



'They Are Digging Their Graves with Their Teeth'

mortality, poverty and nutrition in the Pacific

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Abstract

Pacific Island populations are small by world standards and are not usually seen in the popular imagination as afflicted with poverty and poor nutrition. But severe constraints (especially of distance and resource base) mean that poverty *is* an issue, whose severity varies within and between countries. The paper examines trends in mortality and morbidity across 12 countries, and the major causes of these patterns. In particular, it draws attention to the links with poverty and nutrition, concluding that socioeconomic changes associated with 'development' have indeed set up an alarming axis of poverty and lower health quality.

Keywords

Pacific; mortality; morbidity; demographic transition; epidemiological transition; nutrition transition; under-nutrition; over-nutrition



IN MID-2004 THE POPULATION OF THE PACIFIC REGION WAS ESTIMATED AT 8.6 million (SPC 2004). Pacific Island populations are small by world standards and population and development issues such as poverty and nutrition are of immense concern in these countries. Many people do not associate poverty and nutritional problems with the Pacific Island countries; they more usually link them with sub-Saharan Africa or Asia. The Pacific reality, though, is different from the tourist picture postcard. The Pacific Island countries (PICs) have fragile ecosystems and economies and they are part of the so-called Ring of Fire, vulnerable to natural disasters such as volcanoes and earthquakes as well as hurricanes, droughts and flooding. Except in Melanesia, agricultural land is limited; the atoll islands can support only local populations. The PICs are remote and their resource base is limited. Indeed, poverty *is* an issue in the Pacific but its severity varies between countries and within countries.

The Pacific Island countries, though spoken of as some kind of homogeneous unit, do in fact display one of the most diverse social, economic and demographic profiles. These countries are undergoing various types of transition, not least of a demographic and socioeconomic nature. The consequence is that they are characterised by vast differences in levels of economic development, which are reflected in anomalous differences in health development.

The region contains countries at virtually all stages of the demographic, epidemiological and nutrition transitions. The epidemiological transition is the shift in mortality and disease patterns. It begins with the prevalence of infectious diseases associated with undernourishment and unsanitary conditions, and ends with the prevalence of non-communicable diseases. This era of transition has also brought about the nutrition transition, from a high prevalence of under-nutrition to a situation where dietary excesses contribute significantly to the predominance of non-communicable diseases. Accordingly, because Pacific countries are at different stages of socioeconomic development there are differences *between and among* the subregions (Melanesia, Micronesia and Polynesia) and even *within* subregions, with regard to morbidity and mortality.

The aim of this paper is twofold. First it reviews the patterns of Pacific morbidity and mortality, and causes that explain these patterns. Secondly, it examines the links between morbidity and mortality on the one part and poverty and nutrition on the other.

Matters of data quality in vital registration data

Mortality data used in this study were collected from various sources. Death registration in many Pacific Island countries is incomplete and in many cases data have been adjusted for under-enumeration or calculated by indirect means using census data.

Cause of death is hard to establish. There are problems of discrepancies and errors in the diagnosis of diseases from which the deceased suffered. This diagnosis can be obtained by the physician or it can be obtained by interviewing the bereaved relatives on symptoms experienced by the deceased before death. Identification of a disease as the cause of death therefore is laden with difficulties. Some countries in the Pacific are still using 'ill-defined and unknown' as a label for the cause of death (Lopez 2002). Death certification assumes medical knowledge about the seriousness of the disease and its interconnectedness with other diseases. In Fiji, however, it also depends on the skill of the coder in classifying the cause on the basis of the information provided in the death certificate. The coder is often an officer with no medical training or even training in classifying diseases (Lopez 2002). Suffice it to say, therefore, that 'cause of death' in PIC records must be treated with caution.

Moreover, under-registration of deaths in the Pacific is a long-term problem. McArthur (1967) estimated that 10–15 per cent of all deaths were unregistered. Taylor (1989) estimated that in the 1980s only 80 per cent of all deaths were registered. Mortality statistics continue to be incomplete even in the late 1990s.

Trends in Mortality

Infant and child mortality rate

Gains in life expectancy in the Pacific region are one of the major achievements of the 20th century. Pacific Island countries have benefited from improved health technologies and public health measures. The share of declining infant



and childhood mortality in these gains is significant. Nevertheless, high infant mortality persists, largely because of the prevalence of often preventable communicable diseases.

Table 1 shows the decline in the infant mortality rate in most PICs. This decline is uneven across the region. Countries with lower levels of infant mortality rates are Polynesian countries and Fiji. These countries have instituted public health measures to combat infectious diseases. For Fiji, the biggest decline, occurring in the early 1950s, can be attributed to a number of factors, including the significant increase of access to health services. The number of health centres, dispensaries and nursing stations increased; the number of nurses also increased; and health personnel assisted in educating parents in the care of sick children: the net effect was that any new medical programme such as the immunisation programme could be delivered quickly. Another contributing factor in the decline in infant and child mortality was the simple fact that the Health Department focused on Maternal and Child Health (Roizen 1996).

Increasing urbanisation and better transportation, making people better able to access some type of medical care, have also contributed to the decline in infant and childhood mortality. As women have become better educated, favourable health seeking behaviour has become more common and standards of living have shown improvement, in part no doubt because larger numbers of these more educated people have entered the cash economy. In recent years successful immunisation programmes have also contributed to reductions in infant mortality rates (Roizen 1996).

The Micronesian countries have high infant mortality rates of about 40/1000. These countries are yet to provide adequate health care systems to control the spread of infectious diseases, especially among the under-5-year-olds. In Kiribati overcrowding, especially in the urban area, scarcity of clean water and poor sanitation contribute to a higher infant mortality rate (Seniloli 2002).

While the infant mortality rate is improving in most Pacific Island countries, in two of them, Nauru and Solomon Islands, a rather worrying trend has been experienced. Not only did both these countries fail to maintain their IMR level; they actually experienced reversals in the trend. Further, the

evidence suggests that relatively high incomes do not automatically contribute to lower mortality levels such as in the lowering of infant deaths and the improvement in life expectancy (table 1).

Table 1 Change in infant mortality rate, 1980–2000, and per capita GNI, 2001

Country	1970–80s	1995–2003	Per capita GNI \$US (2001)
Melanesia			
Fiji	23	22	2150
Papua New Guinea	72	64	580
Solomon Islands	38	66	590
Vanuatu	94	27	1050
Micronesia			
Federated States of Micronesia	51	40	2150
Kiribati	82	44	830
Marshall Islands	61	37	2190
Nauru	31	42	2150
Polynesia			
Cook Islands	28	21	4270
Samoa	33	19	1490
Tonga	41	12	1530
Tuvalu	43	35	1260

Source <<http://www.spc.int/demog>> (IMR)
<http://adb.org/documents/books/key_indicators/2003> (GNI)

Child mortality (table 2) has declined in the last decade, 1990–2000. It is, however, relatively high in Papua New Guinea, Solomon Islands, Vanuatu and in the atoll states of Kiribati, Federated States of Micronesia and the Marshall Islands. The high child mortality levels in these countries are due mainly to respiratory diseases (particularly pneumonia), diarrhoea, malnutrition and perinatal causes. Fiji and the Polynesian countries have achieved success in reducing child mortality.

Table 2 Change in child mortality rate ${}_0q_5$ (per 1000 live births) 1990–2000 and in adult mortality levels (${}_{45}q_{15}$ per 1000) 2000

Country	${}_0q_5$ 1990	${}_0q_5$ 2000–	Adult mortality ${}_{45}q_{15}$ per 1000 (2000)
Melanesia			
Fiji	29	25	187
Papua New Guinea	112	99	282
Solomon Islands	55	69	179
Vanuatu	74	58	217
Micronesia			
Federated States of Micronesia	na	60	202
Kiribati	na	77	232
Marshall Islands	na	44	328
Nauru	na	na	407
Polynesia			
Cook Islands	Na	21	152
Samoa	58	22	219
Tonga	Na	23	190
Tuvalu	Na	55	263

Source Adapted from Lopez (2002, Table III.2).

Adult mortality

Currently, focus in the Pacific Island countries has been on premature deaths among adults. Premature adult mortality is defined as those at risk of death before age 60 among those who reach age 15 years (${}_{45}q_{15}$) (table 2). Premature adult mortality is high in Nauru, Marshall Islands, Papua New Guinea and Tuvalu. The levels of adult mortality are higher than expected given the levels of child mortality in Marshall Islands, Samoa and Tuvalu (Lopez 2002).

Life expectancy at birth has improved slowly in the region in the last two decades (table 3). The 2000 range is from 55 years to 73 years, reflecting the differences in levels of health development in the region. Nauru, with the highest diabetes rates in the world, has the lowest life expectancy at birth and made virtually no gain in the last two decades of the century.

Table 3 Change life expectancy at birth 1980–2000

Country	1980s Total	2000 Total
Melanesia		
Fiji	63.1	67.0
Papua New Guinea	49.6	54.5
Solomon Islands	60.7	61.5
Vanuatu	55.0	67.5
Micronesia		
Federated States of Micronesia	58.0	67.0
Kiribati	53.1	64.0
Marshall Islands	60.0	67.5
Nauru	55.0	55.5
Polynesia		
Cook Islands	67.0	71.0
Samoa	62.6	73.0
Tonga	63.0	71.0
Tuvalu	59.0	63.0

Source Bakker (1990: Column 2 of Table 111) (1980s data).
<<http://www.spc.int/demog/>> (2000 data).

Patterns of morbidity and mortality and the epidemiological transition

Most Pacific Island countries have experienced the mortality transition, which essentially describes a state of high mortality due to the incidence of infectious and parasitic diseases, followed by a state of low mortality, resulting from the successful control of communicable diseases. The mortality transition is associated with the epidemiological transition, which focuses on changes in disease patterns and causes of mortality. This is the shift from a pattern of high prevalence of infectious diseases to a high prevalence of chronic and degenerative diseases.

Table 4 shows the diseases recorded by the Pacific Island countries. It is obvious that in some cases the same conditions are classified differently and not according to the ICD (International Statistical Classification of Disease) standard. Once again, health data from the Pacific Island countries must be treated with caution.



In the Pacific Island countries, infectious diseases such as respiratory diseases tend to kill infants and groups in the productive years. These diseases are receding in importance. Consequently, as we have seen, infant and child mortality is declining in most countries of the Pacific, though infant mortality is still relatively high in Papua New Guinea and Solomon Islands (tables 1 and 2). These two countries and parts of Vanuatu are in the malaria belt. Outbreaks of dengue fever occur in both Melanesia and Polynesia. TB, lymphatic filariasis and yaws are still found in some of the Pacific Islands. There are frequent outbreaks of respiratory diseases and diarrhoea, and occasional outbreaks of cholera and typhoid. Hepatitis B is regularly found in a number of island countries.

Many people suffer from diabetes mellitus, which all too often brings with it long-term complications such as diabetic eye disease, kidney damage, nerve damage, peripheral vascular disease, foot ulceration leading to amputation, heart disease and stroke (WHO 2000). It is a costly disease, as it occurs among the economically active age groups, and these costs bear heavily on the health system and on the community (WHO 2000). In Nauru, for instance, diabetes prevalence rates are above 20 per cent in the population.

The Pacific Islands region follows to some extent the epidemiological transition, the general shift in mortality and disease patterns where the pandemics of infection are progressively being displaced by degenerative diseases. Heart diseases, cerebrovascular disease and cancer are now the major causes of mortality (table 4). There is also a shift in average age of death from infancy, to childhood, to adulthood and older ages.

The epidemiological transition was thought to be a one-way process, but it appears that the transition is more complex and evolves in diverse ways, with some diseases disappearing and others re-emerging, a result of demographic, socioeconomic, technological, cultural and environmental changes (Wahdan 1996). In general in the last stage of the epidemiological transition people who reach 70 years or more suffer and die from non-communicable diseases as a consequence of the biological deterioration of their bodies. However, the Pacific Island countries deviate from this in that significant numbers of adults are dying prematurely at ages 35–65 years. They usually die from diabetes mellitus, coronary and vascular diseases and obesity. That is to say, the Pacific



Island countries are characterised by the early onset of non-communicable diseases.

At times a reverse of the trend occurs, such as the emergence of new infections like HIV/AIDS and the re-emergence of infections previously controlled, such as TB, yaws and dengue fever. A few stages of the transition may occur in different groups but within the same population at the same time. The decline in infectious diseases may be slow and stalling in certain groups, while other groups in the same population may be affected by non-communicable diseases. Crude death rates in the Pacific are low by world standards because of the effects of the age structure. These rates obscure the major health problems. The islands exhibit a mixed pattern of morbidity and causes of mortality. Communicable diseases are still found in many of the Pacific communities, because of the environmental problems they face such as unsanitary environments and very high population densities, as is the case in Betio in Kiribati and Ebeye in Marshall Islands. At the same time, there is a sizable proportion suffering and dying from non-communicable diseases.

The double burden disease theory is very apparent in many Pacific countries (table 4). All countries recorded both infectious and non-communicable diseases as occurring amongst the five leading causes of morbidity and mortality. Most countries of the Pacific are struggling not only with old and new infectious disease epidemics but also with the emerging epidemics of chronic communicable diseases such as heart disease, stroke, diabetes and cancer.

Most Pacific Island nations do not have the resources to cope with the 'double disease burden'. They cannot afford the enormous cost of technology and tertiary health care required for the diagnosis, treatment and management of these diseases. Nor do they have the infrastructure for disease surveillance and risk factor assessment.

Underlying causes of morbidity and mortality levels in the Pacific

The Pacific economies – 'Poverty makes you sick'

Poverty is a difficult notion to conceptualise in the Pacific. Women of Melanesia term it as 'hardship'. Many deny that it is a relevant concept in the Pacific. This attitude has implications for data collection and data on poverty across the Pacific are lacking.

Table 4 Leading causes of morbidity and mortality

Country	Morbidity (Rate per 100,000)	Mortality (Rate per 100,000)
Melanesia		
Fiji (1998)	<ol style="list-style-type: none"> 1. Infectious and parasitic diseases 714.91 2. Diseases of the respiratory system 662.77 3. Diseases of the circulatory system 558.71 4. Injury and poisoning 494.75 5. Diseases of the digestive system 337.23 	Diseases of the circulatory system 50.95 Infectious and parasitic diseases 13.72 Neoplasm 12.05 Endocrine, nutritional and metabolic diseases and immunity disorders 9.43 Diseases of the genito-urinary system 8.35
Papua New Guinea	<ol style="list-style-type: none"> 1. Respiratory diseases 857.00 2. Malaria 734.00 3. Pneumonia 691.00 4. Obstetric 202.00 5. Skin diseases 176.00 	Pneumonia 20.00 Malaria 15.00 Perinatal conditions 15.00 Tuberculosis 10.00 Heart and pulmonary conditions 9.00
Solomon Islands (morbidity 2001, mortality 1999)	<ol style="list-style-type: none"> 1. Acute respiratory diseases 36 382.52 2. Malaria 30 609.91 3. Fever (syndromic) 28 768.17 4. Skin diseases (excluding yaws) 8 603.31 5. Ear infections 4 857.58 	Neoplasm Neonatal causes Malaria Cardiovascular diseases Respiratory diseases – pneumonia as the leading cause
Vanuatu	<ol style="list-style-type: none"> 1. Acute respiratory diseases 14 785.00 2. Other respiratory infections 7 887.00 3. Skin diseases 4 575.00 4. Malaria 3 770.00 5. Diarrhoea 2 368.00 	Heart-related Senility Cancer Stroke Pneumonia
Micronesia		
Federated States of Micronesia	<ol style="list-style-type: none"> 1. Pregnancy complications 2 886.30 2. Respiratory diseases 1 434.60 3. Endocrine/metabolic diseases 1 144.50 4. Infections and parasites 657.70 5. Genito-urinary diseases 605.30 	Diseases of the circulatory system 79.00 Endocrine/metabolic 48.00 Diseases of the digestive system 47.00 Diseases of the respiratory system 44.00 Cancer 43.00
Kiribati (morbidity 1998, mortality 1999)	<ol style="list-style-type: none"> 1. Acute respiratory infections 106 881.62 2. Wounds and sores 23 102.47 3. Diarrhoeal diseases 18 053.89 4. Skin conditions 14 200.19 5. Eye diseases 6 477.97 	Ill defined conditions 28.51 Diseases of the circulatory system 15.96 Infectious and parasitic diseases 14.82 Diseases of the digestive system 11.40 Diseases of the respiratory system 9.43

Marshall Islands (1998)	1. Gastro-enteritis	1614.22	Malnutrition	31.96
	2. Scabies	1603.03	Accidents (all types)	31.96
	3. Influenza	1595.04	Sepsis	27.17
	4. Conjunctivitis	1422.43	Pneumonia	19.18
	5. Diarrhoea – adults	974.92	Cancer (all types)	19.18
Nauru	1. Respiratory infections/pneumonia	1009.43	Ill defined conditions	28.51
	2. Accidents, poisoning and violence	556.60	Cardiovascular disease/hypertension	236.85
	3. Diarrhoeal diseases	462.26	Respiratory infection/pneumonia	198.11
	4. Skin and musculoskeletal infections	367.92	Malignant neoplasm (all forms)	169.81
	5. Diseases of stomach, duodenum and large bowel	358.49	Diseases of the respiratory system	9.43
			Stillbirths	122.64
			Renal failure – diabetes	103.77
Polynesia				
Cook Islands (2002)	1. Infectious and parasitic diseases	2 711.96	Diseases of the circulatory system	211.96
	2. Diseases of the respiratory system	2168.48	Neoplasm	76.09
	3. Diseases of the circulatory system	2059.78	Endocrine, nutritional and metabolic diseases	70.65
	4. Injury and poisoning	1967.39	Diseases of the respiratory system	48.91
	5. External causes of morbidity	1826.09	Injury, poisoning and certain other consequences of external causes	38.04
Samoa (2000)	1. Pregnancy, childbirth and puerperum	2 380.99	Diseases of the circulatory system	32.22
	2. Diseases of the respiratory system	1233.55	Diseases of the respiratory system	26.94
	3. Injury, poisoning and other consequences	510.17	Certain conditions originating in the perinatal period	18.74
	4. Certain infections & parasitic diseases	425.83	Infectious and parasitic diseases	12.89
	5. Diseases of the digestive system	401.23	Endocrine, nutritional and metabolic diseases	12.30
Tonga	1. Acute respiratory infection	25 538.23	Diseases of the circulatory system	168.82
	2. Influenza	21 471.70	Neoplasm	67.53
	3. Diarrhoea	2 890.76	Abnormal not classified	39.72
	4. Broncho-pneumonia	1961.27	Diseases of the respiratory system	33.76
	5. Gastro-enteritis	214.50	Diseases of the digestive system	27.81
Tuvalu (2000)	1. Body ache	22 407.34	Heart problems	204.92
	2. Headache	20 340.34	Third-degree burns	169.28
	3. Acute respiratory infections	11 956.52	Senility	106.91
	4. Diarrhoea	9 372.77	Stillbirth	44.55
	5. Cough	9372.77	Diabetes	35.64



Many Pacific Island countries have struggled through generations to attain a reasonable standard of living from available resources. Others, on the other hand, are struggling just to survive. In general, Pacific cultures emphasise sharing and reciprocity. Nonetheless, in some communities, despite the support system, the people live in poverty

On the basis of 1980s data, the World Bank established the international poverty line at \$1—since 2000, ‘under \$2’ has been heard increasingly commonly—for each person a day. This covers a person’s income or the amount of goods they consume. It represents the minimum amount with which a person can meet his needs; a person whose income falls below this modest sum is considered to be living in poverty. Many, of course, have criticised this measure, as it does not take into account cost of living differentials within countries. It does not differentiate those trapped in permanent poverty from those who can easily move out of this situation. Further, the measure does not take into account goods from the subsistence sector.

A focus on income is not always helpful. Poverty is multidimensional and needs a broader definition. It requires different sets of indicators, such as access to health services, availability of clean water, sanitation, life expectancy, maternal mortality rate and literacy levels. To measure poverty by a cut-off point above and below which lie sufficiency and poverty, without consideration of social variables other than income, is a good deal less than perfect. The poor are deprived of many things—services, resources, knowledge and opportunities. Economic growth is not a panacea to problems of poverty. Further, eradication of poverty is not only a matter of creating employment. Wages are also a critical issue. Close to half of those in full-time employment in Fiji, for instance, earn wages below the poverty line. These are the working poor.

Underpinning poverty are the fundamental issues of slow economic growth, high urban population growth rates and minimal employment opportunities. From the outset, the Pacific Island countries are small and do not enjoy economies of scale; they suffer from external shocks such as climatic events or market failures; and they have a narrow economic base. UNESCAP described as lacklustre the economic performance of Pacific Island countries in 2002: GDP growth ranged from a low of -5.0 to a high of 4.4 (UNESCAP 2003).

Solomon Islands suffered contraction in the economy by 14 per cent as a consequence of civil unrest in 1999–2000 (UNESCAP 2003). Fiji also experienced political turmoil in 2000. Such events threaten lives and livelihoods. Moreover, they deter investment and reduce employment opportunities. As a result of Fiji's attempted political coup in 2000, GDP contracted by 2.8 per cent, unemployment increased and emigration resulted in pronounced skills shortages (UNESCAP 2003). The garment industry in Fiji, a major source of employment for the poor, was especially affected by the political problems of 2000. United Apparel, one of the larger garment companies, lost FJD200,000 in six weeks after the May coup. The industry lost FJD10 million a month. This meant that 14 of the 48 garment factories closed down (Storey 2004). The departure of investors resulted in major social problems such as an increase in unemployment and its attendant social ills. About 8,000 jobs were lost (Storey 2004). Those who lost their jobs were mostly the working poor.

Similarly, the economy of Solomon Islands headed towards total collapse as a result of ethnic conflict in 1999–2003 (WHO 2004). Decreased economic activity resulted in unpaid wages, poor maintenance of health facilities, job redundancies and increased unemployment (WHO 2004). This is reflected in the reversal of infant mortality levels to 66 and the rise in the prevalence of infectious diseases as the major causes of morbidity and mortality. Likewise Vanuatu, the other country described as part of the 'arc of instability', has also experienced political instability since 1996 in the form of seven changes in government, one bloodless coup and a national state of emergency (FAO 2003). This has discouraged overseas investment in the country.

Samoa's economy performed well in 2000–2001 but lost ground in 2002 (UNESCAP 2003). Papua New Guinea and Vanuatu recorded contraction in GDP in 2002 (UNESCAP 2003). Overall, the pattern of GDP growth has been low and uneven in the Pacific region. Because of the low growth in the economies of South Pacific countries, unemployment is a problem. This is aggravated by the reduction in fertility, which has resulted in increasing proportions in the working-age group, 15–64 years. This large proportion cannot all be absorbed into the labour market. A slow pace of economic growth in the region is constraining the ability of governments to increase budgetary allocations to health.



Another factor that can set a country's development back by years or even decades is natural disaster. Disasters affect the land and communities. The PICs lie along weak areas of the Earth's crust, the so-called Ring of Fire, where the damaging effects of frequent earthquakes and volcanic activities attest to the accuracy of the sobriquet. The region also lies in the regular path of tropical cyclones and is subject to hurricanes and storms (FAO 2001). Disasters mean the loss of past development gains and can interrupt or even arrest development and improvements, by shifting the focus to disaster management. Those who suffer most are the most vulnerable, the poorest households in the affected population, because they live in dilapidated shelters. Disasters also have a major impact on food security and nutrition (FAO 2001). The prevalence of malnutrition among the poor is likely to increase and these communities are usually at risk of infectious diseases during such periods of disruption. Further, it usually takes a long time for these communities to recover from the devastation.

Communities weighed down by a heavy burden of disease tend to face difficulties in making economic progress. The burden of diseases can hamper economic growth (WHO 2001). It is therefore imperative, in the interests of promoting economic development and reducing poverty, to invest in health. The improvements in health would in turn translate into higher income and higher economic growth. Many believe that economic growth in developing countries the disease burden itself would automatically result in the lowering of mortality, eventually to a level similar to that in developed countries. However, in developing countries the disease burden itself will slow economic growth and any convergence of mortality rates will take a long time.

Health systems

Currently, many Pacific Island countries are reforming their health systems to make them more responsive to rapidly changing socioeconomic and political settings. Stable and effective health care funding that ensures access to good quality health services for everyone is a goal for many countries in the region. In the Pacific, the level of funding from different sources—taxation, health insurance, private payments and external support—is low. The World Bank recommended spending is at least USD15 per person per year (Bayarsaikhan 2003). Pacific Island countries fall below this. Previously, governments were



solely responsible for providing and funding health care. Health spending among Pacific Island countries as a percentage of GDP ranges from a low 2.5 per cent in Papua New Guinea to 10 per cent in Nauru, depending on the size of the economy and foreign assistance (Bayarsaikhan 2003). Private payments are increasing. The former trust territories of the United States have been affected by reductions in US compact funding. As a consequence these countries have introduced user fees (Bayarsaikhan 2003). A flat-rate schedule introduced in the Cook Islands has affected mainly the people with low incomes. Everywhere in the region, the low levels of government spending on health have increased inequity in delivery of services (Bayarsaikhan 2003).

Globalisation and the information revolution have meant that new medical technology can be quickly adopted by other countries in a very short span of time. Currently the escalation of health care expenditure associated with new medical technologies has meant that more resources are needed than what most governments can afford. Most Pacific Island countries do not have the resources to cope with non-communicable diseases: the diagnosis, treatment and management of these diseases are notoriously costly. In addition, offshore referral costs are excessively high in most PICs, where intranational referrals from the outer dispersed islands to the main hospital are also a necessity. Offshore and local referrals are an expensive component of health care expenditure. For instance, offshore referral accounts for 20 per cent of the health expenditure in Micronesia; similarly, in Marshall Islands 14 per cent of total expenditure covers the treatment of diabetes and referrals (Bayarsaikhan 2003). This high cost of referrals must be set against a background of low health care budgets.

The quality of health care that a government provides for its people is an indication of the quality of the government's concern. Countries should do more to make current spending more equitable and effective. Despite improvements in the health of the peoples of the Pacific in the last 50 years, major gaps remain. Health improvements have not been shared equally and there are health inequalities both between and within countries in the region. Health systems need to be responsive to client needs, particularly when the clients are the poor and those in remote places. More investment in health means more lives saved from infectious diseases and nutritional deficiencies.



The health spending of the developing countries of the South Pacific is low and most public health systems are underfinanced. These inadequate levels of health spending, determined mainly by the national budget, are first and foremost a reflection of slow economic growth. This is made worse by poor budgeting, planning and management at all levels of the health system. The overall low health care financing worsens the overall insufficiency of resources. In some countries health spending is slanted towards hospitals and away from cost-effective public health programmes (Bayarsaikhan 2003). Health personnel still face shortages of drugs and most hospitals and health centres are ill equipped or have equipment that is not maintained. In Fiji, borrowing of equipment from other sections of the same hospital or from other hospitals is by no means unknown.

Lack of an appropriate policy and framework to guide health care financing arrangements has led to a decline in equity, quality and efficiency of health care systems. Despite their importance for the effective analysis of existing data, an essential basis for health policy and planning, health information systems remain weak. Their improvement will require a coordinated effort by several sectors. Capacity building in the health sector in these countries is constrained by emigration and inadequate health budgets. Underlying these issues are broader questions of leadership, commitment and governance. For instance, there is a grave need to tackle the loss of doctors and nurses from the region. Politicians respond by appealing to doctors' sense of patriotism and duty. This is not enough. The policy makers need to have the will to develop packages that health personnel will find attractive (Moulds 2004).

The migration of doctors and nurses is part of the globalisation of health care, but at the same time it compromises the delivery of health services. The shortage of health care personnel in richer countries has a significant impact on the flow of health workers from developing countries such as the Pacific Island countries. The Fiji School of Medicine continues to lose its good graduates, who migrate to fill the shortfall of doctors in Australia and New Zealand (Moulds 2004). This is a drain on the PICs' human resources because their investment in the human capital development will benefit the recipient (developed) country. The Ministry of Health in Fiji is facing a shortage of doctors and nurses. Between 1992 and 2004 some 50 per cent of the total



stock of nurses has left the service (Narsey 2004). The Pacific Island countries, even the larger ones, are small and have few senior posts in the health sector, so upward career mobility is limited. In addition, the greatest push is the disparity in work conditions and remuneration.

The loss of doctors and nurses means loss of skills and experience. People moving out are the ones with 10–20 years of experience. It takes time to recover. As a consequence, standards are falling: of necessity, untrained and informally trained personnel are used, absenteeism rises as a result of unrealistic work loads, and services provided to the public are reduced, quantitatively and qualitatively.

Health and poverty linkages: the micro-level

The condition of the health system affects the health of the community and of individuals within it. The health of the individual is inextricably linked to poverty. Health is the basis for job security. Ill health prevents people from working, affecting their productivity and lowering their income. It can also prevent them from earning an income at all, miring them in poverty. With the early onset of non-communicable diseases in the Pacific, resulting in the early onset of disability and premature death of men, many families quickly find themselves in poverty. Death means a loss of livelihood to the head of the family, plunging the family into poverty. The majority of people do not have insurance against illness and have great difficulty borrowing money to deal with illness and its consequences.

Good health, on the other hand, increases the capacity of children to learn at school. Health increases the capability to grow intellectually, physically and emotionally. Health and education are the basis of human capital. Good health is critical in reducing poverty, facilitating economic growth and economic development. Many Western countries were able to achieve industrialisation and economic development because there were other developments taking place in society, such as the breakthrough in public health, disease control and improved nutritional intake.

Health infrastructure: poor environmental living conditions

Apart from the need for more investments in health services per se, there is also a need to ensure heavy investment in the health infrastructure, such as the



provision of water supply, sanitation, garbage disposal, housing, education and agricultural improvement. Most of the illnesses associated with poverty are infectious diseases such as diarrhoeal diseases, malaria and tuberculosis. These diseases are associated with lack of income, lack of clean water and sanitation, lack of access to medical services, low levels of education and malnutrition. These have been aggravated by the process of urbanisation.

Increasing numbers of people are moving into towns in the Pacific. In Melanesia, the rate of urban growth is very high, about 6 per cent (UNESCAP 2003). Everywhere, the increasing urban populations contribute to poor living conditions. High populations in Pacific towns increase the threat of water-related diseases in the region, especially in squatter settlements. The high urban population is also pushing essential services such as clean water, adequate sanitation, waste disposal and transport to their capacities. Infrastructure is increasingly run-down and unable to handle rapid population growth in urban areas. There is evidence that lack of planning and investment is resulting in haphazard development and environmental degradation.

Safe water supply is unevenly distributed in Pacific Island countries. In atoll countries particularly, water sources are limited. Kiribati and Tuvalu rely mainly on water sourced from wells, tanks and drums, and the shortage and poor quality of water contribute to the relatively high infant mortality in the atoll countries. Many of the region's countries indicate that coverage is high but the real problem is quality and reliability of water supply. A few countries face problems of mismanagement of the water supply system and this is seen in leakage because of lack of maintenance of the system.

Overall, the inadequate disposal of human waste is one serious environmental problem in the Pacific. There are very few sewage treatment plants in urban areas in the region and their coverage is very limited. Lack of reticulated sewage systems has resulted in an increase in numbers of septic tanks and in some urban areas, pit latrines. Many places, such as Honiara and South Tarawa, use ocean outfalls for sewage disposal (UNESCAP nd). Foreshore contamination is high, with deleterious effects on marine resources. In Marshall Islands there is surface pollution from septic tanks, pit latrines and household and domestic waste resulting in the contamination of the underlying water lens. High faecal coliform levels in lagoons (Fanga'uta in Tonga and



beside South Tarawa) and sea (around Suva and Port Vila) are a public health concern (UNESCAP nd).

Solid waste management is also a problem, particularly in the atoll countries. The volume of solid waste is increasing with the adoption of a western life style but there are few programmes of solid waste reduction. The usual method of disposal is to dump at the seashore, estuaries, swamps or mangroves. This pollutes waterways, lagoons and water supply.

In Micronesia, most notably in the Republic of Marshall Islands and Kiribati, and particularly in Ebeye and Betio therein, the problems of land shortage and overcrowding result in the spread of infectious diseases. Inadequate sanitation causes outbreaks of gastro-intestinal diseases and hepatitis in both Kiribati and Marshall Islands.

One of the results of urbanisation is the increase in the numbers of squatter settlements in Pacific towns. In 1995 10 per cent of Fiji's population lived in squatter settlements and by 2003 this had increased to 12 per cent and estimates for 2005 place it even higher. For Fiji, some of the contributing factors are the expiry of agricultural land leases, job losses, and the attraction of service sector employment. These squatter settlements are characterised by inadequate water and electricity supply, sanitation and garbage disposal. Housing conditions are extremely poor: dilapidated shelter and overcrowding predominate. The 1996 Fiji population and housing census showed the high proportion of dwellings in squatter settlements that were inadequate structurally, without electricity and using pit toilets (Fiji Bureau of Statistics 2002). These settlements are often located on marginal land near streams, mangroves or hilltops. Such are the deficiencies that affect the urban poor, especially their health and quality of life.

In Fiji, as in other Pacific Island countries, significant inequalities in housing provision continue to exist between regions and between the rural and urban sectors. Safe and adequate water supply is a basic human need but it is unevenly distributed. Adequate sanitation is also unevenly distributed. The poor are more likely to experience living conditions that contribute to poor health. The most prevalent diseases in the Pacific are those related to poor living conditions, such as respiratory diseases, gastro-intestinal diseases, mosquito-borne infections such as malaria and dengue fever, and those relating to poor nutrition.

*Access to health centres: rural areas, outer islands*

Most development in Pacific Island countries concentrates in the main town, leaving the remote communities under-serviced and with fewer opportunities for development. The cost of servicing rural areas in rough terrains or the scattered, lightly populated islands is high. Professionals are also reluctant to locate outside the main centres. As a consequence, people in rural areas have fewer opportunities and services and their risk of falling into poverty is greater.

Many PICs face a major challenge in providing health services to rural areas in the face of resource constraints and staff shortage. Many health centres are ill equipped. A few have had to be closed. 'Access', of course, implies more than the mere existence of health facilities. In so far as many of these health facilities lack properly trained staff, open irregularly and suffer from shortage of supplies, most of these rural and remote communities do not have access to health services. Health services are usually very rudimentary in outer atolls, as in Marshall Islands and Kiribati. The Melanesian islands are large with difficult terrain, so not everyone is within easy reach of a medical centre. In general, PICs do not have the resources to provide services to the more remote areas and outer islands, and poor people in these places do not have the means to access medical facilities. Serious and complicated cases are referred to the bigger hospital in the main centre. Most people outside urban areas have less access to health care and are less likely to have health insurance coverage.

The urban dwellers are better served than their rural counterparts. In Fiji despite this, there is shortage of nurses and doctors because of migration. This continues to burden and compromise the delivery of health services. Discussion with senior health personnel in the main hospital makes it clear that the health sector is losing skill and experience that will take years to recover. The workload has increased and the quality of care has slipped. The poor are the ones who feel the effects of this. The well-to-do go to doctors in private practice, or to the private hospital or go overseas for treatment. They are also more likely to have medical insurance cover.

Food security

Pacific Island nations face food and water security challenges. Increasingly, the food supply situation is characterised by a heavy dependence on overseas food imports. The atoll nations of the Pacific are particularly vulnerable to food and water insecurity.

Climate change and sea-level rise threaten food and water security in many island nations. Tuvalu is particularly vulnerable to sea-level rise. Climate change affects marine food sources. Coral bleaching caused by rising ocean temperatures affects artisanal coastal fishing (www.foe.org.au).

The frequency and severity of natural disasters such as cyclones and droughts also affect food security in the region. Cyclone Heta destroyed the agricultural sector and the infrastructure in Niue in 2004. Droughts have been experienced in Papua New Guinea and Marshall Islands. Saltwater intrusion reduces the land use in Tuvalu. Disasters often highlight conditions of food scarcity (www.foe.org.au).

Many countries of the Pacific have only a low level of self-sufficiency in terms of local food production. Countries therefore have to import food in order to meet food demands. Fiji, for instance, imports more than half (57 per cent) of the country's food requirements.

Nutrition

'One cannot think well, love well, sleep well if one has not dined well.'

Virginia Woolf

Access to sufficient and nutritionally adequate and safe food for all people at all times is internationally recognised as a basic human right. Nutrition is a major determinant of morbidity and mortality. Improved nutrition results in improved health, which in turn contributes to increased human capital and labour productivity. Hunger and malnutrition are problems faced by different countries, especially the poor in these countries. Malnutrition affects all ages. From conception to birth, intrauterine nutrition affects foetal development. Nutrition also affects physical and mental development from birth and throughout life and affects the development of non-communicable diseases in the later years of life.



The peoples of the Pacific do suffer from malnutrition. Malnutrition early in life, followed by inappropriate diets and physical inactivity in childhood and adult life, increases vulnerability to chronic diseases. A group within a population will have some form of malnutrition. Malnutrition, which covers both under-nutrition and over-nutrition (WHO 1998), includes a number of nutrient-related disorders, deficiencies and conditions, such as intrauterine growth retardation, iodine deficiency disorders and iron deficiency.

Malnutrition is responsible for higher rates of death, especially, in some PICs, among children. Pacific Island children suffer when, as a result of inadequate care, they do not eat the right kinds of foods or the right amount. Diets do not contain whole grains, fibre, fruits and vegetables. As noted already, Pacific Island countries are characteristically heavily dependent on overseas food imports. In Kiribati and Tuvalu dependence on imported food and the absence of fresh vegetables from the diet result in some degree of malnutrition. Micronutrient deficiencies such as Vitamin A and iodine deficiencies and anaemia are problems of varying severity across the Pacific. Iodine deficiency disorders (IDD) is a problem in Fiji and Papua New Guinea (FAO 2003). Malnutrition in children, a consequence of inadequate dietary intake, is a concern. In Papua New Guinea infants under one year have a high prevalence of underweight and wasting, and half of children under 4 years suffer from wasting and stunting. This mainly affects children in urban areas. Vanuatu and Fiji also have high prevalence of underweight and wasting in children under 5 years (Saito 1995; Carlot-Tary et al. 2000).

More and more, Pacific people are moving away from their traditional diets. They have replaced nutritional local foods like breadfruit, banana, yam and taro with white rice, bread and now more recently, instant noodles. Dietary changes are part of a cycle of changes in people's tastes. Imported foodstuffs of doubtful nutritional value, such as mutton flaps, turkey tails and canned foods, are also being consumed much more. There is a shift away from traditional foods toward high energy density, high fat and low fibre diets resulting in over-nutrition and obesity—the other face of malnutrition. The level of obesity within Pacific Island countries is extremely high (Gill 2001) as also is the increase in weight-related morbidity (such as diabetes and cardiovascular diseases) and mortality. Cases, too, of overweight children in

the region are numerous—and multiplying. These children are more likely to have high blood pressure or heart disease. Diabetes is beginning to afflict children and puts them at risk of a number of disorders such as blindness, nerve damage, kidney failure and cardiovascular diseases (IFPRI Forum 2004).

Malnourishment among adults also occurs. In Fiji, iron deficiency is a problem among women of childbearing age. Malnutrition incapacitates people, resulting in low productivity, which in turn affects the economy. Mothers who are malnourished give birth to underweight babies whose health and growth are affected throughout their lives. In addition, children who are under- and malnourished cannot fight off diseases or infection. They also cannot concentrate at school and their poor results contribute to their inability to escape from their situation of poverty.

Human history records the process of changes in diet and nutritional status, and the pace of change has quickened over the last three decades. These changes occur at the same time as demographic, epidemiological and socioeconomic changes. Large shifts have occurred in dietary and physical activity and inactivity patterns. These changes are causing overweight, obesity, diabetes, high blood pressure, cardiovascular disease including stroke, and cancer. These changes are also reflected in changes in average stature and body composition.

Hard on the heels of the rapid economic and social change, the pace of nutrition transition has accelerated in the Pacific Island countries. Modernisation, urbanisation and the entry into the monetary economy have meant that as income increases, diets change to ones with higher energy fat intakes, increased consumption of animal fats, sugars and salt, and processed foods, and lower intake of dietary fibre in fruit and vegetables. Obesity emerges in these shifting conditions. In the many cultures of the Pacific, obesity is viewed as beautiful. However, obesity makes people prone to non-communicable diseases, which in turn reduce productivity.

Most Pacific Island nations deviate from the nutritional transition process, exhibiting a mixed pattern of under-nutrition and over-nutrition, rather than the more usual unidirectional process. This is the twin burden of malnutrition that Pacific Island countries now face, of over-nutrition and under-nutrition existing side by side in the same population.

*Changes in lifestyle*

With development and modernisation come behavioural changes in lifestyle, and changes in social behaviour and social value systems. The socioeconomic changes have also brought about new types of employment that do not expend a lot of energy. Labour mechanisation and automation, including watching television and other sedentary activities, have low energy expenditure. Indeed, inactivity and new dietary patterns have contributed to the prevalence of risk factors leading to obesity, diabetes, high blood pressure, cardiovascular diseases including stroke, and cancer.

Urbanisation has brought about changes in lifestyle, especially social behaviour and value systems. It has brought about changes in the pattern of diseases. There is evidence of early and more sexual activity among young people in the region. There is also evidence of multiple partnering among young people. This is reflected in the rapid spread of sexually transmitted infections such as gonorrhoea, syphilis, herpes, hepatitis B and HIV.

Conclusion

The availability of reliable mortality data in the Pacific Island countries is a problem. The vital registration systems are the main source of data on causes of death. It is important that mortality data be both accurate and reliable, since they continue to be very important for epidemiological and demographic research and in the formulation of public policy. Many countries in the region do not have complete registration of deaths and in many cases the causes of death are coded by a non-medical person. There is a need for health ministries in the region to employ a health person to code the causes of death, which must be certified according to the current International Statistical Classification of Diseases and related health problems. Countries need to ensure that medical certification of cause of death is applied in vital registration systems. In addition, campaigns must focus on urging the public to comply with the requirement that all deaths be reported and registered.

There is also a need to strengthen health information systems in the region. This is required to improve the capacity to analyse more effectively existing data that are useful for health policy and planning.

In addition, most countries in the region have no data on nutrition (table 5 is offered as eloquent evidence). No nutrition surveys have been carried out in these countries and many therefore do not have data on micro-nutrient deficiencies. Data on childhood malnutrition and micronutrient deficiencies (especially Vitamin A, zinc and iron deficiency) could assist in policy formulation and planning. Lack of research to date has meant that policy makers do not have the kind of information they need to evaluate the threat of increasing obesity and the rise of related chronic diseases.

Table 5 Child malnutrition (Underweight prevalence)

Country	Moderate	Severe	Reference Period	Source
Melanesia				
Fiji	7.9	0.8	1995	WHO
Papua New Guinea	No data			
Solomon Islands	No data			
Vanuatu	No data			
Micronesia				
Federated States of Micronesia	No data			
Kiribati	No data			
Marshall Islands	No data			
Nauru	No data			
Polynesia				
Cook Islands	No data			
Samoa	No data			
Tonga	No data			
Tuvalu	No data			

Source <<http://www.spc.int/demog>> (IMR)

The qualitative aspects of poverty are often mirrored in the levels of morbidity and mortality of a country. Indeed, the Pacific Island countries have made much progress in the last 50 years in lowering mortality and improving life expectancy. It is important therefore to maintain the momentum. However, even to do that is not easy because the slow economic growth of countries in the region constrains their ability to increase budgetary allocations to health.



This affects the delivery of health services, as is reflected in the shortage and distribution of qualified staff, and technical guidance, programme management and supervision are weak. There is shortage of drugs and other medical supplies. Medical equipment is not well maintained. Access is a problem because the government has not the resources to provide health care services to the poor in remote communities and the poor in turn do not have the resources to use the services. The governments need to increase their health care budget and to use resources more equitably and more effectively.

Poverty is indeed associated with lower health quality. Certain groups in the different countries of the Pacific are still battling infectious diseases. The reasons are well known—poverty, low incomes, food insecurity, poor-quality housing, low levels of education of mothers and poor health infrastructure, namely water supply, sanitation and solid waste management. These factors increase the risk of ill-health. There is a great need for heavy investment in health infrastructure, in the provision of water supply, sanitation, solid waste management and improved housing. Public health infrastructure needs to be extended to all areas that do not benefit from these facilities.

With urbanisation and modernisation the Pacific people have shifted away from their nutritious and traditional diet to one of high energy density, high fat and sugars and low fibre content. This has given rise to over-nutrition, problems of overweight, obesity and the related cardiovascular diseases, hypertension, diabetes and cancer. Moreover, studies have shown that infants who were undernourished while still in the womb and then are born small have a greater risk of developing abdominal obesity and related morbidity as adults. The existence of a double burden of malnutrition (of over-nutrition and under-nutrition) poses a challenge for intervention. Disability or premature death from non-communicable diseases can plunge a family into poverty. Illness and death further impoverish the poor. The cost of diagnosing and managing obesity and the related diseases is high. If action is not taken, this group of diseases will inundate the health services of Pacific Island countries at a time when they are still addressing infectious diseases and against a background of low economic growth. Awareness programmes need to be in place to improve nutrition during pregnancy. If non-communicable diseases are to be effectively addressed in the region, awareness and outreach programmes need to target



everyone, to prevent weight gain and to encourage a healthy lifestyle in adults and children. This must be the focus of public health campaigns.

Sexually transmitted infections have been endemic in the Pacific for generations. The early use of penicillin and related drugs effectively moderated their spread. However, the introduction of drug resistant strains into the Pacific has caused the re-emergence of sexually transmitted infection as a health issue. Cases of HIV are increasing quite quickly in the Pacific. The PICs are small with small populations. HIV could devastate a whole nation. Unless serious measures are taken to curtail the epidemic in early stages, the consequences could be catastrophic. The best way to respond to HIV/AIDS, given that there is no cure, is prevention.

Note

A version of this paper was initially presented in the seminar, 'Mortality as Both Determinant and a Consequence of Poverty and Hunger', Thiruvananthapuram, India, 23–25 February 2005.

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