contrary to general perceptions, the population of the PICs is “ageing” (i.e. the share of the population aged 60 years + is increasing). Current health systems are poorly designed to respond to their health needs. Ageing, combined with the high birth rates in many PICs, is likely to worsen the “dependency ratio” in countries, putting further strain on government budgets. This is exacerbated for those PICs with high levels of out-migration.

With limited financing options (Chapter 2), prohibitively expensive treatment protocols (Chapters 3 and 4), and an ageing population (Chapter 5), a strong case for any budgetary interventions is needed. Chapter 6 identifies, based on a literature survey and stakeholder views, how Ministries of Health can improve their capacity to negotiate better health financing from Ministries of Finance, and development partners. It identifies ten attributes of effective budget requests.

The academic contribution of the thesis is to help fill the research gap relating to the effectiveness and sustainability of NCD and other health care costs in the Pacific. The policy contribution is to provide the analysis underpinning the Pacific's response to the NCD crisis. The "NCD Road Map", which I drafted and which Pacific governments have now approved, is summarized in the Conclusion.

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Acronyms and currencies

Acronyms

CPR	Contraceptive Prevalence Rate
DAH	Development Assistance for Health
DALY	Disability Adjusted Life Year (see glossary for definition)
DHS	Demographic and Health Survey
FSM	Federated States of Micronesia
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
HDI	Human Development Index
HIV and AIDS	Human Immunodeficiency Virus infection and Acquired Immune Deficiency Syndrome
IHME	Institute for Health Metrics and Evaluation
LIC	Low Income Country (see glossary for definition)
LMIC	Lower Middle-Income Country (see glossary for definition)
MDGs	Millennium Development Goals (see glossary for definition)
NCD	Non-Communicable Disease (see glossary for definition)
PEN	Package of Essential NCD interventions (see glossary for further details)
PICs	Pacific Island Countries (see glossary for further details).
PIF	Pacific Islands Forum
PIFS	Pacific Islands Forum Secretariat
PNG	Papua New Guinea
PPP	Purchasing Power Parity (see glossary for further details)
SDGs	Sustainable Development Goals (see glossary for further details)
SPC	Secretariat of the Pacific Communities.
TFR	Total Fertility Rate
UMIC	Upper Middle-Income Country (see glossary for definition)
UNDP	United Nations Development Program
UNFPA	United Nations Fund for Population Activities.
WHO	World Health Organization

Currencies

All \$ are current United States dollars unless otherwise stated.

Glossary

Allocative efficiency and technical efficiency in the health sector.	Allocative efficiency seeks to drive a higher level of health outcomes by reallocating scarce resources to programs and strategies where they are likely to have the biggest (or most equitable) impact. Technical efficiency seeks to get the maximum possible given output — number of hip replacements for example — for a given mix of doctors, nurses, and equipment and other inputs. The difference between allocative efficiency and technical efficiency has also been described as allocative efficiency is “doing the right things” while technical efficiency is “doing things right”. See Liu (2003) ¹ for further details.
Catastrophic health expenditure	The WHO World Health Statistics Report (2016) states that out of pocket expenditures on health “are judged to be catastrophic when they exceed a given proportion (25%) of the total household budget or of the capacity to pay (40%)”. ^{2(p19)} See also “impoverishing” expenditure.
DALYs	Homedes (1996) ^{3(p8)} defines a Disability Adjusted Life Years (DALYs) can be defined as “the only quantitative indicator of burden of disease that reflects the total amount of healthy life lost, to all causes, whether from premature mortality or from some degree of disability during a period of time. These disabilities can be physical or mental. The intended use of the DALY is to assist (i) in setting health service priorities; (ii) in identifying disadvantaged groups and targeting of health interventions; and (iii) in providing a comparable measure of output for intervention, program and sector evaluation and planning.”
Demographic dividend	<p>Lee and Mason (2006) ^{4(p1)} explain a demographic dividend as follows: “Industrial countries have largely completed what is called the demographic transition”— the transition from a largely rural agrarian society with high fertility and mortality rates to a predominantly urban industrial society with low fertility and mortality rates. At an early stage of this transition, fertility rates fall, leading to fewer young mouths to feed.</p> <p>During this period, the labour force temporarily grows more rapidly than the population dependent on it, freeing up resources for investment in economic development and family welfare. Other things being equal, per capita income grows more rapidly too. That is the first demographic dividend.</p> <p>But a <i>second dividend</i> is also possible. A population concentrated at older working ages and facing an extended period of retirement has a powerful incentive to accumulate assets—unless it is confident that its needs will be provided for by families or governments. Whether these additional assets are invested domestically or abroad, national income rises. In short, the first dividend yields a transitory bonus, and the second transforms that bonus into greater assets and sustainable development. These outcomes are not automatic but depend on the implementation of effective policies.”</p>
Employment Population Ratio	The Employment Population Ratio (EPR) is the number of people employed in cash work, divided by the corresponding total population 15 years and older, multiplied by 100. ⁵
Fiscal space	Fiscal space can be defined as “room in a government’s budget that allows it to provide resources for a desired purpose without jeopardizing

	the sustainability of its financial position or the stability of the economy.” See P Heller (2005) ⁶ .
Health System	The World Health Organization states “A good health system delivers quality services to all people, when and where they need them. The exact configuration of services varies from country to country, but in all cases requires a robust financing mechanism; a well-trained and adequately paid workforce; reliable information on which to base decisions and policies; well-maintained facilities and logistics to deliver quality medicines and technologies.” Further details at http://www.who.int/topics/health_systems/en/
High Income country	The World Bank advises ⁷ for the current 2018 fiscal year high-income economies are those with a GNI per capita of \$12,236 or more in 2016.
International dollars	International dollars are a hypothetical construct designed to adjust for differences in costs in individual countries, and market based exchange rate differences. The World Bank states “an international dollar would buy in the cited country a comparable amount of goods and services a U.S. dollar would buy in the United States”. Further details at https://datahelpdesk.worldbank.org/knowledgebase/articles/114944-what-is-an-international-dollar
Impoverishing health expenditure	The WHO states ^{2(p19)} out of pocket expenditure on health “are labelled impoverishing when OOP payments push a household’s other spending below a minimum socially recognized living standard such as that identified by a poverty line. The poverty line should be defined according to national standards and also against an international poverty line, consistent with Sustainable Development Goals”.
Low income country	The World Bank advises ⁷ for the current 2018 fiscal year, low-income economies are defined as those with a GNI per capita of \$1,005 or less in 2016.
Lower middle-income country	The World Bank advises ⁷ that lower middle-income economies are those with a GNI per capita between \$1,006 and \$3,955 in 2016.
Low and Middle-income countries	The World Bank definition means that countries with a GNI per capita less than \$12,235 in 2016 are in the low and middle-income category. ⁷
Market failure	The Economist Dictionary defines market failure as “When a market left to itself does not allocate resources efficiently. Economists have identified four main sorts or causes of market failure. The abuse of market power which can occur whenever a single buyer or seller can exert significant influence over prices or output; externalities - when the market does not take into account the impact of an economic activity on outsiders. For example, the market may ignore the costs imposed on outsiders by a firm polluting the environment; public goods such as national defence. How much defence would be provided if it were left to the market? Where there is incomplete or asymmetric information or uncertainty.” For further details see https://www.economist.com/economics-a-to-z/m#node-21529422
Millennium Development Goals	The Millennium Development Goals (MDGs) involved eight global targets to reduce extreme poverty and improve social development by 2015 that were adopted by the United Nations in September 2000. Details available at http://www.un.org/millenniumgoals/ The MDGs have been replaced by the Sustainable Development Goals (SDGs): see elsewhere in glossary for details.

Non-communicable diseases	<p>The World Health Organization states that “Noncommunicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behaviours factors. The main types of NCDs are cardiovascular diseases (like heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes.”⁸</p> <p>It should be noted that there is debate in the international literature⁹ about changing the term Non-communicable diseases to “socially transmitted conditions” to better reflect the broader social determinants of heart disease, diabetes, cancers, and lung disease.</p>
Obesity	<p>WHO defines obesity and overweight as follows: “Overweight and obesity are defined as abnormal or excessive fat accumulation that may impair health. Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m²). For adults, WHO defines overweight and obesity as follows:</p> <p style="padding-left: 40px;">overweight is a BMI greater than or equal to 25; and obesity is a BMI greater than or equal to 30.</p> <p>BMI provides the most useful population-level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should be considered a rough guide because it may not correspond to the same degree of fatness in different individuals. For children, age needs to be considered when defining overweight and obesity”.¹⁰ Details for children are available at the WHO website.¹⁰</p>
Overweight	See obesity
Pacific Island Countries	In this thesis I focus on the fourteen middle-income and / or small island countries of the Pacific Island Forum. They are, in alphabetical order: Cook Islands; Federated States of Micronesia (FSM); Fiji; Kiribati; Marshall Islands; Nauru; Niue; Palau; Papua New Guinea (PNG); Samoa; Solomon Islands; Tonga; Tuvalu; and Vanuatu. Tokelau is an observer member of the Pacific Islands Forum.
PEN	Package of Essential NCD Interventions. The WHO defines PEN as “a conceptual framework for strengthening equity and efficiency of primary health care in low-resource settings; it identifies core technologies, medicines and risk prediction tools; discusses protocols required for implementation of a set of essential NCD interventions; develops technical and operational outline for integration of essential NCD interventions into primary care and for evaluation of impact.” Further details are available at http://www.who.int/cardiovascular_diseases/publications/pen2010/en/
Primary prevention	<p>Primary prevention “aims to prevent disease or injury before it ever occurs. This is done by preventing exposures to hazards that cause disease or injury, altering unhealthy or unsafe behaviours that can lead to disease or injury, and increasing resistance to disease or injury should exposure occur”. Further details available at https://www.iwh.on.ca/wrmb/primary-secondary-and-tertiary-prevention</p> <p>See also Secondary prevention.</p>
Public health expenditure.	The World Bank definition ¹¹ of public health expenditure, and the definition used in this thesis is as follows: “Public health expenditure

	consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations), and social (or compulsory) health insurance funds.”
Purchasing Power Parity	PPP stands for purchasing power parity. The formal definition according to the IMF is “The rate at which the currency of one country would have to be converted into that of another country to buy the same amount of goods and services in each country.” In general terms, PPP is an approach that takes into account the fact that while poorer countries tend to have a lower level of income per head, they may also have much lower costs and prices: \$ US 10 in a poor country may well buy more food (although perhaps of a lower quality) than \$US 10 in a rich country. PPP also aims to reduce the impact of commercial exchange rate variations. PPP approaches usually use purely notional “International dollars” – shown as \$ I – to distinguish PPP estimates from \$US. Further details at http://www.imf.org/external/pubs/ft/fandd/basics/ppp.htm
Secondary prevention	Secondary prevention “aims to reduce the impact of a disease or injury that has already occurred. This is done by detecting and treating disease or injury as soon as possible to halt or slow its progress, encouraging personal strategies to prevent reinjury or recurrence, and implementing programs to return people to their original health and function to prevent long-term problems”. Further details at https://www.iwh.on.ca/wrmb/primary-secondary-and-tertiary-prevention See also Primary prevention.
STEP wise approach	STEPS is not an acronym. Instead, it is a term used to cover the WHO STEP wise approach to Surveillance of risk factors and diseases. Further details on STEPS is available at http://www.who.int/chp/steps/en/
Sustainable Development Goals	The United Nations states “On September 25th 2015, countries adopted a set of goals to end poverty, protect the planet and ensure prosperity for all as part of a new sustainable development agenda. Each goal has specific targets to be achieved over the next 15 years.” Further details at http://www.un.org/sustainabledevelopment/sustainable-development-goals/
Technical efficiency	See allocative efficiency.
Total Health Expenditure	The World Bank definition of THE, and the definition used in this thesis is “Total health expenditure is the sum of public and private health expenditure. It covers the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation.” Source: World Development Indicators: data. ¹¹
Upper Middle-Income country	The World Bank states ⁷ that for the current 2018 fiscal year upper middle-income economies are those with a GNI per capita between \$3,956 and \$12,235 in 2016.
Universal Health Coverage	WHO states that “Universal health coverage (UHC) means that all people can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship.” Further details at http://www.who.int/mediacentre/factsheets/fs395/en/

References from the Glossary

1. Liu X. Policy tools for allocative efficiency of health services. Geneva: World Health Organization; 2003. 154 p.
2. World Health Organization. World health statistics 2016: measuring health for the SDGs. Geneva: World Health Organization; 2016.
3. Homedes N. The disability-adjusted life year (DALY) definition, measurement and potential use. Washington: World Bank; 1996.
4. Lee R, Mason A. What is the demographic dividend? *Finance Dev.* 2006;43(3).
5. United Nations Population Fund Pacific Sub-Regional Office. Population and development profiles: Pacific Island countries. Suva: United Nations Population Fund; 2014. 128 p.
6. Heller P. Understanding fiscal space. Washington: International Monetary Fund; 2005.
7. The World Bank. World Bank country and lending groups for the 2018 fiscal year [Internet]. [cited 6 August 2017]. Available from <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>.
8. World Health Organization. Noncommunicable diseases [Internet]. 2017 [cited 1 August 2017]. Available from: <http://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>.
9. Allen LN, Feigl AB. Reframing non-communicable diseases as socially transmitted conditions. *Lancet Glob Health.* 2017;5(7): e644–e6.
10. World Health Organization. Obesity and overweight [Internet]. 2016 [cited August 2017]. Available from: <http://www.who.int/mediacentre/factsheets/fs311/en/>.
11. The World Bank. World development indicators [Internet]. 2017 [cited 20 April 2017]. Available from: <http://databank.worldbank.org/data/reports.aspx?source=2&series=SH.XPD.PUBL&country=>.

Chapter 1: Introduction

Section 1: Introduction, context, and significance of the research.

This Chapter explains the research purpose and structure of this thesis.

Section 1 establishes the overall context and significance of the research. It also explains the distinctive nature and development challenges of the Pacific Island Countries (PICs).

Section 2 summarises what is currently understood about the public health, and public financing, challenges facing the PICs. I show that the PICs have distinctive public health and health financing challenges including an unfinished agenda of communicable diseases and high fertility as well as disproportionately high rates of expensive to treat non-communicable diseases (NCDs) such as diabetes. The PICs also have an already high dependence on government expenditure for health care, leaving PIC governments little room to manoeuvre in terms of responding to growing health financing demands.

Section 3 explains the existing research gap and the resulting research questions that drive this thesis. I argue that the most commonly used approaches to analysing health financing challenges and options in low and middle-income countries globally have only limited applicability and relevance in the PICs, due to those Pacific countries' unique public health and public financing characteristics. I show these issues are poorly addressed in the current international literature on priority setting and resource allocation in the health sector. This is the general research gap that the thesis aims to address. There are, within this general research gap, three specific gaps the thesis attends to. Surprisingly little research has been undertaken on (i) the financial costs to PIC governments of the cost of treating NCDs and (ii) on the implications of ageing on health systems in the PICs (iii) how Ministries of Health can prepare more persuasive and evidence-based budget proposals when negotiating with Ministries of Finance and / or development partners. Against this background, I identify five specific research questions driving this thesis that respond to those general and specific research gaps. As this is a thesis by compilation, Section 3 shows how each of those five specific research questions is answered in a corresponding peer-reviewed and published article.

Each article is in a separate chapter in this thesis. Each chapter builds logically on the research findings of the previous chapter.

Section 4 explains the research method and approach, including ethical approvals.

1:1 Why prioritising and allocating resources to improve health is a central issue in public policy.

How countries organise their health care financing is a central issue in public policy globally. That is so for six reasons. First, good health has intrinsic value. The World Health Organization (WHO) (1) and others (2, 3) see health as a fundamental human right. Amartya Sen sees health as an essential condition for expanding human “capabilities” and hence personal freedom and dignity (4, 5) with health equity closely linked to social justice in society (6).

Second, good health has complex, two-way, interactions with broader economic and social development (7-13). In brief, countries – and households – tend to spend more on health as they become richer. However, the arrows of causality point the other way as well. Healthier people are more able to learn, and be productive full-time workers, than those that are in serious ill health. The poor, and near poor, can suffer catastrophic or impoverishing¹ out of pocket health expenditure: an estimated 150 million people globally suffer financial catastrophe annually as a result of paying out of pocket for health care (14). Research² published in *The Lancet* in an article (not included in the thesis) of which I was a co-author finds that “increasing health expenditure by just \$5 per person per year up to 2035 in 74 countries with high (maternal and child mortality) burdens could yield up to nine times that value in economic and social benefits” (15 p1333).

¹ WHO states in *World Health Statistics 2016*) that out of pocket (OOP) payments “are judged to be **catastrophic** when they exceed a given proportion (25%) of the total household budget or of the capacity to pay (40%). They are labelled **impoverishing** when OOP payments push a household’s other spending below a minimum socially recognized living standard such as that identified by a poverty line. The poverty line should be defined according to national standards and also against an international poverty line, consistent with Sustainable Development Goals”.

² This publication has been cited 153 times since its publication in 2014. I am the 4th listed out of 28 authors.

Third, there are special features of the health sector, including market failures,³ that can justify, to varying degrees, government intervention (16-19). Market failures include significant asymmetry of information and knowledge between both patients and health workers; monopolies and oligopolies that restrict competition in, for example, the pharmaceutical industry, and professional associations; and inequities in access and outcomes. There are also important externalities and regional and global public goods including reducing communicable diseases such as pandemic influenza and reducing drug resistant antibiotics where the private sector has little incentive to participate and government intervention may be required. Not surprisingly, health economics is now a distinct field within economics (20, 21) and researchers argue a strong case for “the visible hand” (22 p1) or at least government regulation and oversight in the health sector.

Fourth, even when government expenditure on health is modest in per capita terms it can still be a significant part of total government expenditure, thereby affecting broader macroeconomic parameters. How much a government should spend on health care has been an issue in public policy for some time (23). Various minimum targets have been set over time (10, 24, 25). Latest research from WHO now concludes that there is “no magic number” (26 p1) for spending targets on health. Nevertheless, the needs for public expenditure on health can be large and substantive in national and global terms. WHO estimates that to achieve the Sustainable Development Goals (SDGs)⁴ for health in 67 LMICs⁵ would require new investments increasing from \$134 billion per annum initially to \$ 371 billion by 2030 (27). Importantly from a public policy perspective, those estimates assume health systems are already operating at efficient levels. The modelling concludes that \$7 billion extra funding would be freed up in 2030 if low-income countries were able to improve efficiency of drug purchases and reduce expenditure

³ See glossary for definition of market failures.

⁴ See glossary for a definition of the SDGs.

⁵ The modelling included all low-income countries, the 20 most populous lower middle-income countries, and the 20 most populous upper middle-income countries. According to WHO, this covers 95% of the population in low and middle-income countries and 75% of the global population. Unfortunately – and not for the first time – that process has meant that no Pacific Island country was included in the estimates.

leakages. Much of that funding could be used to address the rise in NCDs: a particular challenge for the Pacific Island countries.

Fifth, global trends suggest middle-income countries need to anticipate increasing absolute and relative levels of public expenditure being allocated to the health sector. Population growth, ageing, and political demands of a rising middle class will increase demand for health expenditure in middle income countries. Tandon (28 p17) notes that many middle-income countries can also expect to see an increase in the *proportion* of funding going to health, and not just the absolute amounts, as they develop, due to Wagner's Law.⁶ Low and middle-income countries globally should also expect to increasingly finance public health expenditure through their own resources. The Institute for Health Metrics and Evaluation (IHME) estimates (29) that low and middle-income countries were already spending, on average, nearly \$20 (\$19.80) for every dollar received in external aid in 2012. Development Assistance for Health (DAH) globally has generally plateaued since 2010 (30) and development partners globally focus their efforts increasingly on low income, rather than middle income, countries.

The sixth reason why health and health expenditure are central to public policy is that public expenditure can be ineffective – even harmful – to public health. Good health can be achieved at low cost under a range of different political, economic and social systems (31-33). However, even when governments are committed to improving health outcomes Filmer, Hammer and Pritchett argue that “weak links in the chain” - including limited institutional capacity, health workers' motivation, and crowding out of private health provision – can make health expenditure ineffective (34 p199, 35). WHO analysis (36) argued that up to 20-40 % of health expenditure globally was wasted.⁷ A recent series of articles in *The Lancet* highlight the waste – and harm to health – that occurs in both the underuse - and overuse - of health care (37-40).

⁶ Tandon says (page 17) that ‘Wagner's Law refers to the positive correlation between the size of government and national income....Not only do richer countries spend more in absolute levels, they also spend a higher *proportion* of their resources on health and education” (italics in the original)

⁷ The leading causes of waste in health expenditure globally were purchasing practices for medicines (under-use of generics; use of substandard or counterfeit medicines; irrational prescribing policies); misaligned incentives (fee for service payments); management practices (medical errors, costly staffing mixes); poor investment decisions (hospital size; technology choices)

1.2 Pacific Island countries face some distinctive development challenges.

The specific unit of analysis for this thesis are the fourteen-middle income and / or small countries⁸ of the Pacific Islands Forum. In alphabetical order the countries are: Cook Islands; Federated States of Micronesia (FSM); Fiji; Kiribati; Marshall Islands; Nauru; Niue; Palau; Papua New Guinea (PNG); Samoa; Solomon Islands; Tonga; Tuvalu; and Vanuatu.⁹ Map 1 on page 28 shows the location of these countries. Table 1 provides basic socio-economic data about these fourteen countries. While there are differences between, and within, the three subregional groupings of the Pacific – Melanesia, Polynesia and Micronesia¹⁰ – there are also some common challenges. Small populations – particularly when they are spread over large distances as happens in much of the Pacific – is one such challenge as it limits opportunities for economies of scale and specialisation in the health and other sectors. Table 1 shows that eleven of the fourteen countries have total populations of less than 250,000, with six countries having less than 100,000, and Niue just 1,600.

Achieving - and sustaining - economic growth is another distinctive challenge facing the PICs. With the exception of PNG, the real (adjusted for inflation) GDP growth in the Pacific has been below the global average of other middle-income countries, and “small states”¹¹ over the decade to 2015 (47). Kiribati, FSM and Vanuatu have stayed at lower-middle income level since 1990. Economic growth has also been volatile for many PICs reflecting, among other things, commodity cycles; natural disasters; and ethnic tensions. Five PICs¹² have had their World Bank country classification at least temporarily

⁸ Palau is classified by the World Bank as a high-income country. However, as a country with a population of only 17,800 it shares many of the health and health financing challenges of the other 13 middle income countries that are members of the Pacific Islands Forum.

⁹ Tokelau is an observer member of the PIF and, where information exists on Tokelau, it has been included in this thesis for completeness

¹⁰ The Melanesia countries included in this thesis are Fiji; Papua New Guinea; Solomon Islands and Vanuatu. The Micronesia countries are Federated States of Micronesia; Kiribati; Marshall Islands; Nauru and Palau. The Polynesian countries are Cook Islands; Niue; Samoa; Tokelau; Tonga; and Tuvalu.

¹¹ The World Bank defines small states as having less than 1.5 million population.

¹² More specifically, Fiji had been classified as lower middle-income country (LMIC) in 1987; “graduated” to upper middle-income country (UMIC) in 2007 – 2009; regressed back to LMIC status over the period 2010 – 2012; returning to UMIC status from 2012 to 2016 (latest year available). Nauru was classified as a high-income country in 2015 when it joined the World Bank but regressed to UMIC status in 2016. PNG has been classified as LMIC over the period 1987-2000; regressed to Low Income status over the period 2001-2007; and “graduated” back to LMIC status

downgraded since 1990, at least for a period, with Solomon Islands moving categories several times (48). Papua New Guinea had periods of strong, resource-driven, economic growth but has not been able to translate this into substantial or sustained progress in human development, including in the health sector (49-54).

The relatively high population growth in much of the Pacific means that *per capita* real GDP growth has also been lower than comparable countries. Recent research from the World Bank (47) finds that the average annual real GDP per capita growth over the period 2005 – 2015 was around 4% for middle income countries globally. PNG – supported by a (then) commodities boom – was the only one of eleven PICs¹³ to match that level or exceed the global average 3% per capita real GDP growth for “small states”. Per capita real GDP growth globally was less than 1% per annum over the decade to 2015 in Samoa, Tonga and Vanuatu, and negative for Kiribati, FSM and Palau. Table 1 shows that nearly half (46%) of the countries for which data is available had a GDP per capita growth rate less than 1% per annum, with the two most populous countries – PNG and Fiji – having GDP per capita growth rates less than 0.5% per annum in the latest year available. Even then, GDP per capita can overstate the situation in countries like PNG where the resources sector is largely foreign owned.¹⁴

Furthermore, periods of rapid overall economic growth in the resource sector of an economy do not necessarily translate into broader economic growth or development. Recent research on PNG finds that “(government) expenditure after inflation has fallen by 36% from its 2014 peak and is also back at about 2006 levels. Core services have been squeezed out by the fall in revenue, the increase in salaries and interest, and the great

over the period 2008-2016. Solomon Islands has moved categories several times. Solomon Islands was classified as low income in 1987; LMIC in 1988; regressing to low income 1989-1991; back to LMIC 1992-1997; regressing again to low income 1998-2007; back to LMIC in 2008; regressing to low income in 2009; and back to LMIC from 2010-2016. Tonga was classified as LMIC 1987-2011; “graduated” to UMIC 2012-2014; regressed to LMIC in 2015; and returned to UMIC in 2016. Marshall Islands, Palau, and Samoa, are the only three countries to have “graduated” to higher income level groupings without regressing to a lower classification. Kiribati, and Vanuatu have stayed at LMIC status since 1987, as has FSM since 1991.

¹³ The World Bank estimates covered its members at the time, so did not include Cook Islands, Nauru, or Niue.

¹⁴ As a result, profits and incomes generated in PNG are repatriated to overseas owners, meaning that GDP overestimates national income.

Most PICs are also aid-dependent, receiving significantly more external aid per capita than their comparators. Figure 1 below shows net ODA per capita is significantly higher in the Pacific than the global average for a wide range of comparator countries including “small states”; lower middle-income countries; and upper middle-income countries. This has policy implications for priority setting and resource allocation: see Section 2:2.

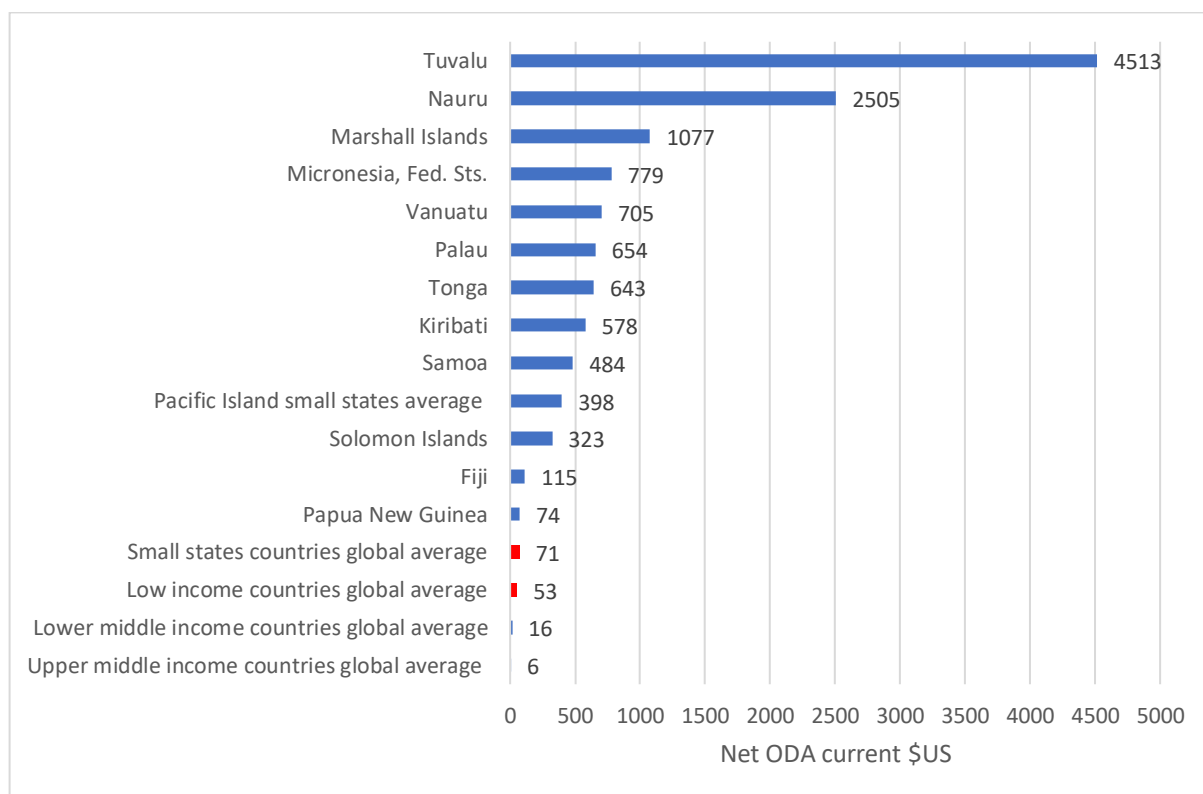


Figure 1: Net ODA per capita in 2014 (current \$).

Source: The World Bank World Development Indicators (41).

Section 2: Public health and public financing challenges in the PICs

In this Section I summarise what is currently known about public health and public financing challenges facing the Pacific. I show that the PICs have distinctive health, and health financing, characteristics that set them apart from other comparable middle-income countries globally.

2:1 A mixed, but generally disappointing, record of overall health outcomes and health systems.

PICs have achieved some important health outcomes. For example, the Pacific has been polio free¹⁵ since 2000, and the PICs have eliminated maternal and neonatal tetanus (68). Hetzel and colleagues (69 p695) conclude there has been an “unprecedented” decline in malaria prevalence throughout PNG, faster than in Africa or other regions. Maternal and child mortality has reduced over time in most PICs but is still high by global standards in PNG (70).

Nevertheless, the PICs have a generally disappointing record of health outcomes. Linhart et al find that life expectancy - a key indicator of health outcomes - has been plateauing for males in more than half (8/15) PICs and in almost half (7/15) for females over the last two decades: see Annex 1. The IHME estimates that, although improving, life expectancy for both males and females is well below projected outcomes given PNG’s economic and other characteristics.

PICs made mixed - and sometimes surprisingly poor - progress under the Millennium Development Goals (MDGs) for health, arguably the most important universally accepted measure of development over the last decade and a half. Just over half (9/14) PIC countries¹⁶ achieved the MDG goal 4 of reducing child mortality by two thirds; only half (7/14) achieved MDG 5 goal of reducing maternal mortality¹⁷; and just less than half¹⁸ (6/14) achieved the overall MDG 6 target of combating HIV / AIDS, TB, malaria and other infectious diseases (70). That same report finds PNG failed to achieve any of the three health related MDG goals for maternal health, child health, or reducing communicable diseases (or, indeed, the other four non-health related MDG goals such as reducing poverty).

¹⁵ This statement was correct at the time of submitting this thesis to examiners on 2 March 2018. However, in July 2018 the WHO confirmed there had been an outbreak of vaccine derived poliovirus type 1 from a child in Lae, Papua New Guinea. Further details are available at <http://www.who.int/csr/don/02-July-2018-polio-png/en/>

¹⁶ In alphabetical order: Cook Islands; Federated States of Micronesia; Fiji; Republic of the Marshall Islands; Niue; Palau; Samoa; Tonga; and Tuvalu. Kiribati, Nauru had mixed results. PNG and Solomon Islands did not meet the goal.

¹⁷ Cook Islands; Fiji; Republic of the Marshall Islands; Niue; Palau; Tonga and Tuvalu.

¹⁸ Cook Islands, Nauru, Niue, Palau, Tonga and Vanuatu.

There is an unfinished agenda of health challenges in the Pacific normally associated with low income countries. For example, the Total Fertility Rate (TFR) – the number of children born per woman – varies within the Pacific but is generally higher than global averages for countries at that stage of development (71-73). Eight PICs, including four upper middle-income¹⁹ PICs, have higher TFRs than occurs on average in the UN’s forty-eight “least developed” countries, most of which are in Sub-Saharan Africa.²⁰ Cultural and family preferences explain some of this high TFR in the Pacific. However, the latest UNFPA report (71 p104) shows that the Contraceptive Prevalence Rate is less than 50% for all fourteen PIC countries it tracks. Importantly from a public policy perspective one fifth or more of women aged 15-49 years have an unmet need for modern contraception in nine of the fourteen countries. Kennedy et al (74) note that the Pacific has some of the highest rates of unmet need for family planning in the world.

The unfinished agenda also includes reducing communicable diseases, under-nutrition and environmental health. Despite progress in reducing malaria, and HIV AIDS in PNG, much of the Pacific have high rates of sexually transmitted infections, with UNICEF reporting chlamydia infection rates “among the highest in the world” (75 p26, 76). PNG has multi-drug resistant tuberculosis (77, 78). PNG also has the fourth highest rate of stunting in the world (79). Nearly half (49.5%) and nearly one third (32.8%) of children under 5 years of age in PNG and Solomon Islands respectively were stunted (short height for age: prima facie evidence of chronic under-nutrition) over the period 2005-2016 (80). About 6.9 million people in Pacific island countries cannot access improved sanitation and more than 4.8 million cannot access improved water supplies (81). Researchers have already recognised that the Pacific faces a double burden of disease – communicable diseases co-existing with NCDs (50, 82, 83). WHO argues there is now a triple burden in the Pacific: communicable disease, NCDs and the health impact of climate change (84).

PICs do not perform particularly well in terms of overall health systems. Researchers in *The Lancet* (85) tracked death rates for 32 diseases “that can be avoided effectively treated with proper medical care” in each of the 195 countries over the period 1990-2015. They concluded most countries improved both access and quality of health care

¹⁹ Samoa, Nauru, Tuvalu and Marshall Islands.

²⁰Among the 48 “least developed” countries, are four from the Pacific: Kiribati, Solomon Islands, Tuvalu, and Vanuatu.

for their citizens over that period but countries in Sub-Saharan Africa and Oceania (i.e. the Pacific) mainly saw the lowest level of progress. (85). The article also found several countries in the Pacific had health systems that were well short of their potential effectiveness and efficiency.

2:2 Six distinctive health and health financing challenges in the Pacific.

There is some acknowledgement in the international literature that small island economies face particular challenges, including in terms of overall health services and outcomes. Hotchkiss (86) identifies several constraints facing small islands including the fact that small populations make specialised or expensive services unviable, difficulties in recruiting and retaining specialised staff. Taylor, in the aptly named article “The tyranny of size: challenges of health administration in Pacific Islands States” notes that “Small health services are not just scaled-down versions of large health services; they are qualitatively different. They are of such a size, and isolated to such an extent, that their situation and difficulties are qualitatively, as well as quantitatively, different” (87 p72). Haque et al, (58) analysing 118 countries globally, find that small populations, and a limited pool of human capital, largely explains why PICs have poorer public expenditure and financial management scores than larger countries of similar income.

Apart from their small size, there are another six significant public health, and public financing, challenges that set the PICs apart from other middle-income countries, and even other small island states.

First, PICs have much higher prevalence of NCDs, especially diabetes, than all other countries in the world. Figure 2 below shows that the Pacific has eight of the top ten countries²¹ in the world for the estimated prevalence of age-adjusted adult female diabetes. The prevalence is noticeably higher than the vast majority of 186 countries globally: in eight PICs, females aged 18 years and over have a prevalence of 20 % or more, whereas the majority of 186 countries globally have an equivalent prevalence of 10% or less. (The pattern of male prevalence of diabetes in the Pacific is not particularly different). The combination of a high prevalence of diabetes among women, and high

²¹ In descending order: Nauru 28.4% prevalence; Niue 27.3%; Cook Islands 26.7%; Samoa 26.6%; Tonga 26.4%; Tuvalu 24.3%; Federated States of Micronesia 23.4%; Palau 21.6%; Egypt 19.8%; and Kuwait 19.6%.

fertility, is a particularly problematic public health issue, as diabetes in pregnancy raises health complications for both mother and then her child.²²

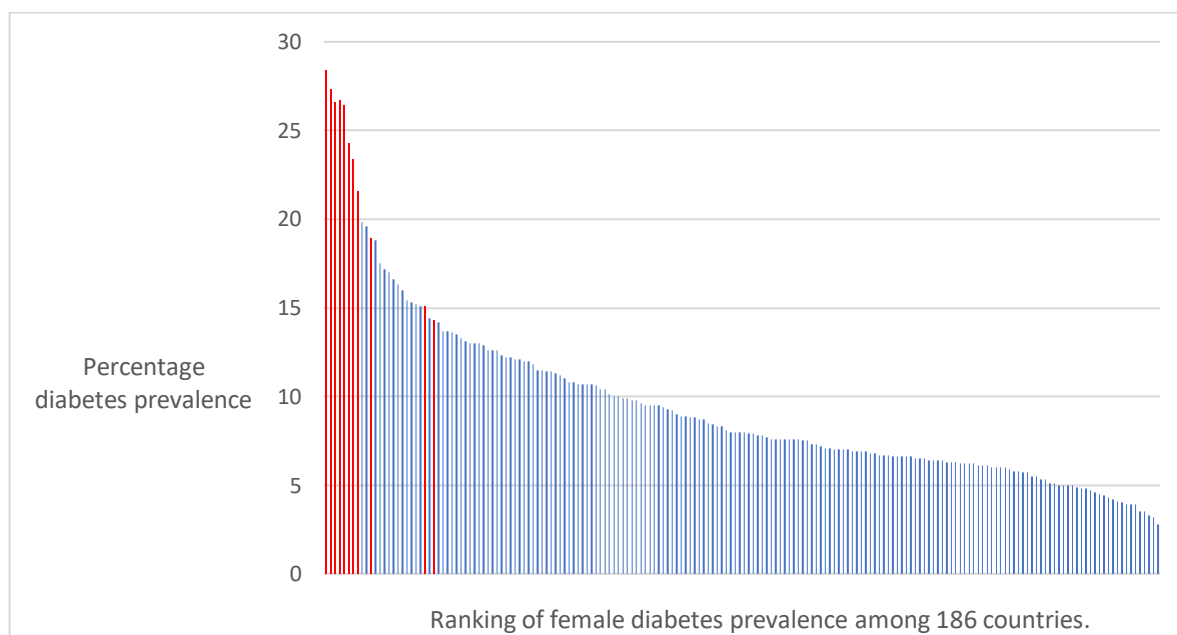


Figure 2: Female diabetes prevalence²³ among 186 countries with Pacific Island countries shown in red bars.

Source: World Health Organization (88).

The rise of NCDs in the Pacific has been a relatively recent phenomenon but is often occurring at faster rates than other middle-income countries. Zimmet et al (89 p91) state that diabetes, hypertension, strokes, and coronary artery disease were “unknown or rare” in most countries of the Pacific in the 1960s (90, 91). Changing diets (92, 93) and lifestyles leading to obesity go part way to explaining the disproportionately large rise in diabetes in the Pacific (94) but Joffe and Zimmet also argue (95) Pacific populations may possess a “thrifty gene”.²⁴ Hawley and McGarvey state that the prevalence of obesity and diabetes is “rising disproportionately faster in the Pacific region over the past three decades *than in the rest of the world*” (221 p28 italics added). The latest WHO

²² I am grateful to Dr Robert Condon who highlighted this point during my Ph D oral presentation at the ANU in August 2017.

²³ The definition used by WHO is raised fasting blood glucose > 7 mmol/L or on medication, age standardised, mid-point estimate, females aged 18 years +

²⁴ The “thrifty gene” hypothesis argues that a genetic metabolic capacity to store fat that was historically protective for those living in remote islands subject to food insecurity but which is now damaging health in an era of processed food abundance.

World Statistics Report (80 p60) finds that of 183 developed and developing countries world-wide in 2015, PNG has the highest probability (36.1%) of dying from any of the four major NCDs between age 30 and age 70, and that Fiji has the third highest probability (31.4%). Six other PICs for which information is available have probabilities higher than 20%: Kiribati (28.2%); Solomon Islands (26.4%); Micronesia Federated States (25.9%); Tonga (24.1%); Vanuatu (22.3%) and Samoa 22%.²⁵

Second, high levels of NCDs are associated with higher levels of premature death in PICs than in comparable countries. WHO estimates show that NCDs are associated with significantly higher rates of premature (less than 60 years of age) death in the PICs than other lower-middle ²⁶income countries globally: see Figure 3. Gopalini and colleagues find that premature deaths from NCDs in the Federated States of Micronesia are higher than global levels (96). Not only are rates of premature death high, Tonga now officially attributes reduced *life expectancy* in the country largely to the rise of NCDs (97). Despite difficulties in estimating the prevalence of NCDs in the Pacific, it is clear that diabetes is also causing or is at least associated with morbidity including eye problems (retinopathy) and limb amputations (98).

²⁵ These are all more than double the probability in Australia (8.9%), reflecting both the different prevalence and risk factors for NCDs in the PICs but also the increased access to effective medical care in Australia.

²⁶ WHO did not provide estimates for upper middle-income countries.

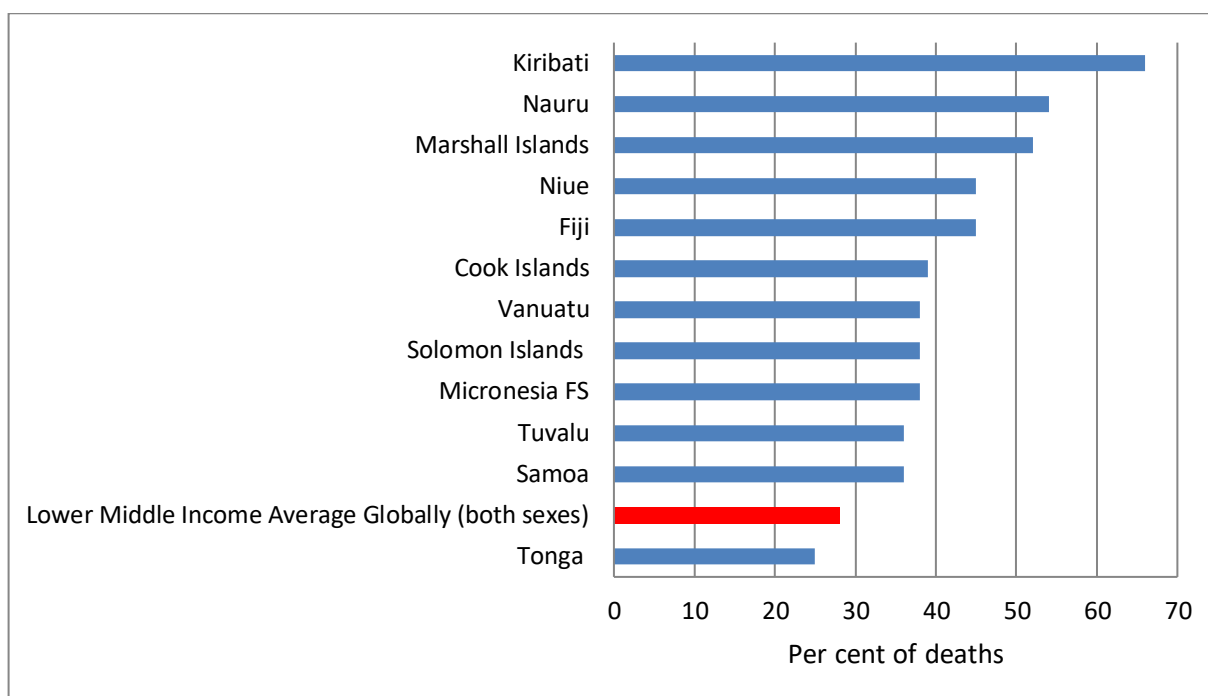


Figure 3: Premature deaths: proportion of all male NCD deaths < 60 years of age in 2010

Source: World Health Organization (99).

Third, PICs have some of the highest *risk factors* for acquiring NCDs in the world, feeding a pipeline of future NCDs unless urgent action is taken. WHO states that obesity is a major – but preventable – risk factor for most NCDs including cardiovascular disease, cancer and diabetes (100). Lin et al note that “obesity is the strongest and most prevalent risk factor for type 2 diabetes” (101 p534). The ten countries in the world with the highest levels of obesity are all in the Pacific²⁷, with six of those countries having 50% or more of the adult population obese (102). It is particularly concerning that young people in the Pacific have rates of obesity and overweight that are the highest in the world. Girls aged 5-19 years in Melanesia, Polynesia, and Micronesia, and boys the same age in Polynesia and Micronesia already had the highest Body Mass Index²⁸ (BMI) out of 200 countries in the world in 1975 (103). Even more concerning, that research found

²⁷ In rank order, showing the percentage of the adult population that are obese (confidence intervals shown in the original data set): Nauru 61%; Cook Islands 55.9%; Palau 55.3%; Marshall Islands 52.9%; Tuvalu 51.6%; Niue 50%; Tonga 48.2%; Samoa 47.3%; Kiribati 46%; Federated States of Micronesia 45.8%. Kuwait is the eleventh ranked country in the world with an obesity prevalence of 37.9%.

²⁸ Body Mass Index compares a person’s weight to their height. The formula is BMI is calculated by dividing a person’s weight in kilograms divided by their height in meters squared.

that the *increase* in BMI between 1975 and 2016 was highest in the world for both girls and boys in some countries of Polynesia.

Rates of tobacco use is also high by world standards among males in parts of the Pacific. This is important because tobacco use causes or exacerbates all four major NCDs (104, 105). Beaglehole et al (106) argue that tobacco control is the most important priority for managing the rise of NCDs. Savedoff and Alwang argue that tobacco taxation is “the single best health policy in the world” (107 p1). Yet Kiribati has the highest prevalence (47.8%) of male smoking out of 195 countries globally and six PICs (Kiribati, Tonga, PNG, Samoa, Vanuatu and Solomon Islands) have male smoking rates higher than the global average (108). The IHME estimates that tobacco use is the single largest risk factor for death and disability in PNG (109). Hou, Xu, and I (110 pi) show tobacco consumption particularly affected the poorest in PNG: “tobacco consumption accounts for about 23% of total household food expenditure for households in the poorest quartile, compared about 15% for the entire sample”.

Kessaram et al analyse other risk factors drawn from WHO STEPs data²⁹ from the Pacific, showing high levels of other risk factors for NCDs in the Pacific including physical inactivity and alcohol use (111). Having a high level of risk factors for NCDs is particularly important and relevant in the Pacific given that WHO states that NCDs such as chronic respiratory diseases globally are already often “under recognized, under diagnosed, under-treated and insufficiently prevented”(112 p1).

The fourth factor that makes the PICs particularly distinctive is that governments finance much more of Total Health Expenditure (THE)³⁰ than in countries of similar levels of socio-economic development. Figure 3 shows that governments fund more than 75% of THE in twelve of the fourteen PICs in 2014 (latest year available). In six of the fourteen countries government funds 90% or more of THE. All fourteen countries, except Fiji, spend significantly more than comparable countries at that level of development. In

²⁹ STEPS is not an acronym. Instead, it is a term used to cover the WHO STEP wise approach to Surveillance of risk factors and diseases. Further details on STEPS is available at <http://www.who.int/chp/steps/en/>

³⁰ Total Health Expenditure (THE) consists of government expenditure, private out of pocket expenditure, and expenditure through health insurance schemes. In most PICs, government finances – and itself directly delivers – health services. In PNG, government financed 81.3% of THE in 2014, but government has purchased the actual delivery of health services from churches.

Niue, FSM, PNG and Kiribati government expenditure on health as a percentage of THE is more than double the global average for lower middle-income countries. In four countries – Samoa, Tonga, Tuvalu and Vanuatu – the share of government expenditure in THE has increased over time since 1995 rising in Samoa from 73.6% in 1995 (earliest baseline date available) to 90% in 2014 (41). In the remaining ten PICs, the share of government expenditure as a percentage of THE has fallen only marginally or stayed the same.

That governments in the Pacific shoulder such a high share of the total expenditure on health cannot be explained just by the small size of the economies of the Pacific. Figure 4 shows that all PICs, with the exception of Fiji, still have significantly higher shares of government expenditure on health than the “small states” global average of 68.6%. Other factors, including the relatively low levels of formal employment (and hence private insurance) and relatively high levels of external aid financing are likely to be contributing factors to the high share of government expenditure in total health spending.

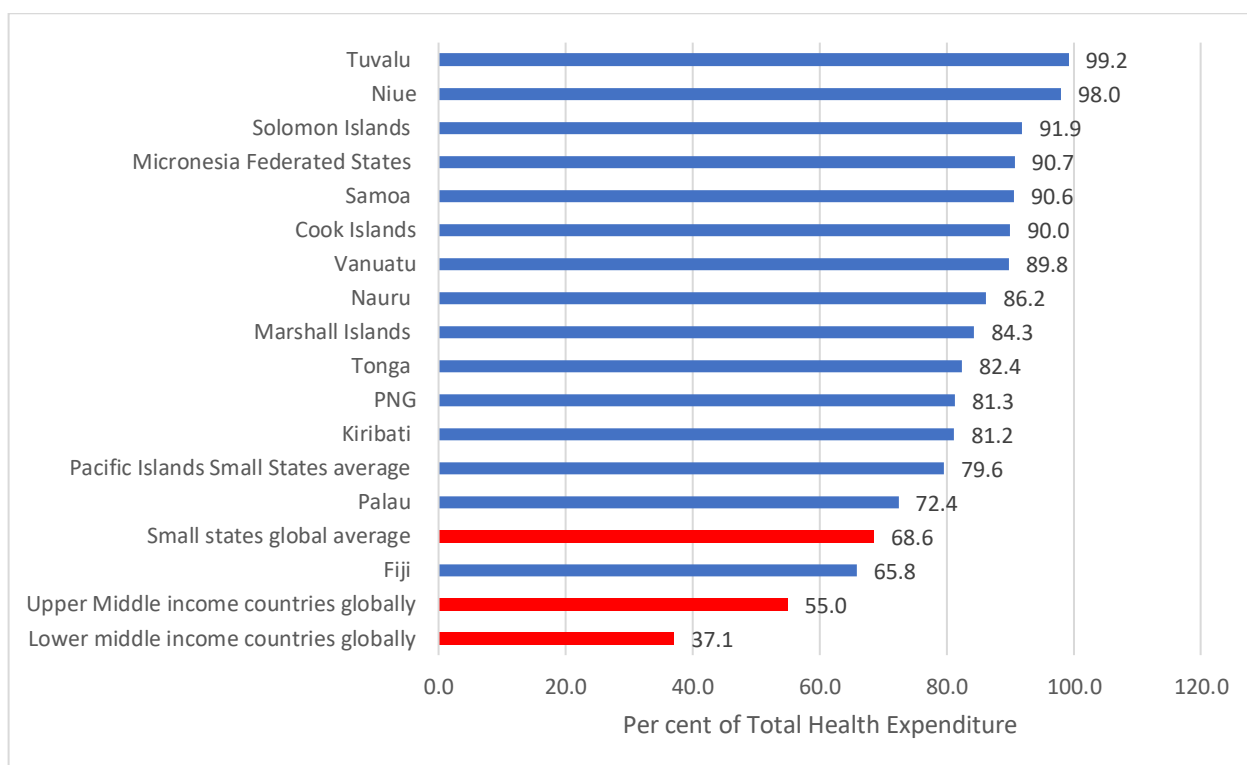


Figure 4: Government expenditure as percentage of Total Health Expenditure

Source: The World Bank World Development Indicators (41).

The corollary to high shares of government expenditure on health is that, unlike most middle-income countries, PICs then have some of the lowest levels of out of pocket expenditure on health care in the world. Figure 5 shows that the average level of out of pocket health expenditure in the PICS (13.2%) is less than one quarter of the average for lower middle-income countries globally (54.9%) and less than one half the average for upper middle-income countries globally (32.4%). This is important from the point of view of public policy because it means few if any Pacific Islanders currently experience direct financial distress as a result of health expenditure.³¹

³¹ Although citizens in remote parts of PNG and Solomon Islands may also simply not get access to essential care.

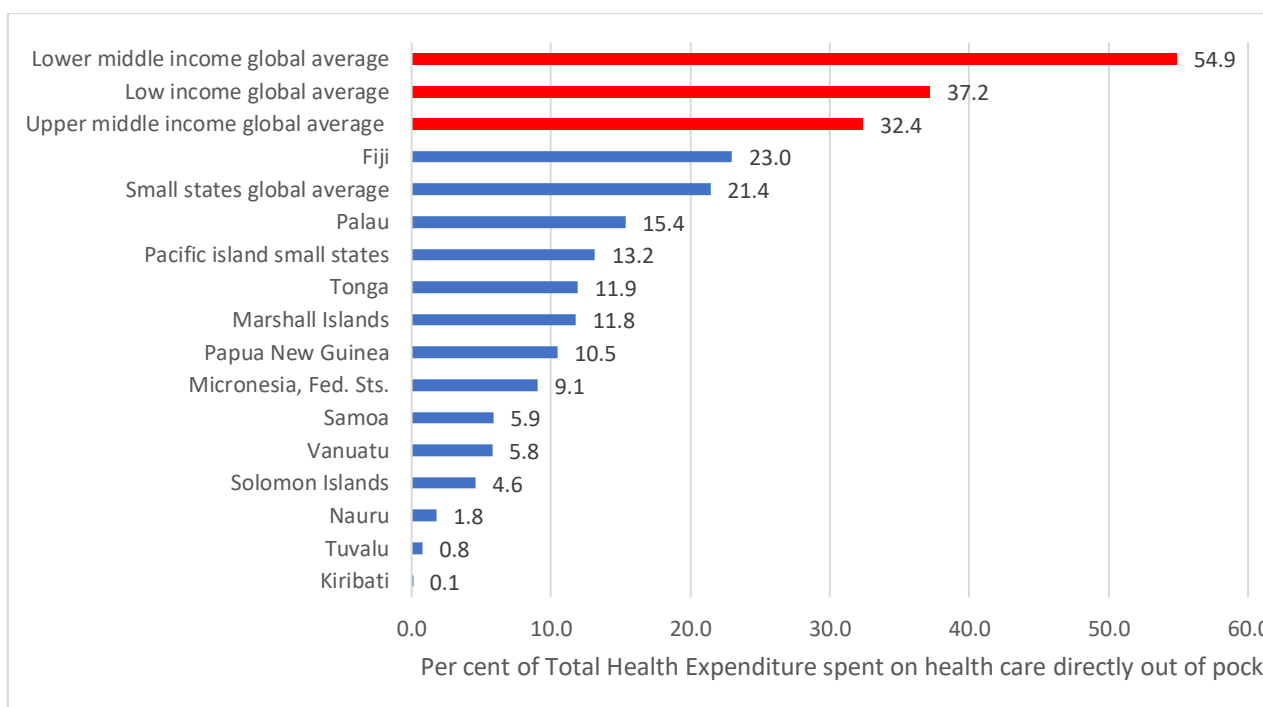


Figure 5: Out of pocket expenditure on health as % of Total Health Expenditure in 2014

Source: The World Bank World Development Indicators 2017 (41).

The current low levels of direct out of pocket expenditure on health care will remain a policy challenge for the PICs. Governments wishing to keep direct out of pocket expenditure levels low for social and political reasons have few easy or palatable options for expanding health expenditure to meet increasing needs. Private health insurance and / or social health insurance social health insurance³² are not realistic options. That is because the small total populations of the Pacific, and even smaller formal sector economy, makes the potential total health insurance pool too small to spread risks in a viable or financially sustainable way. Development partners are also most unlikely to fill any growing health financing gap: an expensive and potentially open-ended obligation for them and hard to sell politically in bilateral partner's own constituencies, especially if PICs have been recently "graduating" to upper middle-income status: see footnote 12 for an account of such movements. Any reduction in overall PIC government financing,

³² Social health insurance essentially involves taking a portion of formal sector workers' salary and pooling it to cover a proportion of health care costs. While common and popular in some European OECD countries, social health insurance usually requires a political culture of 'solidarity' for it to be politically acceptable. Both private health insurance and social health insurance requires potentially significant actuarial, management, and administrative skills to minimise gaming of the system.

whether from domestic sources or aid funding, is also unlikely to be met by PIC citizens directly seeking private sector health providers as there are few such (qualified) providers especially in rural or remote areas.

Conceptually, that then leaves only one option if people are to access health care at all: increasing user fees.³³ Some user fees can be justified, including for purely cosmetic surgery or when applied to hospital emergency or outpatients services as a means of discouraging citizens from bypassing primary health care facilities with minor ailments. But the international literature is clear that user fees that require out of pocket expenditure for health care at the point of service is the most regressive and least attractive form of health financing in any country, especially if it leads to the non-use of health care by the poor (113-116). See also the discussion on what the international literature says on financial protection and direct out of pocket expenditure on health care in Section 3:1.

In short, the current low levels of direct out of pocket expenditure on health care will remain a policy challenge for the PICs in the absence of alternative sources of revenue to meet the needs of growing, ageing populations with already high levels of expensive to treat NCDs.

The fifth factor that makes PICs health financing particularly distinctive is that government expenditure on health is already a significant share of total government expenditure, unlike most other middle-income countries. Four of the ten middle-income countries in the world with the highest share of government overall expenditure being allocated to health are in the Pacific: Marshall Islands; Federated States of Micronesia; Palau and Vanuatu. Figure 6 shows that all ten of the twelve PICs for which information is available allocate more of their overall government budget to health than the average globally for lower middle-income countries (data on upper middle-income shares are not available). Figure 6 shows six PICs allocated 15% or more of government expenditure to health care. To put this in perspective, the WHO notes that “In 2012 only 14% of

³³ Total health care comprises expenditure from either the government; through private or social health insurance; through development partners; or directly out of pocket either to private providers or via increased user fees for government services. It needs to be recognised that poor and marginalised people may also simply forego health care because they cannot afford transport or other indirect out of pocket expenses to access care, including the loss of a day's income.

governments in low and lower-middle-income countries met the (15% Abuja target of government expenditure going to the health sector); indeed, only 29% of upper-middle-income and high-income countries reached this level.” (26 p4)

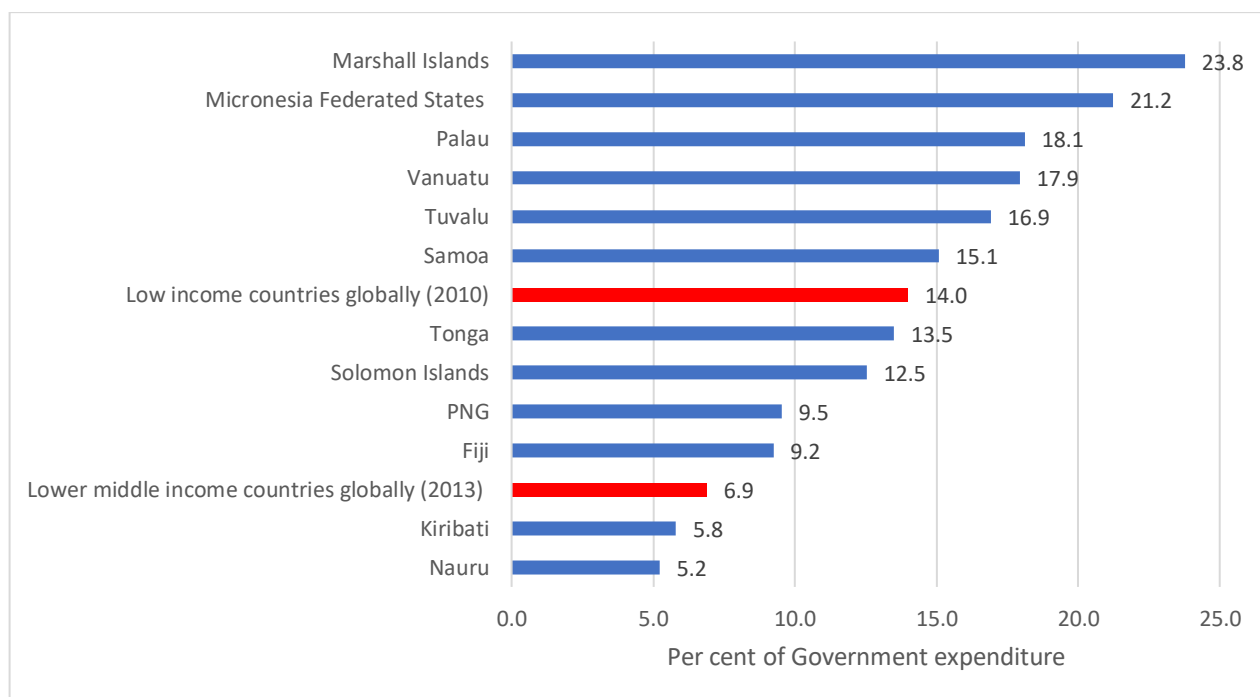


Figure 6: Public Health Expenditure as % of total government expenditure

Source: The World Bank World Development Indicators (41).

A sixth factor that makes health challenges in the PICs particularly distinctive is the level of aid dependence, a characteristic that has important implications for priority setting and resource allocation. Figure 1 showed that net ODA per capita is significantly higher in the Pacific than the global average for a wide range of comparator countries including “small states”; lower middle-income countries; and upper middle-income countries. High levels of external aid are particularly relevant to issues of priority setting and resource allocation because bilateral and multilateral development partners, while providing welcome additional resources, can also distort the public policy priorities of host governments, and because aid volatility can particularly disrupt country priority setting (117-125).

It is the combination of these six distinctive features that puts the PICs in a particularly difficult and challenging policy space. PICs acknowledge that they are facing an NCD “crisis” that can undo previous development gains. In 2011 the Prime Ministers and

other leaders of the fourteen PICs formally acknowledged that the region is facing an “NCD crisis” (126). A subsequent joint meeting of all Forum Economic and Health Ministers declared that “NCDs impose increasingly large, yet often preventable financial costs on national budgets and the economy more broadly. Without decisive action, NCDs can undo the development gains of the last 20 years” (127). Despite the importance of these issues, I show in Section 3 below that there is a research gap when it comes to the fourteen middle-income countries of the Pacific which I then address through this thesis.

Section 3: The general, and the specific, research gaps that this thesis addresses.

3.1. The general research gap.

The **general research gap** exists because the international literature on how middle-income countries should prioritise and allocate scarce resources in the health sector does not adequately take into account the particularly distinctive public health and health financing characteristics and challenges facing the PICs, as outlined in the previous section (2:2). This thesis therefore aims to “provide a corrective to the current research and debate” as described in page 1 of ANU’s guidelines for writing a Ph D thesis (128) at least in terms of how the literature applies to the Pacific.

The evidence that this general research gap applies with respect to the PICs is as follows. There is a substantial body of literature on how, in general, low and middle-income countries might best prioritise public health interventions and allocate scarce resources to address public health challenges. How much a country should spend on health care is a vexed question (23, 26, 35, 129-132). Having said that, various high-profile studies (10, 12, 133-135) argued that the level, and allocation, of public financing for health in low and middle-income countries is often below what is needed to provide a package of essential services. Numerous peer-reviewed and grey area publications stress that the demand for health services will always and everywhere exceed supply: priorities and trade-offs must therefore be set (136-140). The literature also makes clear that scarce

financial and other resources³⁴ in the health sector must be allocated in ways that take account of relative costs and relative benefits, as well as equity and sustainability (136, 138, 141-149). There are several guides to prioritising and resource allocation, including for particular diseases or specific health challenges (12, 22, 150-158).

A particularly well-established approach is the WHO “building blocks” approach. In essence, the WHO argues there are six key components of a well-functioning health system: leadership and governance; service delivery; health financing; human resources for health; essential medical products and technologies; and health information systems (134, 159-161). This “building blocks” approach has been influential in shaping the way researchers analyse the totality of a health system in low and middle-income countries (162, 163). I also use the WHO “building blocks” approach in Chapter 5 of this thesis because the research aim was to analyse how ageing affects the whole health system in the PICs.

Several researches use a political economy lens to analyse health systems (164-171). As just one example, Walt and Gilson argue that “much health policy wrongly focuses on the *content* of reform, and neglects the *actors* involved in policy reformthe *processes* contingent on developing and implementing change and the and the *context* within which policy is developed” (172 p353, italics in the original). They therefore use broader political context, technical content, and processes as three sides of a “health policy triangle” to analyse health systems. Several researchers use various other frameworks and approaches to analyse overall health system *strengthening* in low and middle-income countries (173-177).

All of these approaches are helpful as far as they go, but they do not adequately capture the particularly distinctive characteristics of the Pacific. For example, there has been a particular focus in the literature on options to expand the “fiscal space for health” but

³⁴ Money and finance are just one resource that decision-makers need to prioritise and allocate to their most productive uses. “Other resources” include the health workforce (and labour beyond the health workforce that indirectly affects public health including, for example, those workers involved in producing nutritious food and workers involved in expanding the water and sanitation infrastructure in a society). “Other resources” that need to be prioritised and allocated carefully can even extend to the time that managers have to focus on a problem. Skilled and experienced managers are an important resource anywhere, especially in the Pacific: it is a poor use of that resource if most of their time is spent on routine administrative tasks or in unproductive or unnecessary meetings.

few of these policy options apply to PICs. Expanding the “fiscal space for health” means, in essence, increasing financial resources to the health sector “without any prejudice to the sustainability of a government’s financial position” (178 p75). In 2010 Tandon and colleagues at the World Bank developed this into a framework “for assessing fiscal space for health from five potential sources: conducive macroeconomic conditions; reprioritization of health within the government budget; earmarked income and consumption taxes directed towards the health sector; better efficiency of existing health expenditure; and external aid” (145, 179 p4, 180). Tandon and colleagues state that this framework has now been applied in more than 50 low and middle-income countries, albeit with mixed results (179, 180).

This framework is useful and relevant, particularly to larger middle-income countries with wider economic and institutional options. However, as Chapter 2 and Chapter 3 of this thesis shows, four of the five options available under the World Bank fiscal space analysis rarely apply in the Pacific. That is so particularly given low or at least volatile per capita income growth in the PICs; high levels of existing aid dependency; and existing high shares of government expenditure on health; and limited ability of hypothecated taxes to meet overall financing needs of the PICs.

Much of the existing literature also focuses on the importance of generating additional revenue for health through taxes or Social Health Insurance (181-186). This has limited relevance in the Pacific where, for example, Vanuatu does not have any form of income tax on individuals or businesses. Even in Fiji, a PIC with a relatively large formal sector, Social Health Insurance was not found to be appropriate (187).

The literature is also generally critical of applying user fees to generate revenue for the health sector, especially in low and middle-income countries, given their regressive nature (113, 188, 189). An argument could be made that, because PIC government subsidies to health care were likely to be pro-rich, then user-fees may have the twin benefit of raising revenue for the health sector and providing some measure of equity in health financing.³⁵ I see this as true in principle. On the other hand, the costs of the most expensive dialysis and / or drug treatments – see Chapters 3 and 4 of this thesis – are so high compared to average per capita incomes in the PICs that there is little

³⁵ Dr Peter McCawley made this observation during my oral presentation at the ANU.

headroom to raise user fees even among the richest percentile, or cover the majority of costs.

The international literature encourages increased use of cost-effectiveness analysis, program budgeting, and strategic purchasing to buy health outputs and outcomes in middle-income countries globally (113, 144, 190-192). While sound in principle, this is often unrealistic in the PICs where there is limited data on actual cost of government health services; limited numbers of trained and qualified staff to undertake program budgeting; small markets in which to undertake strategic purchasing or outsourcing; and limited bureaucratic authority to shift resources between historically determined budget line items. I found one study being undertaken on cost-effectiveness of salt reduction as a means of reducing risk factors in the Pacific (193). On the other hand, Shroufi and colleagues (194) conducted a systematic review of cost-effective interventions for the prevention of cardiovascular disease in low and middle-income countries. Out of 9731 search results - which specifically included "Pacific Islands" in the search terms - they identified 16 eligible studies: none covered the Pacific as such.

There is also a global focus in the literature on financial protection for individuals and households. PICs. Direct out of pocket payments for health care are regressive; can be a barrier to seeking essential care for the poor; and can lead to impoverishing or catastrophic³⁶ health expenditures (116, 195, 196). Financial protection for those seeking health care is now a key component for achieving Universal Health Coverage and is specifically being tracked through indicator 3.8.2 of the Sustainable Development Goals (197). That focus on financial protection has, in turn, generated significant attention in terms of global guidelines for achieving financial protection in middle-income countries (36, 114, 181, 183, 185, 198, 199) and in the peer-reviewed literature (200-202). However, once again, that growing literature is of little direct relevance to PICs. That is because, as Figure 5 shows, PICs have significantly lower shares of out of pocket expenditures than comparable countries globally, most having rates one third lower than lower-middle income countries globally. Indeed, WHO states (203) that Kiribati has the lowest annual out of pocket household expenditure on health in the world at just \$ 0.20 in 2012 (latest year available).

³⁶ See footnote 1 and glossary for definition of terms.

The literature gives attention to public private partnerships as part of the resource allocation menu for middle income countries (204-207) but, again, there is only limited coverage of that option in the Pacific (208). Irava and Prasad also found this option to be at a relatively undeveloped state, with limited opportunities for expansion, even in Fiji which has a larger formal private sector than most countries in the Pacific (209).

There is much focus on the rise of NCDs in middle-income countries, but little specific attention to the Pacific where the prevalence of some NCDs are the highest in the world. There are several peer-reviewed (106, 210-217) and grey literature documents (218, 219) providing guidance on the NCDs in middle-income countries. However, even though the PICs have some of the highest rates of NCDs, and risk factors for NCDs, there is little specific literature on how best to reduce NCDs and what the financial costs to government might be: see section 3.3 below.

In summary, this thesis aims to provide a “corrective” to the widely used approaches and analytical frameworks by explaining how the PICs have particularly distinctive health, and health financing, challenges.

3:2 The specific research gaps.

Within this general research gap, I also identify three specific research gaps.

First, there is little peer-reviewed, and / or up to date published data on actual health financing challenges and options in the Pacific, particularly in terms of the financial costs of treating the rapid rise of NCDs. This is despite the financial and economic costs of NCDs being a key part of a health and development “crisis” recognised by all PIC leaders.

There is some research in the international literature about the dramatic rise of specific NCDs in the Pacific, some going back to the year 2000 and earlier (90, 94, 95, 111, 220-225). There is less peer-reviewed literature on what public health interventions are specifically suited to the PICs, but there is some (91, 193, 227-232). However, there are also gaps. Mannava, Annear, and colleagues (233) reviewed the literature on NCDs and broader health systems in Asia and the Pacific published over the period 1990-2010. Despite the disproportionately high prevalence of NCDs in the PICs, with each country in the Pacific included in the search terms, none of the twenty-nine single country

studies analysed a Pacific Island country or the region as a whole.³⁷ A recent book (83) on the history of responses to NCDs and communicable diseases in “Asia and Pacific” had twelve chapters on Asian countries, two chapters on PNG, but no other specific research on other PICs, despite PICs having disproportionately high levels of NCDs such as diabetes. Snowden notes the general need to increase evidence and data on NCDs in the Pacific (232).

There is limited and / or dated research about health financing challenges in the Pacific. Deeble, (234) writing in 1990, argues for increased health expenditure in the Pacific. He recommends changes in government priorities; increased health user charges; and a greater role for community financing as a means of increasing resources for health. (Chapter 2 of this thesis explains why all but the first option is inappropriate for the Pacific). In 1990, Taylor, drawing on health expenditure data up to 1986, provided one of the more comprehensive overview summaries of health expenditure, as well as health status and health services, of six countries of the Pacific.³⁸ Gani estimates the possible reduction in infant mortality of a 10% increase in per capita health expenditure in the Pacific (235) however his analysis uses data from 1990–2002. WHO has produced country studies, including chapters on health financing, on Fiji (236), Tonga (237) and Solomon Islands (238). In addition to the World Bank publications included or referred to in this thesis, I have been the lead author of published World Bank studies on the health financing options facing Vanuatu (239); the economic costs of NCDs in the Pacific (240), and the *Pacific NCD Roadmap* (241). My co-author for the article published in Chapter 4 of this thesis recently published a short study on financing Universal Health Coverage in Fiji (242).

There is even less published research on the direct financial costs to governments of preventing and controlling NCDs in the Pacific but what is available is now somewhat dated. In 2003 Beaver (219) estimated the costs of diabetes treatment in five PICs: Cook Islands, FSM, Fiji, the Marshall Islands and Tonga. She also shows how costs rise with co-morbidities: the wholesale cost of medication for a non-insulin diabetes patient in Tonga was \$Tonga 20 per year in 2001. However, “costs increased 35 fold to \$Tonga 697 if the

³⁷ There were ten published studies on India, six for Thailand and three for Sri Lanka.

³⁸ Fiji, Kiribati, Samoa, Solomon Islands, Tonga and Vanuatu.

patient was treated for hypertension, two episodes of foot infection and one episode of diabetes sepsis” (219 p92). Falconer (243) also estimated the costs of diabetes treatment in Vanuatu, but his 2010 publication uses data from around 2006 which makes it now somewhat dated. His study also did not extend to the direct costs of hypertension that was included in the study I led (see Chapter 4 of this thesis for details).

There is some research on NCD costs in the Pacific that is based on modelling, rather than primary sources. The International Diabetes Federation (IDF) has used modelling to estimate the mean diabetes related expenditure per person for 220 countries and territories including for selected countries in the Pacific. However, these estimates should be treated with caution as they involve five different data sources³⁹, each of which involve their own significant – even heroic – assumptions. Zhang and colleagues build on that approach to estimate that 41% of national health expenditure in Nauru was allocated to diabetes in 2010, the highest percentage out of 193 countries in the world and well above the estimated 12% global average. Tuvalu and Tonga had the fourth, and sixth, highest shares of national expenditure going to diabetes in the world at 19% and 18% respectively (244).

There is some research on the broader economic costs of NCDs in the Pacific including lost productivity although, again, some is quite dated. Szmedra and Sharma (245) estimate that productivity and income losses of those in the formal sector suffering from NCDs amounted to 14% of the 2004 GDP in Nauru and 1.4% of the GDP in Fiji. Tin (246) finds that approximately 10% of people with diabetes in the Pacific retired from the workforce as a result of that illness. Ding and colleagues estimated the economic burden of physical inactivity in 142 countries finding, among other things, that 94% of the economic burden of physical inactivity in the Solomon Islands is borne by the public health system – the highest rate in the world. This is followed by Seychelles (92%), Micronesia (90.3%), Samoa (89.5%) and 87.3% in Vanuatu (247, 248). I was the co-author of the chapter in the World Bank’s *Pacific Possible* report that estimated, through

³⁹ Page 40 of the IDF report explains the modelling used 5 inputs: IDF’s own estimates of diabetes prevalence at the country level; UN population estimates; WHO annual health expenditures; WHO mortality rates; and the assumption that diabetes patients incur expenditure at twice the level of non-diabetes patients.

modelling, the possible economic impact of NCDs in eleven⁴⁰ PICs. We concluded (47 p95):

In summary, four results stand out in terms of projected economic costs of NCD mortality analyses in the Pacific. First, the economic burden of NCDs is greater than expected for middle-income countries; second, although cardiovascular disease is the biggest contributor to the mortality burden in the Pacific, diabetes plays a far greater role in the Pacific countries compared to the global average; third, the economic burden is increasing with time, especially as incomes rise; and fourth, in the absence of these four NCDs, the labour force could be at least 9%, and up to 30%, larger across the 11 Pacific countries.

The second specific research gap concerns little if any published research on the implications of ageing on the overall health systems of the Pacific. There is some research on the extent of ageing in the Pacific (249-250) and some analysis of the implications of ageing on the health workforce in the Pacific (251-253). However, to my knowledge, there is no published peer-reviewed analysis of the implications of ageing on the overall health system, or on key aspects of a health system such as leadership and governance. Chapter 5 addresses that research gap.

The third specific research gap exists because there is limited published research on how Ministries of Health can better present arguments for priority setting and resource allocation to Ministries of Finance and / or development partners. There are several “investment case” articles and grey literature that advocate additional financing for specific diseases or maternal and child health (15, 150-152, 254-256). There is also some guidance on integrating aid funding, particularly in the context of Sector Wide Approaches (154, 257-263). There is literature on the political economy of priority setting and resource allocation in the health sector of low and middle-income countries, some of which I have contributed to (264-273). However, there are few if any articles on how Ministries of Health can better present arguments at a broader systems level (137, 141, 142) and none that I could find that specifically address the situation in the Pacific. Chapter 6 of this thesis addresses that gap.

⁴⁰ This was a World Bank study. The Cook Islands and Niue are not members of the World Bank so were not included in the study.

3:3 How the thesis structure addresses the general, and specific, research gaps.

Given those general, and specific research gaps, this thesis seeks to answer five specific research questions and generate findings that will be central to public health and public financing challenges in the Pacific that have not been covered well in the literature to date. The five specific research questions then have a corresponding, separate, peer-reviewed chapter in this thesis. Table 2 refers. Furthermore, each chapter leads logically and progressively on to the next chapter, for reasons explained below.

To summarise, Chapters 2 and 3 aim to fill the **general research gap** identified in the previous section relating to the inability of existing literature to fully reflect the particular circumstances of PICs. Chapter 2 sets the scene. It provides the (then) latest research on the distinctive health challenges of five countries in the Pacific – Fiji, Samoa, Solomon Islands, Tonga and Vanuatu – and asks what are the public expenditure options available to those countries to respond. Consistent with the themes running throughout this thesis, Chapter 2 concludes that improving technical and allocative efficiency through better prioritisation and allocation of scarce resources is the most urgent, affordable and practical option for those countries. Chapter 2 then identifies seven specific policy interventions⁴¹ that all PICs could consider as an agenda for implementation in the short to medium term. (The specific policy interventions, and their sequencing for implementation, will then vary between each PIC, and over time, depending upon the nature of the health challenge each country faces and the financial resources available at the time).

Chapter 3 then asks what the health financing options are that are available to the Government of Samoa given its particular public health and health financing challenges. Chapter 3 also aims to address the specific research gap relating to health financing and the cost of treatment by identifying – for the first time - the cost to government of dialysis treatment in Samoa for (mainly) diabetes patients.

⁴¹ In essence, give priority to primary and secondary prevention; equity of access and outcomes; strengthening the evidence base for decision making; better alignment of development partners' investments with national priorities; preventive maintenance of existing investments; improved public financial management and preparing for second round effects of scaling up.

Chapter 4 also addresses the existing **specific research gap** of what is the cost to government of treating specific diseases⁴². In this case, the research identifies and publishes—again for the first time - what is the actual cost to the Government of Vanuatu of treating diabetes and hypertension with drugs, analysing how affordable and sustainable current arrangements are.

The country-specific studies of Samoa (Chapter 3) and Vanuatu (Chapter 4) provide a degree of geographical and ethnic-cultural balance given that Samoa is a Polynesian country and Vanuatu a Melanesian country.

Chapter 5 aims to fill the other specific research gap identified⁴³ relating to the implications for the health system in the Pacific if a growing percentage of the population is ageing. Given the links between ageing and NCDs (274, 275) Chapter 5 therefore builds on, and adds another perspective, to the challenge of preventing and treating NCDs in an affordable and sustainable manner in the Pacific: a theme that runs through the rest of this thesis.

Chapter 6 then addresses the fifth and final research question addressed in this thesis: what can Ministries of Health now do to improve their planning and resource allocation decisions? This chapter complements and rounds off the preceding chapters of this thesis. It does so by providing research and insight into how Ministries of Health can shift from presenting to Ministries of Finance and development partners poorly conceived and unprioritised budget proposals that are essentially just “shopping lists” and instead prepare genuine investment plans based on economic reasoning and principles. Chapter 6 has lessons for all low and middle-income countries, and uses investing in women’s, children’s and adolescent’s health to illustrate the principles, for reasons explained in section 4.6 below. Nevertheless, chapter 6 has particular applicability for PICs which already allocate a large share of public resources to the health sector and so need to demonstrate to Ministries of Finance that this is a sound investment if additional resources are to be forthcoming.

⁴² This is the third specific research gap. See Table 2 for details.

⁴³ Research question 4 as set out in Table 2.

Table 2 shows the relationship between the specific research questions and each corresponding chapter.

Table 1: Key socio-economic data on the 14 Pacific Island countries that are the subject of this thesis

Country	Estimated total population, mid year 2016. Source: Pacific Community (42).	Life Expectancy in years at birth (total, combining male and female life expectancy) Source: Pacific Community (42).	Human Development Index Ranking out of 188 countries in 2016 Source: United Nations (43).	GDP \$US current million in 2016. Source: World Bank World Development Indicators (41).	GDP per capita in current \$US in 2016. Source: World Bank World Development Indicators (41).	GDP per capita growth rate (%) in 2016 (latest year available).
Cook Islands	15,200	75.3	Not available	\$NZ 413 (preliminary) (44)	\$NZ 21,216 (preliminary) (44)	1.6 (preliminary) (44)
Federated States of Micronesia	104,600	70	Not available	329	3,143	0.54
Fiji	880,400	67.5	91	4,703	5,233	0.36
Kiribati	109,693 (in 2015)	62.2	137	181	1,587	0.62
Marshall Islands	55,000	71.8	Not available	194	3,665	1.7
Nauru	10,800	61.2	Not available	102	7,821	5.54
Niue	1,600	73.2	Not available	\$NZ 31,273 (45)	\$NZ 16,575 (46)	Not available
Palau	17,800	73	60	310	14,428	0.91
Papua New Guinea	8,151,300	54.2	154	20,213	2,500	0.3
Samoa	194,000	74.2	104	786	4,030	6.4
Solomon Islands	651,700	70.2	156	1,202	2,005	0.9
Tonga	100,600	70.6	101	401	3,748	2.65
Tuvalu	10,100	69.6		34	3,083	1.85
Vanuatu	289,700	71.1	134	773	2,860	1.7

Source: World Bank World Development Indicators (41) unless otherwise shown.

Note: Countries in bold are classified by the World Bank as upper middle income.* Palau is classified high income. The remaining countries are classified as lower middle income.

* The World Bank's latest advice is that "For the current 2018 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the World Bank Atlas method, of \$1,005 or less in 2016; lower middle-income economies are those with a GNI per capita between \$1,006 and \$3,955; upper middle-income economies are those with a GNI per capita between \$3,956 and \$12,235; high-income economies are those with a GNI per capita of \$12,236 or more. Further details are available at <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>

Table 2: Summary of the research questions and the thesis structure: Five specific research questions have corresponding research findings in published, peer reviewed journals or publications

Research question	Title of article where I was lead or sole author	Name of journal or publication.	Impact factor of the journal or publication	Chapter in this thesis
Question 1 What are the public expenditure options that Pacific Island countries now have to respond to the health challenges they face?	The challenges of health financing in five South Pacific countries.	<i>Asian-Pacific Economic Literature</i> , 28: 29-46. 2014	0.455 according to the Journal Citation Report 2016	Chapter 2
Question 2 What are the health financing options for Government of Samoa given (i) the challenge to stem, and then reverse, the rapid rise of NCDs and (ii) to put the country on a health-financing path that is effective, efficient, and financially affordable and sustainable.	Health Financing Options for Samoa: Challenges and Opportunities.	World Bank <i>Health Nutrition and Population Discussion Paper Series</i> . 2013 Report Number 89506*	See footnote [†]	Chapter 3
Question 3 What is the cost to government of treating a specific disease at the country level, and what are the public policy implications?	The costs and affordability of drug treatments for type 2 diabetes and hypertension in Vanuatu.	<i>Pacific Health Dialogue, the Journal of Community Health and Clinical Medicine for the Pacific Region.</i> , 19: 1. 2013	0.33 according to the Research Gate methodology. [‡]	Chapter 4

* This paper has been revised prior to inclusion in the thesis to incorporate additional and original research findings on the cost of dialysis treatment for (mainly) diabetes to the Government of Samoa. See the start of Chapter 3 for further discussion.

† The HNP Discussion Paper series is a high profile, high status, long running set of publications designed to encourage discussion and debate in the international community about current issues in health policy especially affecting low and middle-income countries. In July 2017 the World Bank website says this particular document where I was the sole author has been downloaded 559 times since January 2014.

‡ In consultation with my co-authors I specifically chose this journal as it is published by, and targets, the Pacific Basin Medical Officers Training Program and the Fiji School of Medicine.

Research question	Title of article where I was lead or sole author	Name of journal or publication.	Impact factor of the journal or publication	Chapter in this thesis
Question 4 What are the public policy implications for the health system in the Pacific if a growing percentage of the population is ageing, and largely living with ill health and chronic, expensive to treat diseases?	The implications of aging on the health systems of the Pacific Islands: challenges and opportunities.	<i>Health Systems & Reform</i> . 2017. Volume 3	See footnote [§]	Chapter 5
Question 5 What can Ministries of Health now do to improve their planning and resource allocation decisions?	How can health ministries present persuasive investment plans for women's, children's and adolescents' health?	<i>Bulletin of the World Health Organization</i> , 94: 468-74. (2016)	5.089 in 2014 according to the Web of Science ranking.	Chapter 6

Note: The layout of Chapters 4-6 is as per the journal in which the article was published. Chapter 2 is a Word document of the Journal article, as per the Journal's request. Chapter 3 is a revised version of the original Discussion Paper as published (the linking page to Chapter 3 provides details of the changes).

[§] *Health Systems & Reform* commenced in April 2015 so does not have an impact factor at this stage. However, the Editors in Chief are Professor Michael Reich from Harvard University and Dr Joseph Antoun of the University of Chicago.

Section 4: Research method.

To address the research questions identified in Table 2 I used a combination of literature searches, analysis of publicly available data bases, analysis of country specific expenditure data, and discussions with officials. These methods are the most appropriate research tools given the research questions that drive this thesis for the reasons outlined below in Sections 4:1-4:4.

I did not use Randomised Control Trials or economic modelling as those research techniques are not particularly suited to the gaps in the international literature that I have identified in Section 3 above. I did consider the possibility of comparing the public expenditure costs (and health outputs / outcomes) of the National Kidney Foundation dialysis centre in Samoa with dialysis treatment in neighbouring American Samoa, as the similar ethnic composition, diabetes prevalence, and culture could have generated some useful contrasts and insights. However, it was not practicable to do so in the time available.

4:1 Literature searches.

Each of the chapters involved extensive review of peer-reviewed and grey area publications. Each of the chapters in this thesis, including literature surveys for Chapter 1, provide a list of references directly cited as part of the research. Many other peer-reviewed and grey literature resources were consulted, but have not necessarily been cited. The specific search strategy varied for each chapter. Care was taken to use inclusive search terms. For example, when researching public health challenges in the Pacific I used a combination of search terms including “public health”, “health challenges”, “health sector”, “health”, “life expectancy”, “death”, “mortality and morbidity” in combination with terms such as “Pacific Islands”, “Oceania”, and individual country names. The fact that all search terms were in the English language is not a particular constraint or source of bias because all fourteen countries that are the subject of this thesis have English as the main language for academic literature and official reports.

The thesis draws on reports and documents published by the World Bank and the World Health Organization, particularly in Chapters 2 and 3. This is intentional. I have already

shown in Sections 3:2 and 3:3 that there is surprisingly limited published peer-reviewed material on health financing issues in the Pacific, despite the importance of those issues to the PICs themselves and the uniqueness of the situations in a global context. Making use of recent analysis by the World Bank and WHO in the academic articles I wrote therefore acts as a bridge in knowledge-sharing between reputable international organisations concerned with health financing and the broader international academic community.

The academic validity and reliability of the World Bank and WHO reports is acceptable in a thesis of this nature given that all such World Bank reports were subject to stringent peer review¹, and checking with the governments of the countries concerned, prior to publication. As a further test of the academic validity and reliability, the World Bank and WHO reports were also acceptable to the (unidentified) peer-reviewers of all the academic journals.

4:2 Analysis of publicly available on-line data bases.

I accessed publicly available on-line data bases containing relevant information on health systems, and public expenditure, from several international sources. These included, in alphabetical order: Demographic and Health Surveys; the IHME data base; the International Monetary Fund; Secretariat of the Pacific Community; the World Bank; and the World Health Organization. These sources are cited in each of Chapters 2 to 7. To update and extend the analysis in Chapter 1, I continued to interrogate and analyse publicly available data bases. I then generated all the Figures in this Chapter. At the country level I analysed publicly available national budget documents and reports including National Health Accounts and publicly available Annual Reports of Ministries of Health and / or Ministries of Finance and National Planning.

¹ Usually internal peer review, but occasionally involving senior country officials and / or development partners with direct experience of the country concerned. Internal peer review personnel from the World Bank were always senior professional grade officials, always involving at least one person from another geographical region of the World Bank to facilitate dispassionate and objective comments. Peer reviewers for articles I researched and wrote for the World Bank (for example Chapter 3) were drawn from the World Bank's team working on health financing issues in the Caribbean as that involved another perspective on health financing in small island states.

4:3 Analysis of country-specific expenditure.

I sought and used all the available Annual Reports of the National Kidney Dialysis centre in Apia to analyse the public expenditure implications of diabetes related kidney treatment in Samoa (chapter 3). I used the latest, current, financial and cost data available from the Central Medical Store in Vanuatu to generate the public expenditure implications of diabetes and hypertension prevention and control in Vanuatu (chapter 4). In both Vanuatu and Samoa I checked my cost estimates and research findings with the senior most officer in-country responsible for those programs.

There are factors that make the estimates of the cost of treating diabetes in Samoa (chapter 3) and diabetes and hypertension in Vanuatu (chapter 4) reliable. More specifically, the then current cost data for pharmaceuticals in Vanuatu came from the government's Central Medical Store. This is the sole source of purchasing and dispensing pharmaceuticals in the public sector so gives confidence that such data represents the true cost to the public health budget in Vanuatu. Similarly, the cost data for diabetes patients in Samoa was genuinely representative of the actual cost to government because I used the then current data from the National Kidney Foundation, the only public (or private) dialysis centre in Samoa.

I deliberately took the most conservative approach to estimating costs. For example, in Vanuatu we restricted the analysis to just pharmaceutical costs, deliberately excluding nurse costs and other overheads which were nevertheless also borne by government. To further ensure a conservative approach we also assumed that patients did not have co-morbidities or particular complications. These research approaches were explained in the published articles so that other researchers and policy makers could have confidence in the costing estimates that had hitherto never been published before.

I received formal approval from the Governments of Samoa and Vanuatu, and from the World Bank, to publish the underlying data and the findings (see Ethical Approval at Section 4:5 below).

4:4 Meetings with relevant officials.

I met a range of government officials from Ministries of Health as well as Ministries of Finance / Planning as part of the research for chapter 3 (Samoa) and chapter 4

(Vanuatu). I also met with senior officials from the Australian and New Zealand bilateral aid agencies as well as multilateral agencies working in the health sector of Samoa and Vanuatu including Secretariat for the Pacific (SPC), UNICEF, World Bank and WHO. All were aware in advance of the discussions that the research would be published, and that individual's comments would not be directly quoted or cited in a way that identified them.

The international meeting that triggered the research and writing of Chapter 6 involved views being expressed by senior representatives from 48 countries and organisations, including previous Ministers of Health and Heads of Departments of Health. At the outset of that international meeting I explained, as Chair, that all discussion was under the Chatham House rule². Chapter 6 therefore takes into account informed views by senior officials expressed at the international meeting but does not cite or identify any individual or institution.

4:5 Ethical approval.

Ethical approval for the research undertaken for this PhD was granted by Curtin University on 19 June 2014. I undertook the Research Integrity Training Course while at Curtin University in 2014.

Prior approval to undertake research and publish the findings was arranged by the World Bank with respect to chapter 3 (Samoa) and chapter 4 (Vanuatu) before I entered those countries. I gave the Government of Samoa, and the Government of Vanuatu, an opportunity, in writing, to comment on drafts of the articles that now appear as Chapter 3 and Chapter 4. No objection was raised. I obtained confirmation, in writing, from the World Bank Sector Manager for East Asia and the Pacific, as well as the World Bank Senior Health Economist, PNG and Pacific, that there was no objection to me using the analytical work and findings that I undertook as part of paid consultancy assignments of the World Bank in my Ph D or publishing the reports. This confirmation is available on request.

² Chatham House defines that rule as "When a meeting, or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed." Further details are available at <https://www.chathamhouse.org/chatham-house-rule>

I undertook and passed the Research Integrity Training course in 2014. I am aware of the Australian Code for the Responsible Conduct of Research, and ANU's policies on research integrity. I am a member of the Australasian Evaluation Society, the International Health Economics Association, and the Australian Institute of Management, and am bound by their codes of conduct including the requirement for fair, accurate, dispassionate, professional and unbiased treatment of evidence.

Annex 1: Life expectancy in the Pacific

Table Annex 1: Life expectancy is plateauing for males in 8 countries of the Pacific and for females in 7 countries of the Pacific

Age group	Males life expectancy increasing trend	Males life expectancy plateauing trend	Females life expectancy increasing trend	Females life expectancy plateauing trend
≥ 80 years				
75-79 years			Niue	
70-74 years	Cook Islands; Niue; Republic of the Marshall Islands; Samoa.		Cook Islands; Republic of the Marshall Islands; Federated States of Micronesia; Samoa; Solomon Islands; Vanuatu.	Tokelau; Tonga; Palau; Kiribati.
65-69 years	Solomon Islands. Vanuatu.	Federated States of Micronesia; Fiji; Palau; Tokelau; Tonga.	Tuvalu.	Fiji
60-64 years	Tuvalu.			
55-59 years		Kiribati		Nauru
< 50 years		Nauru; PNG		PNG

Source: Linhart et al (2014) (276).

References

1. World Health Organization. Human rights Geneva [Internet]. 2017. Available from: http://www.who.int/topics/human_rights/en/.
2. Mann J, Gruskin S, Grodin M, Annas G, editors. Health and human rights: a reader. New York: Routledge; 1999. 505 p.
3. Marks S, editor. Health and human rights: basic international documents. Cambridge, Massachusetts: Francois-Xavier Bagnoud Center for Health and Human Rights; 2006. 392 p.
4. Sen A. Human rights and capabilities. *J Human Dev.* 2005;6(2):151–66.
5. Sen A. Health in development. *Bull World Health Org.* 1999;77:619–23.
6. Anand S, Peter F, Sen A. Public health, ethics, and equity. Oxford: Oxford University Press on Demand; 2004. 329 p.
7. Bloom DE, Canning D, Jamison DT. Health, wealth, and welfare. *Finance Dev.* 2004;41:10–5.
8. Frenk J. Health and the economy. *Harvard Int Rev.* 2014;35(4):62.
9. International Monetary Fund. Health and development: why investing in health is critical for achieving economic development goals. Washington: International Monetary Fund; 2004. 64 p.
10. Sachs J. Macroeconomics and health: investing in health for economic development, report of the Commission on Macroeconomics and Health. Geneva: World Health Organisation; 2001. 200 p.
11. Spence M, Lewis M. Health and growth. Washington: World Bank; 2009. 189 p.
12. The World Bank. World development report: investing in health. Washington: Oxford University Press; 1993. 329 p.
13. Well DN. Accounting for the effect of health on economic growth. *Q J Econ.* 2007;122(3):1265–306.
14. Xu K, Evans DB, Carrin G, Aguilar-Rivera AM, Musgrove P, Evans T. Protecting households from catastrophic health spending. *Health Aff.* 2007;26(4):972–83.
15. Stenberg K, Axelson H, Sheehan P, Anderson I, Gülmezoglu AM, Temmerman M, et al. Advancing social and economic development by investing in women's and children's health: a new Global Investment Framework. *The Lancet.* 2014;383(9925):1333–54.
16. Hsiao WC, Heller PS. What should macroeconomists know about health care policy? International Monetary Fund working paper 07/13. January 2007. Available from: <https://www.imf.org/external/pubs/ft/wp/2007/wp0713.pdf>.
17. Bloom G, Standing H, Lloyd R. Markets, information asymmetry and health care: towards new social contracts. *Soc Sci Med.* 2008;66(10):2076–87.
18. Arrow KJ. Uncertainty and the welfare economics of medical care (American Economic Review, 1963). *J Health Polit Policy Law.* 2001;26(5):851–83.
19. Savedoff WD. Kenneth Arrow and the birth of health economics. *Bull World Health Org.* 2004;82(2):139–40.
20. McPake B, Normand C, Smith S. Health economics: an international perspective. New York: Routledge; 2013. 294 p.
21. Borges AP, Laranjeira E. Why and how did health economics appear? Who were the main authors? What is the role of ITCs in its development? *IGI Global*; 2015. p. 1382–98. Available from: <https://pdfs.semanticscholar.org/2441/4b8c9d0543e4d5a4b4842045e2c543fb02b7.pdf>.

22. Donaldson C, Gerard K, Jan S, Mitton C, Wiseman V. Economics of health care financing: the visible hand. New York: Palgrave Macmillan; 2004. 286 p.
23. Savedoff W. What should a country spend on health care? *Health Aff.* 2007;26(4):962–70.
24. Blue I, Harpham T. The World Bank world development report 1993: investing in health: reveals the burden of common mental disorders, but ignores its implications. *Br J Psychiatry.* 1994;165(1):9–12.
25. Fryatt R, Mills A. Taskforce on innovative international financing for health systems: showing the way forward. *Bull World Health Org.* 2010;88(6):476–7.
26. Jowett M, Brunal M, Flores G, Cylus J. Spending targets for health: no magic number. Geneva: World Health Organization; 2016. 32 p.
27. Stenberg K, Hanssen O, Edejer Tan Torres, Bertram M, Brindley C, Meshreky A, et al. Financing transformative health systems towards achievement of the health sustainable development goals: a model for projected resource needs in 67 low-income and middle-income countries. *Lancet Glob Health.* 2017;5(9): e875–e87.
28. Tandon A. Measuring policy effectiveness in health and education. Manila: Asian Development Bank; 2006. 75 p.
29. Institute for Health Metrics and Evaluation. Financing global health 2014: shifts in funding as the MDG era closes [Internet]. 2015. Available from: <http://www.healthdata.org/policy-report/financing-global-health-2014-shifts-funding-mdg-era-closes>.
30. Institute for Health Metrics and Evaluation. Financing global health 2016: development assistance, public and private health spending for the pursuit of universal health coverage. Seattle: IHMF; 2017. 140 p.
31. Halstead SB, Walsh JA, Warren KS. Good health at low cost. Proceedings of a conference held at the Bellagio Conference Center, Bellagio, Italy, 29 April – 3 May, 1985.
32. Balabanova D, McKee M, Mills A. Good health at low cost 25 years on. What makes a successful health system? 2011. *Reprod Health Matters.* 2012;20(39):212–14.
33. Balabanova D, Mills A, Conteh L, Akkazieva B, Banteyerga H, Dash U, et al. Good health at low cost 25 years on: lessons for the future of health systems strengthening. *The Lancet.* 2013;381(9883):2118–33.
34. Filmer D, Hammer J, Pritchett L. Weak links in the chain: a diagnosis of health policy in poor countries. *World Bank Res Obs.* 2000;15(2):199–224.
35. Filmer D, Pritchett L. The impact of public spending on health: does money matter? *Soc Sci Med.* 1999;49(10):1309–23.
36. World Health Organization. World health report: health systems financing: the path to universal coverage. Geneva: World Health Organization; 2010. 106 p.
37. Glasziou P, Straus S, Brownlee S, Trevena L, Dans L, Guyatt G, et al. Evidence for underuse of effective medical services around the world. *The Lancet.* 2017;390(10090):169–77.
38. Brownlee S, Chalkidou K, Doust J, Elshaug AG, Glasziou P, Heath I, et al. Evidence for overuse of medical services around the world. *The Lancet.* 2017;390(10090):156–68.
39. Kleinert S, Horton R. From universal health coverage to right care for health. *The Lancet.* 2017;390(10090):101–2.
40. Saini V, Garcia-Armesto S, Klemperer D, Paris V, Elshaug AG, Brownlee S, et al. Drivers of poor medical care. *The Lancet.* 2017;390(10090):178–90.
41. The World Bank. World development indicators [Internet]. Washington: 2017. Available from: <http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators>.

42. Secretariat of the Pacific Community. Updated mid year 2016 population estimates [Internet]. Noumea; 2016. Available from: <https://sdd.spc.int/en/stats-by-topic/population-statistics>.
43. United Nations Development Program. Human development index (HDI) [Internet]. New York: 2017. Available from: <http://hdr.undp.org/en/content/human-development-index-hdi>.
44. Management GotCIMoFaE. Selected key economic indicators [Internet]. Avarua: 2017. Available from: <http://www.mfem.gov.ck/statistics/economic-statistics/key-economic-indicators>.
45. Pacific Community (SPC). Economic statistics [Internet]. Noumea: 2017. Available from: [//sdd.spc.int/en/stats-by-topic/economic-statistics](https://sdd.spc.int/en/stats-by-topic/economic-statistics).
46. Government of Niue. Economic statistics [Internet]. Niue: 2017. Available from: http://niue.prism.spc.int/index.php?option=com_content&view=article&id=8&Itemid=253.
47. The World Bank. Pacific possible: long-term economic opportunities and challenges for Pacific Island countries. Washington: World Bank; 2017. 158 p.
48. The World Bank. World Bank country and lending groups for the 2018 fiscal year [Internet]. Washington: World Bank; 2017. Available from: <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519>.
49. The World Bank. Assessment of health financing options: Papua New Guinea. Washington: World Bank; 2014. 61 p.
50. Luker V. The double disease burden in Papua New Guinea. In Lewis MJ, MacPherson KL, editors. Health transitions and the double disease burden in Asia and the Pacific: histories of responses to non-communicable and communicable diseases. New York: Routledge; 2012. p. 252.
51. Hurney M. Short changed: the cost of child undernutrition in Papua New Guinea. DevPolicyBlog [Internet]. Aug 2017. Available from: <http://devpolicy.org/short-changed-cost-child-undernutrition-papua-new-guinea-20170824/>.
52. The World Bank. Below the glass floor: analytical review of expenditure by provincial administrations on rural health from health function grants and provincial internal revenue. Washington: World Bank; 2013. 69 p.
53. Howes S, Mako AA, Swan A, Walton G, Webster T, Wiltshire C. A lost decade? Service delivery and reforms in Papua New Guinea 2002–2012. Canberra: Development Policy Centre; 2014. 206 p.
54. Government of Papua New Guinea National Department of Health. Mid-term review and joint assessment of the national health plan 2011-2020. Port Moresby: Government of Papua New Guinea Department of Health; 2015.
55. Fox R, Howes S, Nema NA, Schroder M. 2017 PNG economic survey. Development policy centre discussion paper. Dec 2017;66. 35 p. Available at <http://dx.doi.org/10.2139/ssrn.3083256>.
56. Duncan R, editor. The political economy of economic reform in the Pacific: full report. Manila: Asian Development Bank; 2011. 336 p.
57. Duncan R, Codippily H, Duituturaga E, Bulatale R. Binding constraints to economic growth in the Pacific Islands: some comparative insights. Pacific Islands Brief. 2012 Apr;1:1–6. Available from: <https://www.eastwestcenter.org/system/tdf/private/pib001.pdf?file=1&type=node&id=33939>.
58. Haque TA, Knight D, Jayasuriya D. Capacity constraints and public financial management in small Pacific Island countries. Asia Pac Policy Stud. 2015;2(3):609–22.
59. Prasad B, Roy KC. Development problems and prospects in Pacific Islands states. New York: Nova Science Publishers Inc; 2007.
60. Asian Development Bank. A different kind of voyage: development and dependence in the Pacific Islands. Manila: The Office; 1998. 142 p.

61. Adelman M, Ivaschenko O. Hardship and vulnerability in the Pacific Island countries. Washington: World Bank Publications; 2014.
62. Corbett J. "Everybody knows everybody": practising politics in the Pacific Islands. *Democratization*. 2015;22(1):51–72.
63. Duncan R. An overview of the research on the political economy of reform in the Pacific. In Duncan R, editor. *The political economy of economic reform in the Pacific*. Manila: Asian Development Bank; 2011. p. 15.
64. Hughes T. What we've learned about development in the Pacific Island countries. *DevPolicyBlog* [Internet]. Dec 2013. Available from: <http://www.devpolicy.org/what-weve-learned-about-development-in-the-pacific-islands-a-report-by-practitioners-and-an-opportunity-for-further-interaction-20131209/>.
65. The World Bank. Well-being from work in Pacific Island countries [Internet]. Washington: 2014. Available from: <http://www.worldbank.org/en/news/feature/2014/05/09/well-being-from-work-in-the-pacific-island-countries>.
66. The World Bank. *The World Bank in small states*. [Internet]. 2017. Available from: <http://www.worldbank.org/en/country/smallstates/overview>.
67. Pacific Community (SPC). *Our members* [Internet]. Noumea: 2017. Available from: <http://www.spc.int/our-members/>.
68. World Health Organization. Vaccination is everyone's job. Protect your community [Internet]. Suva: 2015 Available from: <http://www.wpro.who.int/southpacific/mediacentre/releases/2015/immunization-2015/en/>.
69. Manuel Hetzel et al. Insecticide-treated nets and malaria prevalence, Papua New Guinea, 2008–2014. *Bull World Health Org*. 2017;95:695–705.
70. Pacific Islands Forum Secretariat. *Pacific regional MDGs tracking report 2015*. Suva: 2015.
71. United Nations Population Fund Pacific Sub-Regional Office. *Population and development profiles: Pacific Island countries*. Suva: United Nations Population Fund; 2014. 128 p.
72. United Nations Population Fund. Problems in "paradise": addressing reproductive health in the Pacific Islands [Internet]. Aug 2008. Available from: <https://www.unfpa.org/news/problems-paradise-addressing-reproductive-health-pacific-islands>
73. United Nations Population Fund. *Reproductive health status in the Pacific Island countries*. Suva: 2010.
74. Kennedy EC, Mackesy-Buckley S, Subramaniam S, Demmke A, Latu R, Robertson AS, et al. The case for investing in family planning in the Pacific: costs and benefits of reducing unmet need for contraception in Vanuatu and the Solomon Islands. *Reprod Health*. 2013;10(1):30.
75. UNICEF. *Looking back moving forward. A snapshot of UNICEF's work for Pacific Island children*. Suva: UNICEF Pacific; 2016. 63 p.
76. Cliffe SJ, Tabrizi S, Sullivan EA, Group PISGHS. Chlamydia in the Pacific region, the silent epidemic. *J Sex Transm Dis*. 2008;35(9):801–6.
77. Gilpin CM, Simpson G, Vincent S, O'Brien TP, Knight TA, Globan M, et al. Evidence of primary transmission of multidrug-resistant tuberculosis in the western province of Papua New Guinea. *Med J Aust*. 2008;188(3):148–52.
78. Simpson G, Coulter C, Weston J, Knight T, Carter R, Vincent S, et al. Resistance patterns of multidrug-resistant tuberculosis in western province, Papua New Guinea [notes from the field]. *Int J Tuberc Lung*. 2011;15(4):551–2.
79. Save The Children. *Short changed: the human and economic cost of child undernutrition in Papua New Guinea* [Internet]. 2017. Available from: <http://www.devpolicy.org/short-changed-cost-child-undernutrition-papua-new-guinea-20170824/>

80. World Health Organization. World health statistics 2017. Geneva: World Health Organisation; 2017. 116 p.
81. World Health Organization, UNICEF, Pacific Community (SPC), UN Habitat. Sanitation, drinking-water and health in Pacific Island countries: 2015 update and future outlook. Manila: WHO Regional Office for the Western Pacific; 2016. 86 p.
82. Taylor R. The double disease burden in Pacific Island states (except Papua New Guinea). In Lewis, MJ, MacPherson KL, editors. Health transitions and the double disease burden in Asia and the Pacific: histories of responses to non-communicable and communicable diseases. New York: Routledge; 2012. p. 279.
83. MacPherson KL. Health transitions and the double disease burden in Asian and Pacific countries. In Lewis, MJ, MacPherson KL, editors. Health transitions and the double disease burden in Asia and the Pacific: histories of responses to non-communicable and communicable diseases. New York: Routledge; 2012. p. 1.
84. World Health Organization. WHO multi-country cooperation strategy for the Pacific 2013–2017. Geneva: World Health Organization; 2012. 88 p.
85. Laloo R. Healthcare access and quality index based on mortality from causes amenable to personal health care in 195 countries and territories, 1990–2015: a novel analysis from the global burden of disease study 2015. *The Lancet*. 2017; 390(10091):231–66.
86. Hotchkiss J, World Health Organization. Health care on small islands: a review of the literature. Geneva: World Health Organization; 1994. 42 p.
87. Taylor R. The tyranny of size: challenges of health administration in Pacific Island states. *Asia Pacific Journal of Health Management*. 2016;11(3):65.
88. World Health Organization. Global health observatory data repository Geneva 2017 [Internet]. [cited 20 March 2017]. Available from: <http://apps.who.int/gho/data/node.home>.
89. Zimmet P, Dowse G, Finch C, Serjeantson S, King H. The epidemiology and natural history of NIDDM—lessons from the South Pacific. *Diabetes/Metabolism Research and Reviews*. 1990;6(2):91–124.
90. Lower T NB, Abel M, Ake M, Puloka V, Tiban K. Curbing the tide: non-communicable disease in the Pacific. *Pacific Health Dialog*. 2005;12(2):61–4.
91. Taylor R. Prevention and control of non-communicable diseases in Pacific Island nations. Prospects and constraints. *Med J Aust*. 1983;2(8):389–94.
92. Snowdon W, Raj A, Reeve E, Guerrero RL, Fesaitu J, Cateine K, et al. Processed foods available in the Pacific Islands. *Global Health*. 2013;9(1):9–53.
93. Snowdon W, Thow A. Trade policy and obesity prevention: challenges and innovation in the Pacific Islands. *Obes Rev*. 2013;14(S2):150–8.
94. Coyne T. Lifestyle diseases in Pacific communities. Noumea: Secretariat of the Pacific Community; 2000. 331 p.
95. Joffe B, Zimmet P. The thrifty genotype in type 2 diabetes: an unfinished symphony moving to its finale? *Endocrine*. 1998;9(2):139–41.
96. Gopalani SV, Samo M, Soaz S, David WJ, Mori S, Luther X-n, et al. Premature mortality from noncommunicable diseases in the federated states of Micronesia, 2003–2012. *Asia Pac J Public Health*. 2017;29(3):171–9.
97. Government of Tonga. Report of the Minister for Health for the year 2010. Nuku'alofa: Government of Tonga; 2010. 111 p.
98. Tukuitonga C. Diabetes remains major health challenge in the Pacific [Internet]. Canberra: 2016. Available from: <http://devpolicy.org/diabetes-remains-major-health-challenge-pacific-20161026/>.

99. World Health Organization. Noncommunicable diseases country profiles 2011. Geneva: World Health Organization; 2011. 209 p.
100. World Health Organization. Obesity and overweight [Internet]. Geneva: 2016. Available from: <http://www.who.int/mediacentre/factsheets/fs311/en/>.
101. Lin S, Tukana I, Linhart C, Morrell S, Taylor R, Vatucaawaqa P, et al. Diabetes and obesity trends in Fiji over 30 years. *J Diabetes*. 2016;8(4):533–43.
102. World Health Organization. Prevalence of obesity among adults aged 18 years and over, age standardised, both sexes, in 2016 [Internet]. Geneva: 2017. Available from: http://gamapserver.who.int/gho/interactive_charts/ncd/risk_factors/obesity/atlas.html.
103. Abarca-Gómez L, Abdeen ZA, Hamid ZA, Abu-Rmeileh NM, Acosta-Cazares B, Acuin C, et al. Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. *The Lancet*. 2017;390(10113):2627–42.
104. World Health Organization. Tobacco or health: a global status report. Geneva: World Health Organization; 1997. 495 p.
105. World Health Organization. Global status report on noncommunicable diseases 2010. Geneva: World Health Organization; 2011. 162 p.
106. Beaglehole R, Bonita R, Horton R, Adams C, Alleyne G, Asaria P, et al. Priority actions for the non-communicable disease crisis. *The Lancet*. 2011;377(9775):1438–47.
107. Savedoff W, Alwang A. The single best health policy in the world: tobacco taxes. CGD Policy Paper 062. June 2015. Available from: <https://www.cgdev.org/publication/single-best-health-policy-world-tobacco-taxes>.
108. Anderson I. Tobacco trouble: Asia and the Pacific in the spotlight. *DevPolicyBlog* [Internet]. June 2017. Available from: <http://devpolicy.org/tobacco-trouble-asia-pacific-spotlight-20170620/>.
109. Institute for Health Metrics and Evaluation. Health data: Papua New Guinea [Internet]. Washington: 2015. [cited 1 August 2017]. Available from: <http://www.healthdata.org/papua-new-guinea>.
110. Hou X, Xu X, Anderson I. Determinants of tobacco consumption in Papua New Guinea: challenges in changing behaviours. *Asia Pac Policy Stud*. 2015;2(2):255–65.
111. Kessaram T, McKenzie J, Girin N, Roth A, Vivili P, Williams G, et al. Noncommunicable diseases and risk factors in adult populations of several Pacific Islands: results from the WHO STEPwise approach to surveillance. *Aust NZ J Public Health*. 2015;39(4):336–43.
112. World Health Organization. NCD summary sheets: four diseases four risk factors [Internet]. Geneva: 2017. Available from: http://www.who.int/ncdnet/about/summary_sheets/en/.
113. Gottret P, Schieber G. Health financing revisited: a practitioner’s guide. Washington: World Bank; 2006. 340 p.
114. World Health Organization. What is universal health coverage? [Internet]. Geneva: 2017. Available from: http://www.who.int/health_financing/universal_coverage_definition/en/.
115. World Health Organization. Health financing for universal coverage document centre [Internet]. 2017. Available from: http://www.who.int/health_financing/documents/en/.
116. World Health Organization. Out-of-pocket payments, user fees and catastrophic expenditure [Internet]. Geneva: 2017 Available from: http://www.who.int/health_financing/topics/financial-protection/out-of-pocket-payments/en/.
117. Negin J, Irava W, Leon D, Malau C, C M. Sustainable health financing in the Pacific: tracking dependency and transparency. *Health Policy & Health Finance Knowledge Hub* [Internet]. Working Paper Number 22. Nov 2012. Available from:

https://www.burnet.edu.au/system/publication/file/2245/MORGAN_Sustainable_Health_Financing_in_the_Pacific.pdf.

118. Negin J, Robinson H. Funding for HIV and non-communicable diseases: implications for priority setting in the Pacific region. Health Policy & Health Finance Knowledge Hub [Internet]. Working Paper Number 1. Mar 2010. Available from: http://ni.unimelb.edu.au/__data/assets/pdf_file/0008/542447/WP1.pdf.
119. Negin J, Morgan C, Condon R. Regional health meetings in the Pacific and their impact on health governance. *Global Health*. 2012;5(2):1–18.
120. Rudge JW, Phuanakoonon S, Nema KH, Mounier-Jack S, Coker R. Critical interactions between global fund-supported programmes and health systems: a case study in Papua New Guinea. *Health Policy Plan*. 2010;25(suppl1):i48–i52.
121. Samb B, Evans T, Dybul M, Atun R, Moatti JP, Nistar S, et al. An assessment of interactions between global health initiatives and country health systems. *The Lancet*. 2009;373:2137–69.
122. Shiffman J. Has donor prioritization of HIV/AIDS displaced aid for other health issues? *Health Policy Plan*. 2007;23(2):95–100.
123. Spicer N, Walsh A. 10 best resources on ... the current effects of global health initiatives on country health systems. *Health Policy Plan*. 2012;27(3):265–9.
124. Sridhar D, Batniji R. Misfinancing global health: a case for transparency in disbursements and decision making. *The Lancet*. 2008;372(9644):1185–91.
125. Thiele R, Nunnenkamp P, Dreher A. Do donors target aid in line with the millennium development goals? A sector perspective of aid allocation. *Review of World Economics*. 2007;143(4):596–630.
126. Forum Communique. Forum leaders' statement on NCDs [Internet]. Auckland: 2011. Available from: <http://www.pireport.org/articles/2011/09/12/42nd-pacific-islands-forum-leaders-meeting-forum-communique%C3%A3%C2%83%C3%A2%C2%89>.
127. Joint Forum Economic and Pacific Health Ministers Meeting. Meeting outcomes statement, Honiara, Solomon Islands, Suva, Fiji 2014 [Internet]. Available from: <https://cooperation-regionale.gouv.nc/sites/default/files/atoms/files/outcomes.pdf>.
128. Australian National University. Crawford PhD: writing your thesis: introductions, conclusions, abstracts [Internet]. Canberra: 2017. Available from: <https://crawfordphd.wikispaces.com/Writing+your+thesis+introduction,+conclusion,+and+abstract> (site discontinued).
129. Berwick DM, Nolan TW, Whittington J. The triple aim: care, health, and cost. *Health Aff*. 2008;27(3):759–69.
130. Barros P. The black box of health care expenditure growth determinants. *Health Econ*. 1998;7(6):533–44.
131. Hart JT. The inverse care law. *The Lancet*. 1971;297(7696):405–12.
132. Angell M. The doctor as double agent. *Kennedy Inst Ethics J*. 1993;3(3):279–86.
133. Taskforce on Innovative International Financing for Health Systems. Constraints to scaling up and costs. London: 2009. Available from: https://www.uhc2030.org/fileadmin/.../Taskforce_report_EN.2009.pdf.
134. World Health Organization. The world health report 2000: health systems: improving performance. Geneva: World Health Organization; 2000. 215 p.
135. World Health Organisation. World health report 2008: primary health care: now more than ever. Geneva: World Health Organization; 2008. 119 p.
136. Mills A. The challenges of prioritization. *Health Syst Reform*. 2016;2(1):20.

137. Kapiriri L, Martin DK. Successful priority setting in low and middle income countries: a framework for evaluation. *Health Care Anal.* 2010;18(2):129–47.
138. Teerawattananon Y, Luz A, Kanchanachitra C, Tantivess S. Role of priority setting in implementing universal health coverage. *Br Med J.* 2016;352.
139. Evans JR, Hall KL, Warford J. Health care in the developing world: problems of scarcity and choice (Shattuck lecture). *Population.* 1981;61:74.
140. Mills A, Gilson L. *Health economics for developing countries: a survival kit.* London: Evaluation and Planning Centre for Health Care; 1988. 136 p.
141. Shelton JD. Twenty criteria to make the best of scarce health resources in developing countries. *Br Med J.* 2011;343.
142. Yazbeck A. *Idiot's guide to prioritization in the health sector.* World Bank Health Nutrition and Population Discussion Paper. Washington: World Bank; 2002. 37 p.
143. World Health Organization. WHO-CHOICE [Internet]. Available from: <http://www.who.int/choice/cost-effectiveness/en/>.
144. Lui X. *Policy tools for allocative efficiency of health services.* Geneva: World Health Organization; 2003. 154 p.
145. Tandon A, Fleisher L, Li R, Yap W. *Reprioritizing government expenditure on health: pushing an elephant up the stairs?* Washington: World Bank; 2014. 40 p.
146. World Health Organization. *Assessing fiscal space for health expansion in low-and-middle income countries: a review of the evidence.* Geneva: World Health Organization; 2016. 40 p.
147. Ottersen T, Norheim OF. Making fair choices on the path to universal health coverage. *Bull World Health Org.* 2014;92(6):389.
148. Pearson M. *Allocating public resources for health: developing pro-poor approaches.* London: DFID Health Systems Resource Centre; 2002. 39 p.
149. World Health Organization. *Threshold values for intervention cost-effectiveness by region.* 2016. Available from: <http://www.who.int/bulletin/volumes/94/12/15-164418/en/>
150. Belli PC, Bustreo F, Preker A. Investing in children's health: what are the economic benefits? *Bull World Health Org.* 2005;83(10):777–84.
151. Bhutta ZA, Das JK, Rizvi A, Gaffey MF, Walker N, Horton S, et al. Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? *The Lancet.* 2013;82(9890): 452–77.
152. McKinsey and company on behalf of the Roll Back Malaria Partnership. *We can't afford to wait: the business case for rapid scale-up of malaria control in Africa* [Internet]. 2008. Available from: <https://reliefweb.int/.../C8B37956A7265AC9492575B3001C9DE6-RBM-malariacontrol>.
153. Schwartländer B, Stover J, Hallett T, Atun R, Avila C, Gouws E, et al. Towards an improved investment approach for an effective response to HIV/AIDS. *The Lancet.* 2011;377(9782):2031–41.
154. Hauck K, Smith P, Goddard M. *The economics of priority setting for health care: a literature review.* Washington: World Bank; 2004. 92 p.
155. Preker AS, Langenbrunner JC. *Spending wisely: buying health services for the poor.* Washington: World Bank; 2005. 413 p.
156. Reich MR. Introduction to the PMAC 2016 special issue: “priority setting for universal health coverage”. *Health Syst Reform.* 2016;2(1):1–4.
157. Singh S, Darroch J, Ashford L. *Adding it up: the costs and benefits of investing in sexual and reproductive health 2014.* New York: The Guttmacher Institute; 2014. 58 p.
158. Jamison DT, Summers LH, Alleyne G, Arrow KJ, Berkley S, Binagwaho A, et al. *Global health 2035: a world converging within a generation.* *The Lancet.* 2013;382(9908):1898–955.

159. World Health Organization. *Everybody's business: strengthening health systems to improve health outcomes: WHO's framework for action*. Geneva: World Health Organisation; 2007. 56 p.
160. World Health Organization. *Monitoring the building blocks of health systems: a handbook of indicators and their measurement strategies*. Geneva: World Health Organization; 2010. 110 p.
161. De Savigny D, Adam T. *Systems thinking for health systems strengthening*. Geneva: World Health Organization; 2009. 112 p.
162. Mutale W, Bond V, Mwanamwenge MT, Mlewa S, Balabanova D, Spicer N, et al. Systems thinking in practice: the current status of the six WHO building blocks for health system strengthening in three BHOMA intervention districts of Zambia: a baseline qualitative study. *BMC Health Serv Res*. 2013;13(1):291.
163. Manyazewal T. Using the World Health Organization health system building blocks through survey of healthcare professionals to determine the performance of public healthcare facilities. *Arch Public Health*. 2017;75:50.
164. Doyal L, Pennel I. *The political economy of health*. Boston: South End Press; 1979. 360 p.
165. Filippi V, Ronsmans C, Campbell OM, Graham WJ, Mills A, Borghi J, et al. Maternal health in poor countries: the broader context and a call for action. *The Lancet*. 2006;368(9546):1535–41.
166. Grundy J, Hoban E, Allender S. The social and political construction of health-care systems—historical observations from selected countries in Asia. *Health Systems*. 2015;4(2): 124–37.
167. Harris D, Batley R, Wales J. *The technical is political: what does this mean in the health sector ?* Overseas Development Institute/University of Birmingham; 2013. 18 p. Available from: <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8888.pdf/>.
168. Kruk ME, Freedman LP, Anglin GA, Waldman RJ. Rebuilding health systems to improve health and promote statebuilding in post-conflict countries: A theoretical framework and research agenda. *Soc Sci Med*. 2010;70(1):89–97.
169. Moncrieffe J, Luttrell C. *An analytical framework for understanding the political economy of sectors and policy areas*. London: Overseas Development Institute; 2005. 37 p.
170. Ottersen OP, Dasgupta J, Blouin C, Buss P, Chongsuvivatwong V, Frenk J, et al. The political origins of health inequity: prospects for change. *The Lancet*. 2014;383(9917):630–67.
171. Anderson I, Hipgrave D. *The political economy of health, particularly reproductive, maternal, newborn and child health, in four countries of Asia: why political economy analysis is important for development effectiveness*. New York: UNICEF; 2015. 12 p.
172. Walt G, Gilson L. *Reforming the health sector in developing countries: the central role of policy analysis*. *Health Policy Plan*. 1994;9(4):353–70.
173. Adam T, Hsu J, De Savigny D, Lavis JN, Røttingen J-A, Bennett S. Evaluating health systems strengthening interventions in low-income and middle-income countries: are we asking the right questions? *Health Policy Plan*. 2012;27(suppl 4):iv9–iv19.
174. McPake B, Mills A. What can we learn from international comparisons of health systems and health system reform? *Bull World Health Org*. 2000;78(6):811–20.
175. Mills A. Health care systems in low-and middle-income countries. *New Eng J Med*. 2014;370(6):552–7.
176. Mills A, Rasheed F, Tollman S. *Strengthening health systems*. In: Jamison DT editor. *Disease control priorities in developing countries*. 2nd ed. New York: Oxford University Press; 2006. p. 87–102.
177. Newbrander W, Waldman R, Shepherd-Banigan M. Rebuilding and strengthening health systems and providing basic health services in fragile states. *Disasters*. 2011;35(4):639–60.

178. Heller P. The prospects of creating “fiscal space” for the health sector. *Health Policy Plan.* 2006;21(2):75–9.
179. Barroy H, Kutzin J, Tandon A, Kurowski C, Lie G, Borowitz M, et al. Assessing fiscal space for health in the SDG era: a different story. *Health Syst Reform.* 2018;4(1):4–7.
180. Tandon A, Cashin C. Assessing public expenditure on health from a fiscal space perspective. Washington: World Bank; 2010. 84 p.
181. Kutzin J, Witter S, Jowett M, D B. Developing a national health financing strategy: a reference guide. Geneva: World Health Organization; 2017. 37 p.
182. Jowett M, Kutzin J. Raising revenues for health in support of UHC: strategic issues for policy makers. Geneva: World Health Organization; 2015. 14 p.
183. Kutzin J. Health financing for universal coverage and health system performance: concepts and implications for policy. *Bull World Health Org.* 2013;91(8):602–11.
184. Kutzin J, Yip W, Cashin C. Alternative financing strategies for universal health coverage. *World Scientific Handbook of Global Health Economics and Public Policy.* 2016:267–309.
185. McIntyre D, Kutzin J. Health financing country diagnostic: a foundation for national strategy development. Geneva: World Health Organization; 2016. 58 p.
186. Reeves A, Gourtsoyannis Y, Basu S, McCoy D, McKee M, Stuckler D. Financing universal health coverage—effects of alternative tax structures on public health systems: cross-national modelling in 89 low-income and middle-income countries. *The Lancet.* 2015; 386(9990):274–80.
187. Rannan-Eliya R, Irava W, Saleem S. Assessment of social health insurance feasibility and desirability in Fiji. Suva: Ministry of Health and World Health Organization; 2013. 53 p.
188. Gilson L. The lessons of user fee experience in Africa. *Health Policy Plan.* 1997;12(3):273–85.
189. World Health Organization. From primary health care to universal coverage—the “affordable dream” [Internet]. Geneva: 2017. Available from: <http://www.who.int/publications/10-year-review/universal-coverage/en/index5.html>.
190. Akin JS, Birdsall N, De Ferranti DM. Financing health services in developing countries: an agenda for reform. Washington: World Bank Publications; 1987. 108 p.
191. Jamison DT, Mosley WH. Disease control priorities in developing countries: health policy responses to epidemiological change. *American J Public Health.* 1991;81(1):15–22.
192. Liu X, Hotchkiss DR, Bose S. The effectiveness of contracting-out primary health care services in developing countries: a review of the evidence. *Health Policy Plan.* 2007;23(1):1–13.
193. Webster J, Snowdon W, Moodie M, Viali S, Schultz J, Bell C, et al. Cost-effectiveness of reducing salt intake in the Pacific Islands: protocol for a before and after intervention study. *BMC Public Health.* 2014;14(1):107.
194. Shroufi A, Chowdhury R, Anchala R, Stevens S, Blanco P, Han T, et al. Cost effective interventions for the prevention of cardiovascular disease in low and middle income countries: a systematic review. *BMC Public Health.* 2013;13(1):285.
195. Van Doorslaer E, O'Donnell O, Rannan-Eliya RP, Somanathan A, Adhikari SR, Garg CC, et al. Catastrophic payments for health care in Asia. *Health Econ.* 2007;16(11):1159–84.
196. Xu K, Evans DB, Kawabata K, Zeramdini R, Klavus J, Murray CJ. Household catastrophic health expenditure: a multicountry analysis. *The Lancet.* 2003;362(9378):111–7.
197. World Health Organization. Monitoring sustainable development goals: financial protection [Internet]. Geneva: 2017. Available from: http://www.who.int/health_financing/topics/financial-protection/monitoring-sdg/en/.
198. World Health Organization. Financial protection in health calculation tool 2017 [Internet]. Available from: http://www.who.int/health_financing/tools/financial-protection/en/.

199. World Health Organization. Tracking universal health coverage: first global monitoring report. Geneva: WHO/World Bank Group report; 2015. 98 p.
200. Moreno-Serra R, Millett C, Smith PC. Towards improved measurement of financial protection in health. *PLoS Med.* 2011;8(9):e1001087.
201. Ruger JP. An alternative framework for analyzing financial protection in health. *PLoS Med.* 2012;9(8):e1001294.
202. Tangcharoensathien V, Pitayarangsarit S, Patcharanarumol W, Prakongsai P, Sumalee H, Tosanguan J, et al. Promoting universal financial protection: how the Thai universal coverage scheme was designed to ensure equity. *Health Res Policy Syst.* 2013;11(1):25.
203. World Health Organization. Spending on health: a global overview [Internet]. Geneva: 2012. Available from: <http://www.who.int/mediacentre/factsheets/fs319/en/>.
204. Mills A, Brugha R, Hanson K, McPake B. What can be done about the private health sector in low-income countries? *Bull World Health Org.* 2002;80(4):325–30.
205. Palmer N. The use of private-sector contracts for primary health care: theory, evidence and lessons for low-income and middle-income countries. *Bull World Health Org.* 2000;78(6):821–9.
206. Basu S, Andrews J, Kishore S, Panjabi R, Stuckler D. Comparative performance of private and public healthcare systems in low-and middle-income countries: a systematic review. *PLoS Med.* 2012;9(6):e1001244.
207. Bhattacharyya O, Khor S, McGahan A, Dunne D, Daar AS, Singer PA. Innovative health service delivery models in low and middle income countries—what can we learn from the private sector? *Health Res Policy Syst.* 2010;8(1):24.
208. Feachem N, Thomason J. Ailing public hospitals in PNG: a radical remedy from Africa? *DevPolicyBlog* [Internet]. Jul 2013. Available from: <http://devpolicy.org/ailing-public-hospitals-in-png-a-radical-remedy-from-africa-20130709/>.
209. Irava W, Prasad R. A case study on the public and private mix of health services in Fiji. Suva: Centre for Health Information, Policy and Systems Research, Fiji National University; 2012. 17 p.
210. Alleyne G, Binagwaho A, Haines A, Jahan S, Nugent R, Rojhani A, et al. Embedding non-communicable diseases in the post-2015 development agenda. *The Lancet.* 2013;381(9866):566–74.
211. Atun R, Jaffar S, Nishtar S, Knaul FM, Barreto ML, Nyirenda M, et al. Improving responsiveness of health systems to non-communicable diseases. *The Lancet.* 2013;381(9867):690–7.
212. Beaglehole R, Bonita R, Horton R, Ezzati M, Bhala N, Amuyunzu-Nyamongo M, et al. Measuring progress on NCDs: one goal and five targets. *The Lancet.* 2012;380(9850):1283–5.
213. Bonita R, Magnusson R, Bovet P, Zhao D, Malta DC, Geneau R, et al. Country actions to meet UN commitments on non-communicable diseases: a stepwise approach. *The Lancet.* 2013;381(9866):575–84.
214. Lim SS, Gaziano TA, Gakidou E, Reddy KS, Farzadfar F, Lozano R, et al. Prevention of cardiovascular disease in high-risk individuals in low-income and middle-income countries: health effects and costs. *The Lancet.* 2007;370(9604):2054–62.
215. Muka T, Imo D, Jaspers L, Colpani V, Chaker L, van der Lee SJ, et al. The global impact of non-communicable diseases on healthcare spending and national income: a systematic review. *Eur J Epidemiol.* 2015;30(4):251–77.
216. Narayan KMV, Zhang P, Williams D, Engelgau M, Imperatore G, Kanaya A, et al. How should developing countries manage diabetes? *CMAJ.* 2006;175(7):733.

217. Yach D, Hawkes C, Gould CL, Hofman KJ. The global burden of chronic diseases: overcoming impediments to prevention and control. *JAMA*. 2004;291(21):2616–22.
218. World Health Organization. Noncommunicable disease and poverty: the need for pro-poor strategies in the western Pacific region: a review. Manila: WHO Regional Office for the Western Pacific; 2007. 83 p.
219. Beaver C. Health care decision-making in the western Pacific region: diabetes and the care continuum in the Pacific Island countries. Manila: World Health Organization; 2003. 130 p.
220. Curtis M. The obesity epidemic in the Pacific Islands. *Journal of Development and Social Transformation*. 2004;1:37–45.
221. DiBello JR, McGarvey ST, Kraft P, Goldberg R, Campos H, Qusted C, et al. Dietary patterns are associated with metabolic syndrome in adult Samoans. *J Nutr*. 2009;139(10):1933–43.
222. Hawley NL, McGarvey ST. Obesity and diabetes in Pacific Islanders: the current burden and the need for urgent action. *Curr Diab Rep*. 2015;15(5):1.
223. Hoy D, Roth A, Viney K, Souares Y, Lopez AD. Findings and implications of the global burden of disease 2010 study for the Pacific Islands. *Prev Chronic Dis*. 2014;11:E75.
224. Snowdon W, Waqa G, Raj A, Kanungo A, H. R. Non-communicable diseases and health system responses in Fiji. Health Policy & Health Finance Knowledge Hub [Internet]. Working Paper Number 34. Aug 2013. Available from: http://ni.unimelb.edu.au/__data/assets/pdf_file/0010/852949/User_kelseym_WP_34.pdf.
225. SPC. NCD statistics for the Pacific Islands countries and territories: secretariat of the Pacific community. nd.
226. Martiniuk A, Jagilli R, Natuzzi E, Ilopitu JW, Oipata M, Christie A-M, et al. Cancer in the Solomon Islands. *Cancer Epidemiol*. 2017;50:176–83.
227. Snowdon W, Lawrence M, Schultz J, Vivili P, Swinburn B. Evidence-informed process to identify policies that will promote a healthy food environment in the Pacific Islands. *Public Health Nutr*. 2010;13(06):886–92.
228. Thow AM, Qusted C, Juventin L, Kun R, Khan AN, Swinburn B. Taxing soft drinks in the Pacific: implementation lessons for improving health. *Health Promot Int*. 2011;26(1):55–64.
229. Tuitama LT, Young-soo S, Clark H, Tukuitonga C, Beaglehole R. Acting on the Pacific crisis in non-communicable diseases. *The Lancet*. 2014;384(9957):1823–4.
230. Christoforou A, Snowdon W, Laesango N, Vatucawaqa S, Lamar D, Alam L, et al. Progress on salt reduction in the Pacific Islands: from strategies to action. *Heart, Lung Circ*. 2015;24(5):503–9.
231. Snowdon W, Malakellis M, Millar L, Swinburn B. Ability of body mass index and waist circumference to identify risk factors for non-communicable disease in the Pacific Islands. *Obes Res Clin Prac*. 2014;8(1):e35–e45.
232. Snowdon W. Challenges of noncommunicable diseases in the Pacific Islands: the need for evidence and data. *Asia Pac J Public Health*. 2011;23(1):110–1.
233. Mannava P, Abdullah A, James C, Dodd R, Annear PL. Health systems and noncommunicable diseases in the Asia-Pacific region: a review of the published literature. *Asia Pac J Public Health*. 2015;27(2):NP1–NP19.
234. Deeble J. Financing health care in South Pacific countries. Canberra: National Centre for Development Studies; 1990. 14 p.
235. Gani A. Health care financing and health outcomes in Pacific Island countries. *Health Policy Plan*. 2008;24(1):72–81.

236. World Health Organization. The Fiji Islands health system review. Geneva: World Health Organization; 2011. 140 p.
237. World Health Organization. The Kingdom of Tonga health system review. Manila: World Health Organization; 2015. 179 p.
238. Hodge N. Solomon Islands health system review. Geneva: World Health Organization; 2015. 124 p.
239. Anderson I. Health financing in Vanuatu: challenges and options. Health, Nutrition and Population Discussion Paper Series. 2014. Pages 1-90. Available from: <http://documents.worldbank.org/curated/en/802001468125696716/Health-financing-in-Vanuatu-challenges-and-options>
240. Anderson I. The economic costs of noncommunicable diseases in the Pacific Islands: a rapid stocktake of the situation in Samoa, Tonga, and Vanuatu. Washington: World Bank; 2013. 98 p. Available from: <http://documents.worldbank.org/curated/en/291471468063255184/The-economic-costs-of-non-communicable-diseases-in-the-Pacific-Islands-a-rapid-stock-take-of-the-situation-in-Samoa-Tonga-and-Vanuatu>.
241. The World Bank. Non communicable disease roadmap report. Washington: World Bank; 2014. 140 p. Available from: <http://www.worldbank.org/en/news/feature/2014/07/11/pacific-islands-non-communicable-disease-roadmap>.
242. Irava W. Universal health coverage assessment Republic of the Fiji Islands. Ottawa: Global Network for Health Equity; 2015. 10 p.
243. Falconer G, Buckley A, Colagiuri R. Counting the cost of type 2 diabetes in Vanuatu. *Diabetes Res Clin Pract.* 2010;87:92–7.
244. Zhang P, Zhang X, Brown J, Vistisen D, Sicree R, Shaw J, et al. Global healthcare expenditure on diabetes for 2010 and 2030. *Diabetes Res Clin Pract.* 2010;87(3):293–301.
245. Szmedra P, Sharma KL. Small island states in crisis: the economic impact of lifestyle diseases in the South Pacific. *J Third World Stud.* 2007;24(2):45.
246. Si Thu Win Tin. Putting the spotlight on diabetes in the Pacific: a regional perspective. Pacific NCD Summit, Tonga Secretariat of the Pacific Community; 2016. Summary available from: Pacific Community SPC. Summit report: Pacific NCD summit. Translating global and regional commitments into local action. Noumea: Pacific Community SPC; 2016. 41 p.
247. Ding D, Lawson KD, Kolbe-Alexander TL, Finkelstein EA, Katzmarzyk PT, van Mechelen W, et al. The economic burden of physical inactivity: a global analysis of major non-communicable diseases. *The Lancet.* 2016;388(10051):1311–24.
248. Anderson I. The economic burden of physical inactivity in the Asia-Pacific. *DevPolicyBlog* [Internet]. Aug 2016. Available from: <http://devpolicy.org/the-economic-burden-of-physical-inactivity-in-the-asia-pacific-region-20160810/>.
249. United Nations Fund for Population Activities. Population ageing in the Pacific Islands: a situation analysis. Suva: United Nations Population Fund; 2010. 60 p.
250. Hayes G. Population ageing in the Pacific Islands: emerging trends and future challenges. *Asia Pac Popul J.* 2009;24(2):79–113.
251. Morris I, Somanathan A. PNG health workforce crisis: a call to action. Washington: World Bank; 2011. 174 p.
252. Connell J. The migration of skilled health professionals: from the Pacific Islands to the world. *Asian Pac Migr J.* 2004;13(2):155–77.
253. Connell J. Pacific islands in the global economy: paradoxes of migration and culture. *Singapore J Trop Geog.* 2010;31(1):115–29.
254. Akachi Y, Atun R. Effect of investment in malaria control on child mortality in sub-Saharan Africa in 2002–2008. *PLoS One.* 2011;6(6):e21309.

255. Borghi J, Ensor T, Somanathan A, Lissner C, Mills A. Mobilising financial resources for maternal health. *The Lancet*. 2006;368(9545):1457–65.
256. Pathmanathan I, Liljestrand J. Investing in maternal health: learning from Malaysia and Sri Lanka. Washington: World Bank Publications; 2003. 182 p.
257. Cassels A, World Health Organization. A guide to sector-wide approaches for health development: concepts, issues and working arrangements. Geneva: World Health Organization; 1997. 60 p.
258. Walt G, Pavignani E, Gilson L, Buse K. Managing external resources in the health sector: are there lessons for SWAPs? *Health Policy Plan*. 1999;14(3):273–84.
259. Fisher CM. Resource allocation in the public sector: values, priorities, and markets in the management of public services. New York: Routledge; 1998. 294 p.
260. Negin J. Sector-wide approaches for health: a comparative study of experiences in Samoa and Solomon Islands. Melbourne: The Nossal Institute for Global Health; 2010.
261. Negin J, Hort K. Governance and management arrangements for health sector-wide approaches (SWAPs): examples from Africa, Asia and the Pacific. Melbourne: The Nossal Institute for Global Health; 2010. 13 p.
262. Negin J. Sector-wide approaches for health: an introduction to SWAPs and their implementation in the Pacific region. Health Policy & Health Finance Knowledge Hub [Internet]. Working Paper Number 2. Mar 2010. Available from: http://ni.unimelb.edu.au/__data/assets/pdf_file/0009/542448/wp2.pdf.
263. Negin J, Martiniuk A. Sector wide approaches for health in small island states: lessons learned from the Solomon Islands. *Glob Public Health*. 2012;7(2):137–48.
264. Shiffman J. Generating political priority for maternal mortality reduction in 5 developing countries. *Am J Public Health*. 2007;97(5):796–803.
265. Shiffman J, Smith S. Generation of political priority for global health initiatives: a framework and case study of maternal mortality. *The Lancet*. 2007;370(9595):1370–9.
266. Chowdhury AMR, Bhuiya A, Chowdhury ME, Rasheed S, Hussain Z, Chen LC. The Bangladesh paradox: exceptional health achievement despite economic poverty. *The Lancet*. 2013;382(9906):1734–45.
267. Harris D. Applied political economy analysis: a problem-driven framework. Overseas Development Institute; 2013. 10 p.
268. Fritz V, Kaiser K, Levy B. Problem-driven governance and political economy framework: good practice framework. Washington DC: World Bank; 2009. 84 p.
269. Gillespie S, Haddad L, Mannar V, Menon P, Nisbett N. The politics of reducing malnutrition: building commitment and accelerating progress. *The Lancet*. 2013;382(9891):552–69.
270. Hipgrave D, Alderman K, Anderson I, Jimenez Soto E. Health sector priority setting at meso-level in lower and middle income countries: lessons learned, available options, and suggested next steps. *Soc Sci Med*. 2014;102:190–200.
271. Howes S. A framework for understanding aid effectiveness: determinants, strategies and tradeoffs. *Asia Pac Policy Stud*. 2014;1(1): 58–72.
272. Anderson I, Hipgrave D. Philippines political economy assessment report: an assessment of the political economy factors that shape the prioritisation and allocation of resources for essential health services for women and children. New York: UNICEF; 2015. 31 p.
273. Anderson I, Hipgrave D. Political economy analysis: country report on Indonesia. A summary of the political economy factors that are shaping the way Indonesia uses evidence to plan, prioritise, and allocate resources in the health sector. New York: 2015. Available from: http://www.unicef.org/health/files/Indonesia_PEA_-_design_version_28May15.pdf.

274. Lloyd-Sherlock P, McKee M, Ebrahim S, Gorman M, Greengross S, Prince M, et al. Population ageing and health. *The Lancet*. 2012;379(9823):1295–6.
275. Suzman R, Beard JR, Boerma T, Chatterji S. Health in an ageing world—what do we know? *The Lancet*. 2015;385(9967):484–6.
276. Linhart C, Carter K, Taylor R, Rao C, Lopez A. Mortality trends in Pacific Island states. Sydney: School of Public Health and Community Medicine, University of New South Wales; 2014. 89 p.

Introductory note: Relationship between Chapter 1 and Chapter 2

Chapter 2 researches the policy responses available to five Pacific Island countries: Fiji, Samoa, Solomon Islands, Tonga, and Vanuatu. Chapter 2 addresses the general research gap identified in Chapter 1: that existing literature on priority setting and resource allocation in middle-income countries does not adequately capture the distinctive public health and public financing characteristics of the Pacific. Chapter 2 identifies a common theme among all five Pacific Island countries: improved prioritisation and resource allocation is the most strategic available policy option to respond to the public health and public financing challenges they face.

For copyright reasons, Chapter 2 is the pre-publication version of the article, accepted by the journal *Asia Pacific Economic Literature (APEL)* for publication. The attached chapter was then published in May 2014 in *Asia Pacific Economic Literature* Volume 28 Issue number 1, pages 29-46 with some copyediting changes to suit the journal format (but which did not alter the substance of the article). The published article is available from the *Asia Pacific Economic Literature* journal here:

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Chapter 2: The challenges of health financing in five South Pacific countries

Ian Anderson, Susan Ivatts, Aparnaa Somanathan, and Benjamin Rolfe¹

Abstract

Health is a central development issue. Arrangements for health financing also have important implications for national and household budgets and broader macroeconomic conditions. The latest evidence from Fiji, Samoa, Solomon Islands, Tonga and Vanuatu shows these five South Pacific countries have substantial – and changing – health challenges, especially given rapid population growth and the rise of noncommunicable diseases. Yet each country faces important constraints to expanding public expenditure on health. Several options for obtaining better health outcomes for health expenditure are canvassed: improving technical and allocative efficiency is the most urgent, affordable and practical option. An agenda for action is provided.

Key words: health financing; fiscal space; South Pacific; Fiji; Samoa; Solomon Islands; Tonga; Vanuatu.

1. Background and context

Health is a central issue in development. Healthier people are potentially more capable of learning at school; being productive at work; living longer and therefore changing

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incentives and opportunities for accumulating savings at both the household and macroeconomic level; and reducing expenditure on often otherwise preventable health expenditure that could have been spent on other, perhaps more productive, alternative uses (Spence M and Lewis M 2009) (Giullem Lopez-Casasnovas 2005) (IMF 2004) (Commission on Macroeconomics and Health 2001) (Sen 1999). Health services, including family planning, contribute to strategic and beneficial changes in the population size and structure of society, potentially leading to a 'demographic dividend'. Estimates suggest that between 30% and 50% of Asia's economic growth between 1965 and 1990 can be attributed to favourable demographic changes, including reductions in total fertility rate, and infant and child mortality (Bloom DE and Williamson JG 1998). Health affects development at the household level as well. The poor tend to have higher health burdens due to environmental and other social determinants; have more children; are less likely to seek medical care when needed; and can be tipped below the poverty line as a result of out of pocket payments. There is emerging evidence that maternal health and birthweight are also associated with subsequent incidence of obesity and chronic non-communicable diseases (NCDs) including diabetes and high blood pressure in later life (Adair, Fall et al. 2013), (Bhutta 2013), (Barker D 1990).

The level, sourcing, and nature of health expenditure also have important financial, budgetary, and macroeconomic implications. How much a country should spend on health care is a vexed question (Baltussen 2006, Savedoff W 2007). However, population growth, more people living to old age, new technologies, and rising incomes combine to generally increase expenditure pressures on health over time. Demand for health services grows at an average rate 20 % higher than overall economic growth rates in middle income countries (Langenbrunner J and Somanathan A 2011). Wagner's Law suggests that as countries get richer they do not only spend more in absolute terms on health (and education): they also spend a higher proportion of their resources on those sectors (Tandon A 2006). Many of the determinants of health outcomes - including genetics, lifestyle factors, female empowerment, education levels, and poverty - lie outside the formal health sector but many of the costs of ill health are then ultimately borne within the government financed health sector or in some countries by households.

This paper shows that achieving adequate – but sustainable – health financing is a particular challenge in the Pacific. This is partly because population growth and the rise of NCDs are putting increasing demands on the health system (Section Two below). It is also a challenge because Pacific governments already shoulder most of the health expenditure and have limited options to spend more (Section Three below). This paper draws on several recent analytical reports that highlight the challenges and options of sustainable health financing in five countries of the South Pacific: Fiji (WHO 2011, Rannan-Eliya R 2013), Samoa (World Bank 2013), Solomon Islands (World Bank 2010) (World Bank 2011), Tonga (World Bank 2012), and Vanuatu (World Bank 2013) (World Bank 2012). Section Four of this paper identifies options to respond to these challenges based on the recent reports. Section Five provides a recommended agenda for action.

2. The health challenges in the five countries of the South Pacific.

Despite some important differences, there are some features common to all five countries. All are classified as lower-middle income,² with a combined population of 1.95 million in 2011. As seen in Table 1 below, all have relatively small populations, small Gross National Incomes (GNIs), and per capita incomes. All five countries have achieved some substantial health gains. Infant mortality has been falling (World Bank 2011). Life expectancy has generally been increasing, although life expectancy in Fiji and Tonga has recently fallen due to the rise of NCDs (World Bank 2012) (World Bank 2011). There is generally a negligible difference in access to health care or health outcomes based on gender, but gender-based violence is a serious issue in many countries (AusAID 2009, Moriarty A 2012). The widespread use of government financed, usually ‘free’, health services means there is a high level of financial protection against out of pocket, ‘catastrophic’ health expenditure that otherwise impoverishes individuals or households. However poor quality health services leave little protection when ill health subsequently affects income generation and livelihoods.

² Lower middle-income countries have a Gross National Income per capita of \$ 1026 - \$ 4035 in 2011 using the World Bank Atlas method.

Table 1: Key macroeconomic and health indicators

	Fiji	Samoa	Solomon Islands	Tonga	Vanuatu
Population size (2012)	874,742	188,889	549,598	104,941	247,262
Basic needs poverty (%)*	35	27	23	23	13
GNI per capita, Atlas method \$US (2012)	4,200	3,220	1,130	4,240	3,080
Life expectancy, total (2011)	69	73	68	72	71
Infant mortality rate per 1000 births (2011)	14	16	18	13	11
Maternal mortality rate, per 100,000 live births*	23 (2010)	46 (2006)	100 (2008)	37 (2010)	86 (2007)
Health workers per 1,000 population**	No data	21.6***	No data	7.52	5.47

Source: World Development Indicators, *Pacific MDG Tracking Report 2012, ** Health Service Delivery Profiles 2012 Samoa HRD Project: Analysis of HRD Priorities Stewart Forsyth and Tyrone Laurenson July 2013.

Demographic pressures

Demographic pressures are putting additional demands on health financing in all five countries. As shown in Figure 1, all five countries except Fiji have a Total Fertility Rate (TFR) higher than the global average for other lower middle-income countries of 2.9 births per woman. A high TFR places significant ongoing demands on maternal, newborn and child health services (as well as expenditure on public education) in the short term, and increased health care needs for populations growing old in the long term. A high TFR is also associated with a rapidly growing total population although this tends to be offset by out-migration in the Polynesian countries of Samoa and Tonga.

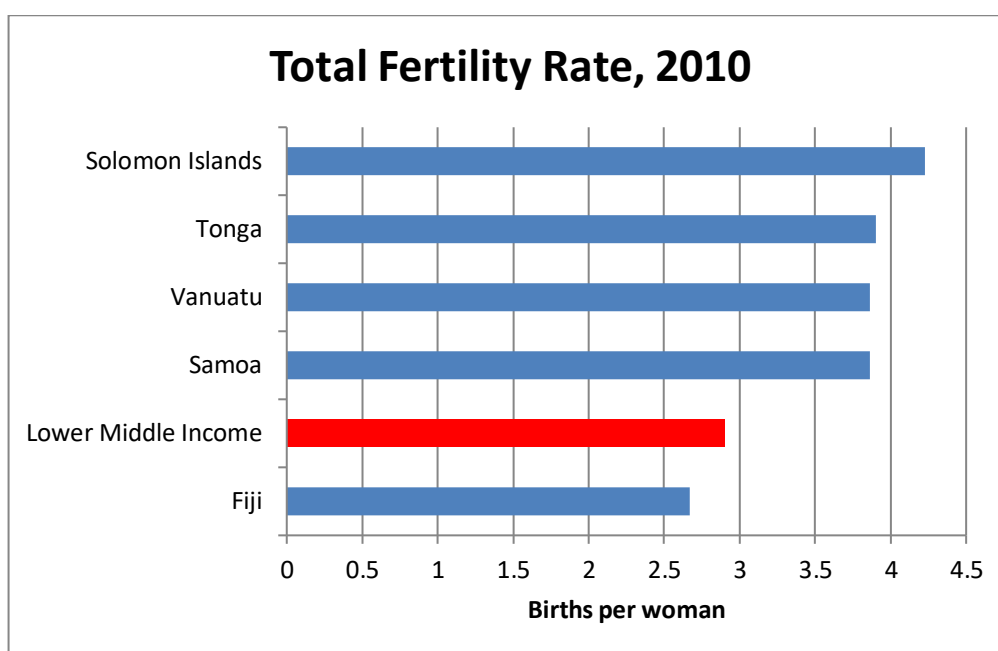


Figure 1: Total fertility rate, 2010

Source: WHO (WHO 2011).

Population growth rates - past and present - influence the structure, as well as the total size, of the population and have economic consequences. But the tangible benefits and 'demographic dividend' of having a large share of working age population only arise if men and women can find productive employment, earn incomes, and pay taxes. This is by no means assured in the five countries where formal sector employment opportunities are limited (World Bank 2013). Fiji, Solomon Islands and Vanuatu are "off track" to achieve Millennium Development Goal 1b ('to achieve full and productive employment and decent work for all, including women and young people') while Samoa and Tonga are judged to have 'mixed progress' (Pacific Islands Forum Secretariat 2012).

Communicable diseases, maternal and newborn health, and nutrition

There is an unfinished agenda of communicable, maternal, newborn, and nutritional challenges. Figure 2 shows that communicable, maternal, perinatal and nutritional challenges are still the cause of nearly one fifth (18%) of all deaths in Fiji, more than 20% in Samoa, Tonga and Vanuatu, and over one third (35%) deaths in Solomon Islands. The Solomon Islands has one of the highest incidence of malaria in the world outside of Africa (World Bank 2010). Under-nutrition is a challenge: 20 % of children less than five years of age in Vanuatu were moderately stunted (low height for age), 16 % moderately

underweight (low weight for age) and 6.5 % moderately wasted (low weight for height) (UNICEF 2012, World Bank 2013). Measles vaccines coverage in Vanuatu – an indication of the overall effectiveness of service delivery in a health system - was estimated at just 37.2% for children in 2009 (UNICEF 2012) although subsequent catch up campaigns improved vaccination coverage (Tyson S 2012) (Government of Vanuatu 2013). Latest analysis finds that rates of progress in reducing maternal, infant and child deaths fall ‘far short’ of achieving MDG targets in Fiji (WHO 2011) with another report concluding that Fiji’s maternal mortality ratio of 26/100,000 live births is ‘off track’ for achieving MDG 5 (WHO 2012). Sexually transmitted infections are relatively high in many of the countries. For example, possibly 40.7 % of 300 ante-natal women under 25 years of age had chlamydia in Samoa (World Bank 2013). There is also a need for expanded reproductive health services in most countries of the South Pacific. The Contraceptive Prevalence Rate (CPR) for all five countries ranges from 27% in Tonga to 38% in Vanuatu: still well below the average CPR of 62% for developing countries globally. (Pacific Islands Forum Secretariat 2012).

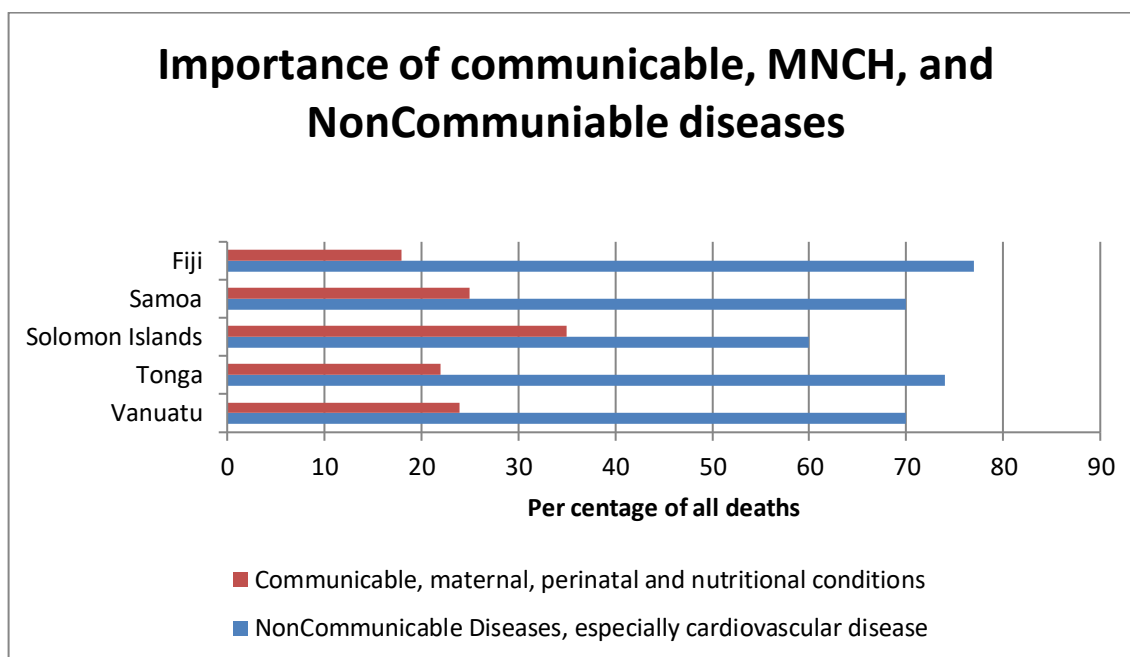


Figure 2: Importance of communicable, MNCH, and noncommunicable diseases

Source: WHO (WHO 2011).

Non-communicable diseases

All five countries also face a growing challenge of NCDs especially cardiovascular disease, cancer and diabetes. Figure 2 shows that NCDs now account for more than three quarters (77%) of all deaths in Fiji and well over half (60%) of all deaths even in the Solomon Islands.³ Although cause of death data are patchy, cardiovascular disease is considered to be the major cause of death in all five countries (WHO 2011). Importantly, many of these NCD related deaths are premature (before age 60). Figure 3 shows that men die prematurely from NCDs in all five countries in the Pacific at rates higher than the average for low income⁴ countries globally, with Fiji's rate more than double that of the global average.⁵ Figure 4 shows more than one third of female NCD related deaths in Vanuatu, Solomon Islands, and Fiji are premature, at or higher than the global average for low income countries. Life expectancy has decreased in Fiji (WHO 2011) and Tonga (World Bank 2012) particularly as a result of NCDs.

³ Injuries across the South Pacific tend to be a small percentage of deaths (around 5%) but an important source of morbidity including violence to women.

⁴ Estimates are not available for lower middle-income countries.

⁵ 45.6% of all NCD male deaths in Fiji occur below age 60, compared to 22% for low income countries globally.

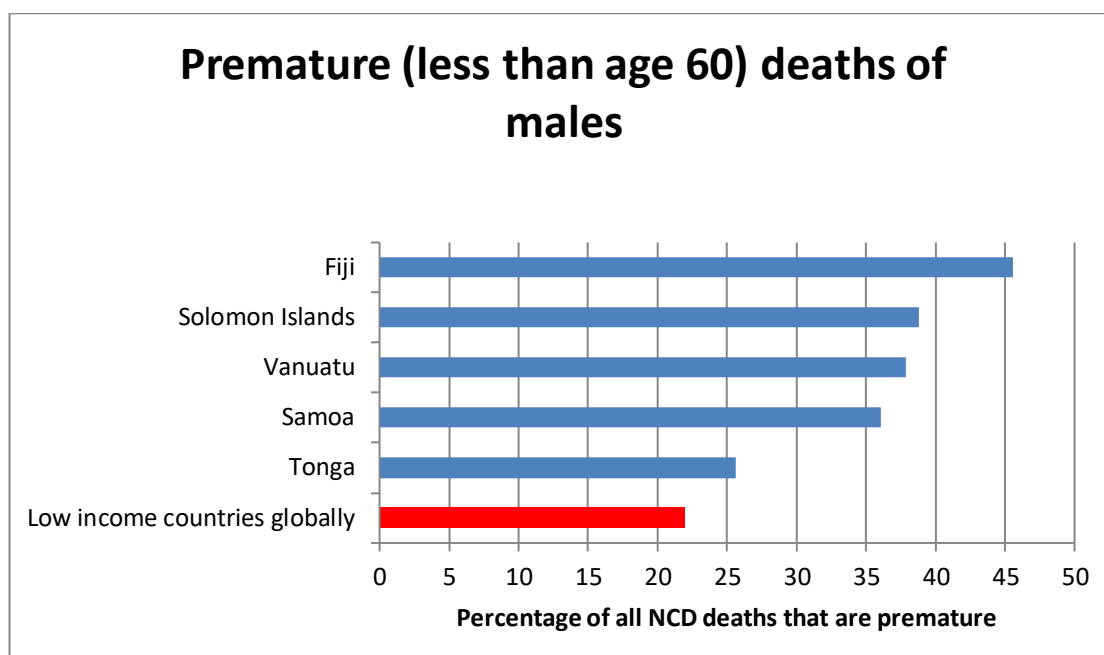


Figure 3: Premature (less than age 60) deaths of males

Source: WHO (WHO 2011).

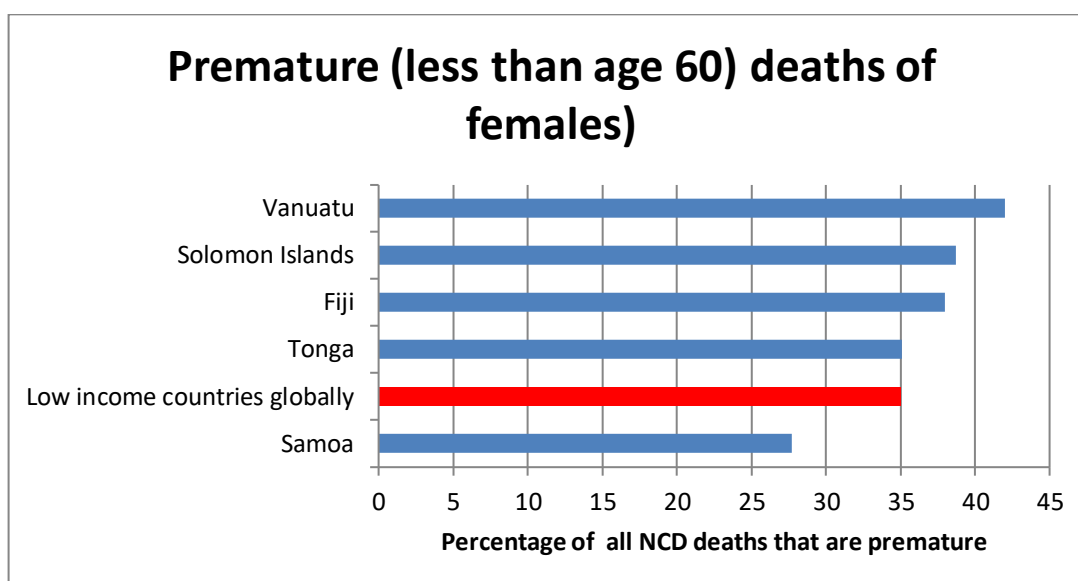


Figure 4: Premature (less than age 60) deaths of females

Source: WHO (WHO 2011).

NCDs are also an important determinant of morbidity, including strokes, and diabetic related amputations and blindness. Diabetes is now the leading cause of morbidity in Fiji, and some estimates suggest that Fiji now has the third highest prevalence of diabetes in the world (WHO 2011). In Vanuatu, diabetes vascular disease is the most common reason for admittance to surgery wards, representing around half of all

patients admitted at Vanuatu's Northern District Hospital and one quarter at Vila Central Hospital. Diabetes and stroke are now estimated to be the leading two causes of premature death in the Solomon Islands in 2010, displacing lower respiratory infections and diarrheal diseases: the two leading causes in 1990 (IHME 2013).

Importantly, all five countries have widespread risk factors that are feeding a future pipeline of increased incidence of NCDs unless very strong and effective promotive and preventive measures are taken. The recent WHO NCD STEPS survey in Vanuatu found that more than one fifth (22 %) of adults of working age (25 – 64 years) have three or more risk factors for acquiring any NCD. Only around 10% of adult men and 5% of adult women did not demonstrate signs of any of the major NCD risk factors (World Bank 2013). In Samoa, WHO confirm that NCDs 'including obesity, diabetes, heart disease, high blood pressure, stroke and cancer, are a top health priority, with high and increasing prevalence rates: the obesity rate is currently 57.0%, the diabetes rate is 23.1% and high blood pressure rate is 21.4%' (World Bank 2013). The average weight for a woman in Tonga increased by 21.1 kg over 30 years to reach 95 kg, and increased by 17.4 kg to reach 95.7 kg for men: overweight being a risk factor for various NCDs including heart disease and diabetes (World Bank 2012). Recent Global School Based Student Health Surveys also identify important risk factors for NCDs among 13- 15 year olds in all five South Pacific countries. Nearly one quarter of boys in Tonga and more than one fifth of girls in Samoa are obese;⁶ at least one third of children drank carbonated soft drinks one or more times a day; and around 42% of 13-15 year old boys in Samoa smoked cigarettes on one or more days during the past 30 days.

3. Are health financing systems in the five countries well placed to respond to these health challenges?

Health expenditure is relatively high in the five countries of the Pacific on several measures. As seen in Table 2, total health expenditure per capita is significantly and consistently higher than the average for other lower middle-income countries, in Samoa's case more than three times higher than other lower middle-income countries spend globally. Table 2 also shows that total health expenditure is dominated by

⁶ > + 2 Standard Deviations from median for Body Mass Index for age and sex.

government public expenditure. More specifically, over 80% of total health expenditure in Samoa, Solomon Islands, Tonga and Vanuatu comes from government, often supported by aid donors, more than double the average 36.4% share in lower middle-income countries globally. And if government looms large in total health expenditure in these five Pacific countries, health also looms large in their respective government budgets. One quarter of the total government budget, including external funds, in Samoa and Solomon Islands is now devoted to the health sector, more than three times the level of lower middle-income countries globally.

Table 2: Health expenditure characteristics in 2011

Health expenditure characteristics	Fiji	Samoa	Solomon Islands	Tonga	Vanuatu	Lower Middle Income Countries average globally
Health expenditure per capita (current US\$)	167	248	133	219	133	79
Health expenditure per capita PPP (constant 2005 International dollars)	183	321	259	245	190	160
Public health expenditure as a % of total health expenditure	68	88	94.7	83.5	87	36.4
Public health expenditure as a % of total government expenditure	9	25	25.4	15.7	15	7.6
Total Health Expenditure as % of GDP	3.8	7.0	8.8	5.25	4.1	4.2

Source: (World Bank 2014).

The relatively large role of public health expenditure in the five countries therefore raises questions about the sustainability of current financing arrangements. This is especially true in the face of current demographic and epidemiological trends, and

limited prospects for economic growth. This is a consistent theme in the recent analysis of all five countries.

For example, the latest analytical work on Fiji noted that total hospital admissions increased by 19% in the five years to 2008, compared to a 4.5% population increase over the same period. The average length of stay in hospitals also increased, from 4.5 to 6.3 days, putting further pressure on health budgets (WHO 2011). Another recent report finds a failure to achieve productivity improvements in Fiji Ministry of Health since the mid-1980s, particularly in terms of hospital inpatient turnover and average length of stay (Rannan-Eliya R 2013).

The rise in chronic NCDs is also putting significant – and sometimes unsustainable – additional pressure on health budgets: one patient requiring insulin absorbs the equivalent notional drug allocation of 76.4 other citizens in Vanuatu. Only 1.31% of the total population could be treated with insulin before the total government pharmaceutical and medical supplies budget was used up (World Bank 2013). The estimated average total cost of dialysis for patients with diabetes related kidney failure to the Government of Samoa was \$ 38,686 per patient per year in 2010/11. While less than the previous approach of sending patients to New Zealand, the cost to Government is still more than twelve times the Gross National Income of Samoa. The cost-effectiveness of dialysis is further undermined by the fact that almost two thirds have died two years after commencing treatment.

Overseas medical treatment also imposes large – and growing – costs on public health systems. The Samoa Overseas Medical Visits Treatment Scheme (OVT) program, which exists to send usually complex NCD cases to Australia or New Zealand for treatment, absorbed 15 % of total public health expenditure in 2009/10, to the private benefit of less than 0.1 % of the nation's population. OVT absorbed 11 % of total public health funding in 2008/9, but this had grown to 15 % by 2009/10. Expenditure on OVT almost matched the entire public expenditure on outpatient curative care in 2006/7. Since that study was undertaken, expenditure on OVT has continued to grow. Total expenditure on OVT has increased 30 % in nominal terms since 2007/8. Expenditure on the OVT scheme is now 30 % higher than the total personnel costs at the main hospital in Apia and associated allied services. Public expenditure on OVT (\$T10.5 million in 2011/12) is

larger than the total budget of at least ten other important government departments or authorities, including the Ministry of Women, Community, and Social Development; Ministry of Revenue; the Ministry of the Prime Minister; and the Legislative Assembly (World Bank 2013).

In summary, faced with growing populations and changing disease profiles, Governments cannot continue with a ‘business as usual’ approach to health financing. Governments need to increase their capacity for health expenditure (‘fiscal space’⁷) but in ways that are economically and administratively efficient; politically and financially sustainable; and retain the best features of existing health financing arrangements. The following section summarises analysis from the recent reports about the options.

4. Options for health financing in the face of increased pressures

Sustained economic growth as a source of increased government revenues

In principle, sustained economic growth is the most obvious and fundamental option for generating increased government revenues to meet rising pressures for health care. However, history shows (Figure 5) that all five countries have been subject to volatile changes in GDP growth. This reflects the vulnerability of the Pacific Island countries to a variety of external and internal economic shocks including cyclones and tsunamis, political instability, and global economic downturns. As a result, growth in GDP per capita has also been volatile (Figure 6). Importantly, trends in real (taking into account inflation) GDP per capita over the longer term have also been quite volatile (Figure 7). Figure 7 shows that real GDP per capita is lower in the Solomon Islands than it was in 1995; and that real GDP per capita has been generally flat in Fiji, Samoa, and Tonga from around 2005.

⁷ ‘Fiscal space’ has been defined by Heller as ‘the capacity of government to provide additional budgetary resources for a desired purpose without any prejudice to the sustainability of its financial position’. Tandon and Cashin further state that ‘fiscal space exists when a government has budgetary room to increase spending and can do so without impairing fiscal solvency, i.e. the government’s present and future ability to cover its recurrent expenditures and service its debt’.

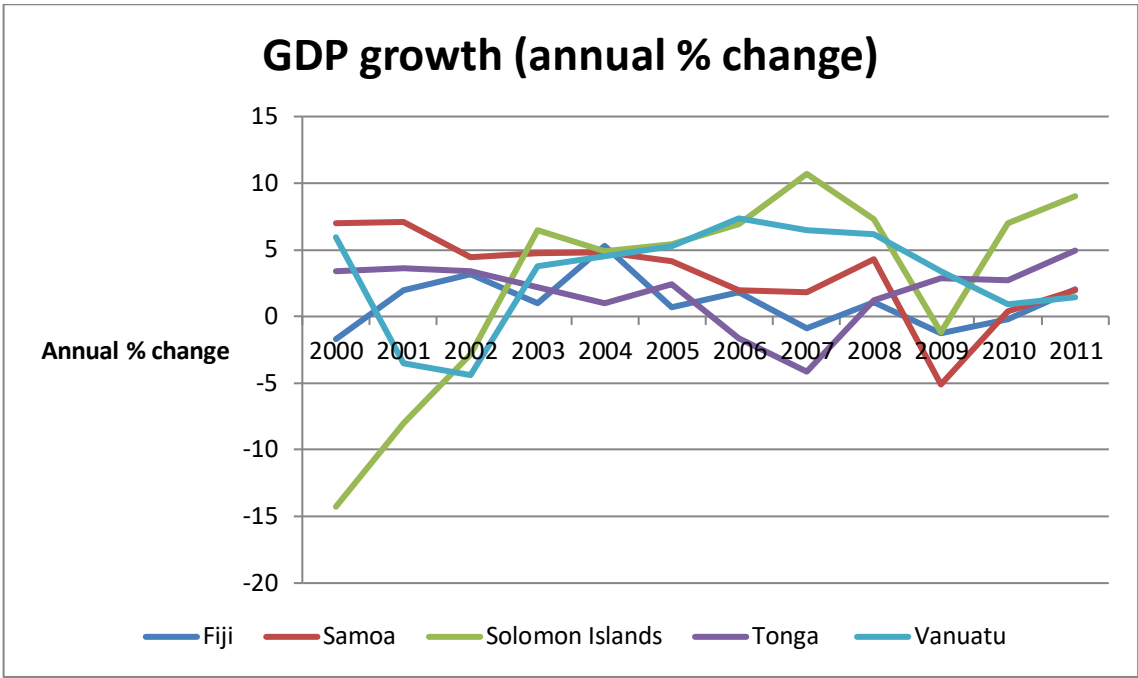


Figure 5: GDP growth (annual % change)

Source: World Bank (World Bank 2013).

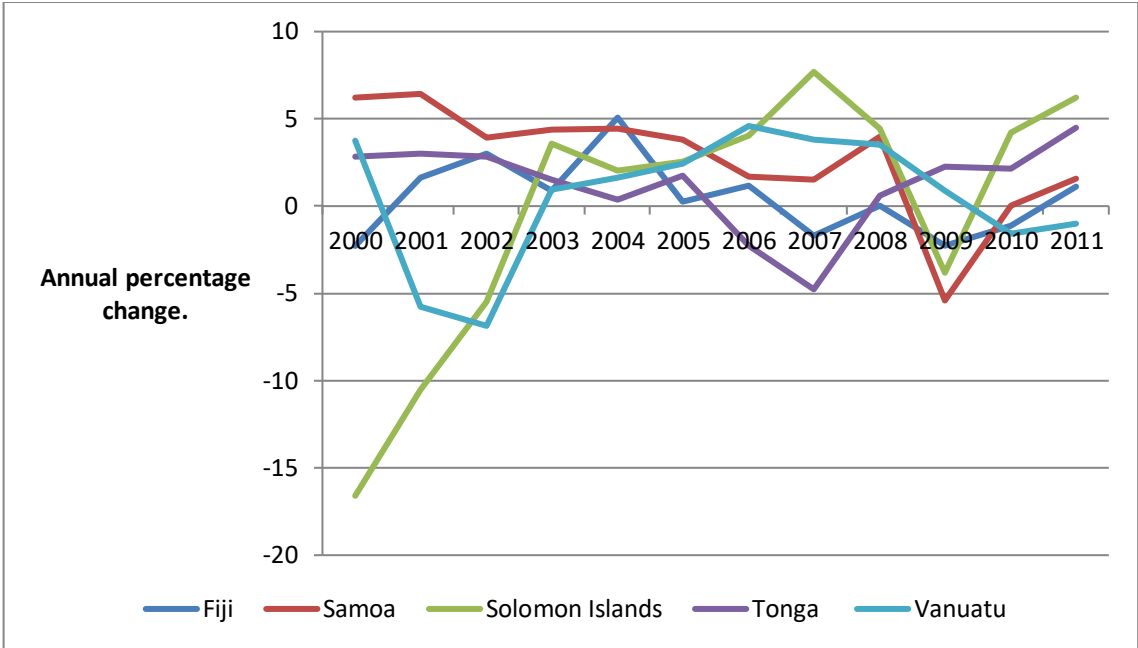


Figure 6: Annual percentage change in GDP per capita

Source: World Bank (World Bank 2013).

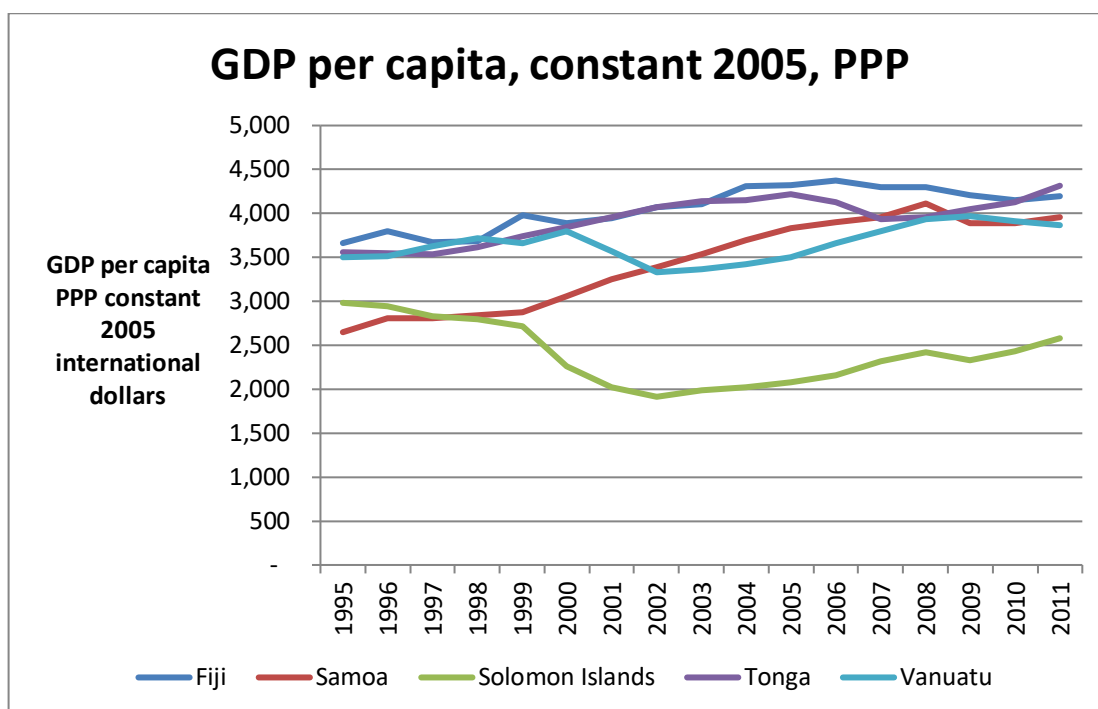


Figure 7: GDP per capita, constant 2005, PPP

Source: World Bank (World Bank 2013).

History therefore suggests that the five countries cannot necessarily rely on sustained economic growth to expand fiscal space for health. Recent analysis also confirms that Pacific Island countries face a suite of unique geographical and political economy circumstances constraining rapid economic growth. These constraints include small population size (preventing economies of scale in the private sector as well as in government service delivery); distance from markets; high cost structures; political instability and / or volatile political coalitions that inhibit economic reform; unsustainable rent seeking from natural resources; and land ownership and contract enforcement practices that inhibit private investment (Duncan Ron (Editor) 2011, World Bank 2011, Duncan R 2012). Even if future economic growth was strong and stable, governments would need to have the political will and administrative capacity to raise increased revenue from taxes, including from the often large informal sector.

Increased share of government expenditure going to the health sector

In the absence of reliable, economic growth over the long run, an option for many developing countries would be to increase the share of government expenditure going to health. However, this is not a realistic option in the case of these five countries where

government expenditure on health (including support from development partners) is already above 15% of total government expenditure in all countries except Fiji, and at 25% for Samoa and Solomon Islands (Figure 8). Furthermore, Ministries of Finance, and development partners, would be reluctant to increase the share of expenditure going to the health sector when they have concerns about chronic overspending, underspending, as well as other problems with basic public financial management.

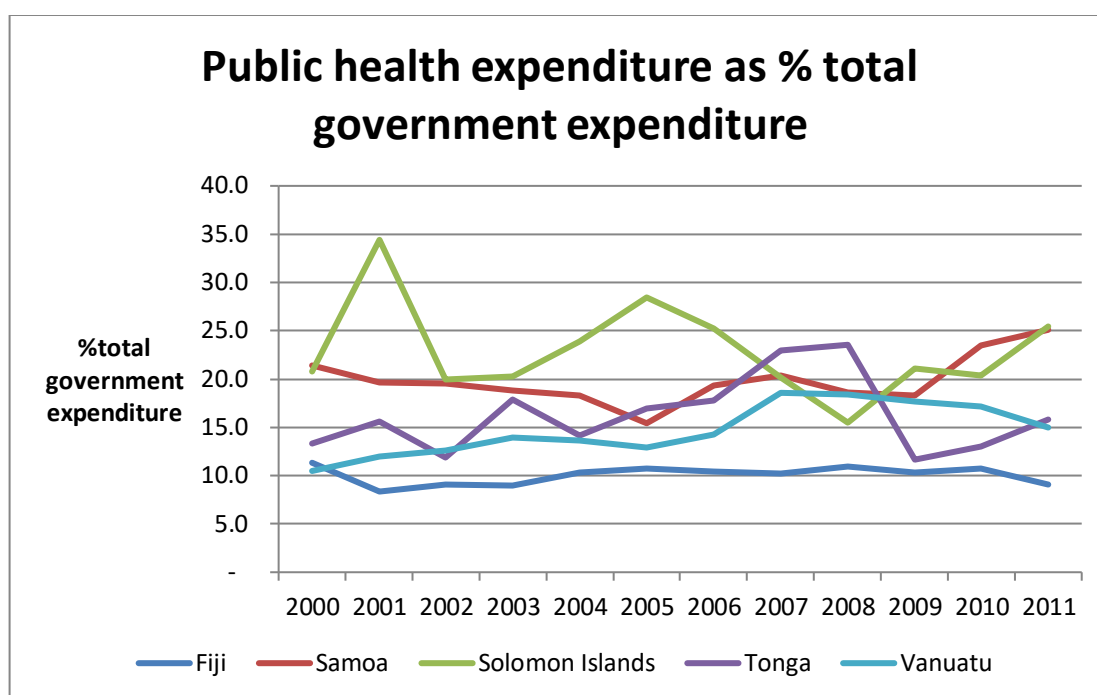


Figure 8: Public health expenditure as % total government expenditure

Source: World Bank (World Bank 2013).

Increased reliance on development partners

Increased reliance on development partners is a theoretical option but one with practical limits in current circumstances and with certain risks. That is because external resourcing for health is already more than 20% of total health expenditure in all five countries except Fiji, and up to 45% in the Solomon Islands (Figure 9). External resourcing is also volatile (Figure 10) leaving Pacific island countries vulnerable to shortfalls in ongoing programs (World Bank 2010). Development partners may also be reluctant to expand their financial contribution to the health sector if they have reservations about the effectiveness, efficiency, and value for money of expenditure to date. They will also be reluctant to increase their own expenditure in the health sector

if they believe this displaces or substitutes for government's own expenditure effort or are facing their own budgetary constraints.

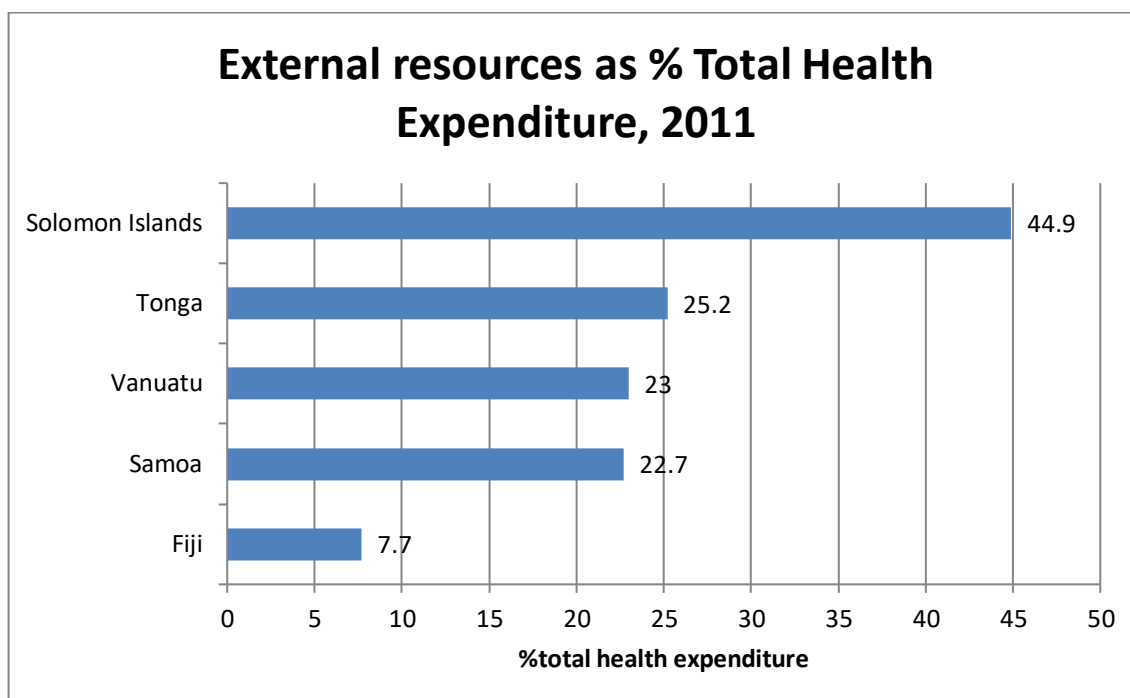


Figure 9: External resources as % total health expenditure, 2011

Source: World Bank (World Bank 2013).

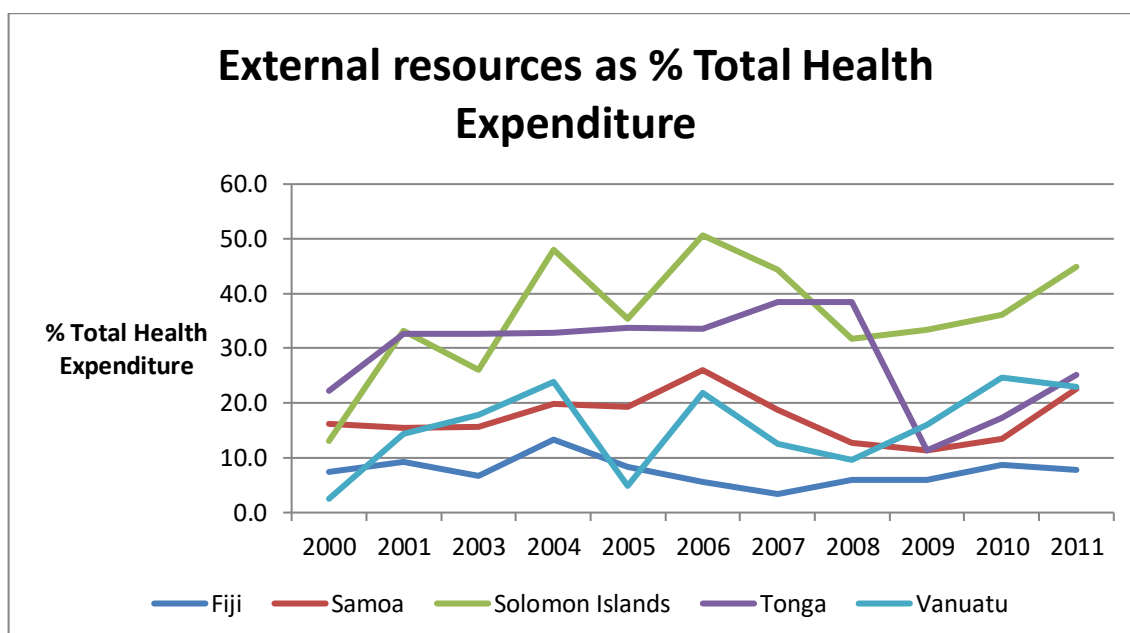


Figure 10: External resources as % total health expenditure

Source: World Bank (World Bank 2013).

User fees

User fees for government services are very low in most of the countries. Total receipts from all sources in the health sector in 2011/12 in Samoa were projected to be just \$US 25,000, or just 0.08 % of the total Government appropriations to the health sector in that year (World Bank 2013). On the other hand, citizens of Samoa (World Bank 2013) and Vanuatu (World Bank 2013) are prepared to pay quite high amounts for perceived services from traditional healers, in Vanuatu's case around ten times the current government user fees where they exist. However several reports cast doubt on whether imposing user fees is an effective, efficient, equitable, or politically sustainable approach to expanding fiscal space (Yates 2009, WHO 2010, Sachs 2012). Reports note that user fees often act as a barrier to health care, especially for the poor, and require good administrative systems as well as involving costs, in collecting and targeting fees (Gottret and Schieber 2006, World Bank 2010). Experience in Fiji suggests user fees have not been a source of additional revenue generation: generating an average of just 0.83% of health expenditure over the period 2003 -2008. Recent analysis for Fiji also notes that 'despite the fact that fees were based on costs in the 1940s, they have remained largely unchanged, apart from some minor modifications in the early 1980s' (WHO 2011).

Social Health Insurance

Social Health Insurance⁸ (SHI) has been discussed as a means of generating additional revenue for the health sector in some countries, and Samoa passed legislation allowing it to be introduced at some time in the future. However, all the recent analytical reports are clear that SHI is not an appropriate source of health financing in the Pacific for the foreseeable future. As noted in the case of the Solomon Islands:

Far from being an additional source of revenue for health, it is likely to be a further drain on Solomon Islands Government revenues, as additional government spending will be required to scale up insurance.... In the Solomon Islands, weak economic growth prospects and the need for fiscal restraint in the short to medium term would rule out any substantial increase in government subsidies to finance the scaling up of SHI. Significant additional

⁸ Social Health Insurance has been defined as 'generally characterised by independent or quasi-independent insurance funds, a reliance on mandatory earmarked payroll contributions (usually from individuals and employers) and a clear link between these contributions and the right to a defined package of benefits' Gottret, P. and G. Schieber (2006). *Health Financing Revisited: A Practitioner's Guide*, World Bank. Washington DC.

health spending would be needed to expand SHI to the 80% or more of the population that is in the informal sector. Moreover, the establishment of SHI involves relatively high start up costs, which will also have to be financed through general revenues. (World Bank 2010)

A World Bank study (World Bank 2013) of health financing options in Samoa cited recent research that found

‘SHI is complicated and implementation takes many years; achieving universal population coverage has taken decades in most countries; benefit packages must be explicit and costed carefully; user fees must be in place and must be sufficient to motivate populations to join SHI voluntarily; stakeholders must be convinced of the actuarial soundness of SHI; SHI agencies need to be able to negotiate and implement purchasing and provider payment mechanisms that ensure delivery of services and goods at minimal cost’.

That study also noted that Samoa still had a relatively small formal sector and that ‘the existence of compulsory SHI premiums, on top of compulsory income taxation, may actually discourage individuals from joining the formal sector: the opposite of Government intentions’.

Reports for Fiji, Tonga and Vanuatu come to similar conclusions. A specific study assessing the feasibility and desirability of SHI in Fiji concluded that while some technical aspects for introducing SHI were present, including the capacity to collect revenues from contributing members, there were significant risks and challenges. For example, SHI was unlikely to drive the necessary efficiency gains in the health sector; would likely involve increased general taxes to cover those not able to pay SHI contributions; may not result in a net addition to the level of health financing; and could add to pressures on cost-control (Rannan-Eliya R 2013). The Vanuatu report (World Bank 2013) noted that in the Organisation for Economic Cooperation and Development (OECD) countries:

‘adopting Social Health Insurance in preference to tax financing increases per capita health spending by 3-4 per cent, reduces the formal sector share of employment by 8-10 per cent, and reduces total employment by as much as 6 per cent. For the most part, Social Health Insurance adoption has no significant impact on amenable mortality, but for one cause – breast cancer among women – Social Health Insurance systems perform significantly worse, with 5-6 % more potential years of life lost.’

Raising revenue from tobacco, alcohol, and other products that affect health

Reduction in tobacco consumption is a key development priority because tobacco related illness and premature deaths impose large - but preventable - social and economic costs at the macroeconomic level, and reduce incomes at the individual and household level, particularly among the poorest sectors of society (Abedian I 1998). The report on the Economic Costs of Non Communicable Diseases (World Bank 2012) notes that tobacco consumption significantly contributes to, or accelerates, the adverse health outcomes of each of the four main NCDs: heart disease, cancers, lung disease and diabetes (Beaglehole R et al 2011).

Raising taxes on tobacco would be a 'win - win' for both Ministers of Health - who would see a reduction in use and uptake of cigarettes - but also Ministers of Finance - who would see an increase in general revenue (Jha P 2012). WHO recommends that excise duties should be at least 70 % of the retail prices of cigarettes as an important instrument in curbing tobacco consumption and uptake, especially among the young (WHO 2010, WHO 2013).

Modelling suggests that raising the excise rate on cigarettes by 50% would increase cigarette excise revenue by around 14% and 20% per annum in Samoa and Tonga respectively. This would translate into extra excise revenue of 3.6 million Tala (\$1.6 million) for Samoa and 2.5 million Pa'anga (\$1.45 million) for Tonga each year (World Bank 2012). Raising taxes on alcohol is also a viable option for raising revenue and promoting public health. The Cook Islands has imposed increased import duties on sweetened and carbonated soft drinks – each of which have up to 8 teaspoons of sugar – as a means of reducing overweight and obesity.

Improving efficiency as the most strategic, achievable, option to increasing resources and fiscal space

The recent reports are unanimous that making better use of existing resources through improved efficiency is the best and most achievable option for increasing the fiscal space for health, especially given the alternatives canvassed earlier. This is consistent with WHO findings that 20% to 40% of all health spending globally is currently wasted through inefficiency and waste. The WHO report identifies ten leading sources of

inefficiency in health. These include: purchasing practices for medicines (under-use of generics; use of substandard or counterfeit medicines; irrational prescribing policies); misaligned incentives (fee for service payments); management practices (medical errors, costly staffing mixes); and poor investment decisions (hospital size; technology choices) (WHO 2010).

The various reports recognise that there will be some natural limits to efficiency: high level of population dispersion in the Pacific Islands region demands a higher ratio of health inputs per capita than more densely populated countries. However, they each argue there are still large opportunities for achieving allocative ('doing the right things') and technical ('then doing them right') efficiency. Specific, practical examples for improving efficiency are offered. For example:

The Solomon Islands could shift resources towards more cost-effective primary care services; maintain a physical investment plan and budget adequately for the incremental recurrent costs of new investment; improve the mix and productivity of inputs; leverage resources allocated for vertical programs to strengthen health services more broadly; and improve the geographic targeting of expenditures. Underlying these improvements is the need to strengthen budget planning and expenditure management, and alignment with national priorities. Improving the effectiveness and coordination of external donor resources will be equally important (World Bank 2010).

In Tonga inefficiencies include:

'the use of doctors for child delivery when well-trained midwives could perform the same role; the failure of procurement systems to purchase medicines at the lowest available prices; the use of tertiary care hospitals for the provision of basic, primary care simply because primary care facilities are inadequately supplied; or more generally, an inefficient mix of medicines and personnel being used to provide a service. Technical inefficiency can also arise due to low productivity of health care workers, who see fewer patients than they could. In some countries, inefficiencies account for a ten-fold variation in the unit cost of delivering the same services but at different health facilities' (World Bank 2013).

5. An agenda for the short to medium term

Countries cannot do everything at once: strategic priority setting is therefore important. While each of the five countries has quite specific health and financing challenges to

address, there are some common themes for early priority action that arise in the various reports. These are summarised below.

Focus on primary and secondary prevention of communicable and non-communicable diseases to improve health and reduce subsequent cost burdens

Investing in prevention is an important strategic option identified in each of the reports for all five countries. Strengthening evidence-based primary and secondary prevention will increase both allocative and technical efficiency. Improving the quality of primary care services would allow the treatment and control of diseases early in their onset. In turn, this would lower, or at least delay hospital admissions and lengths of stay, and thus overall costs. Yet the analyses in the reports show a different trend. In Tonga for example prevention of communicable and NCDs and health promotion accounted for less than 5% of total government expenditure, and about 6% of donor health expenditures. Allocation to in-patient curative care accounted for 29% of total expenditure (World Bank 2012). There were similar findings in the other countries as well. The report on Samoa (World Bank 2013) notes that

‘Per capita expenditure on total inpatient curative care, including overseas treatment, was recently over one hundred times more than per capita expenditure on prevention of NCDs, and almost eighty times what was spent per capita on maternal and child health and family planning. Even per capita expenditure on traditional health care was more than seven times that which was spent on prevention of NCDs’

Focus on equity of access and outcomes, especially for women

Recent analysis shows that some public expenditure, including in-patient hospital services in the Solomon Islands, is pro-poor: the poorest quintiles receiving more than a proportional share of public expenditure (World Bank 2010). On the other hand, that same analysis finds that ‘the geographic distribution of health spending is skewed in favour of Honiara and not consistent with the pattern of population health needs’. Average health expenditure per capita was \$SI 10,830 in Honiara, compared to a national average of \$SI 4795, falling to \$SI 2850 per capita in more remote provinces like Temotu. Similarly, Honiara had a ratio of 1.32 doctors per 1000 population, compared to the national average of 0.2 doctors per 1000 population, and just 0.04 doctors per 1000 in more remote provinces.

Similar concentration of funding occurs elsewhere. In Vanuatu, like the Solomon Islands, Government is trying to decentralise health financing and services to address the needs of more remote islands. In Tonga, analysis finds that the poorest quintile reported 0.86 outpatient consultations per person per year, compared to 1.39 in the richest quintile (World Bank 2012). The poorest quintile was also less likely to see care when ill. A recent study by UNICEF in Vanuatu found that the most remote northern and southern provinces received only 40% to 50% of six basic essential health, nutrition and education services, compared to those in the capital, Port Vila, which received 80% of the six nominated services (UNICEF 2012).

Investing in the health of young women is a worthwhile investment in its own right, which can improve equity and strengthen health outcomes in both communicable and NCDs simultaneously. Adverse maternal health, including under-nutrition, obesity, and diabetes, can also program chronic disease in the developing foetus in-utero transferring increased NCD risks (and costs) to the next generation. Chronic diseases amongst pregnant women can also raise the risk of complications and costs (World Bank 2012).

Improve the evidence and information base for improved decision making

Governments and their development partners cannot allow relatively scarce health resources go to waste. But the evidence and information base for making good public policy choices is weak with respect to the major causes and drivers of disease. The report on Vanuatu (World Bank 2013) for example notes that the leading cause of death in Vanuatu, involving 199 cases, or over half (51%) of all recorded deaths, is classified as 'unknown'. Similarly, the second highest cause of death in Tonga after diseases of the circulatory system was 'unknown'. Less than half of health facilities provided the expected Health Information System reports in Vanuatu during 2010. Reporting coverage of this basic piece of information had fallen to just 34% in 2011 although this has since improved. There is little data on mental health in each of the five countries, a potentially large and costly public health issue as the population lives to older age. More than 50% of total deaths in Tonga occur outside the health infrastructure system and are vulnerable to having no death certificate unless the family requests it (World Bank 2012). Data on health financing is also patchy: most National Health Accounts are

around five years old, and rarely capture financing at the program level as distinct from line items such as salaries.

Work with development partners to align investments with national priorities and strengthen the health system more broadly

Development partners have an important – but potentially distorting – role in supporting health outcomes. As just one example, the report on the Solomon Islands (World Bank 2010) notes that:

Malaria has attracted significant donor funding and other development partner resources but, as a result, the malaria program now accounts for the largest share of primary and preventive health expenditures – nearly three times the amount allocated to reproductive health. Donors and the national malaria program are also mindful of the problems that were associated with premature winding back of technical and financial support during the global eradication program of the 1960s and 70s, and understand their ethical responsibility to maintain support until a very high and sustainable level of control has been achieved..... Premature cessation of interventions may result in a resurgence of malaria transmission, the emergence of drug resistance in the parasite and insecticide resistance in the mosquito vectors.

Invest in maintenance

Inadequate maintenance shortens the lifespan of expensive equipment, resulting in items becoming unusable, or replaced with financing that could have been used for other purposes. The report (WHO 2011) on Fiji notes that

‘the technical efficiency of hospitals has been compromised over many years by inadequate investment in health infrastructure upgrading and maintenance. This has been compounded by the purchase and donation of biomedical equipment from a variety of sources, without a coherent plan for the maintenance and supply of consumables, parts and trained technicians’.

In Samoa ‘maintenance’ is allocated only \$T 60,000 under the recurrent budget of \$ST 68.8 million for 2010/11. ‘Maintenance’ attracted just \$T 2 million out of a total budget of \$T 53.5 million – just 3.8 % – of the latest National Health Service budget (World Bank 2013). A costing study of the Vila Central Hospital (VCH) found that the repairs and maintenance budget for this 38 year old key facility should be around Vt 9.5 million per year, but that the actual funding was Vt 0.6 million. The line item budget for repairs and maintenance was 2% of the total annual budget for VCH, or 0.7% of the total value of

fixed assets. What little had been set aside for repairs and maintenance at VCH was used for other purposes, including freight charges (World Bank 2013).

Improve public financial management

Reports for Solomon Islands and Vanuatu particularly demonstrate the need for improved public financial management as a means of achieving value for money and accountability in the immediate term, and giving Ministries of Finance and development partners confidence to provide additional financing in the medium term. The specific areas for reform and improvement are identified in each of the various reports. In the case of the Solomon Islands, for example:

The Public Expenditure Review team found three main issues related to budget formation: a) policy priorities, plans, and budgets are not well linked or integrated; b) budgetary allocations are made with little consultation with the line ministries or citizens and without a feed-back process to facilitate corrections; and c) there is a general lack of consistency over time in allocations to public services. Ministry of Health had nearly 400 virements. Accountability for and measuring 'results' is weak. (World Bank 2011)

Identify and plan for the second-round effects of new initiatives to scale up health services

As at April 2013, these five countries have over 700 medical students in training (136 currently in Cuba, the rest in regional universities). These countries are now estimating the direct salary and allowance costs of these personnel. However, consideration should also be given to the implications for health financing of the likely induced increases in prescribing additional medical tests and pharmaceuticals as the doctors take up their posts.

All countries in the Pacific have committed themselves to an NCD Crisis response package that covers ten⁹ broad areas for preventing and treating NCDs. This package includes scale up to national levels of a series of 'best buys' known as the Package of

⁹ Reducing tobacco use; alcohol use; unhealthy diet and inactivity; use of package of essential NCD interventions for cardiovascular disease and diabetes; cancer interventions (including immunisation against HEP B and screening for cervical cancer); strengthen vital registration and cause specific mortality; adult NCD STEPS survey; youth survey; cancer registry; health system (including referral system, coverage of PEN trained health workforce and PEN equipment).

Essential Noncommunicable Disease Interventions (PEN). It will be important to estimate accurately – and then reflect in the budgets - the cost of national scale up. For example, will unit costs of diagnostic equipment and medicines increase as a result of reaching remote and outlying islands, or decrease as a result of economies of scale? It will also be important to accurately estimate and then budget for routine maintenance of equipment and other recurrent costs.

Governments in Samoa, Solomon Islands, Tonga and Vanuatu have also received aid funding for hospitals recently. Again, it is important that recurrent costs including electricity and maintenance are explicitly reflected and planned for in future budgets. Controlling hospital costs will be an important priority, as high expectations for NCD related treatment among urban populations place spending pressures on highly visible and politically important hospital services.

Conclusion

The various recent reports on the five countries – Fiji, Samoa, Solomon Islands, Tonga and Vanuatu – demonstrate that each of these countries have significant strengths on which to build a more effective, efficient, equitable and financially sustainable health financing system. Despite their many differences, there are some important common challenges, and recommended responses, to address in the coming months and years. There are limited options to expanding fiscal space for health given historic and projected rates of economic growth, the relatively high share of government expenditure going to health, and constraints in tapping private funding. Making better use of existing resources through improved efficiency is the most urgent and practical policy response.

References

- Abadian I, M. R., Wilkins N, Jha P, Ed. (1998). *The Economics of Tobacco Control: Towards an Optimum Policy Mix*. Cape Town.
- Adair, L S, Fall, C, Osmond C, Stein A, Martorell R, Ramirez-Zea M, Sachdev H, Dahly D, Bas I, Norris A, Micklesfield L, Hallal P and Victora C (2013). "Associations of linear growth and relative weight gain during early life with adult health and human capital in countries of low and middle income: findings from five birth cohort studies." *The Lancet*. Vol 382 Number 9891 pp 525-534.
- AusAID (2009). *Stop violence: responding to violence against women in Melanesia and East Timor*. Canberra
- Baltussen, R. (2006). "Priority setting of public spending in developing countries: do not try to do everything for everybody." *Health Policy* 78(2-3): 149-156.
- Barker D (1990). "The fetal and infant origins of adult disease: the womb may be more important than the home." *British Medical Journal* 301.
- Beaglehole R et al (2011). "Priority Actions for the NonCommunicable Disease Crisis." *The Lancet* 377(9775).
- Bhutta, Z. A. (2013). "Early nutrition and adult outcomes: pieces of the puzzle." *The Lancet*. Vol 382 Number 9891 pp 486-487.
- Bloom DE and Williamson JG (1998). "Demographic transitions and economic miracles in emerging Asia." *World Bank Economic Review* 12.
- Commission on Macroeconomics and Health (2001). *Macroeconomics and health: investing in health for economic development*. World Health Organization. Geneva
- Duncan R, C. H., Duituturaga E, Bulatale R, (2012). *Binding constraints to economic growth in the Pacific Islands: some comparative insights*. Pacific Islands Brief. Pacific Islands Development Program, East West Center. Hawaii
- Duncan R (Editor) (2011). *The political economy of economic reform in the Pacific*, Asian Development Bank.
- Gottret, P and Schieber G (2006). *Health Financing Revisited: A Practitioner's Guide*. World Bank. Washington DC.
- Government of Vanuatu. (2013). "Ministry of Health website." Retrieved from <http://www.governmentofvanuatu.gov.vu/index.php/government/health>.
- Institute for Health Metrics and Evaluation (2013). "Global burden of disease: country profiles." Retrieved 9 September 2013, from <http://www.healthmetricsandevaluation.org/gbd/country-profiles>.

- International Monetary Fund (2004). *Health and development: why investing in health is critical for achieving economic development goals*. Washington DC
- Jha P, Joseph R, Li D, Gauvreau C, Anderson I, Moser P, Bonu S, Bhushan I, Chaloupka F, (2012). *Tobacco Taxes: A Win-Win Measure for Fiscal Space and Health*. Asian Development Bank. Manila
- Langenbrunner J and Somanathan A (2011). *Financing Health Care in East Asia and the Pacific*. The World Bank. Washington DC.
- Lopez-Casasnovas, G, Rivera B, Currais L, Ed. (2005). *Health and economic growth: findings and policy implications*, MIT Press. Cambridge USA.
- Moriarty A. (2012). "The Pacific Islands cannot afford the human and economic cost of violence against women." Retrieved 5 September 2013, from <http://www.worldbank.org/en/news/opinion/2012/11/25/the-human-and-economic-cost-the-pacific-cannot-afford>.
- Pacific Islands Forum Secretariat (2012). *2012 Pacific Regional MDGs Tracking Report*.
- Rannan-Eliya R, Irava W, Saleem S, (2013). Assessment of social health insurance feasibility and desirability in Fiji, Ministry of Health, World Health Organization, Suva.
- Sachs, J. D. (2012). "Achieving universal health coverage in low-income settings." *The Lancet* 380(9845): 944-947.
- Savedoff W (2007). "What should a country spend on health care?" *Health Affairs* 26(4).
- Sen, A. (1999). "Health in Development." *Bulletin of the World Health Organization* 77: 619 - 623.
- Spence M and Lewis M (2009). *Health and growth*. Commission on Growth and Development.
- Tandon A (2006). *Measuring Policy Effectiveness in Health and Education*. Asian Development Bank, Manila.
- Tyson S, Peacock-Taylor C, Saketa S, (2012). *Independent Completion Review: AusAID support for UNICEF Pacific multi-country program 2008-2012*.
- UNICEF (2012). *Global study on child poverty and disparities: national report Vanuatu*.
- WHO (2010). *WHO Technical manual on tobacco tax administration*. Geneva.
- WHO (2010). *World Health Report: The Path to Universal Coverage*. Geneva.
- WHO (2011). *The Fiji Islands Health System Review. Health Systems in Transition*. Asia Pacific Observatory on Health. Geneva.
- WHO (2011). *Noncommunicable Diseases Country Profiles*. Geneva.
- WHO (2012). *Achieving the Health Related Millennium Development Goals In the Western Pacific Region*. Manila.
- WHO (2013). *WHO Report on the global tobacco epidemic*. Geneva.
- World Bank (2010). *Health Financing Options Solomon Islands*. Washington DC

- World Bank (2011). *Discussion note: Pacific futures*. Washington DC
- World Bank (2011). *Public Expenditure Review for the Solomon Islands Government*.
Washington DC
- World Bank (2012). *The Economic Costs of Non-Communicable Diseases in the Pacific Islands: A Rapid Stocktake Of The Situation In Samoa, Tonga and Vanuatu*. Washington DC.
- World Bank (2012). *Financing Options For The Health Sector In Tonga*. Washington DC.
- World Bank (2012). *Health Equity and Financial Protection Datasheet Vanuatu*.
- World Bank (2013). *At work in East Asia Pacific*. Washington DC.
- World Bank (2013). *Health Financing In Vanuatu: Challenges and Options*. Washington DC.
- World Bank (2013). *Health Financing Options for Samoa*. Washington DC.
- World Bank (2013). *World Development Indicators DataBank*.
- World Bank. (2014). "World Development Indicators." Extracted from
http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators#c_v.
- World Development Indicators. (2013). *World Bank Data Bank*, extracted from
<http://databank.worldbank.org/data/home.aspx>.
- Yates, R. (2009). "Universal health care and the removal of user fees." *The Lancet* 373(9680): 2078-2081.

Introductory note: Relationship between Chapter 2 and Chapter 3

Chapter 2 addressed the general research gap identified in Chapter 1: that existing literature on priority setting and resource allocation in middle-income countries does not adequately capture the distinctive public health and public financing characteristics of five middle-income countries of the Pacific.

Chapter 3 now provides a more detailed analysis of this general research gap at an individual country level: Samoa. I explain in Chapter 3 the national context of Samoa and the public health and public financing challenges the country faces. I explore in detail the policy options for public financing available to Samoa and make recommendations based on the evidence presented.

I also estimate for the first time the financial cost to Government of Samoa in treating diabetes patients with dialysis: thereby in part addressing the specific research gap regarding health costs in the Pacific I identified in Chapter 1. I show in Chapter 3 why reallocating public resources away from largely ineffective attempts at curative care and investing more in primary and secondary prevention would simultaneously improve health outcomes and public financing.

Editorial note: The detailed estimate of costs at the Samoa National Kidney Foundation (NKF) was first published in another World Bank peer-reviewed publication where I was the sole author entitled *The Economic Costs of Non-communicable Diseases in the Pacific Islands: A Rapid Stocktake of the Situation in Samoa, Tonga and Vanuatu* (1). I have included my specific analysis of the NKF costs as Annex 1 in Chapter 3 for completeness of that country analysis. That has required minor drafting changes and alignment of text in the Preface, and paragraphs 3.18; 3.25; 4.47 and 4.56, from the originally published text of what is now Chapter 3. These changes did not involve any changes to the substance of the original text. Chapter 3 is therefore a revised version of the peer reviewed article.

1. Anderson I. *The Economic Costs of Noncommunicable Diseases in the Pacific Islands: A Rapid Stocktake of the Situation in Samoa, Tonga, and Vanuatu*. Washington DC; 2013.

Chapter 3: Health-financing options for Samoa: Challenges and opportunities

Abstract

Samoa currently faces two important public policy challenges in the health sector. One is to stem, and then reverse, the rapid rise of noncommunicable diseases (NCDs). The second challenge is to put the country on a health-financing path that is effective, efficient, and financially affordable and sustainable. The two challenges are interconnected.

This paper examines eight options to address these challenges. The eight options are the following: (1) increasing government expenditure via higher general taxation; (2) increasing government expenditure via deficit financing; (3) increasing the share of government expenditure to health; (4) increasing external and donor financing; (5) increasing specific taxes; (6) mobilizing additional nongovernment resources via insurance (including social health insurance, and community and private insurance); (7) increasing cost-recovery measures; and (8) increasing efficiency.

The paper concludes that the chief opportunity arises from more efficient use of resources already in the health system that are not presently used to maximum effect. Improving technical and allocative efficiency of the existing system has the potential to make a large difference and is technically feasible.

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I also received constructive peer-review comments from senior representatives of the (then) Australian Agency for International Development (AusAID), the New Zealand Aid Program and the World Health Organization.

Abbreviations

ANC	Antenatal care
DHS	Demographic and Health Survey
MDGs	Millennium Development Goals
MOF	Ministry of Finance
MOH	Ministry of Health
MTEF	Medium-Term Expenditure Framework
NCD	Noncommunicable disease
NHS	National Health Service
OVT	Overseas treatment Scheme
PPP	Purchasing power parity (see footnote 11)
SHI	Social health insurance
STI	Sexually transmitted infection
SWAP	Sectorwide approach
THE	Total health expenditure
TTM	Tupua Tamasese Meaole II Hospital, Apia
WHO	World Health Organization

Currencies

One Samoan tala (SAT) was the equivalent of approximately US\$0.422 in May 2012.

One US\$ was the equivalent of approximately SAT 2.36 in May 2012.

Preface

“The spread of noncommunicable diseases (NCDs) presents a global crisis; in almost all countries and in all income groups, men, women, and children are at risk of these diseases. Worldwide, substantial gains have been achieved in economic growth, health, and living standards in the past century. This progress is now threatened by crises of our own creation — climate change, finance, and food insecurities, and the crisis in NCDs, principally heart disease, stroke, diabetes, cancers, and chronic respiratory disease.” (Beaglehole et al. 2011).

Samoa is currently facing two important public policy challenges in the health sector. One is to stem, and then reverse, the rapid rise of noncommunicable diseases (NCDs). The second challenge is to put the country on a health-financing path that is effective, efficient, and financially affordable and sustainable. The two challenges are interconnected. This paper therefore analyses options for reducing Samoa’s burden of disease (especially otherwise preventable NCDs) in a way that is financially sustainable for both government and individual households.

Section 1 of the paper provides background and context. It is noted that Samoa has achieved some important health outcomes over time, especially compared to other similar countries. Section 1 also notes that Samoa, like many other countries, is facing an epidemic of NCDs that can impose heavy health burdens on individuals and families, and heavy economic costs on households and government. The challenge of NCDs should not eclipse the ongoing and important challenges with respect to communicable diseases and family planning in Samoa (paragraphs 1.1–1.14).

Section 2 of the paper briefly summarizes the current structure of the health system, emphasizing that public financing — and public provision — dominates the health system. Development partners are also active supporters of the health-reform agenda (paragraphs 2.1 – 2.5).

Section 3 of the paper analyses the current health-financing system in Samoa. This section shows some distinctive features of health financing. For example, health expenditure, including by government, is relatively high in Samoa in absolute and relative terms, and in comparison to other lower middle-income countries. Conversely, private expenditure, including out-of-pocket expenditure, is relatively low, with

negligible “catastrophic” health expenditures. But there are also important policy challenges in health financing. Long-term financial sustainability of health expenditure is ultimately in doubt. There is negligible cost recovery — just 0.08% of government expenditure on health in 2011/12. Some programs have high, and rapidly rising, costs to Government, including dialysis treatment for kidney disease, usually as a result of diabetes. The estimated average annual cost of dialysis is SAT 92,110 or \$US 38,686 in 2010/11. This is around 12 times GDP per capita, yet has limited health outcomes, with 31 % of patients dying in less than one year and nearly two thirds dying within 2 years. Annex 1 provides details. Importantly, resources generally are still focused on inpatient curative care rather than primary and secondary prevention: per capita expenditure on total inpatient curative care, including overseas treatment, was recently over one hundred times more than per capita expenditure on prevention of NCDs, and almost eighty times what was spent per capita on maternal and child health and family planning. Even per capita expenditure on traditional health care was more than seven times what was spent on prevention of NCDs (paragraphs 3.1–3.25).

Section 4 of the paper examines eight options for addressing health financing in Samoa, given the challenges of population growth, ageing, and the rise of expensive- to-treat NCDs. This section comprises the bulk of the paper. It starts by suggesting some principles to screen the eight options in the best interests of Samoa. It then canvasses the strengths and weaknesses of the eight options in the context of Samoa. The eight options assessed are the following: (1) increasing government expenditure via higher general taxation; (2) increasing government expenditure via deficit financing; (3) increasing the share of government expenditure to health; (4) increasing external and donor financing; (5) increasing specific taxes; (6) mobilizing additional nongovernment resources via insurance (including social health insurance, and community and private insurance); (7) increasing cost-recovery measures; and (8) increasing efficiency (paragraphs 4.1–4.59).

Section 5 draws some conclusions and makes recommendations for government. It concludes that Samoa already has many of the building blocks in place to make some substantive improvements to health outcomes and financial sustainability of the health system. In particular, the paper states there are some potentially “low hanging fruit”

that could be harvested to achieve better health outcomes at reduced financial cost to Samoa (paragraphs 5.1–5.8).

The paper concludes that the chief opportunity for health financing comes from making better use of resources already in the health system that have not been used to maximum effect. Improving technical and allocative efficiency of the existing system has the potential to make a large difference and is technically feasible. Specific recommendations include significantly reorienting public expenditure from curative to primary and secondary prevention; increasing investments in maintenance; proactively reducing future recurrent costs from large infrastructure projects; exploring contracting out and private/public partnerships; leveraging the power of public expenditure to drive incentives on the demand side and supply side of health care; understanding better the true cost of services and underlying cost drivers; and investing in operational research to build up the evidence base for policy making.

The paper further concludes that Samoa has some other opportunities to mobilize additional revenue. Increasing taxation on tobacco and maintaining its value in real terms against inflation is an option, given the inevitable rise of (preventable) tobacco-related NCDs and the simultaneous need to generate revenue in Samoa. Some potential exists to generate more investment from the supportive group of external development partners over the longer term via the sector-wide approach existing in Samoa, but this is limited and should not be assumed. It is also likely that development partners will be more favourably inclined if Samoa continues to take additional reform and resource-mobilization efforts. There is arguably some potential for cost recovery, which at 0.08% of expenditure is currently quite low. However, this should only be considered if there is sound evidence that cost sharing will lead to significant revenues without detrimental impacts on access, equity, and financial protection.

The paper also concludes that social health insurance (SHI), and other forms of formal insurance, are useful options for the longer term, but their implementation is premature at this stage, given the formidable technical and managerial challenges of introducing such schemes in Samoa at present. Additionally, there are arguably higher, quicker, and more feasible gains to be made by improving efficiencies with the resources already in the health system.

The paper also concludes there is only limited capacity to see additional financing directly from government over the longer term, given that health is now the second-largest item in the government's budget and is expected to absorb 16% of government expenditure in 2011/12. The paper argues strongly against deficit financing at the national level to raise additional financing for the health sector.

Section 6 suggests possible next steps, including government's consideration of options with key stakeholders, including the private sector and development partners.

Section 1: Background and context

1.1 Samoa has achieved some solid economic results, but remains vulnerable to external economic shocks. The July 2010 IMF Article IV consultation notes:

Real per-capita income growth since the mid-1990s has been significantly higher than for most comparator countries. Prudent fiscal and monetary policies and structural reforms underpinned this performance.... Samoa's external position remained comfortable ... as remittances and tourism receipts, Samoa's main foreign exchange earners, continued to grow. Official reserves remained stable, well above the central bank's target ... Samoa has low risk of debt distress (IMF 2010).

1.2 The IMF Article IV consultation further finds that real GDP growth was projected to return to 3% in 2010/11, and continue to the period 2016–30, after falling from a high of 7% in 2004/05 to -4.9% in 2008/09 as a result of the September 2009 tsunami. The IMF Article IV consultations estimated GDP per capita at US\$2,967 in 2009/10. This is similar to the World Bank estimate of US\$ 2,980 for 2010 (World Bank 2012a).

1.3 However, the consultations note that Samoa is vulnerable to external shocks. The September 2009 tsunami caused physical damage estimated at 10% of GDP, led to a fiscal deficit of 10% in 2009/10, and is projected to continue at 7% for the following three years before returning to less than 3% of GDP thereafter. Samoa also remains vulnerable to global economic downturns, including reductions in tourism numbers.

1.4 The latest budget outlook confirms the prospects for modest growth and vulnerability to external shocks. The 2012/13 Budget Address by the Minister for Finance in Samoa in May 2012 notes that after two consecutive years of contraction, GDP grew by 2.0% in 2010/11, largely the result of fiscal stimulus and monetary easing as well as post-tsunami reconstruction. GDP growth however, slowed considerably in the last quarter of 2011 and is expected to remain subdued until the second quarter of 2012. It is forecasted that GDP will grow by about 1% in 2011/12. In summary, "The continued uncertainty and possible slowdown expected in the medium term, provides a challenging situation for the government in its efforts to achieve its longer-term macroeconomic targets stated in the 2012–16 Samoa Development Strategy" (Government of Samoa 2012).

1.5 Samoa has also already achieved some substantial health outcomes. Life expectancy at birth was 71.5 years for males, and 74 for females (latest figures available) (Samoa Bureau of Statistics 2012). The December 2010 Health Forum concluded that Samoa is on track, or has already achieved, internationally agreed targets for infant and under-five mortality (Millennium Development Goal [MDG] 4), maternal mortality and skilled birth attendance (MDG 5), and HIV prevalence and TB treatment (MDG 6).¹ The government states that the infant mortality rate has fallen from 37 per 1,000 live births in 1981 to 25 in 1991 and 17 in 2001; that the under-five mortality rate was 13.7 per 1000 live births in 2002; and that the maternal mortality ratio was 19.6 per 100,000 live births in 2002 (Government of Samoa, Ministry of Finance 2008). The Ministry of Health advises there is virtually no difference² in the infant mortality rate between males and females (Government of Samoa, Ministry of Health, Annual Report 2006/7).

1.6 Samoa has also achieved some substantial health outputs and service coverage levels that are known to be important for sound public health. The 2009 Demographic and Health Survey (DHS) found that over 90% of women in Samoa had at least one antenatal care (ANC) visit, and 60% had all four recommended ANC visits. (However, it is of some concern that only 13% of those seeking ANC do so in the important first trimester). Additionally, over 80% of women delivered their babies in a health facility. Initial vaccination rates for infants are relatively good: over three-quarters of infants received BCG injections and their first injection against polio and DPT. Only 15% of infants had no immunization at all. (However, rates of follow-up vaccinations are less encouraging: only about one-third of children completed the courses for measles, polio, and DPT, and only 25% of children — one in four — were fully immunized) (Government of Samoa, Ministry of Health 2010a).

1.7 Samoa's health outcome and health output levels are generally good compared to other lower-middle-income countries. Comparisons between Samoa — a unique Pacific Island country with a population of 184,000 in 2010 — and other lower- middle-income countries, many of which are in Africa, can be misleading. However, some very broad benchmarking against its peers places Samoa's achievements in some context.

¹ Details about the Millennium Development Goals are available at <http://www.un.org/millenniumgoals/>

² Reported as 19.5/1,000 live births for males and 19/1,000 for females.

Using a somewhat different data set from government of Samoa statistics,³ but one that is still generally comparable across countries, The World Health Organization (WHO) estimates show that Samoa has achieved higher health outcomes and outputs than other lower-middle-income countries on a range of indicators, especially infant, child, and maternal mortality, births attended by skilled health personnel, and access to sanitation. This is summarized in table 1.1 below. It is evident that Samoa is closer to, or performing less well than, its peers on other criteria, including physicians per population and the total fertility rate.

³ For example, the latest government of Samoa statistics estimate the life expectancy at birth in Samoa is 71.5 years for males and 74 years for females (Government of Samoa, Ministry of Health Annual Report 2009/10) However the latest statistics from WHO estimate the life expectancy at birth was 68 years for males and 72 years for females in 2009.

Table 1.1: Selected health outcome and output indicators

Indicator	Samoa	Other lower-middle-income countries
<i>Selected health outcomes</i>		
Life expectancy at birth (2009, both sexes)	70 years	68 years
Infant mortality rate (both sexes) in 2009	21/1,000	42/1,000
Under-five mortality rate (both sexes) in 2009	25/1,000	57/1,000
Maternal mortality ratio	58/100,000 live births in 2012	180/100,000 (94–300/100,000 range; WHO interagency estimates)
Total fertility rate (per woman, 2009)	3.9	2.5
<i>Selected health-service coverage and factors conducive to good public health</i>		
Births attended by skilled health personnel (% , 2000–10)	81	64
Population using improved sanitation (% , 2009)	100	49
Physicians (per 10,000 population, 2000–10)	2.7 ⁴	10.0
Nursing and midwifery personnel (per 10,000 population, 2000–10)	9.4	14.0
Adult literacy rate (% , 2000–10)	99	81
Female net primary school enrolment rate (% , 2000–10)	93	83

Source: WHO, World Health Statistics 2011.

1.8 Other indicators would suggest that the health system in Samoa is performing relatively well in terms of other, broader criteria. The low level of out-of-pocket expenditure implies that financial protection for health expenditure is generally satisfactory. There is some evidence to suggest that capacity utilization of the main hospitals in Apia is also generally satisfactory: occupancy rates range from 72% for postnatal care to 95% for other acute cases, although utilization rates at rural health facilities in Upolu and Savaii are much lower⁵ (Government of Samoa 2009). Average

⁴ Government of Samoa, Ministry of Health advised in May 2012 that it had 87 registered doctors in Samoa in 2012, 60 of whom worked in the public sector and 27 in the private sector. With a total population of 184,000 in Samoa, 87 registered doctors implies 4.7 doctors per 10,000.

⁵ Table 7.1 from NHS for 2007/08 (latest year available). Upolu Rural Health Facility has occupancy rates ranging from 1 to 33 percent. Savaii Island has occupancy rates ranging from 213 % in Maleitua Tanumafili II Hospital to 30 % for other hospitals.

length of stay at the main hospital in Apia ranges from 1.6 days for postnatal to 7.8 days for the high-dependency ward. The evidence on the quality of services provided, responsiveness to need, and infection control is harder to obtain.

1.9 However, Samoa also faces some important health challenges, including the rise of noncommunicable diseases. To its credit, the government of Samoa explicitly recognizes this challenge in its own overarching, *Strategy for the Development of Samoa*. That high-level, forward-looking strategic vision states:

Noncommunicable diseases (NCDs) are increasing causes of ill health and leading causes of death, with injuries and wounds. Over the past two decades there have been almost epidemic rises in coronary heart disease, stroke, high blood pressure, and maturity onset diabetes, along with gallstones, digestive disorders, and joint problems. This is linked to changing diets, increased use of tobacco and alcohol, and limited public understanding of associated health risks. The prevalence of diabetes increased from 9.8% in 1987 to 23.0% in 2001. Obesity rates have grown dramatically from 25.5% in 1978 to 50.3% in 1991 and 67.5% in 2001, among the highest rates in the world. Among adolescents there is a high suicide rate; a low but rising number of teenage pregnancies; and growing use of marijuana, tobacco, and alcohol (Government of Samoa, Ministry of Finance 2008).

1.10 The WHO comes to a strikingly similar conclusion. In its country health information profile, it confirms that NCDs “including obesity, diabetes, heart disease, high blood pressure, stroke, and cancer are a top health priority, with high and increasing prevalence rates: the obesity rate is currently 57.0 percent, the diabetes rate is 23.1%, and high blood pressure rate is 21.4%.... The four main risk factors are smoking (tobacco), poor nutrition, excessive alcohol consumption, and physical inactivity (SNAP)” (WHO *Country Health Information Profile for Samoa 2009*).

1.11 Samoa is not alone in confronting a pronounced rise in NCDs. In a major new report (WHO 2011b), WHO concludes that NCDs are the leading cause of death globally, killing more people each year than all other causes combined. Almost two-thirds of global deaths in 2008 (latest year then available) were due to NCDs, especially cardiovascular diseases, cancers, diabetes, and chronic lung diseases. WHO makes the important point that “the combined burden of these diseases is rising fastest among lower-income countries, populations, and communities, where they impose large, avoidable costs in human, social, and economic terms.... Contrary to popular opinion,

available data demonstrate that nearly 80% of NCD deaths occur in low- and middle-income countries” (2011b).

1.12 NCDs impose important economic costs on households and society. In addition to their impact on health, NCDs undermine economic growth. A recent report in *The Lancet* notes that “for every 10% rise in mortality from NCDs, the yearly economic growth is estimated to be reduced by 0.5%. On the basis of this evidence, the World Economic Forum now ranks NCDs as one of the top global threats to economic development” (Beaglehole et al. 2011). WHO notes that people with diabetes require at least two to three times as many health care resources as people who do not have diabetes, and diabetes care may account for up to 15% of national health care budgets. In addition, people with diabetes have a 2-3 times higher risk of tuberculosis compared to people without diabetes (WHO 2011). In a separate study reported in *The Lancet*, researchers found that the cost of diabetes care per patient in Cameroon was US\$489 per year in 2002, exceeding the annual per-head income by 1.5 times, and exceeding the per-head governmental health spending by about 50 times (Allotey et al. 2011).

1.13 Some prevalent and important NCDs appear to have a pronounced socioeconomic gradient in Samoa, disproportionately affecting the wealthier. As shown in figure 1.1 below, the reported level of diabetes among the richest quintile in Samoa is, according to the DHS 2009 (Government of Samoa 2010), just over three times that found in the poorest quintile: 29% compared to 9%. The reported level of hypertension in the richest quintile is also just over twice that of the poorest quintile: 25% compared to 12 percent. It is not clear whether this apparent dominance among wealthier Samoans reflects true underlying behaviour and lifestyle factors, or whether poorer Samoans simply remain undiagnosed and are therefore underrepresented in the statistics. This is, in itself an important area for future study. What is clear, however, is that this pronounced socioeconomic gradient of diagnosed NCDs has some important implications for public financing in Samoa, and not just in public health. More specifically, to the extent that wealthier quintiles in Samoa with these diagnosed NCDs use “free” public health services treating NCDs, public expenditure becomes pro-rich rather than pro-poor. This is an important point of public policy in Samoa where, at the national level, the richest 10% of households earned 31% of total income, while the poorest 10% earned 1.8% of income (Government of Samoa, Ministry of Finance 2008).

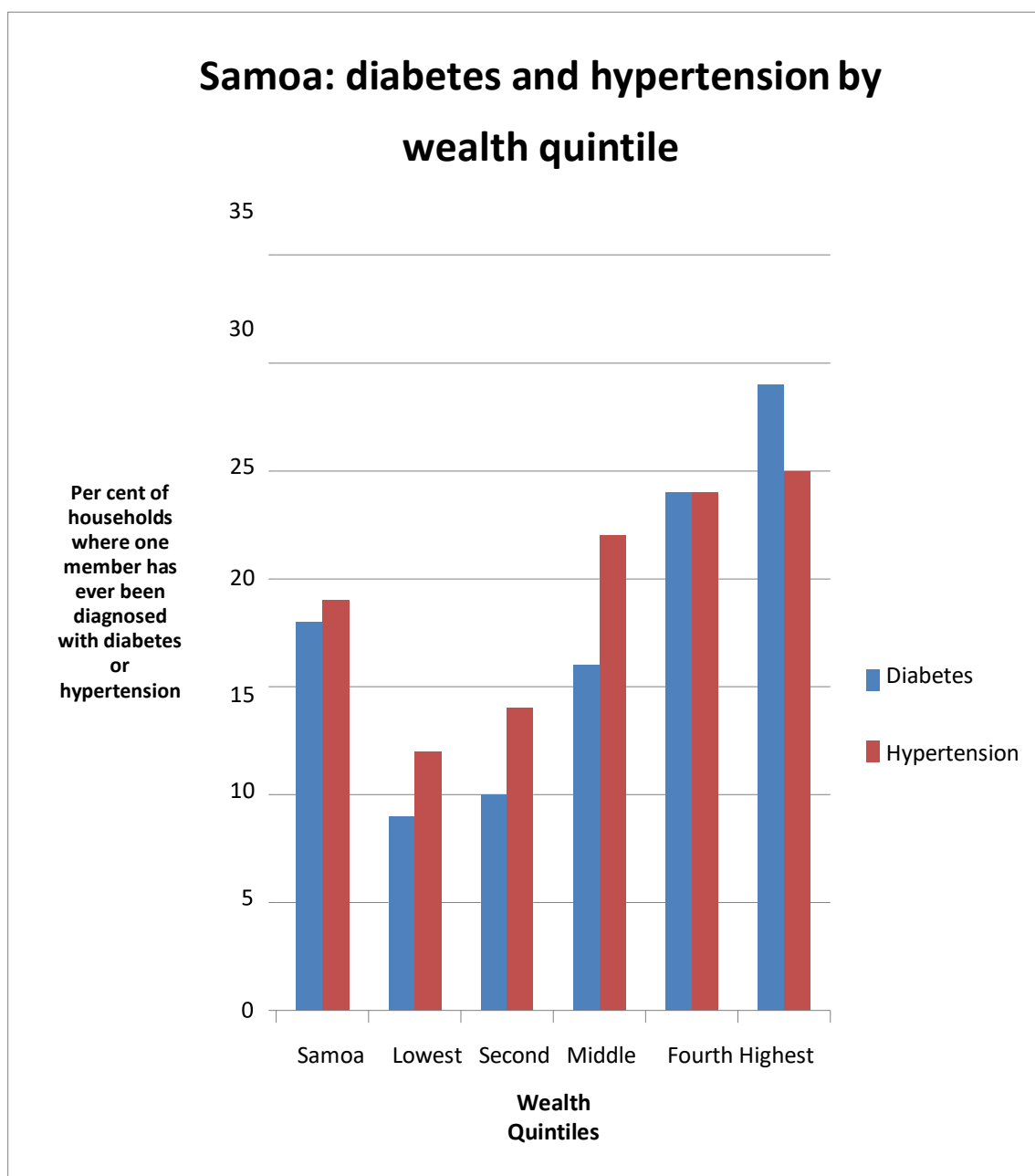


Figure 1.1: Diabetes and Hypertension in Samoa (by wealth quintile)

Source: Samoa DHS 2009.

1.14 The challenges of NCDs should not eclipse the ongoing and important issues with respect to communicable diseases and family planning in Samoa. As noted in paragraphs 1.5 and 1.6 above, Samoa has a good overall record with respect to primary-level care, but there are some important gaps that need to be addressed. Approximately only 25% of children are fully immunized, and only 13% of women obtaining ANC do so in the important first trimester. Furthermore, almost half (46%) of currently married Samoan women have an unmet need for family planning (Government of Samoa,

Ministry of Health 2010a). Some reports suggest high rates of sexually transmitted infections (STIs): possibly 40.7% of 300 antenatal women under age 25 had chlamydia (Enoka 2011). The December 2010 Annual Health Forum found insufficient progress with respect to the proportion of one-year olds immunized against measles (MDG 4). The Annual Health Forum also found that contraceptive prevalence rate is low; there are unmet needs for family planning; and adolescent birthrates have increased since 1990 (MDG 5). There is also a high prevalence of STIs, and condom use at last high-risk sex is relatively low (MDG 6).

Section 2: Structure of the health system

2.1 Publicly funded — and provided — services dominate the health system in Samoa. The Ministry of Health (MOH) is responsible for regulatory oversight, policy, and priority setting. MOH has recently produced a wide range of policy position papers and facilitated legislation on a range of health-related issues.⁶ The Health Sector Plan 2008–2018 provides a well-articulated vision of future directions in health, including a set of six key strategies.⁷ The Health Sector Plan has four explicit strategic objectives for health financing.⁸ The plan also provides a clear output-focused performance framework that is, along with the involvement of other ministries, now being elevated to a health *outcomes* focus, with key indicators explicitly listed in the nation’s next national plan. (Government of Samoa Ministry of Health 2008)

2.2 The government-owned National Health Service (NHS) is the publicly funded provider of preventive and clinical services. It manages the national referral hospital in the capital, Apia, as well as seven district hospitals and several smaller clinics throughout the two main islands of the country. Of the SAT 54 million provided to the NHS in 2010, SAT 25 million (46%) was allocated to personnel costs, including health professionals;

⁶ Recent legislation that came into effect includes the Tobacco Control Act, the Mental Health Act, Nurses and Midwives Act, Health Care Professions Registrations and Standards Act, Pharmacy Act, Dental Practitioners Act, and the Medical Practitioners Act.

⁷ The six key strategies are to strengthen health promotion and primordial prevention; enhance quality health care—service delivery, including management of infectious diseases; strengthen governance, human resources, and health systems in the sector; partnership commitment; financing health services; and donor harmonization.

⁸ “Improve equitable allocation of resources; strengthen financial management systems, including procurement; long-term financial health plan; develop financial sector policies.”

SAT 16 million (30%) went to operating costs (National Health Services 2010). The main hospital in Samoa (Tupua Tamasese Meaole Hospital, commonly referred to as TTM) absorbed at least SAT 10.7 million (20%) of the NHS budget in 2010, excluding costs for the pharmacy and laboratory services provided at the hospital.⁹ Influenza and pneumonia are the main cause of hospital admissions. The Overseas Treatment scheme (OVT), whereby eligible patients are treated in New Zealand, is a significant part of the overall health system (discussed in more detail in paragraphs 3.21 to 3.24 below).

2.3 Nurses and midwives make up two-thirds of the Samoan health workforce. Over 90% of the 316 registered nurses, midwives, and student nurses work in the public sector. Over half (53%) of registered nurses are now age 40 or older, with approximately 20 registered nurses expected to retire in 2010 and each year thereafter. Workforce planning to replace retirees, and some loss of younger nurses to New Zealand and Australia, is therefore a priority issue. Shortage of midwives is a particular workforce challenge (Government of Samoa, Ministry of Health 2010c). There were 87 registered doctors in Samoa in 2012, 60 working in the public sector, and the rest in the small private sector. Most doctors in Samoa have studied in Australia, at the Fiji School of Medicine, or in New Zealand. The relatively new Oceania University of Medicine in Apia now trains doctors.

2.4 There is a small private health sector, with one private hospital (Medcen Hospital), fourteen private medical clinics, and four private pharmacies, mainly concentrated in Apia and focusing on curative interventions. Some modest — and apparently successful — public-private partnerships have produced diabetes clinics in Apia. Private insurance is negligible (see paragraph 3.9 below).

2.5 Samoa has a strong, active, well-resourced network of churches throughout the country, which provide deep and wide outreach and support to families and communities. The Catholic Church supports the Mapuifagalele Old People’s Home; the Seventh Day Adventists promote healthy lifestyles; and the church-supported Fiaola Crisis Centre provides counselling for young people, including suicide prevention.

⁹ The NHS financial statements reveal that there were SAT 6.6 million personnel costs for TTM; SAT 3.87 million for operating costs for TTM; and SAT 282,000 for capital costs. However this does not include the “laboratory” or the “pharmacy” line items in the NHS financial statements.

However, unlike Papua New Guinea, where churches deliver up to half of the nation's health services, sometimes on a contractual basis with government or development partners; churches play a surprisingly peripheral and marginal role in health care in Samoa. Civic support for health care is also provided by women's committees, especially at the village level.

Section 3: Health financing and health systems in Samoa

3.1 At the outset, it is worth recalling the importance — but also the limitations — of analysing health financing. On the one hand, health financing is important: how much money is raised for health, by whom, from whom, for whom, and for what are all issues that affect not just health outcomes, but broader economic aspects at the household and macroeconomic levels. On the other hand, health financing is clearly not the only determinant of health outcomes. Other factors outside the health system and health financing per se are also important, including genetics, hygiene practices, lifestyle decisions, culture, food security, girls' education, vulnerability to natural disasters, and environmental factors such as availability of water and sanitation. The quantity and quality of health financing are therefore necessary but not sufficient parts of improving and sustaining good health outcomes.

3.2 Against that background, the following tables and figures show several distinctive aspects of health financing in Samoa. Table 1.2 provides an overall picture of expenditure trends using the currently available National Health Accounts (NHAs), which end in 2009. Table 1.3 uses latest government of Samoa budget documents to highlight the main sources and uses of funds. (Not all items are displayed so the subtotals do not necessarily sum to 100%).

Table 1.2: Selected health expenditures (current prices) and ratios for 1995, 2000, and 2004–09 (latest years available using NHAs)

	1995	2000	2004	2005	2006	2007	2008	2009
Total expenditure on health (THE), SAT millions	25	43	55	65	78	87	85	101
General government expenditure on health, SAT millions	17	30	45	54	67	74	72	88
General government expenditure on health as % of THE	70.4	70.9	81.4	83.3	85.8	85.3	84.7	87.3
Total expenditure on health as % of GDP	5.0	5.6	5.2	5.5	6.2	6.1	5.9	7.0
Total expenditure on health per capita in PPP terms	107	149	186	224	260	277	264	312
General government expenditure on health per capita in PPP terms	75	106	151	187	223	237	224	273

Source: Samoa NHAs 2002/3; 2004/5; 2006/7; 2008/9.

Table 1.3: Main sources and direction of public expenditure on health 2008/09 to 2011/12, nominal

Item	2011/12 (SAT millions)	2010/11 (SAT millions)	2009/10 (SAT millions)	2008/09 (SAT millions)
Total government resources for health	110.6 ¹⁰	107.8	79.9	81.0
Of which, coming from:				
• Government-appropriated expenditure	69.0	64.8	58.9	70.0
• Donor cash funded/foreign capital project grants	17.8	16.8	19.9	10.5
• Foreign loans	23.7	26.1	1.0	0.5
And then directed to Ministry of Health of which (descending order by amount):	69.06	64.89	58.90	70.06
• Samoa National Health Service	57.6	54.1	48.9	58.4
• Ministry of Health outputs	5.5	5.3	4.6	4.6
• Samoa National Kidney Foundation	4.9	4.5	4.3	5.3

Source: Approved estimates of receipts and payments of the government of Samoa for the financial years ending June 30, 2009/10; 2010/11; 2011/12 (Government of Samoa 2011).

3.3 The first distinctive feature shown in table 1.2 is that total health expenditure (THE) is relatively high in Samoa. Using Samoa NHA figures, table 1.2 shows THE at SAT 101 million (US\$42.6 million) in 2009 (latest year available). At SAT 205 per capita (US\$86.5 at market exchange rates, or International \$312 per capita in purchasing

¹⁰ If SAT 3.2 million “in kind donor assistance” is included, this rises to SAT 113.9 million.

power parity [PPP]¹¹ terms), this is much higher than the US\$38 per capita minimum total expenditure estimated by the WHO Commission on Macroeconomics and Health needed to fund essential health interventions in low-income countries in 2015 (WHO Commission on Macroeconomics and Health 2001). It is also higher than the recommended US\$54 per capita to fund a basic package of essential health services in low-income countries, developed recently for the G8 Leaders Summit by the High-Level Taskforce on Innovative Health Financing (Taskforce on Innovative Health Financing for Health Systems 2009). Table 1.2 also shows these relatively high figures have occurred over time and do not simply reflect any lumpy, one-off expenditures. Like many other Pacific Island countries, the relatively high absolute expenditures per capita do, however, reflect a combination of comparatively small populations, limited opportunities for economies of scale, and relatively high levels of government expenditure on health.

3.4 A second distinctive feature of health financing in Samoa is that government has clearly given priority to health (and education): absolute and relative levels of expenditure on health are quite high compared to other government expenditures. Government's own appropriations for health — and excluding any external loans or grants — were SAT 69,064,202 in 2011/12. This represents 16.02 percent¹² of total government appropriations for the 2011/12 financial year and is not a one-off aberration. Health received 14% of total government expenditure in 2006/07 (latest year for full NHAs) and 15% since then, including 17% in 2008/09. Sustaining 15% or more of total government appropriations to health over many years is noteworthy given that the Abuja Declaration, signed by 53 heads of state in Africa, sets 15% as the benchmark government expenditure for health (WHO 2011a).

3.5 The government's clear political commitment to the health (and education) of its people is further illustrated by the overall ranking given to health in the national

¹¹ PPP stands for purchasing power parity. In essence, PPP approaches seek to avoid distortions caused by market fluctuations in exchange rates. PPP approaches recognize that actual costs in one country may well be lower than in another, so that the actual purchasing power of local currency may be higher than might otherwise seem to be the case. PPP uses a notional "international dollar" to distinguish it from US\$.

¹² Actual expenditure, as distinct from approved estimates, gives a figure of 14.8% to health as a percentage of total government payments in 2010/11, or SAT 64.88 million going to health out of a total expenditure of SAT 437.8 million (Government of Samoa 2011).

budget. As shown in figure 1.2 below, the Ministry of Health was the second-largest appropriation item in Samoa in 2011/12, after the Ministry of Education and Culture (Government of Samoa 2011). The health sector is also the third-largest item in the government's *overall development* budget, including external grants and loans to the country after the Ministry of Finance and the Ministry of Education. Total financing to health at SAT 113 million in 2011/12 (SAT 69 million government appropriations plus SAT 44 million loans and grants) is even larger than resources available to the Ministry of Works, Transport and Infrastructure (SAT 109 million).

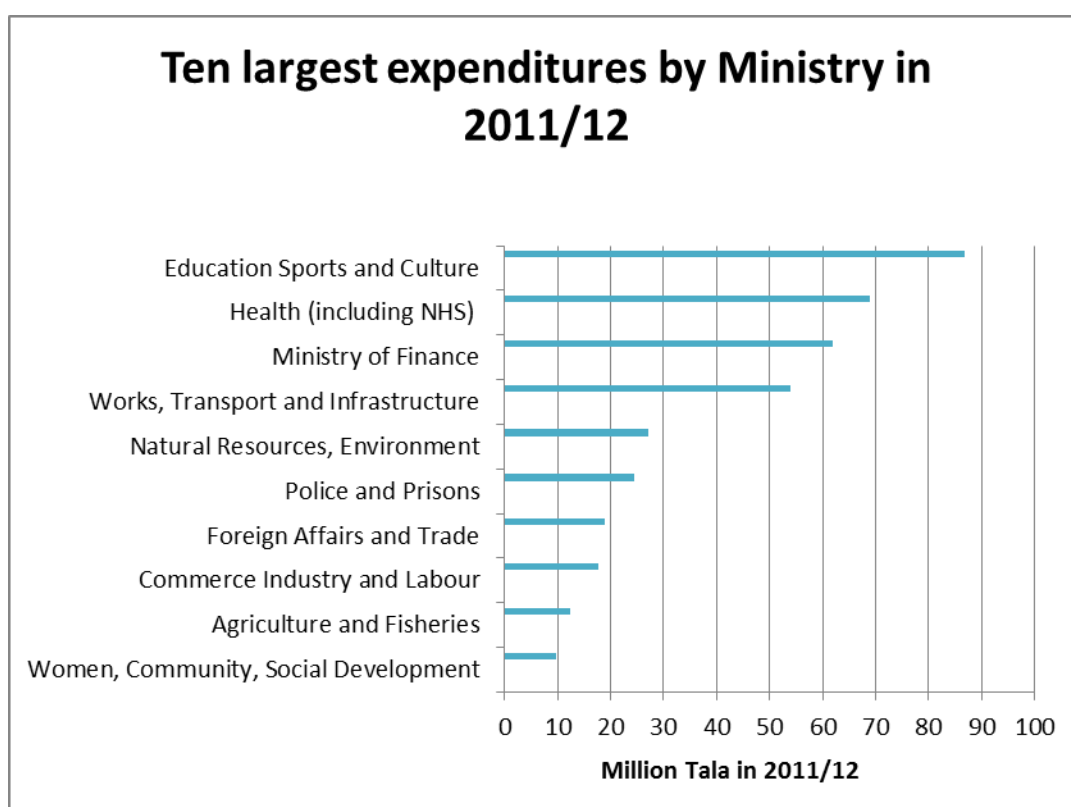


Figure 1.2: Largest Expenditures by Ministry

Source: Government of Samoa 2011.

3.6 Government expenditures on health are also relatively high compared to other lower-middle-income countries. Latest available figures that enable comparisons with other countries come from *World Health Statistics 2011* and relate to 2008. Table 1.4 below shows that the share of government expenditure on health, as a percentage of THE, was double that of other lower-middle-income countries in 2008. It was also noticeably higher as a share of total government expenditure (14.9% in Samoa, compared to 7.8% in other lower-middle-income countries) in that year. Per capita

government expenditure on health is between 2.5 and 3.3 times higher in Samoa than it is in other lower-middle-income countries, depending upon whether current market exchange rates or PPP¹³ approaches are used. However, comparing Samoa's expenditure to other lower-middle-income countries should be approached with some caution: unit costs will be very different in a relatively small Pacific Island country with thin population coverage in outer islands.¹⁴ Further, what really matters is where the money is spent, and how effectively. Nevertheless, these broad indicators do give a broad sense that health expenditure in Samoa is relatively well supported compared to other countries of similar per capita income.

Table 1.4: Selected health financing indicators for Samoa and other lower- middle-income countries, 2008

Indicator	Samoa	Other lower-middle-income countries
Total health expenditure as % of GDP (2008)	5.9	4.3
General government expenditure on health as % of total health expenditure	84.7	45.4
General government expenditure on health as % of total government expenditure	14.9	7.8
External resources for health as % of total expenditure on health	7.1 ¹⁵	1.0
Private expenditure on health as % of total expenditure on health	15.3	54.6
Out-of-pocket expenditure as % of private expenditure on health	62.9	82.7
Per capita total expenditure on health (PPP, \$)	264	197
Per capita government expenditure on health (average exchange rate, US\$)	152	45
Per capita government expenditure on health (PPP, \$)	224	88

Source: WHO 2011b.

3.7 Samoa is also spending comparable amounts on health as other Pacific Island countries. As table 1.5 below shows, Samoa is around the median for other Pacific Island

¹³ See footnote 11 for a definition of PPP.

¹⁴ The impact of small, remote, and dispersed economies — typical in the Pacific — on unit costs for health care would be a useful subject for further research and analysis.

¹⁵ See paragraph 3.12 for an update.

countries in terms of total health expenditure per capita, and for the share of government expenditure going to health.

Table 1.5: Selected health statistics: Samoa and other Pacific Islands

Country	Total health expenditure per capita (US\$, 2008)	Total health expenditure per capita PPP) ¹⁶	Total health expenditure (as % of GDP, 2008)	Government health expenditure (as % of total government expenditure, 2008)
Cook Islands	442	361	4.4	11.7
Fiji	154	168	3.5	10.2
Kiribati	171	304	12.5	16.8
Marshall Islands	351	251	14.0	14.6
Micronesia (Federated States)	306	408	13.3	18.9
Nauru	653	440	14.0	18.5
Niue	1,348	2,360	13.5	12.6
Palau	961	991	10.8	16.6
Papua New Guinea	39	70	3.2	7.4
Samoa	179	264	5.9	14.9
Solomon Islands	68	139	5.3	14.4
Tonga	140	194	5.0	14.2
Tuvalu	291	266	9.7	8.0
Vanuatu	104	170	3.9	14.3
Median	235	265	7.8	13.1

Source: WHO 2011b.

3.8 Of course, care should be taken in drawing conclusions from these cross-country comparisons. What a government “needs” to spend on health is a complex question and depends primarily on local needs and resources (Savedoff 2007). Comparing Samoa with other lower-middle-income countries, many of which are larger countries in Africa with different health and economic challenges, also has limitations. Furthermore, Pacific Island countries face particular challenges in terms of cost structures that make health services expensive, including transportation costs to remote and thinly populated outer

¹⁶ See footnote 11 for an explanation of PPPs.

islands. Relatively small economies also mean that “lumpy” expenditures, such as construction of a hospital, can make a noticeable impact on year- by-year expenditures. Nevertheless, to the extent that the international community believes there should be “more money for health,” especially in low- and lower-middle-income countries, Samoa is spending reasonable amounts on health care. What then becomes important is whether such expenditure is sustainable over time, and if it is achieving intended outputs, outcomes, and impact (see section 4).

3.9 A third distinctive feature of Samoa’s health financing is that the share of total health expenditure from private expenditure is low. As shown in table 1.4, an estimated 15% of total health expenditure comes from the private sector in Samoa compared to 54.6% in the comparator lower-middle-income group. Of the relatively little that is spent privately on health in Samoa, a smaller percentage (62.9%) is actually “out-of-pocket” than is the average for other lower-middle-income countries.

3.10 Indeed, it would appear that generous government subsidies, combined with almost “free” public health care, have protected virtually all citizens from “catastrophic”¹⁷ out-of-pocket health care expenditure. Some research, however, is required to confirm the underlying situation. While it does appear to be the case that few people, if any, are pushed or kept below the poverty line because of out-of-pocket health expenditures, it is also conceivable that poorer and marginalized people simply refrain from spending money on essential health care, and so die prematurely. For example, some in the lower quintiles may not be able to afford the cost of airfare to New Zealand, withdraw from seeking overseas treatment for NCDs, and die prematurely. There is not sufficient evidence to make an informed judgment. A useful research study would examine levels of self-reported health status and determine if those who believe they are ill are deterred from seeking care as a result of any significant direct or indirect out-of- pocket expenditure.

3.11 Clearly, a balance must be found here. On the one hand, no individual should be pushed or kept below the poverty line, or made bankrupt, by paying for essential health

¹⁷ Generally defined as out-of-pocket health expenditure between 5 and 20 percent, but as high as 40 percent, of a household’s capacity to pay. Capacity to pay is, in turn, defined as the effective household income remaining after basic subsistence needs are met (Xu et al. 2003).

care, although that is the case in several developing countries of Asia and, arguably, the United States. Financial protection is now widely recognized to be an intrinsic objective of a health system, at par with the objective of improving health outcomes. On the other hand, achieving decent health outcomes, while simultaneously providing financial protection, does have to be affordable within the available fiscal and resource envelope. (See discussion in paragraphs 4.28 to 4.40 below.)

3.12 Conversely, while private expenditure is relatively low, the share of total health expenditure from external sources — multilateral and bilateral development partners — is high, especially in recent years. This is a fourth distinctive feature of health financing in Samoa. Table 1.6 and figure 1.3 below show that of the total SAT 110.6 million available to the Ministry of Health in 2011/12, SAT 69 million (62.4%) was provided through government of Samoa appropriations, and SAT 41.5 million (37.6%) through overseas development partners. External resourcing to the health sector constitutes a higher share than in 2008, as figures in table 1.5 show, reflecting the more recent increases in external sources. This includes the recent large and “lumpy” loans from China to build the new hospital and MOH headquarters in Apia.

Table 1.6: Domestic and external sources of financing for health 2011/12

Item	Total SAT '000	Share of total resources available to health (%)
Government of Samoa appropriation	69,064	62.4
Donor cash funded, of which largest component is SAT 14 million provided to the Health Sector Program by Australia and New Zealand	17,860	16.1
Loan funded, of which largest component is SAT 20.3 million provided to the National Medical Centre and Ministry of Health HQ by government of China, and SAT 3.4 million provided to the Health Sector Program Phase 11 by the World Bank (IDA).	23,760	21.5
Total available to the health sector	110,625	100.0

Source: Government of Samoa 2011.

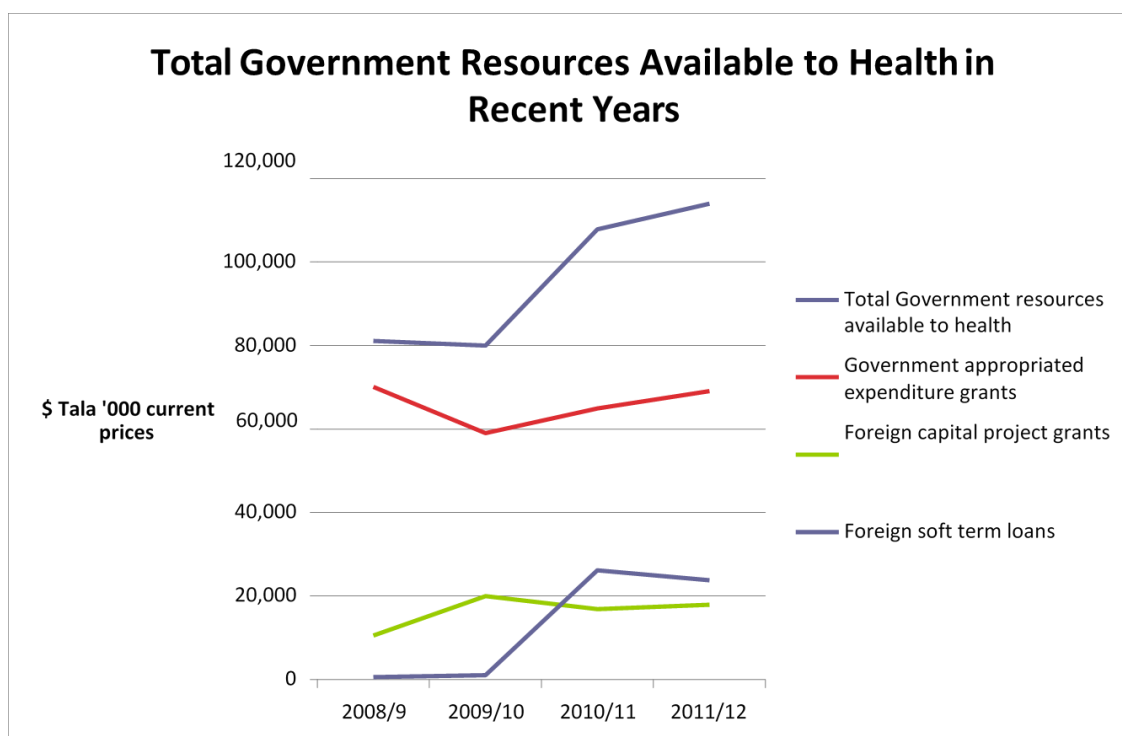


Figure 1.3: Total Government resources available to health in recent years, showing Government appropriations, bilateral grant funding, and soft loans

Source: Government of Samoa 2011.

3.13 Figure 1.3 above suggests that external financing has not strongly substituted for government's own expenditure efforts on health. Rather, external financing has tended to be supplemental to government resourcing. This is in contrast to the situation in some other Pacific Island, and other, countries where external financing has sometimes substituted for domestic financing effort.¹⁸

3.14 There are also some distinctive features about external financing arrangements in Samoa. Three (Australia, New Zealand, and the World Bank) of Samoa's main bilateral and multilateral development partners work through, or in close collaboration with, a sectorwide approach¹⁹ and have pooled funding, albeit not through government

¹⁸ Generally referred to as "fungibility." Money is "fungible" in the sense that it can be used for many purposes: health, education, agriculture, or even less developmentally worthwhile activities such as subsidies for national airlines, sports stadiums, and prestige projects.

¹⁹ SWAPs have many definitions but include concepts such as an agreed multiyear sector plan, ownership of the plan by the government ("government in the driving seat"), which provides leadership for collaborative partnerships with other stakeholders including bilateral and multilateral donors. There is also an expectation of more predictable, hopefully increased, and less volatile external financing, often pooled, and preferably financed "on budget" by the government. The movement to a more programmatic, sectoral approach, in contrast to a project enclave approach, is also expected to be accompanied by greater policy dialogue between

systems. Other stakeholders, including United Nations agencies, the Secretariat of the Pacific Community, and the WHO are “non-pool partners.” All stakeholders — “pool” and “non-pool” — state they work in ways that support Samoa’s own policy and programming reforms over the longer term. They also state they support Samoa’s Second Medium-Term Expenditure Framework (MTEF 2), which covers the period 2009/10 to 2013/14, and involves an estimated SAT 622 million over the five-year period: SAT 345 million (55 percent) for recurrent expenditure and SAT 260 million (41 percent) for development expenditure.²⁰ Reviews find that, unlike other parts of the Pacific, the government in Samoa was actively involved in the initial SWAP (sector wide approach) process, believing that “traditional projects had high transaction costs and that they had a distorting effect on priority setting and coherence of activities” (Negin 2010). This is important given more recent developments.

3.15 The single most striking feature of current external financing is that infrastructure financing by one donor — the People’s Republic of China (PRC) — now constitutes just over three-quarters of donor development expenditure. More specifically, PRC is providing SAT 159 million for the MOH headquarters building and the NHS main hospital, which is 76% of the total other donor development expenditure (SAT 208 million) over the period of MTEF 2 (Government of Samoa, Ministry of Health 2011). External loan funding for the hospital and MOH headquarters is the equivalent of 29% of the government’s total appropriations to health in 2011/12.²¹ The creation of these two new buildings in Apia has substantial implications to the extent that development financing now directly addresses national health priorities, for it swings resource allocation toward infrastructure. The extent to which the possibly long tail of recurrent expenditure associated with these two new buildings (electricity, air conditioning, maintenance, and cleaning) has been factored into future budget planning is also unclear.

government and development partners. Such approaches are designed to be more in keeping with the Paris Declaration on Aid Effectiveness and the Accra Agenda for Action.

²⁰ The balance of SAT 15.4 million (2.4%) is a balancing item.

²¹ Page XIII of the budget statement for 2011/12 states that SAT 20.3 million is being provided for the National Medical Centre and MOH headquarters from the government of China. This is 29% of the SAT 69 million in government appropriations for 2011/12.

3.16 Against that background, it is important to assess current and future health-financing challenges in Samoa. One obvious challenge is government's capacity to keep funding increases in health expenditure in a sustainable manner. Several factors are driving this. Government expenditure on health is already relatively high in per capita terms, and as a share of government budgets. As can be seen in figure 1.4 below, absolute levels of government expenditure have been rising. General government expenditure on health (including external financing) rose from SAT 30 million in 2000 to SAT 88 million in 2009 (latest year available under the National Health Accounts) and is estimated to be SAT 110.6 million in 2011/12. Government appropriations to health have more than doubled in nominal terms since the first NHAs were produced nearly ten years ago.²² Long-term financial sustainability under current arrangements must be questionable when government expenditure on health in 2010/11 (SAT 64.8 million) is expected to exceed total Pay As You Earn (PAYE) income tax (SAT 46.8 million) and company income tax (SAT 9.59 million) *combined* by 15% (Government of Samoa, "Approved Estimates of Receipts and Payments for the Financial Year Ending 30 June, 2011," (Government of Samoa 2011) p.vi). Government expenditure on health is high, and rising, in relative terms too: table 1.2 shows that general government expenditure on health was 70.4% of total health expenditure in 1995. This had risen to 87.3% by 2009 (latest year available under the NHA).

²² Government appropriations were SAT 30.5 million in 2002/03 and SAT 69 million in 2011/12.

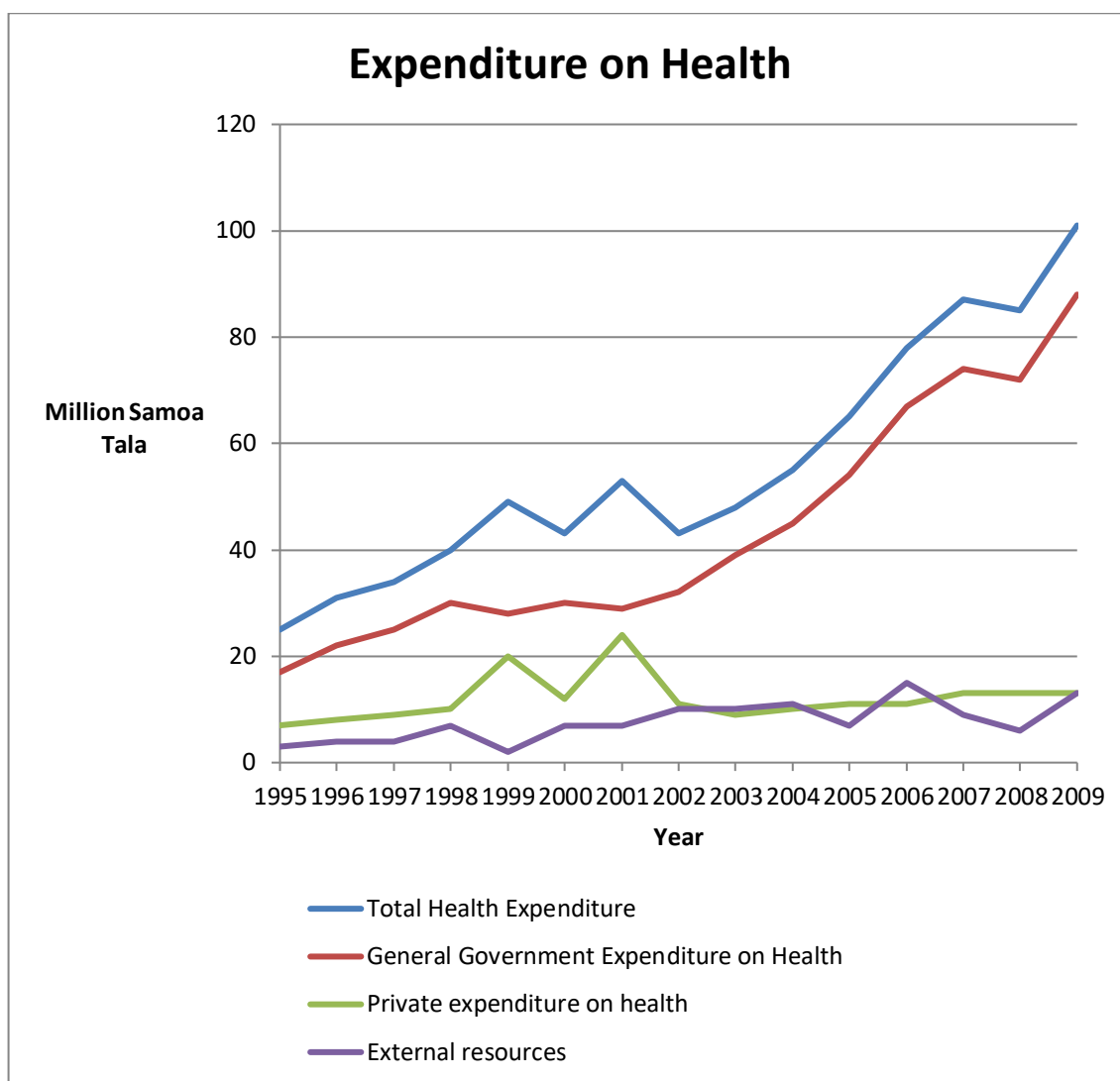


Figure 1.4: Expenditure on health (SAT, millions, current prices)

Source: Samoa NHAs: 2002/3; 2004/5; 2006/7; 2008/9 (Government of Samoa 2012).

3.17 Second, and related to the preceding point about long-term financial sustainability, government receives negligible receipts and cost recovery from the health sector. For reasons discussed in paragraph 4.29 onwards, cost recovery is a complex and sensitive issue. Among other things, it may be a financial barrier to accessing health care and requires very careful targeting so that it is introduced for those who can afford to pay user fees. However, at this point it is worth noting that total receipts from all sources in the health sector in 2011/12 in Samoa are projected to be just SAT 60,600 (US\$25,000). This represents just 0.08% of the total SAT 69,064,202 (US\$28.4 million) government appropriations to the health sector in that year (Government of Samoa 2011). Cost recovery will never solve the challenge of sustainability. However, the government must decide if this small revenue effort — an

estimated 0.08% of government expenditure — from the health sector is appropriate for a country with a GDP per capita of about US\$2,980.

3.18 Cost recovery from the National Kidney Foundation (NKF) is similarly small. Patient treatment fees totalled SAT 84,340 or just 1.6% of the government appropriation to the NKF; not sufficient to cover the electricity charges of the Foundation: see Annex 1.

3.19 The third health-financing challenge is that expenditure is still largely focused on inpatient curative care more than primary and secondary preventive care. Table 1.7 below presents the main items of expenditure by function from the latest available National Health Accounts. It shows that inpatient curative care absorbed over one-quarter (26.4 percent) of total health expenditure in 2006/07 (latest year available). Per capita expenditure on total inpatient curative care, including overseas treatment, was over one hundred times more than per capita expenditure on prevention of NCDs, and almost eighty times what was spent per capita on maternal and child health and family planning. Even allowing that hospitals and clinics provide some health promotion and education, which is captured as inpatient care, it is clear that the focus is on curative care. Furthermore, per capita expenditure on traditional health care was more than seven times the amount spent on prevention of NCDs. And while allocating more resources to promotive and preventive care would appear to be a strategic investment, care should be taken to ensure that it is actually effective. Many countries have found that simply spending money on general advice about nutrition and exercise is ineffective and wasteful: the complex social determinants of health behaviour also need to be addressed.

Table 1.7: Allocation of total health expenditure by function, selected items, 2006/07
(latest year available)

Function	Amount (SAT)	Total health expenditure (%)	Per capita (SAT)
Total inpatient curative care	20,769,519	26.4	114.91
Of which:			
• Inpatient curative care	13,360,769	17.0	73.92
• Inpatient curative (overseas)	7,408,750	9.4	40.99
General government administration of health	13,480,875	17.1	74.59
Basic outpatient medical and diagnostic services	8,424,424	10.7	46.61
Pharmaceuticals and other medical nondurables	8,061,703	10.2	44.60
Capital formation of health care providers	7,002,458	8.9	38.74
Traditional health care	2,237,664	2.8	12.38
Prevention of communicable diseases	5,400	0.0	0.03
Prevention of noncommunicable diseases	305,204	0.4	1.69
Maternal and child health, family planning, and counselling	260,843	0.3	1.44
All other expenditure items (including education and training of health personnel, research, outpatient dental care)	18,132,718	23.2	
Total	78,680,808	100.0	435.30

Source: Government of Samoa, Ministry of Health, Samoa National Health Accounts FY 2006/7, p. 20.

3.20 In one sense this heavy emphasis on inpatient curative care is certainly understandable. Households may not wish to spend money on prevention but will seek treatment when serious disability occurs. Government has also explicitly recognized (see paragraph 1.4 above) that the country is already in the midst of an epidemic of NCDs, and wishes to help its citizens by treating (although rarely curing) those most seriously affected. The proportion going to treatment is also consistent with levels found in developed countries. However, the policy challenge facing the government is whether

health resources achieve better health outcomes for more people and lower overall costs for governments if more resources are shifted toward prevention.

3.21 Another health-financing challenge for Samoa is that some fast-growing items of public expenditure have questionable health outcomes, and are not pro-poor. For example, a study by the Ministry of Health noted that the Overseas Treatment (OVT) scheme absorbed 15% of total public health expenditure in 2009/10, to the private benefit of less than 0.1% of the nation's population. OVT absorbed 11% of total public health funding in 2008/09, and this had grown to 15% by 2009/10. Expenditure on OVT almost matched the entire public expenditure on outpatient curative care (SAT 6.98 million) in 2006/07 (Government of Samoa, Ministry of Health 2010b). Since that study was undertaken, expenditure on OVT has continued to grow. Total expenditure on OVT has increased 30% in nominal terms since 2007/08.²³ Expenditure on the Overseas Treatment scheme is now 30% higher than the total personnel costs and associated allied services at the main TTM Hospital in Apia.²⁴ As figure 1.5 below shows, public expenditure on OVT (SAT 10.5 million in 2011/12) is now also larger than the total budget of at least ten other important government departments or authorities, including the Ministry of Women, Community, and Social Development; the Ministry of Revenue; the Ministry of the Prime Minister; and the Legislative Assembly.

²³ From SAT 8.0 million in 2007/08 to SAT 10.5 million in 2011/12.

²⁴ SAT 10.5 million for OVT compared to SAT 8.0 million for personnel at the TTM hospital in 2011/12.

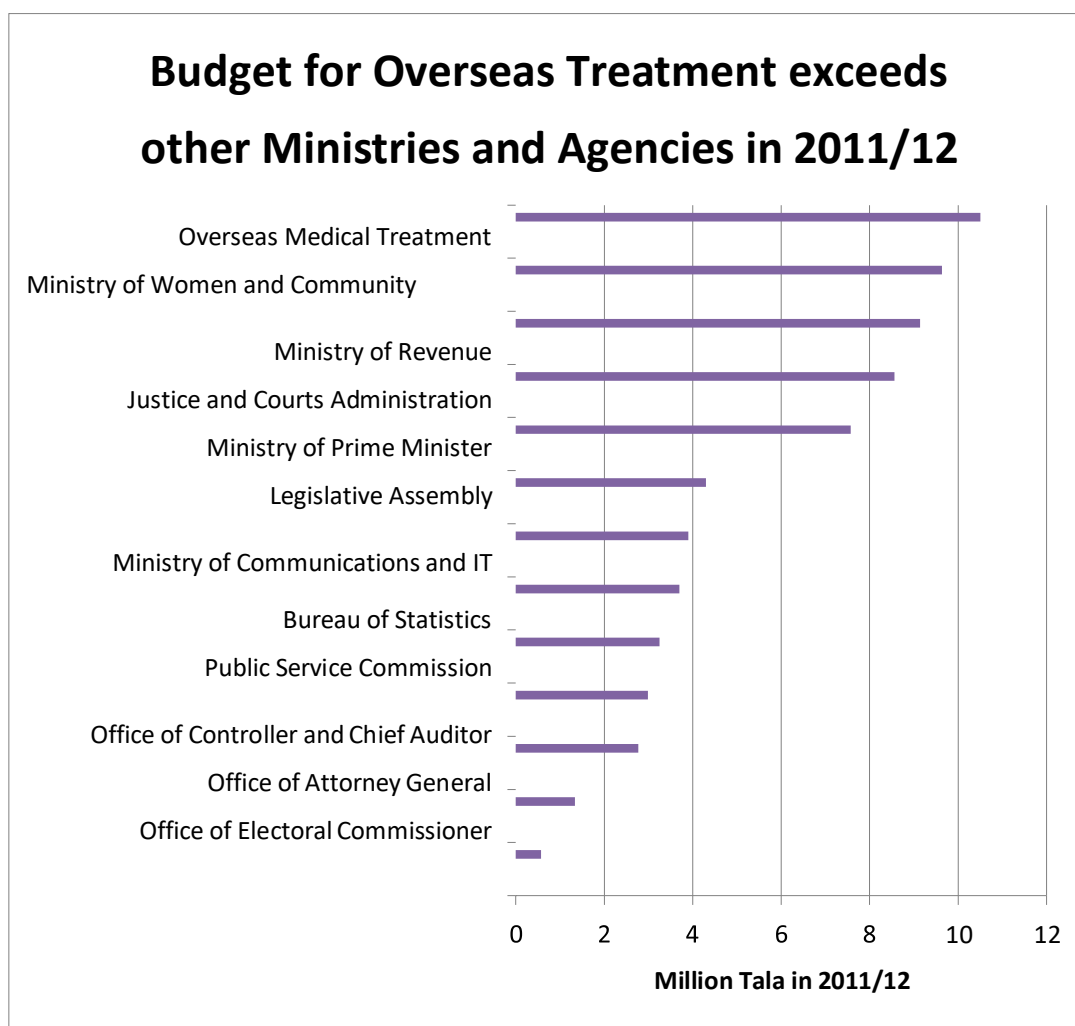


Figure 1.5: Overseas treatment budget exceeds budget of other key ministries and agencies

Source:(Government of Samoa Ministry of Health 2011).

3.22 Despite its high cost, it is not clear that OVT is generating strong health outcomes, especially for the poor. The uncertainty surrounding actual health benefits occurs because the medium- to longer-term health outcomes of OVT patients is not collected, let alone systematically analysed. However, interviews with well-informed Samoan health managers yield some important insights. Their informed view is that those Samoans receiving kidney stone treatment or eye cataract surgery in New Zealand generally have many years of subsequent good health.

3.23 On the other hand, their impression is that cancer patients — constituting about 12% of the program — typically have their life extended by two to three years. A simple

(unweighted) average cost²⁵ of OVT treatment at SAT 36,965 per patient, (US\$16,135) is 5 times the average GNI per capita of Samoans.²⁶ Samoa will need to decide if this is affordable, and the best use of scarce health resources in a lower-middle- income country. Clearly, no one should suffer pain from cancer, and all Samoans should have access to good quality, affordable, compassionate palliative care and pain management. However, OVT does involve a high opportunity cost:²⁷ the average cost of SAT 36,965 for one patient could be used to provide a wide range of health care for a larger number of Samoans.

3.24 Nor is it clear that the OVT is pro-poor. As noted in figure 1.1 of this paper, some important NCDs in Samoa appear to be disproportionately concentrated among the wealthier quintiles. The co-payment of an airfare to New Zealand and accommodation for any person accompanying the patient are important financial barriers in a country where the average per capita income is US\$3,220 per year.

3.25 A similar question about the balance between the public cost and the private benefits of health care arises with the National Kidney Foundation. While much cheaper than sending patients to New Zealand, dialysis at the NKF is still expensive at approximately SAT 92,110(US\$38,686) per patient per year: see Annex 1 for details. However, cost recovery from patient fees covers less than 1.6% of NKF's budgets. Importantly, about one- third (31%) of patients die in less than a year after starting treatment, and nearly two thirds (64%) have died within two years As is the case with cancer patients, it is essential that all Samoans with end stage kidney failure are treated compassionately and kindly, with good access to palliative care and pain relief. Whether government can afford expensive dialysis treatment, when health outcomes are measured largely in months, is something that Samoa will need to decide. Certainly, informal musings among some health professionals about the desirability of having a

25 The average cost of treatment for a cancer patient under the OVT is not known. This would be an important figure to know and understand.

26 GNI per capita of US\$3220 using the World Bank Atlas Method. Reference: <http://siteresources.worldbank.org/DATASTATISTICS/Resources/GNIPC.pdf>.

27 Opportunity cost seeks to measure the benefit of the next best alternative use of resources. Opportunity cost has been defined by *The Economist* magazine as follows: "The true cost of something is what you give up to get it. This includes not only the money spent in buying (or doing) the something, but also the economic benefits that you did without because you bought, or did, that particular something and thus can no longer buy, or do, something else" (2000)

kidney transplant facility in Samoa appears to be technically and economically unjustified at this stage. Officials at the NKF believe a key explanation for the relatively poor outcomes in terms of extending life are that patients are diagnosed, referred and commence treatment for kidney disease too late. This, in turn, suggests that reallocating resources from extending life by a few months through dialysis to primary and especially *secondary* prevention to prevent or at least postpone onset of severe kidney disease and dialysis would appear to be a good investment in both public health and public finance. Annex 1 has further details.

Section 4: Options to respond

4.1 The “business as usual” case is, ultimately, not sustainable. The preceding sections show that while Samoa has many positive health and health-financing features on which to build its future, the country also faces important challenges. Samoa must therefore prepare for even greater demands from NCDs on the public health system in coming years. That is because the existing risk factors for increased levels of chronic and expensive-to-treat NCDs, such as diabetes, are clear: 86% of adult Samoans are overweight or obese according to the 2011 Village Health Survey (Government of Samoa Ministry of Health 2011), of these 26% are overweight, 46% are obese, and 14% are morbidly obese. Yet health is already the second-highest recipient of government expenditure and, at 16% of total government expenditure, may not have much more room to grow. Fast-growing economies can continue to devote increased absolute, if not relative, levels of resources to health to meet the rising challenge of NCDs. But the government’s own projections are cautious about future economic growth (and therefore revenue) prospects (Government of Samoa 2012).

4.2 Furthermore, there is no reason to think that the current health-financing system can self-correct and put itself on a more financially sustainable and equitable path. Indeed, a sense of entitlement about “free” health care and rising expectations are likely to put more pressure on government over time. In the absence of self-correcting mechanisms, government, supported by the Ministry of Health, needs to continue taking proactive policy decisions about public expenditure and resource allocation to put the country on a more affordable, effective, efficient, equitable, and sustainable basis.

4.3 Before considering specific options for health financing in Samoa, it is worth establishing some higher-order principles and criteria against which options can be judged. Only government, supported by the MOH, can ultimately decide those principles, because they are at the heart of the sort of health outcomes Samoa wants for its people, and what it can realistically afford. There is certainly a role here for vigorous public debate and discussion about what Samoans at the personal and community level believe should be key public health priorities. Public finance theory and international experience offer some insights into principles that Samoa might find useful in screening various options.

4.4 More specifically, government in Samoa might decide that any options for health financing should be screened against the following criteria. Government might decide that options should be demonstrably and substantively *outcomes-oriented*, promoting or restoring health and avoiding *premature* deaths rather than being input- or activity-focused, or extending life for only a few months for the very elderly. Government might also decide that selected options should also be *affordable*, not just for individuals and households, but ultimately for government as well. Selected options should also strike the right *balance between the public and the private sector*: Government should focus on those areas where it has comparative advantage (promoting public goods, responding to market failures, reducing poverty and inequity) and encourage (viable and suitably regulated) private sector participation. Government in Samoa might also decide that selected options should strike the right balance between *efficiency* and *equity*. Ideally, selected options should also be technically effective, economically efficient, and politically feasible, and should build on the strengths of any existing system.

4.5 While no country has been able to apply all these principles, they are arguably a good starting point for screening options and prioritizing policy responses.

4.6 Against that background, this section now assesses eight broad health-financing options for Samoa. The eight options are the following: (1) increasing government expenditure via higher general taxation; (2) increasing government expenditure via deficit financing; (3) increasing the share of government expenditure to health; (4) increasing external and donor financing; (5) increasing specific taxes; (6) mobilizing additional nongovernment resources via insurance (including social health insurance,

and community and private insurance); (7) increasing cost-recovery measures; and (8) increasing efficiency. These eight options build on well-established and systematic ways of assessing health financing, especially in developing countries (Tandon and Cashin 2010; World Health Report 2010; Roberts et al. 2008; Gottret and Schieber 2006; WHO Western Pacific Region 2006).

Option 1: Increasing general taxation

4.7 Increasing the general level of taxation, and then applying some or all of that planned-for increase in revenue to the health sector has some advantages in Samoa. Raising the taxation level is technically and administratively a relatively simple option compared to other options — such as social health insurance (SHI) — although it may well be politically difficult. To the extent that taxation is raised from income taxes, it is progressive, drawing more from wealthier Samoans than poorer ones (although excise taxes and VAT are regressive, taking proportionately more from lower-income groups). Development partners are likely to welcome government efforts to raise its own resources and may even be more inclined to support such efforts with their own financing.

4.8 However there are also important counterarguments. Tax revenue is an estimated 25.1% of GDP,²⁸ which is already quite high for a lower-middle-income country. Raising taxes can introduce distortions to the economy,²⁹ and/or raise inflationary pressures if firms have the capacity to pass on increased taxes. If general taxes were to be raised to pay for health, the sequencing of events would need to be taken into account to make the tax increases more politically acceptable. For example, government might need to borrow or rely on external financing to first refurbish and rehabilitate existing health facilities so that the public sees tangible improvements and benefits in the health sector before the tax impost occurs. More fundamentally, however, a “business case” would need to be established for additional financing from general taxation, when the health sector already receives approximately 16% of

²⁸ IMF 2010; table 1.2.

²⁹ Generally known as “deadweight losses,” as the tax drives a wedge between the prices consumers would have otherwise been prepared to pay and suppliers would have otherwise received, in the absence of the tax.

total government expenditure and was the second-largest call on the government budget in 2011/12.

Option 2: Increase the budget for health through broader macroeconomic-level deficit financing

4.9 In theory, government could increase its fiscal deficit (that is, spend more than it generates through revenues) and/or borrow to pay for increased public expenditure on health.³⁰ The most recent (July 2010) IMF Article IV consultations note that Samoa has had a prudent approach to fiscal deficits, and had at that time “low risk of debt distress” (IMF 2010). Some might argue this provides room to increase the fiscal deficit to provide more funds for health expenditure.

4.10 However, deficit financing at the macroeconomic level to support increased health expenditure is a very unattractive option in Samoa for several reasons and is not recommended for any further study. Prudent deficit financing is appropriate for investments that generate returns greater than the cost of borrowing, or to make up shortfalls in private expenditure; neither of which is the case with respect to recurrent health financing in Samoa. Borrowing should usually be used to finance investment, not running costs. Deficit financing also imposes financial costs on the macroeconomic indicators and reduces the capacity of government to respond to economic shocks to the system. Fiscal 2009/10 already saw the need for an expansionary budget in Samoa, with a deficit equivalent to 11% of GDP in view of the need to stimulate economic activity following the global financial crisis and earlier reconstruction efforts from the tsunami. Government has prudently stated its intention to reduce — not increase — the fiscal deficit to about 3% of GDP, which the IMF concludes “would stabilize the net present value of public debt to about 40% of GDP a comfortable level, providing room to absorb future shocks” (IMF 2010). What matters from a macroeconomic perspective is the ability of the government to take on any more borrowing without jeopardizing debt sustainability or introducing distortions into the country’s capital markets. Again, a strong business case would be needed to explain why the health sector needs additional

³⁰ In theory, governments also have the option of increased expenditure through inflation by, in effect, printing money. This, however, is a potentially high-risk approach as inflationary expectations and inflation can become embedded in the economy with consequent heavy social and economic costs on society, and is therefore not a recommended option.

financing from broader macroeconomic deficit financing, when it is already the recipient of about 16% of total government expenditure, the second-largest of the government budget.

Option 3: Increase the share of government expenditure to health

4.11 In a growing economy, the health sector will receive an increased level of resources, assuming government tax revenue increases with economic growth, and the health sector's share of government expenditure stays the same. However, given the increase in government health expenditure over recent years (table 1.2) and recent growth experience (-3.9% in 12 months to September 2009, and real GDP growth of 2% in year to September 2010), this is not a solid foundation on which to expect increased funding.

4.12 Government could, of course, increase the *proportion* of funding to the health sector. This is essentially a political decision, reflecting national priorities, rather than an economic decision. And it could only really be justified if the MOH was able to demonstrate with convincing evidence that public expenditure is generating the public health benefits that government expected. This, of course, is difficult to do in any country, not least because so many factors outside the health sector affect health outcomes, including socioeconomic determinants, genetics, and lifestyle factors.

4.13 However, this option is not recommended, given Samoa's circumstances. Reallocating resources to the health sector is a zero sum event, with any increases being offset by reductions in other sectors. Once again, it is hard to sustain an argument that the health sector is more deserving of an increased share of government resources, when it already absorbs about 16% of government expenditure, and is the second-largest recipient of government resources. This is therefore not a strong or compelling option.

Option 4: Increasing the call on external resources

4.14 This is a plausible option. Samoa has already attracted long-term support from bilateral and multilateral development partners. The characteristics that attracted such long-term external support to Samoa's health sector — modest prospects for economic growth, committed and reforming government, a health ministry prepared to explore

more evidenced-based policy making, a desire among development partners to support Samoa's own response to the rapid growth of NCD's — are all still present. Accessing additional resources from development partners has the added advantage that it can “buy reform space” among the community while government works on other reforms. For example, it is often politically easier for government to introduce higher taxes or cost-recovery measures in the health sector if the community first sees tangible improvements in facilities. Development partners can help here: they can fund refurbishment and rehabilitation of rural clinics and other facilities, knowing that government will then be better placed to mobilize domestic resources, either through increased taxation or cost recovery linked to the health sector. Unfortunately, experience elsewhere suggests that, far from aid “buying reform space,” the existence of aid actually allows governments to *defer* much-needed reform. Fortunately, the existence of a SWAP in Samoa and of a Medium-Term Expenditure Framework provides a potential framework for government and development partners to engage strategically in a way that uses external financing to support, not defer, reform. The existence of the SWAP and a MTEF actively led by government also offers the opportunity for negotiating longer-term, predictable, financing by development partners.

4.15 However, over-reliance on external financing should be avoided. External financing is already relatively high in Samoa. Development partners provided 37% of the total SAT 110.6 million publicly financed allocation to health in Samoa during 2011/12 (Government of Samoa 2012). Even after deducting the large (SAT 26.12 million) “lumpy” externally sourced one-off soft loan for the MOH headquarters and hospital buildings, development partners still account for about 20% of total health financing in 2010/11.³¹ Government and development partners may be prepared to see a relatively high dependence on external financing to help Samoa advance against the NCD epidemic; invest in primary and secondary prevention; and carry out other reforms that put Samoa on a long-term, sustainable path to better health outcomes for all. However, government, and development partners themselves, will not wish to see Samoa overly

³¹ SAT 16.8 million from foreign capital project grants, compared to government-appropriated expenditure for health of SAT 64.88 million in 2010/11 (Government of Samoa (2011) Approved Estimates of Receipts and Payments for the Financial Year Ending 30 June, 2011, p. VIII.

dependent on foreign aid, as this raises fundamental questions about long-term sustainability. This is all the more the case as Samoa moves from lower-middle-income to middle-income status over time.

Option 5: Raising specific taxes

4.16 Increasing taxation on tobacco is a high priority and strongly recommended option for Samoa because it *simultaneously* raises revenue for government while stemming the rise of NCDs. Samoa faces two large public policy challenges in the health sector: How to stem the rise in NCDs, and how to make the financing of its health system more sustainable. Taxation on tobacco directly — and simultaneously — addresses these two overarching challenges.

4.17 Like most other developing countries, Samoa now faces a tobacco epidemic. Almost half (49.4%) of males age 30 to 34 smoke; of those that do, 62.4% smoke more than ten cigarettes per day. Similarly, almost one in five females age 25 to 35 now smoke; of those that do, about one-third smoke more than ten cigarettes a day (Government of Samoa 2010a). Households now spend, on average, SAT 2.48 on tobacco and alcohol for every SAT 1 they spend on medicines (Samoa Bureau of Statistics 2008). WHO recommends that excise duties alone (that is, before import duties or value-added taxes) should be at least 70% of the retail price of cigarettes. Excise duty at that level then becomes an important component in curbing tobacco consumption and uptake, especially among the young (WHO 2010b). Analysis undertaken by Ministry of Finance officials during WHO Workshops on Tobacco Taxation in Auckland, New Zealand, in June 2012, highlighted the benefits of increasing excise rates on tobacco in the Pacific. For example, in the case of Samoa, it was estimated that raising the excise rate on cigarettes by 50% would increase cigarette excise revenue by approximately 14% per annum. This translates to an extra excise revenue of SAT 3.6 million per annum. Final consumer prices of cigarettes in Samoa would increase by about 30%, with the share of excise in the final price rising from 47% to 54%. This would also reduce uptake (and addiction) by the young.

4.18 Reducing tobacco use is now seen as one of the highest and most effective public health interventions available to developing countries. As noted in a recent article on NCDs in *The Lancet*:

The main risk factors for NCDs for individuals are well known and are similar in all countries. Tobacco use, foods high in saturated and trans fats, salt, and sugar (especially in sweetened drinks), physical inactivity, and the harmful consumption of alcohol cause more than two-thirds of all new cases of NCDs and increase the risk of complications in people with NCDs. Tobacco use alone accounts for one in six of all deaths resulting from NCDs.

The Lancet NCD Action Group and the NCD Alliance propose five overarching priority actions for the response to the (NCD) crisis — leadership, prevention, treatment, international cooperation, and monitoring and accountability — and the delivery of five priority interventions — tobacco control, salt reduction, improved diets and physical activity, reduction in hazardous alcohol intake, and essential drugs and technologies. The priority interventions were chosen for their health effects, cost-effectiveness, low costs of implementation, and political and financial feasibility. The most urgent and immediate priority is tobacco control.

We propose as a goal for 2040, a world essentially free from tobacco where less than 5% of people use tobacco (Beaglehole et al. 2011).

4.19 Raising the price on tobacco to a significant level, and then maintaining it in real terms in relation to inflation, may not decrease consumption among those already addicted, but it does have the demonstrated benefit of reducing new uptake (and subsequent addiction) by the young in Samoa (Abedian et al. 1998). Increasing the tax on tobacco, and ensuring it is maintained in real terms in line with inflation, has a high likelihood of increasing government revenue, due to the price inelasticity of the product (Abedian et al. 1998). Such action is administratively easy compared to other ways of raising government revenue. As an island, Samoa will have fewer difficulties with smuggling (although it will inevitably have some) than if it were landlocked with highly porous borders. Earmarking taxation on tobacco as an additional source of income for the health sector also sends an important public message, alerting the community to the adverse links between tobacco and health. Another argument in favour of such earmarked (“hypothecated”) taxes on tobacco is that it may be easier to convince the public if they can see exactly where the tax is being spent and that it is being put to good use.

4.20 There will be some criticism about raising tobacco taxes and ensuring excise duties are maintained in real terms against inflation, but these can be managed. One criticism is that tobacco taxation is regressive, taking more of poorer people’s income than that of the rich. That is true, although it can be equally argued that spending by the

poor on tobacco is itself a potential cause of impoverishment (money spent on tobacco could have been spent on food, housing, or education) and is an example of market failure (tobacco consumption is addictive) that governments are entitled — indeed obliged — to correct. Another criticism is that hypothecated taxation directed to the health sector violates good public finance policy: taxes should be pooled nationally and allocated to their best use rather than directed to a favoured sector. Although this is also true in principle, in the context of Samoa, where NCDs are prominent and health financing must be made more sustainable, there are good reasons for arguing that taxation on tobacco should be raised and added to the health budget. (Whether or not to earmark additional taxes to the health sector is ultimately the decision of ministers and the Ministry of Finance, bearing in mind the arguments for and against hypothecated taxes). A third criticism is that tobacco taxation can damage a legitimate, legal industry, costing jobs. This tends to be an exaggerated claim (Abedian et al. 1998). It ignores the offsetting costs imposed on the public health system in treating otherwise preventable cancers, heart ailments, and lung disease, and the likelihood that resources freed up from producing or selling tobacco will be reabsorbed elsewhere in the economy.

Option 6: Mobilizing revenue through insurance, including social health insurance

4.21 Social health insurance³² (SHI) is a plausible, but longer-term, option for Samoa.

4.22 SHI has, at least in principle, several advantages. In developing countries where the general tax base is small, SHI can mobilize additional financial resources. Premiums may also be easier to collect than general taxes because they can be collected directly by employees. SHI can be a more stable and predictable form of financing, possibly less reliant on overall business cycles than general taxation, and/or yearly negotiations with ministries of finance. SHI can be mildly progressive (wealthier pay proportionately more than poorer) and redistributive (revenue raised from wealthier people in the formal sector can cross-subsidize poorer people). SHI can reflect a country's sense of "social

³² Social Health Insurance, as noted by Gottret and Schieber (2006, p. 84), is not an easy term to define. However, SHI typically involves, or starts, as compulsory payroll deductions in the formal sector. Those deductions are pooled (as are the health risks) to help pay certain defined health expenditures, either directly or through third parties. Governments sometimes extend SHI to those outside the formal sector by, in effect, subsidizing their premiums and contributions.

solidarity” and concern to ensure vulnerable people are not excluded from essential care (Gottret and Schieber 2006; WHO 2010c; WHO 2005; Roberts et al. 2008; Normand and Weber 2009).

4.23 However, SHI has some important weaknesses and involves several challenges that are relevant to Samoa’s current situation. SHI works well when there is a formal sector large enough to mobilize additional revenues and pool risks. It is not clear that this is yet the case in Samoa, where the formal sector employment was just 20, 745, or just 11% of the total population of around 184,000 at the end of September 2010/11 (Government of Samoa, Ministry of Finance 2011). Worse, the existence of compulsory SHI premiums, on top of compulsory income taxation, may actually *discourage* individuals from joining the formal sector: the very opposite of government long-term intentions. Compulsory SHI is also a cost to industry, which — depending upon its level of employment intensity and price elasticities of the market — could result in either reduced profits for the firm or increased costs for consumers. SHI is also, in effect, an earmarked (hypothecated) tax on members and employers, which ministries of finance in some countries resist, believing it better to bring all revenues into a central pool.³³

4.24 Perhaps most significantly, SHI involves formidable technical, managerial, actuarial, and administrative demands even — or perhaps especially — in developing countries. While acknowledging the benefits and importance of SHI, Hsiao et al. (2007) identified fourteen such substantive challenges to introducing SHI in developing countries. Among these is the fact that SHI is complicated, and implementation takes many years; achieving universal population coverage has taken decades in most countries; benefit packages must be explicit and costed carefully; user fees must be in place and must be sufficient to motivate populations to join SHI voluntarily; stakeholders must be convinced of the actuarial soundness of SHI; SHI agencies must be able to negotiate and implement purchasing and provider payment mechanisms that ensure delivery of services and goods at minimal cost (WHO and Republic of Rwanda, Ministry of Health 2008). Even with these conditions in place, SHI premiums may still prove

³³ They do so because they believe it is better public policy to bring all revenues into a central pool — not reserve revenue for the sector in which it was first generated — and then reallocate resources according to overall national priorities. For the same reason, ministries of finance in some countries resist the idea of hypothecated taxes on tobacco or alcohol, where the revenue is retained in the health sector.

insufficient to cover health care, and so additional general taxation and/or user fees may be required.

4.25 If these set-up and implementation challenges are met, there is still an additional challenge in the case of Samoa: the more successful SHI is in Samoa in breadth and depth of coverage, the more demands will likely be placed on the health system for curative care. SHI schemes rarely cover promotive or preventive care but do encourage or facilitate people to make use of their contributions by accessing the curative health care system.

4.26 Samoa passed legislation that allows it to introduce SHI at some time in the future. This is a useful long-term goal. Government may wish to keep the option of introducing SHI under active review, while concentrating on policy interventions that are administratively easier and yield quicker results than SHI.

4.27 For similar reasons — including management and technical complexity — community-based insurance, medisave accounts, and private health insurance are more medium- to longer-term options goals in Samoa. They are useful options to keep under active review by the MOH but are unlikely to yield significant new and additional resources or improved health outcomes in the coming years so are not considered further in this paper.

Option 7: Increasing levels of cost recovery

4.28 Increasing the level of cost recovery is a plausible — but complex — option for Samoa. Should government choose to pursue that option, it must be managed carefully.

4.29 Increasing the level of cost recovery, particularly through user fees, has long and rightly been viewed with scepticism by health-financing professionals (Gottret and Schieber 2006; Creese 1991; Gilson 1997; McPake 1993). That is because user fees impose an additional cost that disproportionately affects the poor, unless carefully targeted exemption mechanisms are put in place. Even then, experience suggests that exemptions are very hard to target properly or enforce, particularly if those applying the exemptions then lose earnings, or are in a position to extract bribes. User fees may create an additional barrier to health care access for the poor, on top of existing barriers (for example, indirect costs such as transport costs from outlying rural

villages, income foregone). There is good evidence in the US context that even small copayments for drugs to treat chronic diseases lower patients' adherence and compliance to treatment (Choudry 2009). Flat user fees tend to be regressive, taking proportionately more from the poorer than the richer members of society. Collecting user fees also produces administrative costs. User fees have political costs as people are required to pay for them but see no ostensible improvement over time in the quality of facilities or services. This suggests that user fees, if they are to occur, be retained at the point of collection, added to existing revenue, and be used to improve facilities in ways that customers can see and appreciate. However, once again, this involves a form of hypothecated tax, which ministries of finance are usually reluctant to endorse (see footnote 33). User fees, once established, are also politically hard to maintain in real terms; with inflation, their resource-mobilizing benefits erode over time.

4.30 However, it could be argued that there is a case for considering some level of cost recovery — for those who can afford it — in Samoa, where user fees are currently negligible. As noted previously, total receipts from all sources in the health sector in 2011/12 are projected at just SAT 60,600 (US\$25,000). This represents 0.08% of the total SAT 69,064,202 (US\$28.4 million) government has appropriated to the health sector in that year (Government of Samoa 2011).

4.31 Cost recovery from the National Kidney Foundation (NKF) is similarly small. Patient treatment fees totalled SAT 104,320 in the year to June 30, 2011. This represented 2.3% of expenditures for the year by the NKF. As noted previously, and to put this into context, the collection of treatment fees from patients covered just 6% of medical supplies used by NKF and 24% of the NKF's electricity bill for the year.

4.32 Roberts et al. (2008) put the issue of user fees, especially out-of-pocket user fees, into perspective. On the one hand, they note:

From both risk protection and equity perspectives, out-of-pocket payment is the worst possible system for health financing. Those who are both sick and poor face the risk of either untreated disease or impoverishment — or some combination thereof. From the viewpoint of vertical equity, direct payments are highly regressive, especially given the correlation of poor health and low income. They are even worse than private insurance, which at least offers some risk-pooling possibility when there is group purchasing or when rates are regulated (p. 174).

4.33 On the other hand, the same authors make this point:

Providing financial risk protection, however, does not allow the population to avoid all the costs of health care. In fact, that cannot be done. Foreign aid aside, all health-care costs in a country are ultimately paid for by its citizens — directly or indirectly. It is simply not possible to protect those in the middle of a country's income distribution against the costs of routine medical care. If they don't pay those costs directly, they will do so indirectly via various taxes. What is relevant for achieving risk protection is helping people avoid the large and unpredictable costs of a serious illness — that is, to provide a risk-spreading or insurance, where revenues from citizens are pooled and used to pay for care for those who do get seriously ill (p. 97).

4.34 The balance between financial protection for its citizens and citizens' eventual responsibility for their own health care, ultimately is a policy point for the government of Samoa and MOH to decide. As Roberts et al. (2008) note above, user fees, especially out-of-pocket, should clearly not act as a barrier to essential care. Nor should they further impoverish poor people, increase inequity, or encourage self-medication. On the other hand, some would argue that neither should a government lean so much in the other direction that virtually *all* services are provided “free” or at notional cost to citizens. This might be especially so for relatively minor and inexpensive, curative treatments, when the individual could be expected to share some responsibility for payments. User fees will never make a health system simultaneously financially self-sufficient *and* accessible to all those in need. But as countries develop, there comes a point where notionally “free” services to everyone, including the wealthier members of society for virtually all services, need to be managed and brought into some sort of relationship with rising GDP per capita.

4.35 The government of Samoa and the MOH might therefore need, at some stage, to consider options for raising user fees above the current level of 0.08 of health expenditure for certain targeted groups and nonessential services. However, the overarching guiding principle should then be that cost sharing should only be considered if there is good evidence it will lead to significant revenues *without* detrimental impact on access, equity, and financial protection. Furthermore, some items should definitely be free at the point of delivery for most if not all Samoans: ANC, immunizations, family planning advice, infectious disease control, and screening for NCDs among high-risk groups. Indeed, there is a case for paying poorer people, through conditional cash

transfers (CCTs), to fully immunize their children, attend ANC visits earlier in pregnancy, and adopt targeted preventive measures against NCDs and other high cost diseases.

4.36 If government did at some stage decide to trial user fees, it would also be important to ensure that both equity and efficiency aspects of the health system were *simultaneously* strengthened, and not traded off against each other. For example, it is possible to envisage a system whereby wealthier people (those known to be in paid employment, with a health card government could issue), who bypass lower-level facilities and present at the outpatient department of TTM for nonurgent care, pay a user fee.

4.37 It is worth noting that user fees are not, in themselves, necessarily a problem or constraint for Samoans, including those in rural and poorer areas. National Health Account figures show, for example, that Samoans paid SAT 1.63 million to traditional healers in Upolo island, at an average of SAT 22 per visit for the top five illnesses in 2006 (Government of Samoa, Ministry of Health, *Samoa National Health Accounts 2006/7*). While much of this was “in kind” payments, it does demonstrate a willingness to pay, even for services that may or may not have been effective.

4.38 In summary, user fees may need to be considered at some stage in Samoa, given pressures on the health budget and the current low level of cost recovery. However as noted above, the overarching guiding principle should be that cost sharing will only be considered if there is good evidence it will lead to significant revenues *without* detrimental impact on access, equity, and financial protection. Furthermore, some items particularly those with a public good characteristic, like immunization — should definitely be free at the point of delivery for most if not all Samoans.

Option 8: Increased efficiency

4.39 Virtually all countries, including those in the OECD, could achieve more effective and equitable — health outcomes by improving the efficiency of resource use in the health system. Indeed, the World Health Organization recently estimated that between 20% to 40% of all health spending globally is currently wasted through inefficiency and waste. The report identifies ten leading sources of inefficiency in health. These include purchasing practices for medicines (underuse of generics, use of substandard or

counterfeit medicines, irrational prescribing policies); misaligned incentives (fee-for-service payments); management practices (medical errors, costly staffing mixes); and poor investment decisions (hospital size, technology choices) (WHO 2010c).

4.40 Improving efficiency is potentially the greatest source of increased resources and improved health outcomes for Samoa. It relies on the relatively simple but powerful argument that Samoa could do more with the valuable resources — financial, human, and management — that it already has, and that services, drugs, and equipment currently being used are not costless. In improving technical and allocative efficiency,³⁴ Samoa will not necessarily have to raise extra taxes or provide more resources to the health system. Rather, it will generate increased — and possibly more equitable — outcomes from existing resources. In doing so, it will relieve pressure on the government’s overall budget and help make health financing more sustainable. It will have the added benefit that development partners — seeing government make best use of its own resources — will be more willing to support government efforts.

4.41 Initial analysis suggests there are seven substantive areas where Samoa could reap large technical and efficiency gains. These are discussed below in order of priority (most important first).

4.42 First, Samoa could consider sharply reallocating resources toward primary and secondary prevention. Table 1.7 shows that inpatient curative care absorbed over one-quarter (26.4 percent) of total health expenditure in 2006/07 (latest year available). Per capita expenditure on total inpatient curative care, including overseas treatment, was over one hundred times more than per capita expenditure on prevention of NCDs, and almost eighty times what was spent per capita on maternal and child health and family planning. Even per capita expenditure on traditional health care was more than seven times what was spent on NCD prevention.

³⁴ A simple but appealing explanation of the difference between these two concepts is that technical efficiency is doing things right, allocative efficiency is doing the right things. That is, technical efficiency seeks to get the maximum possible given output — number of hip replacements for example — for a given mix of doctors, nurses, and equipment. Allocative efficiency, on the other hand, seeks to drive a higher level of health outcomes by reallocating scarce resources to where they are likely to have the biggest (or most equitable) impact. See Liu (2003) for further details.

4.43 Samoa will not be able to stem, let alone reverse, the NCD epidemic unless it urgently and substantively shifts the balance in favour of primary and secondary prevention. Good, effective, affordable, and cost-effective options exist for primary and secondary prevention (WHO and World Economic Forum 2011; WHO 2010a). As noted in the WHO landmark report on NCDs:

Currently, the main focus of health care for NCDs in many low- and middle-income countries is hospital-centred acute care. NCD patients present at hospitals when cardiovascular disease, cancer, diabetes and chronic respiratory disease have reached the point of acute events or long-term complications. This is a very expensive approach that will not contribute to a significant reduction of the NCD burden. It also denies people the health benefits of taking care of their conditions at an early stage....

At least three interventions for prevention and management of diabetes are shown to reduce costs while improving health. Blood pressure and glycaemic control, and foot care are feasible and cost-effective interventions for people with diabetes, including in low- and middle-income countries

Participation in 150 minutes of moderate physical activity each week (or equivalent) is estimated to reduce the risk of ischaemic heart disease by approximately 30 percent, the risk of diabetes by 27 percent, and the risk of breast and colon cancer by 21 to 25 percent. Additionally, physical activity lowers the risk of stroke, hypertension, and depression. It is a key determinant of energy expenditure and thus fundamental to energy balance and weight control (WHO 2011b).

4.44 Other studies confirm the costs of curative care versus the benefits of primary and secondary prevention. For example, Allotey et al. (2011) find that the cost of diabetes care per patient in Cameroon was US\$489 per year in 2002. This cost exceeds the annual per head income by 1.5 times and exceeds the per-head governmental health spending by approximately 50 times.

4.45 On the other hand, others find good results from use of relatively simple interventions, such as aspirin. One study, for example, found that in the primary prevention trials, aspirin allocation yielded a 12% proportional reduction in serious vascular events (0.51% aspirin *versus* 0.57% control per year, $p = 0.0001$), due mainly to a reduction of about a fifth in nonfatal myocardial infarction (0.18% *versus* 0.23% per year, $p < 0.0001$) (ATT Collaboration 2009).

4.46 Another recent study demonstrates the costs and benefits of using a multidrug regime to combat cardiovascular disease. That study is worth quoting in some detail:

We aimed to estimate the number of deaths that could be averted and the financial cost of scaling up, above current coverage levels, a multidrug regimen for prevention of cardiovascular disease (a statin, aspirin, and two blood-pressure-lowering medicines) in 23 such countries. Identification of individuals was limited to those already accessing health services, and treatment eligibility was based on the presence of existing cardiovascular disease or absolute risk of cardiovascular disease by use of easily measurable risk factors. Over a ten-year period, scaling up this multidrug regimen could avert 17.9 million deaths from cardiovascular disease (95% uncertainty interval, 7.4 million to 25.7 million). 56% of deaths averted would be in those younger than 70 years, with more deaths averted in women than in men owing to larger absolute numbers of women at older ages. The ten-year financial cost would be US\$47 billion (US\$33 billion to US\$61 billion) or an average yearly cost per head of US\$1.08 (US\$0.75 to US\$1.40), ranging from US\$0.43 to US\$0.90 across low-income countries and from US\$0.54 to US\$2.93 across middle-income countries. This package could effectively meet three-quarters of the proposed global goal with a moderate increase in health expenditure (Lim et al. 2007).

4.47 Of particular importance in the case of Samoa is to identify the health and financial benefits of secondary prevention: preventing patient “progress” of an already diagnosed patient to a higher level of treatment. Annex 1 shows the high absolute and relative cost of treating a diabetic patient with dialysis: an estimated \$US 38,686 per patient per year or around 12 times the GNI per capita. If government focused more on screening, early referral, and early adherence to interventions that retard the progression of a disease like diabetes, then health outcomes for a large number of Samoans would be improved and public savings would occur. The net savings to government could potentially be very large. As noted in Annex 1, even if secondary prevention through provision of medicines and testing cost \$US1000 per patient per year, government would still save an estimated \$US37,686 per patient per year in averted costs of dialysis, other things being equal.

4.48 Indeed, it may be far more cost-effective for the health system to pay patients a “performance payment” if they reduce their blood pressure and stabilize at a lower level of care, than it would be to have them flown overseas. The use of such conditional cash transfers and pay for performance has a mixed record internationally but, if carefully designed, it can be a useful mechanism for attacking constraints on the demand or

supply side, providing incentives for better health outcomes, and providing financial support for the poor and vulnerable.

4.49 Conditional cash transfers (CCTs) might also be used to address some of the gaps in primary and preventive care. As noted previously, there are relatively low rates of immunization among one-year-olds against measles, and women tend not to make ANC visits in the first trimester of pregnancy. Because both immunization and ANC visits are usually pro-poor³⁵ and highly cost-effective, they yield potentially large strategic gains in helping to close such coverage gaps. The first step would be to better understand the underlying reasons for these gaps and ascertain if they are due to factors on the demand side (lack of perceived need, or means, to access the service) or the supply side (lack of incentive, or funds, to provide outreach services). Depending on the findings, CCTs could be trialled to see if providing women (or, if a supply-side constraint, health providers) a performance payment on completion of immunizations or for ANC visits closes the gaps. If so, such payments may prove to be cost saving if they avert more expensive-to-treat medical complications.

4.50 Reallocating funds to primary, including currently underfunded family planning and maternal care, as well as secondary care is possible in Samoa. That is particularly the case if government were able to limit expenditure for the OVT program, where curative costs are high and benefit less than 1% of the population. Allocating increased revenue from taxation on tobacco, and/or revenues via some level of cost recovery, is also possible. Different approaches are possible to facilitate any such reallocation. One option is to directly cut budgets in certain lower-impact (or pro-rich) activities, to allow expansion in more high-impact (and pro-poor) ones, such as promotion of family planning. This course of action, of course, has political visibility and may therefore be difficult to achieve. An alternative might be to freeze current budgets in real or nominal terms for lower-priority/lower-impact activities and allow growth to occur in the higher-priority/higher-impact activities.

³⁵ That is, lower quintiles tend to then capture disproportionately large benefits, because infants in poorer circumstances are arguably more exposed to communicable diseases such as measles, and because poorer women tend to have more children, and so would benefit from ANC visits.

4.51 A second priority worth exploring in Samoa is reallocating expenditure to maintenance. Currently maintenance is allocated only SAT 60,000 under the recurrent budget of SAT 68.8 million for 2010/11 (Government of Samoa (2011), “Approved Estimates of Receipts and Payments for the Financial Year Ending 30 June, 2011”). This means it is so small it is recorded as 0% of the recurrent budget. Maintenance attracts just SAT 2 million out of a total budget of SAT 53.5 million — just 3.8% of the latest NHS budget (Government of Samoa (2010), National Health Services 2010). Of course, it may be that maintenance expenditure is actually captured by some other costing labels, or perhaps even the responsibility of other departments, such as the Ministry of Public Works. Whatever the explanation, the fact remains that useful, usable, and reliable information on maintenance expenditure is not available, and will inevitably remain below the radar of policy makers.

4.52 The lack of investment in maintenance imposes large — and largely preventable — longer-term costs for the public health budget. Some of these costs are direct and obvious: facilities and equipment will need to be replaced sooner than their technical or economic life would otherwise require had there been proper periodic maintenance. Other costs are more indirect: rural villagers may understandably walk past dilapidated rural clinics and go directly to (higher-cost) secondary and tertiary clinics, imposing high (but hidden) costs on the public health system.

4.53 A third priority for efficiency would be for government to consider trialling public/private partnerships and contracting with the private sector. A well-conducted, and well-publicized, study in Cambodia shows that contracting models can simultaneously improve access, outputs, efficiency, and equity, even in low-income settings such as Cambodia (Bhushan et al. 2005). While conditions in Cambodia are, of course, very different than those in Samoa, there are nevertheless some interesting and important underlying principles that emerge and could be broadly relevant in Samoa as well. Key findings from that study are as follows:

Contracted-out districts experienced an impressive increase in the use of reproductive health services, where, for example, coverage of antenatal care increased by more than 400 percent, compared to contracted-in and control districts where coverage rose by 233 and 160 percent, respectively. Success in the coverage of child health services also followed a similar pattern.

Immunization rates increased in contracted-out districts by 158 percent, in contracted-in districts by 82 percent, and in control districts by 56 percent.

The evaluation survey measured the productive time lost due to illness by patients and their caretakers. The results showed that on an average, people in contracted-out districts lost about 15% less time on illness and seeking health care compared to control districts. People in contracted-in districts lost about 5% less. Thus, the results suggest that contracting-out, besides being cost-effective, is also the most efficient option for providing health care services.

The evaluation study shows, furthermore, that the contracted districts provided more than proportionate benefits to the poor. Much of the increase in health care utilization in contracted districts was attributable to the increased use of services by households of low socioeconomic status. For example, use of curative health services at district hospitals by the bottom half of the socioeconomic group increased about twelve-fold in contracted-out districts and six fold in contracted-in districts in 2.5 years. The corresponding increase in the control districts was considerably less than double. The poor benefited more than proportionately in the contracted-out districts because of the improved accessibility of health services in villages, where most poor people live. The reduction in costs of health services also raised the demand for health services by the poor (Bhushan et al. 2005).

4.54 A fourth strategic area where government and the MOH are likely to achieve significant and long-term efficiency gains is in the recurrent cost implications of recent large infrastructure projects. The new headquarters for the MOH and the new tertiary-level hospital are potentially attractive new buildings in Apia, replacing much older ones. However, both are large investments, involving well over SAT 26.1 million in direct soft loans. Importantly, the sheer size of these two large infrastructure projects will carry with them a large, long-term, “tail” of recurrent costs: electricity, air conditioning, cleaning, and maintenance. It is by no means clear that these long-term recurrent costs have been factored into future budgets.

4.55 More importantly, it is not clear that everything is being done to reduce such long-term — and often avoidable and unnecessary — costs, including by modern design and architectural techniques, passive solar generation for electricity. Nor is it clear if the hospital design is best suited to secondary prevention of NCDs, as distinct from expensive inpatient curative treatment. Similarly, the most efficient mix of staffing for the new hospital in terms of doctors, nurses, midwives, and other health professionals is uncertain. Retrofitting more affordable solutions to recurrent costs will be a very

expensive option for Samoa. It is in Samoa's interests to therefore urgently review the plans and designs for the new tertiary-level hospital, before ground breaking, to ensure that every possible opportunity has been taken to reduce long-term recurrent costs, consistent with good health standards and protocols.

4.56 A fifth strategic area where efficiency and effectiveness can be improved is in developing a better and more explicit understanding of the cost of treating major diseases in Samoa. Policy makers cannot make informed choices about the best mix of inputs because they do not have essential data on the true cost of providing services (costs including, for instance, overheads or depreciation). Managers cannot tell if a primary or secondary prevention treatment is two, three, or four times as expensive as another for a given outcome. Nor can they tell how much the true cost to the public health system is if a patient "progresses" from a hypertension or glucose impairment regime, to a stent, bypass or dialysis regime. Understanding the true cost of treatment for the key drivers of the health system budgets would help managers make more informed, evidenced-based decisions about where to allocate scarce financial and management resources. Having a good knowledge of cost structures will also enable managers to identify cost drivers for a particular intervention and seek out lower cost but equivalent efficacy alternatives. This will also enable policy makers to identify cheaper but equally effective alternatives (for example, use of generic drugs) or mix of inputs. Highlighting the cost of treatment, including x-rays and lab tests, might help to sensitize health care providers to avoid unnecessary or duplicate tests. Development partners are likely to be supportive of analytical work that helps establish such an evidence base, as it will help all stakeholders make better and more transparent choices. Annex 1 provides an example of how the cost of diabetes treatment in Samoa can be estimated and then used for policy analysis.

4.57 Sixth, government and MOH might also wish to consider analytical work on how public expenditure can be better used to drive incentives. Most, if not all, health professionals in Samoa are guided by a sense of professionalism and compassion to do their work well. However, monetary incentives and the form of provider-payment systems also clearly matter in any country's health system: hence the debates over capitation, fee for service, salaried employment, and diagnostic-related groups. When the health sector absorbs approximately 16% of government expenditure it is

strategically important for government to understand how, and for what services, health workers are paid and how those payment mechanisms then affect the level and quality of service delivery. Government and MOH might therefore wish to identify stubborn gaps and blockages in service delivery, including reaching rural and remote areas and transitory peri-urban migrants. Government and MOH might then trial quasi-experimental and operational research to see if performance payments are a cost-effective intervention compared to existing payment arrangements.

4.58 A seventh strategic area to target for efficiency is for government and MOH to use more applied operational research to provide an evidence base for policy making. For example, the vast majority of experienced Samoan doctors interviewed during the research for this paper noted that patients do not usually complete their course of medication, despite being urged to do so. From a health perspective, the doctors noted that this undermined health outcomes for those individuals and raised the chances of antibacterial resistance among the public at large. From an economic perspective, failure to complete the course of medication undermines cost-effectiveness of treatment and is wasteful of a major part of the health system. Doctors had many opinions about why so many people failed to complete the prescribed course of drugs. (The most common theory was that patients did not “value” the drugs because they were free or only of notional cost, and that raising the out-of-pocket price would help people value the drugs more. This is not a recommendation of this paper.) However, no one really knows. The important policy point is that an apparently widespread reluctance to complete drug courses is clearly a major leakage point for better health outcomes, and potentially a gross source of inefficiency. Operational research to understand the situation, and then respond on the basis of evidence, would therefore be a good strategic investment to improve the efficiency and effectiveness of the health system.

4.59 This paper has also identified other areas where operational research would strengthen the evidence base for policy making. Clearly, serious studies that increase understanding of the socioeconomic reasons for NCD risks are a major priority in Samoa, and could potentially enhance regional and global public benefit as well. There would be value in understanding better the socioeconomic characteristics of public versus private provision (paragraph 2.4). As discussed in paragraph 3.10, it would also be

beneficial to verify that the apparently low levels of out-of-pocket expenditure are not simply a result of poorer Samoans failing to seek health care. There is policy benefit in understanding the economic and financial costs to the future health system of an ageing population (paragraph 4.1). There is benefit in understanding the role and impact of user fees, should they eventually be trialled (paragraphs 4.35–4.38). Finally, there would be public and policy benefit in better understanding why women tend not to make ANC visits in the first trimester; why immunization rates against measles is relatively low; and what factors are contributing to the level of STIs and certain NCDs, and whether conditional cash transfers are cost-effective and affordable interventions (paragraphs 4.5–5.1).

Section 5: Conclusion and recommendations

5.1 Samoa is currently facing two important public policy challenges in the health sector. One challenge is to stem, and then reverse, the rapid rise of NCDs. The second challenge is to put the country on a health-financing path that is effective, efficient, and financially affordable and sustainable. The two challenges are clearly interconnected.

5.2 However, Samoa also has several strategic building blocks in place that will enable it to respond.

5.3 First, and importantly, it has a government that is clearly committed to improving the health (and education) of its people. This is clearly evidenced by its financial commitment to the health sector to date. The government is also keen to move the health sector to a more outcomes-focused approach. The government wishes its expenditures to be pro-poor where possible. The newly elected government is now at the beginning of its term, so it has the “political space” to bring forward necessary reforms that might — initially at least — be unpopular.

5.4 Second, government is supported by a competent bureaucracy and active development partners. MOH and NHS have clear roles and clarity of purpose (policy and regulation, and service delivery, respectively). MOH has a well-developed (although now somewhat dated) system of National Health Accounts that has the potential to serve as an evidence base for better public expenditure management and resource allocation.

5.5 Third, there is some potentially “low hanging fruit” that could be harvested to achieve better health outcomes at reduced financial cost to Samoa. The chief opportunity exists in making better use of existing resources already in the health system, but not used to maximum effect. Improving technical and allocative efficiency of the existing system has the potential to make a large difference and is technically feasible. Specific recommendations include reorienting public expenditure from curative to primary and secondary prevention; increasing investments in maintenance; proactively reducing future recurrent costs from large infrastructure projects; exploring contracting out and private/public partnerships; leveraging the power of public expenditure to drive incentives on the demand side and supply side of health care; understanding better the true cost of services and underlying cost drivers; and investing in operational research to build up the evidence base for policy making.

5.6 Samoa also has other opportunities to mobilize additional revenue. Increasing taxation on tobacco is an option, and maintaining the tax in real terms against inflation, given the inevitable rise of (preventable) tobacco-related NCDs and the simultaneous need to generate revenue in Samoa. Some potential exists to generate more investment from the supportive group of external development partners, but this is limited. Development partners will likely respond favorably to Samoa’s own willingness to undertake additional reform and resource-mobilization efforts. There is arguably some potential for cost recovery, which at 0.08% of expenditure is currently quite low. However, this should only be considered if there is sound evidence cost sharing will lead to significant revenues without detrimental impact on access, equity, and financial protection.

5.7 The paper concludes that social health insurance and other forms of formal insurance are useful options for the longer term, but are premature at this stage. That is because of the formidable technical and managerial challenges associated with introducing such schemes in Samoa at present. Further, there are arguably higher — and more feasible — gains to be had by improving efficiencies with the resources already in the health system.

5.8 The paper also concludes that there is only limited capacity for additional financing directly from government over the longer term, given that health is now the

second-largest item in the budget and absorbs approximately 16% of government expenditure. The paper argues strongly against deficit financing at the macroeconomic level as a source of additional revenue for the health sector.

Section 6: Next steps

6.1 This paper is intended to provide an overview of the health-financing situation in Samoa, and to identify options for government to consider. Eight options have been examined. Some, but not all, are shown to be viable or appropriate in Samoa's current circumstances.

6.2 Government may wish to discuss these options with key stakeholders, including the Ministry of Health, the Ministry of Finance, the National Health Service, private sector health professionals, and development partners. Government can then decide which of the options discussed in this paper best suit Samoa's needs and interests.

Annex 1: Financial cost to Government of Samoa of funding the National Kidney Foundation (NKF)

Key Messages

Kidney disease is one important aspect of the large and increasing problem of noncommunicable diseases (NCDs) in Samoa. The government of Samoa funds virtually all the NKF operations. The NKF itself focuses on treatment (mainly hemodialysis). Prevention and retardation of kidney disease absorbs less than 5% of the total appropriation. The estimated average total cost of dialysis was SAT 92,110 (\$ 38,686) per patient per year in Samoa in 2010–11. The average total cost of dialysis *per treatment* was SAT 590 (\$247). Those on dialysis need three treatments per week for the rest of their lives. Outcomes need to be scrutinized objectively given the cost of SAT 92,110 per patient per year. Unfortunately, 31% of patients have died less than a year after commencing dialysis. Almost two-thirds have died two years after commencing it. Much of the reason for these very expensive but poor health outcomes is that patients are diagnosed and commence treatment too late for dialysis to extend life significantly. This in turn suggests that reallocating resources to secondary prevention and kidney disease retardation would have important health benefits for a larger number of Samoans and, over time, help to improve the low cost-effectiveness of treatment and reduce costs to government. Focusing screening and prevention for diabetes and potential kidney disease on pre-pregnant young women would help to interrupt the transmission of NCDs to the next generation of Samoans.

Background and purpose of the paper

1. Kidney disease is one important aspect of the large and increasing problem of noncommunicable diseases in Samoa. Almost three-quarters (73 percent) of all patients at the National Kidney Foundation (NKF) have diabetes and/or hypertension as a primary diagnosis for serious kidney disease.³⁶ Given risk factors in Samoa, it is inevitable that demand for treatment of kidney treatment will continue to grow. Latest estimates find that 86% of Samoan adults are overweight, of these, 46% are obese; these are key

³⁶ Report to the General Manager NKF April 2012.

risk factors for diabetes and hypertension.³⁷ Treatment of kidney disease is expensive: reports from neighbouring American Samoa suggest treating kidney disease was approximately \$43,000 per patient.³⁸ Samoa needs to ensure that its expenditure on preventing and treating NCDs, including through the NKF, is affordable, effective, efficient, equitable, and financially sustainable. This paper provides some preliminary analysis of costs at the NKF to contribute to that effort.

2. The specific purpose of this paper is to estimate the costs of treating hemodialysis (“dialysis”) patients at the NKF and make some initial observations about affordability and identification of “good buys” for the government. The perspective taken is therefore that of the government, rather than society as a whole. (While patients bear some direct and indirect costs, these are small. See discussion below).

Expenditure at the NKF

3. Table A1 below shows the total government budget appropriation to the NKF since its establishment in 2005, and the share of NKF expenditure as a percentage of total government expenditure through the Ministry of Health.

Table A1: Government appropriations to NKF in Samoan tala (current prices) and share of NKF as percentage total appropriations to Ministry of Health

Item	2007/8	2008/9	2009/10	2010/11	2011/12
Total appropriation to NKF	4,611,502	5,343,479	4,376,000	4,521,389	4,966,862
Total appropriation to MOH	60,344,075	70,074,380	58,985,691	65,131,805	69,064,202
NKF as % of total appropriation to Ministry of Health	7.6	7.6	7.4	6.9	7.2

Source: Government of Samoa approved estimates for 2007/8 through to 2011/12.

4. Table A2 below provides the breakdown of costs for the NKF by main output.

³⁷ Village Health Fair Progress Report 2012.

³⁸ Pacific Islands News Association 2011.

Table A2: NKF: Breakdown of costs by main output, in Samoa tala (current prices)

Output	2010/11	Domestic funding in 2011/12	Per cent of the appropriation going to defined outputs 1-4	Per cent of total Government appropriation in 2011/12 ³⁹
1. Policy Advice to the Minister	585,158	458,331	15	9.2
2. Medical Services of which:	1,905,598	2,002,983	65.8	40.3
Personnel	763,312	761,918	-	-
Operating expenses	258,030	316,480	-	-
Capital Costs	128,709	296,854	-	-
Overheads	755,547	627,731	-	-
3. Prevention, Early Detection and Education of which:	161,655	233,034	7.6	4.7
Personnel	61,506	120,917	-	-
Operating expenses	37,030	63,830	-	-
Capital costs	5,000	-	-	-
Overheads	58,119	48,287	-	-
4. Maintenance Services of which:	224,076	347,113	11.4	6.9
Personnel	87,256	110,616	-	-
Operating expenses	60,330	81,080	-	-
Capital costs	18,371	58,843	-	-
Overheads	58,119	96,574	-	-
			100%	
<i>(Sub total of outputs 1-4 delivered by NKF)</i>	<i>(2,876,487)</i>	<i>(3,041,460)</i>	-	-
Transactions on behalf of the State of which:	1,946,982	2,168,742	-	43.6
Overseas medical supplies	1,390,695	1,540,695	-	-
Water rates	20,000	20,000	-	-
Electricity	150,000	200,000	-	-
Ambulatory supplies	150,000	150,000	-	-
VAGST	236,287	258,047	-	-
Government Grant	4,521,389	4,966,862	-	-
Cost recovery		84,3400	-	-

Source: Government of Samoa Approved Estimates 2011–12.

5. Three things are noticeable from Table A2.
6. First, government directly bears virtually all of the cost of the NKF. Multilateral and bilateral development partners do not provide funding to the NKF, although are

³⁹ Sum to 104% because these are as a percentage of Government appropriations only and do not include cost recovery or charitable donations.

active and substantial supporters to other parts of the government's health program. Samoan nationals pay only a notional fee of SAT 10 per treatment, and overseas visitors pay SAT 500 per treatment. Total cost recovery was SAT 84,340 or just 1.6% of the government appropriation for the year; not sufficient to cover even the electricity charges at the NKF. There are no third party contributions via insurance.

7. Second, NKF believes government is nevertheless saving money compared to the previous alternative. More specifically, NKF officials state government spent SAT 6 million on six patients prior to the establishment of the NKF because they were transferred to New Zealand for treatment (simple average of around SAT 1 million per patient including airfares). Now the NKF is treating 50 patients for SAT 4.9 million (simple average of SAT 98,000 per patient), suggesting a saving of SAT 902,000 per patient (\$380,000 per patient) and assuming no difference in quality of treatment and outcome.

8. Third, it is clear from table 2 that the greatest share of expenditure goes to treatment of kidney disease rather than prevention. Virtually two-thirds (65.8 percent) of the budget for the four designated outputs goes to "medical treatment" (output 2). In contrast, prevention and early detection (output 3) attracts the lowest share — 7.6% of the SAT 3,041,460 going to direct outputs. These priorities do not change when the total budget to the NKF is examined. The additional payments made by NKF to other government authorities, including SAT 1.5 million for overseas medical supplies — virtually all of which goes to treatment rather than prevention — reduces prevention to 4.7% of the total budget. (Of course, other parts of the Samoan health system also do spend money on overall prevention of NCDs, including the Ministry of Health, and the National Health Service. The point being made here is that treatment, rather than prevention, of kidney disease per se is the focus of the NKF).

Estimate of cost of treatment per patient

9. Table A3 estimates the financial cost to government of treating an individual patient on dialysis. Several simplifying assumptions and adjustments are applied to make this estimate. More specifically, the Value Added Goods and Services Tax (VAGST) was excluded as this is an internal transfer payment from NKF to government, and not the cost of using a resource. One-off, short-term (often one week) dialysis treatment for overseas patients was excluded. The expenditure on items for Samoans, not

obviously either “treatment” or “prevention,” were recalculated to reflect the notional share of 4.7% total appropriation going to prevention. For example, total expenditure of SAT 458,331 for policy advice to the minister and board (output 1) was reduced by 4.7% (SAT 21,495) on the simplifying assumption that 4.7% of that output would be on prevention, mirroring the share “prevention” receives overall. The same process of apportioning the notional 4.7% expenditure to prevention was applied to maintenance (output 4), and payments to other government departments (for example, overseas medical supplies, electricity, water, ambulatory peritoneal dialysis supplies). This process reduced the total government appropriation assigned directly to “treatment” to SAT 4,605,535 (\$1,934,324). Table A3 then estimates the average cost per patient, assuming each patient receives three dialysis treatments per week for every week of the year.

Table A3: Estimated cost to Government of treating a patient in 2010-11

Component	Tala	Cumulative total in Tala	USD equivalent
Total appropriation to NKF	4,966,862		2,086,082
Less VAGST (a transfer payment)	236,287	4,730,575	-
Less pro-rata of 4.69% going to prevention applied to:			
Minister and Board (output one)	21,495	-	-
Maintenance (output four)	16,279	-	-
Medicine	72,258	-	-
Water	938	-	-
Electricity	7035	-	-
Peritoneal supplies	7035	-	-
Total estimated cost for dialysis treatment			
		4,605,535	1,934,324
Cost per patient			
Total average cost per patient per year (Total of SAT 4,605,535 for dialysis divided by 50 patients per year)	92,110	-	38,686
Total average cost per patient per week	1771		743
Total average cost per treatment per patient (3 treatments per week)	590		247

Source: NKF Annual Report 2010-11

10. The end result is that the average total cost of dialysis was SAT 92,110 (\$38,686) per patient per year in Samoa in 2010–11. The average total cost of dialysis per treatment was SAT 590 (\$247). Those on dialysis need three treatments per week for the rest of their lives.

11. It should be noted that this is a particularly conservative estimate with important limitations. It is conservative because no allowance has been made for the capital cost of the land on which the NKF sits or for the buildings. The important limitations to this exercise include the fact that simple average costs have been estimated, whereas marginal costs (how costs change by small increments of increased services) is of more relevance. Nor is there any estimation made of scale economies (lower average costs as coverage expands) or productivity improvements over time. This is also a snapshot in time: wage increases of staff or exchange rate–driven cost of imported medicines and equipment would quickly alter the estimates. Given that the unit of analysis is cost to government, direct (transportation costs) and indirect (opportunities foregone to earn an income by accompanying care givers) costs were excluded, even though they are real. Similarly, no attempt has been made to quantify “pain and suffering” of patients.

Policy implications

12. An estimated average cost of dialysis of SAT 92,110 (\$38,686) per patient per year raises several important implications.

13. First, is this expenditure effective and the best use of money? To those being treated, and their families, the answer would be yes. How much they would be “willing to pay” for the treatment is an important concept in economics as it sheds light on the perceived benefits of a service. However, this is difficult to measure and raises ethical concerns. Presumably, however, patients value the treatment much more than the SAT 10 they pay per treatment (SAT 30 per week).

14. However, from the government’s perspective, the effectiveness of the expenditure is questionable. About 31% of patients on dialysis have died in less than a year after commencing dialysis. A further 17% of patients have died at the one-year point after commencing dialysis. A further 16% have died at the end of two years. Thus, nearly two-thirds (64%) of patients have died within two years. Expenditure of an average SAT 92,110 (\$US38,686) is about 12 times the GNI per capita of Samoa of about \$US 3220 per capita, and therefore not “cost-effective” under usual benchmarks where, for example, WHO suggests, as a rule of thumb, that anything over 3 times GNI per capita is unlikely to be “cost-effective”. Officials at NKF believe a key explanation for the relatively poor outcomes in terms of extending life are that patients are diagnosed, referred, and commence treatment for kidney disease too late.

15. This, in turn, suggests that focusing more resources on secondary prevention to prevent or at least postpone onset of severe kidney disease and dialysis would be a good investment in both public health and public finance. If government focused more on screening, early referral, and early adherence to “retardation” schemes, then health outcomes for a larger number of Samoans would be improved and savings would occur. The net savings to government would also be very large: even if secondary prevention through provision of medicines and testing cost \$1,000 per patient per year, government would still save an estimated \$37,686 per patient per year in averted costs of dialysis.

16. A similarly high impact “good buy” would be to focus screening, prevention, and, where necessary, diabetes and kidney disease retardation medicine on younger women before they are pregnant. Investing in the health of young women is not just desirable and justified in its own right (maternal health and gender are prominent parts of the Millennium Development Goals). Rather, investing in young women’s health can help to interrupt the transmission of metabolic disorders in utero to her offspring, which may predispose her child to obesity and NCDs (Elisaia et al. 2009).

17. The high cost of dialysis also raises the question of the financial affordability and sustainability of the current focus on treatment. As Table A1 shows, appropriations to the NKF are relatively stable in absolute and relative terms, absorbing about 7% of the total appropriation to the Ministry of Health and its sector over recent years. By itself, this is not a major problem at least in terms of financial sustainability (although it could be argued the money would be better spent on other high priority programs). However, Samoa faces a large and growing pipeline of diabetes and heart-related illnesses as the population ages and becomes more urbanized. The Village Health Fair found that 86% of adult Samoans are overweight or obese: almost half (46%) of those surveyed were clinically obese (BMI 30–39) and 14% were morbidly obese (BMI 40+). This implies a large increase in the need for treatment over time. Paradoxically, the better Samoa is at screening for diabetes, hypertension, and kidney disease, the more demand will be put on the health system more generally and the NKF more specifically. This can only increase financial pressures on an already tight fiscal situation and outlook. Cost recovery of SAT 10 per treatment — totalling just SAT 84,340 or 1.6% of the budget — shows that current arrangements are not financially sustainable.

18. Economic analysis is also about equity. NKF statistics show that dialysis patients are reasonably distributed across different age groups and not significantly skewed to the very old. The largest age group on dialysis is the 61 to 70 year old (25%), followed by the 41 to 50 year old (22%), and then the 51 to 60 year old (14%). Over-71-year-old and under 40-year-old make up the balance. (Details on gender were not available at the time of this analysis). NKF does not keep statistics on the socioeconomic background of patients on dialysis or whether they are urban or rural dwellers. It is therefore not possible to assess if the high expenditure is pro-poor or pro-rich.

Some selected studies from overseas on dialysis and other options

19. One major study in the United States found that dialysis for hospitalized adults had very limited health benefits in terms of prolonging life, and was not cost-effective. More specifically the study found that the median survival time for hospitalized patients undergoing dialysis in various hospitals in the United States was just 32 days. Only 27% were alive after six months. But costs were high: the estimated average cost was \$128,200 per quality-adjusted life year saved. For patients with an initially poor prognosis, the cost was \$274,000 per quality-adjusted life year saved. Even for patients with a good prognosis, the estimated cost was \$61,900 per quality-adjusted life year saved, all of which “far exceeded the \$50,000 per quality-adjusted life year, a commonly cited threshold for cost-effective care” (Hamel et al. 1997).

20. On the other hand, there are affordable, cost-effective, and even cost-saving interventions at the level of primary and secondary prevention for diabetes. For example, preconception care for women with diabetes leads to healthier mothers and babies. The Center for Disease Control and Prevention in the United States estimate that every \$1 invested in such care can reduce health costs by up to \$5.19 by preventing costly complications (2008).

21. Furthermore, one major recent study (Li et al. 2010) found strong evidence to classify the following interventions as either cost-saving or very cost-effective compared to other interventions to treat diabetes across the United States:

Cost saving: (1) ACE inhibitor (ACEI) therapy for intensive hypertension control compared with standard hypertension control; (2) ACEI or angiotensin receptor blocker (ARB) therapy to prevent end-stage renal disease (ESRD) compared with no ACEI or ARB treatment; (3) early irbesartan therapy (at the microalbuminuria stage) to prevent ESRD compared with later treatment (at the macroalbuminuria stage); (4) comprehensive foot care to prevent ulcers compared with usual care; (5) multicomponent interventions for diabetic risk factor control and early detection of complications compared with conventional insulin therapy for persons with type 1 diabetes; and (6) multicomponent interventions for diabetic risk factor control and early detection of complications compared with standard glycemic control for persons with type 2 diabetes.

Very cost-effective: (1) intensive lifestyle interventions to prevent type 2 diabetes among persons with impaired glucose tolerance compared with

standard lifestyle recommendations; (2) universal opportunistic screening for undiagnosed type 2 diabetes in African Americans between 45 and 54 years old; (3) intensive glycaemic control as implemented in the United Kingdom Prospective Diabetes Study in persons with newly diagnosed type 2 diabetes compared with conventional glycaemic control; (4) statin therapy for secondary prevention of cardiovascular disease compared with no statin therapy; (5) counselling and treatment for smoking cessation compared with no counselling and treatment; (6) annual screening for diabetic retinopathy and ensuing treatment in persons with type 1 diabetes compared with no screening; (7) annual screening for diabetic retinopathy and ensuing treatment in persons with type 2 diabetes compared with no screening; and (8) immediate vitrectomy to treat diabetic retinopathy compared with deferred vitrectomy.

Conclusion

22. In conclusion, NKF are staffed by skilled and dedicated professionals. Dialysis services are valued by those relatively few people (about 50 per year) on dialysis. But this is a particularly expensive form of treatment at approximately SAT 92,110 (\$38,686) per patient per year. The health outcomes, measured in terms of extended life, are poor with two-thirds dying within two years of commencement of dialysis. Giving greater emphasis to secondary prevention (screening, retardation medicine) would improve the cost-effectiveness of the program. Screening and retardation interventions that prevented or postponed the requirement for dialysis treatment would be a major and strategic public health benefit and save the government millions of tala.

References

- Abedian, I., R. van der Merwe, N. Wilkins, P. Jha, ed. 1998. *The Economics of Tobacco Control: Towards an Optimal Policy Mix*. Cape Town: University of Cape Town.
- Allotey, P., Daniel D. Reidpath, Shajahan Yasin, Carina K. Chan, Ama de-Graft Aikins. 2011. "Rethinking Health Care Systems: A Focus on Chronicity." *The Lancet* 377 (9764).
- ATT Collaboration. 2009. "Aspirin in the Primary and Secondary Prevention of Vascular Disease: Collaborative Meta Analysis of Individual Participant Data from Randomised Trials." *The Lancet* 373 (9678).
- Beaglehole, R., R. Bonita, R. Horton et al. 2011. "Priority Actions for the Non Communicable Disease Crisis." *The Lancet* 377 (9775).
- Bhushan, I., S. Keller and J. Schwartz. 2005. *Achieving the Twin Objectives of Efficiency and Equity: Contracting Health Services in Cambodia*. Manila: Asian Development Bank.
- Choudry, N. 2009. "Copayment Levels and Medical Adherence." *Circulation* 119.
- Creese, A. 1991. "User Charges For Health Care: A Review Of Recent Experience." *Health Policy and Planning* 6 (4).
- Enoka, T. 2011. "Sexual Disease Alarm." *Samoa Observer*, April 22, p. 1.
- Gilson, L. 1997. "The Lessons of User Fees Experience in Africa." *Health Policy and Planning* 12 (3).
- Gottret, P., and G. Schieber 2006. *Health Financing Revisited: A Practitioner's Guide*. Washington, DC: World Bank.
- Government of Samoa. 2009. *National Health Service Annual Report 2007/8*. Apia, Samoa.
- . 2010. *Approved Estimates of Receipts and Payments for the Financial Year Ending 30 June, 2011*.
- . 2011. *Approved Estimates of Receipts and Payments of Government of Samoa for the Financial Year Ending 30 June, 2012*.
- . 2011. *Approved Estimates of Receipts and Payments of the Government of Samoa for the Financial Year Ending 30 June 2011*. Apia Samoa.
- . 2012. *Samoa National Health Accounts FY 2008/9*. Apia Samoa.
- Government of Samoa., I. M. 2010. "Samoa Demographic and Health Survey 2009." from <http://dhsprogram.com/publications/publication-FR240-DHS-Final-Reports.cfm>.
- Government of Samoa, Ministry of Finance. 2008. *Strategy for the Development of Samoa 2008–2012*.
- . 2010. *Budget Address 2010/11*.
- . 2011. *Quarterly Economic Review July–September 2010/11*.
- . 2012. *Budget Address 2012/13*.

- Government of Samoa, Ministry of Health. 2007 *Annual Report 2006/7*.
- . *Samoa National Health Accounts 2006/7*. National Health Accounts.
- . 2008. *Health Sector Plan 2008–2018*.
- . 2008. *A Healthy Samoa: Third Health Sector Plan 2008 - 2018*. Apia Samoa.
- . n.d. *Annual Report 2009/10*.
- . 2010a. *Samoa Demographic and Health Survey 2009*.
- . 2010b. *Samoa Overseas Treatment Scheme: Financial and Disease Analysis for Financial Year 2008/9 and 2009/10*.
- . 2010c. *Strategy For Scaling Up Capacity and Production of Nursing and Midwifery*.
- . 2011. *Update of the Medium-Term Expenditure Framework (MTEF) for the Health Sector*.
- . 2011. *Samoa Overseas Treatment Scheme: Financial and Disease Analysis for Financial Year 2008-2009 and Financial Year 2009-2010*. Apia, Samoa, Policy Unit, Strategic Development and Planning Division, Ministry of Health.
- . 2011. *Village Health Fair Report 2011*.
- Government of Samoa, National Health Services. 2010. *Financial Statements Year Ended 30 June, 2010*, Draft.
- Hsiao, W, Shaw P, Fraker A, Hanvoravongchai P, Jowett M, Pinto D, Ramachandra S. 2007. *Social Health Insurance for Developing Nations*. World Bank Institute Development Studies, Washington, DC.
- International Monetary Fund. 2010. *Article IV Consultations Samoa*. Washington, DC.
- Lim, S., T. Gaziano, E. Gakidou, K. Srinath Reddy, F. Farzadfar, R. Lozano, A Rodgers. 2007. "Prevention of Cardiovascular Disease in High Risk Individuals in Low- Income and Middle Income Countries: Health Effects and Costs." *The Lancet* 370 (9604).
- Liu, X. 2003. *Policy Tools for Allocative Efficiency*. World Health Organization. Geneva.
- McPake, B. 1993. "User Charges for Health Services in Developing Countries: A Review of the Economic Literature." *Social Science and Medicine* 36 (11).
- National Kidney Foundation of Samoa 2010. *Financial Statements for the Year Ended 30 June 2010*.
- Negin, J. 2010. *Sector-Wide Approaches for Health: A Comparative Study of Experiences in Samoa and Solomon Islands*. Nossal Institute for Global Health Working Paper Series 3, Melbourne, Australia.
- Normand, C, and Weber A 2009. *Social Health Insurance: A Guidebook For Planning*. Asian Development Bank, gtz, ILO, WHO.
- Roberts, M, Hsiao W, Berman P, and Reich M. 2008. *Getting Health Reform Right: A Guide to Improving Performance and Equity*. New York: Oxford University Press.

- Samoa Bureau of Statistics. 2008. *Samoa Household Income and Expenditure Survey 2008*.
- . 2012. *Demographic indicators*. Retrieved from <http://www.sbs.gov.ws/Statistics/Social/DemographicIndicators/tabid/3345/language/en-US/Default.aspx>.
- Samoa Bureau of Statistics website 2011.
- Savedoff, W. 2007. "What Should A Country Spend on Health Care?" *Health Affairs* 26 (4).
- Tandon, A, and Cashin, C. 2010. *Assessing Public Expenditure on Health from a Fiscal Space Perspective*. HNP Discussion Paper, World Bank, Washington, DC.
- Taskforce on Innovative Health Financing for Health Systems 2009. *Constraints to Scaling Up and Costs*. Washington DC.
- The Economist. 2000. *Pocket Economist: the Essentials of Economics from A to Z*.
- World Health Organization. 2005. *Social Health Insurance: Selected Case Studies from Asia and the Pacific*. Manila and New Delhi.
- . 2009. *Country Health Information Profile for Samoa 2009*.
- . 2010a. *Package of Essential Noncommunicable (PEN) Disease Interventions for Primary Health Care in Low Resource Settings*.
- . 2010b. *Technical Manual on Tobacco Tax Administration*.
- . 2010c. *Health Systems Financing: The Path to Universal Coverage*. World Health Report.
- . 2011a. *Abuja Declaration Ten Years On*.
- . 2011b. *Global Status Report on Noncommunicable Diseases 2010*. Geneva.
- . 2010. *World Health Statistics*.
- . 2011c. *World Health Statistics*.
- . 2012. *Samoa Tobacco Surveillance Country Profile*. Retrieved from Tobacco Surveillance Country Profiles: http://www.who.int/tobacco/surveillance/policy/country_profile/en/index.html#S.
- World Health Organization and Republic of Rwanda, Ministry of Health 2008. *Health Financing Systems Review: Options for Universal Coverage*. Geneva.
- World Health Organization and World Economic Forum. 2011. *From Burden to Best Buys: Reducing the Economic Impact of Non Communicable Diseases in Low and Middle Income Countries*. Geneva.
- World Health Organization Commission on Macroeconomics and Health. 2001. *Macroeconomics and Health: Investing in Health for Development*. Geneva.
- World Health Organization Western Pacific Region 2006. *Health Financing: A Basic Guide*. Geneva.

World Health Organization. 2011. "Tuberculosis and Diabetes." Retrieved 30 May 2013, from http://www.who.int/tb/publications/diabetes_tb.pdf.

World Bank. 2012a. *GNI per capita Atlas Method \$US current*. Retrieved from Data: <http://data.worldbank.org/country/samoa>

— — —. 2012b. *World Development Indicators*. Washington, DC.

Xu, K., D. Evans et al. 2003. "Household Catastrophic Expenditure a Multi-country Analysis." *Lancet* Vol 362.

Introductory note: Relationship between Chapter 3 and Chapter 4.

Chapter 4 builds on the preceding chapter by analysing the costs and affordability of pharmaceutical drug treatments for type 2 diabetes and hypertension to the Government of Vanuatu. Like Chapter 3, Chapter 4 helps to address the specific research gap in the Pacific in Chapter 1: lack of published information on the actual costs of treating important NCDs in the Pacific and analysis of the affordability and sustainability of existing public expenditure. Chapter 4 provides further additional evidence showing why primary and secondary prevention of high burden / high cost diseases – including especially type 2 diabetes and hypertension – is a prudent and feasible way of improving allocative efficiency for the Pacific.

In consultation with my co-authors, I deliberately targeted and submitted this article to the journal *Pacific Health Dialog*. That is because we specifically wished to reach front-line primary health care workers in the Pacific Region. I chose that journal because, as the *Pacific Health Dialog* journal web page states: “*Pacific Health Journal* - the Journal of Community Health and Clinical Medicine for the Pacific Region is the only Medline listed medical and public health journal published specifically for Pacific island countries.”¹

This article is also available from the *Pacific Health Dialog* website at <http://pacifichealthdialog.org.fj/>.

¹ Available at <http://pacifichealthdialog.org.fj/>

Chapter 4: The costs and affordability of drug treatments for type 2 diabetes and hypertension in Vanuatu.

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Key words: costs and affordability of preventing and treating Type 2 diabetes and hypertension; developing countries; benefits of health promotion and prevention; Vanuatu.

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Abstract

Non-communicable diseases (NCDs), including diabetes and hypertension, pose increasingly significant health, policy and financing challenges in Vanuatu, a lower middle income Pacific Island country. Pharmaceutical costs to Government are becoming unsustainable.

We show how pharmaceutical cost to Government rise in large, step-wise, patterns as diabetes or hypertension progressively becomes more severe. For diabetes, pharmaceutical costs to Government increased more than four-fold from \$5.59 per patient per year (pppy) to \$24.55 pppy in Vanuatu in late 2012 as a person moves from regular testing of blood glucose levels to first stage oral medication. Pharmaceutical costs increased again to \$367 pppy when insulin and other associated drugs are required. For hypertension, pharmaceutical costs to Government increased more than twelve times as the patient advances from first line drugs to additional drug therapy (\$1.38 pppy to \$17.58 pppy), eventually rising to \$75 pppy if additional drugs are required.

Progression of diabetes and hypertension to more advanced stages squeezes an already tight Government health budget. One patient requiring insulin absorbs the equivalent drug allocation of 76.4 other citizens. Only 1.31% of the total population could be treated with insulin, or 5.3% treated with the full regime of anti-hypertensive drugs, before the total Government drug budget for the country was fully spent.

Primary and secondary prevention of diabetes and hypertension is therefore a particularly important policy priority. Every person who adopted a healthy lifestyle and was able to avoid diabetes or keep it under control would avert direct drug costs to Government of up to \$367 per person per year. Those able to avoid or control hypertension through adopting healthy lifestyles would avert costs to Government for drugs of up to \$75 per person per year: the equivalent of what the Government currently spends on average on 18 other citizens.

Introduction: Diabetes and hypertension as a development issue

Non-communicable diseases⁸ (NCDs), including diabetes⁹ and hypertension,¹⁰ are increasingly being recognised as a development issue (2-5). The World Health Organization (6) estimates that two thirds of global deaths in 2008 were caused by NCDs, more than all other causes combined. Around 80% of these deaths occurred in low and middle-income countries (6). NCDs also account for half of all global disability (7). The UN Secretary General's report to the UN General Assembly High Level Meeting on Prevention and Control of NCDs of September 2011 concluded that:

“Non-communicable diseases affect the developing world and lower-income populations hardest. Strong evidence links poverty, lack of education and other social determinants to such diseases and their risk factors. A vicious cycle is created by the epidemic, whereby non-communicable diseases and their risk factors worsen poverty, while poverty results in rising rates of such diseases. The prevention of non-communicable diseases would reduce poverty, particularly since the majority of expenditures for treatment in low- and middle-income countries are paid privately or from out-of-pocket health-care systems. At the same time, because of the magnitude of the illness, the disabilities and premature deaths they cause and the long-term care required, non-communicable diseases reduce productivity and increase health-care costs, thereby weakening national economic development.”

The World Bank noted at the same UN High Level Meeting on NCDs that “what makes the NCD challenge particularly daunting for many developing countries is that, compared to their higher-income counterparts, they will face higher levels of NCDs at earlier stages of economic development, with fewer resources, and with less time to respond effectively” (8). Recent studies estimate that almost three quarters of people with hypertension – around 639 million – live in developing countries, and that a number of the risk factors for hypertension seem to be more common in developing countries

⁸ The World Health Organization (WHO) states that “Noncommunicable diseases (NCDs), also known as chronic diseases, are not passed from person to person. They are of long duration and generally slow progression. The four main types of NCDs are cardiovascular diseases (like heart attacks and strokes), cancers, chronic respiratory diseases (such as chronic pulmonary disease and asthma) and diabetes.” 1. WHO. WHO Noncommunicable Diseases Fact Sheet. 2011.

⁹ WHO definition of diabetes is available at <http://www.who.int/mediacentre/factsheets/fs312/en/index.html>

¹⁰ There are different definitions of hypertension, and disagreements about appropriate cut-off levels. This paper defines hypertension as blood pressure of 140/90 mm Hg or higher.

than in developed regions, including tobacco use, rapid urbanisation, and possibly genetic factors (9).

Of particular concern are the high rates of *premature* (that is, under 60 years of age) deaths from NCDs in the Pacific, as this indicates loss of potentially productive social and economic years. Figures 1 and 2 below show the relatively high rates of premature deaths from NCDs for males and females in the Pacific compared to other lower-middle income countries.

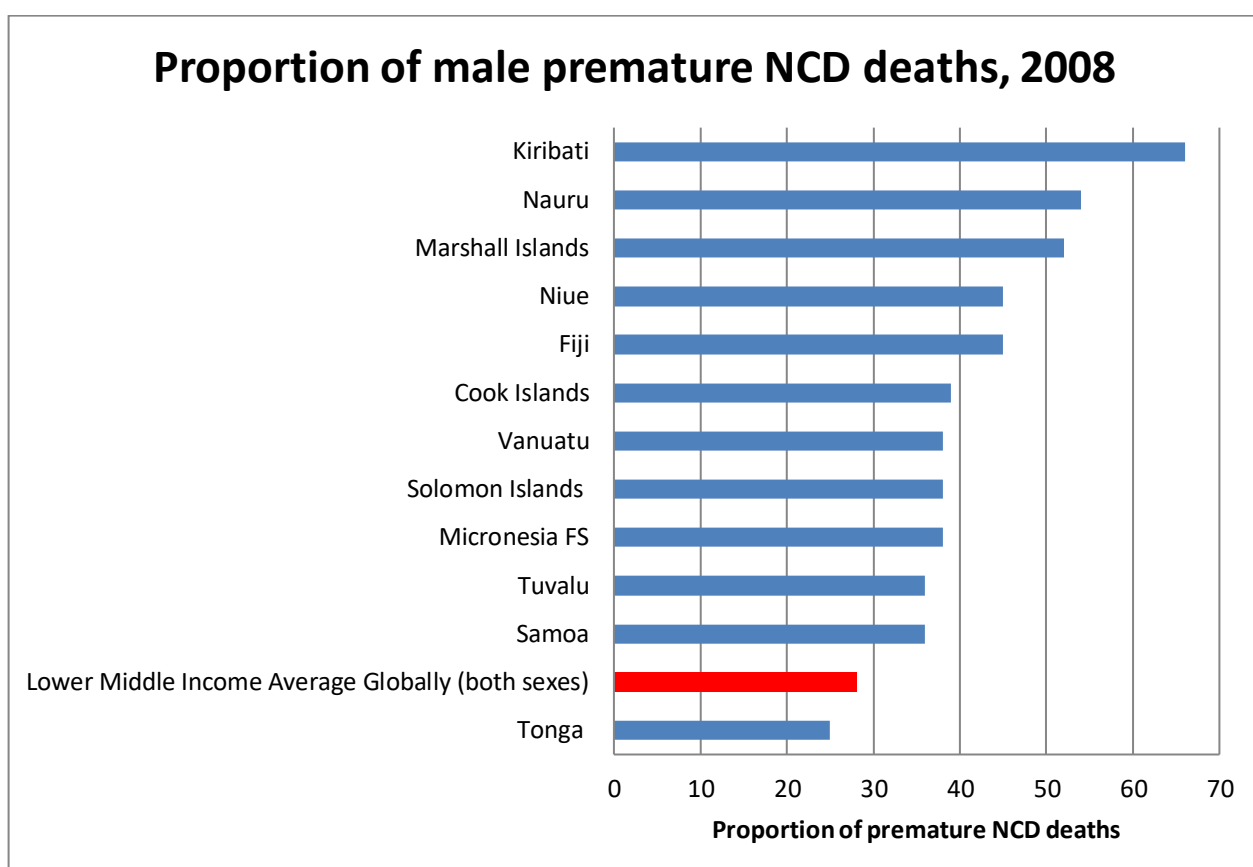


Figure 1: Proportion of male premature NCD deaths, 2008

Source: WHO (2011) Noncommunicable Diseases Country Profile.

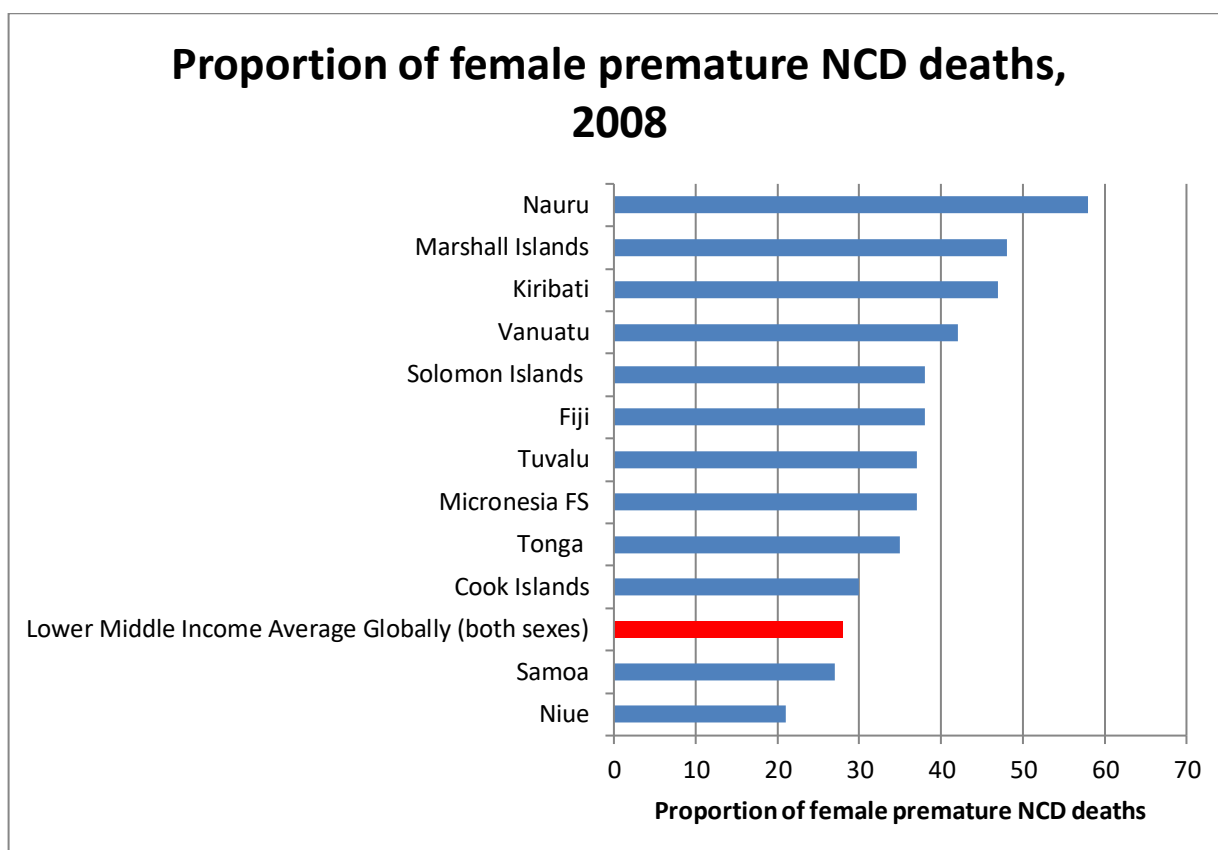


Figure 2: Proportion of female premature NCD deaths 2008

Source: WHO (2011) Noncommunicable Diseases Country Profile.

Diabetes and hypertension impose large – but often preventable – health, financial, and economic burdens on individuals, health sectors, and governments (10-12). WHO estimates that 346 million people worldwide have diabetes; that 80% of diabetes deaths occur in low and middle-income countries; and projects that diabetes deaths will double between 2005 and 2030 (13). The International Diabetes Federation argues that diabetes caused at least \$465¹¹ billion in health care expenditure globally in 2011, 11 % of total health care expenditure of adults (14). Diabetes is a particular challenge in developing countries where an estimated 80% of people with diabetes live (15). Hypertension is also a significant and growing problem: almost three quarters (639 million) people with hypertension now live in developing countries, but with limited access to essential health services (9). Diabetes and hypertension impose broader economic costs too. The prevalence of diabetes for people of working age (less than 60) is higher in lower and middle-income countries than it is in high income countries (14).

¹¹ Current United States dollars used throughout this article unless otherwise stated.

This suggests that, other things being equal, fewer people are available full time in the work force to generate revenues for services to the very young and the elderly: the dependency ratio worsens.¹² Cardiovascular diseases and hypertension can result in disabling strokes, and diabetes in loss of limbs and vision, further reducing the potential for economically productive lives.

Diabetes and hypertension are significant challenges in the South Pacific (16-21). A recent study involving pooled data of 2.7 million people globally found that those in Oceania had the highest fasting plasma glucose (6.1 mmol/L for men and women) of any region in the world (22). Over one third of the adult population has raised blood pressure in eight out of the ten Pacific Island countries, and three quarters of the population are overweight in seven out of ten countries, for which data is available (23). The average weight of a woman in Tonga has increased by 21.1 Kg in the last 30 years to reach 95 Kg. For men, the increase is 17.4 Kg to reach 95.7Kg (24). Increased food availability, rapidly changing diets, physical inactivity and possibly genetic factors help explain the rise in obesity and overweight prevalence.

Vanuatu faces several health challenges. Vanuatu is a relatively small (population 249,528) lower- middle income (GNI per capita of \$US 2750)¹³ country ranked 125 out of 187 countries in the United Nations Human Development Index for 2011. Vanuatu faces a double burden of disease: NCDs now contribute to 70% of all deaths, while maternal, newborn and nutritional disorders contribute a further 25% (23). NCDs now contribute over half (56%) of years of life lost, whilst communicable diseases still contribute over one third (35%) (23). Latest reports from UNICEF state that nearly 7% of all children in Vanuatu are severely stunted and 20% moderately stunted (25).

Diabetes and hypertension are growing health challenges in Vanuatu. Diabetes is the sixth known cause of death in 2011 and the third highest NCD reported: 294 new cases of diabetes were reported in 2011 (26). There is no formal diabetes register in Vanuatu

¹² This requires further study in the Pacific, where levels of unemployment and under-employment can be quite high to begin with. The study by Falconer for example found that 40% of patients with diabetes in Vanuatu were not employed.

¹³ Vanuatu has an estimated Gross National Income of 4,330 'International Dollars': a notional figure that reflects the costs of goods and services, and therefore the Purchasing Power Parity (PPP) of income in that country

at present. However, based on usage data from the Vanuatu Central Medical Store, approximately 62 people are currently being treated with insulin. This is likely to be an underestimate because of the often asymptomatic nature of early stage diabetes and consequent under-diagnosis. Limited capacity for vigorous, nation-wide, screening for early detection of diabetes is also a major cause for underestimation. Hypertension is also a challenge. A recent WHO supported NCD STEPS survey¹⁴¹⁴ found that approximately 30.8% of males and 26.7% of females of the 4671 surveyed adults had raised blood pressure. Around 95% of males and females of that sample were found to have raised blood pressure but were not currently on medication.

Of particular concern is the prevalence of risk factors for diabetes in Vanuatu, potentially feeding a pipeline of significantly increased and widespread incidence of the diseases. WHO estimates that rates of mean fasting blood glucose for women rose from 4.6 mmol/l in 1980 to 5.3 mmol/l in 2008, and from 5.2 to 5.4 for males over the same period (23). The NCD STEPS survey found that almost one in five adults had impaired fasting blood glucose, a risk factor for Type 2 diabetes. More than one fifth (22%) of adults of working age (25 – 64 years) have three or more risk factors for acquiring any NCD. Only around 10% of adult men (7.5% - 11.9%) and 5% of adult women (3.6%-8.5%) did not demonstrate signs of any of the major NCD risk factors (27).

Demographic pressures will add to these risks, and the cost burdens to Government. Vanuatu currently has a youthful age structure, with a median age of 20.5 years. However, 35% of the population are also aged between 25 and 59 years (28). Ageing of the population will therefore see an increase in heart, vascular and diabetes related deaths and disability in future years unless strong preventive measures are taken. Importantly, the current relatively youthful demographic structure does not necessarily translate into a capacity to then finance public health care costs: only 23,584 people contributed to the National Provident Fund in 2010, which the Ministry of Finance see as a proxy for the size of the formal workforce. Even if the size of the formal economy increased, there is no income tax in Vanuatu to generate revenue for Government, including an increasingly over- stretched public health system.

¹⁴ The survey involved a multi stage cluster sampling that then surveyed 4671 adults aged 25-64 between July and October 2011.

Method

It is important to understand the pharmaceutical costs of treating diabetes and hypertension for four reasons. First, the Government of Vanuatu bears virtually all the costs of pharmaceuticals and other health services as there are negligible co-payments or insurance reimbursements. Second, and as a result, the pharmaceutical budget is an important part of public expenditure. Total expenditure on the pharmaceuticals line item in the budget was \$1.37 million (Vt 123.5 million) in 2012, making it the fourth largest item of expenditure within the budget for health that Government appropriated from its own resources. That budget line item included budgets for vaccines, laboratory consumables, dental and X rays. After allowing for these items, the Government's Central Medical Store has, in effect, a budget of \$998,000 (Vt 90 million) for drugs and dressings. With a population of around 249, 528 this gives a notional allocation for drugs from Government's own resources of \$4 per person per year (Vt 360). Third, Government expenditure on pharmaceuticals has, along with salaries and allowances, been a source of budget over-runs, requiring supplementary budgets and requests for substantial emergency funding from development partners. Fourth, the rise of diabetes and hypertension will put unsustainable pressure on a public health system that currently allocates around \$64 (Vt 5849) per person per year from government appropriations to health care. Despite its importance to policy makers and framers of budgets, however, little is known about the actual costs of treating diabetes and hypertensive patients in Vanuatu. Falconer's study is informative but is now becoming a little dated, drawing on surveys in 2006, and did not extend to costs of hypertension (29).

Against that background, we sought to estimate the pharmaceutical cost to Government of treating Type 2 diabetes, and hypertensive, patients in Vanuatu during late 2012. The objective of the study was to estimate how the financial cost to the Government's pharmaceutical budget increased as the disease progressed, and then place those estimates in the context of Government health expenditure and overall affordability. The unit of analysis was the direct pharmaceutical drug cost to Government as it is the substantial source of drug expenditure. Data limitations did not allow the analysis to extend to other direct medical costs, including doctors' and nurses' time, other medical equipment used including syringes or dressings, diagnostic tests including X rays, patient

referrals, surgery or other related treatment arising from medical complications of diabetes or high blood pressure, or administrative overheads. Data and time limitations did not permit analysis of direct (out of pocket) or indirect (foregone income) costs to individuals or their carers.

The method, data sources, approach and assumptions were as follows. We used Vanuatu Government Standard Treatment Guidelines for treating a patient with Type 2 diabetes or hypertension including recommended generic brand and dosage of drug throughout the progression of the disease. We recognise that for many patients, diabetes and hypertension coexist as comorbidities or “bad companions” to each other¹⁵ (11). However, for ease of exposition we first show how pharmaceutical cost rises for diabetes as the disease worsens, and then separately show how costs increase for hypertension. We used current prices in October 2012 from the Government owned Central Medical Stores as the source of pricing and cost to Government for drugs.

Table 1 below summarises the actual unit costs of the main drugs used in treating diabetes and hypertension, the dosage used at various stages in the disease in Vanuatu, and the average annual cost at each stage of treatment.

Results

In the case of diabetes, pharmaceutical costs to Government are initially low, but then rise in a step wise fashion. As seen from Table 1, glucose testing strips cost the Government \$5.59 per patient per year at the initial testing stage. If advice on lifestyle and diet changes are not successful, oral medication in the form of Metformin tablets are prescribed. The cost to Government of one 500 mg Metformin tablet to help control blood sugar levels is \$0.01 (Vt 1.17) per tablet. As blood glucose testing strips are still used on a monthly basis, total direct pharmaceutical costs rise to \$24.55 per patient per year. If the diet and Metformin are insufficient to control the diabetes, a second oral medicine is added, Glibenclamide. Dosage commences at 5mg daily but can rise to a maximum of 10mg twice a day. Adding in the additional costs of \$8.10 (Vt 730) per patient per year for Glibenclamide increases the total drug cost to the Government of

¹⁵ Ferrannini and Cushman estimate that, globally, high blood pressure is reported in over two thirds of patients with Type 2 diabetes and in patients with diabetes, hypertension produces and increased risk of cardiovascular disease

\$32.65 (VT 2942) per patient per year. At this stage blood glucose testing may also increase with associated costs dependent on frequency of testing.

If the disease progresses further and insulin is required the costs rise dramatically. The drug cost of insulin alone adds a further \$262 (Vt 23,655) per patient per year at a conservative dose of 40 Units daily. Dosage of 1 g Metformin twice daily would continue provided renal function remains adequate. Glibenclamide would be discontinued, but the frequency of testing for blood sugar levels would increase from monthly to weekly tests at a health facility. (Ideally, blood sugar levels would be tested daily, but the vast majority of patients in Vanuatu cannot afford a glucometer and the testing strips and so rely entirely on public health facilities). In total, this would bring the net cost of drugs to \$305.78 per patient per year: a more than twelve-fold increase from the oral medication stage using metformin. Experience in Vanuatu and elsewhere suggests that when a patient's diabetes has progressed to the point of requiring insulin, there are usually other risk factors present, including high cholesterol and high blood pressure, or the diabetes has triggered medical complications affecting target organs which require additional drug treatment. Most commonly, aspirin, simvastatin¹⁶ and enalapril are added, incurring an additional \$61.17 (Vt 5511) to treatment costs each year. This brings the total pharmaceutical drug cost to Government to \$366.95 (Vt 33,059) per patient per year: a 15-fold increase in costs from oral medication using Metformin. The increase in direct pharmaceutical costs to Government as the disease progresses is displayed in Figure 3 below.

¹⁶ Statins have been approved for restricted use recently but the Government is still awaiting supplies.

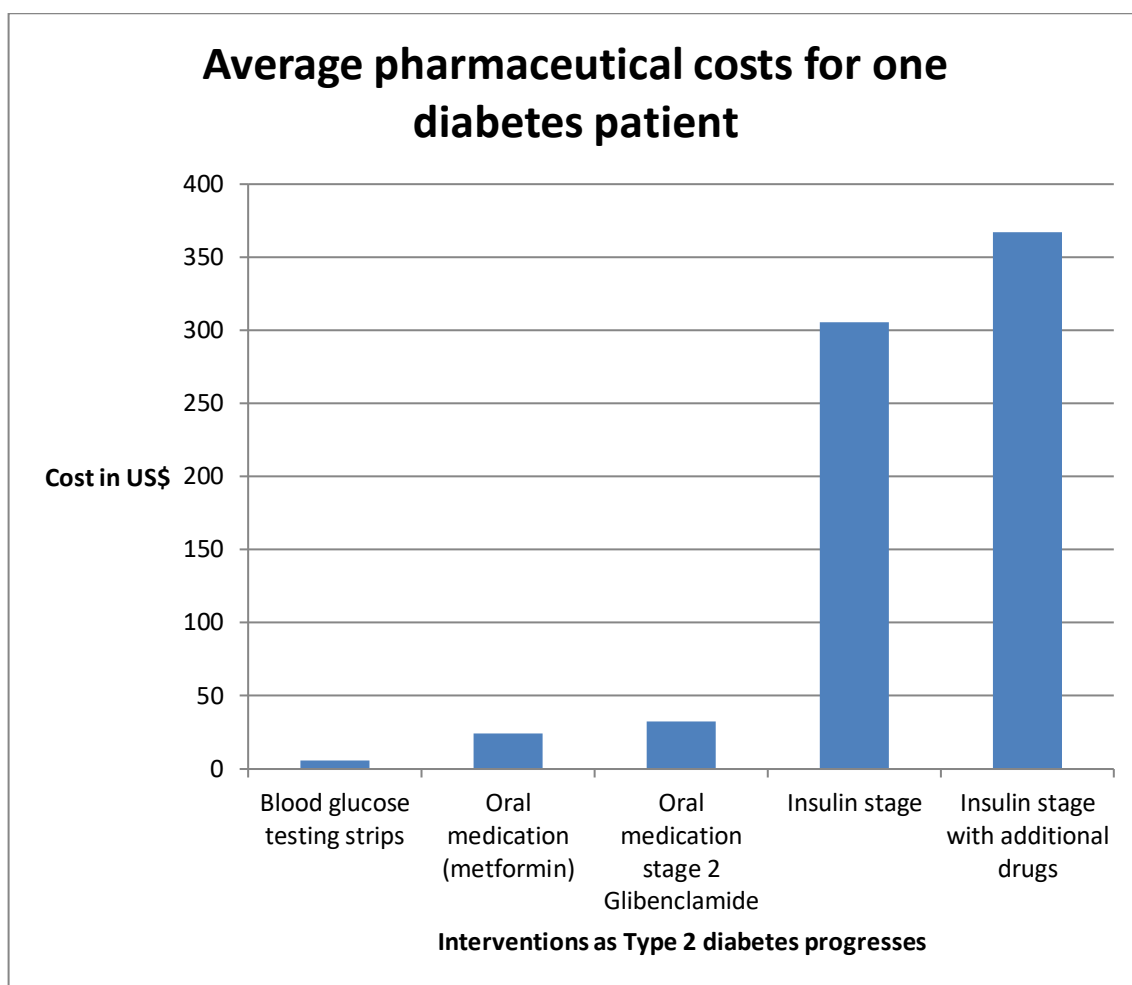


Figure 3: Progression of average pharmaceutical costs per patient per year for Type 2 diabetes in 2012

Source: Government of Vanuatu Ministry of Health.

A similar exercise was also done to estimate the pharmaceutical costs of treating hypertension in Vanuatu. The increase in cost of drugs to the Government as the hypertension progresses is displayed in Figure 4 below.

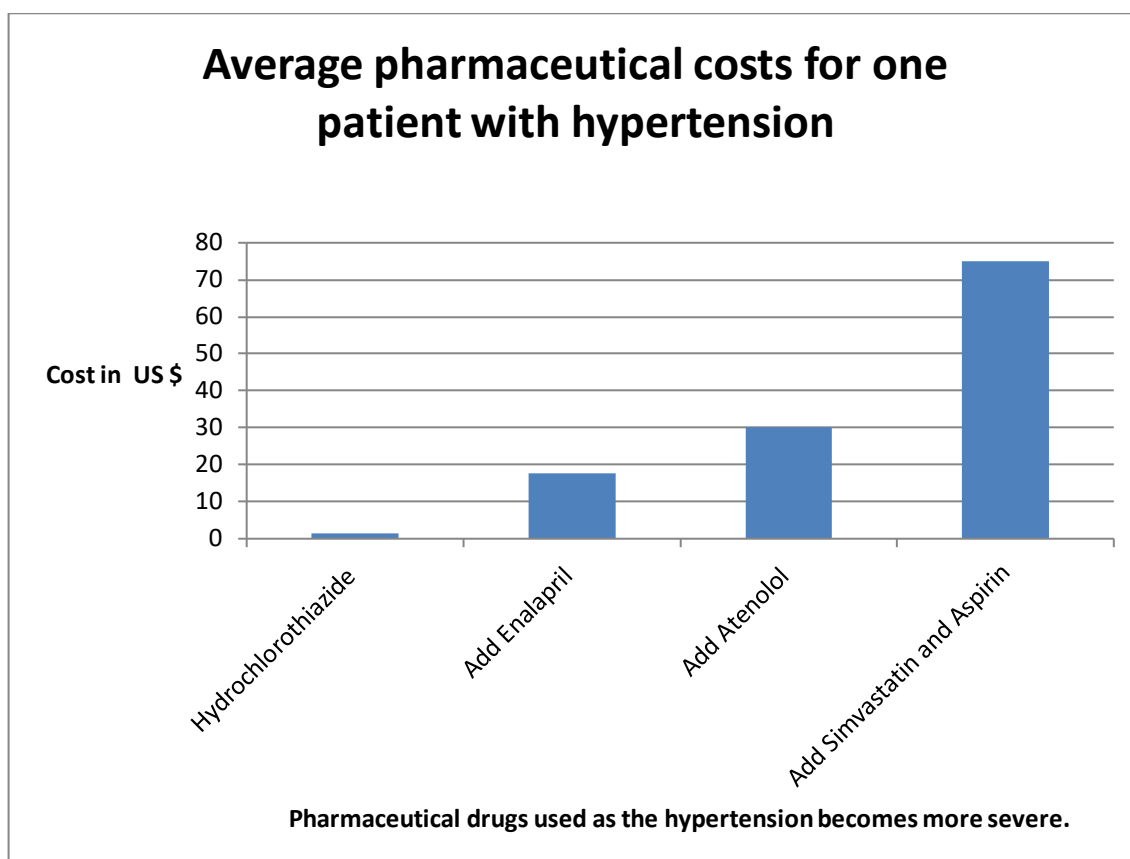


Figure 4: Progression of average pharmaceutical costs per patient per year for hypertension in 2012

Source: Government of Vanuatu Ministry of Health.

Discussion

The first point to note is that drug costs to Government escalate significantly if diabetes and / or hypertension progress to more advanced stages. Costs do not move gradually, or smoothly. Instead, as Figures 3 and 4 shows, drug costs move in large, step wise, fashion as the disease progresses and more expensive / intensive pharmaceutical products are required. Costs increase more than four-fold as a patient moves from the stage of close monitoring, lifestyle changes and no- medication to initiating oral medication using metformin. Costs increase again if Glibenclamide is added to the regime. Costs then increase if the disease further progresses and the patient moves to insulin: a more than twelve-fold increase between the oral medication using Metformin stage to insulin. There is a sixty five-fold increase in costs between first line testing (\$5.59) and insulin with additional drugs (\$366.95). Similarly for hypertension: costs increase more than twelve times as the patient's treatment moves from

Hydrochlorothiazide to addition of Enalapril (\$1.38 per patient per year to \$17.58 per patient per year), almost doubling to \$30.23 with the addition of Atenolol or Nifedipine, and then more than doubling again to \$75.14 if Simvastatin is added to the regime.

Second, the steep increase in costs as the diseases progress has the potential to quickly exhaust the Government's pharmaceutical budget at relatively low levels of service coverage. As noted above, the notional budget allocation for drugs from the Government's Central Medical Store is the equivalent of \$4 per person per year in Vanuatu. Provision of additional essential drugs for those with diabetes and hypertension is obviously important if the disease progresses. But it does come at a high "opportunity cost" in terms of the number of people that could be treated with drugs for other diseases in Vanuatu. As Table 2 shows, a diabetes patient who requires oral medication involving metformin tablets to stabilise blood sugar levels absorbs the equivalent of 6.14 other person's notional drug allocation for the year. If the diabetes then progresses to a more advanced stage and an insulin regime is required, this absorbs the equivalent of 76.4 other person's notional drug allocation rising to 91.7 person's notional drug allocation if Simvastatin and other drugs are employed. There are similarly high opportunity costs arising from hypertension treatment: adding Atenolol to the drug regime for one hypertensive patient is the equivalent of the notional drug allocation of another 7.5 persons.

The third point to note is that even relatively low costs of drugs can become unaffordable in a low resource setting such as Vanuatu. The right hand column of Table 2 shows that, with a notional drug allocation averaging \$4 per person per year, only 16% of the total population could be supplied with early stage oral medication using metformin for diabetes before the total budget for the Government's Central Medical Stores was fully spent. Only 1.31 % of the population could be treated with insulin before the total nation-wide pharmaceutical budget was fully spent, or 1.09% if additional drugs such as simvastatin were added. Similarly for hypertension: only 13.26% of the population could receive the combination of Hydrochlorothiazide + Enalapril + Atenolol before the total pharmaceutical budget for the year was spent. This is not sufficient to cover all those in need, especially when the latest NCD STEPS survey found that prevalence of hypertension is high.

Vanuatu faces important health financing challenges. It has a health system heavily dependent on government financing and provision, but with low absolute levels of domestically generated health expenditure of around \$64 per person per year in 2012. This paper shows that just two NCDs – diabetes and hypertension – impose large and ultimately unsustainable pressures on the Government’s pharmaceutical budget. This is especially the case if the prevalence of those diseases increases over time and / or those diseases progress to more advanced stages and cause severe medical conditions requiring more expensive medications. The high level of current risk factors – 30% of the adult population in the recent NCD STEPS survey have raised blood pressure but 95% of those are not on medication – is a potentially ominous warning of future health and financing challenges. The chronic, long term nature of NCDs such as diabetes and hypertension carries implications for Vanuatu’s health budget and, ultimately, the Government’s longer term fiscal strategies.

While more funding is needed in the health sector, the prospects for substantial increases are limited in the immediate future. This is due to a combination of several factors including relatively modest economic growth in Vanuatu; a narrow tax base (and no income tax); vulnerability to economic and natural disaster shocks; competing Government priorities; and limits to already quite substantial aid funding from development partners. Focusing the country’s limited resources on effective primary and secondary prevention through health promotion, lifestyle change, screening, early detection and treatment and effective clinical management are therefore strategic interventions. This would improve health outcomes for large segments of the population, whilst simultaneously averting - or at least postponing - additional expenditure pressures on an already tightly constrained public budget.

There are limitations to this study. The estimated costs are restricted solely to drug costs. Lack of robust data currently precluded estimates of total counselling, surgery, and other treatment and medical overhead costs that Government bears. Nor does the study estimate the extent of direct out of pocket expenses incurred by patients. (However, these are thought to be quite low given that Government finances and provides pharmaceutical products usually without charge, or at nominal cost to the patient). Nor, given the absence of data, does the study seek to estimate indirect costs to patients (or their employers) that would be incurred through foregone income as a

result of illness and absence from work. Nor is there sufficiently robust data at this stage on the socio-economic profile of patients to estimate the equity implications and burden of hypertension and Type 2 diabetes. On the other hand, this study is the first to have estimated the pharmaceutical costs of treating various stages of Type 2 diabetes and hypertension in Vanuatu and examined this in the context of broader sustainability of health financing. The study has been particularly conservative in its estimating process, capturing the drug costs of treatment to the Government's Central Medical Store as this data was robust and reliable.

The research and analysis was undertaken as part of wider work on health financing options for Vanuatu undertaken by the Vanuatu Ministry of Health, and supported by the World Bank. Financial support from the Australian Agency for International Development (AusAID) enabled this broader work to be undertaken but AusAID had no role in the analysis or writing of this article. The authors declare no conflict of interest.

Contributions of authors

IA conceived the article and led the drafting and analysis. AS provided information on drug costs, treatment regimes at various stages of disease progression, and worked with IA on the analysis. HA and LT provided policy and programming perspectives from the point of the Ministry of Health in Vanuatu; SI provided policy and programming perspectives from her perspective as Task Team Leader with the World Bank leading a range of analytical work on health financing options for Vanuatu; RL and JK provided input in terms of clinical perspectives of the issues and links to public health policy. The authors confirm they have no conflict of interest in undertaking or presenting this article

Table 1: Pharmaceutical costs of treating diabetes and hypertension in Vanuatu in October 2012

Disease stage	Pharmaceutical product used	Unit price in \$US (Vatu in brackets)	Dosage used in Vanuatu	Additional cost to Government of treating one patient in one year	Cumulative cost to Government of treating one patient per annum
DIABETES					
First line testing	Blood glucose testing strips	\$0.47 (Vt 42) per strip	One test per month	\$5.59 (Vt 504)	\$5.59 (Vt504)
Oral medication stage	Metformin 500 mg	\$0.01 (Vt 1.17) per tablet	4 tablets per day	\$18.96 (Vt 1708)	\$24.55 (Vt 2212)
Oral medication stage 2	Glibenclamide 5mg	(0.5Vt) per tablet	4 tablets per day	\$8.10 (Vt 730)	\$32.65 (Vt 2942)
Insulin stage with Metformin and weekly blood glucose testing	Biphasic Insulin	\$13.82 (Vt 1245) per vial of 1000 units.	40 units per day.* Metformin dosage remains the same but blood glucose testing increased to once a week but Glibenclamide discontinued.	\$262 (Vt 23,655) for insulin	\$305.78 (Vt 27,548)
Insulin stage with additional drugs	150 mg Aspirin and 20 mg Simvastatin and 20mg Enalapril	0.4 Vt /tab Aspirin. 10.7Vt/tab Simvastatin and 1Vt/5mg tab Enalapril	One per day of Aspirin and Simvastatin. Four per day of Enalapril	\$61.17 (Vt 5511)	\$366.95 (Vt 33,059)
HYPERTENSION					

* We assume there would be some inevitable wastage and spillage as the insulin is withdrawn from the vial. We therefore assume 50 units are actually withdrawn (40 of which are delivered to the patient). The cost is therefore 50 units * 365 = Vt 18,250 units, or 18.2 vials. In practice, this would equate to 19 vials. 19 vials * Vt1245 per vial = Vt 23,655 or \$262.

Disease stage	Pharmaceutical product used	Unit price in \$US (Vatu in brackets)	Dosage used in Vanuatu	Additional cost to Government of treating one patient in one year	Cumulative cost to Government of treating one patient per annum
First line drug therapy	Hydrochlorothiazide 12.5mg-25mg	\$0.38 for 100 tablets	One tablet per day	\$1.38 (Vt 124)	\$1.38 (Vt 124)
Additional drug therapy	Enalapril	\$0.01 (Vt 1 per 5mg tablet)	Two tablets twice a day	\$16.21 (Vt 1460)	\$17.58 (Vt 1584)
Further drug therapy	Atenolol [†]	(Vt 3.12 per tablet)	50 mg once daily	\$12.64 (Vt 1,139)	\$30.23 (Vt 2723)
Non- hypertensive drug therapy in addition	Aspirin for blood thinning and Simvastatin for cholesterol	Vt 0.4 per 150 mg tablet for Aspirin and Vt 10.7 per tablet for 20 mg Simvastatin	Daily	\$44.91 (Vt 4046) comprising \$1.62 (Vt 146) for Aspirin and \$43.35 (Vt 3900) for Simvastatin	\$75.14 (Vt 6769)

Source: Government of Vanuatu

[†] The alternative treatment in Vanuatu is Nifedipine. The cost is \$13.04 per year (Vt 3.22 per 20 mg tablet), taken once a day, which is similar to the \$12.64 for Atenolol.

Table 2: Number and percentage that can be treated

Stage of Disease	Drug costs per annum per patient	Number of other people's notional allocation of \$4 per person used	Number of people that could be treated at that level before Government's total pharmaceutical budget exhausted	Per cent of the total population that could be treated at that level before Government's total pharmaceutical budget exhausted
Diabetes				
Glucose testing strips	\$5.59	1.4 persons	178,571	72%
Oral medication (Metformin)	\$24.55	6.14 persons	40,717	16%
Oral medication (Metformin with Glibenclamide)	\$32.65	8.1 persons	30,618	12%
Insulin	\$305.78	76.4 persons	3,270	1.31%
Insulin with additional drugs	\$366.95	91.73 persons	2,725	1.09%
Hypertension				
Hydrochlorothiazide	\$1.38	0.34 persons	724,638	290%
Adding Enalapril	\$17.60	4.4 persons	56,818	22%
Adding Atenolol	\$30.23	7.5 persons	33,079	13.26%
Adding Simvastatin and Aspirin	\$75.14	18.78 persons	13,308	5.3%

Source: Government of Vanuatu Ministry of Health

References

1. World Health Organization. WHO Noncommunicable Diseases Fact Sheet. 2011.
2. Abegunde DO, Mathers CD, Adam T, Ortegón M, Strong K. The burden and costs of chronic diseases in low-income and middle-income countries. *The Lancet*. 2007;370(9603):1929-38.
3. Cecchini M, Sassi F, Lauer JA, Lee YY, Guajardo-Barrón V, Chisholm D. Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness. *The Lancet*. 2010;376(9754):1775-84.
4. Beaglehole R et al. Priority Actions for the NonCommunicable Disease Crisis. *The Lancet*. 2011;377(9775).
5. Bloom D et al. The global economic burden of noncommunicable diseases. 2011.
6. World Health Organization. Global Status Report on Non-Communicable Diseases. Geneva: 2010.
7. Beaglehole R, Bonita R, Alleyne G, Horton R, Li L, Lincoln P, et al. UN High-Level Meeting on Non-Communicable Diseases: addressing four questions. *The Lancet*. 2011;378(9789):449-55.
8. World Bank. The Growing Danger of Non Communicable Diseases: Acting Now to Reverse Course. Washington DC: 2011.
9. Ibrahim MM, Damasceno A. Hypertension in developing countries. *The Lancet*. 2012;380(9841):611-9.
10. Schiffrin EL. Hypertension: treatments, diabetes, and developing regions. *The Lancet*. 2012;380(9841):539-41.
11. Ferrannini E, Cushman WC. Diabetes and hypertension: the bad companions. *The Lancet*. 2012;380(9841):601-10.
12. Robinson H. Non-communicable diseases and health systems reform in low and middle income countries. *Pacific Health Dialog*. 2012;18(1):179-90.
13. World Health Organization. Diabetes: Fact Sheet Number 312 2011.
14. International Diabetes Federation. IDF Diabetes Atlas Fifth Edition. 2011.
15. Ramachandran A MR, and Snehalatha C, Diabetes in Asia. *The Lancet Volume 375*. 2010.
16. Colagiuri S PT, Viali S, Hussain Z and Colagiuri R, The epidemiology of diabetes in Pacific Island populations. In: Ekoe J RM, Williams R and Zimmet P, editor. *The epidemiology of diabetes mellitus, second edition: John Wiley and Sons; 2008*.
17. Coyne, T Lifestyle diseases in Pacific communities. 2000.
18. DiBello JR, McGarvey ST, Kraft P, Goldberg R, Campos H, Quesada C, et al. Dietary Patterns Are Associated with Metabolic Syndrome in Adult Samoans. *The Journal of Nutrition*. 2009 October 1, 2009;139(10):1933-43.
19. Lower T NB, Abel M, Ake M, Puloka V, Tiban K,. Curbing the tide: non-communicable disease in the Pacific. *Pacific Health Dialog*. 2005;12(2):61-4.
20. Aitaoto NT BK, Ichiho HM, Kuhau RL,. Diabetes today in the Pacific: reports from the field. *Pacific Health Dialog*. 2005;12(1):124-31.
21. World Bank. The Economic Costs of Non-Communicable Diseases in the Pacific Islands: A Rapid Stocktake Of The Situation In Samoa, Tonga and Vanuatu. 2012.
22. Tabák AG, Herder C, Rathmann W, Brunner EJ, Kivimäki M. Prediabetes: a high-risk state for diabetes development. *The Lancet*. 2012;379(9833):2279-90.
23. World Health Organization. Noncommunicable Diseases Country Profiles. 2011.
24. Government of Tonga. Second National Millennium Development Goals Report. In: Ministry of Finance and National Planning, editor. 2010.
25. UNICEF. Global study on child poverty and disparities: national report Vanuatu. 2012.
26. Government of Vanuatu. Health Information System Annual Report 2011.
27. World Health Organization. Vanuatu STEPS Survey Fact Sheet.: WHO; 2012

[cited 2013 16 April 2013]. Available from: <http://www.who.int/chp/steps/vanuatu/en/>.

28. Government of Vanuatu. National Population and Housing Census 2009. In: Vanuatu National Statistics Office editor. 2010.

29. Falconer G BA, Colagiuri R. Counting the cost of type 2 diabetes in Vanuatu. *Diabetes Research and Clinical Practice*. 2010;87:92-7.

Introductory note: Chapter 5

Chapter 5 addresses another specific research gap in the Pacific: the relative absence of published analysis of the implications of ageing on the health systems of the Pacific.

The focus in this chapter is the implications of ageing per se, and not necessarily NCDs, although the two are clearly related. There is substantial evidence to show that globally, increased life expectancy, even in low income countries, is associated with an increased incidence of NCDs, especially cardiovascular disease, stroke, and cancer, as well as an increased risk of dementia and mental health problems (32-36).

The world-wide link between ageing and increased incidence of NCDs has particular resonance in the Pacific. That is because, as this chapter shows with respect to the PICs: “with some of the highest rates of obesity and diabetes in the world, an ageing population will—unless urgent action is taken—put additional pressure on all aspects of the health system: leadership and governance; health financing; health workforce, service delivery; drugs and equipment; and information systems”.¹

Consistent with the findings of preceding chapters of this thesis, Chapter 5 also shows this is a particularly challenging public health and public financing challenge for the Pacific because of the existing high reliance on public expenditure for health care. Furthermore, and also consistent with the findings of preceding chapters of this thesis, Chapter 5 explains from the analysis of ageing presented the importance of, among other things, primary and secondary prevention of high burden / high cost diseases such as Type 2 diabetes. That is particularly important because, once acquired, Type 2 diabetes usually requires treatment for the remaining years of a person’s life and often involves co-morbidities including potential loss of eyesight and amputations.

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¹ Text taken from the Abstract of Chapter 5.

Chapter 5: The implications of aging on the health systems of the Pacific Islands: Challenges and opportunities



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Research Article

The Implications of Aging on the Health Systems of the Pacific Islands: Challenges and Opportunities

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Abstract—Population aging presents substantial and unique challenges and opportunities to Pacific Island countries. The countries in this region currently have young populations, but the population is rapidly changing. With some of the highest rates of obesity and diabetes in the world, an aging population will—unless urgent action is taken—put additional pressure on all aspects of the health system: leadership and governance; health financing; health workforce, service delivery; drugs and equipment; and information systems. Pacific Island economies face a particular challenge in terms of health financing: government already finances and provides the majority of health services, but most countries have limited fiscal space to expand and deepen health services for growing and aging populations. Most countries cannot rely on a demographic dividend to finance and strengthen their health systems. Increased efficiency, particularly through better targeted primary and secondary prevention of noncommunicable diseases, is a particularly strategic and feasible investment in the Pacific, improving the health and well-being of those who will age and strengthening the effectiveness, efficiency, and affordability of the broader health system.

INTRODUCTION

Population aging—by which we mean an increasing proportion of a population aged 60 years or more—affects many aspects of society, including the workforce, pensions, housing, and health care. Our research goal is to use a literature synthesis of peer-reviewed and grey literature to better understand the implications of aging on the health systems of the Pacific Islands.

The Pacific Island countries (PICs) are particularly interesting and important to study in this way because they are at important points in their demographic and epidemiological transitions.¹ They also face significant social and economic

Keywords: health financing, health systems, Pacific Islands, Papua New Guinea, population aging

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challenges due to the small, open, remote nature of their economies;^{2,3} exposure to natural disasters and climate change;^{4,5} and the history of low—or at least volatile—per capita growth in incomes.⁶

The PICs face many challenges in terms of their overall health system. Health systems in the Pacific have been designed primarily to address communicable diseases and maternal and child health. Though the majority of PICs achieved the Millennium Development Goals of reducing child mortality, only seven fully achieved the goal of reducing maternal mortality, and only six achieved the goal of reducing communicable diseases. Papua New Guinea (PNG)—the most populous and resource-rich country in the region—did not achieve any of the Millennium Development Goals, including any of those for health.^{7,8}

Health systems have, however, started to evolve to address the extraordinary rise in noncommunicable diseases (NCDs), including diabetes, in much of the Pacific,^{9–11} a challenge affecting all parts of the health system as the aging process accelerates. The first five countries in the world with the highest prevalence of diabetes among those aged 20–79 years are all from the Pacific, led by Tokelau with a prevalence of 37.5%.¹² Seven Pacific Island countries are in the top ten worldwide for prevalence of diabetes and are estimated to remain so by 2035 when their aged populations will be larger in numerical terms.¹² Many other countries in the Pacific have high levels of diabetes as well as significant risk factors for diabetes and cardiovascular disease such as obesity.^{9,13} Data from the WHO STEPwise approach to Surveillance (or STEPS) for the Federated States of Micronesia (FSM) estimate that 47% of women were obese in 2006.¹⁴ Furthermore, over two thirds of women (67.8%) and more than three quarters (75.5%) of men aged 45 to 64 years had three or more risk factors for acquiring an NCD, including currently smoking; low level of physical activity; low fruit and vegetable intake; overweight; and raised blood pressure. Over half of those aged 22 to 44 years (both sexes combined) had three or more risk factors for acquiring an NCD.¹⁴ Similar trends are found in other PICs.¹¹ All of these point to a potentially very significant pipeline of complex and often expensive-to-treat NCDs as populations age.

There is some evidence to suggest that the significant rise in NCDs in the Pacific is also slowing the aging process itself, albeit through the unwelcome process of reduced life expectancy. The government of Tonga's *Strategic Development Framework 2015–2025*, for example, specifically refers to “life expectancy falling significantly in recent years as a result of the epidemic of non-communicable diseases.”^{15(p32)} Ministry of Health figures cited in that report suggest that

life expectancy for males fell from 70 to 65 years and for females from 72 years to 69 years over the remarkably short period 2007–2010. The effect of NCDs on life expectancy and the aging process in the Pacific continues to be an important area for future research.

MATERIALS AND METHODS

We define PICs for this article as those 15 low- and middle-income countries that are members of the Pacific Islands Forum regional grouping: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of the Marshall Islands, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, and Vanuatu. We do not include the Pacific territories of France, the UK, or the United States in the analysis. The PICs are generally small in size—just 26 km² in Tuvalu—but cover vast distances across the Pacific; it is 7,500 km from Palau in the western Pacific to Kiribati in the east and 4,500 km from the Marshall Islands in the northern hemisphere to Tonga in the south.² A common sub-grouping for PICs is Micronesia (smaller islands north of the equator and east of the Philippines); Melanesia (generally larger and often mountainous islands south of the equator and closer to Australia); and Polynesia (generally smaller islands, in the east of the Pacific Ocean).

We examine the implications of aging against what the World Health Organization describes as the six key components of a well-functioning health system: leadership and governance; service delivery; health financing; human resources for health; essential medical products and technologies; and health information systems.¹⁶ We note that these components interact with each other and are not silos.

In focussing on the health system per se, we nevertheless recognize that many social determinants of health—including housing, nutrition and food security, tobacco and alcohol use, and social capital—influence health outcomes, including those for the aged. Data limitations and a desire to focus on what is known about the implications for the health sector per se prevented us from exploring these other multisectoral influences. This remains an important area for future research.

Data limitations and space prevent a detailed study of all 15 countries. We therefore provide an overview of the region but then focus the rest of the discussion using examples from four countries where the data are more robust from each of the main Pacific sub-regions: Fiji and PNG from Melanesia; Tonga from Polynesia; and the FSM from Micronesia. We give particular attention to Fiji because it is the most rapidly aging country in the Pacific. Countries in the Pacific will be therefore watching to see whether policies and programs of a

relatively populous (in Pacific terms) and upper-middle-income country can be made to be affordable, effective, and financially and institutionally sustainable.

Data in the Pacific—specifically regarding older people—are limited. Where necessary, we have therefore formed our judgments regarding how we think the aging process will interact with broader health system constraints are empirical.

RESULTS

Population and Aging in the Pacific

Table 1 summarizes key information about population and aging in the Pacific, drawn from the latest mid-year 2016 estimates from the Secretariat of the Pacific Community, the main regional technical and scientific organization in the region.¹⁷ Three features are clear. First, the region is relatively young, with more than half of the countries having a median age of less than 25 years. The number of people aged 60 years and above is also relatively small in global terms—an estimated 612,500 for the region (not counting Kiribati, where final statistics are still under review). The percentage of older people is also generally low. This is especially clear in more

populous Melanesia, with only 4.4% of the population aged 60 or above in the most populous country, PNG. Second, countries are at different stages in their demographic transition. Fiji and most Polynesian countries are more advanced in reducing the total fertility rate (TFR) and with generally higher life expectancies than the more populous Melanesian countries of PNG, Solomon Islands, and Vanuatu.

A third feature of the Pacific is that outmigration of the working-age population is an important driver of population aging, especially in smaller economies with limited employment opportunities. Table 1 shows that eight countries have a crude net migration rate of -10% or more. The majority of people emigrating are of working age. Permanent outmigration dilutes the national population growth rate: ten of the 15 countries in Table 1 have growth rates less than 1% per annum, despite having a relatively high TFR. Tonga, for example, with a TFR of 4.1, has a population growth rate of 0.1%, partly due to a significant crude net migration rate of -18.7% . High levels of outmigration of the working-age population also skew societies to the very young and elderly, particularly noticeable in rural and outer islands where employment opportunities are often poor. The small island of Niue, with a population of 1,600, has only 300 older

Region/ Country	Estimated Total Population Mid-2016	Median Age	Total Fertility Rate	Population Growth Rate (%)	Crude Net Migration Rate (%)	Number Aged 60+ Years	Percentage Total Population Aged 60+ Years	Life Expectancy at Birth (Male)	Life Expectancy at Birth (Female)
Melanesia	10,250,000					535,200	5.2		
Fiji	880,400	28.5	2.6	0.5	-6.0	85,600	9.7	65.3	69.6
Papua New Guinea	8,151,300	21.8	4.4	2.3	0.0	361,000	4.4	53.7	54.8
Solomon Islands	651,700	19.4	4.4	2.3	-2.5	34,600	5.3	66.7	73.7
Vanuatu	289,700	21.3	4.2	2.5	-0.4	17,600	6.1	69.6	72.7
Micronesia									
Kiribati			3.9					58.0	66.3
Marshall Islands	55,000	19.9	4.1	0.5	-18.2	3,000	5.5	71.3	72.5
Micronesia Federated States	102,843	23.3	3.4	0.3	-15.6	7,600	7.3	68.5	71.6
Nauru	10,800	20.8	3.9	1.1	-11.0	400	4.0	57.8	64.8
Palau	17,800	36.5	2.2 (p)	0.3	-2.8	2,300	13.1	68.1	77.8
Polynesia						64,000	9.7		
Cook Islands	14,974	31.1	2.6	0.2	-7.3	2,200	14.2	71.7	79.6
Niue	1,600	35.6	2.6	-1.1	-12.8	300	20.1	70.1	76.3
Samoa	194,000	20.3	5.1	0.7	-15.5	15,200	7.8	72.7	75.6
Tokelau	1,400	25.6	2.1	0.0	-10.4	200	12.2	68.0	70.0
Tonga	100,600	22.6	4.1	0.1	-18.7	8,600	8.5	68.6	72.7
Tuvalu	10,100	25.1	3.6	0.4	-11.6	1,000	9.9	67.4	71.9

TABLE 1. Population Dynamics in the Pacific Islands. Source: Adapted from Ref. 17

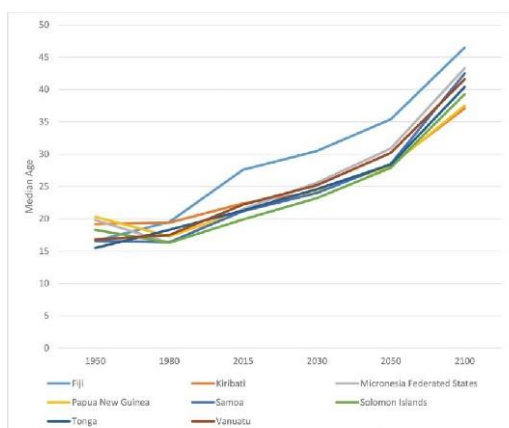


FIGURE 1. Median Age for Selected Countries in the Pacific. Source: Adapted from Ref. 18

people (aged 60 years and older).¹⁷ But with a crude net migration rate of -12.8% for the country as a whole,¹⁷ mainly involving those of working age, these 300 older people now represent nearly one fifth (18.75%) of the total population.

Figure 1 shows the rise in median age for those countries where data are available. Figure 2 shows the latest United Nation's projections for aging for the Pacific. What is particularly noticeable is that the share of the population aged 60 years and older is projected to increase in all eight countries for which projections are available between 2015 and 2050. The share of the older population at least doubles for three of the eight countries—Fiji, Solomon Islands, and Vanuatu—and nearly doubles in Kiribati and PNG. Vanuatu

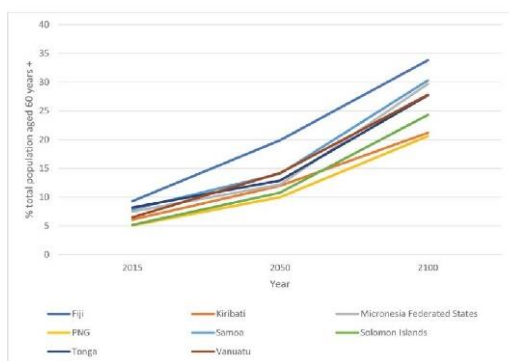


FIGURE 2. Share of Total Population Aged 60 Years and Above. Source: Adapted from Ref. 18

is projected to see the fastest aging, with the share of those aged 60+ increasing from 6.5% of the population to 14.2% over the period. Projections out to 2100 see the aging trend accelerate even further, led by Fiji, which is projected to have over one third (33.8%) of its population aged 60 years and over by 2100, compared to 9.3% in 2015. Figure 3 shows the rapidly changing age pyramid in Fiji.

Aging and the Health System

Leadership and Governance

There is little evidence that aging is currently a priority for PIC leaders, hardly surprising given the youthful populations of the region. The “Healthy Islands” statement for the region endorsed by all ministers for health in 1995 does include that “people work and age with dignity”^{20(p3)} as one of five core principles for health promotion and protection. Pacific Island leaders also have formally acknowledged they face a “crisis” of noncommunicable diseases,²¹ although it is noticeable that the declaration focuses on the “economically active age bracket”^{20(p7)} and does not mention the aged. A recent study assessing the implementation of the Madrid International Plan of Action on Ageing found that the Cook Islands and Fiji had specific national plans on aging. However, of the six countries in Asia and the Pacific that had no specific plans, four were in the Pacific—Palau, Solomon Islands, Tonga, and Tuvalu; the other countries were Afghanistan and the Maldives.²²

Fiji was the first PIC to have developed an aging policy, launched in 2011,²³ in recognition of the changing population structure (Figure 3). However—and somewhat surprising for a phenomenon that, by definition, has implications for decades—the original 2011 policy only extended through to 2015. The policy has not been evaluated and there is no specific indication as yet that it will be updated. In 2013, the Fiji government also established the National Council of Older People through a decree.²⁴ Though this was a move in the right direction in terms of supporting the elderly, the council received only a budget of approximately 200,000 FJD per year (approximately 95,000 USD).²⁵ This limited the activities that the council could effectively engage in. Government provides a monthly payment of 50 FJD (equivalent to around 24 USD) per month for those aged 66 years and above, although less than one third of those eligible are enrolled. The government also funds three homes for the elderly in different parts of the country, housing around 50 people each. Most elderly are assumed to be cared for using traditional social protection methods such as families, communities, and

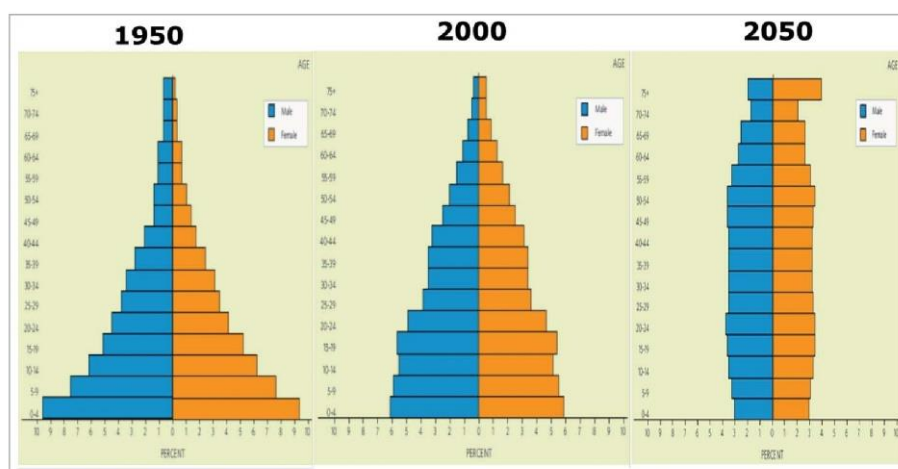


FIGURE 3. Changes in the Population Pyramid for Fiji. From United Nations Population Fund.¹⁹ © 2009 United Nations Population Fund. Reproduced by permission of United Nations Population Fund. Permission to reuse must be obtained from the rightsholder.

religious groups. There has been no research undertaken to measure the extent of these methods.

Unfortunately, the cost, affordability, and cost-effectiveness of responding to the needs of the growing population of elderly in Fiji are not known. This is an important area of future public policy research for Fiji, which will be of interest to all other countries in the Pacific.

The record on governance in the health system in the Pacific is mixed. For example, the Tonga government and ministry of health are regarded as an exemplar for planning, monitoring, evaluation, and accountability of its overall health system.²⁶ On the other hand, oversight of the primary health care system is particularly weak in PNG, with less than half (40%) of health clinics receiving a supervision visit in 2012 and less community engagement and oversight than for schools.⁷ Decentralization has led to fragmentation of responsibilities, roles, and financing in PNG.⁷

Health Financing

Table 2 summarizes key health financing statistics for the Pacific. Column 2 shows that total health expenditure (THE) is relatively high: all lower–middle-income countries in the Pacific exceed the global average, often by a large margin. Samoa, for example, has a THE of 301 USD per capita, more than three times the global average for lower–middle-income countries of 90 USD per capita.²⁷ (Adjusting for domestic price differentials—column 3—shows some countries are, however, below the average per capita expenditure for their income group.)

A particularly striking feature is the already high level of government expenditure on health in much of the Pacific. This has implications for the long-term capacity to finance the health consequences of aging. For example, in half of the countries in the Pacific, 90% or more of THE comes from government: in Tuvalu it is 99% (see Table 2, column 4). To put this in perspective, there are only 13 countries worldwide where general government health expenditure is equal to or exceeds 90% of total health expenditure; seven of these countries are in the Pacific.²⁷

Not surprisingly, government expenditure on health is now an important component of total government expenditure, potentially squeezing out opportunities for investments in other sectors or pensions for the aged. Government expenditure on health now represents 15% or more of total government expenditure—the notional and somewhat arbitrary goal set out in the Abuja Declaration^{29,30}—in six countries in the Pacific, rising to a surprisingly high 24% of total government expenditure in the Marshall Islands and 21% in the Federated States of Micronesia.²⁷ The share of government expenditure going to the health sector has also been rising quickly for five countries in the Pacific, increasing from 10% of total general government expenditure to 18% in Vanuatu; from 11% to 21% in the Federated States of Micronesia; and from 12% to 18% in Palau over the period 2000 to 2014.²⁷

High levels of government expenditure on health mean that out-of-pocket expenditure on health is correspondingly low, at 10% or less of total health expenditure in nine countries in the Pacific and at 5% or less in four countries (Table 1, column 5). The World Health Organization

(WHO) notes that Kiribati has the lowest level of out-of-pocket expenditure on health care in the world: just 0.20 USD per capita per year.³¹ Low out-of-pocket expenditure reduces the risk of catastrophic or impoverishing expenditure for individuals, including for the aged: an important issue with the rise of often expensive-to-treat chronic and lifelong noncommunicable diseases such as diabetes. However, it puts continued pressure on government health financing.

The particular challenge for the PICs is that aging increases demands on public health systems but there is limited scope to expand expenditure on health for the aging. More specifically, aging is associated with further increases in NCDs, often with complex comorbidities, and increased length of stay in hospitals. Yet PICs have limited “fiscal space” for health.^{32(p75)} That is partly because most Pacific Island economies have small formal private sectors and a

narrow tax revenue base.³³ Vanuatu does not have income tax. Even countries with larger economies and resources may face challenges in expanding expenditure on health: government revenue in PNG in 2016 adjusted for inflation is now the same as it was in 2006 despite a major resources boom.³⁴ The Pacific is also one of the most vulnerable regions on Earth to natural disasters,³⁵ reducing economic growth and imposing additional costs on government. Vanuatu and Tonga are listed as the two most “at risk” countries from natural disasters out of 171 countries worldwide.³⁶

Several countries are aid dependent and therefore vulnerable to aid volatility and potential skewing of health priorities toward donor preferences, which to date has not included the aged. For example, column 7 of Table 2 shows that external resources for health constitute 20% or more of THE in nine of the 14 PICs, reaching nearly two thirds (65%) of THE in the Federated States of Micronesia. Broader public financial

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Country or Classification	THE per Capita in USD in 2014 Source: WDI	THE per Capita in PPP ^b International Dollars (Constant 2011) Source: WDI	GGE on Health as Percentage of THE in 2014 Source: GHO	Out-of-Pocket Expenditure as Percentage of THE in 2014 Source: GHO	GGHE as Percentage of GGE in 2014 Source: GHO	External Resources for Health as Percentage of THE in 2014 Source: GHO
Cook Islands ^c	518	N/A	90	10	6	8
Fiji ^d	204	364	66	23	9	10 (in 2013)
Kiribati ^e	154	184	81	N/A	6	14
Marshall Islands ^d	625	680	84	12	24	33
Micronesia Federated States ^e	415	473	91	9	21	65
Nauru ^f	516	512	86	2	5	24
Niue ^c	1,162	N/A	98	2	6	64
Palau ^d	1,150	1,429	72	15	18	39
Papua New Guinea ^c	92	109	84	10	10	21
Samoa ^e	301	418	91	6	15	24
Solomon Islands ^c	102	108	92	5	13	57
Tonga ^c	213	270	82	12	13	19
Tuvalu ^d	633	N/A	99	1	17	13
Vanuatu ^c	158	150	90	6	18	48
Caribbean small states average	596	891	N/A	N/A		
Pacific Island small states average	211	292	N/A	N/A		
Lower-middle-income countries globally	90	270	N/A			
Upper-middle-income countries globally	518	930	N/A			

^aTHE indicates total health expenditure; PPP, purchasing power parity; GGE, general government expenditure; GGHE, general government health expenditure; N/A, not available.

WDI = World Development Indicators of the World Bank (data from Ref. 27), GHO = Global Health Observatory of the World Health Organization (data from Ref. 28)

^bPPP is a statistical approach that reflects the overall cost of living in a country and seeks to avoid market-based exchange rate fluctuations.

^cClassified by the World Bank as lower-middle-income countries (gross national income per capita of 1,026 USD–4,035 USD in 2017).

^dClassified as upper-middle-income countries (4,036 USD–12,475 USD).

^eClassified as high income (12,476 USD and above).

^fNot classified by the World Bank.

TABLE 2. Health Financing in the Pacific

management reforms to increase efficiency and accountability in the PICs have had mixed results.^{7,37}

Human Resources for Health

Aging presents a challenge on both the demand side and supply side for health workers. As the aging process continues, there is currently increased demand for more specialized services that cannot easily be met in relatively small island societies. There are, for example, currently no trained gerontologists in Fiji. Formal rehabilitation services in Tonga are judged “extremely limited,”^{26(p124)} with only one physiotherapist employed by the Tonga Ministry of Health in 2013 available to offer services for those—often elderly—patients suffering stroke or diabetic amputations.

On the supply side, there are no specialized training courses in gerontology for nurses in Fiji, and we could not find any such courses in PNG or FSM. There are, however, some components of general nurse training in the general curriculum, and the Fiji National University provides certificate level training on caring for the aged. Shortage of skills and training facilities in Palau meant that country sent health workers to the Pacific Islands Geriatric Education Center at the University of Hawaii for training.³⁸ The Pacific Open Learning Health Network has aimed since 2004 to provide continuing and distance education for health workers across the Pacific but does not appear to have provided any courses on health needs of aging. Aging is associated with increasing incidence of dementia: recent estimates suggest that the Pacific region requires 1,330 additional mental health workers by 2050, including 90 additional psychiatrists, 100 psychologists, and 500 nurses in PNG over 2010 targets.³⁹

The health workforce is itself aging in most countries, particularly among the most senior and specialized workers. A recent report on the “health workforce crisis” in PNG suggests that almost 50% of the service delivery workforce would retire in a decade, and only 12.3% of staff were less than 35 years of age.^{40(pxxv)} Almost one quarter (23%) of the health workforce in Tonga will reach the compulsory retirement age of 60 in ten years, with particular impacts on the most senior and specialized positions.

Another factor affecting the supply side is emigration of health workers from the Pacific, with often permanent loss of scarce skills and personnel.⁴¹ Brown and Connell noted that Pacific Island nurses (especially in Samoa and Tonga) “are choosing nursing as a career precisely because it offers migration” to countries like Australia and New Zealand.^{42(p137)} They further noted that nearly one third of all health workers in Fiji, Samoa, and Tonga aimed to

migrate overseas when they first entered the profession.⁴² Remaining health workers are often reluctant to work in rural or remote island locations where, coincidentally, children—and the aged—often predominate, with young adults moving to urban areas or overseas.

Service Delivery

The PICs have achieved some important progress in service delivery, particularly with respect to primary prevention of communicable diseases. Despite recent outbreaks of measles in Solomon Islands⁴³ and Vanuatu, the WHO notes that maternal and neonatal tetanus has been eliminated in all PICs and all PICs have maintained a polio-free status since 2000.⁴⁴ The WHO is also supporting the introduction and scaling up of the package of essential noncommunicable disease interventions in the Pacific: a package of “affordable, feasible, and cost-effective ‘best buys’ that aim to help prevent, diagnose and treat NCDs.”^{45(para3)} In Samoa, an innovative approach involving a specialized diabetic foot clinic is achieving, on average, better health outcomes than the equivalent treatment in hospital, in shorter periods, and at one eighth of the cost (Samoa Tala 924 per patient or 357 USD compared to Samoa Tala 7,239 per patient or 2801 USD as an in-patient in the nearby hospital).⁴⁶

Having said that, there is a pronounced trend toward urban, in-patient, hospital-based care in much of the Pacific, rather than more cost-effective, accessible, and equitable lower level facilities that would suit chronic NCD patients and the aged. In what the WHO refers to as a “worrying trend,” the average length of stay in a hospital in Tonga has almost doubled for patients with an NCD from 9.2 days in 2003 to 17–18 days in 2010.^{26(p84)} Hospitals with relatively high bed numbers and isolation wards that were appropriate when addressing infectious diseases now have low bed occupancy,²⁶ whereas there are relatively few lower level diabetes, rehabilitation, or nursing homes, especially in the outer islands. Palau had comprehensive aged care facilities for the elderly and caregivers, but funding was phased out when Palau left the compact with the United States. Palau is giving increased attention to home-based care.³⁸ NCDs—and especially diabetes—increase the need for specialist and surgical services. The director general of the Pacific community notes that “in some Pacific Island countries, up to 69% of people with diabetes have retinopathy and 11% have diabetes related amputations.”^{9(para6)}

There is significant variation in the extent and quality of primary health care services—a basic precondition for

healthy aging across the Pacific. The latest WHO report on Tonga concludes that the primary health care system in terms of antenatal care, immunization, and hospital deliveries is “comparable to high income countries.”^{26(p141)} However, a study of PNG found “a primary health care system . . . struggling against the odds, and unable to fulfil basic functions,” with almost three quarters (73%) of health clinics surveyed not undertaking regular health patrols; only one third being able to transfer patients to higher level facilities—important for aged patients with mobility difficulties; around one third having TB drugs; and a general decline in the number of patients using health clinics.^{7(pix)}

A later study in PNG found that

capacity for essential surgery and anaesthesia services is severely limited . . . due to shortfalls in physical infrastructure, human resources, and basic equipment and supplies; fewer than 30% of hospitals surveyed had uninterrupted access to oxygen. . . . almost none of the non-hospital health centres had uninterrupted access to electricity, running water, oxygen and basic supplies for resuscitation, airway management and obstetric services.^{47(p1,p10)}

In the absence of specific data about the aged, it is nevertheless reasonable to think that such constraints—with the exception of obstetric services—may have a disproportionate impact on the aged, who are, in general, more prone to falls and in need of general surgery.

Service delivery in the Pacific is not well equipped to deal with what WHO refers to as “the four giants of geriatrics (memory loss, urinary incontinence, depression and falls/immobility).”^{48(p124)} Even in relatively well-off and well-organized Tonga, the National Centre for Diabetes and Cardiovascular Diseases has only one wheelchair and no walking frames.²⁶ Funding for psychiatric services represents just 1% of the ministry of health’s total expenditure; the main psychiatric unit has just 12 beds as part of the main hospital; and mental health care in outer islands is provided by nonspecialized health workers.²⁶ Sensory organ disease—loss of hearing or eyesight—which generally increases with aging, is already the second greatest burden of disease in Fiji, FSM, Samoa, Solomon Islands, Tonga, and Vanuatu,⁴⁹ but there are limited services. Partly with the aim of providing more affordable care, the Asian Development Bank is piloting a 900,000 USD activity in Tonga that involves local nongovernmental organizations providing home-based care and support (including bathing, meal preparation, and reducing social isolation) to over 500 elderly and poor Tongans and children with disabilities.

Essential Medical Products and Technologies

Aging, especially with NCDs, often involves increased—and daily—use of pharmaceutical drugs, which can be financially unsustainable for Pacific Island health budgets. Recent analysis shows that progression of diabetes and hypertension to more advanced stages in Vanuatu squeezes an already tight government health budget. More specifically,

one patient requiring insulin absorbs the equivalent drug allocation of 76.4 other citizens. Only 1.31% of the total population could be treated with insulin, or 5.3% treated with the full regime of anti-hypertensive drugs, before the total Government drug budget for the country was fully spent.^{50(p1)}

This calculation is just the pharmaceutical cost of the insulin product itself and does not include the necessary direct add-on costs—also borne directly by government—such as nursing assistance to inject insulin or the indirect costs of warehousing and other overheads. The affordability to the public health budget of purchasing insulin is a particular challenge when Vanuatu has an estimated diabetes prevalence rate of 24% among those aged 20–70 years.¹²

Small populations combined with the need for expensive and skill-intensive technology means that several PICs needed to send patients overseas for radiography, chemotherapy, cardiac surgery, or other services that particularly affect the aged. This is a major financial burden for the smallest PICs, with overseas referrals representing almost one third (32.3%) of government health expenditure in Tuvalu for the direct benefit of only 100 patients in 2012.⁵¹ Overseas referrals tend to disproportionately favor the aged: 45% of patients referred overseas from Fiji and Cook Islands were aged 50 and above.⁵¹ In other cases, governments have directly funded renal dialysis units and are increasingly under pressure to do so as aging and NCDs increase. However, dialysis raises questions of cost-effectiveness and affordability in the Pacific: the average cost of dialysis treatment per patient in Samoa was more than 12 times the gross national income per capita, and around two thirds of patients had died within two years.^{10,52}

The PICs are also not always well equipped for early detection of diseases that can affect the elderly. For example, despite the fact that breast cancer is the leading cause of cancer among women, Tonga received its first mammogram machine for breast cancer screening only in 2014.²⁶ FSM does not have the capacity to undertake pap smears to detect cervical cancer and thus sends specimens to Hawaii.⁵³

The PICs are particularly vulnerable to natural disasters, and this has direct and indirect implications for buildings and facilities used by the aged. Directly, buildings need to be

cyclone resistant with easy access and exits for the aged: more than half of deaths associated with five major natural disasters globally occurred among people aged 60 years and older.⁵⁴ Indirectly, natural disasters impose large costs on economies, further constraining fiscal space: the 2009 tsunami cost economies 22% of their gross domestic product over a number of years.⁴

Health Information Systems

The coverage and quality of health information is generally improving across the Pacific, but there are major gaps in the evidence base concerning aging and its implications for the health system. Only three of the 15 PICs routinely produce national health accounts: Fiji, Samoa, and Tonga.⁵⁵ All but Palau and Tuvalu have undertaken at least one WHO STEPS estimates of risk factors for NCDs. Nine PICs have undertaken a demographic and health survey. One country (Vanuatu) has a UNICEF Multiple Indicator Cluster Survey.

Though these international survey instruments potentially provide useful insights into the operations and challenges of the health system as a whole, they rarely capture detailed data or evidence that can be used for planning a response to aging. For example, while acknowledging that 16% of the total population in Tonga was aged 50 and above, the latest Tonga demographic and health survey confined its survey sample to men and women aged 15–49.⁵⁶ It also devoted a separate 32-page chapter to HIV/AIDS—a total of 19 people had ever been diagnosed with HIV at the time—but did not have a section on aging.⁵⁶ STEPS estimates of risk factors for NCDs, including hypertension, smoking, nutrition, and obesity, cover the 15–64 year age group but not older cohorts for whom the incidence of NCDs is usually higher.

There are other information gaps as well that are relevant to planning and health systems for aging, particularly for less populous countries in the Pacific. The United Nations Population Division does not prepare projections for individual countries with a population below 100,000, 12 of which are in the Pacific.⁵⁷ The Asia Pacific Observatory, hosted by the WHO, has undertaken comprehensive and independent health system reviews of Fiji, Tonga, and Solomon Islands, but there have been no *Health Systems in Transition* report of any country in Micronesia. FSM tracks 14 indicators in its “Health Sector Progress Report.” Four of the indicators are age specific but relate only to children under five years of age. There is no indicator tracking the aged, although NCDs now account for 75% of all hospital admissions, and curative

care was the largest and fastest increasing share of total health expenditure.⁵³ Informed planning for aging requires a multiyear approach: few PICs have robust or up-to-date medium-term expenditure frameworks to allocate scarce financial and human resources to best effect. There is not a strong evaluation culture to assess impact and value for money in the Pacific.⁵⁸

DISCUSSION

Pacific Island health systems are not well organized to meet the growing challenges of aging. This is understandable from a political economy perspective. Decision makers are focused on an unfinished agenda of maternal and child health. They are also focused on *premature* mortality and disability, which are higher than global averages for many countries in the Pacific as a result of NCDs. There is a limited political constituency for the aged when their proportion of the population is still relatively small. The benefits of healthy aging and avoidance of chronic diseases may also appear to be too distant in the future, and too invisible politically, to warrant additional investment.

Even if aging were a priority, most countries have low or at least volatile economic growth prospects and limited fiscal space to further invest in health systems further. The World Bank includes six PICs (Kiribati, Marshall Islands, FSM, PNG, Solomon Islands, and Tuvalu) in its *Harmonized List of Fragile Situations* for 2017,⁵⁹ and the Asian Development Bank lists Nauru, the Marshall Islands, and Tuvalu as “fragile states.”⁶⁰ Tonga, often seen as a reforming country, was reclassified from upper–middle-income (4,036 USD–12,475 USD per capita) to lower–middle-income (1,026 USD–4,035 USD) by the World Bank in 2016.⁶¹

Yet it is these very characteristics in Pacific Island societies and economies that indicate that countries should now be proactively strengthening public policy and health systems to meet the challenges of aging. Barring a major pandemic, aging is inevitable and unavoidable in all countries in the Pacific; see Figures 1 and 2. The existing pipeline of NCDs and high level of risk factors mean that many PICs already have a disproportionately large share of expensive-to-treat NCDs by global standards, putting additional strain on public health systems as the aging process accelerates. High levels of unemployment, underemployment, informal employment, outward emigration, and informal remittances mean that governments (and society more broadly) are not able to capture the full extent of any demographic dividend potentially available from existing swells in working-age population. Pacific economies—even including PNG—do not have the economic growth prospects, fiscal space, or systems capacity to

respond to the inevitable and predictable rise in aging cohorts. Complacency in public policy about aging and health systems simply because the current numbers and share of the aged population are still relatively small will sow the seeds of significant social, health, and financial problems in the future.

There is a positive alternative. Unlike much of Asia where aging is already an existing and substantive challenge for health systems, Pacific Island governments can plan now how to organize and fund their health systems to promote healthy aging and reduce financial and other burdens on the health system. Shrewd governments will use aging to redouble efforts to prevent and control NCDs, especially through targeted primary and secondary prevention of often chronic, disabling, and expensive diseases such as diabetes. The smaller and poorer the country, the more important it will be to achieve maximum health outcome and value for money from the health system, including through improved efficiency; better information and evaluation; more appropriate training; workforce planning; and better purchasing of/compliance with drugs.

CONCLUSION

The quality of aging—whether people are healthy or ill in their older years and for how long—affects many aspects of society: health care costs, pension liabilities, housing, savings, and poverty. The quality of aging is determined, in turn and in part, by a country's health system. The PICs do not currently face the health system challenges of aging that much of developing Asia faces. However, PICs face their own unique health system challenges as the aging process accelerates. These challenges include a significant pipeline of chronic and expensive-to-treat NCDs, especially diabetes; high reliance on government health expenditure, yet limited fiscal space for public expenditure increases; and gaps, weaknesses, and inefficiencies in other parts of the health system, including leadership and governance, service delivery, health workforce, drugs, and information systems. The strategic opportunity for the PICs is to use the current period to aggressively focus on primary and secondary prevention of NCDs and improve the overall efficiency of health systems to increase the likelihood of healthy aging for their citizens.

This article brings together—we believe for the first time—the implications of aging on the key components of health systems in PICs and points to the importance of planning now for the aging process. A key limitation in researching this article has been the limited data and published research on key aspects of aging in the Pacific. We hope that this article stimulates further interest in this important issue.

DISCLOSURE OF POTENTIAL CONFLICTS OF INTEREST

The authors confirm that they have no conflict of interest.

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REFERENCES

- [1] Hayes G. Population ageing in the Pacific Islands: emerging trends and future challenges. *Asia Pac Popul J* 2009; 24(2): 79-111.
- [2] The World Bank. *Pacific possible: long-term economic opportunities and challenges for Pacific Island countries*. Washington, DC: The World Bank; 2017.
- [3] Juswanto W, Ali Z. *Economic growth and sustainable development in the Pacific Island countries*. Tokyo: Asian Development Bank Institute; 2016.
- [4] The World Bank. *Pacific Islands: disaster risk reduction and financing in the Pacific*. 2012. Available at <http://www.worldbank.org/en/results/2012/04/01/pacific-islands-disaster-risk-reduction-and-financing-in-the-pacific> (accessed 19 January 2017)
- [5] Asian Development Bank, *The economics of climate change in the Pacific*. Manila: Asian Development Bank; 2013.
- [6] Adelman M, Ivaschenko O. *Hardship and vulnerability in the Pacific Island countries*. Washington, DC: World Bank Publications; 2014.
- [7] Howes S, Mako AA, Swan A, Walton G, Webster T, Wiltshire C. *A lost decade?: Service delivery and reforms in Papua New Guinea 2002–2012*. Canberra, Australia: The National Research Institute of Papua New Guinea and the Development Policy Centre; 2014.
- [8] Pacific Islands Forum Secretariat. *Pacific regional MDGs tracking report 2015*. Suva: Pacific Islands Forum Secretariat; 2015.
- [9] Tukuitonga C. *Diabetes remains major health challenge in the Pacific*. 2016. Available at http://devpolicy.org/diabetes-remains-major-health-challenge-pacific-20161026/?utm_source=Devpolicy&utm_campaign=b2efb0c490-RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_082b498f84-b2efb0c490-312068301 (accessed 18 January 2017)
- [10] Anderson I. *The economic costs of noncommunicable diseases in the Pacific Islands: a rapid stocktake of the situation in Samoa, Tonga, and Vanuatu*. Washington, DC: World Bank; 2013. World Bank Health Nutrition and Population Discussion Paper Number 86522.

- [11] The World Bank. Non communicable disease roadmap report. Washington, DC: The World Bank; 2014.
- [12] International Diabetes Federation. IDF Diabetes Atlas, sixth edition. Brussels, Belgium: International Diabetes Federation; 2015.
- [13] Secretariat of the Pacific Community. NCD statistics for the Pacific Islands countries and territories. New Caledonia: Secretariat of the Pacific Community; 2010.
- [14] World Health Organization. Federated States of Micronesia STEPS survey. Suva: World Health Organization Western Pacific Region and Government of the Federated States of Micronesia; 2006.
- [15] Government of Tonga Ministry of Finance and National Planning. Tonga strategic development framework 2015–2025. Nuku'alofa, Tonga: Government of Tonga Ministry of Finance and National Planning; 2015.
- [16] World Health Organization. Key components of a well functioning health system. 2010. Available at http://www.who.int/healthsystems/publications/hss_key/en/ (accessed 20 December 2016)
- [17] Secretariat of the Pacific Community. Updated mid year 2016 population estimates. 2016. Available at <http://prism.spc.int/regional-data-and-tools/population-statistics/169-pacific-island-populations> (accessed 21 May 2017)
- [18] United Nations Department of Economic and Social Affairs Population Division. World population prospects: the 2015 revision, key findings and advance tables. New York: United Nations Department of Economic and Social Affairs, Population Division; 2016. Working Paper No. ESA/P/WP 227.
- [19] United Nations Population Fund. Population ageing in the Pacific Islands: a situation analysis. Suva, Fiji: United Nations Population Fund; 2009.
- [20] Matheson D. The healthy islands journey (1995–2015): achievements, challenges and way forward. Presentation to the Pacific Heads of Health Meeting, Yanuka Island, Fiji, 15–17 April 2015. Available at http://www.wpro.who.int/southpacific/pic_meeting/2015/presentations/1healthy_islands_country_frends_20150401_v06.com.pdf
- [21] Pacific Islands Forum Secretariat. Forty-second Pacific Islands Forum: forum communiqué. 2011. Available at <http://www.forumsec.org/pages.cfm/about-us/secretariat/walk-down-memory-lane/>
- [22] Williamson C. Policy mapping on ageing in Asia and the Pacific analytical report. Chiang Mai: Help Age International East Asia/Pacific Regional Office; 2015.
- [23] Government of Fiji Ministry of Social Welfare Women and Poverty Alleviation, and United Nations Fund for Population Activities Pacific Sub-Regional Office. Fiji national policy on aging 2011–2015. Suva, Fiji: Government of Fiji Ministry of Social Welfare Women and Poverty Alleviation and the United Nations Fund for Population Activities Pacific Sub-Regional Office; 2011.
- [24] Government of Fiji Gazette. National Council for Older Persons Decree 2012. Suva, Fiji: Government of Fiji; 2012.
- [25] Government of Fiji. Fiji budget estimates 2016. Suva, Fiji: Government of Fiji; 2016.
- [26] World Health Organization. The Kingdom of Tonga health system review. Geneva: World Health Organization; 2015.
- [27] The World Bank. World development indicators. 2017. Available at [http://databank.worldbank.org/data/reports.aspx?source=2&series=SH.XPD.PUBL&country=\(accessed 20 April 2017\)](http://databank.worldbank.org/data/reports.aspx?source=2&series=SH.XPD.PUBL&country=(accessed 20 April 2017))
- [28] World Health Organization. Global Health Observatory data repository. 2017. Available at <http://apps.who.int/gho/data/node.home> (accessed 17 January 2017).
- [29] World Health Organization. Public financing for health in Africa: from Abuja to the SDGs. Geneva: World Health Organization; 2016.
- [30] Jowett M, Brunal MP, Flores G, Cylus J. Spending targets for health: no magic number. Geneva: World Health Organization; 2016. WHO/HIS/HGF/HF Working Paper 16.1.
- [31] World Health Organization. Spending on health: a global overview. Fact sheet Number 319. 2012. Available at <http://www.who.int/mediacentre/factsheets/fs319/en/> (accessed 28 March 2017)
- [32] Heller P. The prospects of creating “fiscal space” for the health sector. Health Policy Plan 2006; 21(2): 75–79.
- [33] Chongvilaivan A, Francisco R, Rabanal R. Informal sector growth and employment in the Pacific. 2014. Available at <http://development.asia/policy-brief/informal-sector-growth-and-employment-pacific> (accessed 28 May 2017)
- [34] Fox R, Howes S. PNG real revenue back to 2006 levels. 2016. Available at <http://devpolicy.org/png-real-revenue-back-to-2006-levels-20160822/> (18 January 2017)
- [35] Bettencourt S. Not if but when: Adapting to natural hazards in the Pacific Islands region. Washington, DC: The World Bank; 2006.
- [36] Integrated Research on Disaster Risk. World risk index. 2015. Available at <http://www.irdrinternational.org/2016/03/01/world-risk-index/> (accessed 20 January 2017)
- [37] The World Bank. Strengthening public financial management reform in Pacific Island countries. Washington, DC: The World Bank; 2016.
- [38] Fernandes R, Osarch S, Bell C, Flynn B, Nguyen L, Abad M, Wen A, Masaki K. Aging and caregiving in the Republic of Palau. J Cross Cult Gerontol 2013; 28(2): 167–180.
- [39] Charlson FJ, Diminic S, Whiteford HA. The rising tide of mental disorders in the Pacific region: forecasts of disease burden and service requirements from 2010 to 2050. Asia Pac Policy Stud 2015; 2: 280–292.
- [40] Morris I, Somanathan A. PNG health workforce crisis: a call to action. Washington, DC: The World Bank; 2011.
- [41] Connell J. The migration of skilled health professionals: from the Pacific Islands to the world. Asian Pac Migr J 2004; 13(2): 155–177.
- [42] Brown RP, Connell J. Occupation—specific analysis of migration and remittance behaviour: Pacific Island nurses in Australia and New Zealand. Asia Pac Viewp 2006; 47:135–150.
- [43] Diao J, Jimuru C, Asugeni J, Asugeni L, Puia M, Maomatekwa J, Harrington H, MacLaren D, Speare R, Massey P. Measles outbreak investigation in a remote area of Solomon Islands, 2014. Western Pac Surveill Response J 2015; 6(3): 17–21.
- [44] World Health Organization. Vaccination is everyone’s job. Protect your community 2015. Available at <http://www.wpro.who.int/southpacific/mediacentre/releases/2015/immunization-2015/en/> (accessed 25 May 2017)

- [45] World Health Organization. Fitness, gardening and dispensaries: tackling noncommunicable diseases in the Pacific. 2013. Available at http://www.who.int/features/2013/ncds_pacific/en/ (accessed 25 May 2017).
- [46] McGrath K. Cutting costs while improving care: Samoa's diabetic foot clinic. Canberra, Australia: Development Policy Centre, Australian National University Canberra; 2016.
- [47] Martin J, Tau G, Cherian M, Vergel de Dios J, Mills D, Fitzpatrick J, Adu-Krow W, Cheng D. Survey of the capacity for essential surgery and anaesthesia services in Papua New Guinea. *BMJ Open* 2015; 5: 1-12.
- [48] World Health Organization. Age-friendly primary health care centres toolkit. Geneva: World Health Organization; 2008.
- [49] World Health Organization. The health of older people in selected countries of the Western Pacific region. Geneva: World Health Organization; 2014.
- [50] Anderson I, Sanburg A, Aru H, Tarivonda L, Ivatts S, Latu R, Kool J. The costs and affordability of drug treatments for type 2 diabetes and hypertension in Vanuatu. *Pac Health Dialog* 2013; 19(2): 1-10.
- [51] Irava W, Prasad R, Mahakalanda H. Unpublished report on overseas referrals from selected Pacific Island countries. 2015.
- [52] Anderson I. Health financing options for Samoa: challenges and opportunities. Health Nutrition and Population Discussion Paper Number 89506. Washington, DC: The World Bank; 2013.
- [53] Federated States of Micronesia Department of Health and Social Affairs. Health progress report: 2008–2011 2012.
- [54] Beard JR, Officer AM, Cassels AK. The world report on ageing and health. *Gerontologist* 2016; 56(Suppl 2): S163-S166.
- [55] Hopkins S, Irava W, Tin Y. Comparisons of health expenditure in 3 Pacific Island countries using national health accounts. *Pac Health Dial* 2010; 16(2): 41-50
- [56] Kingdom of Tonga and Secretariat of the Pacific Community. Demographic and health survey 2012. Noumea, New Caledonia: Secretariat of the Pacific Community; 2013.
- [57] Hayes G. Population ageing in the Pacific Islands: a situation analysis. Suva, Fiji: UNFPA Subregional Office Suva 2009.
- [58] Swan A. Evaluating impact evaluation in PNG and the Pacific. 2016. Available at <http://devpolicy.org/evaluating-impact-evaluation-in-png-and-the-pacific-20160909/> (accessed 6 January 2017)
- [59] The World Bank. Harmonized list of fragile situations in financial year 2017. Washington, DC: The World Bank; 2016.
- [60] Asian Development Bank. Fragile states in the Pacific: 12 things to know. 2016. Available at <https://www.adb.org/news/features/fragile-states-pacific-12-things-know> (accessed 19 January 2017)
- [61] The World Bank. New country classifications by income level. 2016. Available at <https://blogs.worldbank.org/opendata/new-country-classifications-2016> (accessed 15 January 2017).

Introductory note: Chapter 6

Chapter 6 completes the trajectory of previous chapters by exploring the policy question of how governments can improve budget planning, priority setting and resource allocation in the health sector. Chapter 6 responds to the third specific research gap that I identified in Chapter 1: little guidance in the international literature on how Ministries of Health can better frame and argue their health financing proposals to Ministries of Finance and / or development partners.

As explained in the chapter itself, I wrote this article after chairing a meeting in June 2015 in Geneva entitled *From “shopping lists” to Investment Plans: Supporting countries to develop and finance sound Investment Plans for Women’s, Children’s and Adolescents’ health*. The meeting was sponsored by UNICEF, UNFPA, World Bank and the WHO.

The theme of improving women’s, children’s and adolescents’ health through better public investment was the theme of the international meeting because it is a global challenge in low and middle-income countries. This theme also has particular resonance for countries in the Pacific given their high Total Fertility Rates and unmet needs for modern contraception (as explained in Section 2.1 of chapter 1).

We make it clear in the article that the ten attributes for improving public investment for women’s, children’s and adolescent’s health apply equally and easily to other public health challenges facing low and middle-income countries. The analytical framework we propose can and should therefore be used by PICs when responding to the NCD crisis they face. Having a framework for public health financing based on strong economic principles is particularly relevant to the countries of the Pacific given that, as argued earlier in the thesis, they face limited health financing options because of the distinctive nature of their economies (Chapter 1, 2, and 3 of this thesis); prohibitively expensive treatment protocols for certain NCDs including in particular Type 2 diabetes and associated kidney disease as well as heart disease (Chapters 3 and 4); and an ageing and potentially sick population (Chapter 5). This article is also available from the *Bulletin of the World Health Organization* website at <http://www.who.int/bulletin/volumes/94/6/15-168419/en/>.

Chapter 6: How can health ministries present persuasive investment plans for women's, children's and adolescents' health

How can health ministries present persuasive investment plans for women's, children's and adolescents' health?

Ian Anderson,^a Blerta Maliqi,^b Henrik Axelson^c & Mikael Ostergren^b

Abstract Most low- and middle-income countries face financing pressures if they are to adequately address the recommendations of the Global Strategy for Women's, Children's and Adolescent's Health. Negotiations between government ministries of health and finance are a key determinant of the level and effectiveness of public expenditure in the health sector. Yet ministries of health in low- and middle-income countries do not always have a good record in obtaining additional resources from key decision-making institutions. This is despite the strong evidence about the affordability and cost-effectiveness of many public health interventions and of the economic returns of investing in health. This article sets out 10 attributes of effective budget requests that can address the analytical needs and perspectives of ministries of finance and other financial decision-makers. We developed the list based on accepted economic principles, a literature review and a workshop in June 2015 involving government officials and other key stakeholders from low- and middle-income countries. The aim is to support ministries of health to present a more strategic and compelling plan for investments in the health of women, children and adolescents.

Abstracts in [عربي](#), [中文](#), [Français](#), [Русский](#) and [Español](#) at the end of each article.

Introduction

Most low- and middle-income countries face financing pressures if they are to adequately address global goals for improving the health of women, children and adolescents. Only six of the 75 priority countries achieved the 5.5% annual rate of reduction in maternal mortality needed to achieve the United Nations (UN) millennium development goal 5.¹ Now further investments are required to meet the sustainable development goals for 2030 and implement the recommendations in the updated UN Global Strategy for Women's, Children's and Adolescents' Health (2016–2030).² According to the strategy, "existing financing falls far short of the sums needed to fund all the measures envisioned in this strategy. To scale up from current coverage to the targets for 2030 requires 33.3 billion United States dollars (US\$) in 2015 alone across 63 high-burden, low-income and lower-middle-income countries, equivalent to US\$ 10 per capita".

How much low- and middle-income countries spend from their own resources, and how well they spend them, is a key determinant of the outputs and outcomes of women's, children's and adolescents' health. There is no consensus about the amount or proportion of national income to spend on health;³ good outcomes for maternal health, for example, can be achieved even in low-income settings.⁴ Nevertheless, government expenditure on health is often low in absolute and relative terms in many low- and middle-income countries. This is important, because governments are usually the principal provider of public goods – worthwhile interventions that the private sector tend not to supply because they cannot easily charge a price for it, such as disease surveillance, vector control and other public-wide interventions against infectious diseases. Government expenditure is also a potentially key instrument for addressing health-related poverty and inequity and for preventing impoverishment due to out-of-pocket private expenditure. Sixty-three high-burden, low- and lower-middle-income countries are eligible for support under the recently launched global financing facility in sup-

port of the UN Secretary-General's Every Woman Every Child global strategy.² Yet in 48 of these countries the government's expenditure on health in 2013 was less than US\$ 50 per capita, with eight countries spending less than US\$ 10 per capita, and as low as US\$ 4 per capita in Myanmar.⁵ Fig. 1 shows that only nine countries have achieved the target of allocating 15% of national budget to the health sector which was agreed to by many low-income governments in 2001.⁶ Eight countries, including highly populated India and Pakistan, allocated less than 5% of total government expenditure to health.

The share of government expenditure being allocated to women's and children's health, and the health sector more broadly, is also important because it reveals the political priority given to health compared with other sectors and priorities. An analysis of national health accounts for this article showed that the one lower-middle income and nine low-income countries for which data were available allocated on average just 22.6% of government health expenditure to reproductive, maternal, newborn and child health (expenditure on adolescents was not captured), despite that group normally comprising more than 50% of the population.

Governments in low- and middle-income countries already spend on average US\$ 19.8 of their own resources on health for every dollar they receive in external assistance,⁸ but virtually all such countries face significant pressures for additional government expenditure in coming years. Population growth will put additional demands on already under-funded public health systems.⁹ Almost all low- and middle-income countries are seeking to achieve universal health coverage, yet most are also experiencing increased financial pressures as a result of rising rates of often expensive-to-treat and chronic noncommunicable diseases. Many countries are losing access to external development finance as they move into middle-income status.⁸ At the same time, there is increasing competition for those requiring aid financing for health. How well ministries of health can negotiate with ministries of finance to access and then spend additional financing is therefore a key issue.

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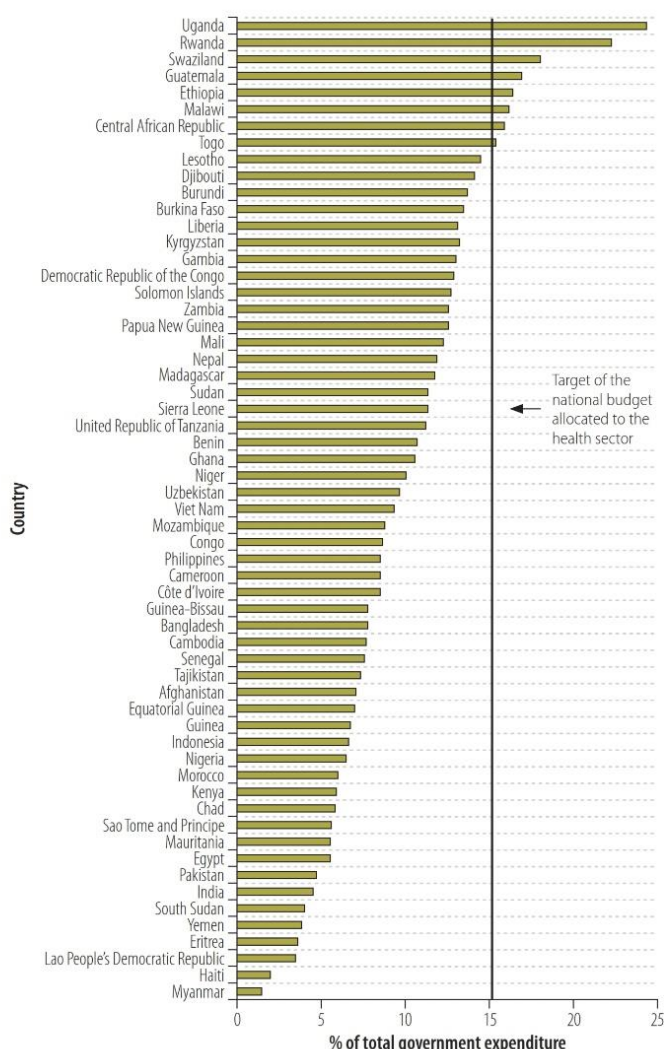
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Negotiations between ministries

Many factors, especially political economy factors, affect the level and allocation of public resources for health. Different stakeholders – including government institutions, politicians, development partners, the private sector, civil society and individual households – also ultimately influence the level and allocation of expenditure on women's, children's and adolescents' health. However, the interaction between the ministry of health and ministry of finance is critical for priority setting and resource allocation decisions. The ministry of health is key to this because it is the institution primarily responsible for advocating additional public financial resources and then managing public expenditure. The ministry of finance is also key because it is usually the most influential institution helping to decide the allocation of resources among competing needs and sectors. All too often health ministry officials are unable to convince their finance ministry counterparts that additional public expenditure is justified. This is despite the fact that the health sector has a strong evidence base, including randomized control trials, to demonstrate the affordability and cost-effectiveness of interventions, immunization being just one example. There can be missed opportunities to successfully negotiate additional financing due to the way in which health ministries approach finance ministries. The ministry of health proposal may have the appearance of an ad hoc shopping list rather than genuine investment plan that demonstrates prioritized use of scarce resources with a clear focus on significant results and value for money.

Against that background, we have identified 10 key attributes that ministries of finance and other financial decision-makers will normally be looking for in any investment plan being submitted from the ministry of health (Box 1). We developed the list based on accepted economic principles, a literature review with key search terms including "priority setting in health", "resource allocation in health", "public expenditure for health" and "low and middle income countries". We also explored the issues during a two-day workshop entitled *From shopping lists to investment plans* held in June 2015 in Geneva, Switzerland, involving 48 government officials and other key stake-

Fig. 1. Public health expenditure as a percentage of total government expenditure in countries eligible for financing from the global financing facility for women and children's health, 2013



Note: Target agreed to by many low-income governments in 2001.⁶
Data source: Global health observatory data repository.⁷

holders from ministries of health and finance, from low- and middle-income countries, as well as several bilateral and multilateral development partners.¹⁰

Key funding attributes

A starting point for the ministry of finance will be how the ministry of health's proposals can specifically contribute to

broader national development objectives. Improving health and saving lives has, of course, intrinsic value. However, the health ministry needs to also specifically demonstrate how, where, when and at what cost investments in health directly contribute to broader priority national objectives and not just to health goals, important as they may be. There are many arguments that the ministry of health can

make, depending on the country. For example, investments in health, including family planning, have been shown to contribute directly and indirectly to favourable demographic trends, better learning outcomes, higher worker productivity and greater household savings and investment, and therefore to better longer term economic growth, often at low per capita cost.^{11–16} Box 2 gives examples of investments in women's, children's and adolescents' health that contribute directly to economic growth and poverty reduction.

Second, the ministry of finance will usually want to see that the proposed expenditure is an investment yielding substantial outputs and outcomes, and not simply a cost, with a focus on inputs and expenses. Proposals that can demonstrate measurable outputs and outcomes in ways that are affordable, feasible, financially and institutionally sustainable, cost-effective or even potentially cost-saving, and yield economic returns on investment in a wide range of settings are more convincing than budget proposals that focus just on inputs. Box 3 provides examples of effective investment for women's, children's and adolescents' health.

Third, a ministry of finance will be more confident about allocating additional resources if the ministry of health provides evidence that it is already making good use of its existing resources. A finance ministry may concede that the health ministry requires additional funding, but may be reluctant to allocate additional funds if it knows or perceives, for example, that public health facilities are irregularly staffed or underused; that there has been under-expenditure in the health budget in previous years; or that there are inefficiencies in procurement or cases of waste and corruption. The World Health Organization (WHO) notes that around 20–40% of health expenditure globally could be freed up through eliminating 10 preventable sources of waste and inefficiency in the health sector (Box 4).²² A World Bank report estimated that in Cambodia savings could exceed US\$ 50 million a year or one-third of government health spending (the equivalent of 0.4% of gross domestic product), through more efficient purchasing of pharmaceuticals, medical equipment and supplies.²³

Fourth, the ministry of health can make a stronger case if it can specifically demonstrate that the requested expenditure is part of a coherent investment plan,

Box 1. Ten attributes of an effective health ministry investment plan to ministry of finance decision-makers

1. Demonstrates how health programmes contribute to broader national development objectives
2. Explains and quantifies how well-designed and well-targeted health expenditure is an investment not merely a cost
3. Demonstrates good use of existing financial and other resources by the health sector
4. Demonstrates effective allocation of existing health sector resources, with a focus on results
5. Shows how health expenditure is cost-effective and even cost-saving to government, development partners and households
6. Identifies and explains market failures in health provision that require public expenditure
7. Identifies and quantifies mutual benefits for the public health and finance sectors: improving health while raising additional government revenue
8. Presents a clear and accountable plan for downstream implementation, management, evaluation and lesson-learning from health programmes
9. Presents a strong evidence base for health policy and programming decision-making
10. Avoids earmarking of funds to the health sector, but shows how investment in the health sector complements investments in other sectors such as education

Box 2. Examples of how investment in women's, children's and adolescents' health contributes directly to economic growth and poverty reduction

- Recent analysis of the Global Investment Framework for Women's and Children's Health suggests increasing health expenditure by just US\$ 5 per person per year up to 2035 in 74 high-burden countries could yield up to nine times that value in economic and social benefits.⁶
- An estimated 30–50% of eastern Asia's dramatic economic growth in 1965–1990 is attributed to reduced child mortality and subsequent lower fertility rates that created a baby-boom cohort and decreased the dependency ratio.¹⁷
- Good access to affordable and quality health-care significantly reduces catastrophic out-of-pocket health care costs that push, or keep, millions of people below the poverty line worldwide, undermining nations' poverty alleviation goals.¹⁸
- Shifting from the UN medium-fertility population projection to the UN low-fertility population projection is estimated to raise income per capita by 5.6% over 20 years, and by 11.9% over 50 years.¹⁹

Box 3. Examples of how investment in women's, children's and adolescents' health can yield significant outcomes at low cost

If coverage of key evidence-based interventions were scaled up to at least 80%, and immunization coverage to at least 90%, 95% of deaths due to diarrhoea and 67% due to pneumonia in children younger than 5 years could be eliminated by 2025 at an additional cost globally of US\$ 2.9 billion.²⁰

Sri Lanka has been able to halve maternal deaths relative to the number of live births every 6 to 12 years for many decades since 1935, despite having spent less on health than most countries of similar income level.²¹

with resources allocated strategically to where they will achieve the highest impact and value for money. The ministry of finance will expect an accurate and transparent estimate of various costs, including the capital costs, recurrent costs and, most importantly, opportunity costs – that is, what benefits are being foregone if the health ministry's recommended intervention is adopted, including the cost of doing nothing.²⁴ Interventions that simultaneously achieve both efficiency and equity in women's, children's and

adolescents' health, as has been the case in Cambodia,²⁵ are particularly convincing to a ministry of finance. It also helps their case if health ministry officials can explain, for example, that while the unit costs of expanding antenatal care or immunization to remote and rural areas may be increasing, the cost-effectiveness of those interventions could also be increasing if the burden of disease or risk factors are higher in such areas. Some investment plans fail to apply the lesson that investing in preventive maintenance,

Box 4. Ten leading sources of inefficiency in health systems**Medicines**

- Underuse of generics and higher than necessary prices for medicines
- Use of substandard and counterfeit medicines
- Inappropriate and ineffective use

Health-care services

- Overuse or undersupply of equipment, investigations and procedures
- Inappropriate hospital admissions and length of stay
- Inappropriate hospital size (low use of infrastructure)
- Medical errors and suboptimal quality of care

Broader health system

- Health workers: inappropriate or costly staff mix, unmotivated workers
- Health system leakages: waste, corruption and fraud
- Health interventions: inefficient mix/inappropriate level of strategies

Source: World health report 2010.²²

for example of a cold-chain supply for immunizations, often yields a much higher economic return than investing in new capital equipment.

Fifth, ministries of finance are usually interested in saving money and reducing costs. Health ministries can therefore help their case if they demonstrate that expenditure on health is not just cost-effective but can also be cost-saving to government and to households. For example, reducing unintended pregnancies through expanded coverage of modern family planning methods is estimated to save US\$ 5.1 billion globally that would otherwise be required to provide the recommended care to pregnant women and newborns.¹³ In another example, every 26 days the United States of America saves the total amount of its original contribution to the campaign to eradicate smallpox, because it no longer has to vaccinate against or treat the disease.²⁶ Even though many governments currently allocate only relatively small amounts to the health sector, ministries of finance are aware that health-sector expenditure can increase faster than economic growth, inflation and government revenues, and may become financially unsustainable. It is therefore prudent for health ministries to show in their budget submissions that they include cost-saving interventions, when these are warranted on health grounds, and that they are also alert to the need to avoid unproductive and financially unsustainable cost escalation over the longer term.²⁷

Sixth, it helps if health ministries can argue when and how market failures in health require public expenditure. Market failures occur when markets

do not allocate resources in a way that maximizes overall welfare. In the health sector, this can justify public expenditure, for example on disease surveillance, which the private sector has little commercial incentive to provide, or on communicable diseases, which affect others beyond the immediate patient paying for a service. Well-targeted public expenditure is justified to correct significant market failures, although this does not necessarily mean public provision (that is, government directly providing the service), and this can run the risk of government failures in provision, including waste and inefficiency.²⁸ The ministry of finance, however, may still be unwilling to allocate additional resources to the government health sector if this duplicates, or displaces, the existing role of the private sector which, if it is well regulated, is capable of supporting health and social outcomes. Having an up-to-date national health account that maps the sources and uses of health financing from all sectors, including the private sector, enables health ministries to demonstrate to the ministry of finance where, and why, there are gaps in public provision. Cambodia provides a good example of how national health accounts can strengthen the evidence base to drive policy discussions and prioritization and allocation of resources.²⁹

Seventh, an effective health funding proposal is one that identifies, and where possible quantifies, where there are mutual gains for both the ministry of finance and the ministry of health. Increasing taxation on tobacco – recently described as the “single best health policy in the world”³⁰ – is one example. That is because

raising the excise duty on tobacco reduces health risks through reducing consumption while at the same time expanding the financial resources for the ministry of finance (through increased tax revenue) and for the ministry of health (through reduced expenditure on tobacco-related disease).³¹ WHO has estimated that a 50% increase in tobacco excise taxes would generate US\$ 1.42 billion in additional funds in the 22 low-income countries for which data are available.²² If all of these funds were allocated to health, it would allow government health spending to increase by more than 25% in several countries. Analysis shows that raising excise duties on tobacco is not regressive (that is, disproportionately affecting the poor) over the medium to long term: a claim often made by the tobacco industry lobby and sometimes by finance ministries.³¹ The ministry of health is also in a good position to demonstrate to the finance ministry and other financial decision-makers the mutual benefits to other sectors of investing in women's, children's and adolescents' health: for example, the potential for improved school attendance, educational achievement and worker productivity.

Eighth, presenting a strong plan for the implementation, management and evaluation of health programmes is important. Some ministries of health, and their development partners, place emphasis on the upstream strategic planning but pay less attention to the downstream realities of procurement, health-worker salaries, supply-side readiness and other key aspects of scaling up implementation in practice.^{32,33} Strategic plans can be derailed during implementation due to subsequent misprocurement or poor budget execution. A good investment plan is one that anticipates possible second-round effects of an intervention. For example, increases in the supply of doctors in a country may lead to increased prescribing of diagnostic tests and drugs that then need to be anticipated and provided for in budgets and supply logistics. In other cases, the funding of building and capital costs of hospitals by development partners may result in a large, and long, tail of recurrent costs, such as staffing, electricity and maintenance, which were not fully anticipated or budgeted for by the ministry of health. Good implementation can be a particular challenge in the aftermath of decentralization of health services, because staff may lack experience in programme and financial man-

agement and in managing larger procurement packages.³⁴ In general, the poorer the country is, the more important it is to demonstrate that health managers are actively monitoring the use and impact of scarce resources, learning lessons and making necessary adjustments to achieve substantive and sustained results in ways that achieve value for money.

Ninth, strengthening the information and evidence base for policy and programming is important in budget proposals. Ministries of health already collect input-focused data, such as salaries and the number of professional training workshops. Collecting and analysing output and outcome indicators and the incremental costs of scaling up programmes, can better inform policy and programming decisions with the ministry of finance. The health ministry is also in a good position to advocate for and help build the civil registration and vital statistics data that are essential for health and broader national planning. Statistics on births and deaths are incomplete in many countries, with coverage ranging from 50% in Latin America to 25% in south Asia, and a mere 6% in sub-Saharan Africa.³⁵ An absence of reliable civil registration and vital statistics data means, for example, that it is not possible to conclude with confidence if a populous country like Nigeria has made progress in achieving the millennium development goal for reducing maternal mortality.³⁶

Finally, ministries of health need to be cautious about advocating earmarked (hypothecated) taxes: for example, proposing an increased tax on tobacco and alcohol products for health reasons but asking for the additional revenue be used to fund health-related services such as health promotion. Such taxes do have some justification from a political economy perspective. For example, consumers may be more willing to accept increased taxes on tobacco and alcohol if they perceive the benefits of publicly-funded smoking cessation and alcohol reduction

programmes or, in the case of the Philippines, an expanded health insurance programme.³⁷ However, ministries of finance tend to be resistant to earmarked taxes, preferring to allocate additional government revenue to the next priority investment area, irrespective of sector. The ministry of finance may well, for example, decide that the extra tax revenue from tobacco and alcohol may have the greatest public benefit when allocated to improving girls' education, rural road infrastructure, agricultural productivity or electricity generation than if it is allocated to the health sector. Earmarked taxes may, however, be persuasive to a finance ministry official if the health challenge is of the highest national priority: for example, noncommunicable diseases in some Pacific island countries.³⁸

Discussion

Effective action on women's, children's and adolescents' health will always involve adequate and effective public expenditure in the health sector. A key aspect determining this will be the capacity of a health ministry to present coherent investment plans to the ministry of finance. This article has identified 10 key attributes which ministries of finance will normally be looking for when they are assessing requests for financing and which health officials can consider before they start annual budget preparations and negotiations with ministries of finance.

The factors we have identified are sufficiently broad-based that they can be applied in virtually any setting and any country. We recognize, however, that applying these attributes may be difficult in fragile and conflict-affected states, where basic data may be missing and lines of authority and responsibility may be blurred. Furthermore, while many of the attributes also apply to engaging with bilateral and multilateral development partners, other issues may then arise, including the requirement for ministries of

health to demonstrate that development partners' resources are an addition to, rather than a substitution for, government's own expenditure efforts (what ministry of finance and development partners refer to as fungibility). While we focus on what ministries of health can do, we also recognize that ministries of finance too have a responsibility to improve prioritization, planning and resource allocation. Having a credible ministry of finance medium-term expenditure framework would assist a health ministry to achieve better longer term planning. Releasing funds on time to line departments and allowing the ministry of health more flexibility to transfer resources within budget lines, would improve public expenditure and planning. We also recognize that there are many important contributions to women's and children's health that arise as a result of investments and resource allocations to other sectors including for example investments in girls' education, food security and rural roads.

The Global Strategy for Women's, Children's and Adolescents' Health already provides an overarching policy framework and strategy for improving the health outcomes of women, children and adolescents.³ This paper complements this by providing practical suggestions about how health planners can engage more effectively with ministries of finance and other financial decision-makers to access additional funds for the necessary health programmes. There are other published guides on how to make good use of health resources.^{24,39-44} Nevertheless, we believe this article goes further, and contributes to the theme of knowledge for effective action on women's, children's and adolescents' health, by explaining how ministry of health officials can anticipate the specific technical arguments and counter-arguments from their own ministry of finance in order to prepare more convincing investment plans. ■

Competing interests: None declared.

ملخص

كيف يمكن لوزارات الصحة تقديم خطط استثمارية مقنعة حول صحة المرأة والطفل والمراهقين؟
سوف تواجه أغلب البلدان منخفضة ومتوسطة الدخل ضغوطاً لتحويل الأموال لتأمينات توصيات الاستراتيجيات العالمية حول صحة المرأة والطفل والمراهقين بشكل كاف. وتمثل المفاوضات بين الوزارات الحكومية للصحة والمالية المحدد الرئيسي لمستوى الإنفاق العام في قطاع الصحة ومدى فعاليته، إلا أن وزارات الصحة في البلدان منخفضة ومتوسطة الدخل تفتقر دائماً إلى سجل مشهود يشير لنجاحها في الحصول على موارد إضافية من مؤسسات صنع القرارات الرئيسية. وهذا على الرغم من الأدلة القوية عن معقولية الأسعار وفعالية تكلفة العديد من التدخلات الصحية العامة والعوائد الاقتصادية للاستثمار في الصحة. تنص هذه المقالة على 10 سمات

والتي شارك فيها مسؤولون حكوميون وجهات معنية رئيسية أخرى من البلدان منخفضة ومتوسطة الأجر. ويتمثل الهدف منها في دعم وزارات الصحة لتقديم خطة أكثر استراتيجية ومقنعة للاستشارات في صحة المرأة والطفل والمراهقين.

لطلبات الميزانية الفعالة التي يمكنها أن تتناول الاحتياجات التحليلية ووجهات نظر وزارات المالية وصناع القرار الماليين الآخرين. وقد قمنا بوضع القائمة بناءً على المبادئ الاقتصادية المقبولة، واستعراض الكتابات، وحلقة العمل التي انعقدت في يونيو/حزيران 2015

摘要

卫生部如何能够针对妇女、儿童以及青少年的健康提出令人信服的投资计划？

对于大多数低收入和中等收入国家来说，要想充分落实《妇女、儿童和青少年健康全球战略》的建议，各国面临着融资压力。政府卫生部和财政部之间的协商是公共支出在卫生领域支出水平和效率的关键因素。然而从过往经验来说，低收入和中等收入国家的卫生部并不总是能够从关键的决策机构那里获得额外资源。尽管在负担能力和成本效益方面有足够的证据证明许多公共卫生干预措施有效且卫生投资的经济回报

率颇高。本文针对财政部和其他财政决策者的分析需求和看法，列出了有效预算申请的 10 个特性。我们依据公认的经济原则、文献综述以及 2015 年 7 月由许多低收入和中等收入国家政府官员和其他关键利益相关者参与的研讨会制定了列表。此举的目的是为了支持卫生部针对妇女、儿童以及青少年的健康提出更具战略性和信服力的投资计划。

Résumé

Comment les ministères de la Santé peuvent-ils présenter des plans d'investissements persuasifs en matière de santé de la femme, de l'enfant et de l'adolescent ?

La plupart des pays à revenu faible et intermédiaire font face à des contraintes de financement pour pouvoir suivre correctement les recommandations de la Stratégie mondiale pour la santé de la femme, de l'enfant et de l'adolescent. Les négociations entre le ministère de la Santé et celui des Finances sont un déterminant clé de l'importance et de l'efficacité des dépenses publiques en matière de santé. Or, dans les pays à revenu faible et intermédiaire, le ministère de la Santé ne parvient pas toujours à obtenir des ressources supplémentaires de la part des grandes institutions décisionnaires, en dépit d'éléments démontrant l'abordabilité et la rentabilité de nombreuses actions de santé publique et du rendement économique des investissements

dans le domaine de la santé. Cet article présente 10 caractéristiques convaincantes de demandes de crédits permettant de tenir compte des besoins analytiques et des perspectives des ministères des Finances et d'autres décideurs financiers. Nous avons établi cette liste à partir des principes économiques courants, d'une analyse documentaire et d'un atelier organisé en juin 2015, auquel ont participé des représentants de gouvernements et d'autres acteurs clés de pays à revenu faible et intermédiaire. L'objectif est d'aider les ministères de la Santé à présenter un plan d'investissement plus stratégique et plus convaincant dans le domaine de la santé de la femme, de l'enfant et de l'adolescent.

Резюме

Возможные способы представления министерствами здравоохранения обоснованных планов инвестиций в сферу охраны здоровья женщин, детей и подростков

Большинство стран с низким и средним уровнем доходов испытывают финансовые трудности при попытке надлежущего воплощения в жизнь рекомендаций Глобальной стратегии по здоровью женщин, детей и подростков. Переговоры между министерствами здравоохранения и финансов являются ключевым фактором, определяющим уровень и эффективность государственных расходов в сфере здравоохранения. Тем не менее министерствам здравоохранения в странах с низким и средним уровнем доходов не всегда удается получить дополнительные ресурсы у основных организаций, принимающих решения. Такое возможно даже при наличии веского обоснования осуществимости и эффективности инвестиционных мер многих государственных мероприятий в области здравоохранения, а также будущей экономической отдачи такого инвестирования. В данной

статье перечисляются 10 характерных признаков убедительных бюджетных запросов, в которых учитывались бы потребности и интересы министерств финансов и других лиц, принимающих решения в этой области, в части анализов, проводимых ими. На основе принятых экономических принципов был составлен список таких признаков. Кроме того, в качестве материалов для статьи были использованы обзор литературных источников и результаты практикума, проведенного в июне 2015 года, в котором приняли участие государственные должностные лица и другие ключевые участники из стран с низким и средним уровнем доходов. Целью данной статьи является содействие министерствам здравоохранения в представлении более продуманного и убедительного плана инвестиций в сферу охраны здоровья женщин, детей и подростков.

Resumen

¿Cómo pueden los ministerios de salud presentar planes convincentes de inversión para la salud de mujeres, niños y adolescentes?

La mayoría de los países con ingresos bajos y medios afrontan presiones de financiación para poder abordar de forma adecuada las recomendaciones de la Estrategia Mundial para la Salud de la Mujer, el Niño y el Adolescente. Las negociaciones entre los ministerios de sanidad y economía son un determinante fundamental del nivel y eficacia del gasto público en el sector sanitario. Aun así, los ministerios de salud de países con ingresos bajos y medios no siempre cuentan con una buena trayectoria a la hora de obtener recursos adicionales de instituciones fundamentales para la toma de decisiones. Esto se produce a pesar de la fuerte prueba acerca de la asequibilidad y rentabilidad de muchas intervenciones de salud pública y de

los beneficios económicos de la inversión en sanidad. Este artículo presenta 10 características de solicitudes presupuestarias eficaces que pueden abordar las necesidades analíticas y las perspectivas de los ministerios de economía y otros responsables de la toma de decisiones financieras. La lista se desarrolló en base a los principios económicos aceptados, una revisión bibliográfica y un taller realizado en junio de 2015 en el que participaron funcionarios del gobierno y otras partes interesadas fundamentales de países con ingresos bajos y medios. El objetivo es dar apoyo a los ministerios de salud para que presenten un plan más estratégico y completo para invertir en la salud de mujeres, niños y adolescentes.

References

- Countdown report: a decade of tracking progress for maternal, newborn and child survival. The 2015 report. Geneva: Countdown to 2015 Secretariat; 2015.
- The Global Strategy for Women's, Children's and Adolescents' Health (2016–2030). New York: Every Woman Every Child; 2015.
- Savedoff WD. What should a country spend on health care? *Health Aff (Millwood)*. 2007 Jul-Aug;26(4):962–70.
- Pathmanathan I, Liljestrand J. Investing in maternal health: learning from Malaysia and Sri Lanka. Washington: World Bank; 2003.
- Global health expenditure database 2014. Geneva: World Health Organization; 2014.
- Desalegn H, Solberg E, Kim JY. The global financing facility: country investments for every woman, adolescent, and child. *Lancet*. 2015 Jul 11;386(9989):105–6.
- Global health observatory data repository [Internet]. Geneva: World Health Organization.
- Financing global health 2014: shifts in financing as the MDG era closes. Seattle: Institute for Health Metrics and Evaluation; 2015.
- World population prospects: the 2015 revision. Key findings and advance tables [ESA/P/WP/241]. New York: United Nations; 2015.
- WHO, UNFPA, UNICEF, World Bank. From "shopping lists" to investment plans: supporting countries to develop and finance sound investment plans for women's, children's and adolescents' health. Workshop report, 2015 Jun 22–24, Geneva, Switzerland. Geneva: World Health Organization; 2015.
- Bloom D, Williamson J. Demographic transitions and economic miracles in emerging Asia. *World Bank Econ Rev*. 1998;12(3):419–55. doi: <http://dx.doi.org/10.1093/wber/12.3.419>
- World development report 1993: investing in health. Washington: World Bank; 1993.
- Singh SDJ, Ashford L, Vlassoff M. Adding it up: the costs and benefits of investing in family planning and maternal and newborn health. New York: Guttmacher Institute; 2010.
- Stenberg K, Axelson H, Sheehan P, Anderson I, Gülmözoglu AM, Temmerman M, et al; Study Group for the Global Investment Framework for Women's Children's Health. Advancing social and economic development by investing in women's and children's health: a new global investment framework. *Lancet*. 2014 Apr 12;383(9925):1333–54.
- Balabanova D, Mills A, Conteh L, Akkaziya B, Banteyerga H, Dash U, et al. Good health at low cost 25 years on: lessons for the future of health systems strengthening. *Lancet*. 2013 Jun 15;381(9883):2118–33.
- Belli PC, Bustreo F, Preker A. Investing in children's health: what are the economic benefits? *Bull World Health Organ*. 2005 Oct;83(10):777–84.
- Bloom DE, Williamson JG. Demographic transitions and economic miracles in emerging Asia. *World Bank Econ Rev*. 1998;12(3):419–55.
- Designing health financing systems to reduce catastrophic health expenditure. Geneva: World Health Organization; 2005.
- Ashraf QH, Weil DN, Wilde J. The effect of interventions to reduce fertility on economic growth. [Working paper series no. 17377]. Cambridge: National Bureau of Economic Research; 2011.
- Bhutta ZA, Das JK, Walker N, Rizvi A, Campbell H, Rudan I, et al; Lancet Diarrhoea and Pneumonia Interventions Study Group. Interventions to address deaths from childhood pneumonia and diarrhoea equitably: what works and at what cost? *Lancet*. 2013 Apr 20;381(9875):1417–29.
- Levine R. Saving mothers' lives in Sri Lanka. Millions saved: proven success in global health. Washington: Center for Global Development; 2004.
- World health report 2010. Health system financing: the path to universal coverage. Geneva: World Health Organization; 2010.
- Cambodia: more efficient government spending for strong and inclusive growth: integrated fiduciary assessment and public expenditure review 2011. Washington: World Bank; 2011.
- Yazbeck A. An idiot's guide to prioritization in the health sector. [HNP discussion paper series]. Washington: World Bank; 2002.
- Bhushan I, Keller S, Schwartz B. Achieving the twin objectives of effectiveness and efficiency: contracting health services in Cambodia. Manila: Asian Development Bank; 2002.
- Levine R. Millions saved: proven successes in global health. Washington: Center for Global Development; 2004.
- Jamison DT, Summers LH, Alleyne G, Arrow KJ, Berkley S, Binagwaho A, et al. Global health 2035: a world converging within a generation. *Lancet*. 2013 Dec 7;382(9908):1898–955.
- Musgrove P, editor. Health economics in development. Washington: World Bank; 2004.
- Estimating health expenditure in Cambodia: national health accounts report 2012. Phnom Penh: Ministry of Health, World Health Organization and Clinton Health Access Initiative; 2014.
- Savedoff WD, Alwang A. The single best health policy in the world: tobacco taxation. [CGD Policy Paper 062]. Washington: Center for Global Development; 2015.
- Jha P, Renu J, Li D, Gauvreau C, Anderson I, Moser P, et al. Tobacco taxes: a win-win measure for fiscal space and health. Manila: Asian Development Bank; 2012.
- Thomas J, Grindle M. After the decision: implementing policy reforms in developing countries. *World Dev*. 1990;18(8):1163–81.
- Matta NF, Ashkenas RN. Why good projects fail anyway. *Harv Bus Rev*. 2003 Sep;81(9):109–14, 134. PMID: 12964398
- Hipgrave D, Alderman K, Anderson I, Jimenez Soto E. Health sector priority setting at meso-level in lower and middle income countries: lessons learned, available options, and suggested next steps. *Soc Sci Med*. 2014 Feb;102:190–200.
- Global monitoring report 2015/5016: development goals in an era of demographic change. Washington: World Bank; 2016.
- Trends in maternal mortality: 1990 to 2015. Estimates by WHO, UNICEF, UNFPA, World Bank Group and the United Nations Population Division. Geneva: World Health Organization; 2015.
- Manasan RG, Parel DKC. Amending the sin tax law. [Development Studies Discussion Paper Series no 2013-19]. Makati City: Philippine Institute for Development Studies; 2013.
- Anderson I. The economic costs of noncommunicable diseases in Pacific Islands. [World Bank health nutrition and population discussion paper]. Washington: World Bank; 2013.
- Interventions WHO-CHOICE: choosing interventions that are cost effective. Geneva: World Health Organization; 2010.
- Roing S. WHO-CHOICE: a look at the effectiveness of different health interventions [Internet]. 2014.
- Hauck K, Smith P, Goddard M. The economics of priority setting for health care: a literature review. Washington: World Bank; 2004.
- Tandon A, Fleisher L, Li R, Yap WA. Reprioritizing government expenditure on health: pushing an elephant up the stairs? [Health, Nutrition, and Population (HNP) discussion paper]. Washington: World Bank; 2014.
- Hammer JS. Economic analysis for health projects. *World Bank Res Obs*. 1997;12(1):47–71.
- Lui X. Policy tools for allocative efficiency of health services. Geneva: World Health Organization; 2003.

Chapter 7: Conclusion

Section 7. Context and significance of the research.

How countries prioritise and allocate scarce financial and other resources to improving health outcomes for their citizens is always a complex and important task. The challenge is particularly acute for the fourteen middle-income and small countries of the Pacific Islands Forum which face three inter-related public policy challenges in the health sector that are particularly distinctive to the Pacific, and that have been under-researched to date. As this thesis shows, those three inter-related challenges are:

- i. Some of the highest rates of NCDs such as type 2 diabetes - and risk factors for acquiring such NCDs - in the world, co-existing with an unfinished agenda of communicable diseases, high fertility, and under-nutrition;
- ii. Reliance on government expenditure, including aid funding, for expenditure on health that are already some of the highest rates in the world.
- iii. Relatively low and / or volatile economic growth that then limits the capacity to expand government health expenditure to address population growth and the growing burden of expensive to treat NCDs such as type 2 diabetes and kidney failure which usually involve treatment for the remaining duration of a person's life.

7:1. The academic contribution.

Against that background, this thesis makes four academic contributions based on the research methods identified and defended in Section 4 of the Introduction.

First, it provides a corrective to the existing literature and widely-accepted orthodoxy on health financing as it applies to the Pacific. For example, as Chapter 2 and Chapter 3 shows, four of the five options available under the World Bank fiscal space analysis – now applied in over 50 low and middle-income countries - rarely apply in the Pacific. That is so particularly given the low or at least volatile per capita income growth in the PICs; already existing high shares of government expenditure on health; already existing

high levels of existing aid dependency; and limited capacity for addressing overall health financing needs in the Pacific via hypothecated taxes¹. The main practical, available option for the PICs is therefore improved allocative and technical efficiency. In that sense the thesis provides a “corrective” to the existing literature, as it applies to the Pacific. The thesis shows that giving significantly higher priority and resources to primary and especially secondary prevention of NCDs is a key strategic objective. Addressing the high Total Fertility Rate and unmet need for contraception is a similarly strategic objective.

That academic contribution is relevant to all fourteen PICs because they all share to varying degrees the particularly distinctive health, and health financing challenges, of the Pacific as detailed in Section 1 and 2 of the Introduction. It follows that this “corrective” to the orthodox approach to health financing is of less direct relevance, and is difficult to generalise, to other low and middle-income countries that do not share those distinctive characteristics, even including other small island states outside the Pacific.²

Second, the thesis helps fill a research gap on the affordability and financial sustainability of current approaches to addressing NCDs. I show (Chapter 3) for the first time the direct costs of dialysis treatment to the Government of Samoa was \$38,686 per patient per year in 2010–11, 98.4% of which was borne by government. I show that dialysis in the Samoa context is not particularly cost-effective (two thirds of patients have died within two years) particularly compared to investing in primary and secondary prevention of NCDs. I also show for the first time the pharmaceutical costs of treating diabetes and hypertension in Vanuatu, showing that only 1.31% of the total population of Vanuatu could be treated with insulin, or 5.3% treated with the full regime of anti-hypertensive drugs, before the total Government drug budget for the country was fully spent (Chapter 4). These specific findings have direct relevance to other PICs which tend to have relatively similar disease burdens (especially diabetes), health systems, and

¹ Having said that, increased taxes on tobacco, and taxes on food and drink that contributes to obesity, are important strategies in the PICs to reduce risk factors for NCDs.

² See in particular Figure 1,2,4,5 of the Introduction which shows that the PICs have noticeably different characteristics to even “small island states” as defined by the World Bank. As discussed in Section 1:2 of the Introduction, the PICs are also significantly more distant from major economic markets than other island states including the island countries of the Caribbean.

costing structures. The newly generated cost data, and analysis of financial sustainability, will have more limited specific relevance given different disease burdens, cost structures, and fiscal space characteristics in countries outside the Pacific.

Third, the thesis researches the implications of ageing on the whole health system. The Pacific is often viewed as having a young population and there is literature on, for example, the “youth bulge” in the Pacific (1-3). To my knowledge, the article in Chapter 5 is the first peer-reviewed published research on the implications of ageing on the whole of a country’s health system in the Pacific.

Fourth, there is little guidance in the international literature on how Ministries of Health can better frame and argue their health financing proposals to Ministries of Finance and / or development partners. As I noted in Chapter 1, while relevant to all countries, this gap is particularly important in the case of the Pacific which face limited health financing options given the distinctive nature of their economies (Chapter 1 and 2 of this thesis); prohibitively expensive treatment protocols for certain NCDs (Chapters 3 and 4); and an ageing and potentially sick population (Chapter 5). Chapter 6 of this thesis addresses that gap.

7:2 The policy contribution, and specific policy recommendations.

The papers published in this thesis contribute to public policy in three ways. First, it expands and deepens the evidence base on the unique challenges of health financing in the Pacific, and likely options to respond. The thesis provides a “corrective” to the most widely used analytical framework and approaches for assessing fiscal space when applied to the Pacific (Chapters 2-5). The research also publishes for the first time the actual costs to governments of dialysis in Samoa (Chapter 3); pharmaceutical drugs in Vanuatu (Chapter 4); and implications of ageing on the whole health system (Chapter 5).

The second policy contribution of the research in this thesis concerns a regional agreement in the Pacific to combat NCDs. More specifically, recognition by PIC leaders that their countries were facing an “NCD crisis” led to the World Bank commissioning me to analyse and write the *Non-Communicable Disease Roadmap Report* (4). I was the sole author of that report. The literature survey and primary analysis of financial costs

to government of treating NCDs (Chapters 2-4 of this thesis) directly informed my thinking and drafting of that report.

The *NCD Roadmap Report* recommended four strategic interventions that all PICs could and should adopt: urgently strengthen tobacco control; tax and better regulate food and drink products that are directly linked to obesity; improve the efficiency and impact of existing health dollar by reallocating scarce health resources to prevention and ‘best buys’; and strengthen the evidence base for better investment planning and program effectiveness / value for money. The *NCD Roadmap Report* also included over thirty other recommendations, including inter-sectoral interventions, that countries could implement depending upon their specific circumstances.

The *Roadmap Report* was then tabled in 2014 at the first ever joint meeting of Ministers of Health, and Economic and Finance Ministers, from the Pacific Islands Forum. All of the specific policy recommendations for addressing NCDs I made in that Report were then essentially adopted by the meeting and are entirely consistent with the research findings of this thesis. The adoption of those policy recommendations by all relevant PIC Ministers at the Pacific Islands Forum would not have occurred in that way had I not done extensive literature reviews and research as part of this thesis.

The third policy contribution of the thesis is that Ministries of Health in low and middle-income countries—including the Pacific—are often disadvantaged by having a poor understanding of how Ministries of Finance, and development partners, assess requests for public health financing and priority setting. Chapter 6 of this thesis provides specific and practical guidance on how Ministries of Health can strengthen their own understanding of and advocacy for public financing for health. I am not aware of other peer-reviewed published articles taking that particular, and practical, perspective.

7:3 Limitations.

There are significant data limitations in the Pacific. For example, the UN Population Division does not prepare projections for countries with less than 100,000 population but there are twelve such countries in the Pacific. There are also data limitations at the regional level which then makes comparisons difficult. For example, the *Pacific Community* presents latest data on the prevalence of diabetes, overweight adults, and

obese adults for 15 PICS (5). However, only one country (Samoa) had data for 2013; 12 countries had data preceding 2012, with five countries data going back to 2005 or longer;³ there is no data for Tokelau and only partial data for Tuvalu; there is often little published data on Cook Islands.

The research focus of this thesis is how PICs can better prioritise and allocate scarce financial and other resources within the health sector. It is clear that mental health issues, including depression and self-harm, are increasingly important factors globally (6, 7), and in the Pacific (8) within the health sector. While I refer to the importance of that challenge in Chapter 5, I did not find enough publicly available data to explore that issue further.

I also recognise, but it is beyond the scope and focus of this thesis, that health outcomes are also determined by many factors *outside* the formal health sector. These factors include the availability of water and sanitation, food security, climate change and natural disasters, and the all-weather availability of rural roads or inter-island shipping to access emergency care (9, 10). Health outcomes are also affected by the social determinants of health including education (especially girls' education), poverty, culture, and power structures (11, 12). I also recognise that decisions about allocating scarce resources between and within sectors of an economy are always taken within a broader political economy context (13, 14, 15, 18-20).

I also recognise that there are important differences between, and even within, the fourteen countries of the Pacific. It was not always possible to explore those differences within the word-length of the articles.

A final limitation is that multilateral and bilateral aid can play a positive – but also a potentially distorting – role in priority setting and resource allocation, especially in the Pacific (21-32). I refer to the importance of aid funding in the Pacific in the published articles of this thesis. However, had I written another article, I would have analysed the role of development partners in terms of priority setting and resource allocation in more depth.

³ Fiji and Federated States of Micronesia data is for 2002; Cook Islands and Nauru data is for 2004; and Tokelau data is for 2005.

7:4 Recommendations for future research.

As explained in Chapter 1, there is a shortage of up-to-date data and analysis of the actual financial costs to Governments in the Pacific of addressing the “NCD crisis” and the affordability and cost-effectiveness of various interventions. In addition to my own published research, research is being undertaken (33) on the cost-effectiveness of salt reduction in the Pacific to reduce risk factors for NCDs. McGrath shows that the treatment costs of the Diabetes Foot Clinic in Samoa are nearly eight times lower when compared to the costs of admitting a client with diabetic foot sepsis into the nearby hospital (34). Such research provides an evidence base for priority setting and allocating scarce resources. More research of that nature is recommended.

Published research is also needed on the affordability and cost-effectiveness of the WHO Package of Essential NCD Interventions (PEN) in the Pacific (35). Such research help governments to prioritise and allocate their resources on a more transparent and rational basis. Furthermore, such published research would have the added advantage of being a “regional and global public good”⁴ because most countries in the Pacific are scaling up PEN simultaneously. As a result, there are then opportunities to learn from each other if the research is published. Specific research questions could include:

- i. Which PICs are the positive “outriders” in terms of preventing and treating high burden / high cost NCDs such as diabetes? What were the financial and human resource investments needed?
- ii. How do unit costs to governments change as scale up the intervention proceeds? Do unit costs increase (due to inflation in small economies) or decrease (due to economies of scale).
- iii. Does cost-effectiveness increase as more remote populations are served because the disease burden is higher in remote areas or does cost-effectiveness decrease because of the additional cost of reaching remote areas?

⁴ That is, available to all stakeholders in the Pacific and beyond.

- iv. How effective are specific interventions? For example, does a tax on sugary drinks – a risk factor for diabetes – actually change consumption, and if so, by what amount?

Further research would also be valuable by examining some of the broader political economy, community and social aspects of health service delivery in the PICs. For example, what are the constraints and opportunities that affect the extent to which scarce health resources are allocated to address gender inequity, particularly in light of the relatively high levels of unmet need for family planning and health leadership in much of the Pacific? How can political and administrative leaders facilitate – and in some countries regain - more community involvement and participation in health promotion and service delivery?

7:5 Concluding comment: The benefits and application of the research.

A worst-case future scenario involves PIC governments needing to further expand public health expenditure to meet growing, ageing, and potentially sicker populations, yet with ever decreasing fiscal space to respond. Such a scenario is plausible. Several PICs have high Total Fertility Rates that requires expansion of antenatal, maternal, newborn, and then infant and child health services (and often publicly funded education services in subsequent years). Yet several of those same PICs also have significant increases in the incidence and prevalence of chronic, otherwise avoidable, and expensive to treat diseases such as diabetes, heart disease, cancers and stroke. That will have the effect of putting increased demands – including financial pressure - on the public health system. Such an increase could occur given the high level of risk factors for NCDs, and the rapid ageing of the population in most PICs (Chapter 5).

There is a positive alternative. PIC governments can use their dominant position in financing health care to proactively reallocate resources to affordable and often more cost-effective primary and especially secondary prevention of NCDs. PICs need to further prioritise reducing communicable diseases such as sexually transmitted infections in most PICs; HIV and AIDS / TB in PNG; and undernutrition in PNG and Solomon Islands. Done well, that will allow the pipeline of ageing citizens to live in reasonable health compared to the business as usual case, with fewer calls on government health budgets. PIC governments can also invest much more proactively in

meeting the contraceptive prevalence needs of families and citizens, thereby initiating a demographic transition and, with good education and employment policies, the potential for a strategic demographic dividend. The starting point for this more positive alternative is good public policy informed by sound research.

References

1. Booth H, Zhang G, Rao M, Taomia F, Duncan R. Population pressures in Papua New Guinea, the Pacific Island economies, and Timor Leste. Canberra: Australian National University (ANU), Research School of Social Sciences; 2006. Available from: <http://demography.cass.anu.edu.au/working-papers-demography-1975-2006>.
2. United Nations Population Fund Pacific Sub-Regional Office. Population and development profiles: Pacific Island countries. Suva: United Nations Population Fund; 2014. 128 p.
3. Connell J. Pacific islands in the global economy: paradoxes of migration and culture. Singapore J Trop Geog. 2010;31(1):115–29.
4. The World Bank. Non communicable disease roadmap report. Washington: World Bank; 2014. 140 p.
5. Secretariat of the Pacific Community. Compare noncommunicable disease indicators (public health) [Internet]. Noumea: 2017. Available from: <http://www.spc.int/nmdi/ncds>.
6. Whiteford HA, Degenhardt L, Rehm J, Baxter AJ, Ferrari AJ, Erskine HE, et al. Global burden of disease attributable to mental and substance use disorders: findings from the Global Burden of Disease Study 2010. The Lancet. 2013;382(9904):1575–86.
7. Becker AE, Kleinman A. Mental health and the global agenda. New Eng J Med. 2013;369(1):66–73.
8. Mulder RT, Petaia L, Pulotu-Endemann FK, Tuitama GL, Viali S, Parkin I. Building on the strengths of Pacific mental health: experience from Samoa. Aust N Z J Psychiatry. 2016;50(5):397–8.
9. Mannheimer L, Gulis G, Lehto J, Östlin P. Introducing health impact assessment: an analysis of political and administrative intersectoral working methods. Eur J Public Health. 2007;17(5):526–31.
10. Kindig D, Stoddart G. What is population health? Am J Public Health. 2003;93(3):380–3.
11. Irwin A, Valentine N, Brown C, Loewenson R, Solar O, Brown H, et al. The commission on social determinants of health: tackling the social roots of health inequities. PLoS Med. 2006;3(6):e106.
12. Marmot M, Wilkinson R. Social determinants of health. 2nd ed. Oxford: Oxford University Press; 2005. 389 p.
13. Doyal L, Pennel I. The political economy of health. Boston: South End Press; 1979. 360 p.
14. Grundy J, Hoban E, Allender S. The social and political construction of health-care systems—historical observations from selected countries in Asia. Health Systems. 2015;4(2): 124–37.
15. Harris D, Batley R, Wales J. The technical is political: what does this mean in the health sector? Overseas Development Institute/University of Birmingham; 2013. 18 p. Available from: <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8888.pdf/>.
16. Kruk ME, Freedman LP, Anglin GA, Waldman RJ. Rebuilding health systems to improve health and promote statebuilding in post-conflict countries: A theoretical framework and research agenda. Soc Sci Med. 2010;70(1):89–97.
17. Moncrieffe J, Luttrell C. An analytical framework for understanding the political economy of sectors and policy areas. London: Overseas Development Institute; 2005. 37 p.
18. Ottersen OP, Dasgupta J, Blouin C, Buss P, Chongsuvivatwong V, Frenk J, et al. The political origins of health inequity: prospects for change. The Lancet. 2014;383(9917):630–67.

19. Anderson I, Hipgrave D. The political economy of health, particularly reproductive, maternal, newborn and child health, in four countries of Asia: why political economy analysis is important for development effectiveness. New York: UNICEF; 2015. 12 p.
20. Walt G, Gilson L. Reforming the health sector in developing countries: the central role of policy analysis. *Health Policy Plan.* 1994;9(4):353–70.
21. Negin J, Robinson H. Funding for HIV and non-communicable diseases: implications for priority setting in the Pacific region. *Health Policy & Health Finance Knowledge Hub [Internet]. Working Paper Number 1.* Mar 2010. Available from: http://ni.unimelb.edu.au/__data/assets/pdf_file/0008/542447/WP1.pdf
22. Negin J, Irava W, Leon D, Malau C, C M. Sustainable health financing in the Pacific: tracking dependency and transparency. *Health Policy & Health Finance Knowledge Hub [Internet]. Working Paper Number 22.* Nov 2012. Available from: https://www.burnet.edu.au/system/publication/file/2245/MORGAN_Sustainable_Health_Financing_in_the_Pacific.pdf.
23. Negin J, Morgan C, Condon R. Regional health meetings in the Pacific and their impact on health governance. *Global Health.* 2012;5(2):1–12.
24. Ravishankar N, Gubbins P, Cooley RJ, Leach-Kemon K, Michaud CM, Jamison DT, et al. Financing of global health: tracking development assistance for health from 1990 to 2007. *The Lancet.* 2009;373(9681):2113–24.
25. Dieleman JL, Graves CM, Hanlon M. The fungibility of health aid: reconsidering the reconsidered. *J Dev Stud.* 2013;49(12):1755–62.
26. Lordan G, Tang KK, Carmignani F. Has HIV/AIDS displaced other health funding priorities? Evidence from a new dataset of development aid for health. *Soc Sci Med.* 2011;73(3):351–5.
27. Samb B ET, Dybul M, et al. An assessment of interactions between global health initiatives and country health systems. *The Lancet.* 2009;373:2137–69.
28. Shiffman J. Donor funding priorities for communicable disease control in the developing world. *Health Policy Plan.* 2006;21(6):411–20.
29. Sridhar D, Batniji R. Misfinancing global health: a case for transparency in disbursements and decision making. *The Lancet.* 2008;372(9644):1185–91.
30. Thiele R, Nunnenkamp P, Dreher A. Do donors target aid in line with the millennium development goals? A sector perspective of aid allocation. *Review of World Economics.* 2007;143(4):596–630.
31. Avdeeva O, Lazarus JV, Aziz MA, Atun R. The global fund’s resource allocation decisions for HIV programmes: addressing those in need. *J Int AIDS Soc.* 2011;14(1):51.
32. Hetzel MW, Pulford J, Maraga S, Barnadas C, Reimer LJ, Tavul L, et al. Evaluation of the global fund-supported national malaria control program in Papua New Guinea, 2009–2014. *PNG Med J.* 2014;57(1/4):7.
33. Webster J, Snowdon W, Moodie M, Viali S, Schultz J, Bell C, et al. Cost-effectiveness of reducing salt intake in the Pacific Islands: protocol for a before and after intervention study. *BMC Public Health.* 2014;14(1):107.
34. McGrath K. Cutting costs while improving care: Samoa’s diabetic foot clinic. *DevPolicyBlog [Internet].* Oct 2016. Available from: <http://devpolicy.org/cutting-costs-improving-care-samoas-diabetic-foot-clinic-20161013/>.
35. World Health Organization. Tools for implementing WHO PEN (package of essential noncommunicable disease interventions) [Internet]. Geneva: 2017. Available from: http://www.who.int/ncds/management/pen_tools/en/.