

Cohort profile: A decade on and strong - The Pacific Islands Families Study

Gerhard Sundborn^{1,2§}, Janis Paterson¹, Upasana Jhagroo¹, Steve Taylor¹, Leon Iusitini¹, El-Shadan Tautolo¹, Fa'asisila Savila¹, Amor Hirao¹, Melody Oliver¹

¹ AUT University, School of Public Health and Psychosocial Studies, Auckland, New Zealand

² University of Auckland, School of Population Health, Auckland New Zealand

§ **Corresponding author:** Dr Gerhard Sundborn, Faculty of Health & Environmental Sciences, AUT University, Private Bag 92006, Auckland, New Zealand, Phone: +64 09 921 9999 ext. 7735, Fax: +64 09 921 9877, Email: gerhard.sundborn@aut.ac.nz

Fakamalolo ke he tau amaamanakiaga, ke mafola ai e tau matakainaga

- Niuean proverb

The Pacific population is one of the fastest growing ethnic subgroups in New Zealand (NZ). In the 2006 census the Pacific population comprised 6.9% of the total NZ population¹ and this figure is projected to increase to approximately 10% by 2026.² The Pacific ethnic group is diverse, Samoans make up the largest group (50%), followed by Cook Island Māori (23%), Tongan (18%), Niuean (9%), Fijian (3%), Tokelauan (3%) and Tuvalu Islanders (1%).³ This diversity presents itself in unique cultural backgrounds, languages, patterns of acculturation, and resulting access to and utilisation of health and social services. Such ethnic variety contributes to an image of NZ as a melting pot of cultural diversity. While this symbolism lends itself to positive notions of multiculturalism and inclusiveness it has the potential to cover differences in health status between these population groups.

In 2006, Pacific males had a life expectancy of 73.9 years which was 4.3 years lower than the average for NZ males. Similarly, Pacific females had a life expectancy of 78.1 years, 4.1 years lower than the average for NZ females.⁴ These figures underscore the consequential effects of Pacific overrepresentation in many adverse health and social statistics.^{3,5-9} Despite this, there has been a general lack of acknowledgement of these disparities that manifest in the scarcity of culturally specific information about Pacific peoples.

It is within this context that the Pacific Islands Families Study (PIFS) was established and has since been instrumental in the advancement of culturally specific information about the Pacific population living in NZ. The study owes its inception to the extensive efforts of its two founding directors, Professor Janis Paterson, who continues to co-direct the project into its 11th year, and Dr Colin Tukuitonga and members of the initial management team. These include Professor Max Abbott, Professor Phil Silva, Esther Cowley-Malcolm, Dr Michael Feehan, Jim Borrowes, Sarnia Carter (formerly Butler), and Maynard Williams. The management team facilitated the day-to-day running of the study in their respective roles. The study directors and management group have overseen an expansive research team composed of Pacific and non-Pacific investigators and field staff. Broad consultation with Pacific stakeholders and community was undertaken by Esther Cowley-Malcolm by which support was established and resulted in the formation of the Pacific Peoples Advisory Board (PAB). The function of the PAB role was to ensure that Pacific input would have a meaningful contribution throughout the study. In the PIFS 10 year history many significant contributions



have also been made to the study by Dr Teuila Percival, Professor Elaine Rush, Professor Philip Schluter and Professor Peggy Fairbairn-Dunlop.

In 1998 and 1999, the Foundation for Research, Science and Technology (FRST) and the Health Research Council (HRC) respectively, awarded grants for an initial pilot to test and refine the study methods, which led to the commencement of the main study in 2000. The PIFS was initially focused on the key developmental stages of early infancy and the influence of the socio-cultural context and family environment on Pacific children in their first two years of life (PIF:FTY) with measurement phases at 6 weeks, 12 months and 2 years postpartum. The study has since progressed to include the child's transition to school (PIF:TTS) with measurement phases at 4 years and 6 years, and their shift towards adolescence (PIF:TA) with measurement phases at 9 years and currently in progress at 11 years. Continued growth of the study has been primarily achieved through the ability of the study to meet set milestones and outcome measures at each phase which has led to the sustained support of the FRST, in addition to numerous other national and regional agencies, which have funded supplementary studies. To date, these funding contributions have totalled approximately NZD\$9.96 million.

Throughout the various phases the study has been underpinned by a multidisciplinary, broad-based, and inclusive study design that captures information from mothers, fathers, children, and the children's teachers once they started school. The broad aims of the study are to:

- i. Identify and characterise those individuals and families experiencing both positive and negative health outcomes;
- ii. Understand the mechanisms and processes shaping the pathways to those outcomes; and
- iii. Make empirically based strategic and tactical recommendations to improve the wellbeing of Pacific children and families and thereby benefit New Zealand society as a whole.

PIFS Cohort

The PIFS cohort was recruited from Middlemore Hospital (a large tertiary hospital) in Manukau, NZ. All Pacific Island infants born between 15 March 2000 and 17 December 2000, with at least one parent who identified with a Pacific Island ethnicity and was a permanent resident in NZ were eligible for inclusion in the study. In addition to the infants, the cohort includes their caregiver(s). For the majority of children, their primary caregiver is their birthmother and their secondary (collateral) caregiver is their birth father.



Table 1. Percentage of maternal and child baseline characteristics at 6 weeks, 12 months, 2 years, 4 years, 6 years and 9 years; paternal baseline characteristics at 12 months, 2 years and 6 years; child assessment characteristics at 2 years, 4 years, 6 years and 9 years; and teacher characteristics at 6 years and 9 years.

	PIFS sample					
	6 weeks (n = 1376)	12 months (n = 1224)	2 years (n = 1144)	4 years (n = 1048)	6 years (n = 1001)	9 years (n = 996)
Maternal characteristics^a						
<i>Age (yrs)</i>						
<20	8.1	7.4	7.4	7.6	7.3	7.4
20-29	52.4	52.3	51.5	51.2	51.9	51.5
30-39	36.4	37.0	37.9	37.9	37.2	37.6
≥40	3.2	3.4	3.3	3.4	3.6	3.4
<i>Ethnicity</i>						
Samoan	47.2	48.1	47.6	45.3	46.3	45.3
Cook Island	16.9	17.5	16.6	17.8	17.4	17.7
Tongan	21.0	19.8	21.2	21.4	21.8	22.2
Other Pacific	7.7	7.7	7.4	8.3	7.8	7.4
Non-Pacific ^b	7.2	6.9	7.2	7.3	6.8	7.4
<i>Highest educational qualification</i>						
No formal qualification	38.9	38.2	37.5	36.0	37.1	36.0
Secondary	33.7	33.9	34.2	35.2	35.8	34.7
Post-secondary	27.4	27.9	28.3	28.8	27.2	29.2
Maternal interviews						
<i>Sex of child</i>						
Female	48.6	48.1	48.4	49.0	49.1	49.4
Male	51.4	51.9	51.6	51.0	50.9	50.6
Paternal characteristics^c						
<i>Age (yrs)</i>		(n = 825)	(n = 757)		(n = 591)	
<20		0.9	0.7		0.9	
20-29		38.2	36.0		33.1	
30-39		47.4	47.8		50.0	
≥40		13.6	15.6		16.0	
<i>Ethnicity</i>						
Samoan		53.3	58.3		48.5	
Cook Island		8.9	8.3		7.3	
Tongan		24.1	20.2		32.4	
Other Pacific		6.6	6.5		6.4	
Non-Pacific ^b		7.2	6.7		5.5	
<i>Highest educational qualification</i>						
No formal qualification		58.4	57.7		61.8	
Secondary		26.7	27.3		22.0	
Post-secondary		14.8	15.1		16.3	
Child assessments						
<i>Sex</i>			(n = 1064)	(n = 909)	(n = 897)	(n = 891)
Female			48.1	48.6	49.2	50.3
Male			51.9	51.4	50.8	49.7
Teacher characteristics						
<i>Sex</i>					(n = 559)	(n = 692)
Female					94.8	77.6
Male					5.2	22.4
<i>Pacific identity</i>						
No					75.7	75.3
Yes					24.3	24.7

^a Figures in **Bold font** = significant chi-square test ($p < 0.05$) which assessed overall characteristic differences in mothers who participated and those that did not at each phase compared to the baseline cohort (6 week phase). Tests were not performed for other participants because their participation was dependent on maternal consent.

^b Eligible for the study through the Pacific ethnicity of their partner.

^c Information regarding paternal baseline characteristics at 2 years and 6 years is based on maternal baseline report. At 2 years, 164 participating fathers did not participate at 12 months, and at 6 years 158 participating fathers did not participate at 12 months.



Multimedia advertising was used to promote the study prior to its commencement allowing prospective families sufficient time to consider their participation. Within the hospital setting further information about the study was disseminated and an assessment of potential eligibility was carried out. At the 6-week postpartum interview 1477 mothers (96% of potentially eligible mothers) were deemed eligible, of which 1376 (93%) agreed to participate in the study. These mothers collectively gave birth to 1398 children (23 pairs of twins however one twin member was stillborn). Fathers were not interviewed until the 12-month phase of interviews in 2001. During this phase, 999 mothers had partners (collateral respondents), of whom 825 (83%) completed an interview. A summary of the distribution of baseline socio-demographic variables for maternal, child, and paternal participants, and descriptive characteristics for the child assessments and the teacher respondents over the six completed measurement phases are presented in Table 1.

PIFS Data Collection Phases

In order to pursue the study aims data collection phases were planned around specific developmental stages in the child's life. Each phase offers a unique opportunity to elicit data about the how the child develops within the context of a Pacific family.

The first data collection phase took place approximately 6-weeks postpartum. Maternal interviews were carried out in the participants homes by trained Pacific female bilingual interviewers. Participants were given the option of completing the survey in English, Samoan, Tongan, or Cook Island Māori. At this phase it was found that only 14% of them elected to use a Pacific language survey, and as a result all subsequent survey instruments were made available in English only. Maternal interviews were repeated at approximately 12 months, 2 years, 4 years, 6 years, 9 years, and currently 11 years postpartum. Funding is currently being sought to interview the children (and their parents) at 14 and 16 years of age.

At each data collection phase, upon completion of the maternal interview, mothers were asked to consent to all or some of the following: the child's father being interviewed; the child undergoing a comprehensive assessment; and/or the child's teacher being contacted. Paternal interviews were carried out at the 12-month, 2-year, 6-year, and 11-year data collection phases. These interviews were conducted by Pacific male bilingual interviewers. Child assessments have been performed by trained child assessors at every measurement phase since the child was 2 years of age, following maternal consent. Teacher questionnaires were introduced at the 6-year and 9-year phases and provide a valuable source of data about the child's school life.

The maternal and paternal interviews adhered strictly to separate protocols that employed an array of questions and standardised instruments which broadly assessed socio-demographic, cultural, environmental and lifestyle factors, child development, family and household dynamics, childcare, and parental and child health issues. Additional data about the child has been obtained from hospital and Plunket postnatal records inclusive of obstetric and perinatal information, the child assessments comprising physical, social, cognitive, and language developmental information, and the teacher questionnaires from which further information about the child's scholastic and social attributes were elicited.

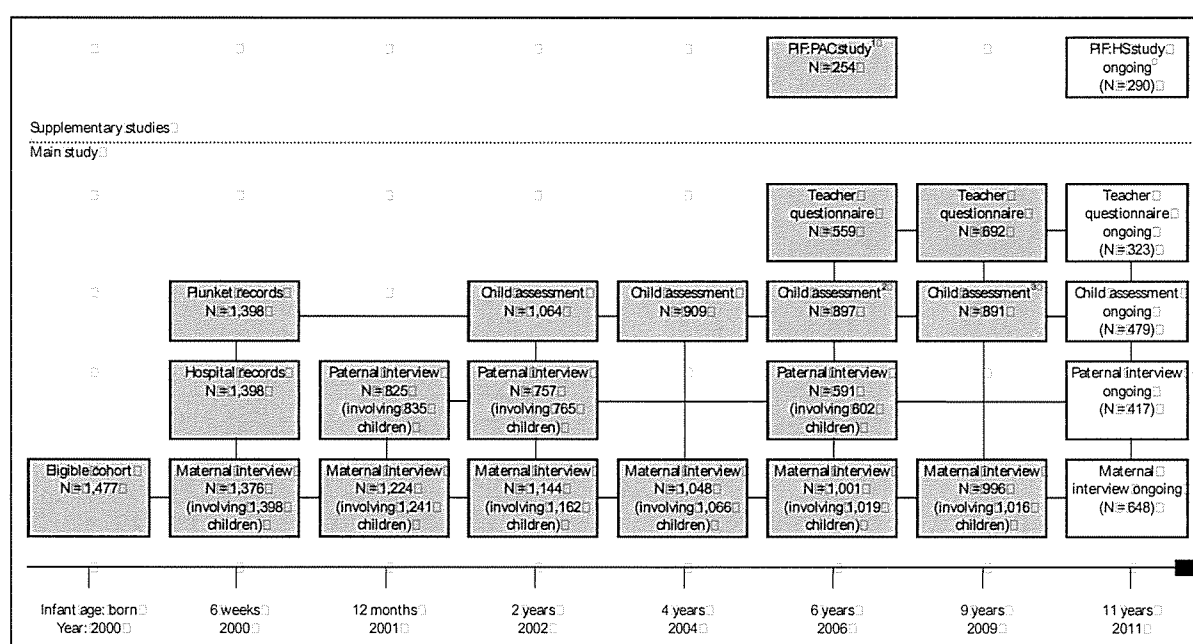
In addition to the main PIFS, several supplementary studies have also been carried out including: the Child and Parental Physical Activity and Body Size (PIF:PAC) study¹⁰ and the Nutrition and Body Size of 6 year old Pacific children (PIF:NBS) study at 6 years; the Nutrition, Body Size and Physical Activity of 9 year old Pacific children (PIF:NBS-2) study at 9 years; and two pilot studies which investigated ambient pollutants



and child health at 6 years (n=30), and oral health at 9 years (n=50). These studies have employed both self-report and objective measures to understand and assess aspects of Pacific child and parental health. A study of the hearing status of 11 year olds (PIF:HS) is being conducted concurrently with the main PIFS. This study is objectively examining hearing impairment in Pacific children by assessing the middle ear, hearing status, and auditory processing of children in the cohort.

An overview of the study to date, highlighting the data collection phases and its components, is presented in Figure 1.

Figure 1. Participant groups and numbers over time covering the information of 1398 children in the cohort (revised from Figure 2¹¹)



¹ The sample was recruited from the first 660 eligible PIFS participants at the 6-year measurement phase.

² The Nutrition and Body Size of 6 year old Pacific children (PIF:NBS) study was included in the main child assessment.

³ The Nutrition, Body Size and Physical Activity of 9 year old Pacific children (PIF:NBS-2) study was included in the main child assessment.

PIFS Attrition

The nature of this study means that participants are eligible to participate at any phase irrespective of their participation status at previous phases. As eligibility and formal recruitment was confirmed by mothers at the 6-week phase, maternal participants that completed the 6-week interview formed the baseline cohort against which attrition or non-participation has been measured at the subsequent phases. For example, the distribution of participants and non-participants differed to the baseline distribution with regards to maternal age at 2 years and education level at 4 years, and the distribution of maternal ethnicity differed from baseline at 12 months and thereafter showed no significant difference (Table 1). This illustrates that fluctuations in baseline characteristics of participants and non-participants may be possible at different phases but not necessarily permanent. This design limits the effects of attrition because the whole cohort is effectively eligible to participate at each phase (apart from instances where the child has died or the family has elected to drop-out of the study). To date, seven participants have died and 41 participants from the original cohort have formally dropped-out. This means that over 97% of the original cohort remains in the



study. It should be noted however that some of these participants have been very difficult to track and has consequently been the main cause for attrition.

The retention figures for the study to date are 1224 (89%) of the original 1376 mothers were re-interviewed at 12 months, 1144 (83%) at 2 years, 1048 (76%) at 4 years, 1001 (73%) at 6 years, 996 (72%) at 9 years. The current 11-year phase is nearly mid-way through data collection and already 617 (45%) of mothers have completed interviews (Figure 1). The high number of interviews completed in this time is due to a modified allocation process and is likely to result in a higher number of interviews completed than the previous 9-year phase. These mothers provided information for 1398, 1241, 1162, 1066, 1019, and 1016 children at each completed phase, respectively (excluding the current phase). The PIFS designates mothers as the first point of contact with the child's family and all subsequent interviews and assessments (paternal and child) are dependent on maternal consent.

After receiving the mother's permission, hospital and Plunket records were available for all infants at the baseline time point. Child assessments were completed for 1064 children (32 twins) at 2 years, 909 (28 twins) at 4 years, 897 (32 twins) at 6 years, 891 (34 twins) at 9 years, and at present 419 at 11 years. Maternal consent was obtained for 999 fathers at 12 months, 938 fathers at 2 years, and 848 fathers at 6 years. Of these 825 (83%) fathers participated at 12 months, 757 (81%) at 2 years, and 591 (70%) at 6 years. These fathers have provided information for 835 children at 12 months, 765 children at 2 years, and 602 children at 6 years. At 11 years, though still ongoing, 417 fathers have consented and completed the paternal interview.

PIFS Geographical Mobility

Over the last decade geographical movement from the original recruitment site in Manukau has put some pressure on the ability of the study to maintain the cohort and is primarily responsible for attrition in the latter phases (Figure 2). In August 2011, of the 1350 remaining participants (excluding dropouts and deceased) the locations of 1274 were known. The majority of participants have remained in New Zealand (84.1%). Of these, 80.2% are still in Auckland, with the remainder spread over North and South Island regions. In total, 15.9% of participants have moved offshore. Internationally, Australia is the preferred country of domicile and is home to 13.7% of the cohort. Within Australia, participants are mainly located in Queensland (n=41), New South Wales (n=35), and Victoria (n=30). Additionally, the Pacific nations of Samoa (n=10), Cook Islands (n=7), Tonga (n=2), American Samoa (n=1), and Niue (n=1) are also home to some of the cohort. Finally, only seven participants have moved outside Australasia to the United States of America (n=6) and China (n=1).

To minimise the effects of geographical movement on cohort attrition various procedures have been implemented at each phase. During the 6-year and 9-year measurement phases phone interviews were carried out to gather information from participants outside of Auckland. Also at the 9-year phase specifically-designed postal questionnaires were mailed to participants outside of Auckland. Tracking via a number of national databases have been utilised to find participants from the 9-year measurement phase. In the current phase, interviewers have been sent to locations outside of Auckland, such as Hamilton and Tonga, to interview participants. Such efforts have been pivotal in maintaining high retention rates across the study phases and are becoming increasingly important as the study matures.



Figure 2. Residence of cohort at 2011

PIFS Key Findings and Publications

At present the PIFS has amassed 59 peer-reviewed journal articles, one book chapter, and three major technical reports. The PIFS research team has also contributed extensively to increasing awareness of Pacific people's health by presenting at numerous local, national, and international conferences and academic seminars. Most recently PIFS researchers have presented at the International Conference for Infant, Toddler and Preschool Mental Health, Liga Maopo: National Pacific Provider & Workforce Development Fono 2010, the Regional Oral Health Forum (Auckland), the Annual Cook Islands Health Conference, the 5th International Conference on Interdisciplinary Social Sciences, the 5th Measina a Samoa Conference, the Australasian Epidemiological Association Annual Conference 2010, the Asics Conference of Science and Medicine in Sport, the 12th New Zealand Language and Society Conference, the International Social Sciences Conference, the Aboriginal Child Health Symposium and the ALAC Addiction Treatment Leadership Day 2011.

The last cohort profile summary¹¹ reported some of the published key findings based on data collected up to the 4-year phase, which included topics on child immunisation,^{12,13} otitis media with effusion,¹⁴ oral health risk,¹⁵ traditional gift giving,¹⁶ intimate partner violence,^{17,18} experience and risk factors in the antenatal period,¹⁹⁻²¹ infant care practices,²²⁻²⁷ infant health problems,²⁸⁻³⁰ postnatal depression,³¹ housing issues,³²⁻³⁴ smoking,³⁵⁻³⁷ gambling,^{38,39} and cultural experiences.^{40,41} Since then, further articles on oral health,⁴² intimate partner violence,⁴³⁻⁴⁸ gambling^{49,50} and smoking.⁵¹

Additionally, numerous other findings about Pacific peoples in NZ have emerged. Patterns of acculturation among Pacific mothers have been identified,⁵² in addition to the impact such maternal acculturation has on infant and maternal health outcomes.⁵³ These papers highlight that Pacific cultural orientation has a protective effect but this is reduced in the presence of high NZ cultural orientation; many Pacific mothers are increasingly adopting the NZ culture at the compromise of their Pacific roots.

The main PIFS in combination with the PIF:PAC and PID:NBS studies¹⁰ have been crucial to gaining an understanding of obesogenic factors within the Pacific community. It has been shown that Pacific children are born heavy and have steep weight increase trajectories^{54,55} highlighting the importance of the intrauterine environment on eventual weight status. With regards to physical activity, Pacific mothers do



not perceive the same barriers or incentives in determining their physical activity as non-Pacific mothers.⁵⁶ Understanding the determinants of maternal physical activity is important as it has been shown to influence children's physical activity.⁵⁷ Coupled with this, food insecurity is prevalent in Pacific Island families which may lead to unfavourable food choices.⁵⁸

Gender specific parenting practices have also been examined. Pacific mothers with high levels of nurturance tended to be of Samoan ethnicity and have post school qualifications, while low levels of nurturance was associated with postnatal depression, alcohol consumption and gambling.⁵⁹ For Pacific fathers, nurturance and harsh disciplinary practices were more closely linked to acculturation.⁶⁰ Those who retained their Pacific culture were less likely to use harsh discipline and were also less likely to engage in nurturing behaviours. Tongan fathers were significantly less likely to use harsh discipline,⁶⁰ while Tongan mothers were more likely to employ disciplinary methods.⁵⁹ Like their maternal counterparts, higher levels of education were associated with higher nurturance, however gambling and alcohol consumption were associated with higher use of harsh disciplinary practices amongst Pacific fathers. While some differences in parenting styles existed between Pacific mothers and fathers, use of an object (i.e. belt or spoon) in disciplinary practice was a commonality and smacking prevalence was similar to the general NZ population.⁶¹

The study has also advanced knowledge about Pacific parents' mental health and the effect it may have on child behavioural problems. Overall Pacific fathers were found to perceive their health and wellbeing as good and had low rates of symptomatic mental disorders though this did increase over time.⁶² In addition, smoking, unemployment, being separated or single, or of Cook Islands or Tongan ethnicity increased the risk of experiencing symptoms of psychological disorder among Pacific fathers. The effect of parental psychological disorder has also been shown to influence internalising problems in children of mothers who had self-reported symptoms of psychological disorder.⁶³

This paper opened with the Niuean proverb, *strengthen all endeavours and the community will benefit*. These words take breath in the findings which demonstrate the contribution the study has made in improving understanding of Pacific peoples over the last 10 years, by producing a unique and robust international database on Pacific children and their families. In doing so, the study has finally led to an acknowledgement of ethnic disparity and has provided a steppingstone towards effective culturally-specific interventions with inevitable benefits for all New Zealanders.

PIFS Strengths and Limitations

The PIFS's primary strength is its success in recruiting what was previously considered a "hard-to-reach" population and high retention rates over the last decade. Recruitment and retention success is fundamental to the success of most robust longitudinal studies and has been driven in the PIFS by the involvement of both the Pacific community in the consultation, design, procedural development, recruitment, elicitation and interpretation of information and governance of the study, and the Pacific Peoples' Advisory Board who have been critical in monitoring and guiding the study. Pacific input at all stages of the study has ensured its credibility and cultural sensitivity to Pacific participants. These efforts have been rewarded in the perceived importance and ownership that participants afford the study.

The PIFS has been fortunate to have had the support of well-known Pacific personalities. In the early years former All-Black Eroni Clarke and former Captain of Manu Samoa Peter Fatiafalo publicly endorsed the PIFS and more recently iconic Kiwi musician Che Fu.



In addition to Pacific involvement, home visits by gender matched and generally ethnic matched bilingual Pacific interviewers has facilitated the interview process and contributed towards the high retention success of the study. Home visits proved to be a convenient and comfortable way to maintain relationships with participants, particularly those without transportation and/or telephones. In addition, the gender and ethnic-match of the interviewers has facilitated the rapport with participants, and reduced language barriers.

Design efficiencies, including the single hospital-based recruitment strategy and the collection of data from several available data sources, have aided recruitment success. The use of a single recruitment site has allowed the target population to be easily located which has enhanced the cost-effectiveness of recruitment and data collection. Alternate data sources, such as hospital and Plunket records, child information retrieved from teacher evaluations and data provided from the National Health Index (NHI) listings contained within the National Medical Discharge Summary (NMDS) database have provided rich data and have lessened the burden on participants.

Although the study employs an array of commonly used standardised instruments allowing comparisons with international studies, its dependence on participant self-report is its main limitation. The introduction of objective measures, such as accelerometer measurements, in addition to the proposed collection of further biological samples at 14 and 16 years have begun to address this deficiency.

Additionally, while the single recruitment strategy has been shown to be advantageous to recruitment and retention success it may also limit the generalisability of the study. Pacific individuals and families in rural areas, minor towns or other cities (for example in the South Island) may differ to the participants in the PIFS with regards to health and other outcomes. The effects of this geographical recruitment strategy are likely to be minimal, as 98% of the Pacific population is urbanised and furthermore two-thirds live in the Auckland urban area.³

PIFS Further Information

This paper has presented a general overview of the PIFS to date. Further information about the study, including the study publications and contact details for key members of the PIFS team, is available at the study's website, www.aut-pif.ac.nz. A publication register is also provided in the final section of this journal edition.

The PIFS team welcomes future opportunities for collaborative research. Access to the data is subject to study protocols and enquires should be made to the study directors whose details are listed on the website.



References

1. Statistics New Zealand and Ministry of Pacific Island Affairs. *Demographics of New Zealand's Pacific population*. Wellington: Statistics New Zealand and Ministry of Pacific Island Affairs; 2010.
2. Statistics New Zealand. *National ethnic population projections: 2006 (base) - 2026*. Wellington: Statistics New Zealand; 2008.
3. Statistics New Zealand. *Pacific progress: A report on the economic status of Pacific peoples in New Zealand*. Wellington: Statistics New Zealand; 2002.
4. Tukuitonga C. Pacific peoples in New Zealand. In: St George I, editor. *Cole's Medical practice in New Zealand*. 10th ed. Wellington: The Medical Council of New Zealand; 2011. p. 61-7.
5. Blakely T, Tobias M, Atkinson J, Yeh L-C, Huang K. *Tracking disparity: Trends in ethnic and socioeconomic inequalities in mortality, 1981–2004*. Wellington: Ministry of Health; 2007.
6. Bathgate M, Donnell A, Mitikulena A. *The health of Pacific Islands people in New Zealand*. Wellington: Public Health Commission; 1994.
7. Ministry of Health. *The health of Pacific peoples*. Wellington: Ministry of Health; 2005.
8. Ministry of Health. *Te Orau Ora: Pacific mental health profile*. Wellington: Ministry of Health; 2005.
9. Tukuitonga C, Bell S, Robinson E. Hospital admission among Pacific children in Auckland 1992-97. *New Zealand Medical Journal* 2000;**113**: 358-61.
10. Oliver M, Schluter PJ, Paterson J, Kolt GS, Schofield GM. Pacific Islands Families: Child and Parental Physical Activity and Body Size—design and methodology. *New Zealand Medical Journal* 2009 3 July;**122**(1298).
11. Paterson J, Percival T, Schluter P, et al. Cohort Profile: The Pacific Islands Families (PIF) Study. *International Journal of Epidemiology* 2008 10 September;**37**(2): 273-9.
12. Paterson J, Schluter P, Percival T, Carter S. Immunisation of a cohort Pacific children living in New Zealand over the first 2 years of life. *Vaccine* 2006 29 May;**24**(22): 4883-9.
13. Paterson J, Percival T, Butler S, Williams M. Maternal and demographic factors associated with non-immunisation of Pacific infants living in New Zealand. *New Zealand Medical Journal* 2004 6 August;**117**(1199).
14. Paterson JE, Carter S, Wallace J, Ahmad Z, Garrett N, Silva PA. Pacific Islands Families Study: Risk factors associated with otitis media with effusion among Pacific 2-year-old children. *International Journal of Pediatric Otorhinolaryngology* 2007;**71**(7): 1047-54.
15. Schluter PJ, Durward C, Cartwright S, Paterson J. Maternal Self-Report of Oral Health in 4-Year-Old Pacific Children from South Auckland, New Zealand: Findings from the Pacific Islands Families Study. *Journal of Public Health Dentistry* 2007 9 May;**67**(2): 69-77.
16. Cowley ET, Paterson J, Williams M. Traditional Gift Giving Among Pacific Families in New Zealand. *Journal of Family and Economic Issues* 2004 25 October;**25**(3): 431-44.
17. Schluter PJ, Paterson J, Feehan M. Prevalence and concordance of interpersonal violence reports from intimate partners: findings from the Pacific Islands Families Study. *Journal of Epidemiology and Community Health* 2007 July 1;**61**(7): 625-30.
18. Paterson J, Feehan M, Butler S, Williams M, Cowley-Malcolm ET. Intimate Partner Violence Within a Cohort of Pacific Mothers Living in New Zealand. *Journal of Interpersonal Violence* 2007 1 June;**22**(6): 698-721.
19. Paterson J, Cowley ET, Percival T, Williams M. Pregnancy planning by mothers of Pacific infants recently delivered at Middlemore Hospital. *New Zealand Medical Journal* 2004 30 January;**117**(1188).
20. Low P, Paterson J, Woules T, Carter S, Williams M, Percival T. Factors affecting antenatal care attendance by mothers of Pacific infants living in New Zealand. *New Zealand Medical Journal* 2005 3 June;**118**(1216).



21. Gao W, Paterson J, Carter S, Percival T. Risk factors for preterm and small-for-gestational-age babies: A cohort from the Pacific Islands Families Study. *Journal of Paediatrics and Child Health* 2006;**42**: 785-92.
22. Paterson J, Tukuitonga C, Butler S, Williams M. Awareness of Sudden Infant Death Syndrome risk factors among mothers of Pacific infants in New Zealand. *New Zealand Medical Journal* 2002 8 February;**114**(1147): 33-5.
23. Paterson J, Tukuitonga C, Butler S, Williams M. Infant bed-sharing among Pacific families in New Zealand. *New Zealand Medical Journal* 2002 24 May;**115**(1154): 241-3.
24. Schluter PJ, Paterson J, Percival T. Infant care practices associated with sudden infant death syndrome: Findings from the Pacific Islands Families study. *Journal of Paediatrics and Child Health* 2007;**43**(5): 388-93.
25. Butler S, Tukuitonga C, Paterson J, Williams M. Infant feeding and feeding problems experienced by mothers of a birth cohort of Pacific infants in New Zealand. *Pacific Health Dialog: Journal of Community Health and Clinical Medicine for the Pacific* 2002;**9**(1): 34-9.
26. Butler S, Williams M, Tukuitonga C, Paterson J. Factors associated with not breastfeeding exclusively among mothers of a cohort of Pacific infants in New Zealand. *New Zealand Medical Journal* 2004 4 June;**117**(1195).
27. Schluter PJ, Carter S, Percival T. Exclusive and any breast-feeding rates of Pacific infants in Auckland: data from the Pacific Islands Families First Two Years of Life study. *Public Health Nutrition* 2006 September;**9**(6): 692-9.
28. Schluter PJ, Paterson J, Percival T. Non-fatal injuries among Pacific infants in Auckland: Data from the Pacific Islands Families First Two Years of Life study. *Journal of Paediatrics and Child Health* 2006 March;**42**(3): 123-8.
29. Paterson J, Carter S, Gao W, Perese L. Pacific Islands Families Study: behavioural problems among two-year-old Pacific children living in New Zealand. *Journal of Child Psychology and Psychiatry* 2007 May;**48**(5): 514-22.
30. Paterson J, Carter S, Williams M, Tukuitonga C. Health problems among six-week old Pacific infants living in New Zealand. *Medical Science Monitor* 2006 1 February;**12**(2): CR51-4.
31. Abbott M, Williams M. Postnatal depressive symptoms among Pacific mothers in Auckland: prevalence and risk factors. *Australian and New Zealand Journal of Psychiatry* 2006;**40**: 230-8.
32. Schluter P, Carter S, Kokaua J. Indices and perception of crowding in Pacific households domicile within Auckland, New Zealand: findings from the Pacific Islands Families Study. *New Zealand Medical Journal* 2007 26 January;**120**(1248).
33. Carter S, Paterson J, Williams M. Housing Tenure: Pacific Families in New Zealand. *Urban Policy & Research* 2005 December;**23**(4): 413-28.
34. Butler S, Williams M, Tukuitonga C, Paterson J. Problems with damp and cold housing among Pacific families in New Zealand. *New Zealand Medical Journal* 2003 11 July;**116**(1177).
35. Butler S, Williams M, Paterson J, Tukuitonga C. Smoking among mothers of a Pacific Island birth cohort in New Zealand: associated factors *New Zealand Medical Journal* 2004 26 November;**117**(1206).
36. Carter S, Percival T, Paterson J, Williams M. Maternal smoking: risks related to maternal asthma and reduced birth weight in a Pacific Island birth cohort in New Zealand. *New Zealand Medical Journal* 2006 21 July;**119**(1238).
37. Carter S, Paterson J, Gao W, Iusitini L. Maternal smoking during pregnancy and behaviour problems in a birth cohort of 2-year-old Pacific children in New Zealand. *Early Human Development* 2008 17 May;**84**(1): 59-66.



38. Bellringer ME, Perese LM, Abbott MW, Williams MM. Gambling Among Pacific Mothers Living in New Zealand. *International Gambling Studies* 2006;**6**(2): 217-35.
39. Schluter P, Bellringer M, Abbott M. Maternal gambling associated with families' food, shelter, and safety needs: Findings from the Pacific Islands Families Study. *Journal of Gambling Issues* 2007 January;**19**: 87-90.
40. Fairbairn-Dunlop P, Paterson J, Cowley-Malcolm ET. Maternal experiences of childhood: Pacific mothers in New Zealand. *Journal of Pacific Studies* 2005 November;**28**(2): 291-309.
41. Poland M, Paterson J, Carter S, Gao W, Perese L, Stillman S. Pacific Islands Families Study: factors associated with living in extended families one year on from the birth of a child. *Kotuitui: New Zealand Journal of Social Sciences Online* 2007 20 June;**2**(1): 17-28.
42. Paterson JE, Gao W, Sundborn G, Cartwright S. Maternal self-report of oral health in six-year-old Pacific children from South Auckland, New Zealand. *Community Dentistry and Oral Epidemiology* 2011 February;**39**(1): 19-28.
43. Gao W, Paterson J, Abbott M, Carter S, Iusitini L, McDonald-Sundborn G. Impact of current and past intimate partner violence on maternal mental health and behaviour at 2 years after childbirth: evidence from the Pacific Islands Families Study. *Australian and New Zealand Journal of Psychiatry* 2010 February;**44**(2): 174-82.
44. Gao W, Paterson J, Abbott MW, Carter S, Iusitini L. Pacific Islands Families Study: Intimate Partner Violence and Postnatal Depression. *Journal of Immigrant and Minority Health* 2010;**12**: 242-8.
45. Gao W, Paterson J, Carter S, Iusitini L. Intimate partner violence and unplanned pregnancy in the Pacific Islands Families Study. *International Journal of Gynecology & Obstetrics* 2008 February;**100**(2): 109-15.
46. Paterson J, Carter S, Gao W, Cowley-Malcolm E, Iusitini L. Maternal intimate partner violence and behavioural problems among Pacific children living in New Zealand. *Journal of Child Psychology and Psychiatry* 2008 April;**49**(4): 395-404.
47. Paterson J, Fairbairn-Dunlop P, Cowley-Malcolm ET, Schluter PJ. Maternal Childhood Parental Abuse History and Current Intimate Partner Violence: Data From the Pacific Islands Families Study. *Violence and Victims* 2007 August;**22**(4): 474-88.
48. Schluter PJ, Paterson J. Relating intimate partner violence to health-care utilisation and injuries among Pacific children in Auckland: The Pacific Islands Families Study. *Journal of Paediatrics and Child Health* 2009 21 August;**45**(9): 518-24.
49. Perese LM, Bellringer ME, Williams MM, Abbott MW. Two years on: Gambling amongst Pacific mothers living in New Zealand. *Pacific Health Dialog: Journal of Community Health and Clinical Medicine for the Pacific* 2009;**15**(1): 55-67.
50. Schluter PJ, Abbott MW, Bellringer ME. Problem Gambling related to Intimate Partner Violence: findings from the Pacific Islands Families Study. *International Gambling Studies* 2008 April;**8**(1): 49-61.
51. Erick-Peleti S, Paterson J, Williams M. Pacific Islands Families Study: maternal factors associated with cigarette smoking amongst a cohort of Pacific mothers with infants. *New Zealand Medical Journal* 2007 15 June;**120**(1256).
52. Schluter P, Tautolo E-S, Paterson J. Acculturation of Pacific mothers in New Zealand over time: findings from the Pacific Islands Families study. *BMC Public Health* 2011;**11**(1): 307.
53. Borrows J, Williams M, Schluter P, Paterson J, Langitoto Helu S. Pacific Islands Families Study: The Association of Infant Health Risk Indicators and Acculturation of Pacific Island Mothers Living in New Zealand. *Journal of Cross-Cultural Psychology* 2011 July 2011;**42**(5): 699-724.
54. Rush EC, Paterson J, Obolonkin VV, Puniani K. Application of the 2006 WHO growth standard from birth to 4 years to Pacific Island children. *International Journal of Obesity* 2008 March;**32**(3): 567-72.



55. Rush E, Gao W, Funaki-Tahifote M, et al. Birth weight and growth trajectory to six years in Pacific children. *International Journal of Pediatric Obesity* 2010;**5**(2): 192-9.
56. Schluter P, Oliver M, Paterson J. Perceived barriers and incentives to increased physical activity for Pacific mothers in New Zealand: findings from the Pacific Islands Families Study. *Australian and New Zealand Journal of Public Health* 2011;**35**(2): 151-8.
57. Oliver M, Schluter PJ, Schofield GM, Paterson J. Factors Related to Accelerometer-Derived Physical Activity in Pacific Children Aged 6 Years. *Asia-Pacific Journal of Public Health* 2011;**23**(1): 44-56.
58. Rush E, Puniani N, Snowling N, Paterson J. Food security, selection, and healthy eating in a Pacific Community in Auckland New Zealand. *Asia Pacific Journal of Clinical Nutrition* 2007 September;**16**(3): 448-54.
59. Cowley-Malcolm ET, Fairbairn-Dunlop TP, Paterson J, Gao W, Williams M. Child discipline and nurturing practices among a cohort of Pacific mothers living in New Zealand. *Pacific Health Dialog: Journal of Community Health and Clinical Medicine for the Pacific* 2009;**15**(1): 36-45.
60. Iusitini L, Gao W, Sundborn G, Paterson J. Parenting Practices Among Fathers of a Cohort of Pacific Infants in New Zealand. *Journal of Cross-Cultural Psychology* 2011 January;**42**(1): 39-55.
61. Schluter PJ, Sundborn G, Abbott M, Paterson J. Smacking—are we being too heavy-handed? Findings from the Pacific Islands Families Study. *New Zealand Medical Journal* 2007 14 December;**120**(1267).
62. Tautolo E-S, Schluter PJ, Sundborn G. Mental health well-being amongst fathers within the Pacific Islands Families Study. *Pacific Health Dialog: Journal of Community Health and Clinical Medicine for the Pacific* 2009;**15**(1): 69-78.
63. Gao W, Paterson J, Abbott M, Carter S, Iusitini L. Maternal mental health and child behaviour problems at 2 years: findings from the Pacific Islands Families Study. *Australian and New Zealand Journal of Psychiatry* 2007;**41**(11): 885-95.

*“Try not to become a man of success
but a man of value”*

Albert Einstein

