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A REVIEW OF HEALTH SERVICES OF TOKELAU

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A REPORT
PREPARED FOR THE OFFICE OF TOKELAU AFFAIRS

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EXECUTIVE SUMMARY

In December 1989, Mr Ross Naylor on behalf of the South Pacific Commission, visited Tokelau to undertake a review of its health services. The review was to be carried out by interviewing staff of the South Pacific Commission, Noumea, the Office of Tokelau Affairs Apia, Western Samoa, and health staff and community groups of the three Tokelau atolls, Fakaofu, Nukunonu and Atafu. In addition, inspections of the hospitals and villages were undertaken, and a range of background material was collected and studied.

An interim report of the findings and conclusions was made available to the Office of Tokelau Affairs in February 1990.

The major findings of the review are as follows:

1. The health status of the Tokelaun people is generally good with an absence or low incidence of the major communicable diseases. Infant mortality and the crude death rates are at satisfactory levels given the isolation and absence of major hospital facilities.
2. However, as with other South Pacific countries, Tokelau is experiencing a rapid rise in non-communicable diseases such as diabetes, cardiovascular disease and hypertension.
3. The dietary habits of Tokelauns are undergoing considerable change, with less use of fresh fish and traditional root and leaf vegetables and greater use of highly refined, processed foods with salt and sugar additives and less fibre, vitamins and minerals.
4. Smoking is now widespread and there is increased consumption of alcohol.
5. There is some evidence of obesity in the population, especially amongst women over 30 years of age and men in non-physical occupations.
6. The water supply and sanitation programmes are making extremely slow progress. There are regular water shortages and two of the atolls have virtually no sanitation apart from over-water toilets.
7. Community health education is not well developed apart from the health programmes in schools.
8. Communications between the atolls and Apia are under resourced and there is not a 24 hour service.
9. There are no established emergency procedures for the evacuation of patients from the atolls. These largely depend upon the availability of the charter ship, the MV Wairua. As a result, considerable delays in evacuations occur, putting lives at risk.
10. The hospitals electricity is supplied by small generators and is precarious. As a result, of unreliable electricity supply for refrigerated storage of vaccines the vaccination programme is at risk, and there is sometimes inadequate lighting for emergency surgery or deliveries.
11. The major focus of the doctors and nurses is clinical and hospital based, with variable commitments to health education in the community.
12. There is a potentially serious shortage of doctors and nurses now and forecast for the next few years.
13. The Health Service has a set of aims and objectives but not a long term health plan.
14. There is no written maintenance programme, for hospital property or equipment, this results in chronic breakdowns of essential items of equipment.

15. The pigs are generally too close to the villages to avoid health problems associated with poor hygiene.
16. Occupational health hazards are becoming a serious problem especially amongst the aumaunga (able-bodied men) and those in non-physical occupations.

The major recommendations are:

1. Boost community based health education with greater involvement of health department and staff. Establish or strengthen a Primary Health Care Committee on each atoll representing various community groups and Public Service departments.
2. Create opportunities to catch more fish and grow more vegetables and promote a market on each atoll for these foods.
3. Focus school health education more on the actual health problems prevalent on the atolls, by greater involvement of doctors and nurses.
4. Accelerate the pace of the water supply and sanitation programmes by simpler methods of supplying water and providing toilets. Give greater priority to the allocation of manpower, equipment, and materials to these programmes.
5. Significantly improve health care communications by installing HF radio at each hospital and at the Health Department in Apia. They would operate on 12 volt solar power and would be available for use 24 hour per day.
6. Formalise evacuation arrangements with New Zealand, improve the patient transfer facilities on the MV Wairua, and eventually replace the ship with a more suitable craft.
7. Investigate the construction of an airstrip on at least one of the atolls with parallel consolidation of the health services to one major site. Serve the other two atolls with the planned inter-atoll boat.
8. Undertake an urgent and immediate review of the provision of doctors and nurses on the atolls, and investigate the various potential sources of supply of these staff.
9. Develop a long term health plan for Tokelau.
10. Develop a written and comprehensive maintenance program for health services property and equipment, and convert of the hospitals' main power supply to solar electricity.

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1. INTRODUCTION

At the request of the Office of Tokelau Affairs, a review of health services in Tokelau was undertaken by the South Pacific Commission. The SPC consultant Mr Ross Naylor, from MPW Australia Pty Ltd carried out the field work between November 19 and December 25 1989. The consultant visited the Office of Tokelau Affairs in Apia, Western Samoa, and the three Tokelau atolls during his consultancy which also included briefing and debriefing at SPC headquarters. A preliminary report with the major recommendations was sent to Tokelau Affairs in February 1990.

The terms of reference were as follows:

- To examine and review all current hospital services and programmes for health improvement at the hospitals in the three atolls of Tokelau, by conducting a series of interviews with all health personnel, Women's Committees, Councils of Elders, school principals and selected teachers, and other government workers in selected fields.
- To identify problem areas and develop recommendations for improvement.
- To prepare a draft report after having discussions with the Office of Tokelau Affairs in Western Samoa, and finalise the report after discussions at the South Pacific Commission for submission to the Office of Tokelau Affairs.

2. GENERAL OVERVIEW

2.1 Geography

Tokelau consists of 3 coral atolls approximately 50 - 100 km apart in the Central South Pacific, about 480 Km north of Western Samoa. Each atoll comprises a ring of small islands around a central lagoon. The atolls are protected by coral reefs and as a result there is no shipping access to the lagoons. Hence there are no harbours for shipping or trading vessels. Usually ships and visiting boats have to hold off a few hundred metres from the coral reef. Anchoring is extremely difficult as the water is very deep. Therefore, shipping usually has to motor/drift whilst loading or unloading. Access to the atolls from the ships is by aluminum boats powered by outboard motors. These reach the main islands on each atoll by access channels that have been blasted through the reefs. There is currently no air service to the atolls. Nor is there is any inter-atoll shipping service due to the lack of harbour facilities or ocean-going boats that have a small enough draught to be able to enter the lagoons.

Each atoll has a number of islands of which only one or two are populated. The others are left in their natural state or used for coconut plantations. The climate is tropical and temperatures vary from approximately 26° to 33° during the year. Most rainfall occurs in the warmer months between November and March. The rainfall is approximately 80 inches per year. There is a cyclone season from January to March. Serious cyclones have occurred from time to time, the last in January 1990, when the atolls suffered significant damage. The atolls are only about 3 - 4 metres above sea level.

2.2 The people

There are approximately 2000 people in the three atolls of Tokelau.

The people are almost entirely of Polynesian origin and are generally of Tokelaun descent except where a small number of marriages have occurred with partners from other Pacific islands. There are no people of European descent resident on the atolls. There are, however, visitors from other countries representing aid organisations, church administration and the New Zealand Government. These people usually visit via the monthly shipping service from Apia, Western Samoa.

2.3 The administration

Tokelau is a territory of New Zealand and is officially administrated by its Department of Foreign Affairs. However, in recent years a Tokelau Public Service has been developed with its head office in Apia, Western Samoa. The public service also has administration offices on each atoll. The Official Secretary is the head of the public service and was previously a New Zealander. A Tokelaun has been the incumbent for some years. Public service departments include Health, Fisheries and Agriculture, Education, Public Works, Administration, Finance and Economic Development.

Approximately NZ \$4 million in aid was provided to Tokelau last year via the public service from the New Zealand Government. The emergence of the public service has meant a source of income for Tokelauns resident on the atolls. This is supplemented by income from Tokelaun residents in Apia working for the public service, and from others residing overseas, mainly New Zealand, Western and American Samoa, the United States and Australia. Some income is derived from the sale of copra, postage stamps and artifacts.

There are also a considerable number of students (up to 200 annually) attending schools and tertiary institutions in New Zealand, Fiji, Niue, Western Samoa, the Cook islands and elsewhere. These students are generally financed through scholarships awarded by the Tokelau Education Department.

The traditional government on each atoll is by a Council of Elders which makes decisions about most activities concerning the welfare of the people. The three Councils of Elders meet as a General Fono three times per year to consider matters affecting Tokelau generally.

The Councils of Elders and the General Fono are advised by the Official Secretary.

2.4 Housing

The housing on the atolls is undergoing significant change. Traditionally, family housing was the fale which consisted of a small building with a roof of pandanus leaves held up by wooden poles. The floor was usually coral and sand covered with pandanus mats. Cooking in the same building or a nearby building in 'umus', which are heated coral stones on which the food is cooked in pots. Toilets have been built out on jetties over the lagoons, and human waste falls directly into the water. Water was usually supplied from central wells, and was used for personal hygiene, and the washing of clothes and cooking utensils.

In recent years imported building materials such as cement sheeting, timber, concrete, and galvanized iron have been utilized to construct housing, and the traditional fales have become much less common. Central wells have been replaced by house based water storage, initially metal and concrete tanks, and more recently plastic storage tanks and large concrete tanks utilized as part of the foundations of new houses.

In recent times, the demand on water supplies has increased, especially as a result of the desire for cistern flush toilets and septic sewage systems. Also, some imported materials have not stood up to the sometimes harsh marine environment, especially when cyclones occur. Therefore, there has been a move towards building houses with concrete foundations (with water tanks below floor level) and concrete walls, with louver windows and galvanized iron roofs. Spouting directs water into the water storage. Some housing on the crowded island of Fale at Fakaofu is double-storied.

2.5 Communications

Communication between the atolls and with Apia is poor. A telephone system installed some years ago does not work properly and at best offers unreliable telephone services within each atoll only. Sometimes, the telephone system is able to operate between two atolls. The HF radio system between the atolls and with Apia, generally operates well considering the limitations on clarity of HF transmissions. However, there are a number of problems. These include:

- The HF radio system operates at full capacity during office hours 8am-4.30pm 5 days a week, and allows little time for health discussion.
- The system is not confidential, therefore some aspects of patient cases are not discussed.
- The system does not operate between 4.30pm and 8am and therefore it is difficult to make contact with the outside world during these hours. This is a difficult situation when urgent medical advice is required. Contact out of hours is often made with Apia meteorological station which is then requested to locate the Director of Health. This informal ad hoc approach is not satisfactory.

Possible solutions could include:

- The installation of another HF system dedicated to health care and on another frequency, not available to the current HF radios. This could provide a direct and relatively confidential link between the atoll hospitals themselves and a link between each atoll hospital and the office of the Director of Health in Apia. An HF radio system was set up about 12 months ago in Tuvalu linking the health clinics and each of the eight other islands with the main hospital at Funafuti. It works very successfully, and was funded by the Australian and New Zealand Governments.
- This system could be supplemented by pagers kept on the persons of each atoll doctor and the Director of Health in Apia. When a message is transmitted on this frequency the pagers are automatically activated.
- This system would probably be permitted under current New Zealand radio communication regulations.
- Only a small dipole antenna would be required on each location.
- The system is easy to install and would only involve one shipping visit by the SPC technician accompanied by the Tokelau technician based in Apia.

2.6 The shipping service

The MV Wairua is at the end of its long service as a small passenger trading vessel and is unsuited to the tropical environment of Tokelau. It is designed for service at the southern tip of New Zealand. Consequently, the sleeping quarters are very hot, humid, and lacking fresh air, which is not helped by the inability of the auxiliary engines to operate the air conditioning and provide essential power to the pumps and blowers at the same time. Therefore, the air conditioning is seldom working. The sanitary conditions are not satisfactory, with blocked toilets being a regular occurrence. Such a hot, humid environment with poor sanitary conditions is an ideal situation for cross infections to occur between passengers. It is no surprise therefore, that the arrival of the ship at the atolls is accompanied by outbreaks of infectious diseases a few days later. Access to and from the ship via the ship's portable stairway is not suitable for the movement of seriously ill patients.

Being so old the ship is inclined to be unreliable, as it sometimes has to wait in port for repairs. This is not a satisfactory arrangement when it is the only organised form of evacuation from the atolls.

2.7 The Tokelau Health Service

The health service is managed by the Tokelau Health Department based in Apia, Western Samoa. The Director of the Health Department is usually a doctor. Doctors are also in charge of the health services on each atoll and report to the Director of Health. Currently, there is a vacancy for a doctor on the atoll of Fakaofu, since the incumbent is working in an acting capacity as Director of Health in Apia.

Each atoll has an establishment of 5 registered nurses and 4 nursing aides. The registered nurses are trained overseas, usually Western Samoa or New Zealand. The nursing aides are trained at the hospitals on each atoll. The hospitals each employ a porter and three vector control and sanitation staff. The porters are used to assist with patient care, movement and accommodation, and also help with equipment and capital maintenance. The vector control and sanitation staff assist in ensuring that water tanks are covered and that swampy areas are sprayed with kerosene. They also remove rubbish and other items from the villages.

The hospitals on each atoll are identical in layout and construction. Each appears to be of a similar age, approximately 10 - 15 years old.

The four main buildings are connected by covered walkways, which have water storage tanks underneath. Power is supplied to the hospitals by 27 KVA and 35 KVA generators used for the villages, and are backed up by 7.5 KVA generators exclusively available for hospital use. Refrigerators used for storage of vaccines and other medicines are electric powered. There are emergency pressure kerosene lights.

Dental services are provided for on each atoll with a dental nurse on Atafu and Nukunonu and a dentist on Fakaofu. However, the time of the dentist on Fakaofu is largely taken up his position of Administrator of the atoll.

Apart from the hospitals, the atoll of Fakaofu also has a clinic on the most populated island of Fale, as the hospital is situated on the island of Fenuafala, about 15 minutes away by power boat.

The doctors on each atoll receive patients at the hospital (and clinic) and also undertake home visits. Patients are admitted to the hospital when that inpatient care is required. Often family members stay with inpatients in the wards. The registered nurses accompany the doctor on home visits and also attend home inspections with the Women's Committees of each atoll. Home inspections are designed to monitor domestic hygiene and sanitation standards. Maternity facilities are available at each hospital with about 15 - 20 births per annum on each atoll. Where obstetric complications are forecast by a doctor, the patient is referred to Western Samoa or New Zealand. Patients are also referred for a number of other surgical and medical treatments. Permission has to be sought from the Director of Health in Apia first. All patients referred (including emergency cases) have to travel by ship, which may result in delays of up to 3 weeks.

3 METHODOLOGY USED FOR THE REVIEW

3.1 Interviews and collection of background materials

A 4 day briefing programme was undertaken at Noumea at the commencement of the assignment. Significant data was collected on Tokelau and its health services from the SPC Library and during interviews with South Pacific Commission staff. A stopover in Fiji (3 days) en route to Western Samoa permitted some useful interviews with UNDP, UNFPA, WHO and USP. In Apia, Western Samoa (14 days), interviews were with staff of the Office of Tokelau Affairs for briefings on the health service, and to discuss logistics arrangements. Discussions were also held with staff from the Western Samoa Government and other agencies. In Western Samoa a significant amount of data was collected relating to the health services of Tokelau.

The ship M.V. Wairua left Apia for Tokelau on the evening of December 8. The schedule for my visits to the three atolls was based on a visit to each atoll on the first trip, to remain on one atoll for 4-5 days and wait for the ship to return from Apia for the second trip. The ship would then re-visit the other two atolls. This schedule allowed for 5 days on Fakaofu, two days on Nukunonu and two days on Atafu.

3.2 Meetings with hospital staff, other public service personnel and community groups

Meetings were prearranged in Apia and communicated by HF radio to the three atolls, although specific times had to be arranged on arrival at each atoll (a detailed list of people interviewed is given in Appendix I).

3.3 Village inspections

Village inspections were carried out on each atoll in the company of the Acting Director of Health and the resident atoll doctor. Particular attention was given to:

- (1) the adequacy of the water supply
- (2) whether water supplies were covered to reduce mosquito breeding
- (3) the water catchment systems
- (4) the methods of sanitation
- (5) the approach to hygiene by individual households
- (6) proximity of swimming and cleaning to waste disposal
- (7) the degree to which rubbish had been removed or disposed of away from the village. This included rubbish that would allow for the breeding of mosquitoes and flies, i.e., coconut husks, tin cans, cardboard and plastic containers, bottles, coconut leaves, unused or rusted corrugated iron, spouting and plastic wrapping.
- (8) the development of composting and recycling pits for vegetable matter to improve gardens
- (9) the development of household, school, Women's Committee and village gardens
- (10) the proximity of piggeries to the village and the possibilities for infection from piggery effluent
- (11) the number and type of toilet facilities
- (12) the types of housing
- (13) proximity of swamps to the village
- (14) the arrangements for loading and unloading of cargo and people from the ships and the aluminum power boats
- (15) the location of fishing and swimming areas, and areas where fish cleaning occurs
- (16) the goods sold in the village store, including food stuffs and beverages, their quantity, quality, price and choice
- (17) cooking facilities in individual households
- (18) opportunities for sport and recreation on the atolls.

3.4 Hospital inspections

Matters considered included:

- (1) the proximity of the village to the hospital
- (2) the communication arrangements in the village and with the hospital
- (3) the methods of power generation in the village and the hospital
- (4) the physical condition of the hospital and the clinic, including all equipment and utensils
- (5) the cleaning and toilet facilities at the hospital; the methods of storage of vaccines and other medicines; the storage of surgical instruments; vector control; methods of waste disposal; hospital layout; patient isolation, consultation, surgery and midwifery facilities; infection control; location and condition of nurses quarters; systems for patient and other hospital records.

4.0 MAJOR DISEASE PATTERNS IN TOKELAU

4.1 Morbidity

In 1988, the major reasons for outpatient visits in Tokelau were:

	Percent
● skin infections	19.2
● upper respiratory tract infections	4.4
● influenza	46.7
● gastroenteritis	8.0
● bronchitis	2.0
● arthritis	2.3
● conjunctivitis	1.8
● skin lacerations	1.7
● other illness	<u>13.9</u>
	100.0

A full list is given in Appendix A.

Notifiable diseases reported to the South Pacific Epidemiology and Health Information Services (SPEHIS) over the two year period 1988 and 1989 were:

Number of cases reported	
Influenza	2652
Diarrhoea (child-adult)	351
Diarrhoea (under 1 year)	149
Dengue Fever	118
Acute Conjunctivitis	131
Fish Poisoning	37
Hepatitis	1

(No other notifiable diseases reported. Further details are given in Appendix B.

4.2 Mortality

Over the two year period 1987 and 1988, there were a total of 30 deaths reported with the following causes:

Causes	Numbers
Pneumonia	7
Cardiac Arrest	5
Cancer	4
Cardio pulmonary failure	3
Congenital defects (at birth)	3
CVA	2
Meconium Pneumonitis (at birth)	1
Dehydration (4 months old)	1
Suicide	1
Liver failure	1
Diabetes	1
Drowning	1
TOTAL	30

Further details are given in Appendix C.

Death rates are difficult to interpret and compare with other populations since the number of deaths and the population are so small. The constant migration flow between Tokelau, Western Samoa and New Zealand is also an important confounding factor, since births and deaths occurring outside the atolls are not taken into account in health service reports. With these reservations, when compared to other South Pacific nations the crude death and infant mortality rates for Tokelau are satisfactory. However life expectancy estimates are low. Life expectancy rates are not available.

Country	Crude death rate	Infant mortality rate
Tokelau	7.0	14.8
New Zealand	8.3	11.4
Western Samoa	7.1	24.0
Tuvalu	9.3	26-30
Kiribati	13.9	-
French Polynesia	5.8	18.4
Fiji	5.6	19.8
American Samoa	4.7	10.4
New Caledonia	5.8	16.8

Source: World Health Organization, Western Pacific Data Bank on Socioeconomic and Health Indicator, Manila 1989.

In 1987 and 1988 over 50% of deaths in Tokelau were due to cancer or cardiovascular diseases, which can be termed 'lifestyle' diseases. The graph in Appendix D would indicate that deaths from such diseases in Tokelau are relatively high.

5.0 FACTORS RESPONSIBLE FOR ILLNESS ON TOKELAU

5.1 Major factors

Some of the illnesses may have multiple causes, however major factors are given below (from interviews with the medical officers).

Illness	Major factors
Skin infections	hygiene, sanitation, flies, piggery waste, diet, water shortages.
Respiratory infections	smoking, infectious transfer.
Influenza	infectious transfer, conditions on ship.
Gastroenteritis	sanitation, flies, water shortages.
Bronchitis	smoking.
Arthritis	symptoms affected by occupational health practices.
Conjunctivitis	infectious transfer, saltwater environment.
Skin lacerations	coral, sport, work.
Heart disease	diet, level of fitness, smoking.
Cancer	smoking, diet.
Diabetes	diet, level of fitness.
Liver failure	alcohol.
Diarrhoea	sanitation, tinned foods.
Dengue fever	mosquitos, stagnant water.
Fish poisoning	certain types of fish.
Hepatitis	sanitation.

The most common factors are:

1. the quality and supply of freshwater
2. the conditions of sanitation
3. diet
4. cigarette smoking
5. personal hygiene
6. the level of fitness
7. the control of flies and mosquitoes
8. the prevalence of accidents and chronic physical conditions due to poor work practices.

5.2 Dietary habits

Major changes are occurring in the dietary habits of Tokelauns. Traditional foods such as coconut and fish are still consumed but in smaller amounts. They are being replaced by white rice, white flour, tinned meat and fish, tinned vegetables, sugar and salt. Also fresh vegetable consumption is low, sometimes once/twice per month.

The change in diet has brought about increases in the prevalence of cardiovascular diseases, hypertension, diabetes, obesity, gastroenteritis and cancers. There are a number of reasons for the change in diet. These include:

- The access to income and therefore the ability to purchase processed and easily prepared foods from the village store.
- The increased status associated with purchasing and consuming imported foods.
- The increased level of paid employment in times which would have been otherwise utilised catching fish, harvesting coconuts or growing vegetables.
- The influence of dietary choice in New Zealand and Western Samoa where many Tokelauns have visited or lived for some period of their lives.
- The attractiveness of salt and sugar additives to most cooking.
- The busier schedule of the aumuanga (able bodied-men) in building houses, improving the water supply, loading and unloading the ship and other community work activities, leaving less time to catch fish for the village.
- The failure to realise the importance of traditional foods and methods of preparation and cooking, especially fish, coconuts and fresh vegetables.

A number of actions could be taken to counter these disturbing trends. These include :

- increased health education, especially for adults, about the importance of traditional foods and the dangers of low nutrient processed foods.
- health education posters and other materials in the Tokelaun language could be produced and distributed to the atoll communities.
- the encouragement of more vegetable gardening and fishing through
 - * making more materials and equipment available, especially wire, seedlings and seeds, wood chippers, fish nets and lines.
 - * greater concentration of the Department of Agriculture and Fisheries on non-commercial family food production.
- development of a fish and vegetable market as part of the village store, encouraging people to catch and grow surplus foods.
- increasing the prices of poor nutrient foods and subsidising the prices of good foods. This needs to be treated with some caution as demand for certain foods doesn't change with increases in price. However, experimentation with the prices of one or two products initially may be a useful exercise (i.e.. sugar, salt and cigarettes), if accompanied with a health education message from the Council of Elders.
- allowing the aumaunga and other paid workers the time to catch fish and grow vegetables, through the introduction of changed working hours (to allow an afternoon free in the working week, for example).
- incorporation of gardening, fishing, traditional cooking and preparation into the school curriculum at all levels.
- encouraging school, Women's Committee and individual household gardens by an incentive mechanism such as community prizes and the ability to sell the surplus to individuals or the village store.

5.3 Physical fitness

The level of fitness of girls and boys and adult men is generally good, as they participate regularly in sport or physical work activities. Two notable exceptions are adult men in sedentary occupations and women after having children and who are occupied with home duties.

Possible remedies are to:

- Offer more recreational activities on the atolls to these people. (e.g walking groups, aerobic exercises)
- Stress the importance of appropriate diet and physical fitness in maintaining good health through targeted health education programmes.
- Encourage a reduction in smoking which impairs involvement in fitness activities.

The women have especially requested assistance with developing aerobic classes.

The schools are short of a number of items of sporting equipment such as tennis racquets, rugby and basketballs, volley balls, table tennis tables, outriggers and small sailing boats.

5.4 The water supply

The water supply programme is the responsibility of the Department of Administration which utilises the services of the Public Works Department staff.

Water is collected from roof catchments and fed by PVC piping into plastic or concrete above ground tanks or concrete tanks that comprise the foundations of houses. Wells were used in the past but the water was affected by saltwater contamination. Demands on water for drinking, cooking, cleaning, washing, sanitation and provision of water to animals. The major use of water is for human waste disposal. The methods used on the atolls, are the flush toilet and the septic tank. Cistern flush toilets are predominant on the two Fakaofu islets of Fale and Fenuafala, but only a small number exist on each of Nukunonu and Atafu.

Water storage is on a per building basis and there is no common water supply storage. The Council of Elders or the Tokelau Public Service therefore have little control over the amount of water being stored, or the effectiveness of the catchment methods. Catchment effectiveness is significantly reduced by broken or absent PVC piping, broken or absent spouting or inadequate and sometimes leaking storage tanks. Consequently, despite the 80 inch annual rainfall, there are frequent periods when there is little or no fresh water available on the atolls. This is usually accompanied by an increase in skin infections, conjunctivitis, influenza, gastroenteritis and other ailments affected by the lack of good hygiene. The water storage programme is currently based on the constructions of foundations for new houses and is therefore dependent on the progress of the housing scheme. This in turn relies on manpower availability within families, of savings required to contribute to the construction cost of houses, and the availability of materials, especially cement and reinforced wire.

The progress of water supply programme is too slow and consideration should be given to reducing the reliance upon new houses being built. Integral water storage tanks could be built on house sites with the houses to follow at a later stage or concrete or plastic tanks that are not components of the finished house could be built.

A study is needed to:

- calculate the long term water requirements of each atoll.
- calculate the present water storage capacity.
- consider the development of a community water storage and reticulation system.

One simple way to save water is to install dual flush cisterns in all flush toilet systems (with two different volumes of water being flushed) and possibly to reduce the size of the cistern and the bowl.

5.5 Sanitation

The current methods of sanitation vary considerably. They are:

On Fakaofu:

Mostly cistern flush toilets with septic tanks or undertoilet pits. Some toilets are connected to normal septic tanks with concrete walls and floors with an overflow and piping to distribute the waste through the ground. Some toilets are connected to underground pits with rock walls and open floors where the waste tends to be washed away by the saltwater permeating through the coral. There are still some overwater toilets being used when the cistern toilet fails to operate, where the toilet septic system is still incomplete (waiting on materials), or when the family wishes to save water.

On Nukunonu:

Most toilets are overwater toilets where the waste is deposited into the lagoon. There is a higher incidence of gastroenteritis as a result. There are only seven buildings on Nukunonu with flush toilets.

On Atafu:

As with Nukunonu, most toilets are overwater toilets. Only three buildings have flush toilets. The situation is made worse at Atafu because the water in the lagoon is very slow moving with higher possibilities of infections from swimming, catching or cleaning fish and washing.

Cistern flush toilets seem to be the preferred alternative to pour flush toilets despite their unreliability, difficulty in obtaining replacement parts and their high use of water. The islanders' preferences have a lot to do with experiences in New Zealand, the often close proximity of houses on the atolls, and the desire to avoid the smell associated with non water-trap toilets.

There are a number of problems associated with the progress of the sanitation programme. These include:

- A reliance on the water supply to enable the flush toilets and septic systems to operate. This in turn is related to the progress of the housing programme, mentioned earlier. If the problems relating to the water supply programme were solved, the sanitation programme could proceed more quickly.
- The design of water storage systems for the flush toilets. These are often 44 gallon drums which have to be filled by bucket or borrowed electric pumps. Consequently they are often out of water. It would be better to connect these tanks directly to the spouting with the overflow going to the main storage tank, or alternatively to install a simple hand pump from the main water storage.
- The shortage of materials, especially cement, PVC piping and reinforced wire mesh. Some atolls have been waiting for months for supplies. Atafu has been waiting for water taps for three years, it is claimed.
- The shortage of specialist manpower in the Public Works Department, especially plumbers who seem to be largely occupied with house building activities.
- The shortage of equipment such as cement mixers, shovels, tractors and trailers, most of which have to be borrowed from other departments when they are available.

Methods of alleviating these problems include:

- improving the progress of the water supply programme by separating it from the housing programme, where possible. This would mean the development of a project to supply all households with simple above ground tanks, as soon as possible.
- improving the design of cistern flush water storage so that there is always sufficient water. Above ground tanks could be installed higher than the level of the cistern allowing the water to be gravity fed.
- improving the supply of key materials such as cement, wire and PVC piping and dedicating them to the sanitation programme. (they are often assigned to the building programme first).

- training sanitation staff in plumbing techniques specific to the installation of flush toilets and septic tanks.
- installing simple pour flush toilets, which can be installed much more quickly and without the need of a plumber.
- making more key equipment available to the sanitation staff.
- Placing sanitation and water supply higher on the priority list than new house construction where the current housing is adequate for a few more years. (This depends somewhat on the damage caused by the recent cyclones).

5.6 The effects of animals

Dogs are banned in Tokelau. Rats are present however and are a health problem, especially on Fale (Fakaofu) which is densely populated. Fowls exist on all the atolls in the villages and do not appear to present a problem, except possibly on Fakaofu.

The animal with a major impact on health is the domestic pig, present in large numbers on all of the atolls. Pigs are kept on a reef adjoining the main village on Fale in Fakaofu. They regularly escape and wander through the village, leaving their waste around houses and washing areas. Also, their effluent washes into a channel next to the village and into a shallow area of water near the ocean where many villagers swim. The possibilities of infection from pig waste are therefore high.

On Fenuafala, the other islet of Fakaofu, the pigs are kept in small pig sties on land next to the houses, and some are seen scavenging around the village for food. It may be appropriate to consider moving the pigs away from Fale to Fenuafala. However, the residents of Fale would be reluctant to do this as they would not have easy daily access to the pigs for feeding, cleaning the piggeries, and maintenance of the fencing. Many people do not want to move to Fenuafala either, because their traditional homes are in Fale. The development of a walkway along the reef wide enough for tractors and trailers would assist in community acceptance of moving the pigs to Fenuafala. The residents of Fale would then have walking and tractor access to their pigs. A piggery structure has been commenced behind the village at Fenuafala, but progress has been slow.

On Nukunonu, small piggeries exist throughout the village, and some pigs also roam freely. A village piggery was constructed at the southern end of the village, but was destroyed in the 1987 cyclone. On Atafu, a village piggery with individual sties exists about 250 metres north of the village. It is bounded by a high community built wall made from coral and cement. No pigs are allowed to wander through the village. Consideration should be given to accommodating the Fakaofu pigs on Fenuafala, once a walkway is constructed, the Fenuafala village piggery should be completed. The piggery destroyed at Nukunonu should be rebuilt. A programme to reduce the rat population, especially on Fale, should be instituted.

5.7 Occupational hazards

The aumaunga (able-bodied men) on each atoll are susceptible to occupational health problems from lifting, lack of protective clothing and sometimes handling materials with some degree of toxicity. The crane of the MV Wairua is unreliable and therefore supplies frequently have to be loaded and unloaded by hand. Similarly, items that passengers bring with them such as freezers full of meat, pigs, suitcases, boxes, and outboard motors are manhandled up and down the stairway to the small aluminum boats. These goods plus the supplies from the hold of the ship are then unloaded onto the beach or the concrete landings by hand, without any mechanical assistance. They are then carried to the loading/unloading sheds about 20 metres from the beach. Some of the supplies are very heavy and include bags of rice, sugar, and flour, reinforced steel, bags of cement, coconuts, boxes of tinned food, drums of fuel, etc.

The resultant occupational injuries include:

- external piles
- chronic back problems
- skin problems from cement dust and leaking fuel drums
- broken bones in feet and hands
- muscle damage
- arthritis
- enlarged testicles
- knee injuries
- eye problems from dust and fuel.

Solutions to these problems would include:

- the fabrication of galvanised mild steel cranes for use at the landings at each atoll. The cranes would be mounted on rails, to allow them to be winched away from the beach or landing when not in use.
- the provision of protective clothing including:
 - work boots
 - ear muffs
 - protective glasses
 - overalls
 - helmets (for use in the ship's hold or in the workboats when loading from the ship)
- the provision of an extra crane at the ship's stairway for unloading/loading passengers' heavy items (and stretchers for patients referred to Apia).
- the provision of sufficient tractors and trailers to be able to transport heavy items unloaded by the crane at the beach or the landings.
- the Adult Learning centres on each atoll conducting occupational health and safety courses for all members of the Aumaunga and Tokelau Public Service Departments where heavy or dangerous physical work is undertaken.

Other aspects of occupational health that could be investigated include:

- the exposure of the vector control and sanitation staff to insecticide spillage and inhalation. The provision of protective clothing should be considered.
- the dangers involved in siphoning outboard fuel through a hose by sucking (this practice occurs).
- the level of obesity that may result from sedentary occupations (desk jobs).

6.0 THE OPERATION OF THE TOKELAU HEALTH SERVICE ON EACH ATOLL

6.1 Medical/hospital services

6.1.1 Outpatient services

Consultations with the doctors are available during normal working hours 8am to 4:30pm, and after hours when necessary. Special clinics are sometimes held on the atolls, although the degree of regularity varies (eg. diabetes and hypertension clinics). Weekly home visits are also conducted on each atoll. On Nukunonu, the nurses conduct the home visits because the doctor cannot speak Tokelaun. The doctors and nurses also undertake daily school clinics either at the schools or the hospitals. These clinics are designed to attend to any evident health problems the children may have (eg. skin irritations, gastroenteritis, conjunctivitis, influenza) and which may be infectious.

The diagnostic services are extremely limited and are confined to blood grouping, glucose testing and simple (paper) urine tests. Glucometers are available but there is a shortage of batteries. There are no X-Ray facilities on the atolls. Some nurses have training in laboratory methods. For other diagnostic testing, specimens have to be sent to Western Samoa, Fiji or even New Zealand. Patients requiring X-Rays have to travel to Western Samoa. Consequently, considerable delays often occur in accurate diagnosis.

6.1.2 Patient admissions

Details of patient admissions for 1987 and 1988 are given in Appendix E. Most admissions are related to midwifery, and diseases of the digestive and respiratory systems. Admissions were equally spread across the three atolls, although gastroenteritis, urinary tract infections and fish poisoning were very high in Atafu, and pneumonia was high at Fakaofu. (Appendix F).

Emergency surgery and care is carried out for the following:

- appendix
- laparotomy
- acute abdomen
- caesarean section
- peptic ulcers
- bleeding
- accident trauma

When forecast, most major surgical cases and medical complications are referred to Apia, Western Samoa, or New Zealand. In the first instance, patient transfer to Apia Hospital and specialist consultation is arranged, after permission from the Director of Health in Apia.

Obstetric cases are the major reason for patient admissions, and virtually all births in Tokelau take place at the hospitals. Births often take place without the doctor present, but usually with a registered nurse trained in midwifery. Again, where obstetric complications are forecast, the patient is referred to Apia.

General anaesthetics are undertaken by the doctor at Atafu, and the doctor at Fakaofu (until he became Acting Director of Health in Apia). The doctor at Nukunonu only feels comfortable with local anaesthetics, and therefore virtually all his surgery cases are referred. Anaesthetic machines are available but are often not in working order. The nurses have had little post-basic training in anaesthetics.

6.1.3 Administration of drugs and vaccines

Small supplies of drugs and vaccines are available on the atolls and are sent as regularly as supplies from New Zealand will allow. Drugs are currently procured from New Zealand on a six month order to be prepared three months in advance. The New Zealand Department of Foreign Affairs has responsibility for placing tenders with major drug companies operating in New Zealand. There are considerable delays in the ordering process and many items are not always available. The six month order is then shipped to Western Samoa to the Office of Tokelau Affairs from where it is distributed to the atolls or held in stock. As a result, the atolls tend to run short of important medicines on a regular basis or they are overstocked on other items (eg. many of the drugs on the atolls had expired use-by dates). A common complaint when interviewing members of the communities on all three atolls was the shortage of drug supplies.

Vaccines are stored in the electric powered refrigerators, but their effectiveness is severely diminished because the refrigerators do not operate from approximately 10:30 pm till 8:00 am the next morning. Vaccines are generally administered on a bulk basis due to the manner in which they are supplied. This lack of flexibility prevents a complete vaccination programme being implemented because children are not always present on the atolls when vaccinations are carried out.

The program for children's vaccinations is as follows:

- | | |
|-------------------------------------|---|
| - When mother in hospital for birth | - (BCG), Tuberculosis |
| - At three months of age | - polio, diphtheria, whooping cough and tetanus (DPT) |
| - At six months of age | - second dose of above |
| - At nine months | - third dose of above |
| - At five years (school entry) | - second dose of BCG and booster of polio and DPT |
| - At sixteen years (leaving school) | - tetanus |

No data was available on Tokelau for hepatitis B infection but considering the high rates of infection in Western Samoa and New Zealand, mass immunization should be implemented as soon as possible in Tokelau together with the regular Expanded programme of immunization. New Zealand itself has already adopted such a policy, as well as more than half of the Pacific island countries.

All children and mothers' individual vaccination histories are kept on file at the hospitals. A list of vaccinations conducted in 1987 and 1988 is given at Appendix G.

6.1.4 Patient transfers and referrals

Where complications are foreseen patients are referred to Western Samoa for specialist advice or treatment after permission is sought from the Director of Health in Apia. This applies to potentially serious conditions where the doctor is not sure of the diagnosis or treatment, child birth problems, where surgery or specialist drug treatment is required, or in emergency situations. The effectiveness of emergency referral is reduced by the inadequate patient evacuation arrangements. Sometimes emergency cases have to wait days or weeks before evacuation can be arranged.

The number of referrals varies between atolls. The doctor at Nukunonu has a high volume of referrals due to his lack of recent experience with complicated child birth cases, patient diagnoses, general anaesthetics and emergency surgery. The doctor at Atafu will undertake most midwifery cases and emergency surgery and medical treatment. Referrals from Fakaofu have been high due to the lack of a doctor for some months.

6.1.5 Disabled people

All geriatric and disabled people are cared for in family homes by relatives. Assistance in the form of wheelchairs and ramps would in some cases make a considerable difference to their quality of life.

An Australian company 'Platypus Wheelchairs' makes a wheelchair that is made from entirely plastic components and which is very light. No foam is used, so heavy rain would not cause prolonged discomfort, and the person could be washed in the wheel chair. It has large rubber wheels that would cope with the coral pathways well, and it will not rust.

One of the Women's Committees suggested a day centre be built and developed for the older and disabled people. This suggestion has merit, but would need to be treated with some caution as it may bring about undesirable segregation of older and disabled people from their community if daily attendance for long hours occurs. Consideration could be given to operating a respite care service from the hospital. This would enable small families to be relieved of the constant burden of care from time to time.

6.1.6 Evacuation

The problems with the ship are exacerbated by the fact that Tokelau doesn't have control of the ship's movements except when it is under charter. When not under charter, the ship may be committed to another voyage which would range from Fiji to the Cook Islands. Obtaining another ship when the MV Wairua is not available has proved to be difficult at times, especially at short notice for a medical emergency. From a health point of view alone, a ship dedicated to the Tokelau voyage between Apia and Tokelau is required, and it should be available for Tokelau's use virtually all of the time. The ship should be suited to passenger voyages in the tropical Pacific island groups, with well ventilated accommodation facilities, and with an ambulance room complete with oxygen, suction, emergency resuscitation equipment, and emergency drug supplies. The ship should have an arrangement to allow easy movement of patients from the aluminum workboats to and from the ship's deck.

In the long term, an aeroplane service for Tokelau would allow medical emergencies to be handled more easily, but this requires airstrips as seaplanes are no longer economically viable options. In discussions with the Councils of Elders on each atoll, it was made clear that airstrips were certainly a possibility but this requires further negotiations.

The question of emergency evacuation is a very important one, as a number of patients could have been saved in recent years if suitable evacuation arrangements had been established. In the shorter term, negotiations should occur with the New Zealand Government to establish an 'Emergency Evacuation Procedure' that would allow for options, such as:

- utilizing the New Zealand Airforce
- utilizing seaplane or helicopter services of other nations in the South Pacific (e.g. USA or French territories)
- setting aside funds from the New Zealand Government for emergency charter of ships or fishing boats to pick up patients on the atolls.

There are cases which do not qualify as emergencies but where it could be dangerous for the patients to wait one or two weeks for the ship to arrive. These include:

- appendicitis
- abdominal pain
- premature births.

these patients would not be subjected to such risks if a regular air service was available.

6.2 Dental services

There is a dental nurse resident on Atafu and a dental nurse on Nukunonu. A dentist lives at Fakaofu, but he works as the full time Administrator of the atoll, and only undertakes referral work. The bulk of the dental services is undertaken by the two dental nurses. Each hospital has a dental surgery well supplied with equipment and dental supplies as a result of the visit of the New Zealand Armed Forces Dental Corps in 1989.

Most of the dental treatment involves fillings and extractions as dental cares (tooth decay) and periodontitis (gum disease) are both very prevalent. Neither the dental nurses or the dentist regularly visit the schools to undertake a preventative dental health program. This has traditionally been undertaken by the schools themselves. The dentist visits the other atolls for Administration duties and takes referrals from the dental nurses on those occasions. It may be beneficial for the dentist to visit the dental nurses more often as his administration duties allow.

The dental nurse on Nukunonu was trained in Fiji whereas the dental nurse on Atafu was trained in New Zealand as a child dental nurse, which limits her ability to deal with adult dental problems. It would be appropriate for the dental nurses to undertake some post-graduate training and refresher courses from time to time.

Ordering dental supplies is difficult as there is no up to date catalogue of materials and supplies.

The visit of the New Zealand Armed Services Dental Corps was highly successful. However, dental treatment was undertaken in such haste that in some cases dentures do not fit properly and people have removed them. In other cases, teeth have been extracted to be replaced by dentures but the dentures were not fitted in the time available. School inspection of teeth is not a routine and on Fakaofu only one inspection was carried out in 1989. The dental suction equipment on Nukunonu is being used by the hospital as the hospitals' suction equipment has broken down.

6.3 Community health services

6.3.1 Health advice to the community and the school

The doctors on the atolls consult with the Councils of Elders and the Women's Committees about village health, and on occasions make visits to the schools to conduct or participate in health education classes. Most health advice, however, is on a clinical basis either at the hospital, on home visits, or in school clinics. Generally, the registered nurses have a similar involvement in health education to the doctors, but are usually more involved with Women's Committee village and home inspections, and school health education classes.

6.3.2 Vector control and sanitation

The vector control and sanitation staff on each atoll are responsible to the atoll doctor for adequate vector control and advice/assistance in liaison with the Public Works Department for installation and upkeep of sanitation systems. Although, the Health Department is responsible for the sanitation programme it is very dependent upon the Public Works Department for manpower and specialist technical services, especially the use of the plumber. There has also been a chronic shortage of materials, especially cement, reinforcing wire and PVC piping. There is also a shortage of equipment such as wheelbarrows, cement mixers and shovels. The vector control staff spray insecticides through the village on regular occasions to reduce mosquito populations. However, insecticides are expensive and in short supply on the atolls. Stocks are kept in Apia and supplied to the atolls on the basis of need, as determined by the Director of Health.

Kerosene is used to cover open water supplies and swamps to discourage mosquito breeding. The doctor at Nukunonu has banned the use of kerosene because he considers it a health hazard.

Many people commented on the significant increase in mosquitoes in the last twelve months. 1989 also saw a rise in dengue fever, a trend common in the South Pacific.

The vector control and sanitation staff also clean up rubbish, obsolete building materials, coconut husks and leaves and other items that collect rainwater and allow mosquitoes to breed. The rubbish is buried on another islet or dumped into the ocean. Shortages of boats and outboard motors, specific to this purpose, impede regular rubbish clean ups.

6.3.3 Health education

Some form of health education operates at all levels in the schools. At the primary level there is a subject called Health and at the secondary level health education forms part of the Home Economics course. At Fakeafo, health is taught at Primer level (1st three years of Primary) for half an hour every day and for the remainder of primary school (4 levels) for 40 minutes per week. Home economics is taught for 40 minutes every day of the week at secondary level. Health comprises about 50% of Home Economics. Health education embraces a number of components.

These include:

- Personal hygiene
- Knowledge of the body and its functions.
- Limited sex education at senior levels, mainly biological rather than moral, psychological and self-esteem aspects of adolescent and adult human behaviour
- Safe preparation and cooking of foods
- The dangers associated with cigarette smoking.
- The avoidance of common illnesses and accidents

A health curriculum was not available so comment on the course components is restricted. The school programmes, while making a significant contribution to good health, appear to lack focus on the important emerging health problems. These include:

- Cigarette smoking. More effort in informing the children of the dangers of dying or being severely impaired by cigarette smoking is needed, with special in reference to actual cases occurring on the atolls (bearing confidentiality in mind).
- The dangers associated with the availability and wide use of imported foods, especially sugar, salt, white flour and rice and tinned foods.
- The importance of the use of traditional fresh vegetables and fruits in the diet.
- The encouragement of school and home gardening. Gardens should be seen as a health matter as much as an agriculture matter. The importance of fishing and gardening should be stressed in school health education. Time should be allowed in the health curriculum for practical periods actually fishing and gardening.

- The encouragement in Home Economics of the use of recipes that make the use of traditional foods more attractive (eg. the SPC has a number of recipes that could be translated into Tokelaun). Also recipes could be developed that combine traditional foods with imported foods, to discourage the sole use of imported foods.
- The appropriate use of alcohol. There are some domestic situations, where alcohol is a problem on the atolls.
- The role of physical fitness in the health of school children. Sport and physical recreation should be encouraged within the health curriculum, including some practical demonstration and participation sessions (eg. walking groups, sailing outriggers, games, skipping, volley ball, swimming).

All schools reported a shortage of health education posters. The current posters are mainly in English or French. Since Tokelaun is the official language used in schools and by the people it would be appropriate for all posters (and other materials) to be produced in Tokelaun. Few people speak a foreign language such as English or French in Tokelau.

There are shortages of other teaching aids for use in health education. These include:

- overhead projectors
- photocopiers
- video recorders and television sets
- audio-cassette recorders

Some of these items exist in the schools but are often not in good working condition. There are also shortages of appropriate health education books. For example, the Fakaofu school has 2 books for 150 or more students.

The involvement of the doctors and nurses in school health education is varied. The Atafu doctor attends the school on a weekly basis for involvement in classes, whereas in Fakaofu the nurses (no doctor) attend only twice a year. The doctor and nurses at Nukunonu attend the school for health education classes only a few times a year.

The provision of sporting opportunities is an important component of a good health system where the requirement to undertake physical work has diminished. Children in Tokelau actively participate in sport, but are limited by shortages of sporting facilities and equipment. For example, the Fakaofu school, with over 150 students has:

- one rugby ball
- 2 volley balls
- 2 fibreglasa canoes
- 2 tennis racquets (no balls)
- one old fishing net
- no skipping ropes

One of the most discouraging aspects of school community health education is the fact that a large number of teachers smoke. Children will not normally be convinced of the danger of smoking if their teachers (and their parents) smoke.

The most significant gap in health education in the atolls is the lack of health education for adults. Adults have virtually no exposure to health education except if they attend the hospital as a patient, are visited by the Women's Committee or the doctor or nurses on home visits. Some posters (in English or French) are put up for display at the hospital and sometimes community group discussions are held. A suitable forum to develop health education workshops would be the Adult Learning Centres. Health education teachers from the schools could be employed to facilitate the programme, and the Councils of Elders and the Women's Committees could encourage adults in families to attend.

Health education posters in the Tokelaun language could be displayed in public places on the atoll: the administration buildings, the hospital, near the churches, the boat landing areas, beside village pathways, and inside and outside the store (especially dietary and non-smoking posters). Recipes, encouraging healthy diets, could be available from the store.

6.3.4 The role of the Women's Committee

The Women's Committees play an important role in the health services of the atolls by undertaking regular village and home inspections. Usually a registered nurse accompanies Women's Committee representatives. They usually check on the degree of cleanliness and hygiene in the home, including cooking areas, bedding, rubbish disposal and washing facilities. They also inspect areas for stray pigs and the cleanliness of the toilets. The Women's Committees also have a role in encouraging home gardens and there is a Women's Committee garden on each atoll. They also have a role in encouraging good health practices regarding diet and physical fitness. Most mothers are encouraged to breast feed and do so until the child is about one year old, when artificial milk and semisolid foods are used. The Women's Committees are aware that many of the older women are overweight, and encourage walking, and involvement in sporting activities. They have requested aerobic exercise equipment (tape recorder, mirrors, curtains, soft matting, aerobic exercise tapes).

6.4 Buildings and equipment

6.4.1 The hospital buildings

The hospital buildings are generally in good condition, except that the roofs leak and there are signs of timber rot in the fascias of the ends of the main buildings. Plastic covers for the waste water drains are sometimes missing. The building that requires most attention is the clinic at Fale, which is inadequate for the purpose. The roof leaks badly and is rusted through in parts. The clinic does not have a flush toilet and instead an over water toilet 7 metres away is used. The timber walls show signs of rot. A replacement location has been made available in the new administration building, but this room is far too small and hot. Hot water to the hospitals is supplied by solar powered units placed on the roofs of the main buildings. These are not working efficiently. Hot water is only available to the theatres in each hospital. Water is supplied to feeder tanks above roof level by electric pumps which are borrowed from elsewhere in the village and which are not always available.

Electricity is supplied to the hospitals by the village generators when they are working, but these are generally turned off from 10:30pm till 8:00am the next day. Therefore, to obtain light between these hours, the person responsible for starting the village or hospital generator has to be found and the generator then has to be started, causing considerable delays. Otherwise, kerosene lighting has to be used, and from time to time is used for emergency surgery. The hospital generators, when they are used, are too small for the task. For example, when the steriliser is operating, the hospital lights are too dim. Oxygen and nitrous oxide gases are available to the hospitals and generally operate well.

6.4.2 Equipment

A list of hospital equipment is given in Appendix H. Much of the equipment is badly affected by salt spray, especially the surgical and delivery utensils. Most of the beds are badly rusted, especially the springs which have been replaced by timber panels. Fakaofu Hospital requires a steriliser as theirs was lost in the 1987 cyclone. The Fakaofu delivery table is badly rusted. It would be appropriate to provide incubators for each hospital for the improved care of premature babies. The provision of ice would also be beneficial in treating bruising fractures and for surgery. All of the hospitals require new chairs and tables, and ceiling fans would be useful in improving patient and staff comfort.

The Fakaofu Clinic at Fale is in urgent need of a number of items. These include:

- a medical cupboard
- linen storage
- a steriliser
- scales (and a baby scale)
- beds for patients and staff
- a flush toilet
- a refrigerator
- tables and chairs
- a washing machine
- a fan
- an improved telephone link to the hospital

6.4.3 Repairs and maintenance

The Public Works Department is responsible for repairs and maintenance of the hospital buildings and major items of equipment. Much of the equipment has broken down and has not been repaired. In many cases equipment has been sent to Western Samoa or New Zealand and has not returned.

Items requiring immediate follow up include:

At Nukunonu

- a hospital generator sent away 12 months ago
- a defibrillator sent away over 12 months ago
- a washing machine sent away three years ago
- an autoclave sent away last year.

At Atafu

- a hospital generator sent away two months ago (at time of review)
- an autoclave that no longer functions
- the solar hot water unit no longer works

At Fakaofu

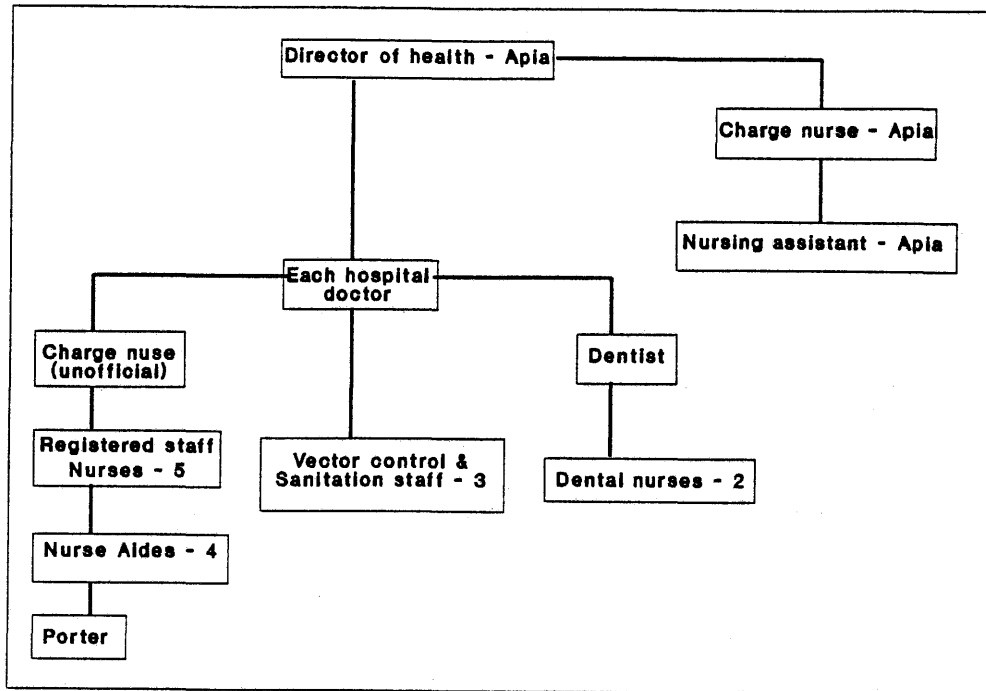
- The autoclave was sent away 12 months ago (using pots and steam for sterilising currently)
- No washing machine
- No bulbs in the theatre lights
- The anaesthetic machine doesn't work
- The solar hot water is inefficient

The Public Works Department has responsibility for the repair and maintenance of all public buildings and equipment. However, there is no evidence of a written maintenance programme on the atolls, with the result that a number of items of equipment may not receive regular preventive maintenance. For example the village, school and hospital generators are continually breaking down. The engine mountings on some of the generators are either non-existent or have broken, causing them to shake badly.

7. MANPOWER RESOURCES

7.1 Management and planning

The management structure of the Tokelau Health Department is as follow:



The Director of Health in Apia is in charge of each doctor and his staff on each of the atolls, and is a part of the senior management team of the Tokelau Public Service in Apia. However, he also acts as the resident consulting doctor for staff and Tokelaun residents and in-transit Tokelaun visitors in Western Samoa. The charge nurse in Apia assists in consultations and acts as a personal assistant to the Director of Health. She also has a role in community health and nutrition development.

The doctors on each atoll submit a written report to the Director every month about hospital patient activity, drug requirements and epidemiological data. A weekly formal radio report and discussion takes place. Ad hoc radio discussions also occur regarding patient diagnoses, treatment and referrals to Apia. Radio communication with Apia, however, is inadequate, due to the high demand for the single HF radio frequency between Apia and the atolls. It may be appropriate to operate another frequency between Apia and the atolls exclusively for hospital use, employing HF radio and dipole antennas. This system would be permitted by the New Zealand Government communication authority. For urgent use, pagers linked to the radios could be used by the Director of Health in Apia and the atoll doctors.

As a result of the radio communication problems and the difficulties relating to distance and transport, the doctors tend to operate somewhat autonomously on the atolls. All staff have job descriptions, but do not always appear to comply with them. A notable example of this is the inadequate involvement of the doctors in community health education. This may not be due to lack of interest, but rather to the lack of a directive and mechanism for the doctors to become more involved. For example, to become more involved with the schools, they need to be invited by the principals who currently are not sure how involved the doctor should be. This needs to be defined at Director level in Apia. The doctors probably require a mechanism to become involved in community health education with adults. An adult community health programme could be operated by the adult learning centres or the schools. Community health requires an integrated approach involving several public service departments and community groups. The development of a community health unit within the Health Department is a progressive move, but not sufficient.

There appears to be considerable variation in the extent to which the doctors are involved in home visits school clinics, discussion with community groups, midwifery and emergency surgery and care. This depends on their skills, language problems and the demands on their primary services. Greater definition of their specific duties and the related allocation of time would be appropriate.

An unofficial charge nurse position usually exists for the most senior staff nurse to lead the nursing staff. It is not appropriate for seniority to be the criteria for appointments to this position. Consideration should be given to the creation of a Director of Nursing position that would be gained on the basis of ability and qualifications and not just seniority. This position would have a stronger management function and would effectively mean the Director of Nursing would have responsibility for the day-to-day efficient operation of the hospital. This would allow the doctor more time for community health work with community groups such as the Council of Elders, the Women's Committee, the Youth group and the Department of Agriculture and Fisheries, and to have more influence in the operation and progress of the sanitation program. These extra duties should be written into the doctors' job descriptions once the Director of Nursing positions are created. The Director of Nursing could also become the nursing representative on the atolls' Health Committees.

7.2 Training and staffing

There is a serious potential shortage of both doctors and nurses on the atolls. The Nukunonu doctor's contract expires in March 1990 with no prospect of a replacement, and if another doctor leaves, then the health services will be in serious trouble. Given the problems in obtaining doctors in the short term, consideration should be given to the appointment of a fourth doctor, who could operate in a relieving capacity and have a project management role in health education, hospital development and epidemiology. The atoll doctors are often absent for weeks from their respective atolls, to accompany patients to Apia, relieve doctors on other atolls or to attend meetings. An extra position would help solve problems associated with the absence of the resident doctor. Currently the doctors are not inclined to take leave, especially away from their atolls, and of course are susceptible to illness themselves. Consideration should be given to obtaining doctors from a number of sources, including recruitment via the New Zealand Government, the United Nations Development Programme or through volunteer agencies. It would be preferable to recruit doctors resident in the South Pacific, but they are now in very short supply.

There is also a serious shortage of staff nurses at the moment with at least one vacancy on each atoll. Consultations with the Education Department need to be held to ensure that there are sufficient Tokelauns studying nursing to meet future requirements. Many of the current nurses are either considering retiring or leaving the atolls. There appears to be a greater retention rate for nurses when they study in Fiji or Western Samoa rather than New Zealand. A possible source for new nurses is the on-going training of the nurse aides currently working in the hospitals. Many of these staff are competent and dedicated but have not had formal training. Most of them would like the opportunity to undertake a registered nurse course, even if it means moving to Western Samoa or Fiji. However, they do not have the entrance qualifications. Some nurse training courses do have adult entry programs and this option should be investigated. Some funding would need to be made available to assist these people and their families during the training period.

Currently, the financial performance of all the hospitals is grouped by functional cost centre but not on a per hospital basis. Cost centre accounting per hospital would be a useful management tool in assessing the relative financial performance in relation to patient throughput and other activities (especially community health) of each hospital.

The Health Department currently has a comprehensive list of aims and objectives, but this needs to be:

- more hospital and atoll specific
- time related
- broken into sub-goals
- fully costed
- regularly reviewed to assess progress towards their achievement.
- fully discussed with all hospital staff with their regular input

The doctors and nurses need regular post graduate training and refresher courses away from the atolls. Many of the nurses for example, have not undertaken any courses since their initial training. They feel isolated and lack confidence in their ability. The doctors also feel isolated professionally.

The hospitals require more local training assistance in the form of videos, audio cassettes, training manuals, and a small medical, nursing and community health library. The hospitals also appear to be short of stationery and filing systems required to keep patient histories and epidemiological data up to date.

8.0 RECOMMENDATIONS ARISING OUT OF THIS REVIEW

This section contains 12 principal areas of concern, each with a major summary recommendation (in italics). Specific recommendations are also given when more detail is required.

8.1 Health education

Major recommendations

Community based health education should be significantly increased by a number of methods, but principally by strengthening or establishing primary health care committees on each atoll and increasing the involvement of health care staff.

In detail

1. As a matter of urgency, a community based health education programme (for adults and children) should be developed, possibly in consultation with the South Pacific Commission. It should have the following features.
 - it should be presented and written in the Tokelaun language
 - it should take the form of self-help workshops
 - it should be conducted in liaison with the Adult Learning Centres, school health education staff and hospital staff
 - it should focus on:
 - * diet
 - * fitness and recreation
 - * cigarettes and alcohol
 - * home gardening and fishing
 - * improving the range and presentation of foods available (i.e recipes involving both fresh and tinned foods)
 - * hygiene in relation to sanitation and water supply
 - the main emphasis should be on changing habits that are dangerous to health

2. Each atoll should establish (or strengthen) a Primary Health Care Committee to co-ordinate the health education programme. This committee should meet at least once a month and have the following members:
 - The Faipule
 - The Pulenuku
 - The President of the Women's Committee
 - The doctor
 - A staff nurse
 - A dental nurse
 - A vector control and sanitation aid
 - The Department of Agriculture foreman
 - The village store manager
 - The school principal
 - The manager of the Adult Learning Centre.

Part of the role of this committee is to utilize and co-ordinate the activities of the groups being represented and to disseminate information through those groups into the community. This approach is used successfully in Tuvalu. Health topics could be discussed on a monthly basis, recommendations made and passed on to the various groups being represented.

3. School health education should become a joint responsibility of the Education and Health Departments.
4. The Health Department and Education Department should agree on a curriculum and the Education Department should implement that curriculum.
5. The school health curriculum should be modified to focus on emerging issues affecting health in Tokelau. These are:
 - the importance of using traditional food in the diet including coconut, fish, root vegetables, leafy vegetables and fruits
 - the dangers of using mainly imported food in the diet
 - the importance of home gardening and fishing, including practical sessions
 - the dangers of smoking and excessive alcohol.
 - life experience education relating to sexual and moral questions, adolescent health risks, handling difficult decisions and self-esteem.
6. Other positive components of the curriculum could involve:
 - developing creative recipes using a mixture of traditional foods and new foods (some recipes using traditional vegetables are available from SPC).
 - developing a respect for good physical health and its importance, including practical sessions such as walking, sailing, volley-ball, swimming, skipping and games.
 - developing school posters and materials relating to health education in the Tokelaun language (the SPC Health Education Unit would be able to assist).
7. Teaching equipment to assist in Health Education classes should be bought. This may include projectors, video recorders, television, photocopiers and video cassettes, depending on the availability of funding. The schools have some of these items of equipment but many are broken down. Attention should be given to having these items repaired or replaced.
8. The development of health education texts in the Tokelaun language should be considered.
9. More coordinated visits of doctors and nurses from the atoll hospitals should be arranged, for incorporation into health education classes.
10. Funding or funding assistance should be allocated for the purchase of more sporting equipment for the school children. This should be mainly for group activities such as sailing, volley ball, tennis, skipping, basket ball and rugby. The enhancement of female sport would be an important objective.

8.2 Water supply

Major recommendation

The water supply programme should be speeded up and it should concentrate more on the provision of above-ground tanks, piping and catchments instead of the construction of tanks forming the foundations of new houses.

In detail

11. The water supply programme should not be dependant upon the progress of the building programme. Efforts should be made to dedicate materials to the construction of tanks which are not necessarily foundations for houses. These tanks could later become part of the foundations, or be portable plastic tanks.
12. More Public Works Department manpower and materials should be applied to the development of the water supply.
13. Villages should be encouraged to improve the catchment arrangements for water around their houses, including repair and replacing spouting and PVC piping, ensuring that tanks do not leak and that there are sufficient tanks to collect all available water.
14. Dual flush cisterns should be purchased for all future installations of cistern flush toilets. The cisterns should preferably be of small capacity.
15. A study should be undertaken of the long term water requirements for the atolls given the high demand as a result of the preference for cistern flush toilets. This study should also estimate the current water storage capacity on the atolls.
16. A study should also be undertaken to consider the long term development of community water storage and reticulation systems.

8.3 Sanitation**Major recommendation**

The installation of cistern flush toilets is proceeding too slowly and many of those installed are breaking down due to the unreliability of the water supply. Consideration should be given to speeding up the sanitation programme by installation of more reliable pour flush toilets, which have a lower level of installation technology.

In detail

17. The sanitation programme should be given higher priority in the development programmes of the atolls. With the high priority for the sanitation programme more materials such as cement, reinforced wire and PVC piping will be required.
18. Currently there are two types of septic systems operating on the atolls. A study should be undertaken to ascertain the most appropriate, and whether it would be possible to use saltwater.
19. Over water toilets should be removed when new cistern toilets are built to avoid their continued use.
20. As part of the Health Education Programme, villagers should be discouraged from swimming washing, or cleaning fish near over water toilets.
21. An easier method of filling 44 gallon drums to supply water to cistern toilets should be devised. This could include a direct piping of water from spoutings to the drums with the overflow continuing to the main water supply or, alternatively, a simple pump system from the main water supply. This would prevent the drums becoming empty the cistern toilet blocking up. New installation of household tanks could be made above the level of the cistern to allow gravity feed.
22. Consideration should be given to training the vector control and sanitation staff in basic plumbing to avoid reliance on the Public Works Department.

23. The vector control and sanitation staff should be allocated more equipment such as concrete mixers, shovels, wheel barrows, tractors and trailers to assist in the progress of the sanitation programme.

8.4 Food production and diet

Major recommendation

Greater development and encouragement of fishing and gardening for domestic food supplies is needed to occur. The use of poor dietary foods and cigarettes should be discouraged, principally by health education, but pricing could also be used.

In detail

24. Consideration should be given to changing the working hours of the Aumaunga to allow them free time during the week to catch fish. This may involve changing hours to allow a complete afternoon free and would not necessarily mean a reduction in working hours. Consideration should also be given to selling nets and fishing lines at subsidised prices in the village store (could be subsidised by taxing cigarettes).
25. More Department of Agriculture and Fisheries time should be allocated to the development of fishing and home gardening by villagers, including the development of home based, Women's Committee and school gardens. Seeds, seedlings, wire and fertiliser should all be obtainable at subsidised prices at the village store. Incentives, such as prizes could be awarded to the best home gardens.
26. Villagers should be encouraged to produce surpluses in fish, vegetables and fruits by being able to sell these items to the store. Methods will need to be developed to allow the safe storage of these items, using freezers and refrigerators (preferably solar-powered).
27. The subsidies mentioned above could be obtained by the allocation of a bad food or drug tax on less desirable foods and cigarettes. The less desirable foods include white rice, white flour, white sugar and salt. Foods that could be subsidised include wholemeal flour and brown rice. Appropriate airtight containers will need to be available for sale at the village store to allow for the successful storage of these items, as they attract pests more readily.

8.5 Communications

Major recommendation

A separate solar-powered HF radio system should be installed at each hospital and with the Director of Health in Apia. It should provide a 24 hour per day coverage.

In detail

28. Attempts should be made to repair the current telephone system with the possible use of an outside telecommunications expert available through an external agency.
29. An application should be made to the New Zealand Government for a new HF radio frequency, dedicated to Health Department use. HF radios should be purchased and placed in each hospital to allow 24 hour communication between the hospital on each atoll and the Director of Health in Apia. It will be important to supply power to these radios on a 24 hour basis. Solar panels and batteries should be installed at the hospitals for that purpose. Small dipole antennas will need to be erected on the hospital sites and in Apia. Access to the hospital HF frequency should not be available through the normal HF radio system currently

operating on the atolls. The Director of Health and the three doctors on the atolls should all be furnished with pagers which are activated every time transmissions are made on the HF radios.

30. Consideration should also be given to linking this HF radio system to the Peacesat satellite ATS III operating over the Pacific and administered out of Honolulu, Hawaii. This satellite system is designed to provide health conferencing facilities and will substantially improve the on going post-graduate education of the doctors and nurses on the atolls. This system can also be used for emergency contact with the outside world.

8.6 Shipping and Evacuations

Major recommendation

A formalised evacuation procedure needs to be arranged with the New Zealand Government as reliance on the MV. Wairua is unduly risky. In the longer term a series of evacuation options needs to be developed including the provision of airstrips and fast inter-atoll boats.

In detail

The MV Wairua is currently unsuitable for evacuation of patients from the atoll. However, as a replacement for the ship may not be imminent the following recommendations should be implemented:

31. The main crane on the ship should be repaired and be made more reliable to reduce the occupational health hazard of the Aumaunga in unloading and loading the ship.
32. A second crane should be installed near the portable passenger stairway on the ship to enable heavy items such as freezers and suitcases to be loaded and unloaded more easily, and to be used to lift patient stretchers to and from the ship.
33. The portable passenger stairway should be repaired to make it safer and more secure.
34. The ship's toilets should be checked for blockage and cleanliness by the stewards at least every hour.
35. One of the auxiliary engines should be replaced to allow the air conditioning to operate throughout the voyage.
36. A replacement of the MV Wairua should be considered for the near future and have the following features.
 - good ventilation in passenger areas
 - a crane at the passenger stairway
 - a medical ambulance room with oxygen, suction, monitoring and resuscitation equipment.
37. In the long term, the provision of a regular air service would assist in the evacuation of emergency cases from the atolls. As a seaplane is no longer considered viable, this would involve the development of airstrips on one or all of the atolls depending on the type of inter-atoll boat to be purchased. The question of airstrips is a sensitive issue and remains a discussion point with the Councils of Elders, the Official Secretary and the New Zealand Government.
38. In the mean time, negotiations should be undertaken with the New Zealand Government to formalise regular evacuation arrangements. This could include the stand by of the New Zealand Air Force when emergency evacuation is required, or the use of seaplanes or helicopters from territories of other countries nearby (e.g. United-States and France). In addition, the New Zealand Government should set aside funds for the emergency charter of ships or fast boats for emergency evacuations.

8.7 Drugs and vaccines

Major recommendation

The ordering and supply procedures for drugs should be reviewed. Solar-powered refrigerators should be installed at the hospitals to ensure vaccines are kept at the appropriate temperatures.

In detail

39. The method of purchasing drugs needs to be reviewed. The time delay in procurement of drugs is currently causing over-stocking and under-stocking of drugs on the atolls. Consideration should be given to purchasing drugs through a New Zealand or Australian cooperative purchasing organisation, such as a hospitals' association (for example, the Victorian Hospitals Association in Australia which purchases drugs for well over 200 hospitals, many of which are similar in size to the atoll hospitals).
40. The purchase of solar electricity operated refrigerators similar to those supplied to the Tuvalu Health Service should be considered. This would also involve the installation of solar electricity units at the hospitals, but this would ensure the safe and effective storage of vaccines 24 hours a day.
41. Consideration should also be given to purchasing of vaccines both in bulk and individually to allow for individual vaccinations when children are presented to the hospital without warning.
42. Hepatitis B immunization should be urgently included into the regular Expanded Programme of Immunization for all newborns.

8.8 Management, staffing and planning

Major recommendation

A ten year plan should be developed for the Tokelau Health Service including the development of options for the consolidation of hospital services on one atoll, evacuation arrangements, and manpower planning for health staff. An urgent review is required to study new options for recruiting doctors and nurses for the Health service.

In detail

43. Discussions should be held with the atoll doctors to ascertain how long they are likely help to remain on the atolls in their current capacity. This will determe what degree of urgency applies to the recruitment of new doctors. In any case, it is recommended that a fourth doctor should be recruited on a permanent basis to act as a relieving doctor on the atolls when doctors are ill, on leave, or accompanying patients to Apia. He would also act as a special projects officer to assist the Director of Health on matters relating to health education, epidemiology, negotiations for funding with aid agencies and the New Zealand government. The funding implications of such an appointment should be discussed with the New Zealand Government. Ideally, the new doctor appointed should have skills and experience in anaesthetics, general practice, community health, general surgery and midwifery, and should be able to speak Tokelaun, Tuvaluan or Samoan. It should be noted that consolidation of the hospital services on one atoll (with a fast inter-atoll boat) may require fewer doctors in the longer-term).

44. The job descriptions of the doctors should be reviewed to further define the actual duties and time allowances for specific activities such as community health education in the schools, community health education with adults, home visits, hospital management, and discussions with other Tokelau Public Service Departments on the atoll, such as the Department of Agriculture and Fisheries and the Public Works Department, about their programmes and the impact on health care.
45. A Director of Nursing position should be introduced on each atoll with the successful applicant being recruited on the basis of ability and qualifications and not only seniority. The Director of Nursing would be expected to take over some of the current management functions of the doctor in the hospital. The Director of Nursing would also be the nursing representative on the atoll's health committees.
46. More trained nurses will be required in the near future and the Education Department should undertake an urgent review of its nursing recruiting programme. Nurses should probably be trained in Fiji or Western Samoa rather than New Zealand as it appears a greater retention of trained nurses on the atolls will result.
47. Consideration should also be given to developing a training programme for nurse aides to become qualified registered nurses. This will involve negotiations with an overseas nurse training authority, such as a hospital or a university, to allow adult entry into their courses for people who do not have the necessary school academic record. It will also be necessary to provide financial assistance to those nurse aides who would make themselves available to undertake such courses. Most nurse aides interviewed said they would be keen to be involved in such a programme.
48. The aims and objectives of the Tokelau Health Service should be further refined by relating more to the progress of specific programmes and the health status of people on each atoll. The aims and objectives should also be more time related with specific achievement dates, and should define who is responsible for their achievement. To allow easier implementation, time related and costed sub-goals should be developed for each objective, with a review and monitoring process.
49. Individual cost centre accounting should be developed for each of the hospitals to assess their comparative financial performance. This should be assessed by the Director of Health, the Finance Director, the atoll doctors, and the Directors of Nursing.
50. It will be important to implement a number of post graduate training and refresher courses for both doctors and nurses to ensure that they remain professionally competent and retain their level of confidence in their ability. Such refresher courses could include the following:

- Obstetrics and gynaecology
- Anaesthetics
- Emergency surgery
- Theatre practices
- Community health
- Dietetics
- Geriatric care
- Vector control
- Anti- and Post-natal care
- Pharmacy practice
- Laboratory and Diagnostic practices
- Dental nursing (Dental nurses)
- Drug and Vaccination programmes
- Small hospital management
- Epidemiology

It would not be necessary for all of these courses to be undertaken outside of Tokelau, especially if the conferencing link with the Peacesat satellite was implemented. Other learning aids will include videos, audio cassettes and training manuals. It would also be useful for each atoll hospital to have a medical and nursing library with basic references on all aspects of health care relating to atoll environments.

51. All three hospitals require increased stocks of stationery and data filing systems for patient histories, vaccination programmes, and drug registers.
52. A set of aims and objectives exists for the Tokelau Health Service . However, it would be desirable to develop a long term health plan for the next 10 years. This would take into account questions relating to the health service that may arise as a result of long term developments such as a regular air service and inter-atoll boat, the development of urban lifestyle diseases such as cancer, cardiovascular diseases and diabetes, the changing supply of doctors and nurses, the emergence of new diseases such as AIDS and hepatitis B, changes in medical and surgical practices, the importance of family planning programmes as result of population forecasts, and the development of rationalised hospital services into a single location. It may be necessary for the development of a long term plan to be facilitated by the services of an outside agency. However, the plan should be a community based project taking into account the views of Tokelauns and the representative community groups on the atolls. The planning process initially would take some months and would require a regular review to take account of emerging trends.
53. X-Ray and improved blood and urine testing should be available on at least one atoll. This of course would not be an entirely satisfactory situation but would be a vast improvement on sending patients or specimens to Apia for testing. In the long term an inter-atoll boat would assist in the speedy diagnosis of patients from the other two atolls.

8.9 Buildings and equipment

Major recommendation

An ongoing written maintenance programme should be developed for all buildings and equipment, and it should be monitored by the Director of Health and Public Works jointly. Many items of equipment are in urgent need of repair or replacement.

In detail

54. All three hospitals require urgent maintenance. This includes the repair of facias and leaking roofs. Covers for drains should be installed.
55. The Clinic at Fale is unsatisfactory as the roof is very badly rusted and the walls are rotting. A new building is required urgently. A small room has been set aside in the Administration building, but this is far too small and hot. The clinic requires the following items:

A medical cupboard, linen storage, a steriliser, adult and baby scales, two beds, a flush toilet, a refrigerator, two tables and two chairs, a washing machine, an electric fan and a reliable telephone link.
56. A number of items of equipment at the atoll hospitals also need repair or replacement. The solar hot water units either don't work or are not efficient and should be repaired or replaced. Hot water should be available to more than one room in each hospital. Electric pumps should be purchased for the gravity fed water tanks at each hospital. The hospital generators should be replaced by larger generators, bearing in mind that most hospital electricity requirements should actually be converted to solar power. A number of surgical and delivery instruments in each hospital are badly rusted and need replacement. Beds and delivery tables are also rusted and either need repair or replacement. Incubators for premature babies should be provided to each hospital but only if staff are adequately trained to use and maintain them.
57. An inquiry should be undertaken as to the condition and location of a number of items of equipment sent away from the atolls for repair in the last few years. A list of these is given in the body of the report. The hospital generators are sometimes not properly mounted on proper engine mounts and as a result become badly damaged. The repair and maintenance problems outlined above are mainly due to the fact there is no written maintenance programme on any of the atolls. Such a programme should be developed immediately and

coordinated by the director of Public Works in Apia. This will involve developing a register for all buildings and equipment that the Public Works Department is responsible for. These items will then have a maintenance programme developed with regular maintenance dates to be complied with, including actual maintenance activities such as painting, changing oil, cleaning, replacing parts, etc.

8.10 Aged and disabled persons

Major recommendation

A survey of the access difficulties of disabled people should be undertaken, including the provision of rust resistant wheelchairs, access ramps, and personal aids. Limited respite care could be offered by the Health service where no current community alternative is available.

8.11 Animals

Major recommendation

Pigs should be kept well away from villages in secure enclosures. In Fakaofu, a walkway should be constructed between Fale and Fenuafala to enable the Fale pigs to be relocated away from the village.

In detail

58. A programme should be undertaken by the vector control and sanitation staff with possible assistance from other departments to reduce the rat populations on Fakaofu and other atolls, if necessary.
59. Consideration should be given to removing the pigs from Fale to Fenuafala. However, this will only be possible if a community or agency built walkway is constructed between Fale and Fenuafala along the reef. This should be constructed in such a way that waves as a result of cyclones will go over the top of the walkway and underneath to allow lagoon water to leave and enter. The walkway should also be wide enough for tractors and trailers so that pigs can be fed by Fale residents.
60. The pigs at Nukunonu should be housed in a new piggery and removed from the village.
61. Currently piggery waste is not readily utilised in the villages as a recycled fertilizer, due to its smell. The Department of Agriculture and Fisheries should develop a composting programme that would allow the waste be recycled after it has been broken down and mixed with fibrous material. This will help promote the development of vegetable gardens.

8.12 Fitness and occupational health

Major recommendation

Programmes that encourage physical fitness in adults and children should be developed including regular intra and inter-atoll sporting events.

In detail

62. Physical fitness activities of Tokelauns are a very important aspect of health care. The further development of adult, adolescent, and children's sporting activities should be encouraged (especially for females).
63. Occupational health hazards are an emerging problem in Tokelau, especially among the Aumaunga and people in non-physical occupations. The work of the Aumaunga in loading and unloading the ships could be greatly assisted by the installation of fabricated steel galvanised cranes at the beach landings on each atoll. These cranes could be winched away from the water's edge to reduce rusting by the use of the railway line.
64. The Aumaunga should also have access to protective clothing, including work boots, ear muffs, protective glasses, overalls, and helmets (for use when unloading/loading the ship).
65. The extra provision of tractors and trailers should be considered to ensure that large and heavy boxes, fuel drums, bags of cement and food etc. are not physically manhandled from the landings to the sheds.
66. The vector control and sanitation staff should also have adequate protection from insecticides, and dangerous items of rubbish, by ensuring that they have overalls, protective boots and spraying gear.
67. Warnings on the dangers of fuel syphoning and other practices (home wiring of 240 volt cables) should be incorporated into the community health programme.
68. The Tokelau Public Service should institute a programme of physical fitness awareness and medical check ups for its staff.

8.13 Dental services**Major recommendation**

Efforts should be made to recruit a dental nurse for Fakaofu as soon as possible.

In detail

69. Fakaofu has a dentist who acts as the Administrator and is generally not available for dental duties. Therefore, a dental nurse should be recruited.
70. The school dental programme should be revived on each atoll, with regular clinical and health education visits by the dental nurses.
71. The regular availability of a visiting dental team from New Zealand should be examined, including the provision of dental technicians to provide dentures for those who currently have none, or where they are poorly fitting.



9. APPENDICES

APPENDIX A

CAUSES OF MORBIDITY IN ORDER OF FREQUENCY FOR 1988

NO.	DISEASES	CASES	NO.	DISEASES	CASES
1	Influenza	2052	23	Disorders of menses	14
2	Skin sepsis	843	24	Other resp. tract infections	14
3	Gastroenteritis	352	25	Pneumonia	13
4	U.R.T.I.	192	26	U.T.I.	12
5	Routine examinations	96	27	Mumps	8
6	Bronchitis	88	28	Peptic ulcers	8
7	Rheumatoid arthritis	88	29	Other CNS diseases	7
8	Conjunctivitis	77	30	Domestic accidents	7
9	Skin lacerations	76	31	Abortions	7
10	Colitis/Diverticulitis	57	32	Chicken pox	6
11	Normal delivery	46	33	Burns	5
12	Other M/S diseases	41	34	Appendicitis	5
13	Non-articular rheumatism	37	35	Renal Colic/Calculi	4
14	Bronchial asthma	34	36	Contraceptive advice	3
15	Food poisoning	31	37	Vaginal bleeding	3
16	Diabetes Mellitus	31	38	Rheumatic heart disease	3
17	Other Parasitic infections	29	39	Other abn. of pregnancy	2
18	Hypertension	27	40	T.B.	1
19	Home visits	24	41	Malignant neoplasm	1
20	Anaemia	15	42	Cerebrovascular disease	1
21	Gout	15	43	Ischaemic heart disease	1
22	Osteoarthritis	15	44	Other accidents	1

Source: Tokelau Health Service Annual Report 1987/1988

DEATHS IN 1987 AND 1988 BY AGE SEX AND CAUSE OF DEATHS

AGE	CAUSE OF DEATH	ATAFU				FAKAOFO				NUKUNONU				TOTAL	
		1987		1988		1987		1988		1987		1988		1987	1988
		M	F	M	F	M	F	M	F	M	F	M	F		
1 day	Congenital defects	-	-	-	-	-	-	-	-	1	-	2	-	1	2
1 day	Meconium pneumonitis	-	-	-	-	-	-	-	-	1	-	-	-	1	-
4 months	Severe dehydration	-	-	-	-	-	-	1	-	-	-	-	-	-	1
36 years	Suicide	1	-	-	-	-	-	-	-	-	-	-	-	1	-
48 years	Liver failure/Alcoholism	-	-	-	-	-	-	-	-	1	-	-	-	1	-
52 years	Diabetes mellitus	-	-	-	-	-	-	-	-	-	1	-	-	1	-
60 years	Cardiac arrest	-	-	-	-	1	1	-	-	1	2	-	-	5	-
60 years	C.V.A	-	-	-	-	1	-	-	-	1	-	-	-	2	-
70 years	Cancer	2	-	1	-	-	1	-	-	-	-	-	-	3	1
80 years	Hypostatic pneumonia	1	2	-	-	-	2	-	-	1	1	-	-	7	-
80 years	Drowned	-	-	1	-	-	-	-	-	-	-	-	-	-	1
80 years	Cardio-Pulmonary Failure	1	-	-	-	-	-	-	-	1	1	-	-	3	-
TOTAL		5	2	2	-	2	4	1	-	7	4	2	-	24	6

Percentage at various ages

- Death at less than 1 year age = 16.7%
- Death at 60 years = 16.7%
- Death at 70 - 80 years = 48.1%

Source: Tokelau Health Service Annual Report 1987/1988

**THE SOUTH PACIFIC EPIDEMIOLOGICAL AND HEALTH INFORMATION SERVICE - SPC -
YEARLY REPORTS—MONTHLY SUMMARIES BY COUNTRY**

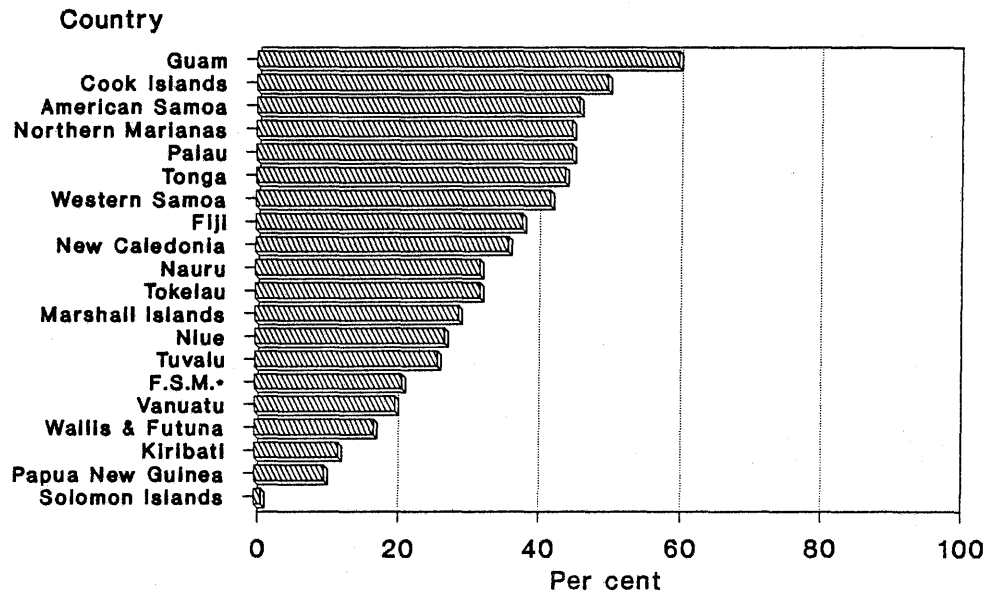
Country: TOKELAU ISLANDS

Reported Cases of Selected Notifiable Diseases	Jan 89	Feb 89	Mar 89	Apr 89	May 89	Jun 89	Jul 89	Aug 89	Sep 89	Oct 89	Nov 89	Dec 89	Cum. Total 1/89-12/89		Cum. Total 1/88-12/88	
	Cases	Rate*	Cases	Rate*	Cases	Rate*	Cases	Rate*	Cases	Rate*	Cases	Rate*	Cases	Rate*	Cases	Rate*
No. of Institutions Reporting	**/0	**/0	**/0	**/0	**/0	**/0	**/0	**/0	**/0	**/0	**/0	**/0				
Amoebiasis	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0	0	0.0
Conjunctivitis (acute)	10	11	10	18	3	3	2	3	1	11	12		84	52.5	71	44.4
Dengue fever	0	0	0	0	0	0	73	45	21	2	0		141	88.1	0	0.0
Diarrhoea (child-adult)	8	0	3	0	2	4	2	21	26	33	93		192	120.0	311	194.4
Diarrhoea (under 1 year)	23	16	12	9	22	19	12	36	0	0	0		149	93.1	0	0.0
Fish poisoning	0	7	0	0	2	0	3	0	0	7	3		22	13.8	15	9.4
Gonorrhoea/NSU	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Hepatitis	0	0	1	0	0	0	0	0	0	0	0		1	0.6	0	0.0
Influenza	76	20	10	38	26	193	74	114	79	29	118		777	485.6	2101	1313.1
Leprosy	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Leptospirosis	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Malaria	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Measles	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Meningitis	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Pertussis (whooping cough)	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Rheumatic fever (acute)	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Salmonellosis	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Shigellosis	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Syphilis	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Tetanus (other)	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Tuberculosis	0	0	0	0	0	0	0	0	0	0	0		0	0.0	1	0.6
Typhoid fever	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0
Yaws	0	0	0	0	0	0	0	0	0	0	0		0	0.0	0	0.0

* Number of active cases per 1,000 population ** Not available

Source: South Pacific Commission, 1989

PREVALENCE OF DEATHS FROM URBAN LIFESTYLE DISEASES



(1) Cardiovascular diseases and cancer.

(*) Federated States of Micronesia.

Source: Pacific Island Mortality: A review circa 1980, South Pacific Commission. In press.



ADMISSION BY I.C.D. CATEGORIZATION FOR 1987 AND 1988

I.C.D.	DISEASES/ DIAGNOSIS	ATAFU		FAKAOFO		NUKUNONU		TOTAL		Percentage of admission
		1987	1988	1987	1988	1987	1988	1987	1988	
I	Infective/Parasitic	1	-	2	-	-	-	3	-	0.74
II	Neoplastic	2	1	-	-	-	-	2	1	0.74
III	Endocrine system	1	-	-	1	3	4	4	5	2.23
IV	Blood	-	-	-	-	-	-	-	-	-
V	Mental disorders	-	-	2	-	-	-	2	-	0.49
VI	Nervous system	2	5	1	3	3	11	6	19	6.20
VII	Circulatory system	3	2	2	1	2	8	7	11	4.46
VIII	Respiratory system	5	13	14	12	6	8	25	33	14.39
IX	Digestive system	28	14	6	11	11	12	45	37	20.34
X	Genitourinary	5	5	7	2	-	3	12	10	5.45
XI	Pregnancy/child birth	25	26	20	25	15	10	60	61	30.02
XII	Skin, subcut. tissue	2	2	5	1	4	2	11	5	3.97
XIII	Musculoskeletal	6	5	2	4	5	3	13	12	6.20
XIV	Congenital defect	-	-	-	-	1	1	1	1	0.49
XV	Perinatal	-	-	-	-	-	-	-	-	-
XVI	Ill defined	-	-	2	2	1	2	3	4	1.73
XVII	External causes	1	3	6	1	-	1	7	5	2.97
TOTAL		81	76	67	63	51	65	199	204	100

Source: Tokelau Health Service Annual Report 1987/1988

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ADMISSIONS BY SPECIFIC DIAGNOSIS AND SEX GROUPS IN 1987 AND 1988

I.C.D.	DIAGNOSIS	ATAFU				FAKAOFO				NUKUNONU				TOTAL	
		1987		1988		1987		1988		1987		1988		1987	1988
		M	F	M	F	M	F	M	F	M	F	M	F		
I	Chicken pox	1	-	-	-	2	-	-	-	-	-	-	-	3	-
II	Sq. cell carcinoma	1	-	-	-	-	-	-	-	-	-	-	-	1	-
II	Pulmonary carcinoma	-	-	1	-	-	-	-	-	-	-	-	-	1	-
II	Ca. prostate	1	-	-	-	-	-	-	-	-	-	-	-	1	-
III	Diabetes mellitis	-	1	-	-	-	-	1	-	3	1	3	-	4	5
V	Epilepsy	-	-	-	-	2	-	-	-	-	-	-	-	2	-
VI	Head injury	1	-	4	-	1	-	-	-	1	-	-	-	3	4
VI	C.V.A.	1	-	1	-	-	-	1	-	2	1	-	-	4	2
VI	Migraine	-	-	-	-	-	-	-	1	-	-	-	-	-	1
VI	Neuralgia	-	-	-	-	-	-	-	1	-	-	-	-	-	1
VI	Pterygium extraction	-	-	-	-	-	-	-	-	-	7	4	-	-	11
VII	Hypertension	1	1	1	-	1	-	1	-	-	3	2	-	3	7
VII	Heart failure	-	1	-	-	-	-	-	-	-	1	-	-	1	1
VII	Ischaemic heart disease	-	-	1	-	-	-	-	-	1	-	-	1	1	1
VII	Rheumatic heart disease	-	-	-	-	1	1	-	-	1	1	1	-	2	2
VII	Asthma	1	-	-	-	1	-	1	1	-	2	2	3	4	7
VIII	Pneumonia	3	1	-	-	7	6	6	4	1	2	2	1	20	13
VIII	Respiratory synd.	-	-	-	-	-	-	-	-	1	-	-	-	1	-
IX	Fish poisoning	6	5	2	4	-	-	-	-	-	4	5	-	11	15
IX	Gastroenteritis	6	6	-	5	-	2	1	3	3	2	2	1	19	12
IX	Inguinal Hernia	1	-	-	-	-	-	-	-	-	-	-	-	1	-
IX	Ruptured liver	1	-	-	-	-	-	-	-	-	-	-	-	1	-
IX	Acute appendicitis	-	3	-	3	-	1	2	2	-	1	-	-	5	7
IX	Acute gastritis	-	-	1	1	2	3	3	-	-	-	-	-	5	5
IX	Int. Obstruction	-	-	1	-	-	-	-	-	1	-	-	-	1	1
IX	Haemorrhoids	-	-	1	-	-	-	-	-	-	-	-	-	-	1
IX	Int. colic	-	-	-	-	-	-	-	-	1	2	-	-	3	-
IX	Infectious hepatitis	-	-	-	-	-	-	-	-	1	-	-	-	1	-
X	UTI	-	5	1	3	2	4	-	2	-	-	2	-	11	8
X	Renal colic	-	-	1	-	1	-	-	-	-	1	-	-	1	2
XI	Confinements	-	19	-	18	-	16	-	20	-	11	-	8	46	46
XI	Caesarean section	-	1	-	-	-	-	-	-	2	-	-	-	1	2
XI	A.P.H.	-	2	-	3	-	-	-	-	-	-	3	-	2	6
XI	P.I.D.	-	2	-	-	-	2	-	-	1	-	-	-	5	-
XI	Abortions	-	-	-	4	-	-	-	3	-	-	-	-	-	7
XI	Hyperemesis gravid	-	-	-	1	-	1	-	1	-	-	-	-	1	2
XI	Premature labour	-	-	-	-	-	1	-	-	2	-	-	-	3	-
XI	P.V. bleeding	-	1	-	-	-	-	-	1	-	-	-	-	1	1
XII	Cellulitis	-	2	-	1	3	-	1	-	2	-	-	-	8	3
XII	Abscess	-	-	1	1	1	1	-	-	-	1	1	-	3	2
XIII	Backache	1	-	1	-	-	-	-	-	2	-	-	-	4	-
XIII	Joint dislocation	2	-	2	-	-	-	-	-	-	-	-	-	2	2
XIII	Fractures	-	1	1	-	-	-	2	-	-	-	-	-	1	3
XIII	Atrhitis	-	2	1	-	-	-	1	-	1	2	1	2	5	5
XIII	Myalgia	-	-	-	-	-	2	-	-	-	-	-	-	2	-
XIII	Amputation	-	-	-	-	-	-	1	-	-	-	-	-	-	1
XIV	PUO	-	-	-	-	1	1	1	1	1	-	1	1	3	4
XVII	Suicides	1	-	1	-	-	-	-	-	-	-	-	-	1	1
XVII	Burn	-	-	2	-	1	-	1	-	-	-	1	-	3	4
XVII	Assault	-	-	-	-	2	1	-	-	-	-	-	-	3	-

Key:

- = Nil

... = Not reported

Source: Tokelau Health Service Annual Report 1987/1988

IMMUNIZATION PROGRAMME IN 1987 AND 1988

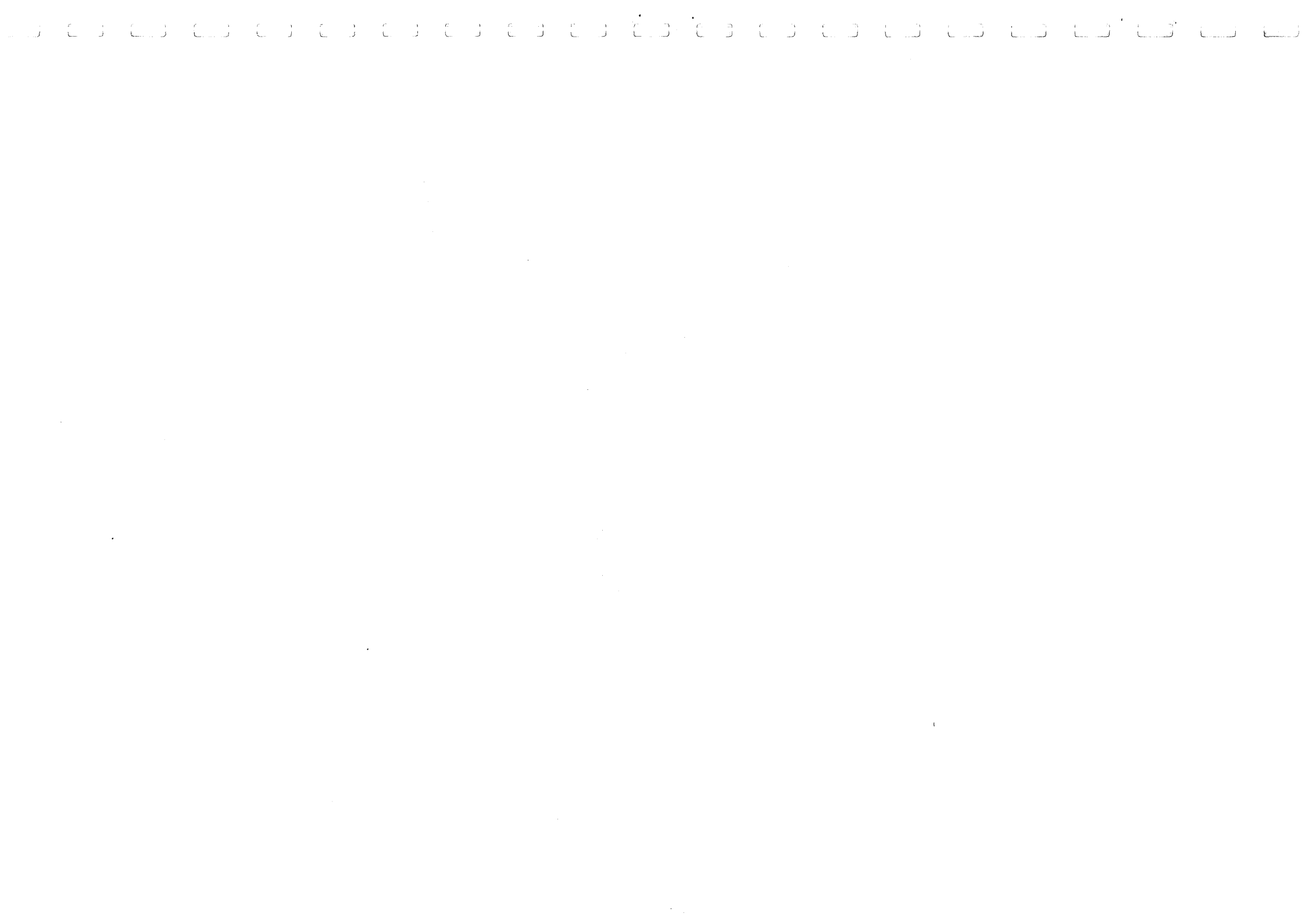
MONTH/YEAR	ATAFU					FAKAOFO					NUKUNONU					TOTAL			
	BCG	Sabin	DPT	Measles	Tetanus	BCG	Sabin	DPT	Measles	Tetanus	BCG	Sabin	DPT	Measles	Tetanus	BCG	Sabin	DPT	Measles/Polio
January 1987	-	-	-	-	-	9	1	2	-	-	-	-	-	-	-	9	1	2	-
February 1987	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
March 1987	-	-	-	-	-	63	89	89	-	-	5	11	5	-	-	68	100	94	-
April 1987	11	-	-	-	-	-	3	3	-	-	-	1	1	-	-	11	4	4	-
May 1987	-	-	-	-	-	-	3	3	-	-	-	-	-	-	-	-	3	3	-
June 1987	-	-	34	-	-	-	-	-	-	-	-	2	2	-	-	-	2	36	-
July 1987	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
August 1987	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
September 1987	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
October 1987	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
November 1987	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
December 1987	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	11	-	34	-	0	72	96	97	-	-	5	14	8	-	-	88	110	39	-
January 1988	-	-	-	-	-	-	6	6	-	-	-	2	2	-	-	-	8	8	-
February 1988	-	-	-	-	-	-	-	-	-	-	8	18	18	-	-	8	18	18	-
March 1988	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1	1	-
April 1988	-	-	-	-	-	-	-	-	-	-	-	4	4	-	-	-	4	4	-
May 1988	-	-	-	-	-	-	6	6	-	-	-	-	-	-	-	-	6	6	-
June 1988	-	-	-	-	-	15	6	6	-	-	-	2	2	-	-	15	8	8	-
July 1988	-	-	-	-	-	-	5	5	-	-	1	1	1	-	1	5	6	-	
August 1988	-	-	-	-	-	-	5	5	-	-	2	11	11	-	2	16	16	-	
September 1988	-	-	-	-	-	-	5	5	-	-	1	-	-	-	1	5	5	-	
October 1988	-	-	-	-	-	-	14	14	-	-	-	-	-	-	-	14	14	-	
November 1988	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
December 1988	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL	10	42	42	-	60	15	47	47	-	-	12	28	29	-	-	37	85	85	-

Source: Tokelau Health Service, Annual Report 1987 and 1988.



HOSPITAL EQUIPMENT PER HOSPITAL

Electric fans
Dental chair
Dental mixer
Dental instruments
ECG/Defibrillator
Mist sprayers
Mattresses
Refrigerator
Washing machine
Mop/buckets
Kettle
Surgical instruments
Operating theatre bed
Delivery bed
7.5 KVA generator
Autoclave
Gas - Oxygen and nitrous oxide
Anaesthetics machine
Basic filing system
Chairs
Tables
Solar panels
Three mosquito sprayers
Protective clothing
A hospital boat and outboard motor (Fakaofu)
Suction machine
Scales



PEOPLE INTERVIEWED DURING THE CONSULTANCY

1. Briefing with South Pacific Commission in Noumea, New Caledonia

A 4 day briefing programme was undertaken at Noumea at the commencement of the assignment. Significant data was collected on Tokelau and its health services, and interviews were held with the following South Pacific Commission staff.

- Mr Jon Jonassen Director of Programmes
- Dr Francois Bach Epidemiologist
- Mr David Clarkson Public Health Engineer
- Mr Robert Watters Maintenance Technician
- Mr David Rosario Health Education Specialist
- Ms Mele Ofa Malolo Nutrition Education and Training Officer
- Mr Brian Doyle Statistician.

2. Stopover in Fiji - 3 days

This component was a flight stopover en route to Western Samoa. Some useful interviews were held with:

- Dr S.A. Finau who had spent some weeks in Tokelau a few years earlier.
- Diane Goodwille, United Nations Development Programme, (telephone discussion) who has undertaken some nutrition development for Tokelau.
- Mr Frank Rauser, World Health Organisation, who deals with vaccination programmes. (telephone discussion).
- Ms Jiko Luveni, Programme Management Officer, United Nations Fund Population Activities, who deals with Family Planning projects.

Mr Rauser was interested in the vaccination programme at Tokelau and felt there may be some scope for assistance. Ms Luveni was also interested in family planning assistance to Tokelau if requested.

3. Apia, Western Samoa - 14 days

Briefing interviews were undertaken with staff of the Office of Tokelau Affairs in Apia. These included:

- Official Secretary, Mr Casimilo Perez
- Acting Director of Health, Dr Elekana Faafoi
- Director of Finance, Mr Esera Rimoni
- Director of Public Works, Mr George Tinielu.
- Director of Administration, Mr Henry Joseph.
- Director of Economic Affairs, Mr Semu Vili.
- Director of Education, Sister Juliana Perez.
- Health Education Officer, Mrs Fenuafala Faafoi.
- Stores Officer, Mr Siu Yuen.
- A staff nurse from Nukunonu, currently in Apia, Apolonia Sakalia.
- Administration Officer, General Services, Mr Solomona Aleta.
- Radio Technician.
- A meeting with the scholarship students (approximately 100) returning to the atolls for summer holidays from Fiji, Nuie, the Cook Islands, the Solomons and New Zealand.

- Personnel Officer, Mr Mika Sese.
- Acting Librarian.
- Nurses Aide, Miss Luiti Veniale.
- Radio Officer.
- Acting Director of Fisheries and Agriculture, Mr Etuale Gaulofa.

I also had discussions with other people in Western Samoa:

- The Acting Director General of Health for Western Samoa, Dr Schuster.
- Mr Richard Tenney, Agricultural Extensions/Communications Officer, University of the South Pacific, Alafua Campus, Apia.
- By telephone I spoke with Ms Lori Mukaida, Coordinator/Manager, Peacesat (Pan Pacific Education and Communications Experiments by Satellite) Social Science Research Institute, University of Hawaii. Honolulu, Hawaii.

Whilst in Western Samoa, I collected a significant amount of data relating to the health services of Tokelau.

4. Tokelau - 14 days

The ship M.V. Wairua left Apia for Tokelau on the evening of December 8. The schedule for my visits to the three atolls was based on a visit to each atoll on the first trip, to remain on one atoll for 4-5 days and wait for the ship to return from Apia for the second trip. The ship would then re-visit the other two atolls. This schedule therefore allowed for 5 days on Fakaofu, two days on Nukunonu and two days on Atafu. Meetings were pre-arranged in Apia and communicated by HF radio to the three atolls, although specific times had to be arranged on arrival at each atoll.

I met with the following people on each atoll:

ATAFU

The Doctor:

- Dr Tekia T. Iosefa

The nursing staff:

- Papa Malaki Charge Nurse
- Paogo Simi Staff Nurse
- Anna Sinapati Staff Nurse
- Sagita Taula Nurse Aide
- Mesepe Revelu Staff Nurse
- Onosi Ecueni Nurse Aide
- Siliva Koro Nurse Aide

Council of Elders:

including the Faipule and the Puleuku.

The School Staff:

- Vielua Lopa Principal
- Elia Mamoe Deputy Principal
- Lepeio Simi Teacher

Agricultural Extension Officer:

- Mauaega Epati

Vector Control and Sanitation Staff:

- 3 people

The Youth Committee:

- Saili Paulo
- Mauvaega Epati
- Tom Ioane
- Asora Kalolo

Foreman Public Works Department

- Patuki Isoako

Representatives of the Aumaunga (able-bodied men)

- Asora Tounvia
- Filo

NUKUNONU**The Doctor:**

- Dr V. Mataitoga

The Nursing Staff:

- Akata Koloï Staff Nurse
- Merita Tumua Staff Nurse
- Litia Tibaha Nurse Aide
- Hili Iosefo Nurse Aide
- Joyata Filipino Nurse Aide
- Lita Amato Nurse Aide

Council of Elders:

including the Faipule and the Pulenuku

Foreman - Fisheries and Agriculture:

- Aloha Ihaia

The School Staff:

- Luciano Perez Principal
- Mahelio Salealia Teacher
- Mika Perez Teacher

Representatives - The Women's Committee:

- Fakei Rokeni
- Ailima Kaulena
- Vielva Lopei

Representatives - Public Works Department:

- Falaniko Kosema
- Iaseto Lui

The Dental Nurse:

- Iulia Koloï

Representatives - The Youth Committee

- Pat Falaniko
- Salesio Lui

The Aumaunga Representative:

- Ege Felise

Leading Hand - Vector Control and Sanitation:

- Gumana Tegi

FAKAOFO**The Council of Elders:**

including the Faipule and Pulenuku

The nursing Staff:

- | | |
|--------------------|--------------|
| - Sosina Gaulofa | Charge Nurse |
| - Timaina Teao | Staff Nurse |
| - Ianeta Tinielu | Staff Nurse |
| - Mataalofa Neemia | Nurse Aide |
| - Taase Galo | Nurse Aide |
| - Anna Foua | Staff Nurse |
| - Mauaki Kirifu | Nurse Aide |

Womens Committee Representatives**The Aumaunga****Charge Nurse - Health Clinic on Fale:**

- Kula Fialola

The Dentist:

- Dr Falima Teao

Youth Committee Representatives:**Leading Hand - Agriculture and Fisheries**

- Lomi Gaulofa

School Staff:

- | | |
|---------------------|-----------|
| - Sale Siasi | Principal |
| - Hafiti Vauega | Teacher |
| - Pereira | Teacher |
| - Lise Sosene | Teacher |
| - Melaelofe Faleasi | Teacher |
| - Liomata Siu | Teacher |

Public Works Foreman:

- Holomona Puka

Vector Control and Sanitation Staff:

- Liliu Eteuati
- Peau Lui
- Amnosa Kalo
- Vaelei Vapaba