

# Cancer in Niue: analysis of a cancer register 1962-1985

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## Abstract

Cancer is becoming an important cause of morbidity and mortality in Niue. Analysis of a cancer register showed an overall age adjusted rate of 11.3 and 9.9 per 10000 among males and females, respectively. A significant increase in the trend of cancer during 1952 to 1985 cannot be explained by improved registration alone. This study when compared with other data sources on Niue indicated a gross under-reporting of cancer (over 70%). The establishment of national registers for chronic diseases like cancer is the most accurate, economic and technically achievable way to provide population-based information for the small Pacific Island states.

## Introduction

Cancer is becoming an important cause of morbidity and mortality in the South Pacific islands. Unlike other non-communicable diseases, cancer needs a different diagnostic and management approach that would not be readily affordable and available from the existing health services in the region. Therefore, it is necessary to examine the epidemiology of cancer in these small island states in order to provide information on its relative importance and the features that are prerequisites to appropriate need identification and health services development. Data for specific island states need to be

examined separately since their respective health systems are autonomous and they, rather than the organisations at regional level, are the basis for incountry service provision.

This paper reports a study of the Cancer registry at Lord Liverpool Hospital, Niue Island for the years 1962 through 1985. This analysis makes available to the Niue Health Department information on cancer not previously at its disposal and identifies epidemiological features that would be necessary in the planning of future services. It is hoped that the study method would encourage other Pacific Island countries to similarly examine their own routinely collected information or consider the establishment of a chronic disease registry, to provide a more accurate description of this increasingly important group of diseases.

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## Study population

Niue is an uplifted coral atoll 260 sq km in area in the South Pacific. It is a self governing state in free association with New Zealand. The latter is responsible for its foreign affairs and defence. There were 5000 people in 1962, decreasing to 2774 in 1985.<sup>2</sup> The decline in population was due to migration, especially to New Zealand which has six times more Niueans than live on the island.

The basis of the domestic economy is agriculture. Returns are poor due to the limited cultivatable land. The soil is predominantly coral with pockets of natural radioactivity. The staple food crop is taro but there is marked dependence on imported processed foods from New Zealand.<sup>3</sup> Exports of vegetables and the development of tourism are recent additions to overseas earnings which traditionally come from handicrafts, honey, limejuice, taro, and coconut cream. Niue relies heavily on foreign aid to sustain its economy.

The infrastructure is well developed with piped water and electricity available in all of Niue's thirteen villages. The people live mostly in concrete houses with tin or asbestos roofing. These were built mostly after the

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**Table 1. Fourth yearly distribution of cancer mortality and morbidity in Niue (1962-1985)**

Years	Mortality			Morbidity		
	Number	Frequency %	Annual Crude Rate per 1000	Number	Frequency %	Annual Crude Rate per 1000
1962-1965	17	22.4	8.3	17	14.5	8.3
1966-1969	13	17.1	6.3	13	14.9	6.3
1970-1973	6	7.9	3.3	6	6.9	3.3
1974-1977	9	11.8	5.8	9	11.5	5.8
1978-1981	14	18.4	10.3	14	16.1	10.3
1982-1985	17	22.4	14.0	28	32.2	23.0
<b>Totals</b>	<b>17</b>	<b>22.4</b>	<b>14.0</b>	<b>28</b>	<b>32.2</b>	<b>23.0</b>
Chi-Square Test for Trends	Linear x 2	= 3.8 P = 0.6		Linear x 2	= 14.4 P = 0.0001	
	Non-Linear x 2	= 10.8 P = 0.03		Non-Linear x 2	= 24.3 P = 0.00004	
	Degree of Freedom	= 4		Degree of Freedom	= 4	

hurricanes of 1959 and 1960. Alofi is the main town, business centre, port and airport. Niue has airlinks with New Zealand and a monthly freighter service bringing food and other commodities.

Health services are accessible to all. There is a forty-two bed general hospital serving the whole island and supplemented by the "island round". The latter is a mobile medical service provided by a doctor, nurse and a driver who visit all the villages three times a week. The very complicated cases are referred to New Zealand or attended to by visiting specialists.

The major health problems include acute respiratory infections among children<sup>4</sup>, Hepatitis B<sup>5,6</sup> non insulin dependent diabetes mellitus,<sup>3</sup> hypertension,<sup>3,7,8</sup> and epidemics of viral illnesses.<sup>9</sup> The major causes of mortality are cardiovascular disease, respiratory disease, injury, poisoning, and infections, respectively.<sup>10</sup>

Of the risk factors, the prevalence of smoking is high especially among men.<sup>3,7</sup> In 1983, Niue ranked third highest in the Pacific for per capita alcohol imports.<sup>12</sup> The daily diet is changing rapidly from fresh to processed foods. Nitrite cured beef is a local delicacy. There are no major industrial or chemical exposures but there are reports of high natural radioactivity level in parts of the island.<sup>13</sup>

## Method

The cancer register, kept at Lord Liverpool Hospital, was reviewed for the period 1962-1985. Prior to 1980, cancer cases were diagnosed on clinical grounds without histological confirmation. All the cases diagnosed during and after 1980 had histological confirmation. These were reported by Auckland Hospital in New Zealand.

The register is considered to be reasonably complete because all the doctors on Niue were directly involved in the diagnosis, registration and hospital administration.

Secondly, the hospital served the whole island and most cancer patients would have been processed through the hospital. However, there were a few self referred cases to New Zealand before diagnosis.

The four yearly populations used an average of the estimated population for each year from 1962 to 1985. Age standardisation used the direct ratio method using the World Standard Population for developing countries. Statistical testing used HP-41C programmable calculator. The probability level of significance was  $p=0.05$ .

## Results

There were 87 cases of cancer diagnosed and registered during the period 1962 through 1985 of which 44 were males and 48 females. Fifty-one (58%) were clinical diagnosis without histological confirmation, and the rest were confirmed. The former were from 1962 through 1979 and the latter from 1980 through 1985. Table 1 shows the four yearly distributions of cancer morbidity and mortality in Niue during the study period. There was a significant increase over time. The difference between morbidity (28 cases) and mortality (17 cases) after 1982 were due to increased referral to New Zealand for all the cases with recorded diagnosis of cancer, only 11 (12.6%) have not been recorded dead.

Table 2 shows the age and sex distribution of the cancer cases. As expected, most (63%) of the cancers were found in the older age group (85-55 years). Twenty-four percent (24%) were among the age group 35-54 years

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**Table 2. Age and sex Distribution of cancer in Niue**

Age	Male		Female	
	Number	Age Specific Rates per 1000	Number	Age Specific Rates per 1000
0 - 4	2	2.7	1	1.3
5 - 14	1	0.8	1	1.0
15 - 24	1	0.9	1	1.1
25 - 34	1	1.6	1	1.8
35 - 44	5	10.5	4	8.9
45 - 54	5	13.3	12	43.5
55 - 64	13	43.8	12	43.5
65+	15	60.4	16	40.4

and the rest were distributed evenly among younger age groups. Therefore, cancer in Niue, like other countries has been mostly a disease of the older age group and will become important with increased longevity of the population.

The most important primary cancer sited were lung (17.2%), uterus (16.10%), stomach (14.9%), ovary (11.5%), and large bowels (9.2%). There were 11 males and 4 females with lung cancer. Twelve were male out of the 13 cases of the large bowel.

Overall, cancer of the gastrointestinal tract and female reproductive organs are the most important groups contributing to 59.7% of all cancer. Not notable is the relative scarcity of breast cancer. Table 3 shows a four yearly distribution of the four common cancer sited. Most of the cases were recorded in the last eighty years.

## Discussion

Although the number of cases in this study was low, it must be remembered that this was a function of the size of the population at risk. In this instance, the total population of Niue Island, an autonomous sovereign state. Therefore, this study, in spite of the small numbers, has dealt with information at national decision-making levels. Consequently, discussions of this study have

policy as well as general health implications.

There are about six times more Niueans in New Zealand than in Niue. Furthermore, Niueans go to New Zealand for medical treatment at their expense. Consequently, many of the diagnosed suspected cancer cases would have migrated to New Zealand for treatment and some never to return again. These cases will not be included in the Cancer Registry at Lord Liverpool Hospital, Niue. This raises two important issues that would affect the quality of cancer registration in small highly mobile populations of the Pacific nations. Firstly, Niue could improve its health services to a level of sophistication to diagnose and treat cancer. This, however, is not feasible economically and socially. The second alternative is for a collaboration with the New Zealand cancer registry and hospital boards to forward details of cancer patients from Niue to Lord Liverpool Hospital, Niue. This will provide a complete and more epidemiological useful data base on cancer in Niue. This should be extended to all Pacific islands by Pacific rim countries with developed laboratory facilities and referral centre. The South Pacific Commission can mediate such a regional collaboration.

There was a 16 fold increase in the incidence of cancer from 1974 to 1984. This could not have been due to improved diagnosis because there has been no significant change in diagnostic capability of post mortem rates.

**Table 3. Fourth yearly distribution of the most common cancer sites in Niue (1962-1985)**

Years	Lung		Uterus*		Stomach		Ovary	
	Number	Annual Crude Rate per 10,000	Number	Annual Crude Rate per 10,000	Number	Annual Crude Rate per 10,000	Number	Annual Crude Rate per 10,000
1962-1965	2	1.0	1	1.0	7	3.4	1	1.0
1966-1969	1	0.5	5	4.7	1	0.5	0	0
1970-1973	1	0.5	1	1.0	0	0	0	0
1974-1977	0	0	2	2.6	1	0.6	3	3.9
1978-1981	3	2.2	0	0	2	1.5	3	4.5
1982-1985	8	6.6	5	8.9	2	1.7	3	5.3
Totals	15	1.5	14	2.8	13	1.3	10	2.0

\*Female populations only were denominators.

There has been improved recording but the cases from 1978 onwards were histologically confined cases whereas previously they were not. In addition increased migration and medical referral to New Zealand would have removed many potential cases from the cancer registry. A conservative estimate of about 108 cases from Niue and Cook Islands were reported to the New Zealand registry during 1978 and 1982. The population structure shows a broad based pyramid indicating a young population which would lower the rate of cancer, a disease predominant among the older age group (55 years). Therefore, the observed increase of cancer in Niue should be a matter of interest and concern to all.

The types of cancers seen also closely reflect the pattern seen in cases of cancer among Niueans reported from New Zealand. The three most common cancers were lung (84.75), stomach (11.7%) and liver (9.3%) among men, which were identical with the figures reported here. This confirms a racial or genetic pattern reported elsewhere. Among women the most common cancers among the group from New Zealand were breast (27.9%), cervical (18.5%) and thyroid (10.8%). The three common malignancies reported locally were ovary (24.8%), uterus (19.5%) and cervix (14.6%). The Cook Islands and American Samoa reported a high incidence of breast cancer. There was no case of breast cancer reported in the Niue registry. A national survey of women in 1988 also did not find one case of breast cancer.<sup>3</sup> The higher incidence reported from New Zealand could be partly explained by the fact that this group included Polynesian women from the Cook Islands. The absence of breast cancer in Niue could be explained by a lower average age of births and higher rate of breast feeding.

The prevalence of smoking obtained during the 1980 metabolic survey showed that more than half of the men aged 20 to 69 years smoked cigarettes.<sup>8</sup> About 20% of women also smoked. This indicates a significant public health problem which provides evidence for the high prevalence of lung cancer. Asbestos, used for roofing and tuberculosis are likely explanations, but in terms of the numbers exposed, these do not explain the magnitude of the lung cancer problem.

Stomach cancer was the second most common cancer in men, and was closely associated with peptic ulcers. It is showing a decline similar to other part of Polynesia. This could be due to the availability of drug treatment for peptic ulcers or a change in the eating habits. Liver cancer was the third most common cancer. All the cases were reported among men. Given the difficulty in diagnosis, these cases could also include secondary liver cancers.

However, with the hyperendemicity of Hepatitis B which has been present from the 1960<sup>4</sup> it is a likely explanation for the prevalence of liver cancer. In both the 1960 and 1980 serological surveys, children studies showed that by age 10 years, more than 80% were exposed or were carrying Hepatitis B surface antigen (HbsAG) and/or antibody to the core antigen (anti-HBc). The sex differences in liver cancer incidence could be due to higher alcohol consumption among men.<sup>11</sup> Recently, Hepatitis B vaccination was introduced in Niue but the relationship between Hepatitis B and liver cancer could not be evaluated.

Generally, cancers among Niueans are similar to those reported for other Polynesians. This will allow the national health services to adopt preventive activities that have been beneficial elsewhere, for use in Niue. Cigarette smoking is the most urgent public health problem that needs to be addressed. Early referral of chronic stomach complaints for endoscopy may improve management and detect cases early. Hepatitis B vaccination may contribute to a reduction in liver cancers, especially if measures to reduce alcohol consumption are also adopted. Regular cervical smear needs to be actively encouraged.

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Niue, like many Pacific islands, is also in a unique position to maintain a complete registration system for cancer and other diseases be-

cause the hospital and community registration are done by the same people. In addition, the island is small and the health service centralised at the only hospital that the lack of cooperation by hospital reported from larger countries<sup>14</sup> will be minimal.

A critical problem in chronic disease research and decision making in small Pacific States has been the lack of population based data. It has been shown in other regions that the best way of obtaining population based data is to develop registries of community health information.<sup>14</sup> As this study has shown, registries can permit the examination of existing or proposed healthcare measures. Other data sources on Niue<sup>1,10,15</sup> have under reported cancer by 72% to 83% when compared with the Lord Liverpool Hospital Cancer Register. The data sources reviewed have been used by regional agencies for decision making. Therefore, it is essential that national registries for chronic diseases be established before regional ones, otherwise gross distortion of information would occur. The consequences of the latter cannot possibly be absorbed by the small economies of the Pacific island states but the resources for the establishment of national chronic disease registries are in their hands.

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Despair is better treated with hope, not dope.

**Richard Asher (1912 - ) in Lancet, 1958; 1:954**