



## Differences in health-related socioeconomic characteristics among Pacific populations living in Auckland, New Zealand

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### Abstract

**Aim** To describe, compare and contrast the health-related socioeconomic characteristics of the different Pacific ethnic groups surveyed in the Auckland Diabetes, Heart and Health Survey (DHHS).

**Methods** The DHHS was carried out in Auckland in 2002–2003. Electoral roll based sampling and cluster sampling strategies were used to recruit a representative sample of Auckland Pacific populations. Participants answered a self-administered questionnaire about their demographic and socioeconomic position.

**Results** The study surveyed 1011 Pacific people aged between 35–74 years of age. Of the 1011 Pacific participants, 484 were of Samoan, 255 Tongan, 116 Cook Island, 109 Niuean, 26 Fijian, and 21 were of 'Other Pacific' ethnic groups. Samoans were least likely to have no children, and most likely to hold a certificate qualification. Tongans were least likely to be born in New Zealand (NZ) and had the shortest residence time in NZ. Tongans were most likely to be married and had the largest families. Cook Islanders were most likely to be NZ-born and had the highest household income. Niueans were most likely to be in paid employment, to hold a diploma qualification, to own their own homes, and have the smallest families.

**Conclusions** In conclusion, a distinct pattern (continuum) emerged from the results. The Cook Island and Niuean ethnic groups generally had a similar and more favourable socioeconomic profile compared to the Samoan and Tongan ethnic groups. These differences are most likely to be related to the length of residence in NZ. As differences existed, each Pacific ethnic group should be investigated separately when there are sufficient numbers.

Pacific people comprise 6.5% of New Zealand's (NZ) total population and have the highest fertility rates of any population group.<sup>1</sup> NZ's Pacific population is not one homogenous ethnic group. Indeed, there are more than 12 Pacific Island nations represented in NZ's Pacific community. However, the terms 'Pacific Islanders', 'Polynesians' and 'Pacific People' are used to describe these groups collectively. The collective label fails to acknowledge many differences that exist between Pacific ethnic groups, and creates the assumption of one homogenous group. Previous research has found that significant differences exist in cardiovascular disease (CVD) risk factors between the Pacific ethnic groups and suggested the appropriateness of ethnic specific analysis of Pacific health data.<sup>2</sup>

Many socioeconomic variables reviewed in this article are commonly recognised determinants of health and have clear relationships to health outcomes; these include dwelling (housing), income, employment, education,<sup>3</sup> marital status, length of

residence in NZ, place of birth, and family/household size. These determinants are known to moderate many health outcomes that include infectious diseases (meningococcal B, respiratory infections),<sup>4</sup> cardiovascular diseases (heart disease, obesity, diabetes),<sup>3</sup> and mental health problems (depression).<sup>5</sup> A knowledge of these determinants should aid the development of any strategies used to maintain and improve the health of populations they intend serve.<sup>3</sup> There do not appear to be any accounts of the determinants of health that address individual Pacific groups in NZ.

Since 1981, many studies conducted in NZ have investigated general population health.<sup>6-11</sup> Many of these studies sampled small numbers of Pacific participants which meant that findings relevant to Pacific people were not always reliable or representative. The size and ethnic composition of Pacific participants sampled in the DHHS, allows for findings to be generalised to NZ's Pacific population and for comparisons to be made among the more established Pacific ethnic groups. Few other studies of this type (CVD risk, adults aged 35-74 years) are large enough for this purpose.

## Methods

The DHHS was a cross-sectional study that surveyed 1011 Pacific people (aged 35-74 years) between January 2002 and December 2003. All participants were selected from within the Auckland region. Adults were recruited from two sampling frames: one was a cluster sample where random starting point addresses were obtained from Statistics New Zealand and the probability of selection was proportional to the number of people living in that mesh block; and the other was a random sample taken from the November 2000 Auckland electoral rolls stratified into 5-year age bands and included all people living in the Auckland area, but excluding Franklin and Rodney.

For the electoral roll sample of Pacific people, a program was written that excluded surnames that contained characters not used in standard Pacific alphabets. Then these names were viewed by a person knowledgeable of Pacific languages, and any names that were clearly not Polynesian were excluded. Ethical approval was obtained from the Auckland Ethics Committee.

Participants who indicated belonging to more than one Pacific ethnic group were assigned to one ethnic group only. Those who were of Pacific and non-Pacific or non-Maori were assigned into their respective Pacific ethnic group. Those who belonged to more than one Pacific ethnic group were assigned to the smaller Pacific group as done by census 2001.<sup>12</sup> This gave priority firstly to Niuean, followed by Cook Island, Tongan, and lastly Samoan ethnicity. Small numbers of Fijian (n=27) and 'Other Pacific' (n=27) participants meant that analysis of their results could not generate reliable findings.

All demographic data was self-reported. Participants were interviewed in places close to where they lived and all filled in a self-administered questionnaire about their socioeconomic position.

Statistical analysis was undertaken using SAS (version 9.1) software. Participant data were weighted according to the sampling frame that they were obtained from and means, standard errors and prevalences calculated using dual frame sampling methodology.<sup>13-15</sup> SAS survey procedures (SURVEYMEANS, SURVEYREG AND SURVEYFREQ) were used to calculate weighted means, adjusted means and percentages.<sup>16</sup> The Rao-Scott modified Pearson Chi squared test was used where appropriate with the reference category being the Samoan ethnic group, because it constituted the largest sample.

## Results

Ninety three percent of the sample reported sole ethnicity. Of those who reported multiple ethnicities (7%), half identified also with European ethnicity (3.5% of total), while 41% identified with another Pacific ethnicity (2.9% of total). The remainder identified with Chinese ethnicity (0.6% of total).

Table 1 shows the percentages of participants surveyed by Pacific ethnic group and the ethnic composition of both Auckland and NZ Pacific population. A comparison of the Pacific ethnic composition of the participants to that of Auckland's Pacific population found no significant difference ( $p=0.0921$ ). Fijian and 'Other Pacific' ethnic groups comprised 26 and 21 participants respectively. These numbers were too small for statistically reliable findings and were therefore excluded from further analysis.

**Table 1. Comparison of number (% of total survey sample) in each Pacific ethnic group with the Auckland and NZ Pacific population aged 35–74 years**

| Ethnicity     | Sample (%)<br>n=1011 | Auckland Pacific Population* (%)<br>n=42,486 | NZ Pacific Population* (%)<br>n=64,209 |
|---------------|----------------------|--|--|
| Samoan        | 46 %                 | 49%  | 47%                                    |
| Tongan        | 24%                  | 19%  | 15%                                    |
| Cook Island   | 11 %                 | 18%  | 20%                                    |
| Niuean        | 10 %                 | 10%  | 8%                                     |
| Fijian        | 5%                   | 3%   | 3%                                     |
| Other Pacific | 4%                   | 1%   | 3%                                     |

\*Aged 35– 74 years.

The place of birth and average length of residence in NZ is shown in Table 2. Of the total sample, 84% of participants were born in their home nation, 11% were born in NZ, and 5% were born elsewhere. Tongan participants were significantly less likely to have been born in NZ than Samoans. Cook Island and Niuean participants were significantly less likely to have been born in their home nations than Samoans. Niuean had the longest average residence in NZ for non-NZ born participants of 30.5 years. Tongans had the shortest average length of residence in NZ of 14.2 years.

**Table 2. Place of birth (%) and average length (SE) of residence in New Zealand if born overseas**

| Ethnic group | (%) born in Home Island<br>n=820 | (%) born in NZ<br>n=108 | (%) born elsewhere<br>n=36 | Mean† stay in NZ (years) of non-NZ born (SE) |
|--------------|----------------------------------|-------------------------|----------------------------|--|
| Samoan       | 82.4%                            | 13.1%                   | 4.5%                       | 22.9 (0.96)                                  |
| Tongan       | 98.4%‡                           | 0.4%‡                   | 1.2%                       | 14.2 (1.24)‡                                 |
| Cook Island  | 61.5%†                           | 34.5%                   | 3.9%                       | 25.9 (1.46)                                  |
| Niuean       | 64.0%*                           | 18.3%*                  | 18.3%                      | 30.5 (1.04) ‡                                |

\*0.01< $p$ <0.05; †0.001< $p$ <0.01; ‡ $p$ <0.001 compared to Samoan ethnic group at birth.

The mean age of the entire Pacific sample was 48.4 years. Compared to the average age for Samoans of 47.5 years, no Pacific ethnic group was significantly different ( $p>0.14$ ). In all ethnic groups, with the exception of the Samoans, females comprised a slightly greater proportion each ethnic group. A statistical analysis that compared gender between the ethnic groups found no significant difference ( $p=0.3143$ ).

Table 3 shows the percentage of married, never married, in de facto relationships, and those separated/divorced or widowed by ethnic group. Compared to Samoans, marriage was significantly more common among Tongans, and was less common for Cook Islanders and Niueans. De facto relationships were more common for Cook Islanders and significantly less common among Tongans. Those never married and separated/divorced/widowed were significantly less common among Tongans. Niueans were most likely to never have been married.

**Table 3. Proportion of participants married, never married, in de facto relationships, and separated/divorced or widowed by Pacific ethnic groups**

| <b>Ethnic group</b> | <b>Married (%)<br/>n=677</b> | <b>Never married (%)<br/>n=82</b> | <b>De facto relationship (%)<br/>n=51</b> | <b>Separated, Divorced, Widowed (%)<br/>n=154</b> |
|---------------------|------------------------------|-----------------------------------|---|---|
| Samoan              | 71.5%                        | 6.2%                              | 8.3%                                      | 14%   |
| Tongan              | 86.5%†                       | 1.5%†                             | 0.5%†                                     | 11.4%†  |
| Cook Island         | 54.3%                        | 10.2%                             | 13.4%                                     | 22%   |
| Niuean              | 58.3%                        | 15.7%                             | 8.4%                                      | 17.6%   |

\*0.01<p<0.05; †0.001<p<0.01.

Table 4 shows family and household characteristics of the Pacific ethnic groups. Tongans had the highest average number of both children and adults and household size (6.9 members). Cook Islanders had the smallest estimated household size of 6 members and also reported the lowest average number of adults in a household. Niueans reported having on average the fewest children and were most likely not to have had any children (16.1%).

**Table 4. Mean and (%), (SE) family and household characteristics of the Pacific ethnic groups**

| <b>Ethnicity</b> | <b>Number of children (SE)</b> | <b>Number of adults (SE)</b> | <b>Total per household (SE)</b> | <b>(%) Childless</b> |
|------------------|--------------------------------|------------------------------|---------------------------------|----------------------|
| Samoan           | 3.5 (0.13)                     | 3.0 (0.09)                   | 6.5 (0.17)                      | 5.3%                 |
| Tongan           | 3.8 (0.28)                     | 3.1 (0.17)                   | 6.9 (0.39)                      | 7.0%                 |
| Cook Island      | 3.4 (0.63)                     | 2.6 (0.17)*                  | 6.0 (0.71)                      | 14.5%                |
| Niuean           | 3.2 (0.22)                     | 2.9 (0.14)                   | 6.1 (0.29)                      | 16.1%                |

\*0.01<p<0.05.

Table 5 shows that rented accommodation was the most common type of dwelling for all of the Pacific ethnic groups except Niueans who were most likely to live in owned (mortgaged/freehold) accommodation.

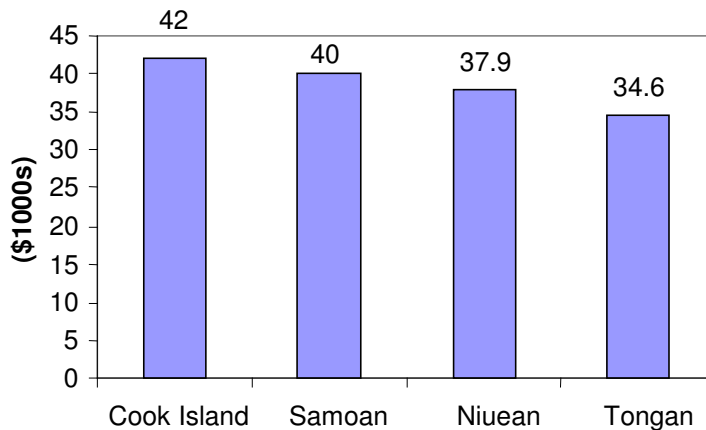
**Table 5. Type of dwelling by Pacific ethnic group (%)**

| <b>Ethnicity</b> | <b>Rented (%)<br/>n=398</b> | <b>Mortgage (%)<br/>n=398</b> | <b>Freehold (%)<br/>n=79</b> | <b>Family / friends / boarding &amp; other (%)<br/>n=84</b> |
|------------------|-----------------------------|-------------------------------|------------------------------|---|
|------------------|-----------------------------|-------------------------------|------------------------------|---|

|             |       |       |      |       |
|-------------|-------|-------|------|-------|
| Samoan      | 44.6% | 41.6% | 5.6% | 8.2%  |
| Tongan      | 55.9% | 28.8% | 2.6% | 12.8% |
| Cook Island | 55.8% | 33.2% | 5.6% | 5.5%  |
| Niuean      | 33.5% | 50.5% | 7.3% | 8.7%  |

Figure 1 illustrates the estimated total annual household income by Pacific ethnic group. Cook Islanders have the highest estimated annual household income, Tongans have the lowest. This difference means that an average-sized Cook Island household will receive \$38 per household member per week more than an average-sized Tongan household.

**Figure 1. Estimated annual household income by ethnicity**



Other measures of income found that 37% of Tongans reported a household income of less than \$20,000 per annum, compared to only 21% of Samoans and Niueans. For household incomes that exceeded \$80,000 per annum, Cook Islanders had the highest (11%), followed by Tongans and Niueans (8%), and Samoans (7%).

Cook Islanders had the greatest proportion that indicated being financially '*comfortable*'. Niueans had the greatest proportion that indicated their financial situation allowed them to '*get by*'. A larger proportion of Tongans (32%) indicated not having enough money to '*make ends meet*'.

Table 6 lists employment characteristics by Pacific ethnic group. Niueans were most likely to participate in both full and part time paid employment. Tongans were least likely to participate in full time work and Cook Islanders were least likely to participate in part time work. A larger proportion of Tongans participated in 'home duties'. Over a quarter of Cook Islanders surveyed were beneficiaries.

**Table 6. Employment characteristics by Pacific ethnic group aged <65 years**

| <b>Ethnicity</b> | <b>Full time (%)<br/>n=425</b> | <b>Part time (%)<br/>n=70</b> | <b>Unemployed/<br/>redundant (%)<br/>n=34</b> | <b>Beneficiary (%)<br/>n=161</b> | <b>Home duties (%)<br/>n=80</b> |
|------------------|--------------------------------|-------------------------------|---|----------------------------------|---------------------------------|
| Samoan           | 59.4%                          | 9.8%                          | 4.3%  | 15.1%                            | 11.4%                           |
| Tongan           | 53.5%                          | 11.4%                         | 4.7%  | 13.5%                            | 16.8%                           |
| Cook Island      | 57.5%                          | 5.2%                          | 2.6%  | 25.4%                            | 9.4%                            |
| Niuean           | 64.2%                          | 11.7%                         | 3.5%  | 14.5%                            | 6.1%                            |

Table 7 lists qualifications by ethnic group. Niueans were most likely to have continued in further education (39.7%); Cook Islanders were least likely to have done so (28.4%). Of those who did further education, there were marked differences in the types of qualifications that were attained. Tongans were most likely to gain degrees, Niueans were most likely to gain diploma qualifications, and Samoans were most likely to have obtained a certificate.

**Table 7. Education type by Pacific ethnic group**

| <b>Ethnicity</b> | <b>Degree (%)<br/>n=45</b> | <b>Diploma (%)<br/>n=108</b> | <b>Certificate (%)<br/>n=129</b> | <b>Other (%)<br/>n=44</b> | <b>Further education (%)<br/>n=326</b> |
|------------------|----------------------------|------------------------------|----------------------------------|---------------------------|--|
| Samoan           | 9.9%                       | 31.3%                        | 45.8%                            | 13.1%                     | 34.9%                                  |
| Tongan           | 26.9%                      | 22.0%                        | 40.9%                            | 10.3%                     | 34.5%                                  |
| Cook Island      | 6.3%                       | 40.1%                        | 43.1%                            | 10.5%                     | 28.4%                                  |
| Niuean           | 7.0%                       | 44.7%                        | 37.3%                            | 11.0%                     | 39.7%                                  |

**Key:** Degree=MA, PhD, BA, BSc, Medicine; Diploma=Teaching, Nursing, Business, Management; Certificate=Trade or Technicians, apprenticeship, typing.

## Discussion

This study indicated that the majority of Pacific people in NZ aged over 35 years were not born in NZ. Niueans and Cook Islanders had a more favourable socioeconomic profile compared to Samoans and Tongans. Cook Islanders and Samoans were in the best (and similar) financial positions, although Samoans reported greater financial stress. Significant differences in health related socioeconomic characteristics existed between the Pacific ethnic groups.

Seven percent of the total sample had mixed ethnicity. A strong sense of self identity has been found to be protective against adverse health outcomes, especially with regard to mental health, sexual health, and criminal behavior.<sup>17</sup> In time, mixed ethnicity will be more common in New Zealand, increasing the potential risk associated with identity.

Migrants tend to have a more adverse risk factor profiles and generally have a higher prevalence of hypertension, chronic conditions (e.g. diabetes), obesity, and cardiovascular diseases (CVD).<sup>18</sup> Birthplace and length of residence in NZ can be used as markers for immigration. Therefore, it is proposed that Cook Islanders and

Niuean people have a better health profiles compared to Samoan and Tongan people, as they have lived longer in NZ.

Marital status has a strong relationship with CVD. For both men and women, marriage decreases the risk of adverse CVD and CVD mortality.<sup>19,20</sup> Results showed that the more recently settled Pacific groups (Tongan and Samoan) were more likely to be married and therefore would be expected to gain the most protection. However, this may also reflect a strong cultural difference between traditional and more liberal Western social norms.

Family or household size can determine overcrowding and affects disposable household income.<sup>21</sup> Most findings from this survey showed similar family trends to Census 2001. One important difference was observed in the average size of Pacific families. Census 2001 reported Pacific family sizes ranged from 3.4–3.9 members. The DHHS estimated family or household size ranged of 6.0–6.9 members.

It is likely that this difference is the result of varied definitions of family or household size. This issue was addressed recently by Koloto et al,<sup>22</sup> who in consultation with the Ministry of Social Development agreed that standard measures used for family were inaccurate for Pacific people and that total household number was best used to quantify a Pacific household or family rather than family size, because a single Pacific household may encompass 3–4 family groups (extended family).

Housing has been directly linked to cardiovascular and all-cause mortality.<sup>3</sup> Living in sub-standard housing has been shown to increase the risk of many infectious diseases and also to worsen the symptoms or ailments associated with chronic diseases.<sup>23,24</sup> Pacific families were more likely to live in damp and cold housing than Maori and NZ European and were also more dependent on rental accommodation and more likely to live in overcrowded circumstances in response to economic hardship and larger families.<sup>25,26</sup> The above factors combined with having lower income increases the mobility of Pacific households, and is also prompted by increasing property rents.

For these reasons it has been proposed that home ownership may be a positive indicator of prospective health status.<sup>21</sup> Long-term residence can increase the quality of care received from a general practitioner as the general practitioner-client relationship can be developed over time and continuity of care established. It was surprising that the Cook Island ethnic group had a low level of home ownership considering their longer residence in NZ, smaller household or family size, and higher income levels (Figure 1). Contrary to our results, Census 2001 reported that Samoans had the highest level of home ownership (41%), followed by Cook Islanders and Niueans (39% each). This may be due to Census 2001 not distinguishing between free-hold or mortgaged home ownership.

Income is reported to be the single most important determinant of health.<sup>3</sup> Although Pacific people have been identified as having low-income levels, there is a paucity of published literature comparing the Pacific ethnic groups. Census 2001 reported that Niueans and Samoans had the highest median incomes.

The DHHS found Cook Islanders and Samoans had the highest and similar income levels. However, Samoans reported greater financial pressure. This may result from the fact that Samoan families have larger households and that other financial pressures may contribute compared to the Cook Island community. These financial pressures

include remittances to family in Samoa, donations of money to the Church, and a continual adherence to the cultural concept of *Fa'a Samoa*,<sup>27</sup> which include requests from family elders, leaders, or *Matai* (village chief) for financial contributions that will be used to finance projects, functions, or for gifting to prominent people, guests, and visitors.<sup>27</sup>

The main factor determining income is employment.<sup>28</sup> Employment has been shown to increase general health and wellbeing as it provides many opportunities for social interaction, community participation, the development of social status, and can increase levels of physical activity.<sup>28</sup> Conversely, unemployment has been found to be detrimental to both physical and mental health.<sup>5</sup> The low level of *full time* employment of Tongans was also observed in the Census 2001 and may reflect larger family sizes and explaining why more Tongans take part in '*home duties*'.<sup>1</sup>

Surprisingly, Tongans had the fewest beneficiaries and Cook Islanders had the most. This may reflect different levels of awareness for welfare entitlements, and how to access them. Many people who are entitled to a Community Services Card (which gives subsidised healthcare assistance to low income earners) do not have them, and this is more common in Maori and Pacific communities.<sup>29</sup> Cook Island and Niuean people are NZ citizens and are therefore entitled to welfare. This is not necessarily the case for all Tongan and Samoan residents, however, and may contribute to the numbers of beneficiaries.

Education can affect many determinants of health indirectly by determining occupation and income,<sup>3</sup> but also affects health directly by improving understanding of health protection and confidence in seeking the aid of professionals. Mothers who were better educated were more likely to receive health services for their children including postnatal care, immunisation, use of community nurses, and early dental care and early childhood education.<sup>30</sup>

The newer Pacific groups (Samoan and Tongan) achieved higher-level qualifications compared to the longer-term NZ-resident Pacific groups (Niuean, Cook Islanders). Indeed, this trend was also observed in Census 2001.<sup>1</sup> An apparently stronger emphasis on education, may explain why these differences have occurred. The new opportunity of higher education is more likely to be appreciated, valued, and utilised. Furthering education is a primary reason for coming to NZ for many Pacific people as there are few institutions that offer tertiary training in the Pacific. Current immigration policy gives preference to skilled/qualified applicants and may contribute to observed differences.<sup>31</sup>

This is one of the two largest surveys carried out on NZ's Pacific community to date. The ethnic composition of this sample makes it a valuable dataset as it is representative of Auckland's four largest Pacific ethnic groups aged 35–75 years (Samoan, Tongan, Cook Island, and Niuean), thus allowing for comparisons to be made between them. It is recognised that the recruitment procedure used in sampling from the Electoral roll does have limitations as it would not capture Pacific people who have non-Pacific surnames. However it did allow for the targeted use of the Electoral Role to sample the Pacific population.

Unlike previous surveys carried out on Pacific people, this is a population-based survey and therefore is more likely to be representative of the Pacific population as opposed to workforce surveys.

It is hypothesised that the primary mechanism that has influenced the differences in the socioeconomic characteristics reported above, is most likely the length of residence in NZ. Longer residence in NZ appears to positively affect socioeconomic characteristics.

In the future, judgments may need to be made that will deal with prioritising and classifying ethnicity. What Pacific ethnicity(ies) should be prioritised if any and why? One suggestion is that questionnaires ask which ethnicity people most identify with.

In conclusion, a distinct pattern (continuum) emerged from the results. The Cook Island and Niuean ethnic groups generally had a similar and more favourable socioeconomic profile compared to the Samoan and Tongan ethnic groups. These differences are most likely to be related to the length of residence in NZ. As differences existed, each Pacific ethnic group should be investigated separately when there are sufficient numbers.

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