

THE HEALTH STATUS, INFORMATION REQUIREMENTS AND HEALTH NEEDS OF TUVALU

A REVIEW PREPARED FOR THE GOVERNMENT OF TUVALU

SPC Library



34333

Bibliothèque CPS

by Ross Naylor

Coffey MPW Pty. Ltd.

South Pacific Commission

Noumea, New Caledonia

February 1991

THE HEALTH STATUS, INFORMATION REQUIREMENTS AND HEALTH NEEDS OF TUVALU

A REVIEW PREPARED FOR THE GOVERNMENT OF TUVALU

**by Ross Naylor
Coffey MPW Pty.Ltd.**

South Pacific Commission

Noumea, New Caledonia

February 1991

ACKNOWLEDGEMENTS

This report was made possible through the invaluable support and cooperation of the Tuvalu Government, and in particular the senior personnel and staff of Tuvalu Ministry of Health, Education and Community Affairs.

iii
CONTENTS

	Page
1. EXECUTIVE SUMMARY	1
1.1 Health status	1
1.2 Information requirements	2
1.3 Health needs and related recommendations	2
1.4 Implementation of recommendations	2
2. INTRODUCTION	3
3. HEALTH REVIEW METHODOLOGY	4
3.1 Terms of reference	4
3.2 Field visits and research	4
3.3 The approach to the development of recommendations	6
4. HEALTH PATTERNS IN TUVALU	6
4.1 Population growth	6
4.2 Mortality	9
4.3 Morbidity	12
4.3.1 Notifiable diseases	12
4.3.2 Non-communicable diseases	17
4.4 Smoking, alcohol and fitness	20
5. THE TUVALU HEALTH SERVICE	21
5.1 The Operation of the Tuvalu health service	21
5.2 Preventive health services	22
5.2.1 Immunisation	22
5.2.2 Family planning	22
5.2.3 School health services	22
5.2.4 Family Health Project	22
5.2.5 Environmental health	23
5.2.6 Nutrition	25
5.2.7 Health education	27

5.3	The Princess Marguerite Hospital	28
5.3.1	Surgery	28
5.3.2	Medical services and outpatients	29
5.3.3	Midwifery	29
5.3.4	Nursing	29
5.3.5	Dental Service	31
5.3.6	Pharmacy	31
5.3.7	X-Ray services	32
5.3.8	Laboratory services	32
5.3.9	Hospital facilities and equipment	33
5.4	Outer island health services	34
5.4.1	Operations	34
5.4.2	Buildings and equipment	35
5.5	Evacuation arrangements	36
6.	INVOLVEMENT OF DONOR AGENCIES IN HEALTH	37
6.1	SPC	37
6.2	UNICEF	37
6.3	WHO	37
6.4	UNFPA	38
6.5	UNDO	38
6.6	AIDAB	38
6.7	New Zealand Government	38
6.8	EEC	38
6.9	BDDP	38
6.10	VSO	39
6.11	AVA	39
6.12	SCF	39
7.	RECOMMENDATIONS	39
APPENDICES	A. Health status surveys undertaken	57
	B. Current programmes and projects conducted by Ministry of Health and donor agencies and comments with regard to this review	67

1. EXECUTIVE SUMMARY

A review was conducted in March 1990 to assess the health status of the people of Tuvalu, the existing health information available, the current health services and programmes and the resultant health requirements of Tuvalu. The consultant was also required to discuss, and make recommendations regarding, a primary health care plan for Tuvalu.

The consultant visited seven of the nine islands of Tuvalu and conducted discussions with health personnel, Island Council representatives and community groups. On the main island of Funafuti he had extensive discussions with the Minister for Health and Community Services, the Secretary for the Department and the Director of Health. He also had discussions with the Matron of the Hospital and other health personnel. Discussions were also held with personnel from related Government departments. In Fiji, he undertook discussions with the major donor agencies operating in Tuvalu.

An Interim Summary Report was made available to the Government of Tuvalu in April 1990.

The major outcomes of the review are given below.

1.1 Health status

The health status of the people of Tuvalu is generally good, with some reductions in the incidence of life threatening communicable diseases in recent years. However, there is still a significant incidence of:

- respiratory tract infections
- diarrhoeal diseases
- conjunctivitis
- influenza
- and fish poisoning (ciguatera)

There are still a significant number of cases of:

- dengue fever
- tuberculosis
- hepatitis
- measles
- and meningitis

As with many Pacific nations, there is an increasing emergence of non-communicable diseases, such as:

- hypertension
- diabetes
- heart disease
- and cancer

Both the crude death rate and the infant mortality rate are worse than the average for the Pacific islands, and have not improved significantly in recent years.

1.2 Information requirements

Few surveys on the general health status of the population have been undertaken since 1983, with the exception of those relating to population and family planning (1987), hepatitis B (1984), filariasis (1989), and eye diseases (1988). Diabetes has not been extensively surveyed since 1976, hypertension was last surveyed in 1982, and iron deficiency and obesity in 1983.

There are significant gaps in the knowledge of the health status of the population, due to limited routine epidemiological monitoring and the absence of new health survey data in recent years.

1.3 Health needs and related recommendations

The health needs of Tuvalu are expressed in the recommendations outlined in this report and are all related to considerably improving the health status of the Tuvaluan people.

The Tuvalu National Development Plan 1988-1991, outlined three major aims of the Government in relation to health.

A further five aims have been recommended in this Review. The eight aims are given below. Each is later followed by a series of objectives and strategies arising from the review.

The eight aims are as follows:

1. To promote greater awareness of the need for better community health and the potential for the prevention of illness and disease.
2. To provide an equitable distribution of primary health and medical services.
3. To reduce the incidence of communicable diseases.
4. To reduce the incidence of non-communicable diseases.
5. To increase the effectiveness of the health service by providing and maintaining accurate information on the health status of the population.
6. To strengthen the family planning programme.
7. To increase the efficiency and effectiveness of the health service by regular operational reviews.
8. To co-ordinate the long-term health planning process.

1.4 Implementation of recommendations

It will not be possible to implement all recommendations given in this report in the short term due to resource constraints and the desire of the Government to co-ordinate all major health initiatives with donor agencies.

However, the development of these recommendations, as given in this review provides a framework for three, five and ten-year health plans to be formulated and implemented within available resource constraints.

Given the changing nature of factors affecting health care over the next few years (population structure, resource availability, disease patterns, health systems management) it will be necessary to review health care plans periodically and re-evaluate priorities.

2. INTRODUCTION

Tuvalu is an independent South Pacific nation of approximately 8,500 people located north of Fiji and south of Kiribati. The people are mainly of Polynesian descent. A Tuvaluan language, similar to Samoan is used, and some people also speak English. The country consists of nine small coral atolls 60-150 km apart with a total land area of 26.4 sq km. The climate is tropical with a high rainfall, especially during the cyclone season from December to March. There are sometimes drought periods during the rest of the year.

Generally the soil is poor, consisting mainly of coral and sand, with small quantities of richer soil derived from vegetation. The natural vegetation is mainly tropical with coconut trees, pandanus and a variety of natural shrubs and starchy root plants. All of the atolls are surrounded by reefs and fishing is carried out on the reefs or in the atoll lagoons. The main diet has traditionally been fish, coconuts, taro, breadfruit, papaya and *lailu*, an edible fern. Chicken and pork are eaten occasionally.

The main access to Tuvalu is by aeroplane, to the island of Funafuti which has the only existing airport. There are flights from Fiji, with connections to Kiribati and the Marshall Islands. Access to the other islands is by the Tuvaluan owned and operated cargo/passenger ship the *Nivanga II* which visits each island approximately every four to five weeks. It makes regular visits to Fiji for supplies and has also commenced a run to Western Samoa and Tokelau. There are no other boating or shipping links between the islands other than infrequent visits by the fishing fleet based at Funafuti.

Communication between the islands is generally by HF radio, including a HF radio network operated by the health services. Communication from Funafuti to the outside world has been via radio telephone, with a major satellite upgrade about to be introduced. Telex is available from Funafuti and facsimile services will be available in the future.

The Tuvaluan people generally still live in a traditional Polynesian manner. The housing on most islands is the traditional fale of pandanus roofing, supported by poles, often without walls, and flooring made from coral and sand with matting. Some more western-style housing has emerged, however, mainly on the island of Funafuti. The men usually fish, tend to the piggeries, maintain the housing and the community buildings and look after vegetable gardens. The women are mostly involved in domestic duties such as child care, cooking/cleaning, weaving and some vegetable growing. Some people have paid occupations with government departments or a range of small business ventures which are appearing, generally at Funafuti. There is usually a village store (the *fusi*) providing foodstuffs and a minimal range of other goods. Transport in the islands is generally on foot or by bicycle, although there are a small number of motorcycles. The few motor vehicles are confined to Funafuti and are almost entirely government-owned. Two privately operated mini-bus services also operate on Funafuti.

There is a 12-member Parliament in Tuvalu, with members from each island democratically elected. The four larger islands have two members, while the four smaller islands return one member each. The ninth island is administered by the larger island of Nukunono. The Government is formed by a coalition of members of Parliament. Each island also has an Island Council, which is responsible for the affairs of the island. The Government has a number of Ministries including the Ministry of Education, Health and Community Services.

3. HEALTH REVIEW METHODOLOGY

3.1 Terms of reference

In 1989 the Tuvalu Government requested the South Pacific Commission to undertake a review of health in Tuvalu, and the following terms of reference were agreed upon:

To examine and review all existing information on the health status and services of Tuvalu.

To discuss, examine and assess the health requirements of Tuvalu.

To consider and make precise recommendations as to the needs for supplementary information through health surveys.

To discuss and make recommendations on objectives and strategies for a simple and realistic primary health care plan for Tuvalu.

3.2 Field visits and research

In March 1990, the consultant visited the South Pacific Commission in Noumea for briefing discussions with Health Programme staff before proceeding to Tuvalu. On arrival in Funafuti, the consultant transferred to a passenger and cargo ship, the *Nivanga II*, and visited the Central islands, Vaitupu, Nukufetau and Nui over a five-day period. On return to Funafuti he then travelled to the Northern islands, Nanumaga, Nanumea and Niutao. The ship then returned to Funafuti via Vaitupu. On the visit to the Central islands, the consultant accompanied the Minister for Health, Mrs Naama Latasi and the Matron of the Princess Margaret Hospital, Mrs Annie Homasi. On the visit to Northern islands the consultant accompanied the Public Health Doctor, vaccination staff and sanitation staff. On returning to Funafuti, interviews were undertaken with the Senior Medical Officer, Dr Falasene Salesa, other hospital staff, personnel of the Ministry of Health and the Ministry of Agriculture, planning staff, the Water Supply and Sanitation Engineer and the Architect.

On each outer island, the following field activities were undertaken:

Interviews

- with the senior staff nurse or medical assistant
- with Mother and Child Health (MCH) clinic staff, if available
- with the Island Council President and other representatives of the Council, if available
- With the Secondary School Principal on Vaitupu.

Inspections

- of health clinics, MCH clinics, clinic wards and delivery rooms
- of villages, particularly water supplies and methods of sanitation
- of vegetable gardens and piggeries
- of village stores.

Two outer islands, Nukulaelae and Niulakita, were not visited due to the shipping schedule.

In Funafuti, the following activities were undertaken:

Interviews with :

- the Director of Health, and Senior Medical Officer of the Princess Margaret Hospital
- the Public Health Doctor, and the Acting Surgeon
- the Matron of the Hospital
- other hospital staff
- the Radiographer
- the Dentists and Dental Technician
- the Pharmacist
- the two Laboratory Technicians
- the vector and sanitation aides
- the epidemiological data personnel
- the MCH clinic staff
- the Minister of Health
- the Secretary for the Department of Health
- the Planning Officer
- the Prime Minister
- the Attorney General
- the Water and Sanitation Engineer
- the Radio Technicians
- the Public Works Architect
- the Senior Education Officer
- the Agriculture Officer.

The consultant then visited Fiji, where he had discussions with the major donor agencies concerning their current involvement in healthcare provision in Tuvalu and likely future plans. He then returned to Noumea for a de-briefing with health staff of the South Pacific Commission. While in Tuvalu, Fiji and Noumea, the consultant collected and researched surveys previously undertaken on various aspects of Tuvaluan health. He also visited Canberra on his return to Australia to collect further data and to undertake discussions with Australian International Development Assistance Bureau (AIDAB) staff.

A list of data collected is given in Appendix A, including brief outlines of previous health surveys undertaken. Further research of previous health surveys was also undertaken in Australia.

3.3 The approach to the development of recommendations

While significant restraints exist; such as a shortage of recurrent and capital works funding, and the availability of medical and nursing personnel, the recommendations have been developed with the long-term improvement of the health of the Tuvaluan people as the major aim. Although it will not be possible to achieve all the recommendations in the short-term, the aims, objectives and strategies expressed in this report provide a strategic framework for a co-ordinated, longer-term effective health plan to be developed, in liaison with the Tuvaluan Government and donor agencies.

Three distinct areas of development are addressed:

1. Programme development in prevention and reduction of disease.
2. The reduction of logistical barriers, such as evacuation and communication difficulties and inadequate supplies.
3. Operational and management effectiveness.

4. HEALTH PATTERNS IN TUVALU

4.1 Population growth

The high population growth rate in Tuvalu is a major concern for the current and future provision of health services, clean water supplies and appropriate sanitation. Currently, the population is growing at 1.66% per annum compared to a Pacific region average of 1.29%. (Tuvalu National Development Plan, 1988-1991).

Population growth rates over the last 15 years on the islands of Vaitupu and Funafuti have been particularly high, straining public services considerably; especially healthcare, sanitation and water supplies. Nanumea has also seen a high rate of population growth between 1979 and 1987. Funafuti, the centre of government and public services, has the largest population of all the islands, followed by Vaitupu and Nanumea (see Table 1).

Table 1: Population growth rates in Tuvalu

Year	1973^a	1978^a	1983^a	1985^a	1986^b	1987^b
Islands						
Nanumea	977	844	908	879	944	965
Nanumaga	587	605	762	672	696	717
Niutao	907	868	917	904	924	867
Nui	569	603	650	604	625	622
Vaitupu	948	1,273	1,320	1,231	1,407	1,437
Nukufetau	620	626	739	694	747	722
Funafuti	671	2,120	2,630	2,856	2,646	2,718
Nukulaelae	343	347	355	315	309	335
Niulakita	55	65	95	74	74	75
Total	5,887	7,349	8,364	8,229	8,372	8,458

Source: a. Government of Tuvalu, Planning and Statistic Division, various censuses.

b. Save the Children Federation, and the Integrated Island Development Office, Socio-economic Study, 1986-1987.

Population distribution amongst the three main island groups is given in table 2.

Table 2: Population distribution amongst the three main island groups.

	Population	Population share %
Northern islands (Nanumea, Nanumaga and Niutao)	2,549	30.14
Central islands (Nui, Vaitupu and Nukufetau)	2,781	32.88
Southern islands (Funafuti, Nukulaelae and Niulakita)	3,128	36.98
Total	8,458	100.00%

Source: Government of Tuvalu, Planning and Statistic Division, various censuses.

Save the Children Federation, and the Integrated Island Development Office, Socio-economic Study, 1986-1987.

The relatively even spread of population amongst the three island groups has important implications for health planning and the equitable distribution of services, and supports later recommendations in this report to establish small hospitals at both Nanumea and Vaitupu, and to locate a doctor at each to service nearby islands.

Average population density is very high, at 347 persons per sq km; higher again on Funafuti, and higher than the Pacific average of 3 persons per sq km. (Tuvalu National Development Plan 1988-1991), as shown in Table 3.

Table 3: Population density by island-1979 and 1987

Island	1979 (Persons per sq km)	1987
Nanumea	236	270
Nanumaga	205	243
Niutao	408	409
Nui	183	189
Vaitupu	260	293
Nukufetau	205	236
Funafuti	898	1,152
Nukulaelae	204	197
Niulakita	156	183
Total	301	347

Source: Tuvalu National Development Plan, 1988 - 1991

The crude birth rate for Tuvalu is also considerably higher than the Pacific average, as shown in Table 4.

Table 4: Comparison of crude birth rate in Tuvalu and the Pacific region.

	Tuvalu	Pacific region
Crude birth rate (per 000')	26.18	18.70
Crude death rate (per 000')	9.57	8.00
Male life expectancy (years)	57.00 (1979)	68.80
Female life expectancy (years)	60.00 (1979)	74.90

Source: Tuvalu National Development Plan 1988-1991, and Tuvalu Health Division Annual Report, 1988.

4.2 Mortality

Life expectancy is much lower than the Pacific average in Tuvalu, reflecting the potential for much improved health services. The crude death rate has not altered significantly since 1981, while the infant mortality rate has fluctuated considerably in recent years, with a peak of 89.6 deaths per 1,000 live births in 1987 (see Table 5).

Table 5: Births, deaths - all islands, 1981 - 1988

Year	1981	1982	1983	1984	1985	1986	1987	1988
Live Births	210	244	197	222	202	231	279	173
Deaths - All ages	78	74	79	63	92	78	109	83
Stillbirths	4	2	6	5	3	6	8	2
Perinatal deaths	4	6	1	9	7	4	10	5
Neonatal deaths	2	1	-	-	2	1	3	-
Infantile deaths	2	-	2	1	2	2	4	1
Maternal deaths	-	-	1	1	-	-	2	-
Crude birth rate 26.18	27.9	31.0	25.1	26.5		23.5	27.6	32.72
Crude death rate	10.3	9.6	10.0	7.5	10.7	9.3	12.78	9.57
Growth rate	1.76	2.2	1.5	1.9	1.28	1.83	1.99	1.66
Infant mortality rate	38.0	28.6	20.3	45.6	54.4	56.3	89.6	35.24

Source: Tuvalu Health Division Annual Report, 1987

Both the mortality and infant mortality rates are above the average for the South Pacific. Comparisons for 1988 are given in Table 6.

Table 6: Comparison of crude death rates and infant mortality rates for Tuvalu, some South Pacific countries and Australia in 1988.

	Crude death rate (per '000 population)	Infant mortality rate (per '000 live births)
Kiribati	13.9	N/A
Tuvalu	9.57	35.2
Australia	7.2	8.8
Western Samoa	7.1	24.0
Tokelau	7.0	14.8
Fiji	5.6	19.8
Tonga	4.2	11.1

Source: WHO South Pacific Region Data Bank on Socio-economic and Health Indicators.

The *Tuvalu Health Division Annual Report 1988* suggests that the dramatic decline in the infant mortality rate between 1987 and 1988 may be due to significantly improved obstetric management at the Princess Margaret Hospital. This coincides with the arrival of a UN volunteer surgeon and underlies the continuing importance of this position.

Trends in mortality in Tuvalu are difficult to ascertain due to incompatibility of data over the years. The *Tuvalu Health Division Annual Report 1987* outlines the major causes of death in that year. However, the data in the 1988 report appears incomplete. 1989 data was obtained by the consultant through direct access to records at the Princess Margaret Hospital. Although age-specific data was available, there was insufficient time to extract it from the records. A significant proportion of deaths in 1987 and 1989 have been recorded as due to old age or senility, or are recorded as for 'unknown reasons'. This is due to the difficulty of diagnosis on the outer islands infrequently visited by doctors. To some degree therefore, it is a difficult task to assess trends in mortality in recent years due to the problems of diagnosis and consistency in diagnosis from island to island and from year to year, (refer to Recommendation 5 in this report). However, a comparison of causes of death in 1987 and 1989 is given in Table 7.

Table 7: Comparison of causes of death.

Cause or description of death - Tuvalu	1987	1989
Dengue fever	1	
Gangrene	2	
General peritonitis	1	
Hepatitis	4	
Meningitis	5	3
Septicemia	1	
Cancer	4	
Cancer of the lung	1	
Cancer of the uterus	1	
Diabetes	1	3
Epilepsy	1	
Senility	23	8
Convulsions - febrile	1	
Paraplegia	1	
Cardiopulmonary failure	1	
Cardiovascular accident	1	
Cerebrovascular accident	6	4
Congestive heart failure	2	
Coronary heart disease	4	
Hypertension	1	
Hypovolemic shock	1	2
Stroke	5	
Asthma	5	2
Chest infection	1	
Chronic bronchitis	1	
Haemoptysis	1	
Pleural effusion	1	
Pneumonia	4	
Pulmonary Oedema	1	
Respiratory distress syndrome	1	2
Tuberculosis	3	2
Abdominal pain	1	
Acute diarrhoea	2	
Cirrhosis of the liver	1	
Chronic diarrhoea	1	
Dysentery	2	
Haematemesis	1	
Intestinal obstruction	1	
Liver Disease	5	
Peptic ulcer	1	
Severe gastritis	1	
Cystitis	1	
Abortion	1	
Breech delivery	1	
Hyperemesis gravidarum	2	
Interuterine death	2	
Perinatal deaths	1	
Placental insufficiency	1	
Postpartum haemorrhage	2	
Prematurity	5	1

Table 7: Comparison of causes of death, cont'd

Cause or description of death - Tuvalu	1987	1989
Prolonged labour (asphyxiation)	1	
Stillbirth	7	1
Arthritis	1	
Cellulitis - extensive	1	
Congenital malformation	1	
Cerebral contusion	2	
Drowning	1	
Fish poisoning	1	
Suicide	1	
Unknown	10	12
Total	109	76

Source: 1987 Data - Tuvalu Health Division Annual Report, 1987

1989 Data - extracted by R. Naylor from primary records at Princess Margaret Hospital

Which is impossible to draw significant conclusions regarding trends in mortality from the above data, it may be said that:

- . There were significantly less deaths in 1989 which related to pregnancy or the birth of a child
- . In both years, non-communicable diseases ranked slightly higher than communicable diseases as the major cause of death.
- . Any conclusion should be qualified by the fact that 30% of deaths in 1987 and 26% of deaths in 1989 were either due to 'old age, senility, or the cause was 'unknown'.

The only mortality data available to the consultant which indicates an age distribution is the 1987 data, given in Table 8.

Of particular concern is the high mortality rate in the 0-1 year age group (24%), especially relating to the birth process. The majority of deaths were in the 60+ year age groups, however liver disease and meningitis were more common in the 20-24 year age groups.

4.3 Morbidity

4.3.1 Notifiable Diseases

Trends in notifiable diseases can be ascertained from two sources:

1. *The Tuvalu Health Division Annual Report 1988.*
2. The South Pacific Epidemiological and Health Information Service (SPEHIS) operated by the SPC in Noumea.

The data are not entirely compatible as SPEHIS reporting requirements and disease classifications have changed in recent years. For example, reporting of acute respiratory infections was not required until 1989, and therefore Tuvalu Health Division data was used

to indicate a trend. Similarly, diarrhoea has had a much more age-specific classification in the last two years. Filariasis was not required by SPEHIS, but has been included since it has been a significant illness in Tuvalu in the past. Clinical reporting of tuberculosis was not required by SPEHIS from 1989 onwards.

Cases of notifiable diseases for the year 1986-1989 derived from both sources are given in Table 9.

Table 8: Causes of death 1987 - by age group

Causes of death	Not stated	Age grouping (year)									Total
		0 - 1	1 - 4	5 - 14	15 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 64	
General Peritonitis		1				2	1				1
Menigitis		2									5
Septicemia		1							1		1
Cancer of the lung											1
Cancer of the uterus											1
Diabetes	1				1					1	1
Epilepsy											1
Senility									2	21	23
Convulsions - febrile		1									1
Paraplegia											1
Cardiopulmonary failure								1		1	1
Cerebrovascular accident								1		3	1
Congestive heart failure								1	2	1	6
Coronary heart disease							1			3	2
Hypovolemic shock		1									4
Unknown		2				1				4	11
Asthma		2		1				1	1	1	10
Chronic bronchitis								1		1	5
Pleural effusion									1	1	1
Pneumonia			1							1	1
Pulmonary oedema						1				2	4
Respiratory Distress Syndrome				1							1
Tuberculosis									1	2	3
Acute diarrhoea										2	2
Chronic diarrhoea										1	2
Haematemesis										1	1
Intestinal obstruction										1	1
Liver disease		1				1	1	1		5	1
Peptic ulcer									1	1	
Breecb delivery		1									1
Hyperemsis gravidarum		1					1				2
Perinatal deaths		1									1
Postpartum haemorrhage		5				1	1				2
Prematurity		7									5
Stillbirth										1	7
Cellulitis-extensive											1
Congenital malformation		1					1				1
Fish poisoning											1
Suicide					1						1

Table 9: Notifiable diseases 1986 - 1990 Tuvalu

Notifiable diseases	1986	% OF	1987	% OF	1988	% OF	1989	% OF	1990	% OF
	CASES	TOTAL	CASES	TOTAL	CASES	TOTAL	CASES	TOTAL	CASES	TOTAL
Conjunctivitis	1158	15	557	8.7	293	7.3	169	6.2	21	2
Dengue fever							29		16	
Filariasis	9		17		13		N/A		N/A	
Hepatitis-unspecified	19		12		24		9		3	
Influenza							1			
Leprosy									1	
Malaria	1						N/A			
Measles	7		8		13		N/A		N/A	
Meningitis-viral	6		5		1		1			
Under nutrition										
Rheumatic Fever	7		8				N/A			
Acute respiratory infection	5138	66.8	3392	53.2	13	69	N/A	57	N/A	86.4
Tuberculosis - pulmonary	18		14		2760		1549		898	
Tuberculosis (other)	7		8		17		N/A		N/A	
Diarrhoea-infectious	623	8.1	1079	16.9	431	10.8	N/A		N/A	
Gonorrhoea	1		5		4		10			
Fish poisoning			3							
Amoebiasis			199	3.1	99	2.5	2			

Acute respiratory tract infections

Thirteen people died in 1987 and seven in 1989 from diseases of the respiratory system. Acute respiratory infections are by far the greatest cause of morbidity, accounting for 66.8% of cases of notifiable diseases in 1986 and 86.4% of cases in 1990 (first two months only). However, the volume of cases has fallen considerably, from 5,138 in 1986 to 1,859 in 1989. A very high incidence was reported in the first two months of 1990. The major cause of respiratory infections would be infectious transfer, however smoking may also be an important contributing factor. That 1983 health care survey by the Save the Children Federation (SCF) indicated that 74% of men and 32% of women smoked.

Conjunctivitis

In 1986 there were 1,158 cases of conjunctivitis, but the prevalence had fallen to only 169 cases in 1989. The excellent improvement can be attributed to visits of the Australian Eye Team in 1986 and 1988, and the implementation of improved hygiene, especially at the secondary school on Vaitupu. The 1983 SCF survey indicated that 36% of people examined had some type of skin or eye infection. In 1986, the visiting eye team determined that 32% of children surveyed (95% of children 0-16 years old) had at least mild trachoma. On the team's return a dramatic improvement had occurred.

Diarrhoea

Diarrhoea is the second leading cause of morbidity in Tuvalu. The incidence of diarrhoeal cases has been relatively stable over the past four years with 623 cases reported in 1986 and 750 cases reported in 1989. The incidence of diarrhoea has much to do with the quality and quantity of the water supply and the effectiveness of sanitation methods, especially the pour-flush toilets which require regular supplies of fresh water. The incidence tends to rise significantly during drought periods. Improved health education regarding personal and household hygiene may have had a positive effect on the incidence of diarrhoea. The 1988 Health Report indicated that six people died from diarrhoeal diseases in that year. Subsequent to this review a cholera epidemic occurred in Tuvalu, starting in July 1990. This was investigated and a report was submitted separately to the Tuvalu government.

Fish poisoning

The incidence of fish poisoning had not fallen significantly in the three years 1986 to 1989, and a large number of cases were reported in early 1990. There is no clear trend that ciguatera is declining. In discussions with health staff and village officials it was evident that the danger of consuming fish from certain reefs was much better communicated than in the past and there was a reluctance on some islands to eat reef fish at all.

Measles

A measles outbreak (199 cases) occurred in 1987 and some cases were also recorded in 1988. No cases were recorded in 1989. The last epidemic of measles occurred in 1980 with 509 reported cases (Tuvalu Health Division Annual Report 1987). Most of the 1987 cases were reported on Funafuti and Vaitupu, with a high incidence in the 5-14 years age group.

Dengue fever

Twenty-nine cases of dengue fever were reported in 1989 (including one death) and 16 in the first two months of 1990. No cases were reported in the period 1986-1988. The 1989 outbreak occurred in line with other dengue fever outbreaks in the South Pacific. Vector control is undertaken by the Health Department with limited use of insecticides. Insecticides have been shown to be effective by field trials undertaken by Laird in 1984 (Appendix A), however, the cost of insecticides and the staffing requirements have made this option

generally unattractive.

Filariasis

A small number of cases (9-17) were reported in the years 1986 - 1988. Figures beyond 1988 were not available. A filariasis survey was undertaken in 1989 on four islands, with over 800 people being tested. Infection rates of over 30% were found (Appendix A). A mass treatment was then undertaken.

Tuberculosis

Twenty-two to twenty-five cases per annum were reported in the years 1986 - 1988. Data for 1989 and 1990 were not available. The Tuvalu Health Division Annual Report 1988 states that of the 24 cases reported in that year five patients died. Two patients died in 1989. Tuberculosis is still a severe problem in Tuvalu, and improved screening programmes are needed.

Hepatitis

The incidence of hepatitis B (unspecified) reduced significantly in 1989, but three cases were reported in the first two months of 1990. Four deaths were recorded in 1988 and another four in 1989. Improvements in personal hygiene and effective sanitation have helped to reduce the incidence of infectious hepatitis.

No recent studies have been undertaken on the incidence rate of hepatitis B in Tuvalu. A study undertaken in 1978 indicated an 82% recorded evidence of past infections among those examined with a 7.5% hepatitis B virus carriage rate among Tuvaluans (Appendix A). There is currently no immunisation against hepatitis B in Tuvalu. Hepatitis B can now be vaccinated against at a much lower cost than in previous years.

Gonorrhoea

The number of reported cases of gonorrhoea has risen from one in 1986 to ten in 1989. The dangers of sexually transmitted diseases are a component of the health education programme. However, more emphasis could be placed on these diseases, including the dangers of hepatitis B and AIDS.

4.3.2 Non-communicable diseases

A high proportion of deaths in 1987 and in 1989 (as given earlier) can be identified as related to non-communicable diseases, such as cancer, stroke, heart disease and diabetes. A number of other deaths may have been influenced by the common determinants of non-communicable disease; nutritionally poor diet, obesity, lack of fitness, smoking and alcohol.

The Annual Reports of the Health Division do not include morbidity data relating to non-communicable diseases, but doctors and nurses report increasing cases of:

- hypertension
- diabetes
- heart disease
- cancer
- obesity.

Table 10: Cases of non-communicable diseases (NCD) on treatment

Island	Population 1987	Hypertension	Diabetes	Rheumatoid and gout-related arthritis	Heart diseases
Funafuti	2718	34	19	NK	1
Vaitupu	1437	11	-	-	1
Nanumea	965	8	5	5	-
Niutao	867	4	2	8	-
Nukufetau	722	6	4	6	-
Nanumaga	717	16	1	2	-
Nui	622	10	4	3	1
Nukulaelae	335	7	2	5	1
Niulakita	75	-	-	-	-
Total	8458	96	37	29	4

NK = Not Known

Table 11: Sex distribution of cases of NCD on treatment.

Diseases	Male	Female	Total
Hypertension	33	63	96
Diabetes	10	27	37
Rheumatoid and gout-related arthritis	20	9	29
Heart disease	3	1	4

Source: SPC Country Statement, Tuvalu 1989.

It appears that there is a higher prevalence of NCD cases in Funafuti, than on the outer islands, however this may be distorted due to:

- A number of outer island patients travelling to the Princess Margaret Hospital for inpatient or outpatient treatment.
- The greater possibility of accurate diagnoses at the hospital where the doctors are located most of the time.

It is notable that the rates of hypertension and diabetes are much higher amongst females than males, reflecting a significantly higher level of obesity amongst women. Possible reasons for the obesity are given under the section **Nutrition** in this report.

Diabetes, hypertension and obesity

A 1976 study of diabetes in Funafuti (Zimmet et al. [Appendix A]) indicated diabetes in 8% of people aged 10 years and over. A further 5.9% had borderline diabetes. The incidence of diabetes was twice as high in females as in males, perhaps due to the higher level of obesity and lack of fitness amongst females. Prevalence of diabetes was found to be five times higher than reported in Caucasian populations. A follow-up article (Zimmet, 1980) based on the same study, indicated hypertension amongst 11% of Tuvaluans. A 1982 study on hypertension in Funafuti (Homasi, 1982 [Appendix A]) indicated that most of the population screened had blood pressures within the normal range. A 1983 study by the Save the Children Federation indicated that over 75% of all women over 29 years of age were overweight and 50% severely obese.

Cancer

One death in 1987 was attributed to lung cancer and another to cancer of the uterus. Four of the 1989 deaths listed are attributed to cancer, although in both years cancer may also be included in the 'unknown' or 'senility' classifications.

Ninety per cent of cases of lung cancer are caused by cigarette smoking and, as mentioned earlier, (smoking is extremely prevalent in Tuvalu (48% of people of 15 years of age or over smoke).

The risk of having some cancers are increased by a low-fibre diet and there is evidence of an increasing consumption of low-fibre foods. Poor nutrition has been documented in a number of studies (Zimmet et al., 1981; National Primary Health Care Advisory Committee, 1985; and Save the Children Federation Primary Health Care Study, 1984 [Appendix A]) and has been confirmed in discussions with health staff in Tuvalu as part of this review (refer to **Nutrition** section).

For the ten years, 1978-1988, there were 26 cases of cancer registered. Most of these cases were lymphoma, cancer of the lungs, skin, uterus or breast. (see Table 12).

Table 12: Tuvalu Cancer Registry 1978-1988

Condition	Males	Females	Total
Bronchogenic carcinoma	4	-	4
Carcinoma of cervix	-	1	1
Carcinoma of skin	4	-	4
Carcinoma of uterus	-	4	4
Lymphoma	3	2	5
Carcinoma of breast	-	4	4
Leukaemia	2	-	2
Carcinoma of rectum	1	-	1
Malignant histiocytoma of bowel	1	-	1
Total	15	11	26

Source: SPC Country Statement Tuvalu, 1989.

Rheumatoid and gout-related arthritis

There are no reliable figures on the prevalence of these conditions, although it is believed that they are becoming more prevalent (SPC Country Statement Tuvalu, 1989).

Non-communicable disease control programme

There are special clinics for diabetics held at the Princess Margaret Hospital, however, most conditions are treated during normal clinics, both at the hospital and on the outer islands. Apart from clinical advice, NCD control tends to occur through community health education and nutrition programmes.

4.4 Smoking, alcohol and fitness

A large proportion of the population smokes cigarettes, although usually not the ready-made variety, as they are too expensive. 'Irish Cake' a roll-your-own tobacco, is popular and pandanus leaves are used as the cigarette papers. Children generally commence smoking at about 15 to 16 years of age.

Alcohol consumed does not appear to be a general problem. Some people suffer from alcohol-related diseases. Some *fusi* do not sell alcohol. Toddy (coconut tree juice) is consumed widely, and is an important source of vitamins. It is used in various forms; consumed warm or cool as soon as it is taken from the tree, or allowed to ferment for a few days. It is also used as a syrup in bread-making and other dishes.

The children on the islands are generally very fit due to their constant physical activities, however organised sports tend to be more male-oriented. There are men's inter-island competitions in

cricket, soccer and volleyball. The schools also organise a range of sporting activities for girls and boys. Both children and adults frequently walk or bicycle on the islands. Also, working in home gardens and performing household chores contributes to a reasonable physical activity level in many adults. The main groups not undertaking adequate physical exercise are the women over 30 years of age, the older men, and some men in sedentary occupations.

5. THE TUVALU HEALTH SERVICE

5.1 Operation of the Health Service

The Health Service of Tuvalu is based upon the services provided by the staff of Princess Margaret Hospital at Funafuti and health clinics on each island (including Funafuti). The services at the hospital include:

- . surgery and obstetrics (inpatients)
- . medical services (inpatients)
- . diagnostic services including X-Ray and pathology
- . pharmacy
- . dental services
- . outpatients clinics
- . other special clinics
- . the operation and administration of the outer island clinics, the Family Health and Family Planning Programmes, the Immunisation Programme and the sanitation programme, including the provision of health inspectors based in Funafuti.

Currently there are three doctors based at Princess Margaret Hospital, with vacancies for a surgeon and an anaesthetist. It is believed that a surgeon has been appointed and will be available within a few weeks (at the time of the consultant's visit). One doctor is the Senior Medical Officer at the hospital and another, who is on contract, is the Acting Surgeon.

Another doctor, also on contract, is the Public Health Doctor, who conducts clinics on the other islands (once every three months per island) and gives advice with regard to sanitation, water supply and other aspects of public health.

The staff establishment for each health clinic is two staff nurses, or a medical assistant and staff nurse, an MCH aide and a sanitation aide, although there are sometimes vacancies, especially in staff nurse positions. There are also vacancies for staff nurses at the hospital.

The New Zealand Government has provided a short-term visiting surgeon and an anesthetist on an annual basis, and an Australian eye surgery team has visited the islands every two years.

The National Dental Service also visits the outer islands regularly, although extractions are carried out by resident staff nurses or medical assistants.

The 30-bed hospital has an operating theatre, delivery room, pharmacy, dental surgery, consulting rooms, X-Ray room and laboratory. Plans are being drawn up for a major refurbishment of the hospital in the near future.

Regular radio communication occurs by HF radios installed at the hospital and all the island health clinics. Transport to and from all the other islands is by ship, the *Nivanga II*.

Referrals from the clinics on the islands to the hospital occur where surgery or medical services are required or when mothers are giving birth for the first time. Occasionally, referrals occur from the hospital for specialist treatment in Suva, Fiji and in some instances patients may be referred to New Zealand or Australia.

5.2 Preventive health services

5.2.1 Immunisation

A comprehensive immunisation programme is carried out in all nine islands by nursing staff. Vaccines are stored in solar-powered refrigerators which are generally very reliable. Where the vaccines have not been stored at the correct temperature due to refrigerator or power malfunction, nursing staff visit from the hospital at Funafuti about three times per year to undertake the vaccination programme. Assistance in supply of vaccines and equipment has been made available by UNICEF.

In 1988, 100% coverage for BCG at 0-1 years and 6-15 years was reported; 95% coverage was reported for polio and DPT; 74% coverage was reported for tetanus toxoid for pregnant women; and 97% coverage for measles in the 0-5 years age group.

5.2.2 Family planning

A family planning programme is operative on all islands and there is extensive use of various types of contraceptives.

Many family planning workshops have been undertaken, with a wide distribution of materials in the Tuvaluan language. Most assistance has been provided by UNFPA and SCF. Training programme have been undertaken for staff nurses, MCH nurses and nurse aides, and community workshops have also taken place on the islands. The crude birth rate is currently 27.60 per 1,000 and it is a UNFPA objective to reduce it to 24 per 1,000.

5.2.3 School health services

Nursing staff on all islands conduct regular school clinics (usually one per week) to identify, monitor and treat any illnesses prevailing amongst the school populations.

5.2.4 Family Health Project

A Family Health Project has been in operation over a number of years with the assistance of UNFPA and WHO. Emphasis has been given to training health staff in health promotion, and disease and illness prevention on a community basis, with maternal and child care having a particular focus. The operation of the outer-island clinics has been particularly important in this project, and assistance has been given towards their recurrent costs. Ante and post-natal clinics are operated from these facilities with regular home visits by clinic nurses and MCH aides. Particular emphasis has been given to a Family Nutrition Project, assisted by SCF.

5.2.5 *Environmental health*

Water supply

An extensive water supply programme has been in operation for a number of years and virtually all families have catchment arrangements and above-ground water tanks. These are supplemented by larger community tanks (fed from public buildings), and wells are provided on some islands where below-ground water is available. However, due to droughts and the increased consumption of water for sanitation and other domestic uses there is a need to expand water storage.

Water shortages are a problem throughout Tuvalu, despite significant action in recent years to supply water tanks to most households. Most houses have 700-800 gallon concrete tanks constructed beside them, with a family building (often a kitchen) having a galvanised iron roof providing the catchment. However, these provide only up to two months supply, and drought periods are quite common. As a result, many villages run out of water once or twice a year. Villages usually also have community water storages fed from public buildings (such as a church). These are provided with pumps and families then have to carry their water back to their houses if their own supplies have run out.

On Nukufetau there is a limited water reticulation system from storage connected to public buildings and the water is pumped to nearby houses. Nukufetau also has a well with a large 'Southern Cross' windmill provided to pump the water to a public storage tank. However, the windmill has not been operating for some years, due to an inability to obtain some small, but necessary replacement parts. There appears to be a shortage of basic plumbing and pump fittings at Nukufetau. Nui also has wells, but very few have pumps and instead the people rely on recycled tins to lift the water. The new village at Nui currently has no water tanks. As with the other islands, Vaitupu is well supplied with family water tanks, and wells are also used. However, many of the well pumps do not work due to maintenance and part problems. On Nanumaga and Nanumea most people have water tanks, but water shortages also occur throughout the year. Wells are also in use on Nanumea, but the people are concerned with the water quality and requested that the Laboratory Technician visit the island to test the water. This concern has arisen because of the increased amount of septic pits being installed on the islands and the possible subsequent contamination of the water supplies. The wells on Vaitupu, for example, are not generally used for drinking water.

Water supplies on Funafuti are a combination of public and household storages, and below-ground water is not used for drinking. In some cases communities construct their own water tanks, but sometimes there is a shortage of materials to build them (as in Nui, where there is no tank mould or sufficient cement). The number of houses with water tanks is given in Table 13.

Table 13: Incidence of household water tanks by islands.

Island	No. of houses	No. of water tanks	Coverage (%)
Funafuti	457	123	26.9
Vaitupu	259	162	62.5
Nanumea	210	214	101.9
Niutao	166	129	77.7
Nukufetau	147	147	100.0
Nanumaga	140	142	101.4
Nui	113	81	71.6
Nukulaelae	62	57	91.9
Niulakita	16	—	—
Total	1,570	1,055	67.00%

Source: Tuvalu Health Division Annual Report, 1988

Funafuti and Niulakita in particular require a considerable increase in water supplies. However, the supplies of water in public cisterns should be taken into account.

Sanitation

Most houses on the islands (76%) have pour-flush toilets and below-ground sewerage pits. These are simple to install and operate reliably, although they depend on adequate supplies of water. The toilets are usually housed in traditionally constructed enclosures.

Table 14: Incidence of household latrines by islands.

Island	No. of houses	No. of latrines	Coverage (%)
Funafuti	457	365	79.8
Vaitupu	259	148	57.1
Nanumea	210	142	67.6
Niutao	166	135	81.3
Nukufetau	147	121	82.3
Nanumaga	140	136	97.1
Nui	113	100	88.5
Nukulaelae	62	56	90.3
Niulakita	16	-	-
Total	1,570	1,203	76.6%

Source: Tuvalu Health Division Annual Report, 1988.

Nanumea, Vaitupu and Niulakita all require an increase in water-sealed latrines.

One of the major problems with the use of the latrines is the inadequate water supply. People are not inclined to use water for flushing when there is a shortage of water, causing hygiene problems and the use of alternatives such as the beach. The cholera epidemic of 1990 is a clear illustration of this problem (see separate report). Another considerable problem is the high cost of toilet paper. Many people find the paper (about A\$1 a roll) too expensive. On Nukufetau 34 houses do not have toilets and there is a shortage of plastic toilet bowls. On Nui, approximately 20 houses do not have toilets, especially in the newly-constructed village. The toilet bowls will be transferred from the old village, but there is a shortage of cement. A large number of houses in Vaitupu do not have toilets and this is considered to be the main reason why the incidence of diarrhoea is so high. There are also a lot of flies on the island. On Nanumaga, only four houses do not have toilets, due to a shortage of plastic bowls, and on Nanumea about five houses do not have latrines. As with Vaitupu, flies are a big problem on Nanumea, and many people still use the beach when they do not have toilets, or when there is a shortage of water.

Most latrines in Tuvalu are the pour-flush pedestal type, although there are a small number of squat type toilets. Some public buildings (including the hospital and the clinics) have cistern-flush toilets, which use about two gallons of water per flush.

Most toilets have a pit underneath surrounded by rocks with an earth base. These are abandoned after filling up after a few years and a new site is chosen. This style of sewage disposal has a potential to contaminate ground-water supplies in nearby wells, as well as the lagoon. There are a small number of septic tanks fitted to toilets in Tuvalu, most being in Funafuti (approximately 50% of toilets in Funafuti have septic tanks).

Animals

Dogs are present in Tuvalu, as well as pigs and chickens. The pigs are generally housed in family pigstys and are usually kept well away from the village areas. However, pigs often stray; this was particularly noticeable in Funafuti and Vaitupu, although cyclone damage was probably the major reason for strays. All islands have a Island Council by-laws enforcing the control of pigs. Pork is eaten on occasions. Chickens are a common sight around villages and are usually allowed to wander or are confined to small yards. The control of chickens is an important element in the success of home-based vegetables gardens. Chicken is a useful protein addition in the diet, and eggs are used when available.

5.2.6 Nutrition

Food production in Tuvalu centres around the harvesting of coconuts and fishing, and root vegetables. There are usually ample supplies of all three types of food, although fish harvesting is severely hampered where ciguatera occurs or when there are extended periods of rough seas. Leafy vegetables and fruits are also grown on the islands, with mixed success.

Often the soil is poor, and gardens can be damaged by cyclones, flooding, tides, chickens, and pigs. There are also regular shortages of seeds, fertilisers for composting and chicken wire for garden protection. However, the Agriculture Department does have a programme of encouraging and advising villages on gardening, and an important component of the health education programme is the encouragement of home gardens. Some small commercial gardens also exist on the islands and supplies are sold directly or through the *fusi*. On Nukufetau there is a large sweet potato garden.

The following vegetables are grown on all the islands:

- . laulu (often wild, edible fern)
- . bele (edible hibiscus leaves)
- . cucumber
- . melon
- . eggplant
- . chinese cabbage
- . sweet potato
- . pulaka
- . taro (roots)
- . papaya
- . pumpkins

However, gardening doesn't appear to be as popular as a few years ago, when there were more regular gardening competitions. A very low proportion of houses have family vegetable gardens.

Fish harvesting, being a traditional practice, is still very common and fish is a regular part of most family meals. However, the prevalence of ciguatera has meant that fishing can only occur beyond the reef on some islands, limiting the quantity and variety of fish available.

Family food production is not as necessary with the increased popularity of the *fusi* on each island. This alternative is only possible of course, where the family has an income. However, an increasing variety of foods can be purchased at the *fusi*, the popular foods being tinned meats and vegetables, white rice, white flour and sugar. The change in diet to low-fibre, higher-energy processed foods with increased consumption of salt and sugar has been an important contributing factor in the increased prevalence of diabetes, hypertension, cardiovascular disease and obesity.

The changing nature of food supplies and consumption has affected components of the population in differing ways:

- Under five-year-olds have tended to be overweight due to overfeeding of infants with generally unnecessary supplementary foods.
- School-age children have a high incidence of skin sores, scabies and eye infections, probably due to low intakes of fresh fruit and vegetables. They also have a high incidence of anemia due to low consumption of green vegetables and the high prevalence of hookworm and other parasites. They also have a high incidence of dental caries due to high sugar consumption from snack and starchy foods.
- Adult females tend to become obese after 30 years of age, and by age 40, 49.88% of women have been found to be overweight with 66.5% obese (Save the Children Federation Survey, 1983).
- A major reason for increased obesity has been the change in energy foods consumed from high-fibre to low-fibre content. (e.g. white rice, white flour, sugar). Traditional energy foods such as breadfruit, *pulaka* and cooking bananas have been high in fibre. Pregnant and lactating women have also tended to eat more in the belief that it will help maintain a healthy child. The high energy consumption has not been relieved by an increase in physical activity amongst women, and there is some evidence that women are exercising less. Anemia also tends to be a major health concern amongst adult females, now consuming less iron-rich foods such as green leafy vegetables than previously, and exacerbated by the continuing presence of hookworm.
- Adult males also tend to be obese but far less so than adult females due to higher levels of physical activity. However, morbidity and mortality data does support the view that the incidence of increased non-communicable disease amongst adult men may also be nutritionally related.

5.2.7 *Health education*

A considerable component of health education is incorporated into the following programmes:

- the Family Planning Programme
- the Mother/Child Health Programme
- medical, dental and special curative and preventative clinics (e.g. diabetes)
- school clinics
- the work and inspections of the sanitation aides.

The nurses and medical assistants play key roles in the conduct of these programmes and the relevant health education components. However, a community-based health education programme also operates through the primary health care committees on each island and its national body, the National Primary Health Care Committee.

Each island has a primary health care committee, with community representatives such as:

- the Island Council President
- the nursing staff
- the medical staff representative(s) (Funafuti)
- the School Principal or a representative teacher
- the Agriculture Foreman
- the Youth Worker
- the Community Worker
- the Girl Guide representative
- the Boy Scout representative
- the Island Executive Officer
- the Women's Committee representative
- the Red Cross representative.

The actual representation on each island varies, but generally includes those listed above. The Primary Health Care Committees (PHCCs) on each island carry out regular village inspections, undertake village health education meetings, and advise the Councils, the Government and the Health Department on actions that may be taken locally to improve people's health. Health matters are discussed at PHCC meetings and information is then passed on to representative organisations. For example, the Girl Guide representative will communicate preventive health information to the Girl Guide's meeting. This filtering of health care information into the island communities is a very effective method of improving community awareness of preventive approaches to health and also has a high degree of community acceptance. Most health meetings involving the community are held at least monthly and are often given by the nurses, or a doctor if he is available. However, attendance is often low.

Generally, there is a critical shortage of health education pamphlets and posters, and the ones that are available are often in English. Radio talks are given twice a week on health education, and the station can be heard throughout the islands. Two very excellent booklets produced by SCF (in Funafuti) have been made available to all families in Tuvalu. They are:

1. *Foodpath to Health - A Nutrition, Gardening and Health Manual for Tuvalu,*
and
2. *Hope for the Future - Family Planning Information for Tuvalu.*

These booklets are written in Tuvaluan and English and have excellent diagrams and illustrations.

Tuvalu also has a community Family Planning Association which currently has 26 members in Funafuti and employs two staff. It is a family volunteer programme assisted by the International Planned Parenthood Association.

The primary schools appear to have very little in health education, although there are plans to expand the curriculum in this area. Clinic nursing staff undertake health education classes at the school, but the frequency varies from island to island; from up to three times per month to only occasionally through the year.

The clinic staff normally have to be invited by the teachers or the Principal to be involved in health education at the schools.

While each island has a primary school, there is only one secondary school in Tuvalu, located at Vaitupu.

Health education for the first few years of secondary school forms part of the subject Home Economics, which is only available for girls. The health education component is therefore very limited, but includes topics on diet, personal hygiene, smoking, alcohol, or gardening and fishing. Some health education is included in a Textiles subject for girls in Form 5. Sex education is taught in Science in Forms 4 and 5, from a biological standpoint, to both girls and boys. Health education in the secondary school is therefore very limited, and mainly available to girls.

5.3 The Princess Margaret Hospital

The Princess Margaret Hospital at Funafuti is the major focus for the provision of health services in Tuvalu and it is where the vast majority of health resources are utilised. All three doctors and 21 of the establishment of 36 nurses are stationed there. It is also the location for Tuvalu's dental services, pharmacy, diagnostic laboratory, X-Ray, and theatre. It also has a delivery room and 30 inpatient beds. A significant proportion of the hospital is to be redeveloped in the near future including the provision of an isolation ward, a paediatric ward, a mental ward, an intensive care unit and a new obstetrics ward. Some of the funding for the redevelopment has yet to be committed by a donor agency.

5.3.1 Surgery

The hospital acts as a referral centre for Funafuti and outer island patients requiring basic surgery. This includes patients suffering from head and other injuries due to accident trauma, peptic ulcers, hernias and appendicitis. There are also minor eye operations, removal of lesions, and a range of other minor surgical procedures performed. More complicated cases are referred to Fiji, New Zealand or Australia.

A UNDO volunteer surgeon completed his service in August 1989 and a retired Tuvaluan doctor has been the Acting Surgeon since then. Currently, the Acting Surgeon also undertakes the

necessary anaesthetics, although UNDO is also seeking a full-time volunteer anaesthetist.

Some diagnoses which may ultimately lead to a decision to operate or not would be assisted by improved X-Ray and laboratory services.

5.3.2 *Medical services and outpatients*

The Senior Medical Officer has the responsibility for the management of medical inpatients and is assisted by the Public Health Doctor. Both conduct regular outpatient clinics for Funafuti residents and patients referred from other islands.

General outpatient clinics are held each Monday to Friday morning and special clinics are held in the afternoons (medical, surgical, ante-natal, post-natal, family planning, diabetes, hypertension, eye, and pediatrics). There is also a two-hour clinic on Saturdays. Not all of the clinics are attended by the doctors. The post-natal and family planning clinics are generally conducted by the staff nurses.

5.3.3 *Midwifery*

Table 15: Birth and infant death statistics for 1988.

	Princess Margaret Hospital, Funafuti	Outer islands	Total
Live births	173	54	227
Still births	2	-	2
Perinatal deaths	4	1	5
Infantile deaths	1	-	1
Total	180	55	235

Most births (66%) occur at the Princess Margaret Hospital, and all mothers giving birth for the first time are referred there. Pregnancies where complications are diagnosed are also referred to the hospital. The MCH clinics on all islands conduct mother/child health clinics to monitor child health for up to two years and to undertake vaccinations. Mothers generally do not have regular medical examinations after the birth, other than at the time of the birth. Breast feeding is very popular in Tuvalu with few mothers bottle feeding. Infant malnutrition is generally not a problem, but there is a tendency for high weight for age in the first two years, mainly due to supplementary feeding.

Midwifery facilities at the hospital are cramped, with shortages of vital equipment, such as delivery utensils and autoclaves. The outer island health clinics all have midwifery rooms, some in poor states of repair. Many of the delivery beds are rusted and there is a shortage of delivery utensils. Most of the delivery rooms have no lighting, tap-water or operating washing facilities. Pregnant mothers on the outer islands often do not have access to either doctors or trained midwives to enable accurate forecasting of possible complications, or to assist in the births.

5.3.4 *Nursing*

There is an establishment of 21 nurses in Funafuti and at the MCH clinic with six current vacancies. Another 15 nurses are on the outer islands, with no current vacancies. Six of these nurses have in fact retired, but are working on a contract basis. There are 14 nurses in training, with four in the final year. This means that the nurse shortage problem will continue to prevail with at least six positions vacant after the graduates become available. One of the problems is the low pensionable retirement age of 45 years set by Government policy, inducing highly trained staff to give up working at a relatively early age.

Apart from clinical work, the nurses play a major role in community health, especially mother/child health care and family planning. They are also very involved in the broader aspects of community health development including nutrition, vegetable garden development, personal hygiene and public health (water supply and sanitation).

The nurses and medical assistants in particular, carry the major responsibility for health care on the outer-islands, which doctor visits only every three to four months. Their responsibilities are considerable and include:

- Emergency care of patients until evacuation can be arranged (sometimes 2-3 weeks).
- Conduct of outpatient clinics for injuries, and minor and chronic illnesses.
- Home visits (especially aged patients).
- Family planning, including IUD insertions, injections, prescriptions of oral contraceptives, and issue of condoms.
- Regular radio discussions with nurses on other islands and with medical and nursing staff in Funafuti.
- In collaboration with MCH nurses on the islands, the conduct of clinics relating to mother and child health care and education.
- Participation and leadership in the community health programme, in liaison with other members of the islands' primary health care committees.
- Responsibility for the child and mother vaccination programme on the islands.
- Staff supervision.
- The maintenance of medical and epidemiological records and the reporting of patient statistics to Funafuti.
- Midwifery responsibilities.
- Ordering and prescription of drugs and giving injections.

Despite the fact that there are no official vacancies on the islands, staff nurses often carry the sole responsibility for the above duties, due to annual leave, retirement, illness, patient assistance to Funafuti and maternity leave of the other staff nurses. For example, only one nurse, recently-graduated, has been at Nanumea since August 1989, and has therefore carried almost the entire health responsibility there.

Nurses have undertaken a variety of postgraduate courses, including family planning, midwifery and theatre training. However, only five nurses have had midwifery training, and there is also a need for neo-natal care training.

No nurses have undertaken courses in public health since the 1970's. However, all nurses do undertake a form of in-service training, usually over a two to four-week-period.

5.3.5 *Dental Service*

The Dental Service is operated from the hospital and is staffed by two dentists (one retired), a technician (not yet qualified), a dental therapist and two chairside assistants.

Dental caries and peridontitis are both very prevalent and according to the dentists are principally due to the high sugar diet, and lack of dental care, especially regular tooth brushing.

The dentists visit the outer islands three times a year to undertake clinics, and usually stay on each island for about two or three weeks. The visits are restricted due to staffing numbers.

There is a need for a dentist to replace the dentist who has returned from retirement and for a qualified dental technician to make and fit dentures. Two dental students are in training in New Zealand, about half way through their courses. Fillings and extractions are carried out on the outer islands between dentists' visits by the staff nurses. It would be ideal to have trained dental therapists resident on each island, (except on the island which has less than 100 inhabitants).

It appears that the schools' tooth brushing programme has not met expectations due to a lack of appropriate supervision, and the lack of toothbrushes and paste (supplied by SPC until two years ago). There are very few health education posters regarding dental health in the schools and talks on the subject by community health personnel are not common.

The Dental Service evidently runs out of supplies on occasions due to the lack of funds to purchase them. This includes the supply of dentures, which approximately 200 people are waiting to be fitted with.

There is currently only one dental chair for two dentists and equipment tends to be poorly maintained.

Complicated dental cases are referred to New Zealand free of charge (sponsored by the New Zealand Government).

It may be appropriate to consider the purchase of a small, portable dental chair for outer island visits.

5.3.6 *Pharmacy*

Drug purchase, storage and distribution is also undertaken from the Princess Margaret Hospital. The hospital pharmacy is operated by a Tuvaluan pharmacist trained in Fiji. A volunteer Japanese pharmacist has been assisting the hospital pharmacist in purchasing appropriate drugs and medical supplies for the hospital and in maintaining appropriate records.

Drug supplies are obtained from a pharmaceutical supplier in Sydney and are delivered to Funafuti about three months after the order is placed. Urgent supplies are air-freighted. They are then held at the hospital and distributed to the outer island health clinics on the basis of orders made up by the clinic staff nurses.

The source of a number of complaints from residents of the islands is the chronic shortage of drugs, with many of the existing drugs in the clinics well beyond their expiry dates. It may be necessary to further develop the ordering process based upon historical usage and past trends in outpatient and inpatient care.

One of the notable features of drug distribution is the need to visit the hospital or health clinic in

order to procure even the most basic of drug or first-aid supplies. All supplies are free if prescribed via the hospital or the clinics, but this approach may not facilitate certain aspects of personal hygiene (e.g. attending to cuts with antiseptic cream and band-aids). It may be possible for the stores to sell a limited supply of band-aids, antiseptic creams, bandages, cotton wool, etc.

5.3.7 *X-Ray services*

The Radiographer is a Tuvaluan trained in Fiji. The X-Ray machine is ten years old and approximately ten X-Rays per day are undertaken. However, because the buckey plates are damaged, a number of X-Rays cannot be taken due to safety factors. These include intravenous pyelograms, barium meals, barium enemas, and X-Rays of pregnant women to establish the likely nature of an impending birth.

Currently, there is one person training in radiography, who will be needed for the new X-Ray facilities planned at Vaitupu.

The processing of films in times of emergency is very slow and the introduction of automatic processors would help. Also, the dark room could do with another safety light. There are few radiography texts and an absence of sufficient on-going training.

5.3.8 *Laboratory services*

The Laboratory Technician was also trained at the Fiji School of Medicine and undertook further post-graduate training in Western Australia and New Zealand. He is assisted by another Fiji-trained laboratory technician. One technician will be transferred to the new laboratory at Vaitupu once the new hospital there is completed.

All basic, routine blood tests are undertaken at the laboratory including the processing of specimens from the outer-islands. The tests include a full blood count (haemoglobin, indices, cell counts, blood film) and tests for blood parasites and coagulation. There is also urine testing for urabalinogen, nitrates, blood, culture and sensitivity.

Blood is taken from a donor when the need arises. The Red Cross at Funafuti is responsible for the supply of appropriate blood donors.

Bacteriology supplies appear to be very depleted. Usually an order is made for three to four months supply, but it sometimes takes up to nine months to arrive in Funafuti. A chloride meter would be a useful item to assist with blood testing. The Laboratory Technician has suggested that further training in hepatitis B testing would be desirable.

5.3.9 *Hospital facilities and equipment*

The hospital buildings are generally sound but are becoming inappropriate for the increasing and changing health care activities of the major curative health centre for Tuvalu. Accordingly, the following refurbishments, and additions are proposed for 1990:

- . A new paediatric ward (6-8 beds).
- . An isolation ward, including two mental beds (4-6 beds).
- . Expansion of storage space in the pharmacy.
- . New Public Health offices.
- . Three new dental surgery rooms and support spaces.
- . Renovation of existing kitchen with additional dry storage.

- . New nurses' station.
- . New eight-bed maternity ward.
- . A four-bed intensive care ward.
- . A four-bed paying ward.
- . A new, expanded X-Ray facility.
- . Enlarged nurse staffing and linen area.
- . Extension/renovation of the central sterilisation unit.

In addition, a new MCH clinic is to be constructed at Vaiaku, Funafuti. External technical advice will probably be required in order to upgrade the X-Ray unit and the pathology laboratory.

There are a number of important items of equipment that need upgrading urgently. The store and washing machines have become inadequate, and a new 240 volt autoclave is required, as the current ones are either broken down or far too small.

Sterilisers should be available for obstetrics, the operating theatre and the outpatients' clinic. An enclosed food trolley and a new obstetrics bed are also needed urgently. Communication within the hospital could be further improved by installing either telephones or two-way radios in each ward. (This is an important consideration due to the shortage of nursing staff). A new refrigerator for hospital food storage is needed.

The collection and processing of epidemiological data is currently undertaken manually and a small computer/word processor would greatly enhance the quality and depth of epidemiological reporting.

Hospital transport is another critical problem. There is only one hospital vehicle, the ambulance, which is used to carry patients, staff and medical supplies, and is also used for message delivery. The roads on Funafuti are not sealed and accelerate the wear-and-tear on vehicles. The nurses utilise bicycles to make maternity calls and home visits, however these are in short supply.

5.4 Outer island health services

5.4.1 Operations

The health services on the outer islands are oriented around the health clinics. Each of these is usually staffed by:

- . Two staff nurses, or a staff nurse and a medical assistant.
- . An MCH aide.
- . A sanitation aide.

However, Nanumea has only one staff nurse (recently graduated) a MCH aide and a sanitation aide catering for a population of approximately 1,000 people. As a result, the nurse is effectively on duty 24 hours per day, seven days per week.

Doctors, dentists, public health nurses and health inspectors visit each island three or four times per year, to undertake clinics, vaccination programmes, or other public health duties. An Australian eye surgery team visits the outer-islands every two years.

Each island has one health clinic, although a small clinic is also located at the secondary school at Vaitupu. A hospital is also being built at Vaitupu, although progress is very slow. The nurses and medical assistants stabilise and treat emergencies, undertake very minor surgical procedures (e.g. stitches, removal of lesions, insertion of IUDs, circumcisions and tooth extractions) and issue drugs and vaccines. They are generally kept very busy and work considerable overtime without payment.

The major causes of morbidity on the islands are similar to Funafuti and comprise:

- . diarrhoea (especially in children)
- . respiratory tract infections
- . hypertension
- . hepatitis B
- . gastroenteritis
- . influenza
- . headaches
- . arthritis
- . skin problems
- . dental caries and periodontitis.

There are also cases of dengue fever, diabetes, meningitis, filariasis, tuberculosis, conjunctivitis, trachoma and ciguatera in varying amounts.

Much of the work of the nurses involves family planning, with the most common contraceptives being depo provera, the pill and IUD. Use of contraceptives by men is not common. Regular family planning talks are given by the nurses to village groups and individual family discussion also occur.

The nurses and medical assistants also undertake vaccination of children and expectant mothers and attempt to reach 100% coverage. However, the vaccination programme is sometimes hampered by malfunctioning of the solar-powered refrigerators or the storage batteries. This is particularly the case at Nui and Nanumea, necessitating the visits of the public health nurses from Funafuti to undertake the vaccination programme. However, the visits are too infrequent (3 to 4 times per year) to allow the vaccination programme to achieve a satisfactory coverage rate. Nanumaga did not have a good BCG coverage because of stock shortages, and the programme did not cover vaccinations for hepatitis B on any islands (including Funafuti).

The MCH aides check child nutrition and health, the health of the mother after delivery, and advise on breast feeding, nutrition and personal hygiene in the home. They also assist the staff nurses with other clinical duties, midwifery, and anti-natal classes.

The sanitation aides are responsible for the sanitation programmes on the islands, and coordinate the installation of pour-flush toilets and sewage pits. They are also responsible for rubbish collection to minimise the breeding of mosquitoes and flies. They undertake mosquito spraying only when the danger of dengue fever or filariasis is regarded as high. Larvicide is also added to some water tanks to reduce mosquito breeding.

One of the major complaints relating to the outer island clinics is the chronic shortage of medical supplies and drugs. A limit on funding for drug purchases means that large stocks are not kept at the pharmacy at Funafuti. However, some improvements could be made in the ordering and supply process for each clinic. Ordering could be more based upon historical usage rates for illnesses; needs could then be forecast for four to eight weeks in advance. The drugs kept at the clinics are often expired, but are sometimes used when new drugs are not available. On occasions there are also shortages of contraceptives. Nanumaga did not have any kerosene for lighting in the midwifery room or wards.

The installation of HF radios in the clinics has been a major improvement. However, they were not all functioning properly. The Nukufetau radio could not transmit, and the Nui and Nanumea clinics cannot contact Funafuti if there has been one or two days of rain. The Vaitupu radio was not working well either, possibly due to a malfunctioning battery. The Vaitupu radio does not appear to be able to make contact with the other outer-islands, which is a big disadvantage.

5.4.2 Buildings and equipment.

The clinics themselves are generally in good condition. However, in one or two cases repairs are needed due to cyclone damage. The delivery rooms and wards, are generally in very poor condition, and do not appear to be utilised very often. They are usually constructed of imported timber framing, with cement sheet cladding, flat roofs and concrete floors. They are not well maintained, and usually with no lighting or water and flush toilets that do not work. Serious consideration should be given to the future of these buildings as their design appears very inappropriate to the climate and culture of Tuvaluans living in the outer islands.

The clinics require the following replacements or repairs:

Nukufetau

- Gas is required for the stove.
- A new steriliser is needed.
- Delivery utensils require replacement.
- A baby cot and mosquito net are required.

Nui

- The refrigerator requires repair.
- Delivery instruments are required.
- Basin stands are needed.
- The delivery room has no light.
- Table, chairs and beds are needed.

Vaitupu

- Three autoclave drums are needed.
- A sphigmenometer is required.
- Holding forceps are needed.
- Bathroom scales need replacing.
- The motor-cycle requires repair.
- Tubs for mothers and babies are needed.
- The wards have no beds.
- Delivery and bed mackintoshes are required.
- The cot needs replacing.

Nanumaga

- The kerosene lamp does not work.
- The wards have been totally destroyed by a cyclone.
- A bicycle is needed for nurse transport.

Nanumea

- The refrigerator has not worked for six months.
- More delivery utensils are required.
- A larger blood pressure checking instrument is needed.
- A new stethoscope is required.
- A set of bathroom scales is required.
- A steriliser is required (old needle are sterilised and re-used).

Niutao

- The obstetrics bed is very rusty and needs replacing.
- The nurse and medical assistants' houses have collapsed due to a cyclone and need rebuilding.
- The beds require replacing due to rust (it may be better to make them from wood).

In most of the clinics, the cistern-flush toilets often run out of water due to the need to pump water to a gravity feed tank. However, the tank arrangement at Niutao is ideal and could be adopted at the other clinics. The main catchment tank is elevated above the height of the cistern and the basin taps, and the water therefore, does not require pumping.

The other major improvement at the clinics would be to provide for solar examination lights. The solar ceiling lighting works well, but is much too dim for medical examinations, midwifery, minor surgical procedures, tooth extractions, IUD insertions etc. Small solar-powered examination lights (like reading lights) should be supplied to all clinics.

5.5 Evacuation arrangements

Evacuation for seriously ill patients from the outer islands is a critical issue in Tuvalu. Patients with internal bleeding, appendicitis, abdominal pain, prolonged labour, other birthing complications and accident trauma are reliant on the *Nivanga II* to be diverted to their island for transport to Funafuti. Sometimes the ship is not in the vicinity of the island and may even be in Fiji or possibly Western Samoa. It would be possible to operate a small seaplane to the outer islands, but it would have to be based in Funafuti. Seaplane services from Fiji generally do not have the range to Funafuti and would require refuelling at Nukulaelae or Niulakita. As well, they are single-engine planes so the operator would be reluctant to make a long sea passage in adverse weather conditions.

Therefore, the options are:

- (a) Maintenance of the current approach utilising the *Nivanga II*, when available. This option is unreliable (because the ship may be a long distance away) and is very expensive.
- (b) Use of a seaplane service based at Funafuti. This could be either owned by the Government or a private charter operator. The economics of this approach would have to be closely examined.
- (c) Use of a private seaplane service from Fiji. This is highly unlikely unless larger planes are purchased by Fiji-based charter operators.
- (d) Use of fishing boats based at Funafuti and possibly Nanumea and Vaitupu. This option is more realistic and cost effective.
- (e) Use of Health Department boats also used to decentralise medical services from Funafuti to the outer islands. These boats would be based at Nanumea, Vaitupu and Funafuti. This is probably the best option. These boats could be purpose built as 'water ambulances' with appropriate nurses or medical assistants available and HF radio.

6. INVOLVEMENT OF DONOR AGENCIES IN HEALTH

6.1 South Pacific Commission (SPC)

In the past few years SPC has provided general support to Tuvalu as part of the regional information networks such as the South Pacific Epidemiological Health Information Service (SPEHIS), *SPC's Nutrition Newsletter* and SPC Information Circulars. Short-term training has been provided for Tuvalu health personnel in number of regional workshops in the areas of nutrition, health education, rural water supply and sanitation, food hygiene, drug identification methods and dental health. Tuvalu has been represented in the regional conferences of heads of health services, chief dental officers and health educators.

Specific activities carried out in Tuvalu include; an anthropometric study, assistance with the development of a national food and nutrition policy, analysis of institutional diets, advice concerning dietary services at Princess Margaret Hospital, the development and translation of nutrition education materials, rural water supplies on Nukufetau atoll, and an assessment of the 1990 cholera epidemic.

6.2 United Nations Children's Fund (UNICEF)

UNICEF supplies vaccines and oral rehydration salts to Tuvalu and in the past supplied financial assistance for the family planning programme. The main focus, however, is to support the food and nutrition programmes. UNICEF also supported an early childhood education programme by training pre-school teachers, but its success was limited due to traditional practices.

6.3 World Health Organisation (WHO)

WHO is funding two trainee nurses in Fiji and some medical supplies and equipment. It has also played a role in the vector control programme and the community water supply and sanitation project, supplying equipment and supplies. It has also supported the development of primary health care through a workshop in Tuvalu. One of the impediments of WHO involvement is that Tuvalu is not a member of WHO. WHO also has inter-country teams available on a consulting basis to countries on request. This includes expertise in vector control, immunisation and communicable diseases.

6.4 United Nations Family Planning Association (UNFPA)

UNFPA has been involved in the Family Health Project, the last phase finishing in 1989. Tuvalu have requested a three-year extension of the project. UNFPA's involvement has concentrated on training of health personnel in family planning counselling and supply of contraceptives.

6.5 United Nations Development Programme (UNDP)

UNDP is involved in three projects; the first is to make available a United Nations Volunteer (UNV) surgeon for Tuvalu. The previous UNV surgeon completed a two-year stay in August 1989. The appointment of a replacement is imminent. Tuvalu has also requested UNDP to supply an anaesthetist. Australian Volunteers Abroad are assisting in searching for a volunteer anaesthetist. The second project is the supply of a UNV pharmacist on a two-year posting, which commenced in March 1989. The third project is the supply of water tanks. This is a United Nations Capital Development Fund (UNCDF) project to supply household water tanks throughout the Tuvalu islands, and was signed in December 1989. There is a parallel project to supply technical assistance via a UNV civil engineer and a UNV plumber. The tanks are 3,000 gallons each. SCF supplied many 1,000 gallon tanks over the last ten years, but this project has now been completed.

6.6 Australian International Development Assistance Bureau (AIDAB)

AIDAB has supplied (with NZ) HF radios for each health clinic. Currently, AIDAB is undertaking a Multi-country Health Initiatives Project for the South Pacific and specific health projects for Tuvalu may be identified. The basic thrust of this project is primary, community-based preventive health care. Australian eye specialists also visit the islands every two years.

6.7 New Zealand Government

The New Zealand Government has funded the construction of some outer-island health clinics, provided a contribution (with Australia) towards the provision of HF radios in the clinics and will be involved in the provision of capital funds towards the redevelopment of the Princess Margaret Hospital.

New Zealand also provides visiting medical specialists (surgeon and anaesthetist) for a few weeks every year. Training assistance is also provided for allied health staff (e.g., laboratory technicians at the Pacific Paramedical Training Centre in New Zealand. New Zealand also provides free treatment for Tuvaluan patients referred to Fiji or New Zealand.

6.8 European Economic Community (EEC)

The EEC has no past or current involvement in healthcare in Tuvalu.

6.9 British Development Division in the Pacific (BDDP)

BDDP has no past or current involvement in healthcare in Tuvalu.

6.10 Volunteer Service Overseas (VSO)

VSO (Great Britain) is supplying a nurse aide trainer for two years to develop and implement training programmes for MCH and sanitation aides.

6.11 Australian Volunteers Abroad (AVA)

AVA has some involvement in searching for a suitable anaesthetist for UNDP, and may also have an involvement in recruiting a nurse aide trainer in liaison with VSO. It is useful to know that AVA has a number of single-certificate nurses available for overseas volunteer work.

6.12 Save the Children Federation (SCF)

Save the Children has had considerable (10 year) involvement in health care in Tuvalu, including:

- Assisting hospital staff with nutrition and family planning development.
- Mother and child health care.
- The strengthening and support of primary health care committees.
- The support and development of the Tuvalu Family Health Association.
- The production of health education booklets, posters, leaflets and radio programmes.
- Community development training in the outer islands including the development of health education and nutrition programmes, village improvement, education and recreation.

7. RECOMMENDATIONS TOWARDS A PRIMARY HEALTH CARE PLAN

In 1984, a review of primary health care in Tuvalu was undertaken and it was decided to strengthen the primary health programme through greater community participation, and a National Primary Health Care Committee was established, with Primary Health Care Committees on each island also being formed. As a result, there is a significant level of community involvement in primary health care development.

The activities of these committees have concentrated on family planning, nutrition and improved sanitation. With funding assistance, much has been achieved since 1984.

The 1988-1991 National Development Plan outlined three major aims of the Government in relation to health.

1. **Promote greater awareness of the need for better community health and the potential for the prevention of illness and diseases.**
2. **Provide an equitable distribution of primary health and medical services.**
3. **Reduce the incidence of communicable diseases.**

It is recommended that five further aims be pursued. These are as follows:

- 4. Reduce the incidence of non-communicable diseases (NCD's) and their risk factors.**
- 5. Increase the effectiveness of the health service by providing and maintaining accurate information on the health status of the population.**
- 6. Strengthen the Family Planning Programme, to maintain and improve the health status of the population with limited health resources.**
- 7. Increase the efficiency of the health service by periodical operational reviews.**
- 8. Establish an effective, long-term health planning process.**

Arising from these aims are a number of objectives and strategies. These are given in the following section.

AIM 1: 'PROMOTE GREATER AWARENESS OF THE NEED FOR BETTER COMMUNITY HEALTH AND THE POTENTIAL FOR THE PREVENTION OF ILLNESS AND DISEASE'

Objectives and Strategies

- (a) More resources should be devoted to the promotion of health education, through; more radio programmes, more posters in the Tuvaluan language located around the villages, and significantly greater health education in schools, especially at secondary level**
- b) Health education should be further developed as a core component of school education, with the regular active involvement of health staff (including doctors, nurses, sanitation and MCH staff) and school teachers in both curriculum development and classroom activities.**
- (c) A greater emphasis should be placed on ensuring that primary health care committees operate as effectively as possible, by providing regular assistance from the Ministry of Health, especially in the form of:**
 - . guest speakers**
 - . promotional material**
 - . developing and implementing priority activities (e.g. NCD health education or an aspect of communicable disease prevention) through annual health programme development by the National Primary Health Care Committee.**
- (d) More health education staff should be provided as current clinical and sanitation staff is already stretched, especially in the outer islands.**

AIM 2: 'PROVIDE AN EQUITABLE DISTRIBUTION OF PRIMARY HEALTH AND MEDICAL SERVICES'

Objectives and Strategies

Medical services are currently highly centralised at the Princess Margaret Hospital, with all three Tuvaluan doctors and the volunteer surgeon being stationed there. Medical visits to the outer islands occur only every three to four months, with the majority of diagnoses and treatment workload being borne by the registered nurses or medical assistants resident on the islands.

A more equitable distribution of medical and health services would occur if such services were more decentralised. The 1990 cholera epidemic has highlighted the need for decentralisation, as all 11 deaths occurred on the outer islands because of the lack of these services. This would improve medical and health services to the majority of the population significantly.

- (a) **Medical skills should be decentralised with a doctor available at Vaitupu to service the central islands, and a doctor at Nanumea to service the northern islands. The southern islands should be serviced more regularly (every four weeks) from Funafuti.**

However, to do this, at least two more doctors would be required, and they would have to be supplied from outside Tuvalu. It may be appropriate to request recruitment and funding (including volunteers) from an outside funding agency.

The recommendation to locate doctors at Vaitupu and Nanumea and therefore increase doctor provision, would not be necessary if fast transport links were available between Funafuti and the outer islands. However, such an option appears some years away. This is discussed in a later recommendation.

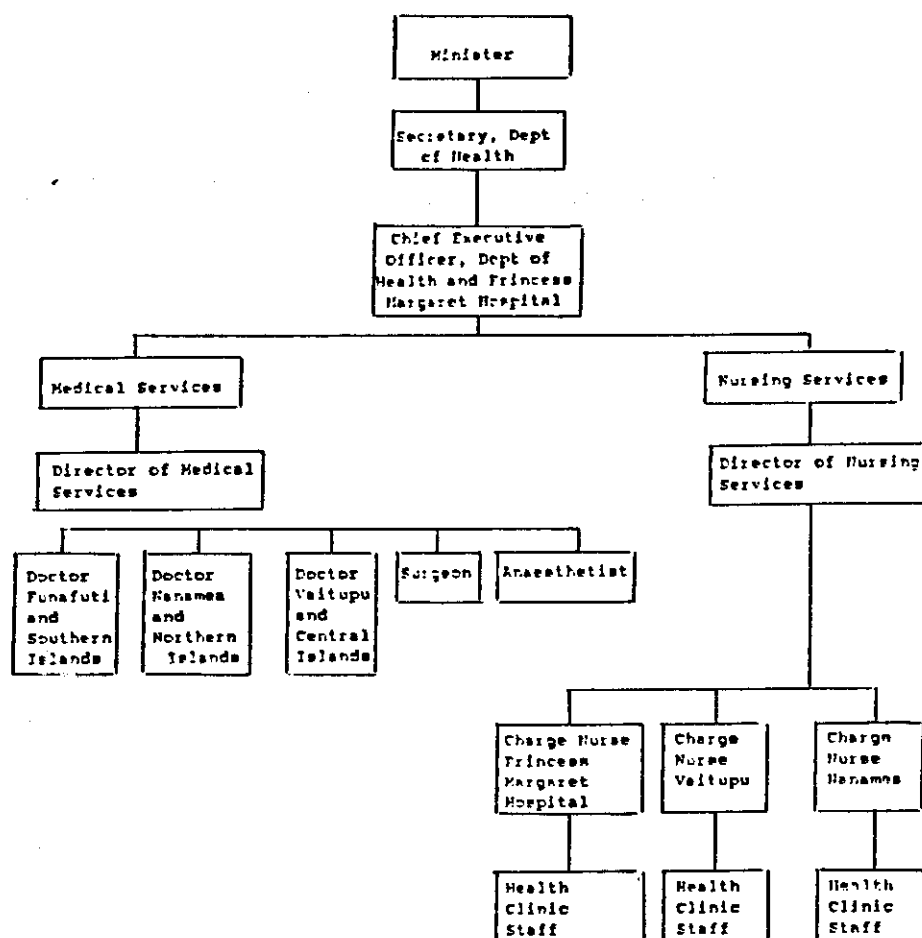
- (b) **The hospital being constructed at Vaitupu should be completed and made operational as soon as possible, with appropriate medical, nursing and diagnostic staffing and equipment.**
- (c) **The size and staffing of the Vaitupu hospital should be limited. Increasing hospital facilities is not necessarily the most effective use of limited Health Department funds. It is also important that the hospital performs preventative activities (diagnosis, health education, family planning etc.).**
- (d) **A new hospital should be built at Nanumea, similar to the development at Vaitupu.**

A doctor's residence exists at Nanumea and would not require extensive refurbishment to make it suitable for accommodation. It would be appropriate to convert the health clinic at Nanumea into a small hospital similar to the development at Vaitupu. It would involve the addition of a new ward (the old ones should be demolished) a nurses' house (accommodation for up to three nurses), a small diagnostic laboratory and an operating theatre/birthing room.

- (e) A surgeon and an anaesthetist should be based in Princess Margaret Hospital.

Given the requirement for two permanent doctors in the outer islands, how many are required in Funafuti? Given the population of Funafuti it would be appropriate to have a general practitioner based there to service Funafuti and the two southern islands. It would also be appropriate to have a surgeon and an anaesthetist. These two positions could continue to be supplied and funded from external agencies.

- (f) It is proposed that the longer term senior management structure be as follows:



It would not be necessary to have a Public Health Doctor as this function would be taken up by the three general practitioners. It is also unnecessary to have the Director of Health as a doctor. This position combined with Chief Executive of the Princess Margaret Hospital could be taken up by a hospital administrator/manager trained in health services management, on retirement of the current Director of Health. The Director of Nursing position at the hospital could be officially expanded to take responsibility for all nursing management in Tuvalu.

The Director of Medical Services position could be rotated amongst the three Tuvaluan doctors

and would not necessarily be the position of the doctor at Funafuti. This position should not be available to the surgeon because; generally he/she will be on a short term contract to Tuvalu and the health services should not be too hospital-based.

The Charge Nurse positions at each location should be primarily responsible for nurse management of the hospital, the health clinics on the other islands, and the MCH clinics.

However, it is important to stress that nurse management should involve preventive and educational as well as clinical aspects of health care.

The ability to diagnose and treat illnesses could also be enhanced by increased availability of medical assistants. A new course for medical assistants is currently being developed covering three years at the Fiji School of Medicine, with a further two years available for conversion into a medical qualification (i.e.. a doctor).

- (g) **Efforts should be made to recruit another dentist to replace or assist the current retired dentist, and efforts should be made to recruit or train a dental technician. It would also be appropriate to take three dental nurse positions available, each to be stationed at Funafuti, Vaitupu and Nanumea and to service adjacent islands.**

A more equitable distribution of health services would be enhanced by improved distribution of dental services to the outer islands. Currently, the shortage of dentists, a qualified dental technician and dental nurses severely restricts dental services, with only three to four visits per year to the outer islands.

Dental nurse positions are difficult to fill, and it would therefore be appropriate to commence training of dental nurses as soon as possible. (They should be trained to treat both adults and children).

- (h) **That three suitable sailing/diesel auxiliary boats should be purchased, and operated by the Health Department, to be stationed at Funafuti, Vaitupu and Nanumea in order to provide adjacent islands with regular medical and ancillary health services and provide emergency evacuation when required.**

Improved evacuation services would also bring about greater equity in the provision of health services. Currently, evacuations from the outer islands to Funafuti occur by regular or emergency use of the *Nivanga II*. This is extremely cost ineffective and unwieldy as the ship could at times be hundreds of kilometers from an ill patient. Recent outer island deaths from the 1990 cholera epidemic were in part caused by the lack of rapid evacuation of severely ill cholera patients to the Princess Margaret Hospital on Funafuti.

With the provision of permanent doctors at Vaitupu and Nanumea serving the adjacent islands, it will be necessary to provide boats to visit the other islands on a regular basis (every three weeks). These boats, which should be operated exclusively by the Health Department, could also function as emergency evacuation transport, either to the small hospitals at Nanumea and Vaitupu, or directly to Funafuti.

To help reduce costs, and improve safety, the boats should be diesel-powered, but also designed to be efficiently sailed (possibly by trainees from the Maritime School at Funafuti). They should provide accommodation for two crew and three health staff with special emergency accommodation for ill patients. The option of provision of suitable boats is far more realistic and cost effective than the provision of aeroplanes which would require significant amounts of land on each island, and which would also incur very high running costs.

AIM 3: 'REDUCE THE INCIDENCE OF COMMUNICABLE DISEASES'

Objectives and Strategies

Tuvalu still has a higher mortality and infant mortality rate than the South Pacific average, and much work is still required to reduce the incidence of communicable diseases. The health status monitoring process and surveys recommended later in this report are an important step in reducing the incidence of communicable diseases. However, more concentration on specific activities will also be important. This includes; improving levels of hygiene, improving diagnosis of life threatening and debilitating diseases, and improving sanitation and water supplies.

(a) Emphasis should be placed on hygiene in the health education process.

Personal and family hygiene can be improved by a greater concentration of health education on hygiene, and ensuring that hygiene education occurs at primary health care committee levels and is disseminated to representative groups such as women's committees. Important aspects of hygiene that should be emphasised are: personal washing, the proximity of animals (and their faces) to dwellings, correct use of pour-flush toilets, ensuring that toilets are used, cleaning of cooking utensils, washing and cleaning of clothes and bedding, and the control of flies by screens and removal of rubbish.

(b) Attempts should be made to improve the early diagnosis of life-threatening or debilitating diseases

Improving diagnoses and treatment of people suffering life-threatening diseases can have significant positive effects on the mortality rate. A number of deaths have occurred in recent years where improved early diagnosis may have increased the chances of survival. This includes such diseases as meningitis, hepatitis, diabetes, asthma, dysentery, appendicitis and deaths associated with pregnancy and the birth of a child.

The decentralisation of medical and other health services to the outer islands with more regular medical visits (every three weeks), as recommended earlier, will substantially improve diagnosis and treatment of communicable diseases.

- (c) **Priority should be given towards greater provision of pour-flush toilets, especially at Nanumea, Vaitupu and Niulakita.**

The under-provision of appropriate sanitation has much to do with the prevalence of communicable diseases.

There are still a significant number of houses without pour-flush toilets and sanitation pits. This is especially the case in Nanumea, Vaitupu and Niulakita. Overall, out of 1,570 houses, 367 do not have pour-flush toilets.

With the use of pour-flush toilets there is a potential risk of contamination of ground-water supplies and it is for this reason, and because of the regular incidence of drought periods, that water tanks have been installed in Tuvalu.

- (d) **More water tanks and appropriate catchments should be provided especially in Funafuti, Vaitupu, Nui, Niutao and Niulakita. However, the supplies of public cisterns should be taken into account when establishing priorities for installation.**
- (e) **Improved training programmes should occur with regard to the maintenance of solar-powered refrigeration and communities be better informed, via health education, of the importance of immunisations for mothers and children.**

Immunisation programmes are an important component of the aim to reduce communicable diseases. Vaccinations occur on all islands and are usually administered by resident nursing staff or medical assistants. However, coverage is still not satisfactory due to; the high workload of resident nursing staff or medical assistants, the breakdown of solar-powered refrigerators (requires investigation), and the movement of mothers and children between islands.

The decentralisation of medical and other health facilities, as recommended will bring about substantial improvement in vaccination provision due to more regular vaccination clinics operating on each island.

- (f) **Hepatitis B immunisation programmes for newborns should be implemented as soon as possible and integrated into the present Expanded Programme of Immunisation (EPI).**

Hepatitis B is responsible for high level of liver cancer in the Pacific.

AIM 4: 'REDUCE THE INCIDENCE OF NON-COMMUNICABLE DISEASES'

Objectives and Strategies

A reduction in the incidence of NCD can occur by; improving nutrition, improving supplies of appropriate foods, undertaking more physical exercise, better diagnosis and treatment, achieving a better understanding of NCD prevalence by undertaking appropriate surveys surveillance and screening programmes, and appropriate health education for lifestyle change.

Diagnosis, treatment and monitoring requirements have all been mentioned elsewhere in these recommendations.

- (a) Health Education regarding non-communicable diseases should be much developed as a core component of school education, especially at secondary level, with the regular, active involvement of health staff and school teachers in both curriculum development and classroom activities.**

Health education should have a high communicable disease prevention component as mentioned, but should also emphasise the factors involved in prevention of non-communicable diseases. There is clearly insufficient health education in schools, especially at secondary school level. An integrated Health Nutrition Agriculture subject, should be taught on a continuing basis throughout primary and secondary schools. Health and Agriculture staff should be available to advise and be involved in the development of the curriculum as well as to play an active role in the teaching/learning process in class. This includes nurses, doctors, sanitation, MCH, and agriculture extension staff participating on an active, regular basis as a normal component of their duties.

- (b) The national food and nutrition policy being developed should encourage the development of an integrated curriculum as mentioned above and seek to increase local food production and consumption.**

Fishing, coconut consumption and vegetable growing are continuing to be replaced by the purchase and consumption of refined, low-fibre, lower-nutrient, and fatty foods available at the island fusi. There are a number of complex reasons for this, including; increased status associated with purchase of imported foods, increased disposable income (from increasing employment, aid, trade and overseas remittances), ease of purchase and preparation of refined foods, a desire to consume 'different' and 'tastier' (sometimes due to extra sugar and salt) foods, shortages of fresh foods due to cyclones, poor soil and in the case of reef fish, ciguatera, and less available time to catch fish, harvest coconuts and grow vegetables (due to employment obligations and smaller families).

Health education is therefore very important in the process of improving nutrition. However, a number of other actions can occur. These include:

- A greater concentration on home-based and commercial vegetable garden development by the Department of Agriculture.
- A change in policy by the management of the co-operative operating the fusi in supplying a broader range of foods, especially wholemeal rice and flour.
- Consideration could be given to increasing the price of less desirable foods such as sweets and junk snack foods, white rice, white flour, sugar and salt. This may have to involve the introduction by the Government of a food import tax on poor quality foods and allowing for a subsidy on good quality foods.
- The further development of a market arrangement at the fusi for fresh foods such as fish, vegetables and fruits. This may necessitate the introduction of solar-powered refrigeration

units at the fusi.

Continued development of a Tuvaluan recipe book to enhance the attractiveness of traditional Tuvaluan foods.

- (c) Further research should be undertaken to reduce the incidence of ciguatera.

The problem of ciguatera is an important one, especially on some atolls where there are wrecked ships, and reef fish cannot be consumed at all. The inability to consume reef fish and continued bad weather, when offshore fishing cannot occur, causes fresh fish shortages for weeks. The habit of consuming poor-quality tinned fish and beef can then easily develop.

- (d) Appropriate sporting and recreational programmes must be introduced for those groups where obesity is a problem, taking local cultural constraints into account. .

Obesity is especially a problem amongst women over thirty years of age, and people in sedentary occupations. As a result, it may be useful to introduce recreational activities that relate to these target groups. These will generally be in the form of organised sport, which males and females can participate in. One useful activity would be the development of home-based vegetable gardens where both exercise and nutritionally valuable foods result. Incentives and prizes for good vegetable gardens could be made available by the Department of Health. Walking or cycling clubs could also be established.

AIM 5: 'INCREASE THE EFFECTIVENESS OF THE HEALTH SERVICE BY PROVIDING AND MAINTAINING ACCURATE INFORMATION ON THE HEALTH STATUS OF THE POPULATION'

Objectives and Strategies

- (a) A health information unit should be established.**

The role of this unit would be to set up on-going monitoring systems for communicable and non-communicable diseases. This would involve the standardisation of case reporting from each outer island health clinic and the Princess Margaret Hospital. This information would then be collated on computer with specific outputs for each disease category.

- (b) The Ministry of Health should establish a standardised epidemiological information system for the whole of Tuvalu.**

Because of staff shortages and limitations on resources, most data will be obtained from case reports rather than specific surveys and screening programmes. However, it will be necessary to standardise diagnosis descriptions amongst the islands for both mortality and morbidity information.

- (c) On-going screening programmes should be established to further evaluate and monitor the health status of the population.**

Surveys indicating the health status of the population generally have not been undertaken since at least 1983 with the exception of those relating to population and family planning (1987) hepatitis B (1984), filariasis (1989) and eye diseases (1988).

Diabetes has not been extensively surveyed since 1976, hypertension was last surveyed in 1982, and iron deficiency and obesity in 1983.

Improved screening can take place by screening inpatients or outpatients of the outer island clinics and the hospital through simple testing procedures. However, in many situations, especially in the outer islands, staffing levels will not allow time to undertake time consuming screening tests during clinics. Also, outer island staff in particular would not be able to perform some screening tests (i.e. where laboratory tests are required by a trained laboratory technician on site, or where a chest X-Ray is required). Appropriate screening should include height and weight measurement, blood pressure testing and annual blood glucose screening using glucometer or urine testing strips. The other limitation of this process is that only in-patients or out-patients being presented to the clinics or hospital are being screened.

It may therefore be necessary to undertake sample, or in some cases, mass screening programmes involving visiting staff from Funafuti e.g. a doctor, a nurse, a laboratory technician, a radiographer, and a dentist. These visits are time consuming and can involve considerable movement of human and physical resources and should only be undertaken where localised monitoring and screening is not possible, or may prove to be insufficiently accurate.

Whether utilising improved inpatient and outpatient data or undertaking sample or mass screening, evaluation and monitoring systems need to be established for a number of disease categories.

- (d) **Screening, evaluation and monitoring systems should be enforced for the following categories:**

Non-communicable diseases

- . **hypertension**
- . **obesity**
- . **diabetes**
- . **anaemia**
- . **cardiovascular diseases**
- . **cancer**
- . **rheumatoid and gouty arthritis**
- . **nutritional status and dietary habits**
- . **alcohol and tobacco usage.**

Notifiable diseases

- . **tuberculosis**
- . **hepatitis A and B**
- . **dengue fever**
- . **filariasis**
- . **conjunctivitis**
- . **some worm infections**
- . **acute respiratory infections**
- . **fish poisoning**
- . **meningitis**
- . **infectious diarrhoea**
- . **some sexually transmitted diseases.**

The degree of depth of information and resource allocation in screening, monitoring and evaluation of each disease category should depend upon the relative importance of each disease in improving and monitoring the health status of the population.

AIM 6: 'STRENGTHEN THE FAMILY PLANNING PROGRAMME'**Objectives and Strategies**

Tuvalu has requested that the UNFPA-funded family planning project be extended for a further three years. Major problems with the programme cited in the Tuvalu Health Division Annual Report 1988 include; a high percentage of contraceptive defaulters, side effects of contraception, and the spontaneous expulsion of inter-uterine devices.

The family planning coverage of women in Tuvalu in 1988 was 40.3%. With a low coverage rate and a high percentage of defaulters, the programme needs to be considerably more effective. Its effectiveness could be improved by the decentralisation of medical services to diagnose and treat problems associated with inter-uterine devices (and therefore increase the popularity of contraception).

The low coverage of women may relate to cultural factors concerning reduced family size and or lack of interest in contraception (female or male) by husbands.

Population growth is one of the most critical factors affecting the future well-being of Tuvaluans.

- (a) **An important component of the increased health education effort must be for people to increasingly engage in family planning by the use of contraceptives and that the effectiveness of contraception be improved by greater medical/nursing consultation, including the counselling of men. Family planning should also be discussed and promoted to a greater extent by primary health care committees.**

AIM 7: 'INCREASE THE EFFICIENCY AND EFFECTIVENESS OF THE HEALTH SERVICE BY REGULAR OPERATIONAL REVIEWS'

Objectives and Strategies

There are certain efficiency and effectiveness problems relating to the operation of the health service, and many may possibly be remedied by substantial increases in recurrent funding. However, as it is unlikely that in the short-term the funding problems will be solved, it will be important to list the problems and then develop a set of priorities for tackling them. Problems that have a direct effect on healthcare should be dealt with first.

It is therefore recommended that attention be given to the following operational problems encountered in the course of undertaking this review.

- (a) **Staff training and recruitment planning should take place to make provision for current and future needs.**

There is a shortage of doctors, medical assistants, registered nurses, dentists, a radiographer, a laboratory technician, a dental technician, and dental therapists, and there will also be a need for a qualified health administrator (For numbers refer to Section 5).

The Ministry of Health will need to work closely with the Ministry of Education to ensure that students have sufficient secondary education training to embark on career training in Fiji, New Zealand, Australia or elsewhere.

Similarly, the Ministry of Health will also need to outline its recruitment needs for up to the next three to four years to donor agencies capable of recruiting paid or volunteer staff. Consideration should be given to the new medical assistants' course in Fiji and the training of dental therapists. Health administrators could be trained in New Zealand or Australia.

- (b) **The official retirement age of 45 years for registered nurses should be reviewed, as it is very difficult to replace experienced nurses.**

- (c) **The following training should be provided for current staff:**

- . Nurses and medical assistants— midwifery, neonatal care, public health
- . Radiographer — refresher course
- . Laboratory technicians — training in hepatitis B testing and other testing relative to health surveys

- (d) **The medical supplies ordering process must be more efficiently managed, basing orders on historical trends, forecast levels of consultations and procedures, and allowance for any likelihood of epidemics.**

There appears to be continual shortages of drug supplies, especially on the outer islands. This may be related to funding shortfalls, but may also be due to inappropriate ordering processes.

Specific shortages included:

- | | | |
|-------------------|---|----------|
| . Dental supplies | — | Funafuti |
| . Dentures | — | Funafuti |

.	Bacteriology supplies	—	Funafuti
.	BCG vaccines	—	Nanumaga
.	Contraceptives	—	most islands
.	Kerosene	—	some islands

- (e) **Consideration should be given to vaccination of all health staff against hepatitis B.**

Hepatitis B vaccine was not available to any island during the period under review.

- (f) **The effectiveness of the current delivery rooms and wards attached to health clinics on the outer islands should be reviewed and consideration be given to:**

- **Designs that are more consistent with Tuvaluan culture and therefore increase utilisation by patients and expectant mothers**
- **Designs that will allow for easier repair and maintenance by islanders.**

The current delivery rooms and wards are in a very poor state of repair and are not well utilised. In many cases they had no water supply, the flush toilets were blocked and broken down, and there was no lighting.

- (g) **All clinics must be provided with water tanks that allow for gravity feed reticulation to hand basins, toilets and showers.**

Otherwise, the cistern-flush toilets become unreliable, due to the lack of reticulated water. It is also recommended that cistern pumps at the health clinics be repaired to allow gravity feed tanks to operate.

- (h) **The following equipment should be repaired, replaced or introduced as funds become available:**

At the Princess Margaret Hospital

- **a 240 volt autoclave**
- **delivery utensils**
- **solar examination lights (new)**
- **X-Ray**
 - **buckey plates**
 - **automatic processors (new)**
 - **safety light (new)**
- **enclosed food trolley (new)**
- **internal telephones (new)**
- **obstetrics bed**
- **chloride meter — laboratory (new)**
- **portable dental chair (new)**
- **dental equipment**
- **washing machine (industrial)**

At the outer island clinics

- **rusted beds (could be made from treated wood or PVC)**
- **delivery utensils**
- **autoclaves**
- **solar examination lights (new)**

- washing machines (solar-powered)
- delivery tables
- scales
- radios (to be repaired)
 - Nukufetau
 - Nui
 - Vaitupu
- refrigerators
 - Nui
 - Nanumea

It is also recommended that consideration be given to purchasing PVC, stainless steel or anodised aluminium wheelchairs, instead of the steel wheelchairs which quickly corrode. One supplier is Platypus Wheelchairs, 2 Manor Road, Hornsby, NSW, Australia, 2077.

A number of other equipment needs were identified at the Princess Margaret Hospital, and a comprehensive list of requirements was made available by the Director of Health.

Epidemiological data collection and analysis could be significantly enhanced by the provision of a microcomputer and appropriate software to the administration of the Hospital.

(i) **The following problems relating to current water supplies be attended to:**

Nukufetau

The future of the windmill needs to be considered, and if still useful, it should be repaired

- **More pumps and plumbing fittings are required**

Nui

- **Pumps for wells should be supplied**
- **Water tanks need to be supplied to the new villages.**

Vaitupu

- **Pumps require repair,**
- **Tanks, materials and moulds need to be supplied.**

Nui

- **Tank moulds and cement are required.**

(j) **On all islands the ground and lagoon water contamination effect of septic pits needs to be assessed, especially in view of the recent cholera outbreak.**

Sources of low cost toilet paper must be examined. On Nukufetau and Nanumaga, plastic bowls are required. On Nui cement is required.

(k) **Installation of cistern-flush toilets should be restricted as they are unreliable when water supplies are low, and they consume excessive amounts of water. There has been an increasing tendency to install cistern-flush toilets, especially in government buildings.**

- (l) **Dual flush toilets should be utilised or the storage volumes of the cisterns be reduced.**
- (m) **Supplies of garden requirements should be an important priority over the provision of less necessary goods (e.g. some 'luxury' items).**

Shortages of seeds, fertiliser and chicken wire inhibit the development of home vegetable gardens; hybrid coconuts of short height would increase utilisation (especially for drinking of toddy).

AIM 8: 'ESTABLISH AN EFFECTIVE LONG-TERM HEALTH PLANNING PROCESS'

Objectives and Strategies

This report has built upon the three health aims of the National Development Plan 1988 -1991, by recommending four further aims, and objectives and strategies for all seven aims.

The aims, objectives and strategies could form the basis for developing priorities and time-related action plans to be taken up by the Tuvalu Government, Ministry of Health staff, and donor agencies.

- (a) Sub-objectives, priorities and action plans should be developed in liaison with donor agencies, utilising the aims, objectives and strategies contained in this review, as a basis.**

The programmes and projects that are subsequently taken up by donor agencies to some degree depend upon the current assistance being offered by those agencies and the likely continuation of that assistance.

A number of donor agencies are involved in programmes and projects relating to the 1988-1991 Tuvalu National Development Plan, and in some cases the Tuvalu Government has requested that projects be extended beyond 1991.

- (b) Utilising the review and other information relating to specific projects, the Ministry of Health should develop strategies, programmes and projects beyond 1991 for three, five and ten years. This process should be undertaken by the Ministry of Health, Tuvalu Government planning staff and health planning consultant, possibly provided by an external agency.**

The role of current donor agency and Ministry of Health activities in relation to the National Development Plan 1988-1991 should be assessed in relation to the aims, objectives and, strategies outlined in this review and comments are given in Appendix B in order to facilitate this process.

APPENDIX A

SURVEYS AND REPORTS UNDERTAKEN IN PREVIOUS YEARS

A. Dental Health

(i) Dental Survey - 1980

An increase in dental decay rates throughout Tuvalu occurred between the 1972 and 1980 surveys, although the rate would be classified as low. Periodontal disease starts with children but is more prevalent in adults. Many people require dentures. There was a big improvement in services since 1972. The survey team visited all nine islands and examined one out of every five people in specified age groups, altogether 985 people.

(ii) *SPC Report on An Oral Health Survey in Tuvalu*, Speake J.D. and T. Malaki, 1980.

Current WHO methods were employed to estimate the prevalence of oral pathology, dentofacial anomalies, periodontal disease, caries and prosthetic status as well as treatment needs in Tuvalu. Fluorosis was endemic, but other disorders of teeth, mucosa or bone were extremely rare and the presence of dentofacial anomalies was very low. Periodontal disease was 'moderate' at 15 years of age, but seemed to be predisposing factor in caries from the late teens onward. Comparison with a survey eight years previously indicated that caries rates had risen from 'very low' to 'low' at 12 years of age but treatment services had improved markedly. More than half of persons in the 55-64 year age group required full maxillary and mandibular dentures whilst 10% already possessed them.

B. Vector control

(iii) *Preliminary assessment of the 1983 Integrated Mosquito Control Programme on Funafuti Atoll.*

A 95% reduction of all species of mosquito was achieved by two rounds of larviciding. After the second round and substantial disposable can collection *A aegypti* larvae (the dengue haemorrhagic fever vector) could no longer be found.

A training programme was also undertaken in vector control and monitoring.

(iv) *Report of SPC Visit to Princess Margaret Hospital, Funafuti*, Taplin J., 1979.

The aim of the visit was to set up a simple system of culturing specimens, report on the present state of the laboratory, equipment requirements and the ability of the laboratory technician. Concern for training needs was expressed about the possibility of a laboratory being set up at Vaitupu.

(v) Filariasis Survey - 1989

A Filariasis survey was undertaken by the Health Department in 1989 covering 200 people over 20 years of age, 50% male and 50% female on a random sample basis. Overall, 800 people were tested on Nanumaga, Nanumea, Vaitupu and another island. Infection rates of over 30% were found. A mass treatment for filariasis was then undertaken.

Island	% Positive
Nanumea	13.5%
Nanumaga	28.5%
Vaitupu	26.2
Nui	14.5

- (vi) *Integrated vector control methods and the threat of dengue haemorrhagic fever in the tropical zone of the Pacific Ocean*, Lard M., 1984.

Historical biography together with a story of the author's earliest visit to Leningrad and first meeting with the late Academician E.N. Pavlovsky, this contribution outlines subsequent developments concerning innovative approaches to the control of Culicidae of medical importance, with particular attention to a major field trial on the atoll of Funafuti, Tuvalu

C. Nutrition - anthropometry

- (vii) *Report of Tuvalu Islands Weight for Age Survey*, December 1981, Ministry of Health Tuvalu, in collaboration with International Courses in Food Science and Nutrition, Wageningen, Netherlands.

This report concluded that underweight children was not a problem of public health significance in Tuvalu in 1981. Instead there was a prevalence of overweight children of concern to the MCH services. It was recommended that action should be taken to reduce the prevalence of overweight children in the 0-5 age group. This survey was repeated in 1987. An obesity survey of the adult population was also undertaken.

D. Population

- (viii) *Primary Health Care Study*, Save the Children Foundation, 1984.

A proposal for a primary health care plan was formulated in 1984, and in order to gain more background data physical examinations and surveys were undertaken on three islands, Nui, Nukufetau and Funafuti during the period April to July, 1983. 1,910 people were examined:

In summary, the following results were recorded:

Diseases observed	No. of people
Skin	348
Eye	225
Septis	87
Hypertension	30
Bronchitis	24
Elephantitis	16
Tuberculosis	7
TOTAL	737

Over 36% of people had some type of skin or eye infection.

Laboratory tests were also undertaken and revealed the following parasitic infections:

Worm infestation

Type of Infestation	% Tested
Whipworm	49.8%
Hookworm	9.0%
Trichomoniasis	4.7%
Roundworm	1.0

Blood smears were obtained from 1,831 people and 68 positive smears (3.7%) for filariasis were obtained.

Nutritional Status

Nutritional status of the people on the three islands was also checked and indicated:

- . A low incidence of low weight for ages in the 0-5 age group. There was not a protein malnutrition problem in this age group.
- . An apparent overweight of children in the first six months. It is suggested that this is due to the practice of supplementary feeding (as well as breast milk) soon after birth.
- . A high incidence of sores, skin problems and eye infections, exacerbated by mineral and vitamin deficiencies.
- . A high incidence of anaemia in school age children.
- . A high incidence of dental caries in school age children.
- . Over 75% of all women over 29 years of age were obese and 50% were severely obese. The major reasons include the:
 - change in diet
 - over consumption of food by breast feeding women
 - women traditionally eating last at meal times
 - low levels of physical activity.
- . A considerable lower level of obesity amongst adult males, with lower recorded levels of diabetes and hypertension.
- . Iron deficiency anaemia occurred in all sections of the population examined.
- . Hypertension

Age Group (years)	% With low hypertension levels (WHO standards)
----------------------	---

1 - 6	32
7 - 14	77
15 - 50+ (males)	29

(Note: Sahali method used for haemoglobin survey)

The report made particular note of the need for a nutritional survey as a result of illnesses that related to low vitamin and mineral intake. It is also important to note that only 23% of the 7-14 age group children with anaemia had hookworm infestation, which led the report to suggest that diet may have been the major factor contributing to anaemia.

- (ix) *Family Enrollment Card Census and Socio-Economic Survey*, Local Government Division of the Integrated Island Development Office, with assistance from SCF, 1984.

This document outlines major features of the Tuvalu population in 1987 of 8,458 people including age/sex classifications and islands of residence.

It also details relative socio-economic status of the people and details of housing type, modes of transport, type of bathing and latrine facilities, water supplies, lighting, and employment details.

In brief, it indicated;

- . 53.2% of the population were female.
- . 61.3% of the population was under 30 years of age.
- . the larger majority of houses are traditional open-sided, with pandanus roofing and sand, coral or cement floors.
- . very few western style bathhouses exist.
- . lighting was mainly kerosene or solar/electric.
- . the large majority of water supplied was by house tanks.
- . most employment is either subsistence (45%) or self employed/civil service (39%).

- (x) *Family Size and Family Welfare Programme*, The National Primary Health Care Advisory Committee of Tuvalu, 1986.

This report details the activities of the programme and gives recommendations about how the programme could be improved. It also gives details of age specific birth rates, fertility rates and contraceptive acceptor and discontinuation rates for 1986.

- (xi) *SPC Report on Nutrition week activities in Tuvalu*, Badcock J., 1984.

More realistic target weights for obesity patients were requested.

E. Non-communicable disease and nutrition

- (xii) *Diet and Eating Patterns in Nanumea, 1973 - 1974*.

- (xiii) *The influence of variation in obesity in the sex difference in the prevalence of abnormal glucose tolerance in Tuvalu*, Taylor R. and P. Zimmet, 1981.

'The prevalence of abnormal glucose tolerance in the Polynesian population of Funafuti, Tuvalu (formerly the Ellice Islands) is much higher in females than males. However, the women are more obese than the men. Adjusting for obesity reduced the relative risk of abnormal glucose tolerance between males and females but the differences remained statistically significant. It is concluded that differences in the extent of obesity in the male and female population of Tuvalu explain part (but not all) of the differences in prevalence of impaired glucose tolerance in Funafutians.'

- (xiv) *Nutrient intake in a partly westernised isolated Polynesian population : Funafuti survey*, Wickling J. et al., 1981.

Dietary data were obtained from 110 adult Polynesians (indigenous Funafutians) during a diabetes epidemiologic survey in Tuvalu. Funafuti (the main island of Tuvalu) was chosen as representative of a partly urbanised population that has seen progressive socioeconomic changes in the previous 30 years. The distribution of calories in the Funafuti diet is almost identical to that reported in the urbanised Micronesian population of Nauru and in Caucasian populations. Prevalence of diabetes was found to be five times higher than that reported in Caucasians populations. Similarly, the prevalence of hypertension was 11% (equal to Caucasian figures), whereas hypertension is virtually unknown in traditional-living populations.

Prevalence of diabetes, and degree of obesity, is significantly greater in women than in men. It is possible that this Polynesian group may have genetic susceptibility to diabetes, which may have been unmasked by change from a traditional to western life-style. Marked obesity is now a characteristic of many Polynesian and Micronesian populations, and must rank as a major causative factor for the diabetes and hypertension explosion.

- (xv) *Blood pressure studies in two Pacific populations with varying degrees of modernisation*, Zimmet P. et al., 1980. New Zealand Medical Journal, 9 April, 1980 pp249-252.

'The prevalence of hypertension and the change in blood pressure with age were investigated in a Polynesian population (Tuvalu), and in a Micronesian population (Nauru) in the South Pacific region. Hypertension was present in 27.2% of the Nauruans and 11.1% of the Tuvaluans. Both population groups also showed a rise in mean blood pressure with increasing age, a phenomenon apparently absent in traditional-living populations of the world but present in western societies.'

- (xvi) *Tuvalu Improved Nutrition Programme*, National Primary Health Care Advisory Committee, Tuvalu, 1985.

This report sets out the major health problems in Tuvalu relating to diet and outlines a two year plan of action to improve peoples' nutritional intakes. The major nutrition related health problems given were:

- a high level of obesity amongst under five year old children
- a high incidence of sores, skin problems and eye infections, indicating vitamin and mineral deficiencies
- a high level of anaemia amongst school age children, indicating iron deficiencies
- a high incidence of dental caries amongst school age children, relating to high sugar and starch intake
- an emerging incidence of obesity, especially amongst the female population, with a significant increase in diabetes, and indications of hypertension and cardio-vascular diseases.

A 1979 study indicated a diabetes prevalence rate of 10.1 per 1,000 in females over 20 years of age. The report suggests the major reasons for obesity are:

- a move away from traditional bulky, high-fibre carbohydrates such as breadfruit, **pulaka** and cooking bananas to imported carbohydrates
- a cultural tendency to give extra food beyond what is necessary to pregnant and breast feeding women
- a cultural tendency for women in the family to eat last, meaning they are most likely to consume carbohydrates
- a low level of obesity and diabetes amongst adult men, but a high level of skin infections related to vitamin deficiencies and personal hygiene. They also had a high level of dental caries related to the high sugar/starch level of foods and lack of oral hygiene. There were indications of significant vitamin deficiencies due to;
- a high level of skin and eye infections
- a lack of consumption of green leafy vegetables.

Iron deficiencies showed up in all age groups in the 1983 Primary Health Care Study with 77% of school children recording iron-deficient anaemia, and 23% of women at child-bearing age.

The major reasons for this were given as follows:

- a low consumption of green leafy vegetables
- infestations of hookworm
- a lack of Vitamin C.

(xvii) *Diabetes Mellitus in an Urbanised, isolated Polynesian Population*, Zimmet P. et al., Diabetes, December 1979, pp1101-1108.

'An epidemiological study of diabetes in Funafuti in 1976 has established a prevalence of 8% in subjects aged ten and over. Of these only 0.9% were known diabetics, and the remainder were diagnosed on the basis of a plasma glucose level of at least 160mg/100ml two hours after a 75 mg glucose load. A further 5.9% had borderline diabetes as judged by a two hour postload plasma glucose of 140/159 mg/100 ml. In those aged 20 and over the prevalence of diabetes was 10.1%, similar to that reported in other acculturated Polynesian groups. The prevalence of both borderline diabetics and frank diabetics was twice as high in the females as in males. This difference appeared to be related to the greater degree of obesity in the females but the prevalence was not related to parity. The results suggest that there may be ten times the actual number of known diabetics in some Pacific populations.'

(xviii) *Summary Report on the Hypertension Survey conducted on Funafuti Atoll during the month of March and April Inclusive*, Homasi A., 1982.

Eighty-four per cent of the total population aged 25-65 years in Funafuti were covered in the survey. The survey indicated that most people had blood pressures within the normal levels.

Diastolic blood pressure	% of Population covered
110 and over	0.6
90 - 100	13.3
70 - 80	73.0
60 or less	13.1
	100.0

Smoking and Drinking

- 48% of people over 15 years of age smoked
- 74% of men smoked
- 32% of women smoked
- more younger women smoked
- 16% of those 15 years of age and over drank alcohol
- 38% of men drank alcohol
- 2% of women drank alcohol

It was noted that some Tuvaluan men tend to drink a lot of alcohol in one sitting, leading to social and health problems.

(xix) Data extracted from health statistics during this review.

Morbidity data for two islands, Nanumea and Funafuti was utilised to extract diagnoses of hypertension and diabetes for the year 1985 - 1989. The results are as follows:

Cases	Nanumea	Funafuti
Hypertension		
1985	14	127
1986	25	168
1987	19	279
1988	24	62
1989	31	106
Diabetes		
1985	-	3
1986	2	3
1987	3	9
1988	-	6
1989	-	15

The cases of hypertension in Funafuti were much higher than Nanumea and this is not adequately explained by the larger population in Funafuti. It is more likely the result of a greater ability to diagnose hypertension at the hospital than at the health clinic on Nanumea. The same applies to diabetes. The diabetes diagnosis appears surprisingly low in numbers, especially since the 1976 diabetes survey indicated that 8% of those ten years and over who were screened had diabetes. This may indicate the need for a follow up diabetes survey and an improvement in methods of diagnosis (and treatment) in Tuvalu.

F. Hepatitis B

- (xx) *Studies on hepatitis B surface antigen and antibody in Nauru; distribution amongst Gilbert and Ellice (Tuvalu) islanders*, Gust I.D. et al., American Journal of Tropical Medicine Hygiene, November 1978, pp1206-1209.

'The age-specific prevalence of hepatitis B surface antigen (HBsAG) and antibody was studied in a random sample of Gilbert and Ellice islanders over the age of ten years living in Nauru. While approximately 82% of each group showed evidence of past infection with hepatitis B virus (HBV) the carriage rate of HBsAG was significantly lower in the Polynesian Ellice islanders (7.5%) than in the Micronesian Gilbertese (26.3%) and indigenous Nauruans (14.7%). These findings suggest that Micronesian and Polynesian populations may differ in the response to infection with HBV.'

G. Eye disease

- (xxi) Australian South Pacific Eye Consultant Team Visits (ASPECT) - 1986 and 1988.

The 1986 visit of the ASPECT team involved visits to eight Tuvalu islands, and consulting with out-patients and screening 1,937 children. In total 3,048 patients (41% of the population) were seen; 636 pairs of spectacles were prescribed and 46 cataract extractions were performed. All of the secondary students at the Vaitupu school were screened and an incidence of 11% active trachoma was found compared to 45% two years earlier. The reduced trachoma incidence is mainly due to a treatment and hygiene programme in the school.

In all 1,937 children (95% of children 0-16) were surveyed with 32% incidence of trachoma in mild form overall. The trachoma incidence rate rose with the age of children and peaked at 42% in the 6-10 year age group. Evidence indicated that the major form of infection transmission was as a result of contact in childrens' peer groups rather than with other family members.

In the 1986 report, emphasis was placed upon the need to improve the water supply and washing facilities at the Motufoua school, and to avoid using containers for flushing toilets that are also dipped into water storages that supply water for washing. It was also suggested that more fly screens be used around crowded eating areas to reduce trachoma transmission. The report recommended that all primary schools also have hand washing facilities in toilet areas. The report also suggested that consideration be given to separation of livestock from residential areas and adequate covered storage and disposal of household refuse occurs. It was also noted that the Motufoua school had poor classroom lighting causing eye strain for students. This was not assisted by the unreliable operation of the 240 volt generators.

Again, in 1988 all of the islands except one, Niulakita were visited and 667 patients were seen at the clinics and 1,980 children were screened. A satisfactory reduction in trachoma follicles in the two years since 1986 had occurred in most age groups. It is intended that the ASPECT team visit Tuvalu every two years.

CURRENT PROGRAMMES AND PROJECTS CONDUCTED
BY THE MINISTRY OF HEALTH AND DONOR AGENCIES IN
RELATION TO THE NATIONAL DEVELOPMENT PLAN 1988-1991
AND COMMENTS WITH REGARD TO AIMS, OBJECTIVES AND
STRATEGIES DEVELOPED IN THIS REVIEW.

PROGRAMMES AND PROJECTS**COMMENTS****A. HEALTH IMPROVEMENT**

- | | |
|---|---|
| 1. Family Health (UNFPA) | An important programme. MCH clinics require continuing support. Accent should be on health education. It may be useful to recruit a female doctor at some stage. |
| 2. Family Planning (UNFPA) | Family planning should continue, as population growth rate is still very high. |
| 3. Child Immunisation (WHO, UNICEF) | The programme should continue, with an emphasis on improving coverage rates. |
| 4. Nutrition and Health | A major initiative is required here to offset the growth of NCD probably with assistance of outside agencies with health education experience. Health education in schools requires a major increase especially at secondary level. |
| 5. TB Control - mainly immunisation of children (Tuvalu Government) | Should be continued, along with a mass screening programme, which may require the purchase of a portable X-Ray machine. |
| 6. Filariasis control (Tuvalu Government) | Filariasis still exists in some islands. A major filariasis survey should be undertaken. |
| 7. Dental Service (Tuvalu Government) | There is a severe shortage of dentists and (Tuvalu Government) there is also a need for a trained dental technician. Training of dental nurses to visit the outer-island regularly would improve the service significantly. A portable dental chair would be appropriate for island visits. |
| 8. Leprosy Control (New Zealand Leprosy Trust) | There have been few cases of leprosy in years. This programme should be reviewed. |

PROGRAMMES AND PROJECTS

COMMENTS

B. HEALTH CARE SERVICES

1. National Hospital Development - Refurbishment project, (New Zealand and other donor agencies).

This should proceed as planned.

2. Outer Island Clinics - upgrade of the clinics and wards (New Zealand)

Upgrading of clinics has occurred, but there are still clinics that require urgent upgrade. The delivery rooms and wards are generally in poor condition. Their role should be reviewed before any upgrades or repairs occur. They appear to be inappropriate designs for island people, and effective maintenance is very difficult. It may be more appropriate to have ward and delivery room designs which people are accustomed to, and which can be easily maintained.

As mentioned elsewhere in this report the clinics at Vaitupu and Nanumea should be converted into small hospitals, serving the central and northern islands and with resident doctors, nurses and diagnostic facilities.

3. HF Radio System
(New Zealand and Australia)

This has been an outstanding success. However, some stations are not operating effectively and should be repaired. Maintenance programmes should be intensified.

C. MANAGEMENT, MANPOWER PLANNING AND TRAINING

1. Health Planning - Preparation of an Integrated Health Plan
(SPC and donor agencies)

This project has commenced with the production of this Report (Refer to later Recommendations).

2. Surgeon - provision of a volunteer surgeon (UNDP)

Funding for this programme has continued.

3. Short-term surgical team visits
(New Zealand)

Useful short-term assistance.

4. Pharmacist provision for two years
(UNDP).

This position has been useful in upgrading pharmacy purchasing, although there are still supply problems in the outer islands.

5. Eye surgeon visits
in two years (Australia)

This has been a very useful programme improving eye health and has initiated improved eye hygiene. This programme should continue.

6. Free overseas medical treatment
(New Zealand)

This programme has enabled treatment to occur, where it would have been otherwise very difficult for either individual families or the Government to finance.