

# A Review of Health and Nutrition Issues in the Pacific

*Future health improvements will require a sustained,  
multisectoral effort, emphasizing  
population-based approaches*

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Poor health hampers economic growth in the South Pacific and is reflected in the relatively high mortality rates and short life expectancy found in the subregion.

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Health is an important measure of any society's development progress. Yet improved health does not necessarily accompany economic development, "modernization", or urbanization. Nowhere is this better illustrated than in the South Pacific.

This article reviews the current state of health in five Pacific island countries: Fiji, Samoa, Solomon Islands, Tonga and Vanuatu. It considers some of the underlying causes of poor health, and it recommends alternative strategies for improving health in the context of overall economic development.

In general, the data on health in the Pacific island countries must be viewed with scepticism: they are often incomplete, inaccurate and unreliable, and are almost invariably out of date (Taylor 1985b), although a number of studies have yielded much useful data about specific health problems (Coyne 1984; Taylor et al. 1985).

### **Two decades of transition**

The five Pacific island countries are experiencing massive changes in health in tandem with rapid changes in the environmental, behavioural and in some cases even genetic factors that interact to determine an individual's health status. During the past decade, the transition in morbidity and mortality patterns in the South Pacific has been especially dramatic.

The Pacific island countries remained relatively isolated until after the Second World War. While some other parts of the globe were experiencing rapid technological, social and economic progress, the island countries retained many of their traditional social, economic and cultural features. The war brought the Pacific islands into contact with the Western powers and precipitated several decades of unprecedented change in virtually all dimensions of economic and social life. Pacific populations were exposed to new technologies (including transport, communications and medicine), social values and behaviours. Changes that had occurred over extended periods of time in other settings were introduced within merely a few years in the Pacific (Zimmer 1979).

Since the Second World War, the five island countries have experienced a shift from more rural, structured, homogeneous, village-based (i.e. "underdeveloped") economies to more urban, fluid, heterogeneous, cash-based (i.e. more "modernized") economies. This description belies important differences among the five countries, but it summarizes an overall trend that has its counterpart in health.

Until the 1950s, infectious diseases were the leading causes of illness

and premature mortality in the islands of the Pacific. Many of these diseases, such as measles and influenza, were introduced by slaves and indentured labourers who arrived by the shipload over several centuries (Taylor 1985b). Other diseases, closely associated with inadequate supplies of water and unhygienic waste disposal, or with other characteristics of a rural, subsistence environment (e.g. diarrhoeal disease), were extremely common.

These diseases persist in rural areas and in burgeoning urban areas where attempts to extend and upgrade utilities and basic services could not keep pace with population growth. The introduction of antibiotics and other drugs after the Second World War, public health improvements, such as malaria eradication campaigns and improvements in water supplies, and general socio-economic development resulted in a decline in mortality rates caused by infectious diseases, such as malaria, pneumonia and tuberculosis. These measures improved the overall health status in the islands.

However, in the 1960s, a new pattern of diseases began to emerge in certain Pacific island countries. In contrast to the earlier disease profile which resembled that of other underdeveloped countries, these island groups began to exhibit characteristics more closely associated with “Western” or “developed” countries. That is, non-communicable diseases, and specifically chronic, degenerative diseases such as diabetes, heart disease, cancer, and more recently accidents, suicide and alcoholism, began to dominate the disease picture.

By the mid-1980s virtually all island countries had been affected by this epidemiological evolution and there is currently a perceptible gradient among them from those characterised more by infectious diseases (e.g. Vanuatu and Solomon Islands), to those in which non-communicable diseases prevail (e.g. Fiji, Samoa and Tonga).

### **Current mortality trends**

Mortality rates and expectation of life at birth in the Pacific islands reviewed in this article are generally better than the global average and appreciably better than those of other developing regions (**table 1**). However, the five island countries generally experience a poorer health status overall than is the average among all countries in the South Pacific. For example, the expectation of life at birth in the five countries ranges from 54 and 56 years among men and women, respectively, in Vanuatu to 60 and 66.2 years in Fiji (Ahlburg 1985 and Taylor et al., in press, 1986), while the average combined (male-female) life expectancy throughout Oceania is 74 years. Infant mortality statistics for the five countries show an even wider spread, from 94 per thousand live births in Vanuatu to 33 per thousand live births in Samoa.

Table 1: Mortality and life expectancy  
(Adapted from Ahlburg, 1985)

	Fiji	Samoa	Solomon Islands	Tonga	Vanuatu
<b>Crude death rate</b>					
1960	(per 1,000) 13.0	-	-	-	-
1965	6.0	-	13.0	14.0 (1966)	20.0
1970	-	7.7	11.0	-	-
1975	7.8	7.0	12.0	8.10	12.0
1980	(1976) 5-6 (1983)	7.9	(1976) 13.0	(1976) 7.8	(1974-1979)
1975-80	<b>World</b> 11.4	<b>Africa</b> 18.0	<b>South Africa</b> 14.4	<b>Oceania</b> 9.0	
<b>Expectation of life at birth</b>					
	<b>Fiji</b>	<b>Samoa</b>	<b>Solomon Islands</b>	<b>Tonga</b>	<b>Vanuatu</b>
	m f	m f	m f	m f	m f
1960	63.1 65.7				
1965	65.3 68.6	60.2 64.3		56.0 53.0	
1970	66.4 69.9	59.6 63.4	58.0 58.0	56.2 59.3	-
1975	66.4 69.9	61.4 65.2	58.0 58.0	57.3 60.9	-
1980	66.2 69.9	62.2 66.0	57.0 57.0	60.0 61.0	56.0 54.0

1980 (Taylor & Levy)	m	f	m	f	m	f	m	f	m	f
Melanesians	61	64.0	62.0	66.0	54.0	54.0	63.0	56.0	54.0	54.0
Indians	60	62								
			<b>World</b>	<b>Africa</b>	<b>Africa</b>	<b>South Africa</b>	<b>Oceania</b>			
1975-80 (total)		57.3	47.6	51.7	74.0					
<b>Infant mortality rate</b>	<b>Fiji</b>	<b>Solomon Islands</b>	<b>Samoa</b>	<b>Tonga</b>	<b>Vanuatu</b>					
(per 1,000 live births)										
1960	65.0	-	-	-	-					
1965	58.0	42.6	52.4	59.0	-					
1970	50.0	47.5	52.4	20.6	-					
1975	43.3	36.0	58.0		-					
1980	54	(1971-1976)								
Indians	37	33.0	53.0	41.0	94					
Melanesians										
		<b>World</b>	<b>Africa</b>	<b>South Africa</b>	<b>Australia</b>					
1975-80	88	125	120	11						

Note: m = male; f = female

Source: Taylor and Levy (1986) and Ahlburg (1985) [AID (1985)]; Lucas and McMurray (1985); World Bank (1980); United Nations (1985)].

### **Modernization, urbanization and health**

“Modernization”, “development” and “urbanization” are frequently identified as the causes of contemporary health trends in the South Pacific. However, the definitions of these terms mask a vague series of attributes: each has been used to denote varied complexes of processes and stages. When researchers assert that development, modernization or urbanization are causally related to health problems, such as diabetes or heart disease, it is not always clear exactly which characteristics are the important correlates.

Some research has established causal linkages between migration, accompanying modernization, and chronic disease among migrants from the South Pacific, but no such causal relationships have been demonstrated among modernising populations who experience the modernization process *in situ*, that is, on their native islands within the South Pacific context (Newell 1983; Fianu 1983). Urbanization might denote dense settlement, predominance of wage labour (rather than subsistence agriculture), a relatively higher per capita income than in rural settlements, reasonably convenient access to goods and services (including transport, communications and health facilities), but not necessarily all of these. Or urbanization might denote a process rather than an end state, in which case its relevant components might be “uncertainty”, “dislocation”, “unemployment”, “stress” and conflict between competing rural and urban value systems etc., which might operate through an entirely distinct constellation of variables to influence health. The process of modernization might be linked with a very different set of health outcomes (such as anxiety, depression and violence) than the steady state definition, even though they may share certain health impacts (such as hypertension, coronary disease and accidents.)

Among the crucial socio-economic factors believed to influence the health transition currently being observed in the subregion are:

- A shift from consumption of local foods to imported and processed foods;
- Sedentarism in lieu of regular physical activity (especially among urban migrants and particularly among women);
- Inadequate housing;
- Poor employment opportunities;
- Expenditure of low incomes on goods and services other than food; and
- Emulation of elite, cosmopolitan life-styles (Taylor and Connell 1982).

Apart from the work of Prior and others on Tokelauan migrants to New Zealand (Prior and Davidson 1966; Prior et al. 1978; Prior and Tasman-Jones

1981; Prior 1981), there is scant research scientifically linking socio-economic aspects of “development” in the Pacific with health outcomes. Taylor’s preliminary analysis (1985b and forthcoming, 1986) has found a positive correlation between life expectancy, disease-specific mortality in the Pacific ‘and particular socio-economic, political and cultural variables, namely:

- Governmental expenditure per capita;
- Foreign aid per capita;
- Imports and exports per capita;
- Proportion of population in urban areas;
- Proportion of school-age children attending school;
- Remaining a territory of a metropolitan country or maintaining strong political ties with a former colonial power; and
- Ratio of physicians to population.

Some of these findings are confirmed by Ahlburg (1985).

Obviously these variables tend to be highly intercorrelated, and are probably only indirect determinants of life expectancy. The underlying determinants of mortality in the region have not been the objects of significant research.

### **Infectious diseases in the Pacific**

Though death and disability owing to infectious diseases have declined considerably in the Pacific island countries during the past two decades, infectious and communicable diseases remain a major problem in most of the five island countries. They are the leading causes of death in Solomon Islands and Vanuatu, where they are responsible for 24.3 per cent and 22.7 per cent of all recorded deaths, respectively (Taylor 1985b).

Of the greatest public health significance are acute respiratory infections (particularly pneumonia and influenza); common childhood diseases (whooping cough, diphtheria, measles and diarrhoea), the effects of which are intensified in undernourished children; and malaria. Other communicable diseases of concern to island health officials are rheumatic heart disease, tuberculosis, leprosy and sexually transmitted diseases.

#### **Malaria**

Malaria, a tropical disease of the greatest public health importance in the South Pacific, is found in Vanuatu and Solomon Islands among the five island countries under review. The recent increase in frequency of occurrence

of the especially virulent strain, *Plasmodium falciparum*, has been attributed to a growing resistance of the parasite to chloroquine. Some scientists have speculated that there has also been a change in mosquito behaviour and that this has rendered residual spraying less effective (Taylor 1985b and personal communication). Consequently, residual spraying is currently being combined with other control methods, including biological control of vectors (in Vanuatu), personal protection and large-scale administration of anti-malarial drugs.

### **Acute respiratory disease**

Acute respiratory infections, principally influenza and pneumonia are among the four leading causes of death in every one of the five islands reviewed in this article (see **table 2**). Acute respiratory disease is believed to be the leading cause of death among children under the age of five years in the South Pacific. (This differs from other developing countries where diarrhoeal disease is commonly the leading cause of mortality among children under five years of age). In a prospective, community-based study of children under five years of age in rural Papua New Guinea, approximately one third of all deaths were attributable to acute respiratory disease (Shann 1986; Riley 1983). Acute respiratory infection is endemic in Fiji (Parliament of Fiji 1986). Pneumonia is undoubtedly responsible for a high proportion of death among infants and young children in the "less developed" islands of Vanuatu, Solomon Islands and Samoa, and is also a major cause of morbidity and mortality among children in rural areas of the other island countries.

Death and illness owing to acute respiratory disease may be reduced through general improvements in standards of living, especially less crowded housing which lessens the probability of direct contact for acute respiratory disease transmission (Shann 1986; Riley 1985). Direct measures such as vaccination against respiratory ailments, and immediate, appropriate treatment of cases can reduce incidence of the disease and avert complications (Shann 1986; WHO 1985; Shann 1985).

### **Diarrhoeal disease and childhood diseases**

Data are not readily available on the importance of diarrhoeal disease as a direct or contributing cause of mortality in infancy and childhood in the Pacific island countries. But since diarrhoea has been incriminated as the leading cause of death among children under five years of age elsewhere in the developing world and because diarrhoeal mortality is so easily and inexpensively averted with oral rehydration therapy, it deserves further study in the Pacific subregion.

Monthly statistics are available on other communicable diseases of child-



**Table 2: Rank order, proportional morbidity attributed to major causes of death, Pacific islands, 1980, (both sexes)**

	Cause of death (proportion of all deaths, per cent)			
Country	Rank1	Rank2	Rank3	Rank4
Fiji				
Melanesians	Cardiovascular (25%)	Respiratory (14%)	Cancer (13%)	Infection (10%)
Indians	Cardiovascular (25%) disease	Accidents (13%)	Perinatal (10%) conditions	Respiratory (4%) disease
Samoa	Cardiovascular (32%) disease	Respiratory (11%) disease	Accidents (11%)	Cancer (10%)
Solomon Islands	Respiratory (25%) disease	Perinatal(25%) conditions	Infection (24%)	Accidents (9%)
Tonga	Cardiovascular (26%) disease	Cancer (18%)	Infection (10%)	Respiratory (8%)
Vanuatu	Infection (23%)	Perinatal(16%) conditions	Respiratory (13%) disease	Cardiovascular(11%) disease

Source: R. Taylor, 1985b.

hood (pertussis, diphtheria and polio). Data from Fiji, for example, indicate that while the incidence of numerous diseases of childhood (as mentioned plus tetanus) fell significantly between 1970 and 1980, the rate of decline was less pronounced for measles (Parliament of Fiji 1986).

### **Conclusions: infectious diseases**

Infectious diseases figure prominently among the leading causes of death in all five countries.

For the immediate future, direct measures as well as indirect improvements in standards of living will be necessary to reduce premature mortality, especially infant and young child mortality, and morbidity resulting from infectious diseases. Within the context of primary health care, which most of the islands have endorsed, the most promising measures are:

- Improved treatment protocols for, and vaccination against, acute respiratory diseases;
- Malaria control through a combination of personal protection, chemoprophylaxis, residual spraying and improved forms of vector control;
- More vigorous and comprehensive immunization of infants and children against childhood diseases;
- National oral rehydration campaigns, if survey data deem them appropriate;
- Continued improvements in water supply and sanitation in unserved rural and dense urban settlements; and
- Promotion of continued breast-feeding and/or adequate supplementation and weaning practices.

### **Non-communicable diseases in the Pacific**

Non-communicable diseases are significant and increasingly common causes of mortality and morbidity in the islands of the South Pacific. The chronic, degenerative diseases of most importance in the Pacific subregion, namely, cardiovascular disease, diabetes, hypertension and cancer, produce debilitating symptoms largely among mature adults, although precursor states may date from childhood.

By contrast, the other category of non-communicable illnesses, “diseases of violence and addiction” (which include suicides, accidents and alcoholism), seems to take a high toll among post-adolescent and younger adults.

**Table 3: Diabetes prevalence (per cent), both sexes, urban and rural, Pacific islands**

Country	Urban	Rural
Fiji		
Melanesians	6.9	1.9
Indians	14.8	13.3
Samoa	7.0	2.7
Tonga	6.2	3.9

Source: Various studies summarised in Coyne, T., 1984.

### Diabetes

Diabetes prevalence rates in the Pacific islands, among the highest in the world, have exploded since the 1960s when diabetes did not constitute a significant problem in the subregion (**table 3**). For instance, there was a ten-fold increase in diabetes prevalence among urban Fijians in just the 10-year period between the late 1960s and the late 1970s (Zimmet and Sloman 1980). Age-specific prevalence rates over time are not readily available, but in Fiji, among the population cohort aged 40-59, mortality owing to diabetes nearly quadrupled from about 40 per 100,000 to nearly 150 per 100,000 per year between 1971 and 1980 (Biumaiwai et al. 1984). Tuomilehto et al. (1985) have suggested that diabetes and cardiovascular disease combined account for more than one third of all deaths in Fiji.

Most of the diabetes observed in the Pacific subregion is adult onset diabetes, i.e. diabetes that appears in maturity (South Pacific Commission 1978). It is infrequent among traditional, rural Polynesian and Melanesian groups except in Tonga (Coyne 1984). For example, it is two to six times as frequent among urbanized Polynesian and Melanesian populations in Fiji and Samoa as among comparable rural populations. But prevalence rates are especially high among Fijian Indians as a group, regardless of whether they reside in rural or urban areas.

The leading causative factors linked with diabetes in the Pacific island countries include heredity, diet, nutritional status (i.e., obesity, adiposity or body mass), and physical inactivity. The starkly differing prevalence rates of diabetes among different ethnic groups in the region have led researchers to postulate the existence of predisposing genetic characteristics. It is believed, for example, that Micronesians and Polynesian are more susceptible to diabetes than other ethnic groups, and that, according to Zimmet, this proclivity is "... unmasked by the change in life-style. . ."occasioned by urbanization (Zimmet 1979).

Obesity is undoubtedly another predisposing variable, though some researchers hypothesize that in itself it is not sufficient to cause diabetes (Zimmet et al. 1983).

Decline in physical activity accompanying a more sedentary, urban life-style may be more strongly correlated with adult onset diabetes in the Pacific. A study in Fiji showed diabetes to be more than twice as common among people who were either sedentary or engaged in light activities than among those who performed moderate or heavy exercise, and this difference prevailed regardless of age, ethnic group, place of residence (rural or urban) or degree of obesity (Taylor et al. 1985b).

The effects of genetic inheritance and sedentarism may be reinforced by a drastic change in the composition of the typical diet, especially in urban areas, from one consisting principally of fresh fish, meat, and local fruits and vegetables high in fibre to a more caloric (and calorie dense) diet of processed and imported items including sugar, rice, tinned meats, fruits and vegetables, soft drinks, beer and white bread (Zimmet 1979 and Taylor 1983).

Quite recent studies by Turtle et al. comparing urban and rural populations of Fijian Melanesians and Indians confirm that there is indeed a genetic predisposition to diabetes among Indians, but that diabetes prevalence rates among both Melanesians and Indians vary directly with degree of "urban life-style", especially diet, e.g. increased caloric consumption and resultant obesity (Turtle, personal communication, 1986).

In short, diet and nutritional status (obesity), life-style (especially exercise) and genetic predisposition, are all potent factors, but no one has thus far quantified the relative weights of these variables. A final variable that may be associated with an increase in the recurrence of diabetes is stress, which appears to contribute to increased rates of diabetes among Tokelauan migrants to New Zealand (Stanhope and Prior 1960; Zimmet 1981).

Diabetes presents a serious public health problem not merely because uncontrolled glucose rates can precipitate death but also because of the high cost of treating the diabetic and averting and/or treating the secondary effects of diabetes, including small-vessel and circulatory disease. These costs are incurred especially in the secondary and tertiary stages of the disease, when symptoms must be treated in the hospital, often on a long-term basis, with the associated costs usually borne by the government.

### **Cardiovascular disease and hypertension**

Cardiovascular diseases are the leading reported causes of death in three of the five Pacific island countries reviewed in this article (Fiji, Tonga and

Samoa, see **table 2**). The two most important cardiovascular diseases are coronary heart disease and hypertension. Hypertension is important both as a disease leading to stroke and cardiovascular or renal failure and as a known risk factor for heart disease (Coyne 1984). Heart disease prevalence rate data are sparse, but available data suggest that rates of diseases in this category, while varying among countries, are on the increase throughout the subregion, as are the known risk factors for heart disease. This may be due to aging of the population, with a commensurate increase in the proportion of the population succumbing to diseases associated with longevity, or to a rise in age-specific rates, or a combination of both. Thus morbidity and mortality from heart disease will continue to rise unless risk factors are reduced (Zimmet 1979).

Little evidence is available on the prevalence of and relative risk from hypertension, genetic susceptibility, and environmental factors (diet, elevated blood lipids, lack of physical activity, smoking and stress), which are the major heart disease risk factors in the Pacific (Coyne 1984). Some inferences can be drawn from closely controlled, prospective studies of Tokelauans migrating to New Zealand among whom elevated blood pressure rates are common (Zimmet 1979; Prior 1979). Based on available evidence subgroups in the Pacific at low risk consist of:

“ . . . small, often isolated traditional societies or subsistence economies where individuals understand their role and where patterns of behaviour are clearly set. A low salt diet is a feature of such groups.” (Prior 1981).

By contrast, urbanization, modernization and rural-urban migration (and the dislocation and change they imply) are associated with high risk for cardiovascular disease (Prior 1981).

Thus in Solomon Islands cerebrovascular disease, angina pectoris, and ischemic heart disease are virtually unknown (Zimmet 1979), even among acculturated groups. Ischemic heart disease and cerebrovascular disease occur infrequently among the urban Melanesian Fijians, but are highly prevalent among Indian Fijians. Blood pressure rates are higher among urban groups in most countries, such as Tonga (Prior et al. 1978) Fiji (Zimmet and Sloman 1980) and Samoa (Zimmet et al. 1980).

Recent research elsewhere indicates that two prime risk factors for cardiovascular disease are physical activity (i.e. sedentary life-styles) and cigarette smoking. The impact of these factors could be minimized through health education aimed at “healthier life-styles” though approaches would be tailored for the South Pacific islands. Other interventions that might be practical for Pacific island populations include reduction of high salt intake, increased use of traditional high-fibre foods in the diet, reduction of smoking, weight control com-

mencing as early as childhood, and maintenance of strong social support networks (Prior 198 1; Coyne 1984).

### Cancer

Apart from recent cancer registry statistics, data on cancer in the South Pacific are poor, particularly considering the disease's rank as a cause of mortality. Disease detection and surveillance activities and reporting are frustrated by a lack of facilities and by variations in reporting practices which thwart attempts at cross-national comparisons. Cancer is the second leading cause of death in Tonga (accounting for 16 to 18 per cent of all deaths), the third cause among Melanesian Fijians, and the fourth most important cause of death in Samoa. (See **tables 2 and 4**). Like other chronic, degenerative diseases, cancer rates appear lowest in the "less developed" Pacific island countries and highest among the more "developed" countries. However, the lower rates observed in the less developed Pacific island countries may simply be an artefact of people dying prematurely of communicable diseases there while their more "Westernized" counterparts live long enough to develop and succumb to cancers.

In Vanuatu, cancer of the reproductive system (including breast cancer) accounts for more than 38 per cent of recorded cancer deaths. Among Solomon Islanders cancer of the mouth and liver were most common, perhaps reflecting the prevalence of betel-nut chewing and incidence of Hepatitis B known to be associated with those two forms of cancer respectively (Taylor et al. 1985a). Cancer rates in Fiji are generally substantially lower than (one fourth to one third of) rates in Australia, the United States or New Zealand, but these statistics may underestimate actual prevalence in Fiji. Rates differ significantly between Melanesian and Indian Fijians for reasons unknown.

Many of these cancers can be prevented by averting known risks such as smoking (linked to lung cancer), betel-nut chewing (oral and possibly oesophageal cancer), and Hepatitis B (liver cancer). Bladder, pancreas and kidney

**Table 4: Proportion of mortality owing to cancer, Pacific island countries (per cent)**

Fiji	
Melanesians	12
Indians	5
Samoa	7
Solomon Islands	0
Tonga	16
Vanuatu	4

Source: South Pacific Commission, *Cancer in Pacific Island Countries*, 1985. Covers years 1980-1982.

cancers, known to be associated with cigarette smoking, could similarly be reduced through a decrease in smoking. Cervical cancer screening has been recommended as a means of reducing mortality from this frequent form of cancer among Pacific island women but implementation would be difficult where basic health services are unavailable.

### **Diseases of violence and addiction**

The most important diseases of violence and addiction in the South Pacific are alcoholism, smoking, accidents (principally motor vehicle accidents) and suicide. With the exception of smoking, these diseases have received considerable attention because of their very rapid and recent increase and, in the case of accidents and suicides, because their occurrence among young males involves dramatic, premature death.

Alcohol-related problems are relatively new to the South Pacific. The data are not reliable but seem to substantiate governmental concern over this growing problem (South Pacific Commission 1986a). Binge-drinking rather than chronic alcoholism, and accidents, domestic violence and even suicide associated with drunkenness are the major concerns today, although the complications of chronic drinking may emerge as problems in future years. Another issue related to excessive drinking is the social and nutritional effect on the family when scarce household cash is used for liquor rather than basic necessities, especially food (Marshall et al. 1982; Richardson 1983). Alcohol-related morbidity and mortality tend to be under-reported: they usually are reflected in statistics on other illnesses or events (e.g. motor vehicle accidents and injuries). Patterns of excessive consumption of alcohol must be traced either through indirect indicators (e.g. volume of alcoholic beverages imported per capita) or through the rare special study (Taylor 1985b).

Estimating the public health significance of motor vehicle accidents in the South Pacific poses similar problems: the data are patchy and probably inaccurate and they have been little analysed. However, a recent review of existing data indicates that motor vehicle accidents are significant problems: when standardized rates for fatalities in various South Pacific island groupings were compared with Australia and New Zealand, fatality rates in the Pacific ranged from two times higher (in Samoa and in the islands overall) to five or six times higher in recent years in Fiji (McLean 1986). Not surprisingly, the more commonly motor vehicles are used for transport in a country, the higher the fatality rate. Vehicle safety and maintenance and driving skill are regulated poorly or not at all. Road upgrading, if unaccompanied by driver education and regulation, may actually increase the fatality rate as vehicles travel at higher speeds. Better data collection and analysis will shed further light on the causes underlying these trends.

A final cause of violent, premature death in certain South Pacific islands is suicide. Recent evidence compiled by epidemiologists points to a startling increase in the rate of accidental and intentional death owing to ingestion of paraquat, a commonly available herbicide (Bowles 1985; Taylor and Goldstein forthcoming 1986). The most pronounced trend is among young (aged 15-25) males in Samoa and Fiji although young Indian females also commit suicide at a high rate using that chemical. (Unlike young Indian males, young women do not appear to ingest paraquat accidentally at all, but rather exclusively with suicidal intent.) These suicides are probably prompted by a complex of social and economic factors such as frustration over limited employment opportunities, friction between children and parents in a cultural setting that scorns intergenerational strife, and intolerable treatment of young Indian brides by their in-laws (Taylor and Goldstein 1986). Solomon Islands appears not to be experiencing the same precipitous rise in suicide rates. Women appear to commit suicide there more often than men, allegedly in response to failed love affairs, family tensions and out-of-wedlock pregnancies, and often through overdoses of chloroquine. One hypothesis is that female suicide is a response to the lack of control and options young women experience (Gegeo and Watson-Gegeo 1985). Many of these suicides may be prevented through better regulation and protection of the herbicide and education aimed at avoiding unintentional poisonings.

### **Occupational health problems**

Not many systematic data are available on occupational health problems in the South Pacific. Even where safety and health standards exist, they are often unimplemented and unenforced (International Labour Organisation 1984). Standards and measures imported from more developed societies are often impractical in the climatic, cultural and economic environment of the South Pacific.

Provisions for maternity leave and child care are one occupational health and industrial measure that might have a very significant effect on infant health in the Pacific. By encouraging longer breast-feeding they would promote better infant nutrition and could avert the frequent diarrhoeas that often accompany early cessation of breast-feeding and introduction of breast-milk substitutes and/or solid foods.

### **Conclusions: non-communicable diseases**

Non-communicable diseases are on the increase in the South Pacific: in several of the five island countries extremely high rates of diabetes and heart disease have already been observed, and certain cancers are also excessively frequent. It is likely that these rates will continue to rise and that these patterns will be replicated in other islands unless immediate measures are taken.



To some degree, the increased proportion of deaths attributable to non-communicable diseases is due to the diminution of infectious diseases throughout the Pacific. But this explanation cannot account entirely for the dramatic rise in their incidence and prevalence: non-communicable disease rates are extremely high even when compared with Western, industrialised countries.

Research in other settings has demonstrated that rates of the leading non-communicable diseases in the Pacific island countries can be lowered substantially with appropriate public health interventions. For most diseases, these interventions are well-known and have been endorsed by the World Health Organization (Taylor 1983 and WHO 1978,1979,1980,1980a,1982).

WHO has recently urged that since some non-communicable diseases, such as coronary heart disease, can take years – even decades – to manifest themselves in higher mortality rates, less developed countries should act immediately to avert and/or lower the known risks with which they are associated. WHO recommends a population-based rather than a high-risk oriented programme (Dodu 1984). This approach would complement the current “primary prevention” approach, which emphasizes reduction and/or modification of “. . . the risk factors that are already present in individuals and the community and thus forestall the development of overt disease ” (Dodu, 1984). The principal difference between the two approaches is that the latter is based on reducing risk already present; the former would operate at an even earlier stage in the etiology of non-communicable diseases by averting risk factors. “Primordial prevention” has another advantage in developing countries such as those in the Pacific in that it is entirely consistent with the “primary health care” approach already embraced by the island Governments which offers them a mechanism for encompassing their communicable and non-communicable disease objectives within a single conceptual strategy.

Among the measures that could be promoted to reduce mortality and morbidity from non-communicable diseases in the Pacific Island countries are:

- Identification and control of cases of clinical hypertension (though this implies continuous patient compliance with drug therapy);
- Promotion of moderate levels of physical activity, especially among the totally inactive;
- Promotion of consumption of less salt and animal fats and more dietary fibre; lower total caloric intake among populations with predilections for obesity;
- Discouraging smoking and betel-nut chewing;
- Introduction of comprehensive cervical and breast cancer screening.

- Educational campaigns against excessive drinking and irresponsible driving; and
- Regulating the sale and handling of poisons such as paraquat.

### **Health, development and women in the Pacific**

Women as a group have special health needs and priorities, some of which were brought to light in the two surveys of women's health conducted thus far in the South Pacific, in Niue (South Pacific Commission 1985) and the Marshall Islands (forthcoming).

Cervical and breast cancer together account for up to 40 per cent of female cancer mortality in the island countries. In Fiji, cervical cancer rates exceed those found in Western countries. But cancer detection may not be easy to implement where health services are poor. By contrast maternal malnutrition, including anemia, which may be a significant determinant of birth-weight and therefore infant mortality levels, could be attacked through improved prenatal care and education. The survey of women's health in the Marshall Islands uncovered an extraordinary level of latent demand for contraception, probably attributable to a combined dearth of information on and access to alternative family planning methods (S. Levy, personal communication, 1986). Education on child spacing and better access to modern means of contraception could improve both maternal and child health. Similarly, efforts aimed at improving maternal and child nutrition, women's mental health, and the educational and economic status of poorer women could have a significant effect on mothers as well as their children.

### **Malnutrition: nutritional disorders, deficiencies and surfeit**

Malnutrition, which comprises undernutrition, overnutrition and poor nutrition, is a major health problem in the South Pacific and is a factor that underlies and contributes to the other principal health problems in the sub-region.

Historical evidence suggests that adults in the Pacific island countries suffered neither nutritional deficiency nor surfeit and consumed a healthful diet low in fat, high in fibre (though also high in carbohydrates) and adequate in protein. Infants were traditionally breastfed to two years of age or until the mother's next pregnancy. Malnutrition was probably common, however, in infancy and childhood from about seven months of age onwards when breast-milk intake decreased and traditional foods were inadequate for the child's

needs and widespread famines exacerbated their conditions (Coyne 1984; Darnton-Hill et al. 1985).

Traditional food habits have recently given way in urban areas (and less so in rural areas) to a diet heavily reliant on processed and imported foods (Thamann 1982; Parkinson 1982; Coyne 1984). These foodstuffs have the advantage of often being more accessible, more convenient to prepare and consume, and cheaper. From a nutritional standpoint, however, the contemporary diet contains excessive animal fat, salt and calories. High-fibre root vegetables (taro, sweet potatoes and yams) are replaced by less beneficial bread, rice, and tinned meats and fish. Food imports accounted for one fifth of total imports throughout the Pacific in 1978; in Tonga they comprised nearly 28 per cent of imports (Harris 1984; see **table 5**).

Recent studies have demonstrated a serious decline in nutritional status in cities and towns and in overall nutrition status compared with two or three decades earlier (Coyne 1984; Darnton-Hill et al. 1985). For example, a 1980 survey in Fiji revealed that 7.9 per cent of Fijian children and 24 per cent of Indian children under the age of five experienced protein energy malnutrition (Darnton-Hill et al. 1985). Moreover, among the adult population of Fiji, 40 per cent of males, 20 per cent of Indians of both sexes, and 80 per cent of Melanesian women in Suva are obese. A 1982 national nutrition survey in Vanuatu revealed a 23 per cent prevalence of protein energy malnutrition among children under five years of age (Darnton-Hill et al. 1985). Surveys of birthweight as an indicator of maternal nutritional status and the primary predictor of infant mortality have demonstrated low birthweights among certain population subgroups, such as poorer rural areas of Vanuatu and Fiji, among Indian Fijians, and in areas where malaria is endemic (Darnton-Hill et al. 1985).

Among women, both malnutrition (especially in Melanesia) and obesity (more characteristic of Polynesia and Micronesia), as well as anemias caused

**Table 5: Food imports, Pacific island countries, 1978**

	<b>Food imports/ total imports (%)</b>	<b>Food imports per capita (\$A)</b>
Fiji	15	110
Samoa	21	77
Solomon Islands	11	31
Tonga	24	73

Source: Connell, 1984, p. 5.

by malaria and/or iron deficiencies, jeopardise pregnancy outcomes and neonatal health. Anemia is also reported to be severe among children in Fiji, Solomon Islands and Vanuatu.

Breast-feeding duration is on the decline, and malnutrition correlates with early weaning among children in Samoa and Solomon Islands. Bottle-fed Samoan children are hospitalized more frequently for gastroenteritis; malnutrition occurs more frequently among bottle-fed Fijian children; and there is a lower incidence rate of infections among Polynesian children breast-fed for longer periods (Darnton-Hill et al. 1985).

On the other end of the spectrum, obesity, once regarded as a desirable attribute and common mostly among chiefs and wealthier islanders, is now routine. As previously noted, obesity has been associated with diabetes and hypertension.

#### **Determinants of malnutrition**

The relatively recent shift in dietary patterns coinciding with “modernization” is the major factor underlying poor nutritional status in the region. But, as noted, malnutrition in children, and sometimes among women of fertile age in certain subgroups, predated the transition and is probably caused by other factors. The factors that influence these patterns are complex, and suggest that introducing more healthful nutrition habits will be a multidisciplinary and difficult task. One researcher has suggested that taste, cost and convenience, in that order, are the principal factors influencing diet in the region (Connell, personal communication, May 1986).

Urbanization and modernization have involved relocation to urban areas and that has meant that:

- Food must be purchased and traditional foodstuffs are not easily available (or are extremely expensive compared with alternative foods, including imports);
- Families become reliant on wages and no longer cultivate rural lands, cutting off traditional subsistence foodstuffs;
- Foods are processed using “modern” techniques employing various additives, notably salt and sugar, but are nutritionally inferior to traditional foods (e.g. lower in fibre and complex carbohydrates);
- Women do not understand the nutritional qualities – or lack of them – of the convenient, but costly and nutritionally deficient processed foods, and thus are unable to compose satisfactory diets for their families;
- Men have migrated temporarily or permanently from rural areas to

urban centres or overseas and have abandoned agriculture entirely. Their families live in part on remittances (in part on cash crop earnings etc.) and thus effectively have an “urban” dietary pattern albeit while residing in a rural area; and

- Nutritionally vapid and expensive imported foods enjoy high status (are associated with an elite, modern, sophisticated lifestyle) and their short-comings are little emphasised in educational activities (Darnton-Hill et al. 1985; Connell 1981; Taylor 1983).

Other factors contributing to a decline in nutritional status in the five island countries are late introduction of nutritionally valuable weaning foods, low protein diets among children under two years of age, and more closely spaced births resulting from disuse of traditional birth-spacing methods (Darnton-Hill et al. 1985).

### **Improving nutrition in the Pacific**

Numerous measures have been suggested for improving nutrition in the island countries, some more practical than others. Some are reminiscent of a return to a more pastoral, labour intensive, subsistence agricultural lifestyle and are probably unrealistic. Assuming that a trend towards urbanization continues, measures that may improve nutrition include:

- Governmental awareness of nutrition problems (e.g., completion of national nutrition surveys and specialised studies where warranted);
- Formulation of national nutrition policies to ensure co-ordinated, adequately financed nutrition programmes (Tonga and Fiji have well-established National Food and Nutrition Committees);
- Stimulation of increased production, healthful processing and consumption of local foods (e.g. through intensified agriculture techniques, more efficient and competitive local transport and marketing systems; governmental research into traditional crops; and development of guidelines on appropriate food-processing);
- Decreased reliance on imported foods where economically and politically practical;
- Enhanced nutritional awareness on the part of the population through nutrition education in schools and communities, or via mass media including responsible advertising; and
- Training of indigenous nutrition experts, some at a paraprofessional level, to become staff members of nutrition education programmes.

A mix of production, marketing and promotional strategies will be necessary in each setting, and these must address realistically issues such as food

imports and continued consumption of monetarily costly and nutritionally undesirable but very convenient, processed imported foods (Harris 1984).

### **Health and health-related services in the Pacific**

#### **Lack of information and analysis**

The extensive documentation summarised in this article is indicative of the relative abundance of demand-side data, particularly clinical data, on health problems among the five island countries. Less well documented and analyzed are supply-side factors.

#### **Health policies of Pacific island countries**

##### *Policies*

All five island countries endorse direct investments in health, and all are in principle committed to primary health care. Only Solomon Islands has no recent health sector policy, although preparatory work for a policy began in 1985. Tonga adopted the primary health care approach in 1979 and Fiji in 1980 in its Eighth Development Plan covering the period 1980-1985. Fiji also endorses the goal promulgated by WHO of "Health for All By the Year 2000". Samoa has similarly endorsed the notion of universal primary health care at the village level.

Among the five countries, Tonga's policy is most multisectoral; it presumes that "health for all" can be achieved only through advances in health, education and family planning and by increasing "equity" and "efficiency" in health services. Most of the countries evince strong commitments to improving access to safe water and sanitary waste disposal.

##### *Performance*

Most of the island countries have embarked on a course of augmenting scarce health personnel – particularly for village-level care – with village health workers, and seem committed to this orientation. Most count on "community participation" in health care, though the interpretation of this concept varies from women's committee management of village health activities (Samoa) to financial payment for health services (Fiji).

Satisfaction with existing policies varies, and at least two countries, Fiji and Vanuatu, have acknowledged the need to interpret fairly general pro-

public health care policies in the form of more specific policies, plans, strategies and assessments; both of them found in mid-term policy reviews that current measures had little impact on the leading health sector problems (Parliament of Fiji 1986; Republic of Vanuatu 1986).

### **Budgets and expenditures**

Information on health expenditures shows a considerable degree of variation among the five island countries. Again, data are inadequate to permit specific recommendations in such critical areas as pricing and subsidies, for they comprise government expenditures on health but ignore the considerable level of expenditures for private health care, including modern medicine, traditional remedies and self-care such as available through over-the-counter medications. However, levels of government expenditure generally compare favourably with other less developed countries. Most of the island countries in theory allocate between 11 per cent (Vanuatu and Tonga) and 15 per cent (Samoa) of government expenditures to health (South Pacific Commission 1986b), a generous allotment relative to other less developed countries. However, as Ahlburg (1985) has suggested, there is a distinct urban bias in the distribution of health facilities and personnel, and this is sustained by an inherent bias in health funding in favour of urban areas.

However, mid-term assessments have indicated that in recent years actual allotments for the health sector have fallen substantially short of more optimistic projections, but accurate data on actual government expenditures are less easy to obtain.

In many cases the health sector is simply underfunded – i.e. given too little money to achieve the objectives in its plans. In some instances foreign donors' funds are used to breach the gap.

Virtually no information was available on new proposals or experiments to increase revenue for the health sector. In Fiji, nominal fees are charged at most levels of the health system, but services are heavily subsidized and all children under 15 years of age – 37 per cent of the population – are provided free services (Fiji's Eighth Development Plan 1980). In Tonga, there is acknowledgement that the health, water supply and sanitation programmes are grossly underfunded (Kingdom of Tonga 1985), but there is no mention of alternative avenues of increasing revenues.

In most developing countries such as those in the South Pacific, the greatest proportion of governmental health budgets is reserved for payment of salaries and benefits (representing 60 per cent or more of total budgets); the remainder is divided among other operating expenses including drugs, petrol and, if possible, maintenance. Little money remains for expansion or

innovation within the health sector, or for increased attention to rural health needs, and for these South Pacific Governments are heavily dependent on foreign aid.

There are promising indications that Pacific island countries are genuinely concerned about poor financial planning in the health sector.

### **Personnel and facilities**

A persistent theme among the five island countries is the scarcity of suitably trained personnel at all levels of the health system, but especially in mid- and higher level planning, management, data analysis, health services research, and evaluation.

Several of the countries suffer acute shortages of physicians. The ratio of population to physicians and nurses is undoubtedly a concern to the entire subregion. Lower ratios of population per physician in the five countries covered in this review are associated with lower infant mortality and crude death rates, a relationship observed among other South Pacific island countries as well (Ahlburg 1985). But more doctors are not a cost-effective means of improving mortality outcomes for, as this review has shown, many of the determinants of poor health and premature mortality are due to factors other than medical care. Ahlburg (1985) found what Vanuatu similarly concluded: population growth and the consequent demand for health services are far outstripping growth in gross national product, government expenditure and foreign aid. Thus more efficient and equitable distribution of existing resources, including greater reliance on non-medical, paraprofessional workers (e.g., primary health care workers) may be the only practical means of improving the population/trained health worker ratio.

### **Health services issues**

The least well-documented and analyzed - yet most crucial - aspect of the health sector in the Pacific island countries is health services. The five countries vary considerably in the structure and organization of their health services systems, coverage of the population, the ratio of public to private service providers, the emphasis the government places on public health measures (such as water and sanitation) versus personal, medical care, policies with regard to fees, and reliance on auxiliary health workers. The level of economic development, the medical and public health heritage bequeathed by colonial regimes, and population density and ease of access to cities and towns are among the many factors that account for the distinctive development of the health sector in each country.

Statistics on facilities, consultations, and coverage were available in some



instances, but it was impossible to gauge from them the quality of services and the extent of population coverage. However, the development plans and reviews offer some clues and insights into health services constraints and issues. According to these plans, virtually all of the countries are in need of improved planning, administration and evaluative research (Fiji 1985; Kingdom of Tonga 1986; Republic of Vanuatu 1986).

### **Health-related facilities and services**

#### *Water supply and sanitation*

Because poor water supplies and sanitation are linked with morbidity and mortality from infectious diseases, it is not surprising that those countries the populations of which have poorest access to these amenities (Solomon Islands and Vanuatu) also have the highest infant mortality rates in the sub-region. Like all other health indicators, access to adequate water supplies and excreta disposal differs between rural and urban areas. While representatives at the 1986 South Pacific Regional Meeting of Heads of Health Services emphasized the lack of these facilities in rural areas, the potential for communicable disease transmission among dense urban populations can be much greater than among rural groups.

Ahlburg (1985) has suggested that continuing urban population growth, in the absence of expanded water supply and sanitation facilities in urban centres, inevitably spells a decline in overall urban access to adequate amenities. Tonga has acknowledged this dilemma and Samoa has identified improvements in Apia's water and sewerage system as a major means of combatting diarrhoeal disease (Samoa 1985). Tonga's water supply and sewerage administration may be illustrative of problems throughout the region: it is underfunded, with technical and management deficiencies in various administrative bodies, and with a pricing system that generates insufficient routine operating funds, let alone money to expand and upgrade the system in tandem with accelerating growth in urban areas (Kingdom of Tonga 1985).

#### *Education*

Poor understanding among Pacific islanders of the causes and means of preventing disease and malnutrition is a serious obstacle to improving the health profile of the region. But low levels of educational attainment among women in particular are another factor rarely considered in health sector planning.

Preceding sections of this review have documented the importance of behavioural factors underlying leading health problems in the Pacific. Health and nutrition education can effectively change many of these behaviours. However, in developing countries (as in modern settings) health behaviours

are part of an ingrained and complex system of values, beliefs and attitudes that govern individual and collective behaviour in all spheres. In these circumstances, discrete behaviours may defy the most systematic, well-intentioned attempts to introduce change.

The effectiveness of health education in the region has been little studied, but the work of Thomas in Samoa provides some insight into the practical difficulties of reaching the most disadvantaged groups with nutrition education (Thomas 1985; Hill and Thomas 1986). Much of the formal and non-formal nutrition education is irrelevant to local circumstances, is presented in incomprehensible language and disregards gender roles.

Yet health education, or communication, can be effective and compatible with the socio-cultural environment. Promoting behavioural change leading to altered lifestyles among those at risk from diabetes, heart disease, strokes and cancer is virtually untried in developing countries but has proven challenging even in Western nations where the mass media are sophisticated, omnipresent and well-funded.

Promoting higher levels of female education – formal schooling as well as improved, more relevant, and culturally appropriate non-formal health and nutrition education – could contribute significantly to improved health in the Pacific subregion.

### **Conclusions: health and health-related services in the Pacific**

The effectiveness of programmes to stem rising rates of non-communicable disease and diminish infant and child mortality resulting from infectious disease depends in part on the availability of effective, accessible, acceptable and affordable health and health-related services. Absent quantitative and qualitative appraisals of health systems in the subregion make it difficult to identify appropriate health system investments for the Pacific countries or external donors, or to gauge the islands' absorptive capacity. Information on non-health sector resources which impinge on health is even more limited: a complete appraisal of health sector needs and options must look well beyond the Ministry of Health's purview. Nevertheless, a number of health services constraints are shared by Fiji, Samoa, Solomon Islands, Tonga and Vanuatu: insufficiently developed health sector policies, strategies and plans; a lack of trained staff at all levels, especially clinical and administrative; poor management information systems (especially health utilization data); general underfunding of the health sector with little attention to increasing revenue and efficiency in the sector; and a lack of intersectoral co-ordination with some few exceptions (e.g. certain nutrition activities).

## **Recommendations for strengthening health services**

Probably the most appropriate and useful recommendations at this time are suggestions on how to fill the health services information gap so that policy formation and programme planning can proceed on firm ground. Immediate measures include:

1. Identification of the immediate, proximate and underlying causes of poor health, including “intersectoral” factors (education, food production/pricing etc.)
2. Review of all existing sources of health funding, including public sector expenditures and private expenditures (on private physicians, non-medical healers, drugs etc.) “Demand for health” studies, carried out in numerous developing countries recently, have been helpful in establishing total expenditure levels, patterns, price elasticity and provider preferences.
3. Analysis of health (epidemiological) profiles on a regional or district basis to determine where additional resources are most needed.
4. Task-based assessments of workforce performance and hence training and recruitment requirements.
5. Diagnosis of logistics and support (supervision) weaknesses.
6. Inventories of planning, management and financing skills, and identification of hiring and training needs.
7. Review of the appropriateness of current medical “technologies”, including use of medical versus non-medical personnel and relative emphasis on preventive versus curative care.
8. Experimentation with and comparison of alternative modes of health care delivery to improve relevance, cost-effectiveness, sustainability and quality of care.

## **Conclusions**

Fiji, Samoa, Solomon Islands, Tonga and Vanuatu are emerging from an era of epidemiological transition. They retain the health characteristics of developing countries – relatively high infant mortality and incidence of communicable diseases – while exhibiting some of the most extreme rates of chronic, degenerative disease found anywhere in the world. Health investments in the region can be justified on humanitarian and human capital grounds, and should accommodate the peculiar balance between diseases of underdevelopment and diseases of “Westernization” found in each island country. Progress in the health sector is hindered by general underfunding, concentra-

tion in urban areas and on end-stage diseases, and by a dearth of adequately trained personnel, especially in health services planning, management and administration.

Future health improvements will require a sustained, multisectoral effort, probably in concert with external donors. Population-based approaches emphasizing preventive and promotive (i.e. life-style or behavioural) activities are most likely to influence morbidity and mortality patterns, though certain medical and public health measures (notably childhood immunization, malaria control and increased access to health care, safe water and sanitation) remain priorities. Finally, improvements in health sector management, planning and financing are required to ensure efficient use of meagre resources.

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