

THE ECONOMIC COSTS OF NONCOMMUNICABLE DISEASES IN THE PACIFIC ISLANDS

A Rapid Stocktake of the Situation in Samoa, Tonga and
Vanuatu

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Health, Nutrition, and Population (HNP) Discussion Paper

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The Economic Costs of Noncommunicable Diseases in the Pacific Islands *A rapid Stocktake of the Situation in Samoa, Tonga, and Vanuatu*

Ian Anderson^a

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Abstract: There are three main messages running throughout this discussion paper. First, noncommunicable diseases (NCDs) can impose large — but often preventable — health, financial, and economic costs on countries. This is particularly important in the Pacific, where government already finances and provides the bulk of health services. Second, risk factors in the Pacific are feeding a pipeline of potentially expensive-to-treat NCDs, including diabetes and heart disease, but governments are already fiscally constrained in how much more they can provide to the health system. Third, from a public health and public finance perspective, many of the NCDs are avoidable — or their health and financial costs can at least be postponed — through good primary and secondary prevention. This will require a more coherent approach to health system financing and to health system operations, more generally. Improving both allocative efficiency (“doing the right things”) and technical efficiency (“doing things right”) are critical strategies to improve health outcomes in a financially sustainable way in the resource-constrained Pacific.

Keywords: Noncommunicable disease, Pacific Islands, health financing, health economics, affordability.

Disclaimer: The findings, interpretations, and conclusions expressed in the paper are entirely those of the authors, and do not represent the views of the World Bank, its Executive Directors, or the countries they represent.

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Table of Contents

FOREWORD	VII
ACKNOWLEDGMENTS	IX
ABBREVIATIONS	X
EXECUTIVE SUMMARY	XI
CHAPTER 1: CONTEXT AND PURPOSE OF THIS DISCUSSION PAPER	1
NCDS AS AN INTERNATIONAL DEVELOPMENT ISSUE	1
WHY NCDS ARE A DEVELOPMENT CHALLENGE IN THE PACIFIC	2
THE OBJECTIVE, INTENDED AUDIENCE, AND STATUS OF THIS REPORT	3
DEFINITIONAL ISSUES AND DATA LIMITATIONS IN ESTIMATING FINANCIAL AND ECONOMIC COSTS OF NCDS IN THIS REPORT	4
CHAPTER 2: THE OVERALL COUNTRY CONTEXT IN SAMOA, TONGA, AND VANUATU	7
ECONOMIES AND PER CAPITA INCOME.....	9
POPULATION AND AGE STRUCTURE.....	9
HEALTH INDICATORS	9
HEALTH FINANCING	10
CHAPTER 3: UPDATE ON NCDS PREVALENCE AND RISK FACTORS IN THE PACIFIC	12
PREVALENCE OF NCDS IN SAMOA, TONGA, AND VANUATU	12
<i>NCDs as the major cause of death</i>	12
<i>The role of cardiovascular disease</i>	14
<i>High rates of premature NCD deaths</i>	15
<i>Specific country data on NCDs</i>	17
UNDERLYING RISK FACTORS FOR NCDS.....	17
<i>Obesity and overweight</i>	18
<i>Changing diets</i>	20
<i>Physical inactivity and urbanization</i>	20
<i>Tobacco and alcohol use</i>	21
<i>Combined risk factors</i>	22
TYPE 2 DIABETES: A PARTICULARLY SIGNIFICANT NCD IN THE PACIFIC	25
COUNTRY RESPONSES TO NCDS	27
CHAPTER 4: FINANCIAL AND ECONOMIC COSTS OF NCDS	30
RECENT ESTIMATES OF THE COSTS OF NCDS FROM THE INTERNATIONAL LITERATURE....	30
ESTIMATING ECONOMIC COSTS OF NCDS IN THE PACIFIC.....	31
<i>Estimating costs through National Health Accounts</i>	31
PREVIOUS ESTIMATES OF COSTS OF NCDS.....	33
PREVIOUS STUDIES ON THE COSTS OF TREATING TYPE 2 DIABETES IN VANUATU	36
NEW ESTIMATES OF THE COST OF DRUG TREATMENT FOR DIABETES AND HYPERTENSION IN VANUATU	37

NEW ESTIMATES OF THE COST OF KIDNEY DIALYSIS IN SAMOA	38
OVERSEAS TREATMENT COSTS	39
CHAPTER 5: BROAD IMPLICATIONS FOR MINISTERS OF HEALTH AND MINISTERS OF FINANCE AND PLANNING	40
IMPLICATIONS FOR MINISTERS OF HEALTH.....	40
IMPLICATIONS FOR MINISTERS OF FINANCE AND PLANNING AND THEIR MINISTRIES.....	43
IMPLICATIONS FOR BOTH MINISTERS OF HEALTH AND MINISTERS OF FINANCE: A CONVERGENCE OF PUBLIC HEALTH AND PUBLIC EXPENDITURE AND POSSIBLE WIN WINS	51
CHAPTER 6: INITIAL RECOMMENDATIONS AND POSSIBLE NEXT STEPS	54
INITIAL RECOMMENDATIONS FOR DISCUSSION WITH GOVERNMENTS AND DEVELOPMENT PARTNERS.....	54
POSSIBLE NEXT STEPS	56
ANNEX 1: PACIFIC ISLANDS INDICATORS OF NONCOMMUNICABLE DISEASES AND RISK FACTORS IN 2008	57
ANNEX 2: HEALTH EXPENDITURE STATISTICS FOR SAMOA, TONGA, AND VANUATU, 2010.....	58
ANNEX 3: HEALTH EXPENDITURE SAMOA, TONGA, AND VANUATU COMPARED TO INCOME GROUPS, 2009.....	59
ANNEX 4: CRUDE DEATH RATES FROM NONCOMMUNICABLE DISEASES IN THE PACIFIC ISLAND REGION.....	60
ANNEX 5: RECENT ESTIMATES OF THE ECONOMIC COSTS OF NCDS FROM THE INTERNATIONAL LITERATURE	61
ANNEX 6. FINANCIAL COST TO GOVERNMENT OF SAMOA OF FUNDING THE NATIONAL KIDNEY FOUNDATION (NKF)	65
ANNEX 7: FIRST DRAFT OF A POSSIBLE POLICY BRIEFING NOTE FOR A HYPOTHETICAL PACIFIC MINISTER OF HEALTH AND MINISTER OF FINANCE	73
REFERENCES.....	75

FOREWORD

The rapid rise of noncommunicable diseases (NCDs) in most countries of the world is not just a major health challenge. NCDs also pose significant financial and other economic costs to the health system, macroeconomic variables, and society more broadly. The challenges of NCDs are particularly acute in the Pacific Islands, which have some of the highest rates of diabetes and obesity in the world. The Pacific Islands also tend to have modest and volatile economic growth per capita, limiting the resources available to confront this challenge.

Pacific leaders declared in 2011 that NCDs have become a “human, social, and economic crisis.” The 42nd Pacific Islands Forum Communique records Pacific leaders confirming they were “deeply concerned that an estimated 75 percent of all adult deaths in the Pacific were due to NCDs, with the majority of the deaths occurring in adults in the economically active age bracket”. Leaders acknowledged the huge economic losses due to NCDs and the resultant impact on national health budgets and possibly on the region’s ultimate achievement of the millennium development goals (MDGs).

The World Bank wishes to help Pacific Island countries and their development partners respond to the challenge of NCDs in ways that are effective, efficient, equitable, affordable, and sustainable. As part of that effort, this discussion paper was commissioned to better understand the context and latest situation and to identify policy options for the governments of the Pacific Islands and their development partners.

This discussion paper was launched during a panel discussion on NCDs in the Pacific led by Dr Jimmie Rodgers, the then Director General of the Secretariat of the Pacific Community; Dr Temo Waganivalu, World Health Organization; and Ian Anderson, author of this discussion paper. The panel discussion was conducted as part of the World Bank Praxis series and is available at <http://www.youtube.com/watch?v=f-yM4t0GATw&list=PL6FE8A490B08CB2DB&index=1>.

ACKNOWLEDGMENTS

This report was written by Ian Anderson, independent consultant, under the direction of Dr. Eva Jarawan, lead health specialist, East Asia and Pacific Region, The World Bank, and task team leader for this project.

Analysis and field visits to Samoa, Tonga, and Vanuatu were conducted in 2011 and 2012.

Helpful comments and inputs were received on earlier drafts from several sources. Senior staff of the World Bank including S. Chao, S. Ivatts, J. Langenbrunner, P. Marquez, T. Palu, and A. Yazbeck made numerous constructive suggestions. M. Lee and S. Harrison of the World Bank office in Sydney assisted in finalization of this report. Helpful comments were also received from C. Bell, J. McKenzie, and T. Waqanivalu of the World Health Organization; and from W. Snowdon of Deakin University. Consultations were held with senior government officials and their development partners, in Samoa, Tonga, and Vanuatu during October 2012, which generated valuable comments and suggestions.

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ABBREVIATIONS

ALOS	Average length of stay (in days, in a hospital)
BOD	Burden of Disease
BMI	Body mass index. A measure of weight for height, calculated as a person's weight in kilograms divided by the square of the person's height in meters: kg/m ² . WHO define BMI equal to or greater than 25 as overweight, and BMI equal to or greater than 30 as obese. There is ongoing research about how appropriate these cut off points are in the Pacific.
CDC	Centers for Disease Control and Prevention
COPD	Chronic obstructive pulmonary disease (that is, respiratory and lung disease)
CVD	Cardiovascular disease
ICD-10	International Classification of Disease, 10th series.
IDF	International Diabetes Federation
IGT	Impaired Glucose Tolerance
NKF	National Kidney Foundation of Samoa
MNCH	Maternal, newborn and child health.
NCDs	Noncommunicable diseases (see box 1.1)
NHA	National Health Account
OPD	Outpatient department (of a hospital)
PEN	Package of Essential Noncommunicable (PEN) disease interventions for primary health care in low-resource settings (A WHO initiative)
SAT	Samoan tala
SNAP	Smoking, nutrition, alcohol, physical inactivity
SPC	Secretariat of the Pacific Community
STEPS	Not an acronym. It is the term used for the WHO stepwise approach to surveillance of risk factors
SWAp	Sector Wide Approach
T\$	Tongan Pa'anga currency
WHO	World Health Organization

EXECUTIVE SUMMARY

There are three main messages running throughout this discussion paper. First, noncommunicable diseases (NCDs) can impose large — but often preventable — health, financial, and economic costs on countries. This is particularly important in the Pacific, where government already finances and provides the bulk of health services. Second, risk factors in the Pacific are feeding a pipeline of potentially expensive-to-treat NCDs, including diabetes and heart disease. But governments are already fiscally constrained in how much more they can provide to the health system. Third, from a public health and public finance perspective, many of the NCDs are avoidable — or their health and financial costs can at least be postponed — through good primary and secondary prevention. This will require a more coherent approach to health system financing and to health system operations, more generally. Improving both allocative efficiency (“doing the right things”) and technical efficiency (“doing things right”) are critical strategies to improve health outcomes in a financially sustainable way in the resource-constrained Pacific.

There is increasing recognition that NCDs are an important international and development issue globally, undermining health gains and imposing financial and economic costs on governments and households. If nothing is done to reduce the risk of chronic disease, an estimated \$84 billion¹ of economic production would be lost from heart disease, stroke, and diabetes between 2006 and 2015 in the twenty-three low- and middle-income countries accounting for about 80 percent of chronic disease mortality. Diabetes — an NCD prevalent in the Pacific — caused an estimated \$465 billion in health care expenditure globally in 2011, 11 percent of total health care expenditure of adults. The economic burden of four major NCDs in island economies of the Caribbean reached \$27 million, 2.8 percent of the island’s GDP in 2006.

NCDs are an important health challenge in the Pacific. NCDs are already the leading cause of death in twelve Pacific Island countries for which data is available, frequently accounting for 70 percent of all deaths. Life expectancy in Tonga has fallen as a result of NCDs. Cardiovascular disease is the leading cause of death in the Pacific, often occurring at rates twice that of more traditional communicable diseases. Importantly, at least one-quarter of NCD deaths are premature in Tonga, Samoa, and Vanuatu, proportions that can be much higher than other lower-middle-income countries. NCDs such as diabetes and stroke can also cause chronic ill health and disability as well as death. The Pacific now has some of the highest rates of diabetes in the world.

Existing risk factors suggest that NCDs will be a major health challenge for the Pacific in coming years. Each of the ten countries in the Pacific for which data is available have 60 percent or more of the adult population that is overweight, and in six countries more than 75 percent are overweight. In four countries of the Pacific at least half the adult population is obese. Obesity and being overweight often occur at young ages: nearly one in four boys and one in five girls in Tonga are obese. Other risk factors

¹. All figures in this report are in US dollars unless otherwise specified.

apart from weight are also significant in the Pacific. Over two-thirds of people in Kiribati smoke tobacco daily. Over 70 percent of people in Cook Islands are physically inactive. Only 5 percent of adult females and 10 percent of adult males were free of any of the preventable risk factors for acquiring NCDs in Vanuatu. Aging is likely to be a challenge. Most Pacific countries currently have young populations: the median in Samoa, Tonga, and Vanuatu is 21 years of age. But as these populations age, NCDs can be expected to increase. This is especially so given the existing level of all the main risk factors for NCDs laid down in younger life in parts of the Pacific, often summarized as Smoking, Nutrition, Alcohol, Physical inactivity (SNAP).

Despite data limitations, it is clear NCDs also impose important financial and economic costs especially to governments in the Pacific. The rise in NCDs has particular relevance to governments, which currently finance the large majority of health expenditure: the governments of Vanuatu, Samoa, and Tonga, supported by their development partners, provided 90 percent, 87 percent and 81 percent of total expenditure on health, respectively, in 2010.

Previous studies show that NCDs can impose larger costs than most communicable diseases in the Pacific. An earlier study found that one out of every ten patients admitted to hospital in Tonga was admitted for an NCD, but resulted in one out of every five dollars spent on treatment. NCDs also often require treatment at higher levels of the public health service, thereby increasing costs to government. Tonga's National Health Accounts show that expenditure on NCDs more than treble as care goes from health centers to outpatients at the main hospital, and increases a further ninefold as treatment moves from outpatient to inpatient care.

New estimates show the high cost of treatment as an NCD progresses to more advanced stages and complications arise. 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 (GNI) of Samoa. The cost-effectiveness of dialysis is further undermined by the fact that almost two-thirds of patients have died two years after commencing treatment. But even low-cost items can impose significant costs to government due to the chronic and long-term nature of certain NCDs. Glucose testing strips for a diabetes patient may cost only 42 vatu (\$0.45) per day. But used every day, as is required, amounts to \$164 per patient per year, more than the total government expenditure on health per capita. The basic testing strips alone would cost government \$1,642 per patient over a ten-year period in nominal terms.

There are implications of these findings that are relevant to ministers of health. The social determinants of NCDs and the underlying risk factors are multisectoral and often beyond the health sector, yet the responses and costs will often be borne largely by Ministries of Health. Governments need to increase the resources allocated to prevention of NCDs, but in doing so, they should be conscious of the challenges in altering lifestyle behaviors (and therefore the risk of wasted expenditure through simplistic “lifestyle

messages” and posters). The rise of NCDs has consequences for the overall functioning of the health system, including responding to the double burden of communicable diseases and NCDs. It would be a mistake for governments — and their development partners — to “verticalize” the response to individual NCDs. Screening and effective treatment become even more important for NCDs.

There are also implications for ministers of finance because government is responsible for the majority of health care in the Pacific. The paradox is that government expenditure on health is generally low in absolute terms: less than \$0.50 per person per day in Samoa, Tonga, and Vanuatu. But it is high in relative terms compared to other countries of similar income levels. Per capita government expenditure on health in Samoa, Tonga, and Vanuatu is at least double that of other lower-middle-income countries globally, and three times the level when local purchasing power is taken into account, partly reflecting the small size of populations in the Pacific. Governments in the Pacific face the challenge of financing the response to a double burden: an unfinished agenda of communicable and reproductive needs while also addressing rising costs for NCDs as populations age. But there are limited prospects for significantly increasing government expenditure to health in absolute terms due to generally subdued economic growth in the Pacific. Nor is there large scope (“fiscal space”) to increase the share of general government expenditure going to health. This varies from 10 percent to 24 percent in Samoa, Tonga, and Vanuatu, at least twice the share found in other lower-middle-income countries globally.

Ministers of finance and planning should also be aware of broader economic implications of NCDs, particularly when they affect working-age cohorts. NCDs reduce worker productivity and can diminish household savings. NCDs could dilute one of the strategic benefits open to Samoa, Tonga, and Vanuatu: its potential “demographic dividend” of a large working-age population. Almost half of all deaths (48 percent) in Tonga occur below age 64, particularly among men, as a result of cardiovascular disease.

There are several strategic opportunities where the interests of the ministers of health, and the ministers of finance would appear to directly coincide in a “win-win” situation. Increasing and then maintaining the real price of tobacco taxes has a double benefit: it reduces uptake of tobacco among the poor and the young, a major risk factor for NCDs, whilst simultaneously generating extra revenues for government. Consideration could also be given to increasing taxes on alcohol, “junk food,” and soft drinks known to be high in sugars, saturated and trans fats, and high salt content. Investing in young female health and antenatal care is also a win-win. Improved female health is valuable in its own right, but can also help break the intergenerational transfer of metabolic risks and NCDs from mother to offspring.

Effective primary and secondary prevention also have significant health and financial returns. Every person in Samoa who avoids dialysis saves the government about \$38,700 per year. Every person in Vanuatu who changes their lifestyle through primary prevention and successfully avoids becoming a newly diagnosed type 2 diabetes patient, saves the government a minimum of \$347 per year: more than twice the annual

per capita government expenditure on health. Effective *secondary* prevention also has high payoff to government. Every diagnosed type 2 diabetes patient in Vanuatu who is stabilized through secondary prevention, and so avoids progressing to an insulin regime, saves the government an *additional* \$484 per year over the cost of an oral medication regime.

Governments and their development partners will now need to decide on future responses. This report involved a rapid stocktake of the nature and selected likely costs of NCDs with a particular focus on Samoa, Tonga, and Vanuatu. This report can serve as a basis for discussion between governments and their development partners on how to respond.

CHAPTER 1: CONTEXT AND PURPOSE OF THIS DISCUSSION PAPER

NCDS AS AN INTERNATIONAL DEVELOPMENT ISSUE

Box 1: Definition and Main Types of Noncommunicable Diseases

Noncommunicable diseases, also known as chronic diseases, are not passed from person to person. The four main causes of death (mortality) and illness (morbidity) from NCDs are the following:

Cardiovascular disease (CVD) includes heart attacks, stroke, and other heart and blood vessel diseases.

Cancer, including neoplasms.

Diabetes rarely kills patients by itself but is a major contributing factor to deaths from heart, circulatory, and kidney failure.

Chronic respiratory diseases including Chronic Obstructive Pulmonary Diseases (COPD), asthma, emphysema, and chronic bronchitis.

Mental health, including age-related dementia, is not usually included in the definition of NCDs but is an important factor in overall well-being. It is a major cost driver in developed countries .

Source: WHO 2011c.

It should be noted that NCDs are not the only chronic diseases: infectious diseases such as HIV and AIDS are also chronic. It should also be noted that not all neoplasms are necessarily cancerous or malignant

1.1 **Noncommunicable diseases (NCDs) are the leading cause of death globally, including in most developing countries.** The World Health Organization (WHO) estimates that two-thirds of global deaths in 2008 were caused by NCDs, more than all other causes combined. About 80 percent of these deaths — approximately 29 million — occurred in low- and middle-income countries. About one-fourth of global NCD-related deaths occur prematurely, taking place before the age of 60 (WHO 2010a; WHO 2011c). NCDs also account for half of all global disability (Beaglehole et al. 2011). Almost three-quarters of people with hypertension (639 million) live in developing countries (Ibrahim and Damasceno 2012). Several NCDs coexist or exacerbate each other: high blood pressure is reported in over two-thirds of patients with type 2 diabetes; in patients with diabetes, hypertension confers an enhanced risk of cardiovascular disease (Ferrannini and Cushman 2012). There are some links between communicable and noncommunicable diseases: rheumatic fever can lead to rheumatic heart disease, and spread of the human papillomavirus through sexual contact can lead to uterine and other cancers.

1.2 **There is increasing recognition, both internationally and in the Pacific that NCDs are an important international and development issue.** WHO notes 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” (WHO 2010a). The UN Secretary General’s report to the UN High Level Meeting on Prevention and Control of NCDs stated the following:

In 2008, 36 million people died from noncommunicable diseases, representing 63 percent of the 57 million global deaths that year. In 2030, such diseases are projected to claim the lives of 52 million people. However, the demographic of lives lost is not readily apparent; people

with noncommunicable diseases often die young, with 9 million annual deaths occurring in persons under 60 years of age. The epidemic is fuelled by a combination of rising risk factors, including tobacco use, an unhealthy diet, lack of physical activity, and harmful alcohol use. The four main noncommunicable diseases that share those risk factors cause almost 80 percent of all deaths from such diseases.

Noncommunicable 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 noncommunicable diseases and their risk factors worsen poverty, while poverty results in rising rates of such diseases. The prevention of noncommunicable 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, noncommunicable diseases reduce productivity and increase health care costs, thereby weakening national economic development.

1.3 Many developing countries will face higher levels of NCDs at earlier stages of economic development, with fewer resources and with less time to respond effectively compared to their higher-income counterparts. This is an important finding from the World Bank in one of its reports prepared prior to the UN High Level Meeting on Prevention and Control of NCDs (World Bank 2011b).

1.4 The social determinants of NCD incidence and prevalence are also linked to poverty and lack of development. Poorer people tend to have less access to education, health services, and markets for nutritious food. They also tend to consume more tobacco, a major contributor to NCDs and premature death. Poorer people are less likely to seek out preventive and screening services for NCDs. If they are diagnosed with an NCD, they are less able to afford medicine and treatment.

WHY NCDs ARE A DEVELOPMENT CHALLENGE IN THE PACIFIC

1.5 NCDs are already a major health challenge in the Pacific. As seen in annex 1, NCDs are the leading cause of death in the Pacific countries for which data is available. Indeed, in nine out of twelve Pacific countries, NCDs account for 70 percent or more of all deaths. The most common cause of death in the Pacific is attributed to cardiovascular disease, which accounts for between 29 and 38 percent of death from all causes: communicable diseases, maternal and perinatal, NCDs, and injuries combined (WHO 2011b). Life expectancy has fallen in Tonga as a result of NCDs. NCDs are also a major source of illness: the Pacific has some of the highest rates of diabetes in the world (International Diabetes Federation 2011). Pacific Island countries also have surprisingly high risk factors for acquiring NCDs. As can be seen from annex 1, in each of the ten countries in the Pacific for which data is available 60 percent or more of the adult population is overweight. In six countries more than 75 percent of the adult population is overweight. In four countries of the Pacific at least half the adult population is obese.

Over two-thirds of people in Kiribati smoke tobacco daily. Over 70 percent of people in the Cook Islands are physically inactive. These risk factors feed a pipeline of future NCDs. Yet at the same time, all Pacific Island countries still need to address communicable, maternal, neonatal, and nutritional conditions, which typically still account for between 20 and 25 percent of all deaths.²

1.6 Governments also realize that the cost of treating NCDs can become unsustainable. A key characteristic of health financing in the Pacific is that governments (supported by development partners) pay for most of health care. Private and out-of-pocket expenditure is low in absolute and relative terms. Indeed, Kiribati has the lowest out-of-pocket household spending in the world: just \$0.20 per year (WHO 2012d). As chapter 4 of this report makes clear, NCDs can impose costs on governments that are high in absolute and relative terms, especially as a disease progresses or becomes chronic. Yet as chapter 4 also shows, many governments in the Pacific already feel the strain of public health care costs on their national budgets. Many also have only limited scope (“fiscal space”) to further increase expenditure on public health in a way that is sustainable.

1.7 Not surprisingly, therefore, governments in the Pacific have recognized NCDs as a national priority affecting socioeconomic development. Pacific Islands Forum Leaders have explicitly recognized the link between NCDs and development, declaring the “Pacific is in an NCD Crisis” as part of the 42nd Pacific Islands Forum communiqué of September 2011. They also noted that “an estimated 75 percent of all adult deaths in the Pacific are due to NCDs, with the majority of deaths occurring in the adults in the economically active age group.” Pacific health ministers have similarly made joint statements about the importance of NCDs as a public health and development issue via the *Honiara Communique on the Pacific NCD Crisis* issued on June 30, 2011.

THE OBJECTIVE, INTENDED AUDIENCE, AND STATUS OF THIS REPORT

1.8 Against this background, the World Bank was asked to undertake some initial work on clarifying the possible financial and economic costs of NCDs. This involved fact-finding and interviews in May 2012 of approximately four days each in Samoa, Tonga, and Vanuatu. These two Polynesian (Samoa and Tonga) and one Melanesian (Vanuatu) countries were chosen because they have reasonably similar levels of NCDs, income per capita in purchasing power parity (PPP) terms, population size, and structure and health financing arrangements, with government financing and provision being dominant. This report summarizes the main findings from that initial stocktake for the three countries, together with other relevant data from other Pacific Island countries where appropriate.

1.9 The objective of this discussion paper is to highlight what is currently known about the nature and costs of NCDs in these three countries; to suggest some initial policy implications for ministers of finance as well as ministers of health based on that rapid

². “Injuries” typically account for only 5 percent of all deaths in the Pacific. Refer to WHO 2011b.

stocktake; and to serve as a basis for discussion about any possible future next steps. The intended audience are government officials in Ministries of Health, Ministries of Finance, and Ministries of Planning, as well as their bilateral and multilateral development partners. A short two-page policy note at annex 7 is intended as an early draft for possible eventual use by ministers of health and ministers of finance.

1.10 This discussion paper is intended to stimulate discussion. Given the existing gaps in data and statistics, this report is not part of the World Bank Economic and Sector Work studies.

DEFINITIONAL ISSUES AND DATA LIMITATIONS IN ESTIMATING FINANCIAL AND ECONOMIC COSTS OF NCDs IN THIS REPORT

1.11 There are several approaches to estimating the financial and economic costs of NCDs (Chisolm et al. 2010; WHO 2009; Drummond et al. 2005). Financial (that is, monetary) and economic (that is, resource costs, more broadly) costs can involve direct medical care for diagnosis, procedures, drugs, and inpatient and outpatient care. They can also impose direct nonmedical costs, such as the costs of transportation for treatment and care. Indirect costs include productivity costs related to lost or impaired ability to work. Intangible costs include pain and suffering. Importantly, opportunity costs of NCDs involve the opportunities foregone to allocate those resources to other health or other national priorities. There can also be nonmarket social costs: withdrawing of children from school to look after stroke or diabetes patients. Costs can occur at the national (macroeconomic) level, including reduced labor supply, savings, and capital formation or at the household and individual firm level, including loss of income or increased expenditures.

1.12 The scope of this study is to identify the financial costs to government of treating and preventing NCDs. Government has been chosen as the unit of analysis in this paper because the major component of health expenditure in the Pacific Islands comes from government (rather than private out-of-pocket payments) as can be seen from annexes 1 and 2. Governments in the Pacific are also directly interested in knowing how to expand essential health services to their population, while simultaneously maintaining some level of cost control over health budgets, which put increasing demands on government budgets. Unfortunately, data limitations have prevented a full economic analysis, including costs to households and productivity losses from NCDs. Limited data on socioeconomic status of patients has also prevented an analysis of equity of access and outcomes, another important part of broader economic analysis.

1.13 There are important data gaps concerning the disease profile of the NCDs. Mortality data — a basic starting point — is generally poor. For example, the leading cause of death in Vanuatu, involving 199 cases, or over half (51 percent) of all recorded deaths, is classified as “unknown.”³ (Government of Vanuatu 2012a). Less than half

³. This is then followed by 35 neonatal deaths, 30 heart-related deaths, 25 asthma deaths, 24 stroke-related deaths, 20 cancer deaths, 18 hypertension deaths, 18 diabetes deaths, 10 diarrhea deaths, and 9 pneumonia deaths.

(48.6 percent) of health facilities provided the expected Health Information System reports in Vanuatu during 2010. Reporting this basic piece of information had fallen to just 34 percent in 2011 (Government of Vanuatu 2011) although the situation has improved since then. More than 50 percent (285/553) of total deaths in Tonga occur outside the health infrastructure system and are likely to have no death certificate unless the family requests it in Tonga. The second highest cause of death in Tonga after diseases of the circulatory system was “unknown” (technically: “Symptoms signs and abnormal clinical and laboratory findings not elsewhere classified”) (Government of Tonga 2010a). The situation is similar in the other countries discussed here.

1.14 Even when vital statistics are recorded, they have been prone to large errors in estimation. For example, a well-conducted study, now in the process of publication, finds that there has been substantial underreporting of diabetes and cancers (neoplasms) as an underlying cause of death in Tonga. Specifically, 47 of 59 (80 percent) deaths for which diabetes was actually the underlying cause of death were originally assigned to septicaemia (which is not an NCD) and cardiovascular disease. Similarly, 12 cancer deaths (18 percent) were originally assigned to other causes (Carter et al. forthcoming).

1.15 There are other data limitations. Cancer deaths were not included in NCD deaths in Tonga’s National Health Accounts. Data that does exist in the Pacific, and in the international literature, tends to focus on mortality (death) rather than morbidity (illness). Very limited country-specific information is available on co-morbidities and the interaction between NCDs, including the effects of diabetes on cardiovascular disease (CVD) and vice-versa. Comparable time series panel data on prevalence and risks for NCDs is limited. Samoa and Tonga had their first STEPS survey in 2002 and 2004, respectively, and a second STEPS survey has been undertaken in both countries during 2012. Vanuatu had its first STEPS survey in 2011, with a second one planned for 2016. There is also very little publicly available data on trends in mental illness and dementia,⁴ an often overlooked but potentially growing health and cost burden, especially in aging populations.

1.16 There are important gaps in understanding costs as well. Most countries in the Pacific collect data on health expenditure under their Chart of Accounts by functional headings — salaries and allowances, medicines — rather than by disease group — communicable or NCD. Tonga has taken the welcome initiative of creating a chapter on NCDs within its National Health Account (NHA), but the most recent NHA is for 2005–06. An updated NHA is being prepared now, but the chapter on NCDs will not be available until the end of 2012. Samoa’s latest NHA is for 2006–07, and Vanuatu’s is for 2007. Neither Samoa nor Vanuatu’s NHA has data on NCDs per se. Budget documents focus on costs to government; they rarely capture survey data on out-of-pocket private expenditure although this is generally expected to be small, and less than 10 percent total health expenditure in Tonga, Samoa, and Vanuatu. Some costs to

⁴. As noted in box 1.1 of this report, mental health and dementia is not usually included in the definition of noncommunicable diseases. This report, focused specifically on NCDs, follows that practice. However, mental health should clearly be included in broader considerations about public health and public financing.

government are not routinely captured in budget documents, including the cost (or depreciation) of buildings including hospitals.⁵ The economic resources used by volunteer services, including overseas volunteer medical missions and surgeries — often for NCDs, are not normally captured in budget documents.

1.17 Lack of data has long been recognized as a problem. The first recommendation of a 2003 study on the impact of NCDs on hospital costs for three countries in the Pacific was to improve the quality of statistical data (Doran 2003). The observation about lack of data on NCDs can also be made about many developed countries: trend data on expenditure on NCDs over time was only available for 6 of the 13 mainly OECD countries examined recently by WHO (Garg and Evans 2011).

1.18 There are, however, regional and national efforts to improve data. The Pacific Research Centre for the Prevention of Obesity and NCDs (C-POND) is a recent initiative of Fiji School of Medicine and Deakin University aimed at generating data on NCDs. The Pacific Vital Statistics Action Plan 2011–14 aims to improve vital registration statistics. The Pacific Health Information Network (PHIN) has a six-year regional plan for improved health information systems and training in the Pacific. The World Bank has been supporting regional courses on health financing and public financial management. The George Institute for Global Health is interested in working on interventions to reduce salt intake in the Pacific. The Brisbane Accord Group involves AusAID, UNICEF, WHO, and others in coordinating support for health issues, including better information, in the Pacific.

⁵. Maintenance and cleaning costs are included in all budgets, but this is not the same thing as depreciation of an asset such as a building and its equipment.

CHAPTER 2: THE OVERALL COUNTRY CONTEXT IN SAMOA, TONGA, AND VANUATU

2.1 This chapter provides a brief summary of the overall country situation and health sector so as to provide broader context for the subsequent discussion on NCDs. Table 2.1 below presents latest available key statistics. Annex 2 provides health expenditure statistics for 2010, the latest year available for comparable statistics. Annex 3 provides health expenditure statistics for 2009, which then allows comparison with averages for all lower-middle-income, and upper-middle-income countries globally.

2.2 The key message is that Samoa, Tonga, and Vanuatu have distinctive but similar characteristics and challenges. All three are lower-middle-income, relatively small economies. All three have relatively high fertility rates and a relatively young population (median age 21 years). All three face the challenge of a “double burden” of disease, with 25 percent of total deaths of all ages occurring through communicable, maternal, perinatal, and nutritional conditions, while 70 percent of total deaths of all ages occur from NCDs. In all three countries, cardiovascular disease — an NCD — is the leading cause of total deaths of all ages, representing more than one-third of all deaths. In all three countries, total expenditure on health as a share of gross domestic product and per capita is higher than the average for other lower-middle-income countries globally (annex 3). In all three countries, governments are the dominant source of funding for health, reaching 90.6 percent of total health expenditure (public and private) in Vanuatu in 2010. In all three countries, governments rely on external sources of assistance to fund health at rates at least four times higher than the average for other lower-middle-income countries. This is discussed further in paragraph 2.3 onwards.

Table 2.1 Key Economic, Population, Health, and Health Financing Indicators

Indicator	Samoa	Tonga	Vanuatu
<i>Economy and income</i>			
Gross National Income per capita 2011	US\$ 3117	US\$ 3580	US\$ 2870
Gross National Income per capita 2011	I\$ 4430	I\$ 4690	I\$ 4500
Gross Domestic Product in 2011 (US\$ current)	649.4 million	435.5 million	819.2 million
<i>Demographics</i>			
Total population 2011	183,874	104,509	245,619
Total fertility rate per woman 2010 (a)	5	5.8	3.5
Annual population growth rate per annum 2010 (a)	3.9%		3.9%
Population aged 0-14, per cent of total (2011)	37%	37%	37%
Population aged 15-64, per cent of total (2011)	57%	56%	58%
Population aged 65 and above, per cent of total (2011)	5%	5.8%	3%
Population median age (a)	21 years	21 years	21 years

Indicator	Samoa	Tonga	Vanuatu
Population in urban setting (% total population) 2010 (a)	20%	23%	26%
Selected Health Indicators (b)			
Life expectancy at birth 2010 (male / female)	69/75	69/75	69/75
Infant mortality rate (a)	17 / 1000 live births	13/1000 live births	12 / 1000 live births
Under five mortality rate (a)	20 / 1000 live births	16/1000 live births	14/ 1000 live births
NCDs as % total deaths, all ages, 2008 (c)	70%	74%	70%
Cardiovascular disease as % of total deaths, all ages, 2008 (c)	37%	38%	36%
Communicable, maternal, perinatal and nutritional conditions as % total deaths, all ages, 2008 (c)	25%	22%	24%
Injuries as % total deaths, all ages, 2008 (c)	5%	4%	5%
Selected Health Resources			
Physicians per 1000 population (2010)	0.47/1000	0.56/1000	0.11/1000
Nurses and midwives per 1000 population (2010)	1.8/1000	3.8/1000	1.7/1000
Health expenditure			
Total Health Expenditure as % GDP 2010 (d)	6.5%	5.1%	5.2%
Private health expenditure as % GDP 2010	0.8%	0.9%	0.5%
General government expenditure on health as % total expenditure on health, 2010 (a)	87.7%	81.5%	90.6%
General government expenditure on health (including external resources) as % total government expenditure 2010 (a)	23.4%	12.9%	18.2%
External resources for health as % total health expenditure (a)	13.4%	17.4%	23.4%
Per capita total health expenditure, current US\$ 2010 (a)	US\$ 204	US\$ 172	US\$ 157
Per capita total health expenditure PPP constant 2005	I\$ 282	I\$ 229	I\$ 239
Per capita government expenditure on health at average exchange rate, 2010, (d)	US\$ 179	\$US 140	\$US 143
Per capita government expenditure on health, 2010, PPP (a)	I\$ 248	I\$187	I\$ 217

Source:

Note (a): (WHO, Global Health Observatory, 2012)

Note (b): The Maternal Mortality Rate is prone to estimation distortions given the small size of island populations and is therefore not included

Note (c): (WHO, Noncommunicable Diseases Country Profiles , 2011)

Note (d): WHO NHA Database. Available at:

http://apps.who.int/nha/database/StandardReport.aspx?ID=REP_WEB_MINI_TEMPLATE_WEB_VERSION&COUNTRYKEY=84701

ECONOMIES AND PER CAPITA INCOME

2.3 **All three countries are lower-middle-income countries⁶ with relatively small economies.** All three countries have a similar GNI per capita especially when purchasing power and local costs are taken into account: all three have a GNI per capita of about I\$ 4,500 in purchasing power parity terms.⁷ All three have volatile but generally relatively low economic growth rates, especially in per capita terms. This reflects the well-known challenges of economic growth in the island economies of the Pacific, including smallness, remoteness from markets, vulnerability to external natural (hurricanes and tsunamis) and economic shocks.

POPULATION AND AGE STRUCTURE

2.4 **All three countries have fast growing, relatively young populations.** The median age for Samoa, Tonga, and Vanuatu is identical at 21 years. In each country over half the population is of working age (15–64). Children under 15 represent just over a third (37 percent) of the age group. Elderly (65 years and above) currently represent approximately 5 percent of the population in Tonga and Samoa, and 3.5 percent of the total population in Vanuatu. Tonga and Samoa have a relatively high total fertility rate (5.8 and 5.0 children per woman, respectively).

2.5 **This has implications for future health outcomes, and future public health financing.** NCDs do not usually appear at the median age of 21 years in these three countries. However the risk factors, including being overweight or obese, being sedentary, and using tobacco and alcohol are often in place or are being formed by the median age of 21 years. There is insufficient epidemiological and population health data to make good projections of the possible incidence and prevalence of NCDs as this large cohort of young adults age and move into middle and old age. However given current rates of premature mortality from NCDs (paragraphs 3.5 and 3.6) and the high level of existing risk factors among adults generally (chapter 3), the prospects for an increase in NCD-related ill health appear somber.

HEALTH INDICATORS

2.6 **The three countries have mixed health indicators and face a “double burden” of communicable and noncommunicable diseases.** Life expectancy is relatively high,

⁶. International practice is to divide economies according to 2010 GNI per capita, calculated using the World Bank Atlas method. The groups are low income, US\$1,005 or less; lower-middle income, US\$1,006 to \$3,975; upper-middle income, US\$3,976 to \$12,275; and high income, US\$12,276 or more (World Bank 2012a).

⁷. In essence, purchasing power parity (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 in one country compared to 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\$.

while infant and under-five mortality is relatively low, compared to other lower-middle-income countries; (the maternal mortality rate is prone to estimation errors given the small size of island populations, so has not been included). The three countries still face a double burden: communicable, maternal, and neonatal deaths still account for about 25 percent of total deaths of all ages, while NCDs account for 70 percent of total deaths of all ages, most of which are premature (before the age of 60, see chapter 3 for further discussion). Undernutrition coexists with obesity: UNICEF notes that in Vanuatu 20 percent of children are stunted, 16 percent are underweight, and 7 percent, wasted (UNICEF 2012), while WHO estimated that 27 percent of the population is obese (WHO 2011b).

HEALTH FINANCING

2.7 The small size of Pacific Island countries means health financing statistics should be evaluated carefully. Total population ranges from 1,468 people in Niue to 860,623 in Fiji. Samoa, Tonga, and Vanuatu all have total populations well below 250,000 (details in annex 1). This means that even relatively modest expenditures, or one-off lumpy expenditures such as building a new hospital, can have large effects in per capita terms. Volatility in aid flows also distorts figures year to year in the Pacific, especially given the relative significance of official development assistance (ODA) in health financing in the region. With those caveats in mind, the following observations can be made.

2.8 Per capita financing for health is low in absolute terms. As can be seen from table 2.1 and annex 2, the total (that is, public and private) per capita expenditure on health in 2010 ranged from \$157 per capita per year in Vanuatu to \$204 per capita per year in Samoa. (All figures in this report are current US\$ unless otherwise specified). This amounts to between \$0.43 and \$0.55 per person per day. Adjusting for often lower prices in the Pacific through purchasing power parity does not significantly alter the situation.⁸ Per capita *government* expenditure is lower, ranging from \$0.38 per person per day in Tonga to \$0.49 in Samoa.

2.9 But per capita financing for health is high relative to other countries. Total per capita expenditure on health in Samoa is nearly two and a half times what other lower-middle-income countries spend. Vanuatu spends almost double what other lower-middle-income countries do. And *government* expenditure on health per capita is even higher than in lower-middle-income countries globally. Government expenditure on health in Samoa is 5.28 times what other lower-middle incomes spend per capita in current US dollars, and 3.57 times higher when purchasing power is taken into account. Chapter 4 provides further details.

2.10 Government financing for health is dominant in several respects. Government finances between 80 and 90 percent of total health care in Samoa, Tonga,

⁸. Footnote 7 describes Purchasing Power Parity (PPP). Total expenditure on health then ranges from I\$ 0.62 per person per day in Tonga to I\$ 0.77 per person per day in Samoa.

and Vanuatu, more than double the ratio of other lower-middle-income countries globally (annex 3). Partly as a corollary, private out-of-pocket expenditure for health is also low compared to other lower-middle-income countries (annex 3). “Catastrophic expenditure” on health care⁹ is virtually unknown in the Pacific. To a large degree, the substantial role of government in financing — and direct provision — of health services reflects the nature of small Pacific Island economies. Even modest absolute levels of expenditure by government (and donors) can be relatively large compared to the population size. The small size of the formal private sector, including in health care, is also a factor. To illustrate, the Vanuatu National Provident Fund (VNPF) had a total of just 23,584 active contributing members as of December 31, 2010 (latest date available) and only 3,092 actively contributing employee companies. The Government of Vanuatu Budget document for 2012 confirms that membership of the VNPF can be taken as a proxy for the level of formal employment in Vanuatu. Relatively small and weak NGOs in the Pacific have also contributed to the dominant role of government financing.

2.11 Just as government financing dominates total health expenditure, expenditure on health figures prominently in overall government budgets. General government expenditure on health, including external financing, was 13 percent, 18 percent, and 23 percent of total government expenditure in Tonga, Vanuatu, and Samoa, respectively, in 2010 (WHO 2012b). This is two to four times higher than the rate in other lower-middle-income countries (annex 3).

2.12 External financing for health is also much larger in relative terms than in other lower-middle-income countries. External financing, particularly in the form of ODA, but also from new emerging donors, is a large and important part of health financing. External financing represented 13.4 percent, 17.4 percent and 23.4 percent of total expenditure on health in 2010 (annex 3). External financing for health in Samoa, Tonga, and Vanuatu ranged from 4.7 to 9.7 times higher than the rate in other lower-middle-income countries in 2009 (annex 3).

⁹. “Catastrophic” expenditure on health care has been defined as spending more than 40 percent of household consumption expenditure — excluding food — on health, spending more than 25 percent of nonfood consumption expenditure on household’s health, or spending more than 10 percent of total household consumption expenditure on health (Tangcharoensathien 2011).

CHAPTER 3: UPDATE ON NCDs PREVALENCE AND RISK FACTORS IN THE PACIFIC

PREVALENCE OF NCDs IN SAMOA, TONGA, AND VANUATU

NCDs as the major cause of death

3.1 **It needs to be emphasized that statistics on NCDs in the Pacific should be treated with caution.** There are important gaps in health information statistics generally in the Pacific (see paragraphs 1.13 to 1.17). This applies to statistics on NCDs as well. Many NCDs, including type 2 diabetes and CVD, have few visible symptoms until the disease is well advanced and so are allowed to progress undiagnosed, untreated, and unreported. Those NCDs that are reported have often been misdiagnosed (paragraph 1.14). Diabetes and circulatory diseases, while classified separately, often coexist in patients. Many of the health estimates are dated, going back to surveys conducted in 2000. Current research suggests that overestimation of life expectancy in the Pacific may have masked the problem of high adult mortality, including from NCDs (Carter et al. forthcoming). With those caveats in mind, the following section summarizes latest statistics on what is known about NCDs in the Pacific.

3.2 **NCDs are already important contributors to mortality and morbidity in the Pacific.** WHO estimated that NCDs accounted for 70 percent of all deaths in Samoa and Vanuatu, and 74 percent of all deaths in Tonga in 2008, the latest year for which comparative estimates are available (WHO 2011b). Deaths from NCDs therefore account for more than twice the contribution of deaths from “communicable, maternal, perinatal, and nutritional disorders conditions,” although that category of death is relatively high too, at about 25 percent of all deaths. The key information about NCDs for Samoa, Tonga, and Vanuatu is available in annex 1 and summarized in table 3.1 below.

Table 3.1 NCD Deaths and Risk Factors, 2008 Estimates

NCD characteristic	Samoa	Tonga	Vanuatu
NCD mortality			
Total NCD deaths (Male; Female)	400 M; 400 F	200 M; 300 F	500 M; 300 F
NCD deaths under age 60 (per cent of all NCD deaths: Male and Female)	36 % M; 27 % F	25% M; 35%F	37% M; 42% F
Age standardised death rate from all NCDs per 100,000 (Male and Female)	772 M; 583 F	649 M; 672 F	767 M; 576F
Behavioural Risk factors (% adult prevalence)			
Physical inactivity (%)	35% M; 65% F	30% M;52%F	Not available
Current daily tobacco consumption	53% M;17% F	36% M; 7% F	21%M; 3%F
Metabolic Risk Factors			
Obesity	43% M; 65% F	46%M; 68%F	21%M; 34%F
Overweight	81% M; 88%F	84% M; 89% F	59%M; 65%F
Raised blood pressure	43% M; 36% F	42% M; 38%F	44%M; 39%F
Raised blood glucose	19% M; 22% F	15% M; 19% F	8%M; 8%F
Elevated cholesterol	31% M. 36% F	52% M; 45% F	Not Available

Source: WHO 2011b.

3.3 **The Secretariat of the Pacific Community (SPC) has also collected statistics on crude death rates from NCDs** for various years for those countries where statistics are available. These are available at annex 4. Table 3.2 below summarizes the situation by showing those ten Pacific Island countries with the highest crude death rates from NCDs. These are ranked in order, with Fiji clearly having the highest national crude death rate from NCDs at 501 per 100,000 adult population. In most cases, the underlying cause of death was circulatory diseases such as heart disease. Diabetes was the principal disease in the sixth- and eighth-ranked countries (Marshall Islands and Fiji, respectively). Table 3.2 also shows the often marked difference in crude death rates between men and women. In every case except the Cook Islands, and in Fiji with respect to diabetes, men have higher crude death rates than women, often by a wide margin.

Table 3.2 Crude Death Rates from NCDs per 100,000 Adult Population: Leading Five Countries.

Country	Total for the country (Male and Female)	NCD disease	Male	Female
Fiji	501	Circulatory	599	400
Marshall Islands	374	Circulatory	521	224
Cook Islands	373	Circulatory	349	396
Palau	369	Circulatory	454	264
Tonga	331	Circulatory	442	224
Marshall Islands	327	Diabetes Mellitus	354	299
American Samoa	313	Circulatory	n/a	n/a
Fiji	304	Diabetes Mellitus	293	314
Guam	295	Circulatory	350	237
Tuvalu	295	Circulatory	n/a	n/a

Source: SPC 2011.

The role of cardiovascular disease

3.4 **Cardiovascular disease is the main cause of death.** WHO estimates that cardiovascular disease (including heart attacks, stroke, coronary heart disease) account for over one-third of total deaths, of all ages in Samoa, Tonga, and Vanuatu (WHO 2011b). More people die from cardiovascular disease in these countries than die from all communicable, maternal, perinatal, and nutritional conditions, although these are important and responsible for approximately one-quarter of all deaths. Cancers, chronic respiratory diseases, and diabetes are also important contributors of deaths. Latest estimates from WHO are summarized in table 3.3. It should also be recalled that many NCDs coexist and interact with each other. For example, globally, 20 percent or more of people with hypertension have diabetes, and 80 percent or more of people with diabetes have hypertension (Schiffrin 2012).

Table 3.3 Proportional Mortality: Total Deaths, All Ages, 2008
(in percent)

NCD and other, proportion of total deaths all ages	Samoa	Tonga	Vanuatu
<i>NCD</i>			
Cardiovascular disease	37%	38%	36%
Chronic Respiratory Diseases	7%	7%	6%
Cancers	6%	9%	12%
Diabetes	5%	5%	4%
Other NCDs	15%	15%	13%
<i>Total NCDS</i>	70%	74%	70%
<i>Communicable, maternal, perinatal and nutritional conditions</i>	25%	22%	24%
<i>Injuries</i>	5%	4%	5%

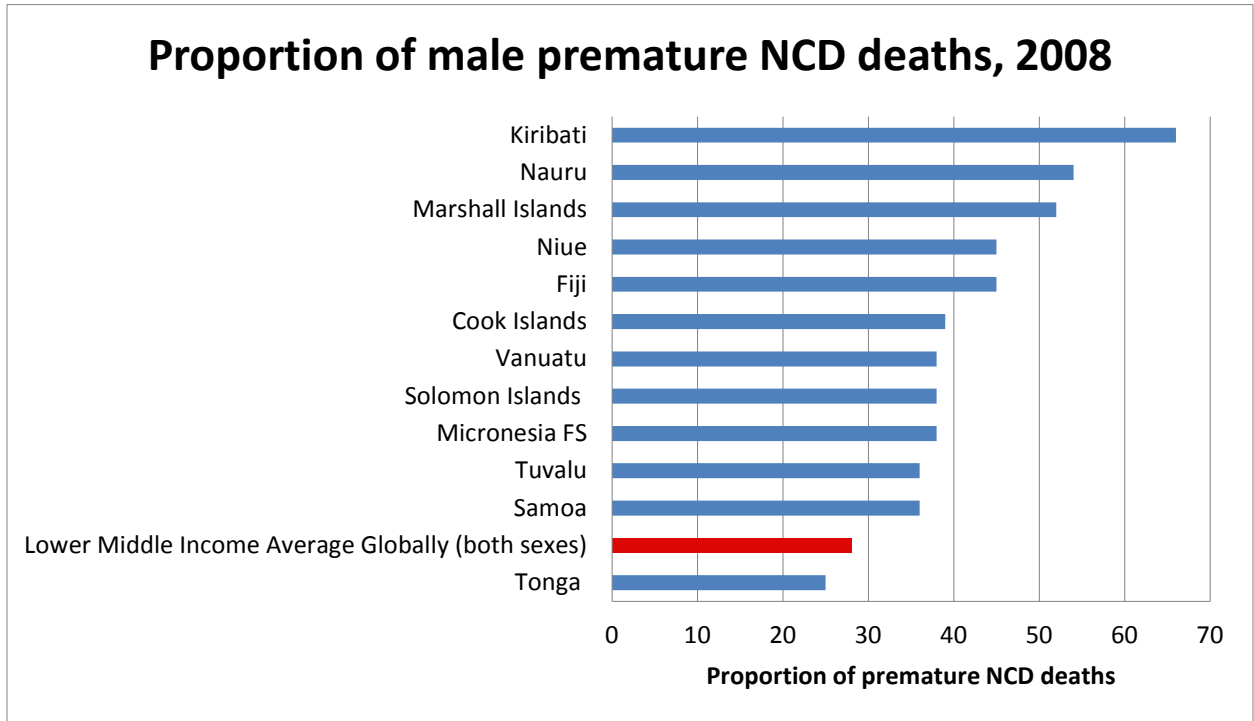
Source: WHO 2011b.

High rates of premature NCD deaths

3.5 **Importantly, at least one-quarter of NCD deaths are premature in Tonga, Samoa, and Vanuatu, proportions that can be much higher than in other lower-middle-income countries.** WHO notes that in lower-middle-income countries the proportion of premature NCD deaths (that is, under age 60) rose to 28 percent in 2008 (2011b). This is also approximately the proportion of premature NCD deaths for males in Tonga and females in Samoa. However, as seen in table 3.1, about one-third of male NCD deaths in Samoa and Vanuatu, and one-third of female NCD deaths in Tonga in 2008, were estimated by WHO to be premature. Forty-two percent of female NCD deaths in Vanuatu were premature, 14 percentage points higher than the average for lower-middle-income countries.

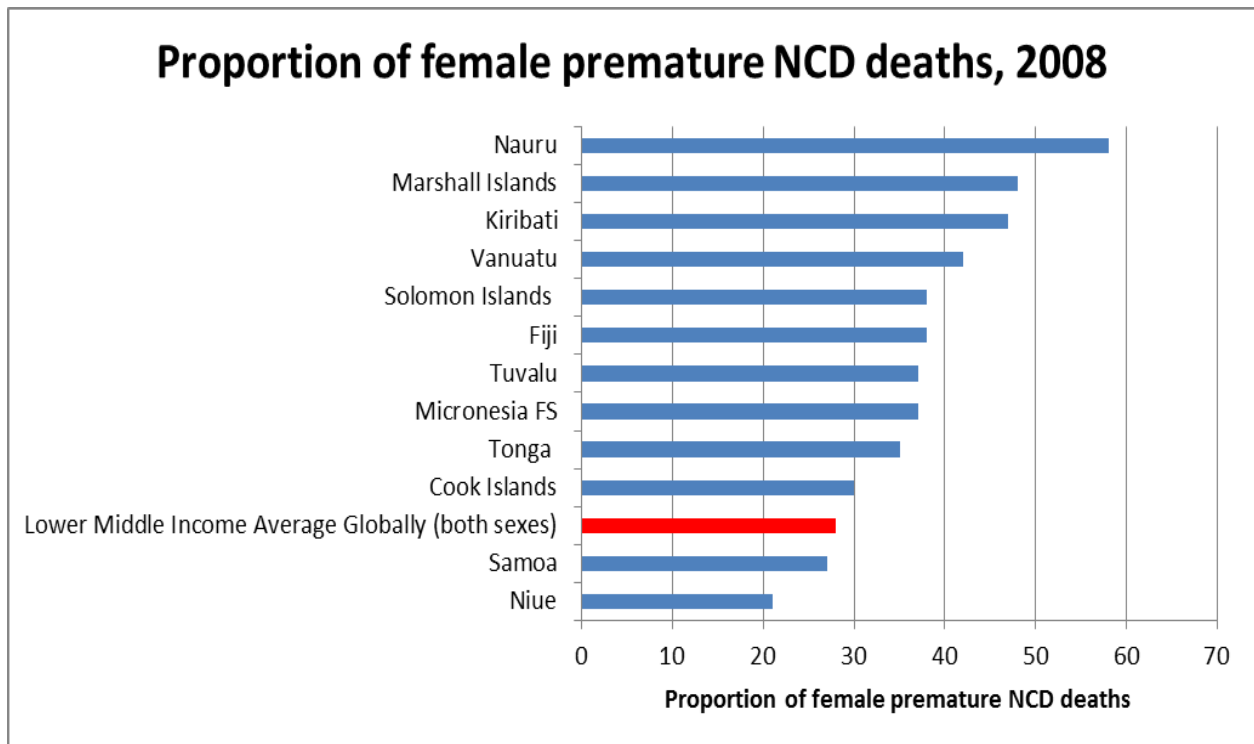
3.6 **There is not sufficient evidence to explain the higher rates of premature NCD deaths in Samoa, Tonga, and Vanuatu.** Nor is it a phenomenon limited to those three countries: charts 3.1 and 3.2 below show that almost all countries in the Pacific have higher proportions of premature NCD deaths than the lower-middle-income global average, albeit at different rates for males and females. One could speculate that the high prevalence of risk factors across the population, summarized in annex 1, is a factor. There is also anecdotal evidence that many NCD diseases go unrecognized and undiagnosed, and appear to be occurring in relatively young cohorts. There is also anecdotal evidence of poor compliance with long-term medication, underpinned by a sense of fatalism, which allows NCD complications to escalate.

Chart 3.1 Proportion of Male Premature NCD Deaths



Source: WHO 2011b.

Chart 3.2 Proportion of Female Premature NCD Deaths



Source: WHO 2011b.

Specific country data on NCDs

3.7 Specific country data confirms the importance of NCDs. Recent official documents note that the prevalence of NCDs in Tonga has risen from 7 percent in 1973 to 18 percent in 2004, and life expectancy appears to have fallen five years for men (from 70 years in 1969 to 65 years in 2010) and three years for women (from 72 to 69) (Government of Tonga 2010a). The leading causes of death registered at the hospitals in Tonga are diseases of the circulatory system (29 percent of all deaths) followed by symptoms, signs, and abnormal clinical findings (102 deaths or 18 percent) and neoplasms (83 deaths or 15 percent), (Government of Tonga 2010a). In Vanuatu, diabetes vascular disease is the most common reason for admittance to surgery wards, representing about half of all patients admitted at Vanuatu’s Northern District Hospital and one-quarter at Vila Central Hospital (Government of Vanuatu 2012b). In Samoa, diabetes-related admissions to the main tertiary hospital increased from 473 to 649 over the period 2006 to 2008. Diabetes-related amputations increased from 49 to 85 over the same period, while the median age of such amputations decreased from 64 to 50. NCDs are a primary cause of overseas medical treatment in Samoa, a high-cost form of treatment.

Table 3.4 Distribution of Mortality by Sex and Age Due to Cardiovascular Disease in Tonga

Age group	Female	Male	Total	Percentage of total	Cumulative percentage
< 1	1	3	4	3	3
1-14	0	0	0	0	3
15-24	1	2	3	2	5
25-34	1	2	3	2	7
36-44	1	7	8	5	12
45-54	3	12	15	10	22
55-64	17	24	41	26	48
65-74	11	29	40	25	73
75+	20	25	45	28	100
Total	55	105	160	100	100

Source: Government of Tonga 2010a.

UNDERLYING RISK FACTORS FOR NCDs

3.8 Many risk factors drive the rise in NCDs. Some risk factors cannot be changed including age, gender, and genetics. Other risk factors are considered wholly or partially modifiable. They include behavioral risk factors (tobacco and alcohol use, diet, and levels of physical activity); metabolic factors (elevated blood pressure, blood glucose levels); and broader, underlying, socioeconomic trends (including rising urbanization with its associated sedentary lifestyles and increased access to highly processed foods and salt). WHO notes that the leading risk factor globally for mortality is raised blood pressure, responsible for 13 percent of deaths globally. This is then followed by tobacco use (9 percent), raised blood glucose (6 percent), physical inactivity (6 percent), and

overweight and obesity (5 percent), (WHO 2011b). WHO notes that four risk factors underpin 80 percent of all NCD deaths globally: smoking, nutrition, alcohol, physical inactivity (SNAP).

Obesity and overweight

3.9 Obesity and being overweight are particularly important risk factors for NCDs in the Pacific. The Pacific Islands have some of the highest rates of obesity and overweight incidence in the world. In four countries of the Pacific¹⁰ at least half the adult population is obese (annex 1). As can be seen from table 3.1, the levels of obesity and overweight in Samoa, Tonga, and Vanuatu are also high. Over 80 percent of males and almost 90 percent of females are overweight in Tonga and Samoa. Almost half of males and over two-thirds of women are also obese. This is important because WHO estimates that, globally, 44 percent of the diabetes burden, 23 percent of the ischemic heart disease burden, and between 7 and 41 percent of certain cancer burdens are attributable to being overweight or obese (WHO 2012c). The average weight for a woman in Tonga increased by 21.1 kilograms over 30 years to reach 95 kilograms, and increased by 17.4 kilograms to reach 95.7 kilograms (Government of Tonga 2010b).

3.10 Obesity and overweight can occur among the young. Chart 3.3 below shows the percentage of students aged 13 to 15 years that were overweight¹¹ in the six Pacific countries that reported results. In Tonga, 61 percent of boys and 58 percent of girls aged 13 to 15 were overweight. Rates of obesity¹² were also high in some instances: 29 percent of boys aged 13 to 15 in the Cook Islands were obese, and nearly one in four boys (24.7 percent) and one in five girls (19.1 percent) in Tonga were obese (Global School-based Student Health Survey 2012). These rates of overweight and obesity are considerably higher than in other WHO regions and are a cause of concern. A recent analysis in *The Lancet* noted the following:

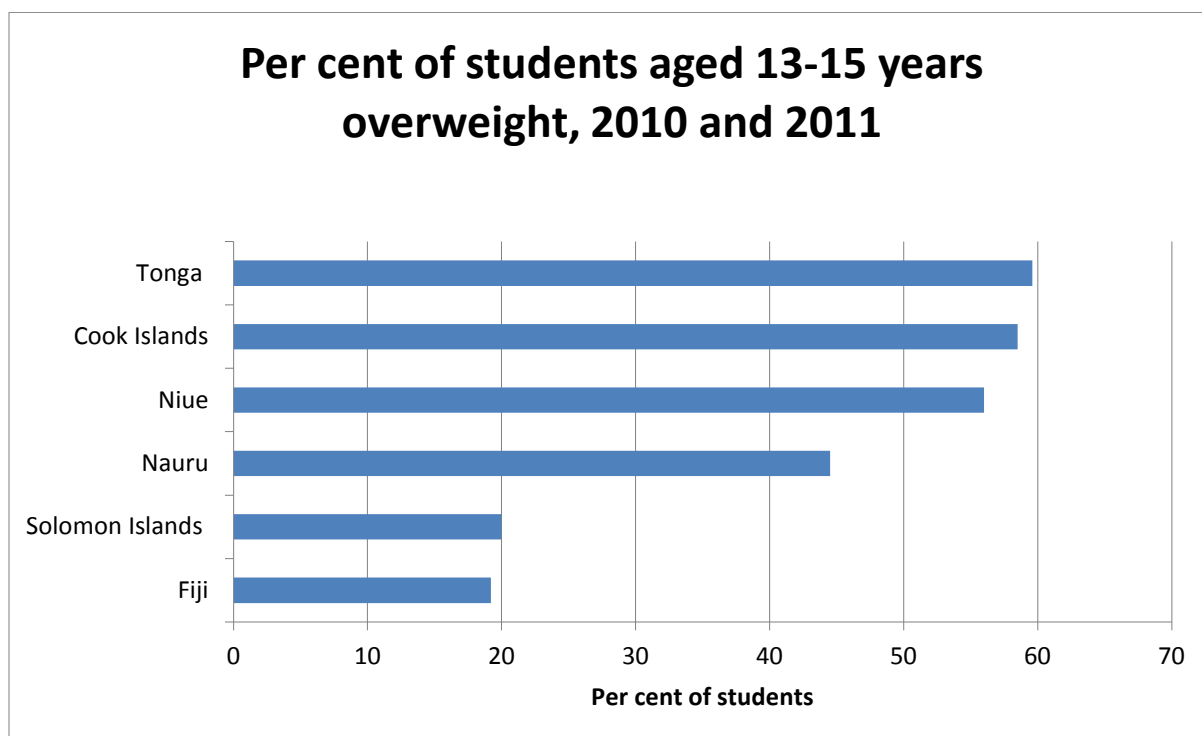
Childhood obesity can adversely affect almost every organ system and often has serious consequences, including hypertension, dyslipidemia, insulin resistance or diabetes, fatty liver disease, and psychosocial complications. Results of one study showed that being overweight or obese between ages 14 and 19 years was associated with increased adult mortality (from age 30 years) from various systemic diseases (Han et al. 2010).

¹⁰. Cook Islands (63 percent obese); Nauru (71 percent obese); Samoa (54 percent obese); and Tonga (57 percent obese).

¹¹. Defined in this case as being greater than one standard deviation from the median body mass index for age and sex.

¹². Defined in this case as being greater than two standard deviations from the median body mass index for age and sex.

Chart 3.3 Students Aged 13 to 15 Who Were Overweight, 2010 and 2011
(as percent)



Source: Global School-based Student Health Survey 2012.

3.11 Obesity and being overweight are relatively recent phenomena in the Pacific, driven by multiple factors. A study on “lifestyle diseases” in the Pacific makes the point that early explorers were particularly struck by the good health and lean physiques of virtually all Pacific Islanders (Coyne 2000). It is argued that this reflected good diets (especially fish), active lifestyles, and the absence of exposure to tobacco, alcohol, and several communicable diseases. The study finds early Western contact first brought epidemics of infectious diseases, including influenza and measles. Subsequently, however, the adoption of sedentary lifestyles and changed diets increased the rates of noncommunicable diseases. It is not particularly clear why Pacific Islanders then became some of the most overweight and obese people in the world. One explanation involves the “thrifty gene.” This is a hypothesis that certain groups, including Pacific Islanders, had a gene that increased fat storage: an advantageous feature in times of food insecurity and long ocean voyages, but, which subsequently increased rates of obesity and diabetes in the face of plentiful, processed, sugar- and salt-rich food and sedentary lifestyles (Joffe and Zimmet 1998). Whatever the explanation, what is noticeable is the relative speed with which obesity and associated NCDs appeared in the region. For example, diabetes was not mentioned as a health problem in a survey conducted in Nauru in 1933. However in 1962 diabetes was reported in 21 Nauruans or 1 percent of the population, and by 1975 a full survey of diabetes found over a third (34.4 percent) of Nauruans aged 15 years and over to be diabetic (Coyne 2000).

Changing diets

3.12 Changing diets is an underlying risk factor in the Pacific. Diets in the Pacific have changed from predominantly root vegetables, coconuts, and fresh fish to ones consisting of bread, rice, tinned fish, sugar, and salt, and more recently, Asian packaged noodles. Certain imported foods also increased NCD risks. Coyne cites earlier studies showing people in Vanuatu “were 2.19 times more likely to be overweight and/or obese and 1.94 times more likely to be diabetic if they used imported fat sources compared to traditional fat sources such as coconut” (2000). A separate study examining the links between food availability, food prices, and obesity in Samoa found that total energy availability from food increased by 47 percent, with more than 900 extra calories available per capita per day between 1961 and 2007. Mean Body Mass index (BMI) for men and women aged 35 to 44 also rose 18 percent between 1980 and 2010 (Seiden et al, 2012). Another study found modern diets with high levels of processed foods were significantly and positively associated with metabolic syndrome in Samoa, an underlying characteristic of cardiovascular disease and type 2 diabetes (DiBello et al. 2009). The WHO-supported 2011 STEPS survey in Vanuatu found that 65 percent of women, and 58 percent of men did not eat the recommended five portions of fruit and vegetables per day. Estimates collected by the SPC show the surprisingly low intake of fruit and vegetables in much of the Pacific, often by more than 95 percent of the total adult population (2011). Unfortunately, there appears to be little reliable public data on salt intake in the Pacific, despite the fact that salt intake is a potentially significant driver of hypertension (Ibrahim and Damasceno 2012).

Physical inactivity and urbanization

3.13 Physical inactivity is also an important risk factor in the Pacific. Recent estimates suggest that, worldwide, physical inactivity causes about 10 percent of breast cancer and colon cancer; 9 percent of all premature mortality; and 7 percent of type 2 diabetes (Lee et al. 2012). A study of lifestyle diseases in Pacific communities found that increasing urbanization and sedentary work practices contributed to “lifestyles of least effort” (Coyne 2000). Approximately 50 percent or more of the adult populations are physically inactive in six¹³ of the eight Pacific countries for which data is available (annex 1).

3.14 Urbanization is associated with more sedentary lifestyles, as well as greater access to alcohol, tobacco, and imported foods with high sugar, salt, and fat content. In a survey of over 30 developing countries, hypertension (high blood pressure) was always more prevalent in urban and semi-urban regions than in rural areas, with the single exception of Nigeria. Furthermore, prevalence of hypertension in urban India increased by 30 times over 25 years, compared to 10 times over 36 years in rural areas (Ibrahim and Damasceno 2012). In five Pacific Island countries, more than 50 percent of the total population now live in urban areas: Nauru (100 percent), Palau (77 percent),

¹³. Cook Islands, 72 percent physically inactive; Kiribati, 49 percent; Marshall Islands, 51 percent; Micronesia Federated States, 65 percent; Nauru, 49 percent; and Samoa, 49 percent.

Cook Islands (72 percent), Marshall Islands (65 percent), and Fiji (51 percent). Current population growth rates imply doubling of the Pacific urban population within 25 years (ADB [Asian Development Bank] 2012).

Tobacco and alcohol use

3.15 Tobacco use is a major risk factor for NCDs globally and a contributing factor in the Pacific. WHO notes that tobacco use is one of four¹⁴ major risk factors for NCDs. WHO also notes that tobacco use causes more deaths globally than HIV and AIDS, tuberculosis, and malaria combined. WHO further notes that “tobacco is the leading behavioral risk factor causing substantially large number of potentially preventable deaths worldwideone death every six seconds” (WHO 2012e). Total prevalence rates of tobacco vary considerably among the Pacific from 8 percent in Fiji to 67 percent in Kiribati (annex 1). Tobacco use by males and females also varies considerably. In Fiji 15 percent of males smoke tobacco daily compared to just 1.7 percent of females, whereas in Kiribati 73 percent of males and 61 percent of females smoke daily (WHO 2011b).

3.16 Up to 10 percent of NCD deaths are attributable to tobacco use in the Pacific. WHO has recently estimated the proportion of deaths attributable to tobacco for a range of countries globally. Table 3.5 below summarizes key information for Samoa, Tonga, and Vanuatu. There are significant variations between the three countries. However it is noticeable that 12 percent of all deaths aged 30 to 44 years from all causes are attributed to tobacco use in Tonga. Ten percent of all NCD deaths are attributable to tobacco use in Vanuatu. More than a third and up to two-thirds of all trachea, bronchus, or lung cancers are attributed to tobacco.

Table 3.5 Proportion of Deaths Attributable to Tobacco, 2004

	Samoa	Tonga	Vanuatu
Proportion of all deaths aged 30 and over attributable to tobacco (%)	2%	7%	8%
Proportion of all deaths aged 30-44 attributable to tobacco (%)	2%	12%	6%
Proportion of NCD deaths aged 30 and over attributable to tobacco (%)	3%	9%	10%
Proportion of all trachea, bronchus and lung cancer deaths aged over 30 attributable to tobacco (%)	38%	57%	66%

Source: WHO 2011b.

3.17 Compliance with tobacco regulation is generally weak, providing an environment for uptake of tobacco and consequently the risk of addiction among the young. The WHO notes that Samoa, Tonga, and Vanuatu each scored 0/5 on key aspects of tobacco regulation: monitoring tobacco use and prevention policies; protecting

¹⁴. The four main risk factors are Smoking, Nutrition, Alcohol, and Physical inactivity (“SNAP”).

citizens from tobacco smoke; offering services to help quit; warning of the dangers of tobacco; enforcing bans; and raising taxation on tobacco products¹⁵ (WHO 2011b). A 2010 survey in Tonga found that access to tobacco was very high: all but one of Tonga's 597 retail store outlets sold tobacco products. This means there is an average of one tobacco outlet for every 29 Tongan households. Roughly speaking, Tongan citizens have a better chance of accessing a store selling tobacco than they do of having a screening for diabetes at the Diabetes Centre.¹⁶ Almost two-thirds (63 percent) of retail store outlets were selling tobacco sticks separately, and almost one-quarter (23 percent) were selling tobacco to underage children, both activities in violation of the law (Government of Tonga 2010c).

3.18 Alcohol use varies across the Pacific and between genders. Statistics collected from STEPS surveys by SPC show that current alcohol use for men ranges from 95 percent of the adult population in Tokelau to 30 percent in the Marshall Islands. Female use of alcohol is consistently lower across the Pacific. In Samoa, 80 percent of adult males and 47 percent of adult females use alcohol (SPC 2011). The more recent WHO STEPS survey in Vanuatu in 2012 found that only 12 percent of males and 7 percent of females drank alcohol in the preceding 30 days.. Excessive consumption of alcohol is acknowledged as a major contributing factor in domestic violence (Government of Tonga 2010b).

Combined risk factors

3.19 Of perhaps greater significance to public health officials is the *combined* risk factors as this can amplify the chances of acquiring NCDs. Table 3.6 and chart 3.4 below show the combined risk factors for NCDs in Vanuatu based on the latest WHO STEPS survey (2011). As can be seen, nearly 20 percent of males and 15 percent of females, aged 25 to 44 years have three or more risk factors¹⁷ for acquiring NCDs. This increases to over 40 percent of females and 25 percent of males having three or more risk factors in the 45 to 64 year age group. Importantly, only 5 percent of adult females and 10 percent of adult males were free of any major risk of acquiring NCDs in Vanuatu. Equally importantly, those with three or more risk factors for acquiring NCDs are still — potentially at least — in the working age group of 25 to 64.

¹⁵. More formally, the WHO noted that Samoa, Tonga, and Vanuatu, along with many other Pacific Island countries, each scored 0/5 in terms of the “implementation of anti-tobacco (m) POWER measures at the highest level of achievement.” (m) POWER stands for M: Monitoring tobacco use and prevention policies; P: Protecting people from tobacco smoke; O: Offering help to quit tobacco use; W: Warning about the dangers of tobacco; E: Enforcing bans on tobacco advertising, promotion, and sponsorship; and R: Raising taxes on tobacco. WHO notes that each measure reflects one or more provisions of the WHO Framework Convention on Tobacco Control, and the package of six measures is an important entry point for scaling-up efforts to reduce the demand for tobacco.

¹⁶. There are 596 retail outlets selling tobacco in Tonga. There were 438 screenings for diabetes at the Diabetes Clinic in 2010.

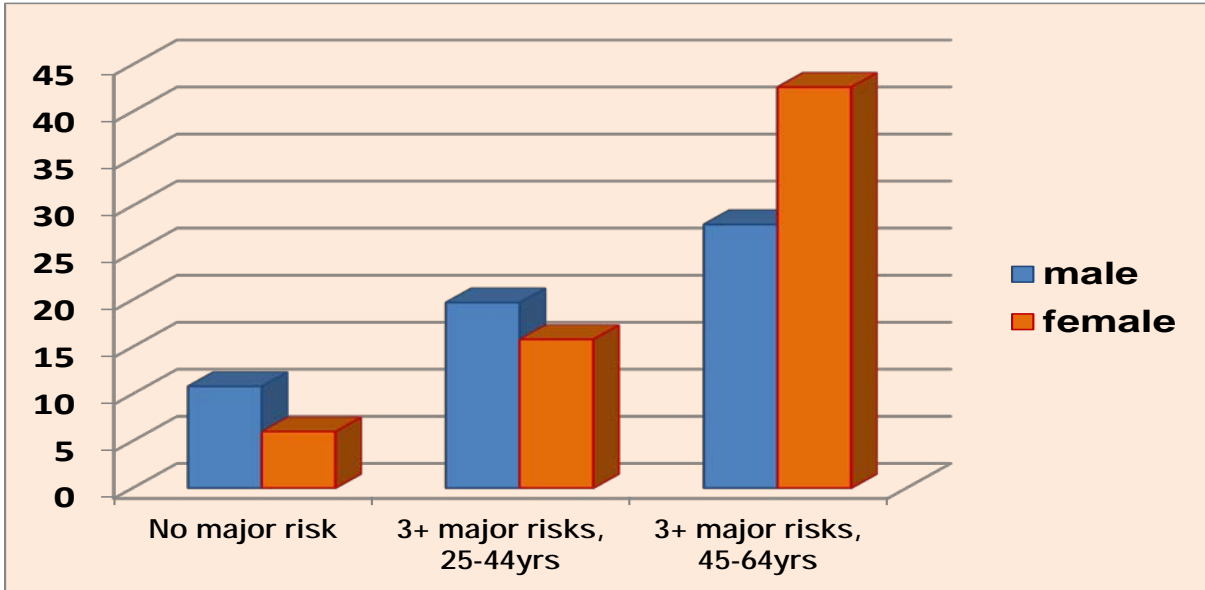
¹⁷. There are five risk factors: current daily smoker; eating less than five servings of fruit and vegetables per day; low level of physical activity; overweight (BMI > 25 kg/m²); and raised blood pressure (systolic blood pressure > 140 and or diastolic >90 mmHg or currently on medication for raised blood pressure).

Table 3.6 Selected Risk Factors for NCDs in Vanuatu

Selected Risk Factor	Both Sexes	Males	Females
Mean body mass index (kg/m ²)	26.1 (25.9-26.4)	25.5 (25.2-25.8)	26.7 (26.4-27)
Per cent who are overweight (BMI ≥25 kg/m ²)	50.9% (48.8 – 53.1)	45.5% (42.8-48.3)	55.9% (53.2-58.5%)
Per cent who are obese (BMI ≥ 30 kg/m ²)	18.8% (16.9 – 20.8)	13.9% (11.9-15.9)	23.3% (20.7-25.8)
Mean fasting blood glucose, including those currently on medication for raised blood glucose: mmol/L	5.7 (5.6-5.8)	5.7 (5.6-5.8)	5.7 (5.6-5.8)
Percentage with impaired fasting blood glucose defined as follows: capillary whole blood value ≥5.6 mmol/L (100mg/dl) and <6.1 mmol/L (110 mg/dl)	18.8% (17.1-20.5)	19.0% (16.6-21.5)	18.6% (16.6-20.7)
Percentage with impaired fasting blood glucose, defined as capillary whole blood value ≥6.1 mmol/L (110mg/dl) or currently on medication for raised blood glucose	21.2% (19.0-23.3)	21.4% (18.8-24.0)	21.0% (18.5-23.5)
Percentage who ate less than 5 servings of fruit and/or vegetables on average per day	61% (57.9-65.6)	58.2% (53.4-63)	65% (61.2-68.7)
Percentage not engaging in vigorous physical activity	32.4% (28.5-36.3)	20.6% (17-24.1)	43% (38.4-47.7)
<i>Summary of combined risk factors for NCDs (current smokers; less than 5 servings fruit and vegetables per day; low level of physical activity; overweight (BMI ≥25kg /m²); raised blood pressure (SBP ≥140 and/or DBP ≥90 mmHg or currently on medication for raised blood pressure).</i>			
Percentage with none of the above risk factors	9.7% (7.5-11.9)	10.8% (8.2-13.3)	6% (3.6-8.5)
Percentage with three or more of the above risk factors aged 25-44 years	18.7% (15.8-21.6)	19.7% (16.1-23.2)	15.8% (11.3-20.2)
Percentage with three or more of the above risk factors aged 45-64 years.	30.6% (26.0-35.2)	28.0% (23.2-32.8)	42.6% (32.3-53.1)
Percentage with three or more of the above risk factors aged 25 to 64 years	22.3% (19.3-25.2)	22.3% (18.9-25.7)	22.1% (17.2-27.1)

Source: WHO STEPS Survey 2011.

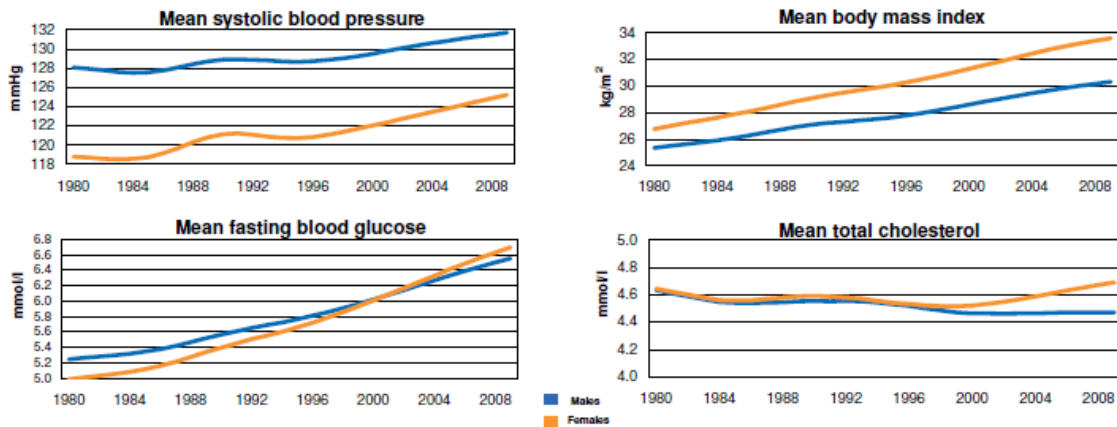
Chart 3.4 Combined Risk Factors: Vanuatu 2011



Source: WHO STEPS Survey 2012.

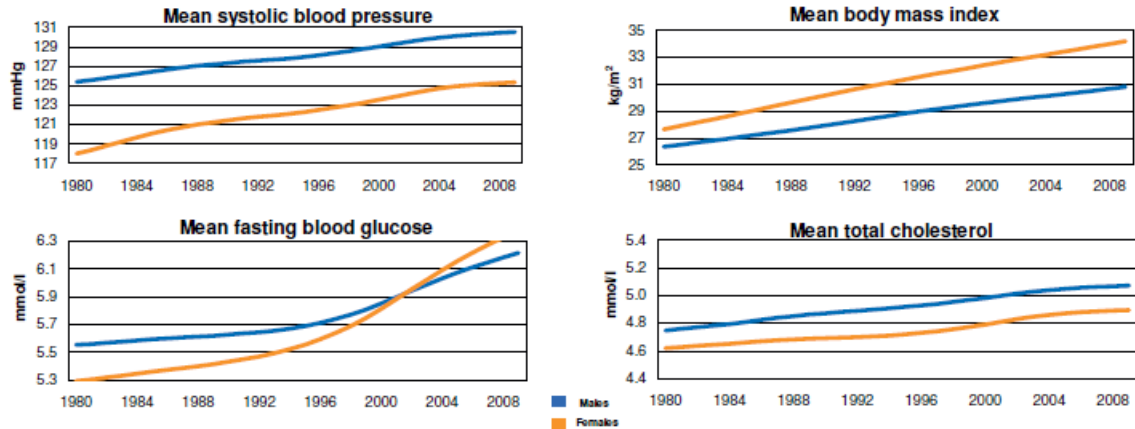
3.20 **Risk factors, while generally increasing overall, tend to differ among the three countries and between genders.** This is seen in charts 3.5, 3.6, and 3.7 below. Vanuatu, for example, displays lower levels of body mass index (BMI) for both males and females than does Samoa or Tonga, with narrower (although increasing) differences between males and females.

Chart 3.5 Trends in Selected Risk Factors, 1980–2008, Samoa



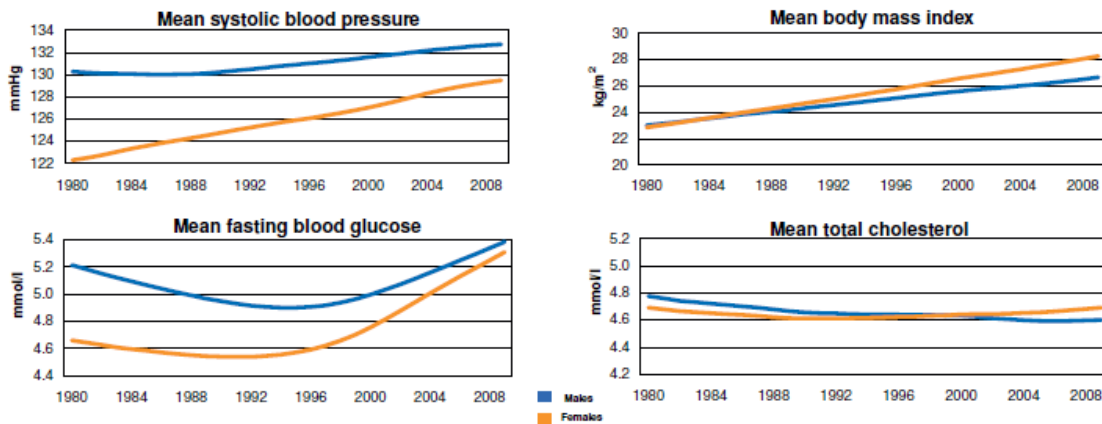
Source: WHO 2011b.

Chart 3.6 Trends in Selected Risk Factors, 1980–2008, Tonga



Source: WHO 2011b.

Chart 3.7 Trends in Selected Risk Factors, 1980–2008, Vanuatu



Source: WHO 2011b.

TYPE 2 DIABETES: A PARTICULARLY SIGNIFICANT NCD IN THE PACIFIC

3.21 **Special attention should be paid to diabetes, as this is particularly prevalent in the Pacific.** Table 3.7 below shows that three of the top ten countries in the world for diabetes prevalence are in the Pacific: Kiribati, Marshall Islands, and Nauru. Estimates by the International Diabetes Federation (IDF) suggest that by 2030, four of the five highest prevalence countries in the world for diabetes will be Pacific Island countries: Kiribati, Marshall Islands, Tuvalu, and Nauru.

Table 3.7 Top Ten Countries Globally for Prevalence (% Total Population) of Diabetes among 20 to 79 Years of age, 2011 and 2030

Global country ranking in 2011	Prevalence of diabetes in 2011 (% total population)	Estimated global country ranking in 2030	Estimated prevalence of diabetes in 2030 (% total population)
1.Kiribati	25.7	1.Kiribati	26.3
2.Marshall Islands	22.2	2.Marshall Islands	23.0
3.Kuwait	21.1	3.Kuwait	21.2
4.Nauru	20.7	4.Tuvalu	20.8
5.Lebanon	20.2	5.Nauru	20.7
6.Qatar	20.2	6. Saudi Arabia	20.6
7. Saudi Arabia	20.0	7. Lebanon	20.4
8. Bahrain	19.9	8. Qatar	20.4
9. Tuvalu	19.5	9. Bahrain	20.2
10. United Arab Emirates	19.2	10.United Arab Emirates	19.8

Source: International Diabetes Federation 2011.

3.22 Diabetes imposes long-term health and financial costs. This is partly due to the chronic, life — long-term nature of diabetes once it is acquired. It is also because diabetes is associated with or contributes to cardiovascular, kidney, and eye diseases (Ferrannini and Cushman 2012). The US Centers for Disease Control and Prevention (CDC) estimates that a person with diabetes spent \$11,744 on health care compared to \$5,095 for a person without the disease (CDC 2008). Latest research also finds that those with type 2 diabetes double their probability of then also acquiring Alzheimer’s disease, and increase their risk of dementia by 175 percent over a 15-year period (Matsuzaki et al. 2011). Diabetes can have an adverse intergenerational effect as well. Pregnant women with diabetes have a higher risk of programming their offspring in utero to obesity and type 2 diabetes and other metabolic disorders (Elisaia et al. 2009).

3.23 Individual country estimates for Samoa, Tonga, and Vanuatu confirm that diabetes is an important challenge for those countries. Numbers of registered diabetic cases in Tonga have increased from 2,000 in 2002 to 4,007 in 2010. Large numbers of diabetics are still unrecognized and unregistered. Almost half (46 percent) of those visiting the Diabetes Centre had some degree of glucose intolerance. Amputations related to diabetes have increased three-fold in the last five years (Government of Tonga 2010a). The numbers of diabetes-related amputations was found to have increased from 473 to 649 between 2006 and 2008 in Samoa, while the median age of those receiving amputations had decreased from 64 to 50.¹⁸ Table 3.8 shows that even though projected prevalence rates do not increase greatly — at least in Samoa and Tonga — absolute numbers of adult diabetics rise noticeably in all three countries due to population growth. Also worth noting are the estimates of impaired glucose tolerance (IGT): a risk factor for developing diabetes and CVD. The policy implication of IGT is that it acts as a proxy

¹⁸. Care should be taken in interpreting these figures as the two-year period in question is not long enough to identify robust or long-term trends.

indicator of the future pipeline of diabetes and CVD if primary and secondary prevention strategies are not effective.

Table 3.8 Estimated Prevalence and Numbers of Adult Diabetes Cases in 2011 and 2030

Country	Estimated national prevalence of adult (20-79 years) diabetes in 2011	Estimated number of adult diabetes cases in 2011	Impaired Glucose Tolerance national prevalence (%) 2011 (standardised)	Mean diabetes related expenditure per person with diabetes (\$US) ¹⁹	Estimated adult national prevalence rate (%) in 2030	Estimated number of adult diabetes cases in 2030
Samoa	7.05	6,550	6.67	312	7.62	8,800
Tonga	11.58	6,130	7.85	221	12.14	8,400
Vanuatu	13.75	17,260	8.63	160	16.5	35,200

Source: International Diabetes Federation 2011.

COUNTRY RESPONSES TO NCDs

3.24 Virtually all governments in the Pacific recognize the importance of NCDs and have various action plans in place or under discussion. Pacific Islands Forum Leaders have explicitly recognized the link between NCDs and development, declaring the “Pacific is in an NCD Crisis” as part of the 42nd Pacific Islands Forum communiqué of September 2011. Pacific health ministers have similarly made joint statements about the importance of NCDs as a public health and development issue via the *Honiara Communique on the Pacific NCD Crisis* issued on June 30, 2011. Virtually all countries in the Pacific were working with WHO and SPC in mid-2012 to develop a “crisis response package” to NCDs, including measures to scale-up “best buys” from the WHO *Package of Essential Noncommunicable (PEN) Interventions* (WHO 2010b). At least four countries in the Pacific have imposed increased taxes or import levies on sugary soft drinks with varying results: Fiji, French Polynesia, Nauru, and Samoa (Thow et al. 2010). The Cook Islands has increased the import levy on sugary soft drinks.

3.25 Samoa has responded to NCDs in various specific ways. The National NCD Policy 2010–15 envisaged an expenditure of \$680,000 over the period of the plan,

¹⁹. According to the IDF website (<http://www.idf.org/diabetes-social-and-economic-impact-studies>), these figures were estimated in the following way. “The IDF estimates are created using a special formula which requires information on country estimates of diabetes prevalence by age and sex, population size by age and sex, total healthcare expenditures by age and sex, and the ratio (R) of medical expenditures per person with diabetes to medical expenditures per person without diabetes, matched for age and sex. “R” is the key parameter in the conversion of per capita health spending in the country into estimates of spending caused by diabetes.”

focusing on six²⁰ main intervention areas. The government is currently in the process of establishing a Health Promotion Foundation, which will have a particular focus on NCDs. Samoa explicitly recognizes the challenge of NCDs in its overarching national Strategy for the Development of Samoa. WHO notes that Samoa has in place many of the key building blocks of country capacity to respond to NCDs, including administrative allocation of responsibility for NCDs, some level of funding support, and key aspects of national health reporting. However WHO also notes that Samoa is yet to establish integrated or topic-specific policies or action plans on most specific diseases, including CVD and diabetes (2011b). Tobacco control policy could also be improved (see discussion in paragraph 3.17). Samoa has also conducted innovative Village Health Fairs, which provide primary-level screening of NCDs and follow-up referrals and treatment. The Ministry of Health notes that “the Village Health Fairs concept provided a festive fun environment that was supportive of NCD screening. It was a strategy to translate a unified framework for health promotion and preventive activities that practically realized the Strengthening Health system through revitalizing primary health care. The Village Health Fair Program for NCD Screening is in line with the priority strategies of the NCD Policy 2010–15 as well as the Health Promotion Policy 2010–15. All these efforts are aligned to the Alma Ata Declaration on Primary Health Care (1978), the Ottawa Charter on Health Promotion (1986), and the Yanuca Declaration on Health in the Pacific in the 21st Century (1995) of which the Samoa Health Sector Vision of ‘A Healthy Samoa’ derives from” (Government of Samoa 2011).

3.26 Tonga has also responded in various ways. It was the first country in the Pacific to have a specific strategic plan to address NCDs.²¹ It was the first country in the Pacific to include a specific chapter on NCDs in its National Health Accounts (Government of Tonga 2010a). Tonga has also specifically included reduction of NCDs as part of its own national MDGs, aiming to — among other things — “reduce NCDs by 2 percent per year by 2015, and reduce prevalence of diabetes by 10 percent” (Government of Tonga 2010b). Tonga has also established an autonomous and active Tonga Health Promotion Foundation with the specific aim of “promoting health and reducing harm from NCDs such as heart disease, obesity, diabetes, high blood pressure, and smoking-related illnesses” (Government of Tonga 2011d). WHO notes that Tonga has in place all of its criteria for assessing country capacity to address and respond to NCDs, other than having a national population-based cancer registry or policy. Tobacco control policy could also be improved (see discussion in paragraph 3.17).

²⁰. Public policy; reorienting health services; creating a supportive environment (including physical environment); community action; and development of personal skills. It is not clear how much of that envisaged budget has been spent on these initiatives, or to what effect.

²¹. The strategy to prevent and control noncommunicable diseases (2010–15) consists of the following six components: Integrated NCD Activities — ensure better coordinated and integrated NCD activities; Physical Activity — improve proportion of population undertaking physical activity; Alcohol Harm Reduction — reduce binge alcohol drinking by 10 percent; Tobacco Control — reduce the prevalence of current tobacco smokers in Tonga; Healthy Eating — improve rate of consumption of fruits and vegetables, reduce saturated fats in diets, and increase awareness of appropriate portion control; and Monitoring, Evaluation, and Surveillance — strengthen monitoring, evaluation, and surveillance of NCDs in Tonga.

3.27 **Vanuatu has also responded.** Vanuatu’s Ministry of Health has a wide-ranging National Policy and Strategy for NCDs 2010–2015 with ten components.²² Major items of expenditure include proposed NCD centers at the two main hospitals (Port Vila and Luganville); improved sport facilities to encourage physical activity; and school healthy eating programs. WHO concludes that Vanuatu has in place all of its criteria for assessing country capacity to address and respond to NCDs (2011b). However tobacco control policy could be improved (see discussion in paragraph 3.17).

²². Integrated NCD activities; tobacco control; physical activity; healthy nutrition; harmful use of alcohol; drug and substance abuse; dental health; mental health, injury and violence; early detection, treatment, and care; research and surveillance.

CHAPTER 4: FINANCIAL AND ECONOMIC COSTS OF NCDs

RECENT ESTIMATES OF THE COSTS OF NCDs FROM THE INTERNATIONAL LITERATURE

4.1 **There are several recent estimates of the economic impact of NCDs internationally.** Research presented at the World Economic Forum in 2011 drew on macroeconomic simulations suggesting the four main NCDs and mental health would lead to cumulative output losses globally of \$47 trillion over the next two decades. Such a loss represented 75 percent of global GDP in 2010. It also represented “enough money to eradicate two dollar a day poverty among the 2.5 billion people who live in that state for more than half a century” (Bloom et al. 2011). The World Economic Forum also identified NCDs as one of the most serious threats to global prosperity, based on the likelihood and the severity of the impact of NCDs, alongside other high impact risks such as global asset price decline. Underlying these “headline” or cumulative impacts lie several assumptions and estimates about the impact of NCDs on various macroeconomic variables including the labor supply, overall savings rates, and capital accumulation (Bloom et al. 2011).

4.2 **NCDs are likely to have particular economic costs to developing countries, many of which are still coping with an unfinished agenda of communicable, maternal, and neonatal mortality and undernutrition.** Abegunde and his colleagues examined 23 low- and middle-income countries accounting for about 80 percent of chronic disease mortality. They concluded that if nothing is done to reduce the risk of chronic disease, an estimated \$84 billion of economic production would be lost from heart disease, stroke, and diabetes between 2006 and 2015. India would lose the most at \$16.6 billion cumulative GDP loss by 2015. Achieving an additional 2 percent yearly reduction in chronic disease death rates over ten years would avert 24 million deaths in those countries and save an estimated \$8 billion (Abegunde et al. 2007).

4.3 **Of interest to Pacific Island countries are estimates that diabetes caused at least \$465 billion in health care expenditure globally in 2011, 11 percent of total health care expenditure of adults** (International Diabetes Federation 2011). The IDF also estimated that the average health care spending due to diabetes was \$5,063 per person per year in high-income countries and \$271 per person per year in low- and middle-income countries. 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 (International Diabetes Federation 2011). This suggests that, other things being equal, fewer people are available full time in the workforce to generate revenues for services to the very young and the elderly: the dependency ratio worsens.²³ In the United Kingdom, the government’s National Health Service (NHS) spent about £10 billion in 2011 or about £1 million per hour on diabetes amounting to 10 percent of the NHS budget. About 80 percent of that NHS spending on diabetes goes into managing avoidable complications (UK Diabetes 2012).

²³. This requires further study in the Pacific, where levels of unemployment and underemployment can be quite high to begin with. The study by Falconer (paragraph 4.11), for example, found that 40 percent of patients with diabetes in Vanuatu were not employed.

What Drives Rising Health Expenditure?

Latest research confirms that health care spending has been growing rapidly in most countries globally, both developed and developing. (Clements et al. 2012). Three population factors explain the growing demand for health expenditure: *growth* in population; changes in the *age structure* of populations (aging populations as part of the demographic transition), and changes in the *disease profile* of populations (from communicable to NCDs). Rising incomes of individuals and economies is associated with rising expenditure on health care. Technological advancement are important drivers of costs. Tandon notes Wagner's Law: the observation that richer countries on average spend a higher proportion of public funds on health and education (although there is a fair amount of variation around this trend). He notes "This is an important point and needs reiterating: not only do richer countries spend more in absolute levels, they also spend a higher *proportion* of their resources on health and education" (Asian Development Bank 2006).

4.4 Of interest to Pacific Island countries are recent estimates of the impact of NCDs in Caribbean island countries. Recent World Bank studies estimated that the economic burden of the four major NCDs in the island of St. Lucia was estimated at \$27 million, 2.8 percent of the island's GDP in 2006. The total average *private* economic burden per patient in the island of St. Lucia was estimated at \$1,320 in 2006. This comprised direct out-of-pocket costs (\$324 for outpatient services, \$315 for inpatient services, and \$440 for medicines) as well as indirect costs (\$241 of losses through absenteeism and sick leave). The study found that average annual household spending per capita ranged from \$322 per capita in St. Vincent and the Grenadines to \$769 in Antigua and Barbuda, exceeding the annual per capita spending on health by a factor of 1.2 in most countries of the Caribbean (World Bank 2011a).

4.5 Additional information on estimates of economic costs of NCDs from the international literature and elsewhere are available in annex 5.

ESTIMATING ECONOMIC COSTS OF NCDs IN THE PACIFIC

Estimating costs through National Health Accounts

4.6 In principle, analyzing data from National Health Accounts (NHAs) is the most useful way of understanding NCDs. That is because NHAs provide a comprehensive overview of the financing flows of the health system, including both sources and uses of funds. Tonga has a specific chapter on NCDs in its NHAs. Unfortunately, the data relate to 2005–06 and so is dated. An updated version is expected at the end of 2012. In the meantime table 4.1 shows that even a summary NHA format is a useful way of displaying information about NCDs. It is noticeable that expenditure on NCDs rises at different levels of care, more than trebling as care goes from health centers

to outpatients at Vaiola Hospital in the capital, and increases a further nine-fold as treatment moves from outpatient to inpatient care.

Table 4.1 NHA Accounts Analysis: NCD Subanalysis 2006, Expenditure by Government

Category	Total visits/cases	Of which NCD visits / cases	NCD as per cent of total	Cost per unit (\$Tonga)	Total MOH NCD cost in 2006 (\$Tonga)	Total MOH NCD cost in 2006 expressed in US\$ using 2012 exchange rate
<i>Outpatients</i>						
Health Centre Activities	39,562	4,306	10.9%	7	30,142	16,780
Vaiola Hospital Outpatient Clinics	105,348	14,602	13.9%	7	102,211	56,900
<i>Inpatients</i>						
MOH Hospitals	10,380	800	7.7%	1,152	921,600	513,054
Auxilliary services						
Radiology	13,206	2641	20%	57	150,548	83,810
Laboratory	172,455	34,941	20%	7	241,437	134,407
<i>Other services</i>						
NCD Prevention sub program 7					7,984	4,444
Health Promotion sub program 8					10,000	5,567
Overseas Treatment			40%		307,421	171,141
Pharmaceutical (MOH Hospitals)	172,168	68,867	40%	30	2,066,016	1,150,977
<i>Total Cost of NCD to MOH</i>					3,837,359	2,137,792

Source: Government of Tonga 2008.

PREVIOUS ESTIMATES OF COSTS OF NCDs

4.7 An earlier study estimated the economic impact of NCDs on hospital resources in Tonga, Vanuatu, and Kiribati (Doran 2003). The following are some of the key conclusions from that report:

The results indicate that in each of the countries included, Tonga, Vanuatu, and Kiribati, NCDs currently account for 10.4 percent, 5.8 percent and 8.1 percent of all admissions, respectively. Patients being admitted for a NCD are much older than those presenting for a non-NCD, 16 years older in Tonga and 10 years older in Kiribati. Patients admitted for a NCD also stay in hospital longer with average length of stay (ALOS) for a NCD admission being 9.2 days, 7.5 days, and 13.5 days in Tonga, Vanuatu, and Kiribati, respectively. This compares with an ALOS for a non-NCD admission of 4.9 days in both Tonga and Vanuatu and 9.3 days in Kiribati. Consistent with this finding, average treatment costs of NCDs are considerably higher than non-NCD admissions. Although NCDs account for a relatively low proportion of all admissions, they account for a disproportionately larger share of all treatment expenditures. In Tonga, Vanuatu, and Kiribati NCDs account for 19.6 percent, 9.0 percent and 8.1 percent, respectively, of all treatment expenditures. To put this in context, in Tonga for example, one out of every ten (10.4 percent) patients admitted to hospital are admitted for a NCD; however, for every five dollars spent on treating all patients, one of these dollars (20 percent), is required to treat the patient with a NCD.

4.8 The study also estimated the costs to hospitals of treating NCDs.²⁴ Average costs of treating NCDs were higher than for other diseases, particularly because they involved longer lengths of stays as inpatients. For example, Doran finds that in Tonga the most frequent cause of admission was for childbirth in 2002, accounting for 34 percent of all admissions. The ALOS was 3.1 days. With average inpatient cost at TOP 157 per day, this generated an average cost of TOP 481 for a pregnancy admission. On the other hand, diabetes patients had an average length of stay of 14.7 days, therefore averaging TOP 2,306 per patient episode, 4.8 times the cost of childbirth.

²⁴ The process was as follows. Estimates were made of the proportion of hospital admissions accounted for by NCDs. Hospital admission data was analyzed and sorted by ICD — 10 code. For example, 911 of the 8,776 admissions (10.3 percent) to hospitals in Tonga in 2001 were found to be NCD-related. Of these 911 admissions, 403 were diseases of the circulatory system, 273 were diabetes-related, 158 were neoplasms (cancers), and 75 were COPD (respiratory). Estimates were also made of the cost of inpatient treatment. This was done in three steps. First, total budgets were separated into inpatient and outpatient stays, and overhead costs apportioned accordingly. Second, total MOH staffing costs actually involved in inpatient care were estimated. These two steps were then combined to generate an estimate of the total expenditure on inpatient care: T\$ 6.7 million in the case of Tonga, representing 52 percent of total MOH budget. The third step involved dividing total inpatient costs by the total inpatient length of stay to get an average inpatient cost per day. In the case of Tonga this was T\$ 157 per day. This average inpatient cost per day was then multiplied by the average length of stay for each disease group. Thus, in Tonga the average 4.4-day stay for infectious and parasitic diseases produced an average cost of T\$ 693 (T\$ 1574.4) whereas a 14.7-day stay for diabetes produced an average cost of T\$ 2,306 (T\$ 15714.7).

4.9 **Other key points from this study are summarized in table 4.2 below.** This shows that NCDs accounted for 10.4 percent (911/8,776) of all hospital admissions in Tonga in 2002, whereas the *treatment* of these diseases represented almost 19.6 percent of all inpatient hospital-based expenditure (TOP 1.3 million/TOP 6.7 million). Similarly, in Vanuatu, NCDs accounted for 5.8 percent (595/10,216) of all hospital admissions, whereas the treatment of NCDs amounted to 9 percent (VT 43.9 million/VT 490.0 million) of all inpatient hospital-based expenditures.

Table 4.2 Relative Significance of NCDs in Hospital Admissions and Hospital Costs in Tonga, Vanuatu, and Kiribati in 2002

Item	Tonga	Vanuatu	Kiribati
<i>Hospital Data</i>			
Number of admissions	8776	10,216	3872
Number of NCD admissions	911	595	313
% NCD to all admissions	10.4%	5.8%	8.1%
ALOS all admissions (days)	4.9	4.9	9.3
ALOS NCD admissions (days)	9.2	7.5	13.5
<i>Cost data</i>			
Inpatient hospital cost per day in local currency (\$US in 2002)	TOP 157	Vt 9883	K\$133
Average hospital cost per admission (all diseases) in local currency (\$US in 2002)	TOP 768	Vt 48003	K\$ 1238
Average hospital cost per admission per NCD in local currency (\$US in 2002)	TOP 1447	Vt 73799	K\$ 1806
% total cost NCD to total cost all admissions	19.6%	9%	8.1%

Source: Doran 2003.

4.10 **The original cost estimates by Doran from 2002 have been escalated to 2012 prices** (using an inflation rate of 6 percent per annum compounded for Tonga and 4 percent per annum compounded for Vanuatu, and using current exchange rates). That provides a quick rough order of magnitude of possible current costs, using the original methodology. The results are shown in tables 4.3 and 4.4 below.

Table 4.3 Average Hospital Cost of the Five Most Expensive and the Least Expensive NCDs in Tonga in 2002, Escalated to 2012 Prices

Disease	Average hospital cost in TOP in 2002	Average hospital cost in TOP, escalated by inflation rate of 6 percent compound, in 2012	US\$ equivalent cost in 2012
Diabetes mellitus	2,306	4,129	2,300
Malignant neoplasms of male genital organs	2,004	3,588	1,999
Malignant neoplasms of digestive organs	1,900	3,402	1,895
Malignant neoplasms of breast	1,820	3,259	1,815
Malignant neoplasms of respiratory and intrathoracic organs	1,799	3,221	1794
Lowest average NCD cost is COPD bronchitis	236	422	235
Average of 27 NCDs	1,447	2,591	1,443

Source: Doran 2003.

Table 4.4 Average Hospital Cost of the Five Most Expensive and the Least Expensive NCDs in Vanuatu in 2002, Escalated to 2012 Prices

Disease	Average hospital cost in vatu in 2002	Average hospital cost in vatu, escalated by inflation rate of 4 percent compound, in 2012	US\$ equivalent cost in 2012
Malignant neoplasms of bone and articular cartilage	217,430	321,849	3,460
Malignant neoplasms of ill-defined, secondary and unspecified sites	195,193	288,933	3,106
Malignant neoplasms of urinary tract	177,898	263,332	2,831
Diseases of the arteries	158,131	234,072	2,516
Diabetes mellitus	131,677	194,914	2,114
Lowest average NCD cost is COPD (bronchitis) ²⁵	39,973	59,169	641
Average for 29 NCDs	73,798	109,239	1,186

Source: Doran 2003.

²⁵. Table 4 of the original report states that ischemic heart disease or coronary heart disease has the lowest average cost with an ALOS of 3.5 days and an average cost of 34,936 vatu. It would seem questionable that ischemic heart disease has the lowest average cost of 29 separately specified NCDs in Vanuatu, so the next lowest average cost — COPD (bronchitis) is used.

PREVIOUS STUDIES ON THE COSTS OF TREATING TYPE 2 DIABETES IN VANUATU

4.11 **A more recent study estimated the specific costs of treating type 2 diabetes in Vanuatu.** The study involved surveying 172 diabetes patients at the Port Vila referral hospital in late 2006 (Falconer et al. 2010). Table 4.5 below summarizes the annual unit and total costs for these 172 patients, using latest exchange rates. The key point to note is that it cost an estimated \$20,715 to treat 172 diabetes patients in 2006, or \$120 per patient using current exchange rates. The bulk of the cost (72 percent) came from inpatient overnight care. Assuming an average inflation rate of 4 percent compound over the six years since that estimate was first done implies current costs in 2012 would be about \$151 per patient. What is also noticeable from table 4.5 is that, despite mainly “free” health care in Vanuatu, direct out-of-pocket payments by patients totaled an estimated 1.8 million vatu (\$8,699) for all patients: money that could have been spent on other goods and services.

Table 4.5 Estimated Costs of Treating Type 2 Diabetes Patients in Vanuatu

Item	Estimated unit cost in Vanuatu Vatu	Estimated unit cost in current \$US	Estimated usage per annum	Total cost in Vatu	Total cost in current \$US ²⁶
<i>Direct cost to the health system</i>					
Outpatient visitation	200	2.15	2212 visitations	442,400	4,759
Overnight hospital admission	9,883	105	140	1,383,620	14,885
Medication	3,220	34	Varied (not all patients were issued drugs)	99,600	1,071
Total direct cost to the health system	13,303	143		1,925,620	20,715
<i>Direct out of pocket expenses to individuals per year</i>					
Over the counter medications	6,600	71	31	204,600	2201
Transport	1980	21	110	217,800	2343
Special diets for diabetics	36,480	392	38	1,386,240	4155
Total direct costs to an individual with all components	45,060	484	Varied (not all patients incurred all expenses)	1,808,640	8699

Source: Falconer et al. 2010.

²⁶. The original article used the then current exchange rate of 110 vatu = US\$ 1. This paper uses the latest exchange rate of 92.95 Vatu = US\$ 1.

4.12 The study authors observe that their cost estimates may be conservative. That is because patients surveyed were from Vanuatu's main referral hospital and may therefore have received better quality care than patients at provincial clinics. Consequently those patients at Vanuatu's main referral hospital could have fewer or less severe diabetic complications than the national average.

NEW ESTIMATES OF THE COST OF DRUG TREATMENT FOR DIABETES AND HYPERTENSION IN VANUATU

4.13 **Estimates have been made during the course of this NCD stocktake study of the direct cost to government of treating adult type 2 diabetes patients in Vanuatu.** It should be noted that these are conservative estimates using minimal essential treatment. The estimates do not include additional drugs for complex cases or costs of any required surgery. Nor do they include any direct (transport costs) or indirect (foregone income) to individual patients. The information and analysis was developed in close consultation with senior officials in Vanuatu responsible for national pharmaceutical and related purchases at the Central Medical Store. Best available — including generic — drug prices at September 2012 were used. The following paragraphs summarize the findings to date.

4.14 **It is clear that the cost to government is high even when treating newly diagnosed, type 2 diabetes patients — a minimum of about \$347 per patient per year.** The estimated direct cost to government of primary level care for a newly diagnosed type 2 diabetes patient is VT 31,334 or \$347 per patient per year. This includes nurse-attended outpatient clinic visits once a month, glucose testing strips, minimal-level laboratory tests, and metformin tablets to help control blood sugar levels. To put this in perspective, the \$347 annual estimated cost per patient in 2012 is 2.2 times more than the total (that is, public and private) per capita expenditure on health in Vanuatu in 2010 (latest year available from WHO). It is 2.42 times the per capita total *government* expenditure on health, including external financing, in 2010 (latest year available from WHO).²⁷ The cost of minimal but essential drugs²⁸ alone at the oral therapy phase of treatment is VT 2,934 (\$32.57) per patient per year. This is more than eight times the VT 360 (\$4) notional budget allocation for all drugs per person per year in Vanuatu. In other words, for a newly diagnosed type 2 diabetes patient, the drug costs alone absorb the budget allocation of eight other citizens in Vanuatu.

4.15 **Costs to government then more than doubles to about \$831 per patient per year as the disease progresses: more than seven times the average total per capita government expenditure on health.** If the disease progresses and the patient requires insulin, costs to government rise significantly to an estimated VT 74,867 (\$831) per

²⁷. As can be seen in annex 2, WHO states that per capita *total* expenditure on health (public and private) and per capita *government* expenditure on health was \$157 and \$143, respectively, in Vanuatu in 2010 (2012a).

²⁸. Including metformin to help control blood sugar levels.

patient per year. This includes the cost of regular insulin, increased frequency of blood glucose level testing, increased laboratory tests, and syringes and dressings, but does not include costs of treating any complications or surgery. The cost of the insulin vials alone is VT 23,655 (\$262) per patient per year to government. This is more than 1.8 times total government expenditure, including donor funding of \$143 per patient per year in 2010 (latest year available from WHO). The cost to government of insulin alone of one patient in a year absorbs 65 citizens notional drug budget allocation in 2012.²⁹

4.16 The financing challenge is even more difficult if government sought to fund these costs through its own domestically generated resources, without recourse to external financing. Government's own expenditure on health, excluding external financing, is an average of VT 6,248 or \$69 per person³⁰ in 2012. One newly diagnosed type 2 diabetes patient on oral medication, assuming average annual costs of \$347 per year, therefore absorbs five times the average per capita domestically resourced government expenditure on health. A patient who progresses to an insulin regime, assuming direct costs of \$831 per patient per year, absorbs 12 times the average per capita budget for health, appropriated from government's own resources.

NEW ESTIMATES OF THE COST OF KIDNEY DIALYSIS IN SAMOA

4.17 Field visits during the stocktake mission enabled **a preliminary estimate to be made of the cost to government of operating a kidney dialysis machine in Samoa.** That study is in annex 6. The key findings are as follows. Government spent Samoan tala (SAT) six million on six patients prior to the establishment of the National Kidney Foundation (NKF) because they were transferred to New Zealand for treatment (average of about SAT 1 million per patient including airfares). The NKF is now treating 50 patients for SAT 4.9 million (simple average of SAT 98,000 per patient) suggesting a saving per patient of SAT 902,000 per patient (\$38,000 per patient) and assuming no difference in quality of treatment and outcome. This suggests a substantial cost saving to the government.

4.18 Another way of looking at the expenditure is to examine the affordability of expenditure to government and the opportunity cost (that is, what other activities in the health sector or beyond could be purchased by the government instead). Analysis suggests the estimated average total cost of dialysis was SAT 92,110 (\$38,686) per patient per year in Samoa in 2010–11. This is more than 12 times (12.41) the average GNI per capita in Samoa of \$3,117. 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. Health outcomes therefore need to be scrutinized objectively given the cost of SAT 92,110 per patient per year. Unfortunately, 31 percent of patients have died less than a year after commencing dialysis. Almost two-thirds have died two years after

²⁹. Cost of insulin alone is VT 23,655 (US\$262) per patient per year. The notional budget allocation for all medicines is VT 360 (US\$4) per patient per year in 2012.

³⁰. The total 2012 government appropriation to the Ministry of Health was VT 1,534,639,563. The total population of Vanuatu is estimated at 245,619.

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. At present, however, prevention and retardation of kidney disease absorbs less than 5 percent of the total appropriation of the NKF.

OVERSEAS TREATMENT COSTS

4.19 Pacific Island governments and their development partners incur high absolute and relative costs when patients are referred overseas for treatment. Patients — most of whom are NCD patients — are referred to Australia, New Zealand, or elsewhere when specialized surgeons and associated facilities are not available in the small islands of the Pacific. There is only limited published material on the costs and consequences in terms of health outcomes of such referrals. One earlier study estimated that between 1992 and 2000, there were 22 rheumatic heart disease operations per year on Samoan patients referred to New Zealand at an average cost of \$NZ 28,000 to \$NZ 44,000 per operation (US\$23,176 to US\$36,420 using exchange rate in September 2012) (Viali 2006).

4.20 A more recent study conducted by the Ministry of Health in Samoa analyzed the Overseas Visit Treatment (OVT) Scheme. It found the OVT absorbed 15 percent of total public health expenditure in 2009–10, to the benefit of less than 0.1 percent of the nation’s population (Ministry of Health, Samoa 2010) Expenditure on OVT almost matched the entire public expenditure on outpatient curative care (SAT 6.98 million) in 2006–07. Public expenditure on OVT (SAT 9.35 million in 2010–11) is now larger than the total budget of ten other government departments or authorities. Expenditure has been growing: OVT absorbed 11 percent of total public health funding in 2008–09, but this had grown to 15 percent by 2009–10. It has not been possible to assess the equity or overall health impact of this expenditure. Records are not available on the socioeconomic profile of those being referred overseas. Nor are records available on the average duration of patient life after treatment overseas, although anecdotal evidence suggests cancer patients survive only a few years.

CHAPTER 5: BROAD IMPLICATIONS FOR MINISTERS OF HEALTH AND MINISTERS OF FINANCE AND PLANNING

5.1 **Despite gaps in the data, some broad implications can be identified for ministers of health, ministers of finance, and other ministries.** Paragraphs 1.13 to 1.17 of this report show there are still some important gaps in the extent and quality of data on NCDs. Data on the costs of preventing and treating NCDs at various levels within the health system are particularly scarce. Nevertheless this rapid stocktake has confirmed the broad landscape of NCDs in the Pacific. Despite gaps in data, it is clear there are some implications for ministers of health, ministers of finance and planning, and other ministries. The following section highlights those broad implications.

IMPLICATIONS FOR MINISTERS OF HEALTH

5.2 **The social determinants of NCDs as well as the underlying risk factors are multisectoral, yet the responses and costs will often be borne largely by ministries of health.** High consumption of tobacco, alcohol, salt, and energy-rich imported foods; limited physical activity; and obesogenic environments are all risk factors for NCDs. Even though they are each beyond the direct control of the health sector, that sector arguably absorbs the costs of NCDs more than other sectors.

5.3 **The rise of NCDs has consequences for the overall organization and functioning of the health system.** Many health systems in developing countries have been designed around population-based communicable diseases priorities that are now not necessarily particularly well suited to addressing NCDs (Robinson and Hort 2011; Samb et al. 2010). The health system typically dealt with immunization against communicable diseases for the population as a whole, especially infants and children, and treatment of episodic one-off illnesses including diarrhea among young children and respiratory infections. NCDs, however, involve different challenges, skills, and approaches: often very long term — even lifelong — care and treatment for maintenance of blood pressure or glucose levels of individual (often adult) patients in single rather than population-based services. Procurement and distribution systems for drugs become even more important in NCDs, given their range and complexity.

5.4 **The shift to NCDs involves a double burden: completing the unfinished agenda of communicable and reproductive health while expanding the response to NCDs.** Several countries in the Pacific face an unfinished agenda of primary health care to complete immunization coverage and address stunting, vector borne diseases (malaria), or reproductive health services (access to family planning and responding to the growing incidence of sexually transmitted infections). For some countries this double burden will also involve the challenge of increasing public expenditure on health, while at the same time looking for ways to achieve cost containment in the health budget, so as not to put undue pressure on national budgets.

5.5 It would be a mistake for governments and their development partners to “verticalize” the response to individual NCDs. Although priorities need to be set, it would be a mistake to simply target one high prevalence NCD such as diabetes or cardiovascular disease (CVD). Many NCDs coexist: people with diabetes are two to six times more likely to develop CVD and about 2.5 times more likely to develop tuberculosis, a communicable disease (International Diabetes Federation 2011). The risk factors for heart disease are also similar to those for diabetes and cancer. Uncontrolled diabetes during pregnancy threatens the health of mother and child, potentially affecting broader maternal and newborn health outcomes. NCDs should therefore be part of the whole health system, not another “vertical” intervention.

5.6 Screening and effective treatment become even more important for NCDs. Most NCDs remain undetected for long periods because they have few symptoms. Diseases like diabetes have been significantly underdiagnosed in parts of the Pacific (Colagiuri et al. 2002). This means that opportunities for early preventive measures are missed, and the disease progresses to the point where the patient needs lifelong medication and treatment or expensive-to-treat complications occur. Even where correct diagnosis occurs, gaps in service delivery and poor compliance by patients means patients are less likely to avoid progression of the diseases, and so increase the likelihood of complications. The 2002 NCD STEPS survey in Fiji found that almost one in five (19.1 percent) adults screened had hypertension. Two-thirds of those screened were not aware they had hypertension, and of those who did know, two-thirds still had high blood pressure. Questions about the overall effectiveness of the health system arise when significant proportion of patients were being reached, but were not receiving or taking medication. Having said that, screening itself imposes direct financial costs (money is required for diagnostic equipment and testing strips) as well as opportunity costs (time and resources spent by health workers doing testing that might have been spent more productively on other activities). Even where screening is affordable and cost-effective in terms of identifying early higher risk cases, there needs to be good sequencing of investments: generating demand for health services as a result of screening may simply overwhelm already stretched public health services.

5.7 Governments (and their development partners) need to think hard about the level of resources — and the likely outcomes — going to population-wide health promotion and prevention. There is some evidence to suggest that funding for health promotion, especially NCDs, is too low. In Tonga, only 1.6 percent of health funds were used for the prevention of NCDs, compared to 15.7 percent of funds being used for in-patient curative care in 2005–06 (Government of Tonga 2010b). In Vanuatu, while 16.7 percent of total recurrent health expenditure went to the category “prevention and public health services” (latest NHA from 2007, p. 17), only 30 million vatu (\$330,000) was actually spent on prevention of NCDs per se (p. 20). This represents just 2.0 percent of total recurrent health expenditure. Similarly in Samoa only 305,204 tala or 1.69 tala per capita, representing 0.4 percent of total health expenditure was spent on prevention of NCDs in 2006–07 (latest year available for NHAs). The newly established “Tonga Health” had an operating budget of just TOP 3.5 (\$2) per person per year for all its health promotion activities in 2010. Within that budget, an average of TOP 0.26 and TOP 0.12

(\$0.15 and \$0.06)³¹ was then available for healthy eating programs and tobacco control, respectively (Tonga Health 2010). Of course, it is possible that coding and cost-allocation practices underestimate the amount of funding actually going to prevention. There may be useful health promotion and preventive interventions subsumed under other cost headings including outpatient visits. And in Tonga’s case, Tonga Health is just starting up. Nevertheless, the available statistics do suggest low expenditure on health promotion in absolute and relative terms.

5.8 On the other hand, simply spending more money on broad “health awareness” and generalized health promotion is unlikely to be effective by itself in changing deeply ingrained lifestyle habits. Effective health promotion messages that encourage lifestyle changes can be a particularly powerful way of averting NCDs: for prediabetic individuals, lifestyle modification through diet and exercise is associated with a 40 to 70 percent relative risk reduction in subsequently acquiring type 2 diabetes (Tabak et al. 2012). But changing lifestyles is not easy, and money can be wasted. Recent research from the University of Queensland in Australia finds that government in the state of Queensland had spent over \$130 million equivalent per year on healthy lifestyle messages but that this had only a “trivial” effect on reducing heart disease.³² This is an important and plausible finding: government exhortations to increase general health awareness and improve lifestyles and eating behaviors are unlikely to have high impact, especially in the face of widespread food manufacturers’ practices (inclusion of salt, sugar, fats) and advertising.³³ Some investment in disseminating basic information and general health awareness is necessary. But this needs to be complemented by proactive and targeted health promotion, and changes to the prices of goods such as tobacco, alcohol, and foods rich in salt, sugar, and saturated fats, if general health awareness is to get traction in reducing NCDs.

5.9 There is some anecdotal evidence that unregulated and untrained informal healers are providing herbal and other “cures” for diabetes, cancers, and other NCDs in the Pacific. This is of obvious concern from a public health point of view and undermines the health system. Patients are likely to have the disease progress under these cures and encounter complications, which are then more difficult and expensive to treat in the formal health sector. There is also a risk that poor and vulnerable people will be financially exploited for out-of-pocket payments for such herbal cures.

³¹. Operating expenses for healthy eating was T\$ 27,760, and for tobacco control was T\$ 12,471. The population of Tonga is 104,058.

³². L. Cobiac 2012.

³³. This contrasts with other government interventions that do demonstrably reduce NCDs and injuries that involve health messages *as well as* other interventions. Raising tobacco prices to certain levels through taxes — accompanied by health warnings — demonstrably reduces uptake of NCD-causing tobacco use among the young and the poor. Compulsory seat belt wearing in cars, helmet use for motorcyclists, and random breath testing for alcohol, accompanied by health warnings, also demonstrably reduces traffic injuries.

IMPLICATIONS FOR MINISTERS OF FINANCE AND PLANNING AND THEIR MINISTRIES

5.10 This initial stocktake also finds several issues of direct interest to ministers of finance and planning and their ministries.

5.11 **First, expenditure on health per capita is higher than that in lower-middle-income countries across the world.** This is true for both government expenditure on health per capita as well as total (public and private) expenditure on health. Table 5.1 shows that total (public and private) expenditure per capita in Samoa is nearly two-and-one-half times (2.48) the amount in other lower-middle-income countries globally. (As seen from annex 3, total expenditure on health in Samoa was \$154 per capita in 2009, compared to the average of \$62 in lower-middle-income countries; that is, 2.48 times greater in Samoa). When it comes to government expenditure, the differences are even larger: government expenditure on health per capita was 5.28 times larger in Samoa than in lower-middle income countries during 2009. Annex 3 provides the details. As noted elsewhere, such high per capita expenditure generally reflects the small populations of the Pacific.

Table 5.1 Ratio of Per Capita Expenditure in Samoa, Tonga, and Vanuatu Compared to Other Lower-Middle–Income Countries

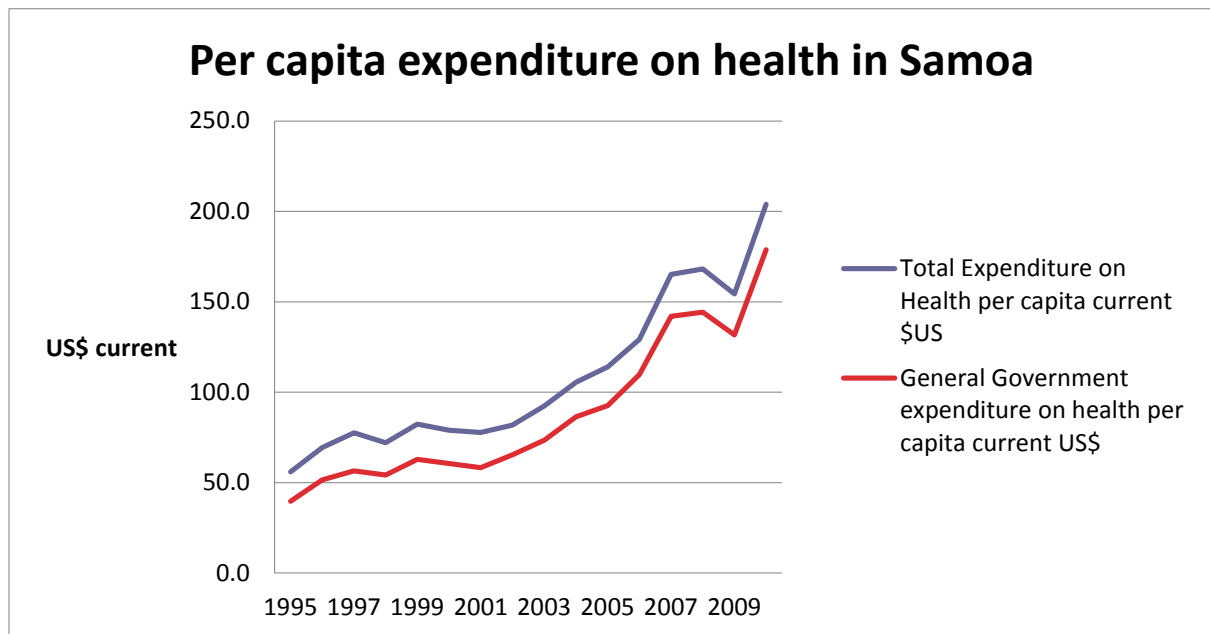
	Samoa	Tonga	Vanuatu
<i>Total expenditure on health</i>			
Per capita <u>total</u> expenditure on health (public and private) compared to other lower middle income countries, current US\$ 2009	2.48	2.29	1.98
Per capita <u>total</u> expenditure on health (public and private) compared to other lower middle income countries, PPP, I\$ 2009 ³⁴	1.62	1.43	1.45
<i>Government expenditure on health</i>			
Per capita <u>Government</u> expenditure on health compared to other lower middle income countries, current US\$ 2009	5.28	4.52	4.4
Per capita <u>Government</u> expenditure on health compared to other lower middle income countries, PPP I\$ 2009	3.57	2.92	3.35

Source: WHO 2012a.

³⁴. Footnote 7 explains PPP and I\$

5.12 **The second point to note is that expenditure on health per capita has been rising in Samoa, Tonga, and Vanuatu, driven by increases in government expenditure.** This is illustrated in charts 5.1 to 5.3. It is very obvious that such increases in per capita expenditure, despite population growth, are driven by total government expenditure on health, including external financial support from donors and other partners.³⁵ The relatively small formal private sector in each of the three countries means private out-of-pocket or private insurance is generally less than 10 percent of total health expenditure in the three countries. Pronounced falls in Samoa reflect, among other things, the tsunami and earthquakes of 2009, a reminder of the vulnerability of small island economies to natural disasters. Pronounced falls in Tonga reflect a targeted program to reduce salaries in the health sector. Chart 5.4 shows a generally rising trend in per capita health expenditure in constant PPP terms. Again, the 2009 tsunami effects on public expenditure generally are visible.

Chart 5.1 Samoa

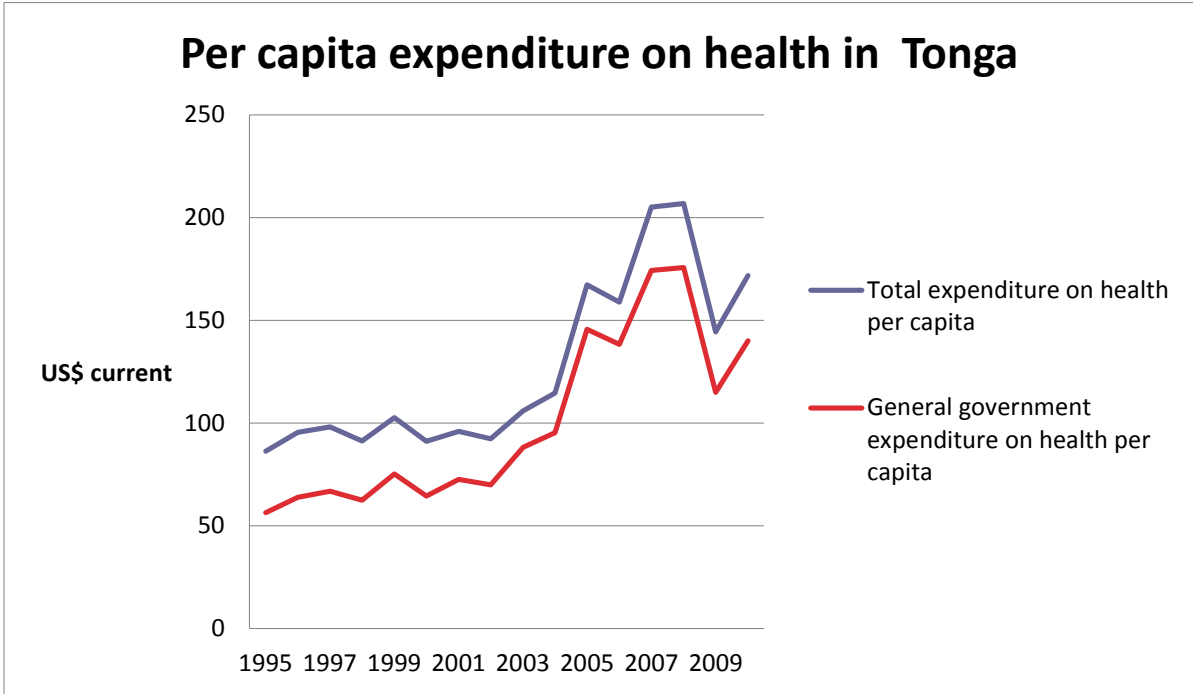


Source: WHO 2012b.

³⁵. “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. 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.” Reference:

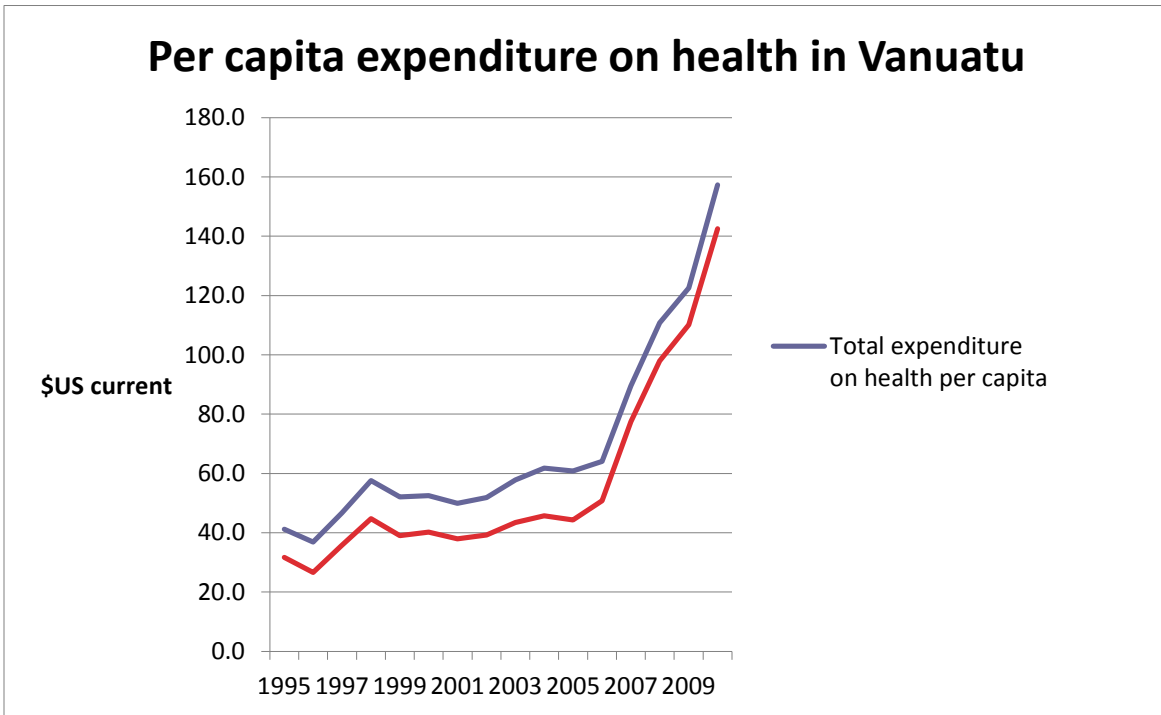
www.data.worldbank.org/indicator/SH.XPD.PUBL

Chart 5.2 Tonga



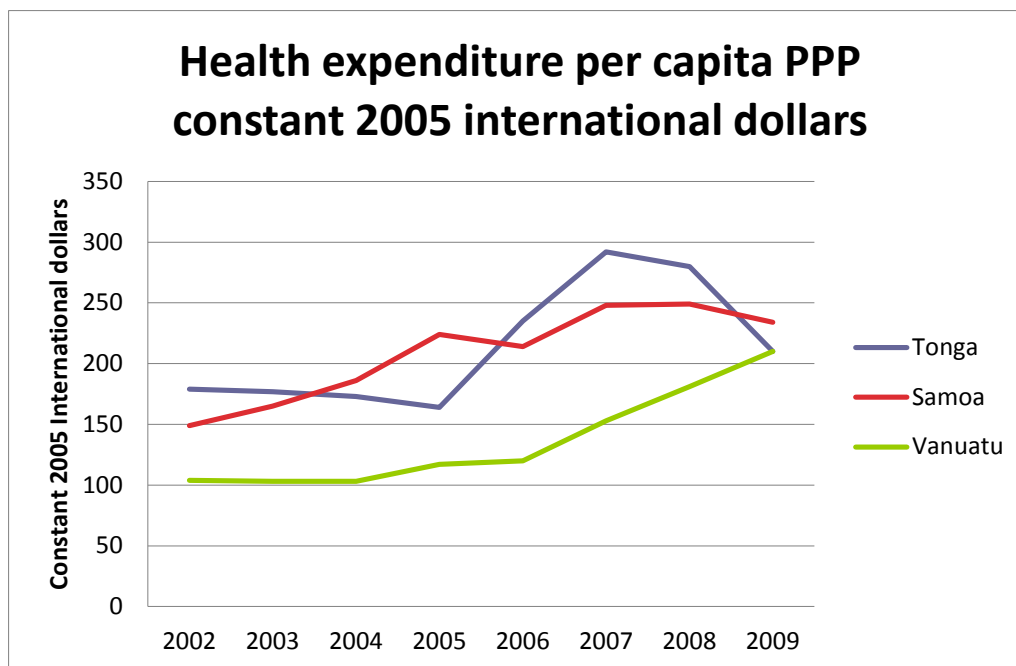
Source: WHO 2012b.

Chart 5.3 Vanuatu



Source: WHO 2012b.

Chart 5.4 Health Expenditure Per Capita PPP, Constant International Dollars³⁶

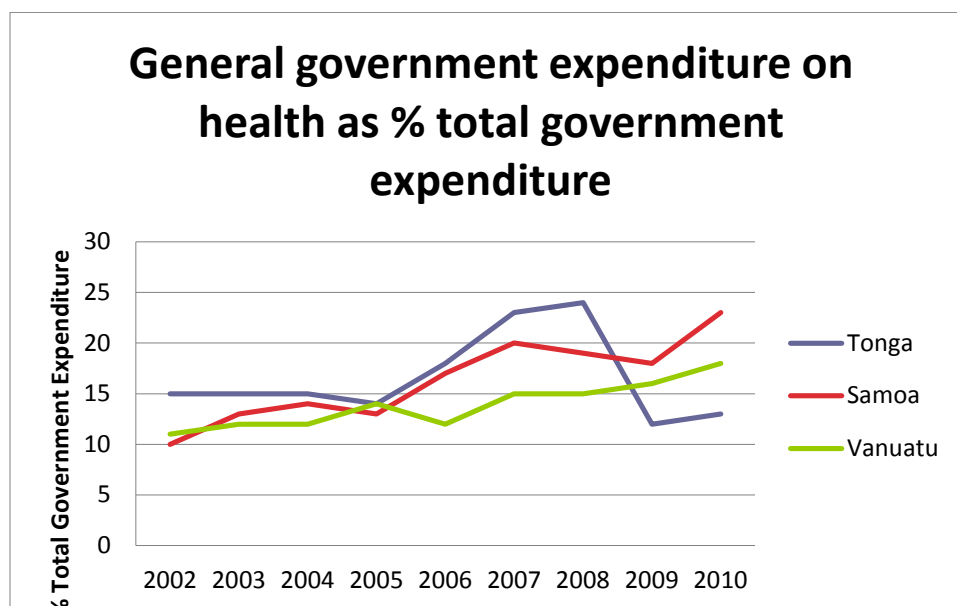


Source: World Bank 2012b.

5.13 **The third point to note is that general government expenditure on health is a significant and generally rising share of total government expenditure.** As can be seen from chart 5.5, all three countries have already allocated 15 percent of total general government expenditure (including external donor assistance) to health for at least some time over recent years. (Fifteen percent of government expenditure going to health was the target level set by most African countries under the Abuja Declaration of 2001, but is yet to be met in most cases). Latest estimates from WHO are that general government expenditure on health was 23.4 percent, 18.2 percent, and 12.9 percent of total government expenditure in Samoa, Vanuatu, and Tonga, respectively, in 2010 (WHO 2012a). These relatively high rates reflect the historical pattern of government financing of health; the relatively small formal private sector to share health costs; the priority generally given to health by consecutive governments in the three countries; and donor support.

³⁶. See footnote 7 for explanation of PPP and international dollars.

Chart 5.5 General Government Expenditure on Health as Percent of Total Government Expenditure



Source: World Bank 2012b.

5.14 More recent figures show that the government of Samoa is providing SAT 69 million (\$7 million) to health in 2011–12. This represents 16 percent of total government expenditure — higher than the target level set by African countries in the Abuja Declaration of 2001 — and is the second largest call on government expenditure after education. Similarly, the government of Tonga expects to spend TOP 22.1 million on health in 2011–12, or 12.9 percent of the government’s total cash budget (Government of Tonga, n.d.). Expenditure by the government of Tonga on medical drugs at TOP 2 million is the fourth largest item of government expenditure on goods and services and is much more than expenditure on other essential expenditures such as maintenance of buildings (TOP \$1.57 million) or fuel (TOP \$1.5 million). The government of Vanuatu appropriated VT 1.53 billion (\$16.8 million) from its own domestically generated resources (excluding external assistance) in 2012, representing 9.4 percent of total government expenditure. As a result of overspends, the government of Vanuatu has had to rely on significant supplementary budget support and emergency funding from development partners to maintain essential health services. In short, there is some evidence to suggest that the health sector has received a level of prioritization within the three governments, and that, at least in the case of Vanuatu, financial strains are appearing.

5.15 The fourth point to note is that there may be relatively little scope (“fiscal space”)³⁷ to increase government expenditure on health. A recent analysis of health

³⁷. One report notes that “fiscal space — as defined in the literature — is said to exist when a government has budgetary room to increase spending, and can do so without impairing fiscal solvency, that is, the government’s present and future ability to cover its recurrent expenditures and service its debts” (Heller 2006).

care financing in the Pacific and East Asia concluded that “the key health financing issues for low- and middle-income countries is how to mobilize sufficient resources to finance health services without resorting to excessive public sector borrowing and how to raise revenues equitably and efficiently” (Langenbrunner and Somanathan 2011). Sustained national economic growth — an obvious source of additional revenue — is somewhat problematic in the Pacific, where small, remote economies are subject to economic shocks and natural disasters. The Governor of the National Reserve Bank of Tonga recently noted that real economic growth in Tonga has been slow for the past decade, averaging a little over 1 percent per annum. Economic growth reached 4.7 percent growth in 2010–11, but this was mainly the result of lumpy, one-off aid expenditure. Overseas remittances have traditionally supported the Tongan economy, accounting for about 30 percent of GDP in 2008. However since 2008, remittances have fallen by \$100 million, equivalent to almost 15 percent of GDP in 2011, as a result of the global financial crisis (Mafi 2012). Similarly, the former finance secretary in Samoa recently noted that the tsunami and then the global economic crisis reduced national economic growth in Samoa and led to an expansion of the fiscal deficit above the target rate of 3 percent in 2008 to 4 percent in 2009, 7 percent in 2010, and about 9 percent at present (Vaai 2012).

5.16 A recent analysis of Tonga’s options to expand fiscal space for health has lessons for many countries in the Pacific. The analysis basically explores five options for generating more revenue for health: relying on broad economic growth; reprioritizing and elevating health within government expenditure; using health sector-specific resources such as insurance or earmarked taxation; increasing foreign aid to health; or generating efficiencies (Tandon and Cashin 2010). The analysis found that prospects for expanding fiscal space through improved macroeconomic conditions and economic growth were — in principle — good, although Tonga (like other island economies) was vulnerable to natural disasters and economic shocks.³⁸ Prospects for expanding fiscal resources for health through improved efficiency were also good; for example, expenditure on preventive services in Tonga was low despite high and often preventable NCD burdens. Reallocating existing health resources to prevention could yield large gains.

5.17 However the analysis also concluded prospects for expanding fiscal space through other options were limited. Significantly increasing the share of government expenditure for health seems unrealistic given its already relatively high share. Generating resources within the health sector also appear limited at least in the medium

³⁸. Tonga has seen real GDP growth of 0.3 percent in 2009–10; 1.5 percent in 2010–11; and 1.2 percent in 2011–12. Long-run average economic growth is 2.0 percent per annum (Government of Tonga, n.d.). Nor does Tonga have the financial head room to increase health expenditure by a significant amount: the government expects a fiscal deficit of T\$ 25.4 million for 2010–11, and government acknowledges that Tonga is currently exceeding most of the IMF-recommended thresholds for debt sustainability (Government of Tonga, n.d.). Samoa expects GDP growth of 2 percent in 2010–11 and 1 percent in 2011–12 (Government of Samoa 2012). Vanuatu has seen higher GDP growth in recent years, but is facing serious funding constraints.

term: there are strong public finance arguments against earmarking taxes,³⁹ and health insurance schemes require time to build, even under ideal circumstances. Imposing user fees raise important issues of access and equity. There were moderate prospects of increasing resources to health through additional health sector-specific grants and foreign aid. Traditional bilateral,⁴⁰ multilateral, UN, and regional agencies have been supportive of health and other sectors in Tonga and other countries of the Pacific. However there are limits to this expansion when external resources for health represent 17.4 percent of total expenditure on health in Tonga in 2010.

5.18 The fifth point to note is that at a time when governments are focused on the relatively high costs to them of health care, risk factors are feeding a large “pipeline” of NCDs in each of the three countries, which will put significant additional pressure on existing health systems, about 90 percent of which is funded by government. Chapter 3 of this report provides the latest evidence on risk factors for NCDs in the three countries. Chapter 4 shows that NCDs are an important determinant of cost increases. Importantly, even relatively small costs per patient to government has fiscal implications, as NCDs are usually chronic, and medication is often required for the remaining years of a person’s life. The least expensive blood glucose strips cost just 11 vatu (\$0.12) per strip. A type 2 diabetes patient using one each day therefore costs the government health system \$44.57 per year, about one-third of total per capita government expenditure on health in 2010. Thus just for blood glucose testing strips, the pre-inflationary cost is \$445 every ten years for every patient. The chronic and long-term nature of most NCDs and their treatments suggest that ministers of finance would therefore be well advised to ensure that their financing strategies for NCDs are explicitly linked to the government’s medium-term expenditure framework.

5.19 The sixth point to note is that development partners need to work with governments to strengthen health systems more broadly, to avoid making NCDs yet another “vertical” disease approach. Development partners play an important role in all three countries. As just one example, Vanuatu received VT 224.6 million (\$2.4 million) in donor funding in 2010, and a further VT 29 million (\$318,000) from the Global Fund to Fight AIDS TB and Malaria. Since 2010, Japan has been providing an extra 105 million vatu (\$1.15 million) per annum for a broad range of pharmaceuticals in Vanuatu, an amount equivalent to 175 percent of the government’s own contribution. However the government reports show that NCDs per se receive the *smallest* allocation within donor funding, the majority of funding going instead to vector borne diseases (malaria), family health, and health promotion.⁴¹ Having up-to-date National Health Accounts (NHAs) will help governments and their development partners to have a more comprehensive and coherent view of sources and uses of financing to tackle not just

³⁹. In essence, the tax revenue generated should be pooled with other government revenues and then allocated to that investment that yields the highest return for society, be that in the education sector, roads and infrastructure, or environmental protection.

⁴⁰. Especially Australia, New Zealand, and, to an extent, Japan.

⁴¹. Family health and health promotion would — or should — involve contributions to reducing the burden of NCDs, but it is not possible to estimate what percentage is involved.

NCDs but other health priorities as well. An up-to-date NHA can serve as a focal point and “glue” for bringing together resources in the health sector in a complementary manner, and avoiding fragmentation. Samoa uses a Sector Wide Approach (SWAp) to health financing involving some — but not all — of the major development partners. This is important as well-managed SWAps should, by definition, facilitate a holistic health sector approach to financing and service delivery, avoiding vertical programs. Tertiary hospitals can be better integrated into the health system more broadly by providing training, supervision, and research of NCD prevention and treatment to lower levels of the health system. This would be a more affordable and cost-effective approach to preventing and treating NCDs than patients admitting themselves to the main tertiary hospital.

5.20 Ministers of finance and planning should also be aware of broader economic implications of NCDs, particularly when they affect working-age cohorts. As noted in paragraph 3.5 to 3.6, almost half (48 percent) of all deaths from cardiovascular disease in Tonga occur below age 64, among people who *potentially* at least are still of working age. This has implications for productivity and income losses at the national, household, and company or firm level although the exact impacts will depend upon the levels of employment, underemployment, unemployment, and overall productivity of workers. There will also be losses to national revenue if workers who would otherwise pay income tax withdraw from the workforce prematurely and reduce their rate of savings. (There is currently no income tax levied in Vanuatu).

5.21 Losing members of a potential workforce through (otherwise preventable and avoidable) NCDs can impose large costs on an economy. WHO estimates that cardiovascular disease (CVD) among people aged 35 to 64 cost China an estimated \$30 billion. Only one-quarter of this was from direct health costs; the rest derived from lost productivity (WHO 2007).

5.22 Losing members of the potential workforce through avoidable NCDs could, in theory, dilute one of the strategic benefits open to Samoa, Tonga, and Vanuatu — its potential demographic dividend. More specifically these three countries can expect to see growing absolute as well as relative numbers of working-age people (potentially) earning incomes and paying taxes, which can then be used to support the very young and the elderly. As can be seen in table 5.2 below, each country has reduced “dependents” (those less than 15 years of age, and those above 65 years of age) as a percentage of the working population from almost 100 percent to 63 to 73 percent in 2010. Projections suggest the dependency ratio could narrow even further — to about 50 percent or below — by 2050 as large cohorts of currently young people move into the workforce and fertility declines (reducing the number and proportion of dependent children under 15 years of age). This is a major strategic advantage to the three countries provided that a large cohort of young people do get productive jobs, earn incomes, and pay taxes. However, to the extent that NCDs appear among working-age populations and reduce their capacity to work, this demographic dividend is diluted.

Table 5.2 Age Dependency Ratio (%) Past and Projected for Samoa, Tonga, and Vanuatu

Country	1960	1970	1980	1990	2000	2010	2020	2030	2040	2050
Samoa	101	97	78	81	82	73	53	60	62	43
Tonga	101	96	89	78	78	63	57	47	53	50
Vanuatu	96	94	93	90	83	70	60	54	52	49

Source: World Bank 2012b.

IMPLICATIONS FOR BOTH MINISTERS OF HEALTH AND MINISTERS OF FINANCE: A CONVERGENCE OF PUBLIC HEALTH AND PUBLIC EXPENDITURE AND POSSIBLE WIN WINS

Primary prevention, secondary prevention, and primary health care: what do the terms mean?

Primary prevention aims to prevent the occurrence of a disease in the first place.

Secondary prevention involves early treatment or management of a disease once it has arisen so to reduce or postpone subsequent deterioration and complications.

Primary health care is the first level of care or entry level to the formal health system. The primary health care setting, including rural aid posts and health clinics, provides a good mechanism for primary and secondary prevention of NCDs through screening for high blood pressure and risk factors for diabetes; advice on diet, exercise, and tobacco cessation; and dispensing basic drugs such as aspirin and statins. This would complement and extend the traditional role of primary health care in preventing and treating communicable diseases, and providing ante-natal and maternal care.

5.23 **There are also two strategic issues where the interests of the ministers of health and the ministers of finance directly coincide. The first is the importance of improving efficiency and effectiveness, particularly through primary and secondary prevention.** From the minister of health’s perspective, primary and secondary prevention is a strategic win. Good screening and management at primary and secondary levels of the health system avert — or at least postpone — death and illness. On the other hand, poor primary or secondary prevention leads to complications and more complex surgery and treatment, often at tertiary or overseas centers, diverting resources that could have been used for other major health priorities. For example, diabetic amputations accounted for 22.3 percent of all surgeries in Tonga during 2010. Minor diabetic amputations were the second leading surgery event (89 surgeries) after appendectomy (95 surgeries). Government reports note that hospitalized diabetes patients are resource-intensive patients as they require many dressings and usually long stays in hospitals. Diabetic patients admitted for major amputation surgery are also classified as emergencies or semi-emergencies rather than elective surgery (Government of Tonga 2010a).

5.24 **Effective primary and secondary prevention is also in the interests of ministers of finance.** Every patient in Samoa who successfully manages diabetes through primary and secondary prevention, and so avoids advanced kidney disease, saves the

government about \$37,000 per year in dialysis costs.⁴² Every person in Vanuatu who changes their lifestyle through primary prevention and successfully avoids becoming a newly diagnosed type 2 diabetes patient saves the government a minimum of \$347 per year (paragraph 4.14). This is more than twice the annual per capita government expenditure on health. Effective secondary prevention also has high pay-off to government. Every diagnosed type 2 diabetes patient in Vanuatu who is stabilized through secondary prevention, and so avoids progressing to an insulin regime, then saves the government an *additional* \$484 per year (paragraph 4.15).

5.25 A second area where the interests of ministers of health and ministers of finance converge is tobacco taxation. 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. Tobacco kills about half of all its users, often prematurely. Numerous and large studies have long shown that raising excise duties on tobacco, and maintaining them in real terms against inflation and disposable income, has a double benefit: it reduces uptake of tobacco among the poor and the young, while simultaneously generating extra revenues for government (World Bank 2009; (Abedian I 1998).

5.26 Ministries of finance should also note the potential revenue currently being lost, and avoidable expenses otherwise incurred, by not having optimum taxation rates for tobacco. More specifically, WHO recommends that excise duties alone should be at least 70 percent of the retail prices of cigarettes as an important component in curbing tobacco consumption and uptake, especially among the young (WHO 2010c). Analysis undertaken by Ministry of Finance officials during the June 2012 World Health Organization Workshop on Tobacco Taxation in Auckland, New Zealand, highlighted the benefits of increasing tobacco excise rates in the Pacific for Samoa, Tonga and Vanuatu, as well as other countries in the Pacific. Raising the excise rate on cigarettes by 50 percent would increase cigarette excise revenue by about 14 percent and 20 percent per annum in Samoa and Tonga, respectively. This translates 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. Final consumer prices of cigarettes in Samoa would increase by almost 30 percent with the share of excise in the final price rising from 47 percent to 54 percent. Final consumer prices of cigarettes in Tonga would increase by almost 35 percent with the share of excise in the final price rising from 54 to 60 percent.

⁴². This is the *net* saving from the total estimated cost of \$38,686 per patient per year for dialysis. It assumes there are still about \$1,600 worth of treatment costs per patient per year to help prevent the patient progressing to dialysis treatment. On the other hand, the IDF argues that targeting of high-risk individuals “is at best likely to have a moderate impact on the prevalence of type 2 diabetes.” This, they argue, is because it is proving hard to apply research studies on prevention into scalable, “real world” interventions. It is also because “a substantial proportion of diabetes will arise in people who are not identified as high risk, and who would not, therefore, be recruited for such preventive interventions.” The IDF urge focusing on the underlying determinants of diabetes — making environments less obesogenic. These conclusions, drawn from global experience, appear valid in general. But it is not at all clear that they apply to the very specific and high prevalence situations in the Pacific, including the three countries in this study.

5.27 Other studies note the (otherwise preventable) costs to the health system from tobacco consumption, and compare it to revenue collected from tobacco to highlight the overall *net* losses. For example, the average tobacco tax revenue in the Philippines was estimated to be \$442 million, whereas the estimated health costs from tobacco use were estimated to range from \$2.8 billion to just over \$6 billion in 2003; health costs outstripping tobacco revenue at least 6:1 (Southeast Asia Tobacco Control Alliance 2010). Arguments by tobacco companies that tobacco control measures harm the economy are usually exaggerated. Consumers do not simply stop spending when tobacco control measures take effect; instead they reallocate their purchases to other products, including potentially better and more nutritious food, housing improvements, and other items that can promote health and stimulate the local economy. Similarly, tobacco farmers and manufacturers do not simply stop producing when consumption of tobacco goes down. Instead, they reallocate land and capital to producing other products, none of which are likely to be as lethal as tobacco. Claims by the tobacco industry that raising taxes on tobacco are regressive and disproportionately hurt the poor are wrong: latest research shows that the poor bear the smallest share of any tax increase but disproportionately large health gains (Jha et al. 2012).

5.28 Studies suggest that raising the price of tobacco (and then adjusting it to keep pace with inflation) is one of the most strategically sound interventions and “best buys” to reduce NCDs (Beaglehole et al. 2011). Pacific Island countries would, however, need to respond for public health reasons to a possible switch to homegrown, informally marketed, loose tobacco leaf if prices of manufactured cigarettes were raised through taxes. Ministers of health and ministers of finance will also need to consider the costs and consequences of increasing taxes on other risk factors for NCDs including alcohol and foods with high concentrations of sugar, salt, fats, and trans fats.

5.29 While ministers of health, and ministers of finance have the most direct interest in preventing and treating NCDs, other ministries also have a direct interest. Ministers of agriculture have an interest in ensuring arable land is used for nutritious fruit and vegetables (and not allocated to tobacco production). Ministers for commerce and industry and the public service commissioner have an interest in ensuring workplaces and cafeterias are conducive to healthy and active lifestyles, and that workers are not becoming absent due to otherwise preventable NCDs. Ministers of education have direct interests in ensuring school curriculum (and cafeterias) promote active lifestyle and better nutrition.

CHAPTER 6: INITIAL RECOMMENDATIONS AND POSSIBLE NEXT STEPS

INITIAL RECOMMENDATIONS FOR DISCUSSION WITH GOVERNMENTS AND DEVELOPMENT PARTNERS

6.1 **It is too early to make firm, specific recommendations.** For the reasons outlined in chapter 1, key data on which to base firm, specific recommendations are missing. Furthermore, governments and their development partners have not had an opportunity to review the findings of this rapid stocktake and advise on main priorities and opportunities. While it is therefore too early to make firm, specific recommendations, the landscape is sufficiently clear from this rapid stocktake to suggest some potential areas for subsequent discussion and attention.

6.2 **Improving the data and evidence base on which better decisions can be made would appear to be a strategic priority.** As noted in paragraphs 1.13 to 1.17, some key data on the epidemiology and costs of NCDs are missing or are unreliable. This undermines good decision making. Yet governments cannot afford to waste any resources on ineffective interventions, especially when government expenditure on health in 2010 was just \$140, \$143, and \$179 per capita in Tonga, Vanuatu, and Samoa, respectively (WHO 2012a). Better data would help make better choices about how to allocate scarce resources to best effect. Paragraph 6.3 below outlines some priority data gaps that governments and development partners might wish to address in the short term. Over the medium to longer term, governments could also keep up-to-date their National Health Accounts, and have a separate chapter on NCDs, as Tonga has done, so as to provide a coherent and comparable mapping of sources and uses of funds in the total health sector.

6.3 **Several priority questions about the economics of NCDs suggest themselves based on the findings of this stocktake report.** What is the full cost to government and to households of treating the main NCDs? How do those costs vary between different levels of the health system (community health clinic, rural secondary hospital, urban tertiary hospital)? How do costs to government (and households) increase as a particular NCD progresses? What are the costs and consequences of alternative NCD interventions, including the cost of doing nothing or continuing a “business as usual” approach? What are the main cost drivers behind specific NCD treatments: technology, drugs, staffing? What are the investment and recurrent costs of scaling-up priority NCD interventions to the national level, including training of health workers? Do unit costs of drugs and equipment increase as more remote islands are reached, or do unit costs decrease through economies of scale and buying in bulk? How much would it cost to scale up the WHO “best buys” PEN package nationwide, and what are the recurrent cost implications? What impact does the direct (out-of-pocket) and indirect (foregone income) costs to households of NCDs have on the poorest two quintiles? Do health promotion measures actually change lifestyle decisions, and how much do they cost? Based on modeling and projections of NCDs prevalence, what is the range of forecasts for health care costs to government over a five- and ten-year period?

6.4 Prioritizing high risk, *premature* deaths would appear to be a priority. Chapter 3 demonstrates the widespread prevalence of NCDs, the widespread prevalence of multiple risk factors, and the relatively high level of premature NCD deaths. Priorities will therefore need to be set. This is particularly so when total health expenditure range from just \$157 per person per year in Vanuatu to \$204 per person per year in Samoa (WHO 2012a). The WHO approach to identifying high-risk cardiovascular disease (CVD) candidates appears to be one good way of prioritizing interventions in the Pacific. That is because, as chapter 3 shows, CVD is the leading cause of death in the Pacific and is the result of multiple risk factors (weight, hypertension, cholesterol, tobacco, and age). The WHO approach uses these multiple risk factors to then generate color-coded prediction charts of absolute risk. Importantly, reviewers note this approach has been validated in primary health care settings in low- and middle-income countries without access to sophisticated diagnostic technology. Reviewers also note that “a shift from management of single risk factors to total cardiovascular risk prediction and management will enable restricted health care resources to be targeted to individuals who are most in need and most likely to benefit” (Lindholm and Mendis 2007).

6.5 Prioritizing primary but especially secondary prevention would seem to be a priority. Chapter 3 notes the widespread levels of obesity and overweight, including among the young. Chapter 4 then notes how the cost to government escalates as a disease like type 2 diabetes progresses. As noted in those discussions, every person in Vanuatu who changes their lifestyle through primary prevention and successfully avoids becoming a newly diagnosed type 2 diabetes patient saves the government a minimum of \$347 per year (paragraph 4.14). This is more than twice the annual per capita total government expenditure on health. Effective secondary prevention also has high pay-off to government. Every diagnosed type 2 diabetes patient in Vanuatu who is stabilized through secondary prevention, and so avoids progressing to an insulin regime, then saves the government an *additional* \$484 per year (paragraph 4.15). Chapter 4 also suggests there is insufficient investment in primary — and especially secondary — prevention and care. Reallocating scarce resources from expensive dialysis treatment for a few, to primary and secondary prevention for the many, should be considered. This is particularly so given the relatively poor survival outcomes of dialysis.

6.6 Prioritizing preventative interventions among young women would appear to be a strategic priority. Improved health for young women is a worthwhile investment in its own right. But adverse maternal health, including undernutrition, obesity, and diabetes, can also program chronic disease in the developing fetus in utero, transferring increased NCD risks (and costs) to the next generation. (Barker 1998; Elisaia et al. 2009). Chronic diseases among pregnant women can also raise the risk of complications and costs. The Centers for Disease Control and Prevention in the United States estimates that every one dollar invested in preconception care for women with diabetes can reduce health costs by up to \$5.19 by preventing costly complications (2008). Pregnant women with diabetes, hypertension, or obesity have also recently been found to be 1.61 times more likely to have a child with autism spectrum disorder and 2.35 times more likely to have neurodevelopment delays (Krakowiak et al. 2012).

6.7 Increasing taxation on tobacco, and possibly some food items, is a priority. Chapter 5 notes that increasing taxation on tobacco is a win-win for ministers of health and ministers of finance, raising revenue while simultaneously reducing tobacco uptake among the young. A recent study has identified five priority interventions to combat NCDs in developing countries globally, with tobacco control being the most urgent and immediate priority. The study (Beaglehole et al. 2011) was published in *The Lancet* against the backdrop of the UN’s High Level Meeting on Prevention and Control of Noncommunicable Diseases. The five priority interventions identified were tobacco control, salt reduction, improved diets and physical activity, reduction in hazardous alcohol intake, and provision of essential drugs and technologies. The report explains that “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” (Beaglehole et al. 2011). Given high rates of obesity and overweight in the Pacific, governments may also need to give priority to taxation of certain foods and drinks, including those with high sugar, salt, or saturated fats. The contrasting experience of countries increasing taxation on sugary drinks in four countries of the Pacific has been examined in recently published research (Thow et al. 2010).

POSSIBLE NEXT STEPS

6.8 Looking to the future, updated estimates on the burden of disease (BOD) and associated risk factors are likely to be released later in 2012. The updated BOD report will include estimates of death and disability for 266 disease outcomes (including NCDs) as well as 66 underlying risk factors for disease, and all major NCD risks such as nutritional status. The report will cover estimates for three time periods (1990, 2005, and 2010) for 20 different age groups and both sexes. The regional and global estimates are based on separate country estimates of BOD for 187 countries, including those in the Pacific with populations greater than 50,000. Strategies for publication and dissemination of the country estimates are yet to be finalized by the BOD study core team. It is envisaged that an Asia Pacific regional forum could be held sometime in the first six months — possibly the first quarter — of 2013, where regional and national level estimates are proposed to be disseminated. Policy makers in the Pacific will then be able to see national-level estimates of incidence, prevalence, and duration of NCD diseases as well as communicable diseases and injuries. They will also see estimates of deaths and disability attributable to NCDs, and their risk factors by age groups and gender. Governments in the Pacific and their development partners can use those updated BOD estimates to explore the public health and public financing implications of NCDs as a strategic priority.

6.9 The World Bank will now use this rapid stocktake as a basis for discussion and feedback with governments and their development partners about possible next steps. Whatever the outcome of those consultations, it is clear that the main response needs to come from the countries and their governments in the region. Development partners, including the World Bank, can assist in various ways. But achieving effective and sustainable results in response to the rise of NCDs will be determined largely by the actions taken — or not taken — by governments and individuals in the Pacific.

ANNEX 1: PACIFIC ISLANDS INDICATORS OF NONCOMMUNICABLE DISEASES AND RISK FACTORS IN 2008

Indicator	Cook Islands	Fiji	Kiribati	Marshall Islands	Micronesia (Federated States)	Nauru	Niue	Samoa	Solomon Islands	Tonga	Tuvalu	Vanuatu
Total population	20,288	860,623	99,546	54,038	111,064	10,255	1,468	183,081	538,148	104,058	9,827	239,651
NCDs as a percentage of all deaths (%)	74	77	69	73	67	70	72	70	60	74	73	70
Current daily smoking total (%)	34	8	67	17	17	47	...	36	28	22	32	12
Physical inactivity (%)	72	...	49	51	65	49	...	49	42	41	...	...
Raised blood pressure (%)	41	39	33	32	38	39	...	40	30	40	...	41
Raised blood glucose (%)	20	13	22	26	15	12	...	21	15	17	...	8
Overweight (%)	90	65	80	79	75	92	...	84	65	87	...	62
Obese (%)	63	30	46	45	40	71	...	54	30	57	...	27
Raised cholesterol(%)	58	52	34	44	46	44	...	33	32	48	...	...

Source: WHO 2011.

ANNEX 2: HEALTH EXPENDITURE STATISTICS FOR SAMOA, TONGA, AND VANUATU, 2010

Country	Total expenditure on health as % Gross Domestic Product 2010	General government expenditure on health as % total expenditure on health 2010	Private expenditure on health as % total government expenditure 2010	General government expenditure on health as % total government expenditure 2010	External resources for health as % total expenditure on health 2010	Out of Pocket expenditure as % of private expenditure on health 2010	Per capita total expenditure on health at average exchange rate (US\$) 2010	Per capita total expenditure on health PPP ⁴³ (I\$) 2010	Per capita government expenditure on health at average exchange rate (US\$) 2010	Per capita government expenditure on health (PPP I\$) 2010
Samoa	6.5	87.7	12.3	23.4	13.4	63	204	283	179	248
Tonga	5.1	81.5	18.5	12.9	17.4	67.8	172	229	140	187
Vanuatu	5.2	90.6	9.4	18.2	23.4	56.7	157	240	143	217

Source: WHO 2012a.

⁴³. See Footnote 7 for an explanation of PPP and International Dollars

ANNEX 3: HEALTH EXPENDITURE SAMOA, TONGA, AND VANUATU COMPARED TO INCOME GROUPS, 2009

Country	Total expenditure on health as % Gross Domestic Product 2009	General government expenditure on health as % total expenditure on health 2009	Private expenditure on health as % total government expenditure 2009	General government expenditure on health as % total government expenditure 2009	External resources for health as % total expenditure on health 2009	Out of Pocket expenditure as % of private expenditure on health	Per capita total expenditure on health at average exchange rate (US\$)	Per capita total expenditure on health PPP44 (I\$) 2009	Per capita government expenditure on health at average exchange rate (US\$) 2009	Per capita government expenditure on health (PPP I\$) 2009
Samoa	5.4	85.3	14.7	18.3	11.3	63	154	234	132	200
Tonga	4.6	79.3	20.7	11.4	11.6	67.8	142	207	113	164
Vanuatu	4.9	89.8	10.2	16.4	23.3	56.7	123	210	110	188
Low Income Group	4.9	38.9	61	8.5	25.7	78	25	59	10	23
Lower Middle Income Group	4.4	39	61	5.5	2.4	87	62	144	25	56
Upper Middle Income Group	6.1	54.8	45.1	10.5	0.2	75	326	565	177	309

Source: WHO 2012f.

⁴⁴. See Footnote 7 for an explanation of PPP and International Dollars

ANNEX 4: CRUDE DEATH RATES FROM NONCOMMUNICABLE DISEASES IN THE PACIFIC ISLAND REGION

per 100,000 population aged 25+

PICT	Latest Year	Malignant Neoplasms			Circulatory Diseases			Diabetes Mellitus			Respiratory Diseases		
		Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
American Samoa	2005	..	..	137	..	..	313	..	..	126	..	..	80
CNMI	2005	..	..	..	..	..	..	..	..	..	..	..	..
Cook Islands	2009	250	223	236	349	396	373	125	74	99	75	50	62
Fiji	2008	110	182	146	599	400	501	293	314	304	103	65	84
French Polynesia	2007	237	191	214	242	164	204	33	17	25	79	62	71
FSM	2009	104	76	90	163	170	167	186	214	200	95	45	70
Guam	2000	174	125	150	350	237	295	19	32	25	..	..	..
Kiribati	2009	59	53	56	223	110	163	35	40	37	..	..	..
Marshall Is	2009	198	203	200	521	224	374	354	299	327	..	..	..
Nauru	2008	100	100	100	149	201	175	50	151	100	149	100	125
New Caledonia	2006	272	196	234	237	182	209	14	20	17	75	44	59
Niue	2001	..	..	..	..	..	..	..	..	..	..	..	..
Palau	2008	284	193	243	454	264	369	142	193	165	184	141	165
PNG	2008	6	9	7	15	13	14	2	2	2	..	..	..
Samoa	2005/6*	45	61	53	136	111	124	66	53	59	23	18	21
Solomon Islands	2005	..	..	..	..	..	..	..	..	..	..	..	..
Tokelau	2009	..	..	..	..	..	..	..	..	..	..	..	..
Tonga	2008	174	148	161	442	224	331	28	22	25	122	148	135
Tuvalu	2007	0	0	0	..	..	295	..	..	92	..	..	..
Vanuatu	2009#	14	23	18	27	43	35	0	6	3	..	..	..
Wallis & Futuna	2005	..	..	..	..	..	..	..	..	..	..	..	..

ANNEX 5: RECENT ESTIMATES OF THE ECONOMIC COSTS OF NCDs FROM THE INTERNATIONAL LITERATURE

1. **Abegunde and colleagues examined 23 low- and middle-income countries accounting for about 80 percent of chronic disease mortality.** They concluded that if nothing is done to reduce the risk of chronic disease, an estimated \$84 billion of economic production would be lost from heart disease, stroke, and diabetes between 2006 and 2015. India would lose the most at \$16.6 billion cumulative GDP loss by 2015. Details are in the table below. Achieving an additional 2 percent yearly reduction in chronic disease death rates over ten years would avert 24 million deaths in those countries and save an estimated \$8 billion (Abegunde et al. 2007).

Table 1 Estimated Foregone GDP Losses to NCDs, Selected Countries

Country	Foregone Gross Domestic Product in 2006 (\$ billion)	Foregone Gross Domestic Product in 2015 (\$ billion)	Cumulative Loss by 2015 (\$ billion)
India	1.35	1.96	16.68
People's Republic of China	1.01	1.84	13.81
Indonesia	0.33	0.53	4.18
Pakistan	0.15	0.21	1.72
Thailand	0.12	0.18	1.49
Bangladesh	0.08	0.14	1.14

Source: Abegunde et al. 2007.

2. **Clements and colleagues (2012) note the rise in health expenditure for developed and developing countries more broadly.** They note the following:

Since 1970, total real per capita health spending has increased fourfold, while spending as a share of GDP has increased from 6 percent to 12 percent in advanced economies. In emerging economies, total health spending has increased from below 3 percent of GDP to 5 percent. These increases have put great fiscal pressure on governments and financial pressure on households and businesses.

3. **They further note that the primary drivers of growth in health spending include rising income, aging population, and technological advancements.** (They cite references to suggest that one-third to one-half of the increased health expenditure in the United States between 1960 and 2007 was due to technological advances including the introduction of new

diagnostic and treatment equipment). Additional factors explaining increased expenditure include productivity issues, health insurance coverage, and health policies (Clements et al. 2012).

4. **One recent WHO study examined the impact of NCDs on national health expenditures rather than the economy more broadly.** A detailed examination of 13 mainly OECD countries found that NCDs accounted for over one-third of a country's total health expenditure and almost half of hospital spending in most countries (Garg and Evans 2011). In five of the six cases where time series data existed, the share of NCD expenditure overall rose. This was particularly noticeable in Germany: expenditure on NCDs rose from 27 to 51 percent of total health expenditure between 2002 and 2006. Importantly, however, that study included mental disorders in its definition of NCDs, along with the standard diseases of cardiovascular, endocrine (mainly diabetes), respiratory, and neoplasms (cancers). The importance of including mental disorders in that study is clear: increases in expenditure on mental health accounted for the greatest component of increased expenditure on NCDs.

5. **NCDs can cause broader economic effects on developing country economies, particularly when they involve loss of production through disability or death of working-age people.** The World Bank study of China estimates that the economic benefit of reducing cardiovascular disease mortality by 1 percent per year over a 30-year period (2010–40) could generate an economic value equivalent to 68 percent of China's real gross domestic product in 2010, more than \$10.7 trillion (valued in purchasing power parity terms). The study found that more than 50 percent of the NCD burden is falling on the economically active population group. Importantly, however, many of those NCDs affecting working-age adults can be prevented — or at least postponed to much later life — by reducing tobacco consumption and other NCD risk factors (World Bank 2011c).

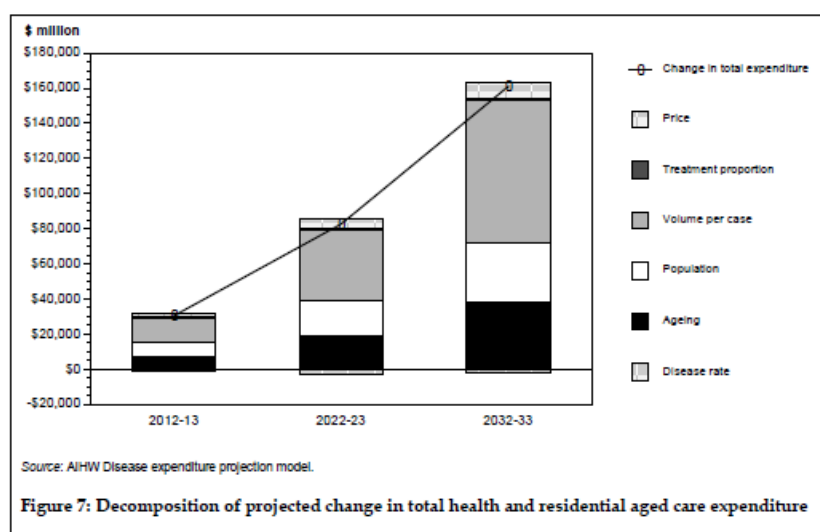
6 **NCDs can also cause significant — even “catastrophic”⁴⁵ — financial hardship in situations to individual households, especially where out-of-pocket payments are high and risk pooling is limited.** World Bank studies found that a single stay in a public hospital for cancer or heart disease in India involved out-of-pocket expenses equivalent to between 40 to 50 percent of national income in 2004, rising to 80 to 90 percent at a private facility. The odds of incurring catastrophic hospitalization expenses for cancer were 160 percent higher than for communicable diseases. Out-of-pocket expenses for an NCD-related single hospital stay in India were found to be almost double for that of costs for other health conditions, with most out-of-pocket expenditure used to purchase medicines, diagnostic tests, and medical appliances. Outpatient costs were found to be 15 to 20 percent higher for NCD-related diseases than for other diseases. Modeling suggests that if NCDs were to be completely eliminated, the estimated GDP in India would have been 5 to 10 percent higher than otherwise, particularly as a result of the beneficial impacts of increased life expectancy (Mahal et al. 2010).

7 **What drives current and future costs of treatment of NCDs is context specific, but some important insights are emerging.** Interesting new analysis from Australia suggests that the *volume* of treatment services is more likely to drive health costs over the coming years than

⁴⁵. Catastrophic is generally defined as health expenditure shocks that absorb between 10 to 40 percent of household expenditure.

aging, price inflation, or other factors (AIHW 2011). As can be seen from chart 6 below, the largest contributor to the overall projected increase in health expenditure in Australia up to 2032 comes from changes in the *volume* of health services provided per case of disease (\$A 81.3 billion). Changes in volume of health services mainly reflect introduction of new technologies and changes in treatment practices. Population aging (\$A 37.8 billion contribution), overall population growth (\$A 34.4 billion), and excess health price inflation (A\$ 8.8 billion) are also important contributors to increased expenditure.

Chart 1 Projected Changes in Total Health Care Expenditure in Australia 2012–13 to 2032–33



Source: AIHW 2011.

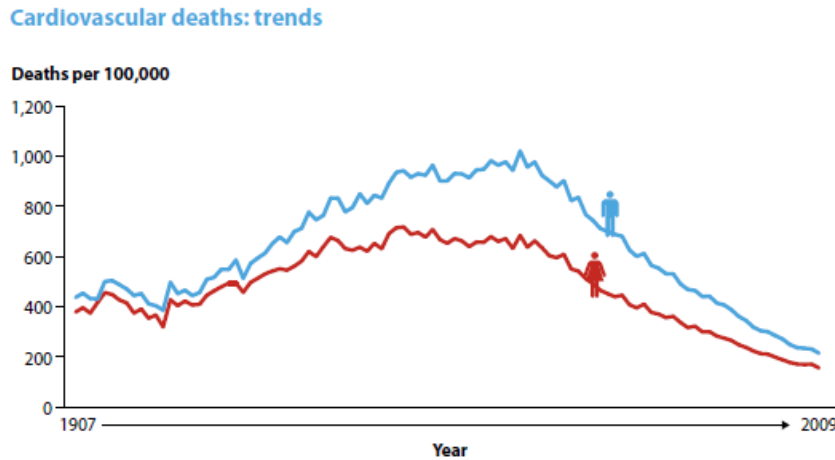
8 **That study also emphasizes that changing patterns of disease determine cost drivers over time.** The Australian report notes that “diabetes has the greatest projected increase (436 percent) between 2003 and 2033, followed by dementia (364 percent). The projected increase in expenditure for injuries (116 percent), neonatal and maternal services (88 percent and 84 percent) is low in comparison, these last two because changes in the age structure of the population mean those giving birth will be a smaller proportion of the population. The projected growth in diabetes expenditure of 436 percent is due to multiple reasons, particularly the projected impact on diabetes prevalence rates of expected increases in obesity” (Goss 2008).

9 The Australian study also shows **the benefits of effective prevention and interventions on health outcomes and costs.** Australia has seen a dramatic national level⁴⁶ reduction in deaths from cardiovascular disease for decades: age standardized death rates from CVD declined from 830/100,000 in the late 1960s to just over 200/100,000 in 2006 (AIHW 2010). As can be seen from the chart 7 below, the death rates from cardiovascular disease have been reduced by 78 percent since its peak in 1968 and are now at rates lower than they were in 1907 for both men

⁴⁶. This national-level progress has not been evenly distributed. Indigenous Australians (aborigines and Torres Strait Islanders) have high rates of CVD and other diseases.

and women. Had deaths from CVD stayed at the peak levels of 1968, 156,000 more people would have died just in 2009. The incidence rate of CVD is also projected to fall by 40.4 percent in the period 2003–13.

Chart 2 Rates of Death from Cardiovascular Disease in Australia for Men and Women: 1907–2009



Source: AIHW 2012.

10 **An important point to note is that costs still rise in this case, but at a rate and a level much lower than they would have had prevention strategies not been so successful.** More specifically, the projected cost attributable to CVD still rises, from \$A 9.3 billion to \$A 22.6 billion over the period 2003 to 2032. However this is still \$A 3.2 billion lower than would have been the case had the disease rate been constant.

ANNEX 6. 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 percent 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, 31percent 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.⁴⁷ Given risk factors in Samoa, it is inevitable that demand for treatment of kidney treatment will continue to grow. Latest estimates find that 86 percent of Samoan adults are overweight, of these, 46 percent are obese; these are key risk factors for diabetes and hypertension.⁴⁸ Treatment of kidney disease is expensive: reports from neighboring American Samoa suggest treating kidney disease was approximately \$43,000 per patient.⁴⁹ 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).

⁴⁷. Report to the General Manager NKF April 2012.

⁴⁸. Village Health Fair Progress Report 2012.

⁴⁹. Pacific Islands News Association 2011.

Expenditure at the NKF

3. Table 1 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 1 Government Appropriations to NKF in Samoan Tala (Current Prices) and Share of NKF as Percentage Total Appropriations to Ministry of Health

Item	2006/7	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 per cent of total appropriation to Ministry of Health		7.6	7.6	7.4	6.9	7.2

Source: Government of Samoa approved estimates for 2006/07 through to 2011/12.

4. Table 2 below provides the breakdown of costs for the NKF by main output.

Table 2 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 ⁵⁰
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 2.

⁵⁰. Sum to 104% because these are as a percentage of Government appropriations only and do not include cost recovery or charitable donations.

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 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 percent 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 percent 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 percent 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 3 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 percent 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 percent (SAT 21,495) on the simplifying assumption that 4.7 percent of that output would be on prevention, mirroring the share “prevention” receives overall. The same process of apportioning the notional 4.7 percent 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 3 then estimates the average cost per patient, assuming each patient receives three dialysis treatments per week for every week of the year.

Table 3 Estimated Cost to Government of Treating a Patient in 201011

Component	Tala	Cumulative total in Tala	USD equivalent
Total appropriation to NKF	4,966,862		2,086,082
Less VAGST (a transfer payment)	236287	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.

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 percent of patients on dialysis have died in less than a year after commencing dialysis. A further 17 percent of patients have died at the one-year point after commencing dialysis. A further 16 percent have died at the end of two years. Thus, nearly two-thirds (64 percent) of patients have died within two years. Expenditure of an average SAT 92,110 (\$38,686) is about 12 times the GNI per capita of Samoa of about \$3,200 per capita, and therefore not “cost-effective” under usual benchmarks. 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 1 shows, appropriations to the NKF are relatively stable in absolute and relative terms, absorbing about 7 percent 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 percent of adult Samoans are overweight or obese: almost half (46 percent) of those surveyed were clinically obese (BMI 30–39) and 14 percent 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 — totaling just SAT 84,340 or 1.6 percent 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 olds (25 percent), followed by the 41 to 50 year olds (22 percent), and then the 51 to 60 year olds (14 percent). Over-71-year-olds and under 40-year-olds 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 percent 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 Centers 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 glycemic control as implemented in the United Kingdom Prospective Diabetes Study in persons with newly diagnosed type 2 diabetes compared with conventional glycemic control; (4) statin therapy for secondary prevention of cardiovascular disease compared with no statin therapy; (5) counseling and treatment for smoking cessation compared with no counseling 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.

ANNEX 7: FIRST DRAFT OF A POSSIBLE POLICY BRIEFING NOTE FOR A HYPOTHETICAL PACIFIC MINISTER OF HEALTH AND MINISTER OF FINANCE

The problem statement

NCDs are an important health challenge in the Pacific. They are already the leading cause of death in 12 Pacific Island countries, frequently accounting for 70 percent of all deaths and often occurring at rates twice that of all communicable, maternal, perinatal, and nutritional conditions combined. Life expectancy in Tonga has fallen as a result of NCDs. Cardiovascular disease is the leading cause of death in the Pacific. At least one-quarter of NCD deaths are premature in Tonga, Samoa, and Vanuatu — proportions that can be much higher than other lower-middle-income countries. NCDs such as diabetes and stroke can also cause chronic ill health and disability as well as death. The Pacific now has some of the highest rates of diabetes in the world.

Existing risk factors suggest that NCDs will be a major health challenge for the Pacific in coming years. Each of the ten countries in the Pacific for which data is available have 60 percent or more of the adult population overweight, and in six countries more than 75 percent are overweight. Obesity often occurs at young ages: nearly one in four boys and one in five girls in Tonga are obese. Other risk factors are also significant including tobacco, diet, and physical inactivity. Only about 5 percent of adult females and about 10 percent of adult males were free of any NCD risk factor. Most Pacific countries have young populations: the median in Samoa, Tonga, and Vanuatu is 21 years of age. As those populations age, NCDs can be expected to increase. This is especially so given the existing level of risk factors laid down in younger life in parts of the Pacific, sometimes summarized as Smoking, Nutrition, Alcohol, and Physical inactivity (SNAP).

NCDs also impose important financial and economic costs, especially to governments in the Pacific, which fund most health care. 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: more than 12 times the gross national income of Samoa. A newly diagnosed type 2 patient in Vanuatu costs the government a minimum of \$347 per year, more than twice the total per capita government expenditure on health. Cost to government more than doubles to \$831 per year if the patient has to move to an insulin regime.

Implications for ministers of health and ministers of finance

There are implications for ministers of health. The underlying risk factors for NCDs often lie in personal lifestyle choices beyond the health sector, yet the responses and costs will often be borne largely by ministries of health. The rise of NCDs has consequences for the overall functioning of the health system, including responding to the double burden of communicable diseases and NCDs. It would be a mistake for governments — and their development partners — to “verticalize” the response to individual NCDs.

There are also implications for ministers of finance because government funds most health care in the Pacific. The paradox is that government expenditure on health is generally low in absolute terms — less than \$0.50 per person per day in Samoa, Tonga, and Vanuatu — but high in relative terms compared to other countries of similar income levels globally. Governments in the Pacific face the challenge of financing the response to a double burden: dealing with an unfinished agenda of communicable and reproductive needs while also addressing rising costs for NCDs as populations age. But there are limited prospects for significantly increasing government expenditure to health in absolute terms due to generally subdued economic growth in several countries of the Pacific. Nor is there large scope (“fiscal space”) to increase the *share* of general government expenditure going to health, which is generally higher than in other comparable countries globally. Ministers of finance and planning should also note that NCDs often involve chronic or lifelong treatment costs: widespread prevalence of NCDs therefore has implications for medium-term expenditure frameworks.

There are broader economic costs too. Premature NCD deaths, which are relatively high in the Pacific, could dilute one of the strategic benefits open to Samoa, Tonga, and Vanuatu — its potential “demographic dividend” from a potentially large working-age population. Almost half of all deaths (48 percent) in Tonga occur before the age of 64, particularly among men, as a result of cardiovascular disease. Chronic NCD illnesses also have broader economic effects: lost productivity through time off work; money spent on medical treatment that could have been spent on other goods and services in the economy; and withdrawing people from productive pursuits (work or school) to become care givers.

Opportunities for strategic responses and win-wins

There are several strategic opportunities where the interests of the ministers of health and the ministers of finance, would appear to directly coincide in a win-win situation. Increasing, and then maintaining, the real price of tobacco taxes has a double benefit: it reduces uptake of tobacco among the poor and the young, thereby eliminating a major risk factor for NCDs, while simultaneously generating extra revenues for government. Consideration could be also given to increasing taxes on alcohol or food and soft drinks known to be high in sugars, saturated and trans fats, and high salt content. Investing in young female health and antenatal care is also a win-win by breaking the intergenerational link between metabolic disorders of the mother and subsequent heightened risks of NCDs in her offspring.

Effective primary and secondary prevention also have significant health and financial returns. Every person in Samoa who avoids dialysis for kidney damage saves the government \$38,686 per year. Every person in Vanuatu who changes his or her lifestyle through primary prevention and successfully avoids becoming a newly diagnosed type 2 diabetes patient saves the government a minimum of \$347 per year — more than twice the annual per capita government expenditure on health. Effective *secondary* prevention also has high pay-off to government. Every diagnosed type 2 diabetes patient in Vanuatu who is stabilized through secondary prevention, and so avoids progressing to an insulin regime, then saves the government an *additional* \$484 per year over the cost of an oral medication regime.

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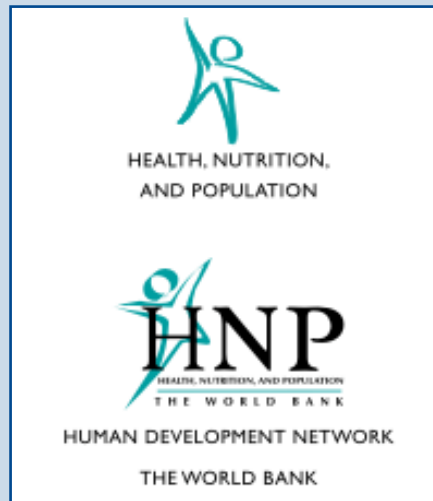
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