

PREVENTING CHRONIC DISEASES THROUGH PHYSICAL ACTIVITY  
IN THE PACIFIC ISLANDS  
A WORKPLACE HEALTH PROMOTION PROGRAMME IN VANUATU

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A THESIS SUBMITTED TO  
AUCKLAND UNIVERSITY OF TECHNOLOGY  
IN FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
DOCTOR OF PHILOSOPHY

2012

School of Public Health and Psychosocial Studies

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## List of Acronyms and Abbreviations

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<b>Abbreviation</b>	<b>Definition</b>
AIDS	acquired immune deficiency syndrome
APPAN	Asia Pacific Physical Activity Network
AUD	Australian Dollar
AUSAID	Australian Government Overseas Aid Programme
BMI	body mass index
BP	blood pressure
CBPR	community-based participatory research
CRP	crisis response package
CVD	cardiovascular disease
DBP	diastolic blood pressure
DVT	data visualisation technique
FAO	Food and Agriculture Organization
GDP	gross domestic product
GAPA	Global Advocacy for Physical Activity
GNI	gross national income
HBLPY	health behaviour and lifestyle of Pacific youth
HDL	high density lipoprotein
HIC	high-income country
HIV	human immunodeficiency virus
HR	high-risk
ILO	International Labour Organization

LDC	least developed country
LDL	low-density lipoprotein
LMIC	low- and middle income country
LR	low-risk
NCD	non-communicable disease
NGO	non-governmental organisation
NZAID	New Zealand International Aid & Development Agency
OPIC	Obesity Prevention in Communities
PA	physical activity
PICs	Pacific Island countries and areas
RE-AIM	Reach Effectiveness Adoption Implementation Maintenance
SBP	systolic blood pressure
SD	standard deviation
SES	socio-economic status
STEPS	STEPwise approach to surveillance
SPC	Secretariat for the Pacific Community
SWOT	strengths, weaknesses, opportunities and threats
TRA	Theory of Reasoned Action
UK	United Kingdom
UN	United Nations
USA	United States of America
WHO	World Health Organization
WHO SP	World Health Organization Office of the South Pacific
WPRO	World Health Organization Western Pacific Regional Office

WTO

World Trade Organization

## Research outputs arising from thesis

Below is a summary of the peer-reviewed publications, one book chapter, five conference presentations and two World Health Organization (WHO) reports that have resulted from this thesis, in addition to the publications currently under review.

Chapters 3, 4, 6 and 7 of this thesis are academic papers, either published or under review in peer-reviewed journals. The contribution of each author is presented below.

Chapter 3 (Study 1) Siefken K, Macniven R, Schofield G, Bauman A, Waqanivalu T. A stocktake of physical activity programmes in the Pacific Islands. *Health Promotion International*. 2012;27(2):197-207. Contributions: Siefken (70%), Macniven (15%), Schofield (5%), Bauman (5%), Waqanivalu (5%).

Chapter 4 (Study 2) Siefken K, Schofield G, Schulenkorf N. Laefstael jenses: An investigation of barriers and facilitators for healthy lifestyles of women in an urban Pacific Island context. *Accepted for publication by the Journal of Physical Activity and Health*. 2012. Contributions: Siefken (70%), Schulenkorf (20%), Schofield (10%).

Chapter 6 (Study 3) Siefken K, Schofield G, Schulenkorf N. Novel techniques to visualise evaluation data and to communicate health promotion programme successes and challenges – a strategy to engage health practitioners in the South Pacific. *Submitted to Health Promotion International*, 2012. Contributions: Siefken (80%), Schofield (10%), Schulenkorf (10%).

Chapter 7 (Study 4) Siefken K, Schofield G, Malcata R. Engaging urban Pacific women in healthy lifestyle behaviour. An outcome evaluation of a workplace-based physical activity intervention in Vanuatu. Submitted to *Journal of Sport for Development*, 2013. Contributions: Siefken (60%), Schofield (20%), Malcata (20%).

Chapter 8 of this thesis has been published as a book chapter.

Chapter 8 Siefken K, Schofield G, Schulenkorf N. Inspiring Pacific women to realise sustainable lifestyle changes: an attempt to halt the spread of chronic diseases". In: Schulenkorf N, Adair D, eds. *Global Sport-for-Development: Critical Perspectives*: Palgrave Macmillan; 2013. Contributions: Siefken (80%), Schofield (10%), Schulenkorf (10%).

The following conference presentations resulted from this thesis.

### **Academic conference presentations**

1. Be Active 2012, International Congress on Physical Activity and Public Health, October 2012, Sydney, Australia  
Siefken K, Schofield G (2012). Presentation: "Physical Activity Intervention Research in the Pacific – What works?"
2. Be Active 2012, International Congress on Physical Activity and Public Health, October 2012, Sydney, Australia  
Siefken K, Schofield G, Schulenkorf N. (2012). Poster presentation: "Women's' healthy lifestyle behaviour in urban Vanuatu – an in-depth investigation".
3. Annual Meeting of the International Society for Behavioural Nutrition and Physical Activity (ISBNPA), June 2011, Melbourne, Australia  
Siefken K, Presentation at the symposium *Physical Activity Research in Developing Countries – What are the opportunities and challenges?* "Engaging low-active women in physical activity in urban Vanuatu: a workplace intervention".
4. 20th IUHPE World Conference on Health Promotion. July 2010, Geneva, Switzerland  
Siefken K, Schofield G, Waqanivalu T, Macniven R, Bauman D. (2010). Poster presentation: "Walk for Life Policy - a government based workplace physical activity programme in Vanuatu".
5. 3rd ICPAPH International Congress on Physical Activity and Public Health. May 2010, Toronto, Canada  
Siefken K, Macniven R, Schofield G, Bauman A, Waqanivalu T. (2010). Poster presentation: "A stocktake of physical activity programmes in the Pacific Islands".

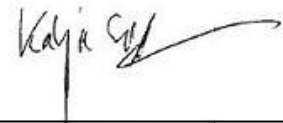
The following WHO technical reports have been prepared during the research project and form part of this thesis. The full reports can be found in Appendix L and N.

### **WHO reports**

1. Siefken K, Schofield G. *Wokabaot Jalens: A workplace healthy lifestyle intervention for female civil servants in Port Vila, Vanuatu, 2011*. Report for the World Health Organization South Pacific Office. Auckland; 2011.
2. Schofield G, Siefken K. *Assessment: Walk for Life Policy Vanuatu Government Public Service*. Report for the World Health Organization South Pacific Office. Auckland; 2009.

## **Attestation of Authorship**

"I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning."

A handwritten signature in black ink, appearing to read 'Katja Siefken', with a long horizontal flourish extending to the right.

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Katja Siefken, December 2012

## **Acknowledgements**

The completion of this doctoral thesis was only possible with the support of several people and institutions.

First and foremost I would like to thank AUT University for awarding me a Graduate Assistantship, which included the provision of funding for PhD fees. I would further like to thank the AUT University Ethics Committee for the ethical approval of this research.

I am extremely grateful to my research supervisor - Professor Grant Schofield - for his valuable guidance, scholarly inputs and the consistent encouragement he provided throughout the academic journey. Thank you for being part of this adventurous research project.

I am thanking Professor Peggy Fairbairn-Dunlop for her role as a second supervisor and for her invaluable Pacific input into this thesis.

I am likewise particularly thankful for having Dr Nico Schlenker on board throughout my research. His guidance on qualitative methods was outstanding. Further, he proved to be a fantastic travel companion and I hope that there are more trips to come.

This thesis was largely supported by the World Health Organization and I would like to express my gratitude for their generous support and trust. Thank you, Dr Gauden Galea and Dr Tim Armstrong for sending me from Geneva to Fiji in the first instance. I also owe a "vinaka vakalevu" to Dr Temo Waqanivalu for welcoming me in Fiji with open arms, for enticing my interest in Pacific public health, and eventually, for supporting my ideas in intervention research.

My field studies were greatly facilitated by the organisational and administration skills of Josephine Prasad. Thank you for your ongoing patience and endless support.

I would like to acknowledge the trust I received from Dr Len Tarivonda, Jerry Iaruel and Hillary Garae at the Ministry of Health in Vanuatu. Your cooperation was outstanding. Thank you to the Ministry of Health personnel and health students who assisted in the conduct of health screenings.

To all the research participants a sincere "tank yu tumas". Thank you "bigwan" for your interest, honesty, insights, and your willingness to participate in my research projects by sharing your experiences and ideas with me.



On a more personal note, I would like to express my gratitude to my family and friends.

I was privileged to learn from my brother Sven and his family who have consistently supported my plans and dreams throughout the years. Thank you for your continued life guidance.

Particular gratitude goes to my parents, Astrid and Peter, who supported me at every stage of my personal and academic life – all over the world. Thank you for giving me the wings and the roots. Hamburg is home and always will be.

And finally, a big “vinaka vakalevu” to Elina and Peni who have also supported and encouraged me in every possible way to enable me to complete this work. Thank you for providing a healthy distraction and for bringing your authentic mentality into our house – priceless for Pacific research.

## Preamble

Metaphors of the *niu* (coconut plant) are often used (by Pacific people in Pacific cultures) to describe a vision and philosophy of Pacific health, well-being and development which can help understand the Pacific health crisis. Among the different Pacific Island countries and areas, an abundance of proverbs and beliefs exist for the coconut tree. Clearly, the coconut tree is slim in shape, strong and versatile in structure, provides healthy juice for the offspring and can be used in a number of ways to secure Pacific lifestyles. The majority of Pacific people of today have lost the metaphorical resemblance to the coconut trees. Once physically fit, muscular and flexible and relatively free of nutritional deficiencies or disorders, the Pacific people used to be healthy and strong individuals. Now the trend towards the opposite not only poses health and economic challenges to the nations but also threatens Pacific identity. The Fijian proverb “Tea nikua me baleta na nomu mataka” highlights the need for sustainable and healthy living.<sup>1</sup> It means *Plant today for your tomorrow* and underpins the traditional understanding of health and well-being. The verb ‘plant’ implies the need to make a difference through some form of action. With this thesis I strive to inspire and engage Pacific people to rethink their lifestyles and move to significant changes. I am hoping to reach relevant decision and policy makers that endeavour to generate positive change in their communities and nations. A reaction to the Pacific emergency that was declared in 2011 by delegates at the Pacific Island Forum in Fiji is overdue and urgently needed.



## Thesis abstract

"It's an emergency!" delegates declared in 2011 at the Pacific Island Forum in Fiji, convened by the Secretariat of the Pacific Community and the World Health Organization Office of the South Pacific.<sup>2</sup> The emergency referred to the ever-increasing burden of non-communicable diseases (NCDs) in the Pacific Islands. The Pacific region is experiencing among the highest prevalence of NCD risk factors in the world.<sup>3-6</sup> American Samoa, Tokelau and Nauru have overweight and obesity rates of 93.5%,<sup>7</sup> 86.2%,<sup>8</sup> and 82.2%<sup>9</sup> and diabetes rates are 47.3% in American Samoa,<sup>7</sup> 33.6% in Tokelau,<sup>8</sup> and 32.1% in Micronesia.<sup>10</sup> A total of 70% of the global increase in diabetes is expected to occur in the Asia Pacific region. The Pacific Island countries and areas are predicted to experience among the greatest increases in diabetes prevalence worldwide.<sup>11,12</sup>

Urbanisation, westernisation, and rapid changes in food supply and security have contributed to obesogenic<sup>i</sup> environments in the PICs. These environments support poor diets and high levels of physical inactivity. Supporting the good health of Pacific populations by encouraging and facilitating the adoption of healthier lifestyles is therefore of utmost importance. This doctoral work is the first in the specific area of physical activity health promotion in the Pacific Islands that seeks to understand and increase PA levels and reduce NCD risk.

The thesis consists of nine separate but related chapters. Following the introduction in Chapter 1, a literature review in Chapter 2 provides background information on a number of research contexts, relevant for the thesis presented. The initial step was then to identify current practice in PA and healthy lifestyle promotion strategies and interventions in all 22 PICs. Therefore, Chapter 3 describes PA programmes in 20 out of 22 PICs. Eighty-four PA programmes were identified to be in existence in 2010; twenty-six of those were implemented in the workplace setting. Whilst monitoring and evaluation mechanisms are important to enhance programme effectiveness and to improve population health,<sup>14,15</sup> findings from this study showed no evidence of monitoring and evaluation approaches in the region.

As a first step to respond to the absence of evaluation work, a formative evaluation of a healthy workplace programme in Port Vila, Vanuatu, was carried out. The aim was to understand the impact of an existing programme that commenced in 2007 (Appendix L). Findings indicate that Ni-Vanuatu women are at particular risk for physical inactivity<sup>16</sup> and as such, are at higher risk for negative health consequences.<sup>17</sup> This outcome was used to tailor a specific PA intervention for these women in greater detail.

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<sup>i</sup> Obesogenic: factors that promote weight gain.<sup>13</sup>

Chapter 4 responds to the lack of empirical evidence on lifestyle behaviour and presents formative work carried out with Ni-Vanuatu<sup>ii</sup> female civil servants. The study identifies barriers and facilitators for the engagement in PA and for the adoption of healthier lifestyles in urban Ni-Vanuatu women. Findings indicate that team-based walking activities are the preferred mode of PA for the target group in Vanuatu. Further, fun-centred approaches may prove effective in increasing PA behaviour. Identified barriers include time, financial limitations, family commitments, environmental aspects and motivational hindrances. These findings were used to design a culturally-meaningful workplace PA programme that responds to local realities and needs.

The workplace-based PA intervention is described in detail in Chapter 5. In summary, a team-based pedometer challenge titled *Wokabaot Jalens* (Walking Challenge) was designed in collaboration with Ni-Vanuatu female civil servants. The 12-week intervention was implemented with 207 participants in Port Vila, Vanuatu, in April 2011. As an important part of the intervention, local leaders were trained to a) collect accurate data and b) take ownership of the programme after the monitored phase had terminated. Baseline (N=207) and follow-up (N=133) health screenings were conducted to understand the physical effect of the intervention. Pedometers provided an objective measure of PA behaviour.

Overall, pedometer-based research has predominantly focused on outcomes, with limited or no information regarding programme processes.<sup>19,20</sup> A process evaluation was conducted in Chapter 6 to understand the effectiveness of the intervention and to provide recommendations for the adjustment and design of future programmes. A novel technique of visualising complex data is provided and a new approach in health promotion research is presented. The new thematic data visualisation (TDV) approach aids non-academics in understanding scientific data in a simple way. This may engage local health practitioners and potential donor agencies to support and initiate future action. Evaluation findings indicate that likert-scale questions have little value in PICs which is assumed to be due to a cultural inclination to assent with external ideas. Open-ended questions, however, revealed more information. Thematic findings indicate that positive health outcomes are the most desired programme effect; that unmotivated team members were considered as counterproductive; that an expansion of the programme to the wider community was the dominant suggestion for programme improvement; and that motivational issues were the biggest challenge for programme participation.

Previous research (Australia,<sup>21</sup> USA<sup>22</sup>) indicates that walking interventions can be effective, at least in the short term, to increase PA levels in women. However, no research has been

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<sup>ii</sup> Ni-Vanuatu is a demonym used to refer to the indigenous population of Vanuatu.<sup>18</sup>

undertaken to understand whether this strategy is effective in Pacific women. The efficacy of the *Wokabaot Jalens* was therefore assessed in Chapter 7. Qualitative and quantitative probabilities were calculated to assess the magnitude of inference. Conclusions are based on inferential statistics that emphasise precision of estimation rather than null hypothesis testing (P values). Overall, a positive effect was identified for PA behaviour which increased by 26.1% (2,513 ± 6,922). High risk individuals benefitted most from the intervention: a large positive effect was identified for PA behaviour (large, +229%). Positive effects were also found for waist circumference (moderate, -6.2%) serum glucose (small, -15.9%) and triglycerides (moderate, -31.%).

Chapter 8 provides an ethnographic investigation that describes the challenges and successes of managing health promotion programmes experienced by the researcher in different PICs (Vanuatu, Tuvalu, Tonga, Kiribati), taking cultural values into consideration. In particular, programme logistics, on-site issues, opportunities and challenges for health promotion programme sustainability, limitations and success stories are reported. The previously designed intervention from Vanuatu serves as an example to describe hands-on experience. Context specific issues that were observed during Pacific health promotion initiatives were categorised into thematic findings and classified as individual, cultural and external barriers and facilitators. Whilst individual issues (attitude, perception, acceptance, distribution) were largely identified as facilitators for health promotion action, cultural (structures, communication, language, gender, dress code, data precision) and environmental issues (climate, funding, conduct, geographical remoteness) may challenge health promotion efforts. The presentation of this reflective praxis is intended to aid future practitioners and researchers in programme design, management and evaluation and seeks to enhance collaboration with local personnel and authorities.

Finally, Chapter 9 describes the intricacies of external factors responsible for the Pacific health crisis. These include genetic susceptibilities, globalisation and contemporary environments, a heavy dependence on external aid, a limited Pacific health workforce, underfunded political systems, and last but not least individual lifestyle behaviours and choices. The chapter concludes that only culturally-centred health promotion approaches which take the attitude and belief system into account are realistic to result in Pacific health progress.

In summary, this doctoral work provides the first robust approach of evidence-based solutions for PA health promotion efforts in the Pacific region. This work is valuable in the context of the absence of evidence around programme efficacy, and other formative and process evaluation

seen as best practice in health promotion. Yet it is hard to see an optimistic future in controlling the spread of NCDs in the region because of the complexities involved.

If a medical emergency is defined as a large amount of human suffering and preventable premature death, then yes, the PICs are in a state of medical emergency. The current state will likely remain until profound social and economic changes are set into process.

# CHAPTER 1

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## Introduction

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### Preface

Making a difference and creating change has always been a major aspiration of mine. Having lived and worked in several low- and middle-income countries (LMICs) in different parts of the world, I had the opportunity to experience firsthand how people in these countries struggle to achieve health and well-being. My academic background and work in physical activity, public health and health promotion helped me understand that 'health is the true 'wealth of nations'', as highlighted by the economist Irving Fisher in 1906. I was privileged to gain internships and therefore work experience with the World Health Organization, both from a headquarters (Geneva, 2007) and a country office perspective (Dominican Republic, 2005; Fiji 2008). It was here that I understood fully that NCDs largely affect poor countries. My next goal was clear and I decided to delve deeper into the field of NCD prevention in LMICs.

Moving to Fiji in 2008 ultimately led me to the embarking on this thesis. I was captivated by the Pacific ambience, both on a personal and professional level. The readily available fresh produce from the local market caught my full attention and it took no time to convince me of the nutritional qualities of Pacific food. Visiting the local market and walking home with bags full of fresh produce became a regular activity. I often thought how lucky I was to live in such a healthy place. Living with the locals, however, soon resulted in a different picture. I was exposed to many personal stories, most of them revolving around poor health and resulting problems, mainly related to chronic disease. Stories of friends and their family members, in their 40s dying of diabetes or strokes were frequent. Observing local lifestyles in detail helped me understand the issues to a greater extent and I soon discovered that lifestyle behaviour is not merely the individual's choice, but is shaped by a number of external influences.

Strategies to generate change are described and understood well in health promotion research.<sup>23</sup> Most of the knowledge and evidence available stems from research conducted in high-income countries (HICs) with good health and media infrastructure, generous resources

and high levels of awareness and education. These three factors provide a sound base for health promotion for the approaches known. However, it is not known how to generate change in communities where these pillars are either non-existent or weak. To bring about health changes in the Pacific region, it is essential to define strategies that work in contexts where there is little infrastructure, limited financial resources and/or human resource capacity (limited levels of education) for both project partners and participants.

Clearly, there is not one single solution to the NCD challenge; it is a complex problem. The Greek physician Herophilos highlighted the interrelation between health and well-being in saying "When health is absent, wisdom cannot reveal itself, art cannot manifest, strength cannot fight, wealth becomes useless, and intelligence cannot be applied" (335-280 BC). This thesis seeks to advocate a holistic change in Pacific well-being by providing robust evidence for effective health promotion approaches in the region.



## Statement of problem

The following section presents problems and challenges essential to understanding the constraints that contribute to ill-health in the Pacific region. A number of factors are described below to enable the reader to comprehend the objective and direction of this thesis. A brief summary of global health trends is provided, followed by information about the causes and consequences of chronic diseases. Their impact on LMICs is presented, highlighting that 80% of all chronic diseases occur in LMICs.<sup>24</sup> The origins and extents of the burden of chronic diseases in PICs are further explored. The author continues with a brief section on relevant research that is imperative for understanding the thesis' context in greater detail. Whilst evidence for optimism is emphasised, a dearth of Pacific research that impedes health promotion progress in the region is highlighted. A more detailed analysis of these issues is presented in the literature review in Chapter 2.

Over the past several decades, a remarkable shift in lifestyle<sup>iii</sup> behaviour has occurred in the world's population.<sup>26</sup> These changes result from modernisation, rapid urbanisation and the globalisation of unhealthy lifestyle behaviour, each minimising physical exertion and creating unhealthy environments.<sup>27-31</sup> Lifestyle behaviour modifications lead to a shift in disease patterns. Whilst infectious diseases have threatened human survival since the beginning of human history, and life expectancy was limited by uncontrolled epidemics, the industrial revolution with its development of new technologies caused a change in disease patterns: success in terms of vaccination, antibiotics and improvements in living conditions were achieved through medical research and life expectancies increased.<sup>32</sup> A global unprecedented demographic transition and an overall increase in life expectancy has resulted in a significant change in mortality patterns. Chronic diseases started to develop unnoticed in individuals and have by now overtaken infectious diseases.<sup>33</sup> In fact, chronic diseases present a leading threat to human survival in today's global society.<sup>34</sup> Whilst in 1990 the majority of the leading causes of death were classified as communicable diseases, a shift in mortality pattern has occurred so that in 2010 the top leading causes of death are chronic diseases.<sup>33</sup> The challenges to overcome these diseases are unprecedented in scope and complexity. Apart from threatening the health of the global population, economies are endangered<sup>35,36</sup> and the viability of health care systems<sup>37</sup> is being questioned.

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<sup>iii</sup> Lifestyle: The behaviour pattern, customs, and habits of persons or groups, generally considered in the context of consequences for health, and including nature and amount of exercise, dietary habits, and use of tobacco, alcohol, coffee, tea, stimulants and sedative substances (licit or illicit), and recreational time.<sup>25</sup>

Importantly, whilst many chronic diseases develop slowly, changes in lifestyles and behaviours are occurring with a stunning speed. Human biology struggles to adjust to the new trends of modern society. The primary mismatches between human biology and modern society have been identified as a preference for sweet and fatty food, combined with a dysfunction of thirst/hunger satiety mechanisms and a tendency to eliminate any kind of physical exertion.<sup>38</sup> Energy expenditure has fallen greatly with economic development and rapid urbanisation, resulting in more sedentary occupations, increased sedentary leisure options, greater use of motorised transport and less activity in daily chores. Concurrently, energy intake has increased with globalised food supply systems.<sup>39</sup>

Chronic diseases, also known as non-communicable diseases (NCDs), are globally causing more deaths than all other causes combined.<sup>31</sup> Four NCDs are the leading contributors to the global NCD epidemic: cardiovascular diseases (CVDs), cancers, chronic respiratory diseases and diabetes.<sup>24</sup> These four diseases cause an estimated 35 million deaths each year - 63% of all deaths globally.<sup>40</sup> The number of deaths from NCDs is estimated to be double the number of deaths that result from a combination of infectious diseases (including HIV/AIDS, tuberculosis and malaria), maternal and perinatal conditions, and nutritional deficiencies.<sup>41</sup> The proportion of deaths from NCDs is predicted to rise globally from 60% in 2002 to 66% in 2030.<sup>42</sup> If no concerted action is taken, NCD mortality rates will increase by 17% over the next ten years.<sup>34</sup> Without doubt, NCDs present a leading threat to human health and development.<sup>43</sup>

These developments are relevant not only in medical but also in economic terms. Global data project that NCDs will cost more than US\$30 trillion in the next 20 years.<sup>44</sup> These estimates refer to direct attributable health costs only and do not take indirect costs (e.g. absence of work) into consideration. Importantly, 80% of all NCDs affect the world's LMIC populations.<sup>24</sup> Data from 23 LMICs estimate that in these countries alone, US\$84 billion will be lost from economic production as a result of prevailing NCDs.<sup>45</sup>

The burden of NCDs in LMICs is substantial. People in these countries tend to develop the diseases at a younger age, suffer longer and die sooner than people in higher income countries.<sup>46</sup> In the past 20 years, the rates of obesity in LMICs have tripled.<sup>47</sup> Diabetes rates are projected to increase by 170% in LMICs, as opposed to 40% in HICs.<sup>48</sup> In fact, 60% of the diabetic world population sits in Asia.<sup>49</sup> NCD mortality rates in middle-aged people (36–64 years) are higher in LMIC than in HICs.<sup>50</sup> and the prevalence of NCDs is predicted to increase substantially in the future in LMICs.<sup>31,48,51–53</sup> Importantly, the WHO projects that the highest absolute number of deaths caused by NCDs will occur in the Western Pacific and South-East Asia regions.<sup>34</sup>

Despite, or because of, their remoteness, the Pacific region has not been excluded from the global pandemic<sup>iv</sup> of NCDs. In fact, since the onset of colonisation and missionary involvement, the PICs have experienced severely high increases in NCD risk factors. As of today, 75% of all deaths in the PICs are attributable to NCDs.<sup>55</sup> Western influences eventually lead to a rise to dominance of commercialisation and consumerism which had significant impacts on Pacific population health; since the 1950s, PICs are experiencing profound epidemiological transitions.<sup>56–59</sup> Obesity levels have reached epidemic proportions in some communities.<sup>60</sup> and it is assumed that this trend results from modernisation and urbanisation; a composite of interactions of numerous physical, biological and socio-cultural processes, which brought lifestyle changes to the populations,<sup>30,57,60–70</sup> particularly in urban settings.<sup>58,60,65,71,72</sup> In terms of diet, physical activity (PA) and health, which are core areas of focus for this thesis, there have been two major lifestyle changes in PICs:

1. Dietary change: root crops were mostly replaced by white rice and bread. Fresh fish was largely replaced by tinned meat, the consumption of fruit and vegetables decreased, while the consumption of sugar, oil, salt, refined cereals and alcohol increased<sup>65,73,74</sup>;
2. Activity change: physical labour on the field or sea was largely replaced by the availability/use of electronic machines. A move to urban centres has led to an increase in sedentary occupations, the use of motorised transport and to a reduction in PA levels.<sup>56,75,76</sup>

Along with these lifestyle changes, the PICs experienced a major shift in disease patterns: NCDs have overtaken communicable diseases and are a critical health and development issue.<sup>65,77,78</sup> Diseases such as diabetes and hypertension which were uncommon in traditional Pacific cultures occur nowadays in many urban Pacific populations, at rates exceeding those in the affluent industrialised countries. The recently published Global Burden of Disease study indicates a substantial change in mortality patterns that was experienced between 1990 and 2010: whilst the four leading causes of death in 1990 were infectious diseases, three out of four deaths in 2010 were NCDs.<sup>33</sup> A genetic predisposition to develop NCDs contributes to the high NCD prevalence in the region.<sup>66</sup> Genetic factors cannot yet be modified as such. This is where holistic lifestyle interventions come into place. The current environment in many Pacific centres is toxic and supports unhealthy lifestyle behaviour through the current food supply system, physical environments, socio-cultural norms and other factors. But it is modifiable and urgently needs changing to reverse the current health trend.

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<sup>iv</sup> Pandemic: An epidemic that becomes very widespread and affects a whole region, a continent, or the world.<sup>54</sup>

Each of the six published STEPS<sup>v</sup> reports from the Pacific (American Samoa, Fiji, Kiribati, Micronesia, Nauru and Tokelau) reveals that Pacific women are at higher NCD risk than their male counterparts: women show higher physical inactivity rates, have a higher mean BMI and higher percentages of overweight and obesity.<sup>7-10,80,81</sup> Whilst empirical research to investigate and explain these differences in detail is largely absent, it is assumed that prevailing gender inequality and cultural gender roles contribute to the variation in NCD risk factor prevalence.

Since the 1990s there has been increasing recognition of the important role played by women in NCD prevention and control programmes in the PICs.<sup>77</sup> Pacific women generally determine the family's diet and the way food is prepared and can thus have a lasting impact on family health. They are further involved in community life through women associations and Church groups.<sup>77</sup> Targeting health interventions at Pacific women can therefore be favourable in terms of community health progress.

Poor health is likely to have detrimental effects on the small PICs and their national health care resources: due to weak economic performances of several PICs, it may lead to significant economic and social constraints.<sup>82</sup> Importantly, the author understands that a global increase in life expectancy, due to reduction in infant mortality, advances in health care and medicine and improved living standards and education, has partly caused an increase in NCD mortality data; therefore mortality data need careful interpretation. For example, from 1992 to 2010, the total life expectancy has increased by five years in the PICs. In 2010, life expectancy was 72 for women and 67 for men.<sup>83</sup> Whilst this phenomenon is important to acknowledge, it is also clear that there have been changes in mortality trends due to NCDs and lifestyle behaviour.<sup>84</sup>

Premature mortality needs crucial consideration when evaluating the impact of NCDs on any given population. Globally, approximately 44% of all NCD deaths occur before the age of 70. Premature deaths put families and societies at large at risk. Importantly, premature mortality is higher in LMICs (48% of all deaths are estimated to occur in people under the age of 70) than in HICs (26% of all deaths are estimated to occur in people under the age of 70).<sup>24</sup> Importantly, the rates of premature mortality from NCDs in the Pacific Islands are generally higher than in other LMICs.<sup>85</sup> It is without doubt that interventions are needed to reduce and prevent further premature deaths in the region.

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<sup>v</sup> STEPS survey: The WHO STEPwise approach to Surveillance (STEPS) is a simple, standardised method for collecting, analysing and disseminating data in WHO member countries.<sup>79</sup>

## Relevant research

Despite the escalating global health problems, there are reasons for some cautious optimism: evidence is available that a significant proportion of NCD morbidity, disability and premature deaths can be prevented through population-based lifestyle interventions and the control of common risk factors.<sup>55,86,87</sup> Modifiable NCD risk factors have been identified as unhealthy diets, physical inactivity, tobacco- and alcohol-abuse.<sup>78,88,89</sup> The WHO estimates that up to 80% of heart disease, stroke, and type 2 diabetes and over a third of cancers can be prevented by eliminating these shared risk factors.<sup>34</sup> Preventive efforts can avert at least 36 million premature deaths by 2015.<sup>41</sup> As an example, a detailed focus on prevention and treatment following cardiovascular events has led to significant declines in mortality rates in HICs: mortality rates from heart disease have decreased by approximately 70% in the past three decades in Australia, Canada, Japan, the UK, and the USA.<sup>27</sup> On the contrary, LMIC's focus of health care for NCDs is often hospital-centred acute care, which is a very expensive approach and the chances of reducing the NCD burden are negligible.<sup>31</sup> Finding ways to implement interventions and to incorporate them into policy and practice in LMICs remains a challenge. Furthermore, interventions at the micro level remain under-researched and whilst evidence on health promotion strategies is readily available, the large majority of findings stem from research conducted in high income countries.

The effect of workplace health interventions has been studied in great detail and their potential for positively affecting employees' health is clear.<sup>90-92</sup> The benefits of workplace health promotion approaches from a public health perspective are also well understood. In 1986, the Ottawa Charter for Health Promotion defined the workplace as a priority setting for health promotion.<sup>93</sup> The exclusion of certain individuals (i.e. unemployed individuals) is a limitation in workplace health promotion and may contribute to an increase in health inequalities.<sup>94</sup> No evidence is available for the effectiveness of workplace-based health interventions from the Pacific region and little is known about whether cultural aspects (e.g. gender issues, values, norms) may hinder or promote effectiveness in this context.

PA is widely recognised as an important component of healthy lifestyle behaviour and a key strategy to reducing NCD risk.<sup>86,95,96</sup> and a plethora of evidence on the health benefits of regular PA is available. Regular PA is associated with several benefits to overall health.<sup>95,97-102</sup> Epidemiological research has demonstrated protective effects between PA and NCD risk factors including coronary heart diseases, hypertension, non-insulin-dependent diabetes mellitus, osteoporosis, colon cancer, and anxiety and depression.<sup>103</sup> PA is also a key element in obesity

prevention,<sup>104</sup> is a critical component of energy balance and it is associated with positive mental health.<sup>105</sup>

Lifestyles, marked by physical inactivity have adverse health effects and are associated with markedly increased all-cause mortality rates.<sup>103</sup> Physical inactivity increases with age and is more prevalent in women than in men.<sup>106</sup> Large differences exist between countries and cultures. For example, global PA surveys indicate that physical inactivity levels<sup>vi</sup> are as high as 27.5% in Africa, 43.4% in the Americas, 43.2% in the eastern Mediterranean countries, 34.8% in Europe, 17.0% in South-East Asia, and 33.7% in the Pacific region.<sup>106</sup> Estimates were obtained from the WHO global health observatory data repository.<sup>108</sup>

PA can be measured through a variety of tools. To avoid social desirability bias<sup>vii</sup> that may result from self-reported PA data, objective measurement of PA is important. Pedometers have become popular tools to monitor individual PA levels and interventions that have used pedometers have been described as successful in increasing PA levels and reducing NCD risk.<sup>19,110-113</sup> Several tools are available to monitor PA levels (e.g. pedometers, accelerometers, self-reports, SenseCam), each with its own strengths and limitations. Pedometers provide the best unit of measurement in this context and whilst not being 100% accurate, pedometers provide a realistic estimate of step numbers.

The majority of research-oriented health intervention efforts have been conducted in HICs and little is known about the effect and feasibility of such programmes in countries with less infrastructure, divergent cultural values, fewer financial opportunities, culturally diverse populations and often different life priorities and expectations.

Step count data offer researchers a convenient tool for the objective measurement of PA. It is assumed that urban and rural pedometry data differ greatly within LMICs, given that physical labour is more prevalent in rural areas; that rural transport mechanisms are limited; and that technology is largely restricted in rural regions. Further, it is assumed that participation in leisure time PA is lower in individuals with lower socio-economic status (SES).<sup>114</sup> However, other forms of PA may be performed in the context of transport, occupational or domestic activities, thus PA levels may suffice for healthy lifestyle behaviour. Overall, PA research in a Pacific Island context is scarce. An investigation of PA levels within an urban Pacific context is considered indispensable for effective health promotion action.

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<sup>vi</sup> Physical inactivity is defined as doing no or very little activity at work, at home, for transport, or in discretionary time.<sup>107</sup>

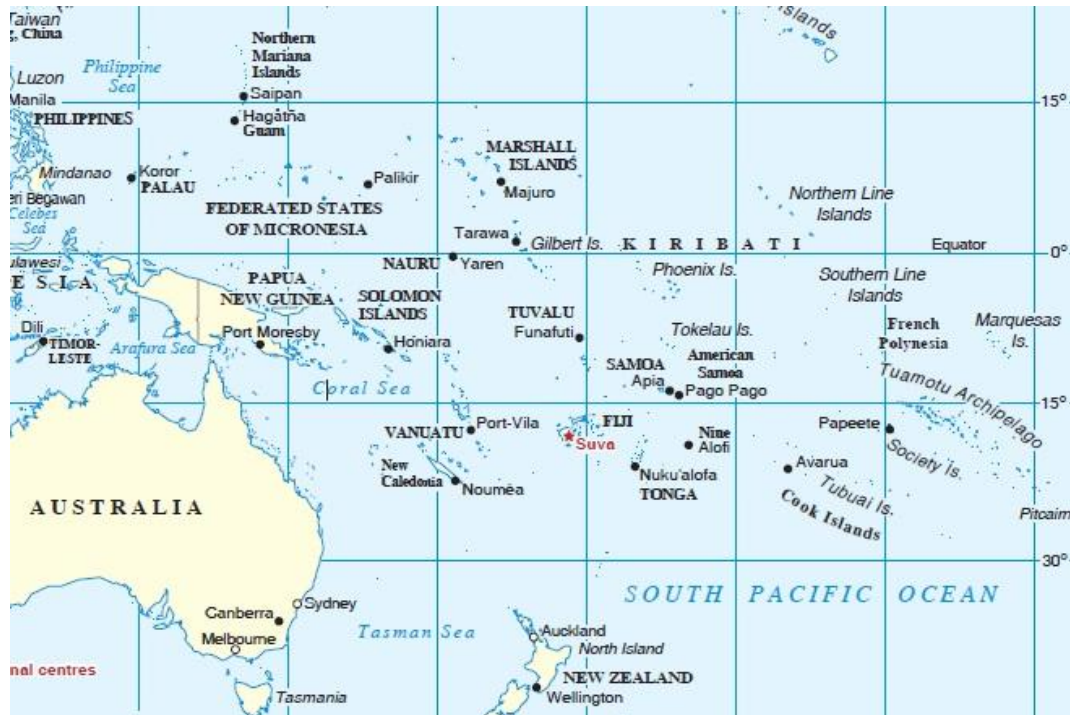
<sup>vii</sup> Social desirability bias is defined as the tendency of participants to respond to questions in a manner that will be viewed favourably by others in order to keeping to social norms.<sup>109</sup>

Whilst a large number of health interventions that seek to increase PA behaviour exist in LMICs, systematic programme evaluation appears lacking.<sup>115,116</sup> And even in Western countries, where programme evaluation has been conducted, this has predominantly focused on outcomes, with limited or no information regarding programme processes.<sup>19,20</sup> For example, 84 PA programmes were identified in the PICs and none of them had been systematically evaluated. Therefore, little is known about factors that contribute to the success of such programmes. Process and outcome evaluations collect, analyse and interpret information to understand the effectiveness of programmes.<sup>117</sup> and the success or failure of a programme can only be properly understood through such analysis.<sup>118</sup> Evaluation mechanisms are therefore indispensable for understanding programme effectiveness.

More in-depth research is needed for effective Pacific PA health promotion. It is essential, in the first place, to identify the target group's preferences and attitudes towards a planned intervention. For example, Pacific dress codes may pose considerable challenges to pedometer interventions – do women accept the use of waistbands underneath their dresses, in order to secure a pedometer? Moreover, process evaluations must be conducted to understand the interventions' effect and, where needed, to direct the intervention towards the most beneficial outcome. Lastly, outcome evaluations are indispensable for understanding whether an intervention has reached its objectives.

## **Background**

The Pacific is a diverse region consisting of countries and territories with varying land sizes, populations, natural resources, economies and cultures.<sup>119</sup> The 22 PICs are scattered over a region of thirty million square kilometres, mostly ocean.<sup>120</sup> In 2011, the Pacific population was 10 million and the population was expected to continue growing, reaching an estimated 15 million by 2035.<sup>121</sup> In addition to challenges on food and water supply, employment opportunities and housing issues, population growth brings with it an increased demand on already stretched transport, energy, health and education infrastructure.<sup>121</sup> Some countries are shrinking (e.g. Niue: -2.3% and Tokelau -0.2%) due to emigration.<sup>121</sup> A considerable 70% of the Pacific population lives in Papua New Guinea, the remaining 30% are spread across the PICs (Figure 1). There are relatively small populations in the PICs: just over half the countries have populations of less than 100,000; several have less than 10,000 residents with Niue being the smallest PIC with 1,625 inhabitants.<sup>119</sup>

**Figure 1:** Map of the Pacific region

Source: United Nations Cartographic Section.<sup>122</sup>

An increasing proportion of the population in PICs is moving to urban centres. It is estimated that 2.3 million people live in cities and towns. The majority of urban populations are growing at twice the rate of national populations. A high rural-to-urban migration causes urban growth.<sup>119</sup> Because this movement is occurring at a very fast pace, the capacity of urban services is challenged.<sup>123</sup>

The Human Development Index classifies the PICs at low- and medium- levels.<sup>124</sup> In fact, some PICS are amongst the poorest and weakest segment of the international community, with Kiribati, Samoa, Solomon Islands, Tuvalu and Vanuatu, currently classified as Least Developed Countries (LDCs).<sup>119</sup> Despite their geographic, economic and cultural differences, PICs have in common their vulnerability to external influences. The adverse impacts of climate change,<sup>125</sup> natural disasters,<sup>74</sup> and the food<sup>13</sup> and financial global crises<sup>126</sup> threaten the PICs development and economy. This is particularly relevant for countries with limited human resources and with little access to management skills. Chronic underfunding, a lack of coordination and human resources, inefficient management skills, inaccessibility to technologies and inadequate information for decision making have been identified to contribute to weak health system performance and impede population health progress.<sup>127,128</sup>



This thesis seeks to identify effective interventions that help reduce NCDs in the Pacific region. It is overdue for Pacific Governments to initiate effective strategies that protect and enhance population health. Governments are advised to face the challenge at hand and to allocate a substantial amount of their national budgets to preventive health care. Key solutions to respond to the NCD crisis have been identified by the WHO as developing and implementing 'Best Buys' interventions in combination with sustained advocacy and surveillance mechanisms.<sup>129</sup> It remains to be seen whether the translation of implementing, monitoring and evaluating such interventions is feasible.

For the purposes of this thesis, the following definitions are used:

- Physical activity (PA) is defined as "any bodily movement produced by skeletal muscles that result in energy expenditure".<sup>130</sup>
- Non-communicable diseases (NCDs) are defined as "diseases or conditions that occur in, or are known to affect, individuals over an extensive period of time and for which there are no known causative agents that are transmitted from one affected individual to another".<sup>41</sup>
- Low-, middle- and high-income country categories are defined by the World Bank, based on gross national income (GNI) per capita.<sup>131</sup>

## **Statement of purpose**

The overall aim of this research is to identify novel strategies that reduce NCD risk in the PICs. Findings contribute to the limited body of knowledge that exists in rigorously evaluated lifestyle research from LMICs, and PICs in particular.

Specific objectives are:

- To describe current practice in PA health promotion in the PICs;
- To identify barriers and facilitators towards PA and healthy lifestyle behaviour in Ni-Vanuatu women;
- To develop, implement and monitor a culturally-meaningful workplace-based health intervention for female civil servants from Vanuatu;
- To identify key success factors and uncover areas for programme improvement via process evaluation and to identify novel approaches in presenting research findings in locally acceptable ways;
- To investigate the intervention's physical effect on PA behaviour and health indicators
- To report on programme logistics, on-site issues, opportunities and limitations in Pacific health promotion.

This research seeks to understand and enhance Pacific public health through PA health promotion strategies that are implemented in the workplace setting, targeting Pacific women. A best practice and culturally-meaningful PA health programme that was designed and implemented in Port Vila, Vanuatu is presented.

## **Significance of research**

Research on NCD prevention is advancing globally and has contributed to increased life expectancies in HICs.<sup>50</sup> In the region most affected by NCDs however, research on lifestyle behaviour and NCD prevention is in its infancy. Objective four of the World Health Organization's Western Pacific Action Plan for NCDs advises governments to promote research for the prevention and control of NCDs.<sup>78</sup> Continuous and sustained research should generate innovative and culturally appropriate NCD prevention programmes. This thesis responds to the appeal of the WHO and is the first to focus on Pacific PA and intervention impacts in depths.

The series of studies that follows contains novel approaches and contributes to the growing body of literature on Pacific health research.

The thesis provides a starting point for Pacific health practitioners and relevant decision makers to utilise locally specific and relevant evidence in the development of Pacific health interventions. The research into lifestyle behaviour in the workplace setting is new in the Pacific and is significant on several levels. Its value is that by advancing the knowledge of evidence-based barriers and facilitators for lifestyle behaviour, the findings allow for the development of meaningful and targeted health promotion programmes. It is anticipated that a collaborative partnership approach utilising principles of community-based participatory research (CBPR) is conducive to recruitment, participation, sustainability and, in particular, programme effectiveness. A CBPR approach was utilised and sought local involvement in programme design and implementation.

The research is a first step into PA intervention research – an understudied area in the Pacific region. Effective means of increasing urban Ni-Vanuatu women's PA levels and reducing NCD risk were defined through workplace-based health programmes; improvements in health indicators were observed. Importantly, findings highlight strategies to keep healthy individuals at low-NCD risk and to reducing NCD risk factors in high risk individuals – a meaningful contribution for NCD prevention research in LMICs.

A new technique of combining qualitative data with frequency of themes and the visualisation of data outcomes were designed to assist in communicating findings among local health practitioners. The novel technique of displaying evaluation data helped design and improve future Pacific health programmes.

Finally, the thesis contributes to the literature in identifying logistical opportunities and challenges for Pacific health promotion approaches that can aid future practitioners and/or researchers in programme design and management.

## **Study delimitations**

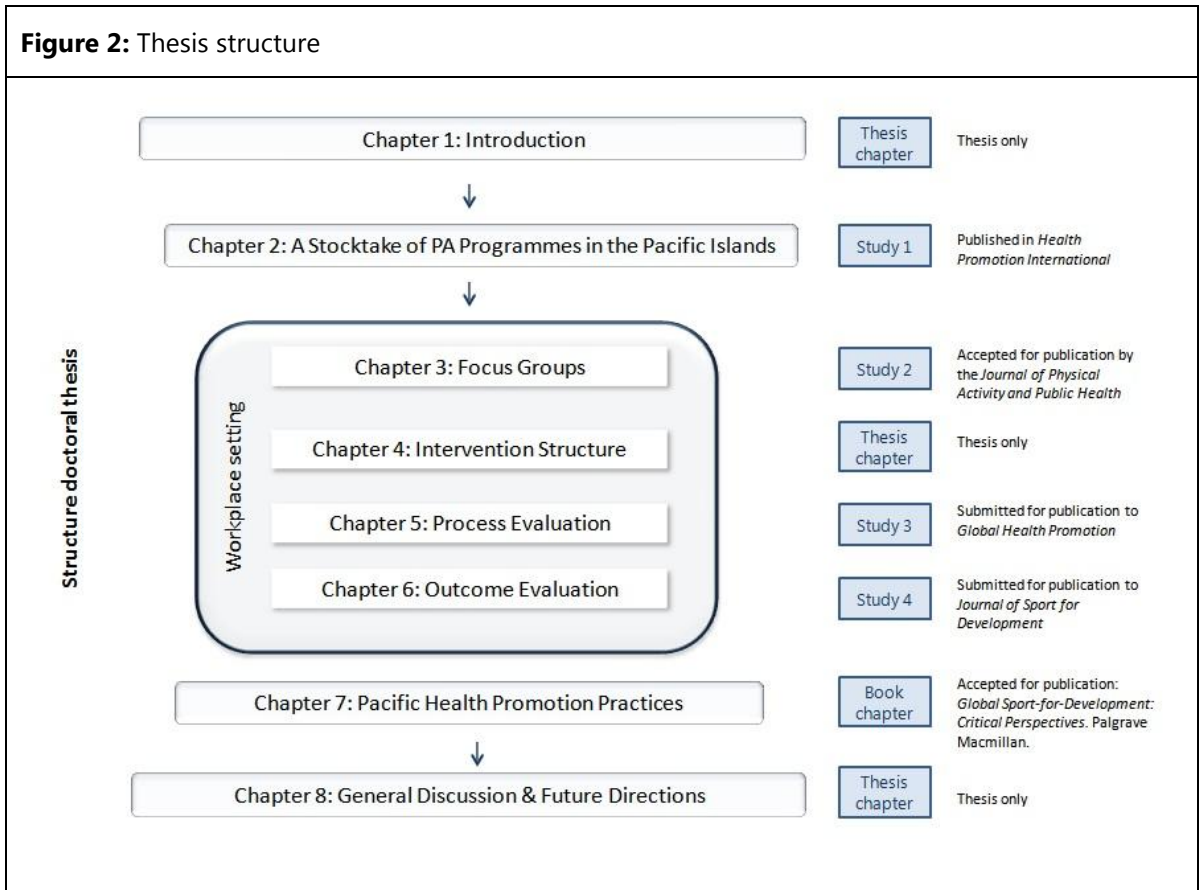
- The Pacific region consists of 22 PICs, broadly categorised into Melanesia, Polynesia and Micronesia. The studies undertaken were carried out in the Melanesian context Vanuatu. Caution should be applied when generalising these findings to neighbouring PICs and/or other LMICs.
- The three intervention studies (Study 2, 3 and 4) were targeted at adult women only and the results cannot be used to draw conclusions for either children or men. The intervention sample has further mainly reached civil servants and it is to be asked whether similar research findings would have been generated if the sample had reached individuals from other urban positions.
- The health status of urban Pacific residents differs greatly to those who follow a more traditional lifestyle in the outer islands and in the country interiors. The findings of this thesis have been drawn from intervention studies conducted with individuals residing in urban centres. It is not appropriate to adopt findings to rural populations.
- Finally, the intervention was limited in its duration. Behaviour change maintenance is typically understood as lasting for at least six months after cessation of implementation. Due to staff turnover and limited funding options in Vanuatu, it was not feasible to conduct the follow-up health screening 12 months after programme implementation. This is limiting the evidence for sustained health behaviour change. Individual feedback from participants demonstrates the lasting positive impacts of the intervention. Notably, 15 months after termination of the monitored phase, the researcher had coincidentally met some participants in the field. The continued use of pedometers highlighted the sustained effect on, at least, some individuals.

## **Role of candidate**

The overall research components were conceived by the author who was part of the Human Potential Centre research team and received funding by the WHO for the initiatives. The candidate was one of two researchers to conduct the stocktake of PA initiatives – a collaborative effort with the University of Sydney. For Study 2, the candidate facilitated the focus groups in Port Vila and was responsible for transcribing, analysing and writing up the results within this doctoral research. Social marketing tools and questionnaires were developed by the candidate who undertook background research. Data analysis and write up after implementing the intervention was undertaken by the candidate as part of the doctoral research. The candidate was further responsible for all aspects of the research process (recruitment, implementation, database management, data analysis, write-up). While funding was received by the WHO to develop, implement and evaluate the intervention, the candidate undertook the research as part of her doctoral studies.

## Thesis structure

This doctoral thesis is presented as a series of chapters that have been published in or submitted for publication in peer-reviewed academic journals and represent a logical progression of studies. Overall, this doctoral work forms a coherent thesis under pathway two, as outlined in the AUT Postgraduate Handbook. The thesis structure is outlined in Figure 2.



The thesis is made up of nine separate but interrelated chapters, four of which have been published or submitted to relevant peer-reviewed academic journals and one published book chapter (in press) in *Global Sport-for-Development: Critical Perspectives* Palgrave Macmillan. Each chapter is prepared in an academic format, with its own introduction, methods, results and discussion sections. Chapter 1 provides a background for the thesis, outlining the significance of the studies that follow. Chapter 2 is a literature review, presenting the current state of knowledge from the field. Chapter 3 is a stocktake of current PA health promotion strategies in the Pacific region. The stocktake identifies a large number of PA programmes – 26 of them being implemented in the workplace setting. To respond to the lack of evaluation work, a robust evaluation approach follows in Chapter 4, 6 and 7. Chapter 4 presents formative work carried out with Ni-Vanuatu urban civil servants to understand barriers and facilitators for the adoption of healthy lifestyle behaviour. Chapter 5 is not structured as an academic manuscript but provides detailed information on the health intervention that was developed based on the

formative study and implemented in the Vanuatu Government. Subsequently, Chapters 6 and 7 form part of the evaluation approach: whilst Chapter 6 investigates the effectiveness of the intervention Chapter 7 explores the actual outcome of the intervention. Programme management issues are discussed and highlighted in detail in Chapter 8. The thesis concludes with a general discussion in Chapter 9, encompassing findings from all studies, highlighting limitations and future recommendations arising from the research. The prefaces serve to link each chapter to the thesis as a whole. Due to the nature of the format of this thesis (i.e., presenting chapters as peer-reviewed academic manuscripts) there is some duplication of material, particularly in the introduction sections of the papers.



## CHAPTER 2

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### Literature review

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#### **Preface**

In the international setting, there is a solid evidence base for the effect of pedometer-based walking interventions, with an abundance of literature outlining the immediate increases in PA behaviour over baseline and the improvement in some health indicators. Importantly, a dearth of process evaluations has been identified and the sustained effects of pedometer-based interventions are unknown. The large majority of the research has been conducted in HICs where infrastructure and socio-cultural aspects differ widely to that encountered in LMICs.

No pedometer-based PA research has been carried out in the Pacific region where NCD risk factors are escalating. In order to promote lifestyle change in the region, an in-depths analysis was needed. No evidence was available to understand the effect and feasibility of PA interventions in these cultures with fewer infrastructures, less economic progress, different cultural values and, often times, gender inequalities. In order to advance the field of Pacific health promotion it was necessary to develop and evaluate an intervention that investigates PA behaviour and health effects in the context of the work environment. This literature review provides the background document that justifies a) the need for Pacific lifestyle research, b) the development of the intervention, and c) the need for rigorous evaluation mechanisms.

## **Introduction**

This review provides background information on a number of research contexts, relevant for the thesis presented. Firstly, an overview of the global burden of NCDs is presented, followed by an explanation of the causalities and the impact of NCDs in the Pacific Islands. The review further presents evidence on effective solutions to reduce NCD risk factors. Importantly, the large majority of those solutions stem from contexts other than Pacific Islands. The need for continued research efforts in the PICs is clear. A discussion of cross cultural challenges in conducting health research in Vanuatu is presented, followed by an overview of evidence on the effect of social marketing strategies on population health. Note that for this thesis 'cross cultural' is defined as the relationship between the researcher (a European and an 'outsider' to Vanuatu) and the participants (Ni-Vanuatu women). The review concludes with background information on health behaviour and evaluation theories to aid the reader in understanding the theoretical model into which the research approach taken is embedded.

## **Non-communicable diseases in a global context**

The world is experiencing a pandemic<sup>viii</sup> of NCDs.<sup>34</sup> NCDs are the leading causes of death globally, contributing to more deaths each year than all other causes combined.<sup>24</sup> The majority of NCDs are chronic.

The prevalence of NCDs presents a global crisis, putting men, women, children and all income groups at risk in almost all countries of the world.<sup>43</sup> In September 2011, the United Nations (UN) have reacted towards the crisis and launched a global campaign on NCDs with a summit meeting devoted to reducing the factors behind the often preventable causes that result in 63% of all deaths worldwide.<sup>132</sup> It was recognised that multi-sectoral actions at national and global level are essential in reducing NCD prevalence.<sup>133</sup>

The global burden of NCDs has been identified as one of the major challenges for sustainable development in the twenty-first century.<sup>134,135</sup> The underlying causes of these diseases are shared and modifiable risk factors which are also the major causes of health inequalities in the world.<sup>136</sup> NCDs are caused by forces that include ageing, rapid unplanned urbanisation<sup>ix</sup>, population-ageing and globalisation.<sup>102,137</sup>

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<sup>viii</sup> Pandemic: An epidemic that becomes very widespread and affects a whole region, a continent, or the world.<sup>54</sup>

<sup>ix</sup> Urbanisation is the process whereby an increasing proportion of the national population comes to live in the towns. It is an almost universal corollary of modern economic development. Yet it is often seen as a major problem for PICs.<sup>123</sup>

Whilst NCDs are often described as problems that exist in affluent communities, NCD mortality rates are meanwhile more prevalent in LMICs especially among adults aged 30–69 years.<sup>27</sup> In fact, 80% of all NCDs occur in LMICs,<sup>24,34</sup> making NCDs an urgent development issue: people in these countries tend to develop NCDs at an earlier stage, they suffer longer and they die earlier than people in HICs.<sup>27,46</sup> To make it even worse, the burden of NCDs is increasing in LMICs, contributing to increased poverty and ill-health. Moreover, NCDs are increasing inequalities within populations<sup>138</sup>: poor people often reside in areas and settings where policies, legislation and regulations to combat NCDs are either non-existing or inadequate. Further, limited access to services or prevention and treatment of NCDs prevails due to financial limitations and weak health systems. Whilst the economically poorest people have been identified to experience the highest risk of developing NCDs they are the least able to cope with the resulting financial consequences.<sup>45</sup> In these countries, NCDs are typically detected at a later stage, when patients need extensive and expensive hospital care for acute complications and events.<sup>24</sup> Most of this care is covered through individual expenses, affecting households at large and leading to considerable medical expenditures.<sup>31</sup> A vicious circle may follow: poverty exposes individuals to behavioural risk factors for NCDs (characteristically seen in the consumption of inexpensive food, alcohol and tobacco) and, in turn, the resulting NCDs may become an important driver that leads families towards poverty.<sup>24</sup> Continued health expenditures trap poor households in cycles of debt and illness, further contributing to health and economic inequalities.<sup>139</sup>

LMICs are projected to experience the highest increase in NCD mortality rate with the Western Pacific and the South-East Asia region having the highest projected absolute number (12.3 million) of NCD-related deaths.<sup>140</sup> Whilst by the year 2025 the number of persons with diabetes is expected to increase in HICs by 41%, it is expected to increase by 170% in LMICs.<sup>48</sup> As a consequence, NCDs pose serious implications for social and economic development.<sup>53</sup> They can cause and entrench poverty, are a threat to human, social, and economic development.<sup>141,142</sup> and have been identified as a global emergency.<sup>36</sup>

Despite the escalating global health problems, there are reasons for some cautious optimism: evidence is available that a significant proportion of NCD morbidity, disability and premature deaths *can* be prevented.<sup>55,86,87</sup> and that sustained interventions *can* achieve important health benefits. In fact, the WHO estimates that up to 80% of heart disease, stroke, and type 2 diabetes and over a third of cancers can be prevented by eliminating shared risk factors, mainly tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol.<sup>34</sup> Preventive efforts can avert at least 36 million premature deaths by 2015.<sup>41</sup> In recent decades, some HICs have experienced increases in life expectancies due to prevention and treatment measures.<sup>77</sup> For

example, mortality rates from heart disease have fallen by up to 70% in the past three decades in Australia, Canada, Japan, the UK, and the USA.<sup>27</sup>

Effective approaches to reduce the NCD mortality rates in LMICs have been identified as a combination of cost-effective population-wide and individual interventions.<sup>143</sup> Such interventions are partly available and include methods for early detection of NCDs and their diagnoses using inexpensive technologies, non pharmacological and pharmacological approaches for modification of NCD risk factors and affordable medications for prevention and treatment of heart attacks and strokes, diabetes, cancer and asthma.<sup>143</sup> Weak health systems, however, hinder the accurate implementation of such interventions, leading to gaps in their implementation.

It is clear that solutions are urgently needed to prevent NCDs in the first instance by reducing their major risk factors. Beaglehole identified the priority actions as political leadership at the highest level; the immediate implementation of priority interventions; the building of international coordination and consensus for priority actions and interventions; and the establishment of monitoring, reporting, and accountability mechanisms for assessment of progress.<sup>139</sup> Priority interventions identified in 2011 include tobacco control, salt reduction, improved diets and PA, reduction in hazardous alcohol intake, and essential drugs and technologies.<sup>139</sup> The most detailed available evidence for the effectiveness of interventions and for public health impact is to minimise the prevalence of the major NCD risk factors through population-wide methods.<sup>144</sup> Whilst these approaches have shown to be effective in HICs, it is unclear whether similar effects can be generated in LMICs. For example, Pearce notes that PA behaviour can be increased through targeted built environment approaches and urban design in HICs; however, the effect of similar strategies is unknown for socially disadvantaged populations. He calls for more research on urban environments and PA behaviour in LMICs.<sup>145</sup>

The Rio+20 United Nations Conference on Sustainable Development in 2012 concluded that to reduce the global burden and threat of NCDs, health systems need to be strengthened, and equitable and affordable access to prevention, treatment and care must be provided to the world population.<sup>134</sup> Delegates approved the development of a global monitoring framework for the prevention and control of NCDs, including indicators and a set of global targets. At the 65<sup>th</sup> World Health Assembly in 2012, Member States of the United Nations set an ambitious goal of a 25% reduction in premature mortality from NCDs until the year 2025.

## **Non-communicable diseases in the Pacific Island context**

Overall, health information of Pacific societies prior to European contact is sparse<sup>64</sup> but anecdotal evidence indicates that NCDs were rather uncommon in the PICs prior to contact to the Western world.<sup>57</sup> The fact that the Pacific region of today is experiencing among the highest NCD burden worldwide is more than alarming. NCDs are contributing to approximately 75% of death in the region.<sup>146</sup> They further contribute to a large proportion of NCD-related morbidity. Both, NCD-mortality and –morbidity are projected to increase further.<sup>31</sup>

NCDs present the most serious problem faced by Pacific nations today.<sup>77,115,129,147</sup> The diseases affect the individual's well-being, the family's economic status, the community's workflow and the populations at large.

There are important differences within Pacific populations in terms of NCD prevalence. Whilst traditionally living individuals experience lower levels of NCDs, the more urban living individuals suffer most. Coyne<sup>56</sup> described traditionally-living Pacific Island adults as robust, physically fit, active and relatively free of nutritional deficiencies or disorders. In fact, until today the traditional Pacific lifestyle presents an exemplary healthy lifestyle which is characterised by high PA levels (physical labour) and by a dietary intake high in fish and fresh vegetables.<sup>65,148</sup> Physical labour continues to be essential for survival, for both men and women in the remote islands. Walking and the use of outrigger canoes are the prime mode of transport; motorised vehicles and electronic devices are very limited.<sup>149</sup> Overall, the Pacific islanders on the very remote islands lead exemplary healthy lifestyles.

The picture looks different however, in the more urban centres and towns in the PICs which have experienced radical changes since contact to the Western world. Over the past decades, local economies and lifestyles have been challenged by the impacts of globalisation, commercialisation and urbanisation.<sup>6</sup> This involved a struggle between customary modes of agrarian production focused on localised needs, versus emergent forms of manufacture and consumption under industrial and service-based capitalism.<sup>61</sup> Chapter 1 highlighted that commercialisation and consumerism resulted in significant health changes in Pacific population health. Epidemiological transitions<sup>56–59</sup> caused higher obesity levels than elsewhere.<sup>60</sup> Modernisation and urbanisation have been identified as major contributors to the health transitions: physical, biological and socio-cultural processes brought lifestyles changes to the populations.<sup>30,57,60–70</sup> The urban population was particularly affected.<sup>58,60,65,71,72</sup> As such, supporting the urban population by encouraging the adaption of healthy lifestyle behaviour is of utmost importance.

Contrary to the situation in HICs where higher educational and socioeconomic status is often associated with lower BMI and decreased risk for overweight and obesity,<sup>150</sup> a survey in Western Samoa and in the Cook Islands showed that obesity is positively and independently associated with high occupational status and urban citizens.<sup>151,152</sup> Contrary, Harris et al. and Siefken et al. state that NCDs in the Pacific are more prevalent among those who do not have the resources to pursue healthy choices easily.<sup>153,154</sup> There is epidemiological evidence that urban civil servants are particularly susceptible to increased NCD risk factors.<sup>72,77</sup> This positive association between socio-economic status (SES) and obesity in Pacific populations is in accord with documented traditional values which associated obesity as desirable and healthy in people of high status, but not necessarily in the general population.<sup>155</sup> Conversely, Taylor states that obesity is no longer officially regarded as beautiful or indicative of high status.<sup>77</sup> Chapter 9 of this thesis suggests that although NCD risk factors may differ among SES, both high SES and low SES are exposed to high NCD risks, but from different angles. A detailed explanation is provided in Chapter 9.

As of today, the majority of adult individuals in urban cities of the PICs lead sedentary lifestyles which is largely related to increased NCD risk factors.<sup>56,75,76,156</sup> The movement to urban centres and towns has caused significant changes in Pacific lifestyles, altering economic, social and gender relations. "Urbanisation over the decades has changed fundamental social conditions affecting men, women and children in the family, the household and community and at national levels".<sup>157</sup>

The PICs are challenged to find effective approaches to reduce the current and prevent the future NCD epidemic. Societal barriers such as limited food choices and little opportunities for leisure-time PA must be overcome. The islands, small in size, are heavily dependent on imported goods.<sup>4</sup> Governments, industries, trade organisations and other stakeholders are strongly advised to reconsider existing policies and/or to implement new policies which secure that Pacific people have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.<sup>158</sup> For example, an emphasis on local food production; and reducing the salt, fat and sugar content of imported foods may help improve food quality and people's overall quality of life.<sup>159</sup> The intricacies of these issues that hinder Pacific health progress are explained in greater detail in Chapter 9.

Interventions need to be designed, implemented, monitored and evaluated to enable communities to live longer and healthier lives, reduce inequalities, and enhance social and economic development. The combination of a rapidly increasing, ageing and urbanised population and an existing epidemic of NCDs have resulted in an enormous health, social and

economic burden.<sup>160</sup> To understand the complexities, the reader is referred to Chapter 9 of this thesis.

### **The role of Pacific women**

Pacific women are at greater NCD risk than their male counterparts, as they show higher physical inactivity rates, have a higher mean BMI and higher percentages of overweight and obesity rates.<sup>7-10,80,81</sup> Empirical research to explain these differences in detail is largely absent. The author assumes that prevailing gender inequality and cultural gender roles contribute to the variation in NCD risk factor prevalence.

Gender inequality exists in most Pacific societies. Details on the areas and degrees on inequality varies. Since the European colonisation two centuries ago, traditional Pacific island economic and social systems have been in a process of change and profound modifications to social relations were experienced. "The introduction of Christianity [...] introduced many changes to how people lived, dressed, married, and brought up children".<sup>157</sup> European colonial beliefs changed cultural practices, freedom of movement of individuals, the use of labour, dress codes, social mores and relationships. Of particular importance is the impact that Christian and European beliefs had on Pacific gender relations and concepts of key institutions such as the family. Griffin highlights that the European understanding of women and property ownership were key areas where differences of perceptions resulted "into a lowering of women's status in many Pacific societies".<sup>157</sup> The new laws regarding marriage and custom in Pacific societies changed women's status and, more broadly, gender relations. "Hardest to address are the losses of rights to land and communal decision-making that women traditionally held in Pacific societies".<sup>157</sup> Whilst an increased inequality has come with colonial impact, men's and women's roles were complementary and given equal status in the traditional societies.

Reports indicate Pacific women often face persistent inequalities in their societies. Among the major gender issues in the region are high rates of gender-based violence, low proportions of women in all levels of decision-making, significant under-representation of women in the normal economy, unaddressed gender dimensions of climate change, natural disasters, food security and renewable energy, and inequitable access to clean water and sanitation.<sup>161</sup> The Beijing +15 report calls out for leaders at all levels, and especially political leaders, to thoroughly understand and commit to the global social contracts that the Pacific nations have signed – the Beijing Declaration, the Convention on the Elimination of all forms of Discrimination Against Women and the Millennium Declaration.<sup>161</sup> The Pacific region struggles with tradition and modernity. Customs that traditionally protected women have been abused and minimised women's welfare. With patriarchal colonial powers, traditional decision-making power of women

in the private sphere, as well as publicly in matrilineal societies was abandoned. Until today in the post-independent era, this has still not been acknowledged.<sup>161</sup> Since the 1980s there is an increasing recognition of the crucial role played by women in health care and NCD prevention and control programmes in the Pacific region.<sup>77</sup> Women have a large impact on families and communities health.<sup>77</sup> and in many LMICs, health care is considered to be an area of life dominated by women.<sup>162</sup>

The author suggests the intervention to target Pacific women for the following reasons:

- ✓ women are less likely to be physically active as a result of the ways women's role and place have been culturally determined.<sup>7-10,80,81</sup> Reasons are socio-cultural and are investigated in greater detail in this thesis;
- ✓ women are more likely to be overweight and obese<sup>7-10,80,81,</sup>
- ✓ women have less access to sport facilities due to cultural and familiar reasons<sup>16;</sup>
- ✓ women can serve as role models in the family and community and stimulate interest in male counterparts<sup>162;</sup>
- ✓ gender issues are a big challenge in the Pacific – a focus on female involvement has the potential to raise awareness about women's right and women's voices.<sup>157</sup>

## **Context Vanuatu**

The Pacific is a diverse region consisting of countries and territories with varying land sizes, populations, natural resources, economies and cultures.<sup>119</sup> The region consists of 22 PICs, broadly categorised into Melanesia, Polynesia and Micronesia. More detailed information about the region is provided in Chapter 1. The studies undertaken in this thesis were carried out in the Melanesian country Vanuatu.

Vanuatu is an archipelago consisting of 83 islands located in the south west Pacific ocean with a total population of 257,000.<sup>163</sup> With more than 100 languages it has the highest density of languages per capita in the world. Vanuatu is classified as a low-middle income country and has a characteristically young population with nearly 50% below 15 years of age.<sup>164</sup> Life expectancy at birth is 69 years for men and 72 years for women.<sup>26</sup> In 2010, the estimated crude birth rate was 29.5 per 1000 population and the estimated crude death rate was 4.8.<sup>164</sup> With an annual growth rate of 2.6% a year, Vanuatu population is expected to double by 2030.<sup>165</sup> The nation's largest towns are the capital Port Vila, situated on Efate, and Luganville situated on Espiritu



Santo, with 44,000 and 13,100 inhabitants respectively. The official languages of Vanuatu are Bislama, English and French; the latter two are used as the principal languages of education.<sup>166</sup>

Whilst the rural population in Vanuatu leads a predominantly subsistence living, the urban population has adopted a more westernised way of life.<sup>166</sup> Research from the 1980s indicates that NCDs were not a major health problem in Vanuatu.<sup>167</sup> This is due to the relative prominence of infectious diseases (malaria, tuberculosis, pneumonia and intestinal infection), and a high proportion of rural population.<sup>167</sup> Nevertheless, anecdotal and some epidemiological evidence indicates that NCD rates started to increase in certain socio-economic groups since the 1950s - particularly in urban-dwelling civil servants, politicians, and professionals.<sup>58,77,168,169</sup>

According to the last national census, the urban population accounted for 24% of the total population in 2009.<sup>170</sup> Urban migration is increasing at an alarming rate, particularly from rural islands to Port Vila and Luganville, as people seek employment or education.<sup>123</sup> The results of Vanuatu's 2009 census indicate an urban population growth of 3.5% a year.<sup>170</sup> The growth rate is deemed unsustainable and infrastructure and services will struggle to cope with the urban population increase. Urban poverty is a pressing concern.<sup>123</sup>

Many ethnic groups and hundreds of diverse traditional customary and cultural practices shape women's role in Vanuatu.<sup>171</sup> Traditionally, in most islands of Vanuatu, women, and men had their own ranking system that gave them status. Opinions and views influenced and shaped decisions in the community and domestic responsibilities were shared. With the influence of missionaries a change in traditional practices and contemporary custom has pushed women further away from the main decision-making bodies in provincial and national levels.<sup>157,171</sup> In modern Vanuatu, wives are more inferior and accountable to their husbands than traditionally. "Her kastom rights and Constitutional rights under Art. 5 are not usually recognized".<sup>171</sup> In contemporary Vanuatu, a male dominance degrades the role and status of women. In 2000, the Ni-Vanuatu female politician and voice of Ni-Vanuatu women Grace Molisa noted that "We have detected a noticeable change in the way women in leadership roles are perceived in Vanuatu. We believe that the environment in which we are now working is one that is becoming more and more enlightened and more aware of gender equality issues than at any time in Vanuatu's modern history".<sup>172</sup> However, the country still has a long way to go until gender equality has been reached.

Local communities are inclusive, and capable of strong community action<sup>173</sup>. Inclusiveness is associated with Vanuatu's hierarchical structure in which the chiefs and the churches play a leading role in reinforcing strong pressures to conform to traditional values. Families have been

defined as the main source of identity and social, political and economic participation. Health is therefore viewed as a communal responsibility of all.<sup>174</sup>

A first NCD survey from 1984 examined the prevalence of obesity, diabetes and hypertension and found higher risk factors prevalence in urban than in rural regions.<sup>175</sup> In 1985, a joint effort by the MoH, SPC and the WHO was undertaken to determine the prevalence of NCDs and their risk factors among adults in Vanuatu, measuring tobacco, alcohol and kava<sup>x</sup> consumption. Further, the correlation of urbanisation and NCD incidence was investigated, measuring populations presumed to be at different levels of modernisation.<sup>177</sup> Findings showed that tobacco, kava and alcohol consumption was significantly higher in men than in women. Tobacco use was higher in rural than in urban populations.

The 1996 National Nutrition Survey found health status differences related to residence: overweight and obesity were more prevalent in the main two urban areas of Sanma (47%), and Shefa (45%) compared with the rural area of Tafea (28%). The proportion of women classified as overweight or obese increased with age from 21% in 19-25 year olds to 55% in 40-49 year olds. This increase was noted at 30 years of age, from 34% in mothers aged 25-29 to 48% in those aged 30-34 years. A major and important difference in overweight and obesity prevalence was noted between rural and urban women: whilst the prevalence of overweight and obesity in rural women of all ages combined was 34% (BMI>25 kg/m<sup>2</sup>) it was 53% for urban women. Of women 40-49 years in urban areas, 80% were overweight or obese. In Luganville the proportion of women surveyed and classified as overweight or obese was higher (92%) than in Port Vila (66%). This negative urban health trend is explained with differing food consumption patterns, new food preparation methods (more practice of frying food in urban areas, less practice of open fires) and less habitual PA levels. Moreover, it was reported that people in urban centres use taxis and buses more than walking.<sup>178</sup>

In 1998 a repeated NCD survey was conducted.<sup>179</sup> The survey found significant differences in food consumption patterns between the urban and rural population. For example, it was found that the consumption of traditional nutrient rich foods is lowest in urban areas, whereas imported food such as white rice, fat/oils, canned and fresh meat/fish, milk and bread is highest. The figures indicate that rice or bread was consumed by 54% and 59% of males and females respectively. These findings indicate that daily consumers of food containing fat from non-traditional sources were twice as likely to be overweight or obese and to have diabetes or

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<sup>x</sup> Kava (*Piper methysticum*) is a non-fermented beverage native to the Pacific Islands, known to have sedative and anaesthetic effects.<sup>176</sup>

impaired glucose tolerance than those who did not consume such non-traditional food sources.<sup>148</sup>

An economic impact assessment from 2002 found that 5.8% of all hospital admissions in Vanuatu were related to NCDs with diseases of the circulatory system accounting for 52%.<sup>35</sup> Compared to other PICs, this number is relatively low (10.4% of all hospital admissions were NCD-related in Tonga, and 8.1% in Kiribati).<sup>35</sup> It is crucial to understand that access to early disease detection is often delayed in LMICs, thus identified numbers may not precisely represent actual NCD prevalence.

In 2007, the Ministry of Health Vanuatu and the WHO carried out an NCD risk factor Mini-Steps survey<sup>xi</sup> within government ministries and nongovernmental organisations in Vanuatu. Regarding the modifiable risk factors the survey revealed that 67.1% of the screened population is involved in only sedentary activities and 62% are current tobacco smokers. No data have been collected on dietary intake. Regarding the intermediate risk factors, 15% of the screened population has hypertension, 11.8% has high blood glucose levels and 22.6% show high cholesterol levels. 66.1% of the screened participants were either overweight or obese. Regrettably, this survey was not desegregated by gender.

A more robust NCD screening was conducted nationwide in 2011. Preliminary findings from the National NCD STEPS<sup>4</sup> survey indicate high prevalence of NCD risk factors.<sup>181,182</sup> For instance it was found that 50% of the screened population (N=4972) from six provinces were classified as overweight and 18% as obese.<sup>181</sup> Importantly, the screened provinces include both rural and urban areas. Noticeable gender differences were found regarding NCD risk factors with females experiencing higher NCD risks than males: 23.3% of women were classified as obese, whilst 13.9% males were classified as obese. 21.2% were diagnosed with raised fasting blood glucose levels and 28.6% were diagnosed with untreated hypertension. No significant gender differences were detected in both variables.<sup>182</sup> Diabetes in Vanuatu is likely to be significantly under-diagnosed and under-treated. The current costs, whilst substantial, may be therefore be artificially low and are expected to rise with increased awareness of the disease and growing rates of obesity.<sup>12</sup>

In 2012 it was reported by local media that Vanuatu hospitals report one heart disease death per month, with patients having a mean age of 26 years only.<sup>183</sup>

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<sup>xi</sup> STEPS survey: The WHO STEPwise approach to Surveillance (STEPS) is a simple, standardised method for collecting, analysing and disseminating data in WHO member countries.<sup>79</sup> The Mini-STEPs survey is an abbreviated STEPS version that was recommended as an excellent tool to promote surveillance and evaluation as part of community initiatives.<sup>180</sup>

The current Vanuatu National NCD Strategy plan was designed in accordance to the WHO STEPwise framework.<sup>79</sup> The framework consists of a nine-cell matrix with actions being undertaken at the national level, with communities or directed towards individual clinical care of sick or high risk persons. Actions are further categorised as:

- Core - those that could be undertaken within a two-year timeframe with existing human and financial resources;
- Expanded - those that would require up to five years to be successfully implemented and frequently require additional resources; and
- Optimal - those that are aspired to after a five-year timeframe and that will require external funding.<sup>184</sup>

<b>Table 1:</b> Framework of the STEPwise Approach to NCD control and prevention			
Resource Level	Population Approach		High-risk Approach
	<i>National (Macro)</i>	<i>Community (Micro)</i>	<i>Clinical Activities</i>
<b>Core</b>		<b>x</b>	
<b>Expanded</b>			
<b>Optimal</b>			
Source: World Health Organization <sup>79</sup>			

The core community strategies of the Vanuatu NCD Plan component 3 (PA) have been defined as follows:

1. To support the walking environment;
2. To increase awareness of benefits of PA;
3. To promote PA events; and
4. To develop PA opportunities.

To achieve these strategies, the following activities were proposed by the Ministry of Health:

- To create a PA friendly environment (clear roads, clean-up campaigns, creation of footpaths in urban areas);
- To develop a coordinated social marketing programme to promote PA;
- To implement a social marketing programme (impact indicator: community awareness);

- To encourage inter-business competitions, sport competitions between government departments and NGOs;
- To introduce PA at the workplace and in rural areas (impact indicator: participation).

Since 2007 the Vanuatu Government has implemented a government-based workplace health programme called *Walk for Life*<sup>xii</sup> – a programme that aims to increase civil servants' PA levels through Wednesday afternoon activities. The programme is unique in releasing civil servants from official duties across the whole of government at 3.00 PM Wednesdays. Process evaluation undertaken showed limited, although sustained, uptake. Interviews showed that it is mostly women who *do not* partake in the afternoon activities.<sup>16</sup> The best model for engaging civil servants in PA participation seems to be the integration of the PA policy and activities into departmental social clubs. Both team sports and walking have been identified as popular activities.

### **Pacific evidence on lifestyle behaviour change**

In the region most affected by NCDs, research on lifestyle behaviour and NCD prevention is in its infancy. Objective four of the WHO Western Pacific Action Plan for NCDs advises governments to promote research for the prevention and control of NCDs.<sup>78</sup> WHO has called for continuous and sustained research that generates innovative and culturally appropriate NCD prevention programmes to assist in increasing population levels of PA to reduce the burden of disease in the Pacific region. The latest issue (March 2011) of the open-access journal *Pacific Health Dialog – the Journal of Community Health and Clinical Medicine for the Pacific Region* embraces the complexities of Pacific NCDs. Whilst research manuscripts include topics such as alcohol, kava and tobacco consumption, cancer, dietary behaviour and mental health, no more than one manuscript on PA behaviour was published.<sup>185</sup> Clearly, there is a need for evidence regarding the effectiveness of interventions, and the factors underlying behaviours such as culture, advertising and social norms.<sup>186</sup> Whilst information about the extent of the Pacific NCD crisis is available from mortality and morbidity data, research on Pacific NCD prevention and PA behaviour is extremely limited.<sup>115,187</sup>

The Tonga Healthy Weight loss programme, initiated in 1995 to combat obesity levels and NCD risk factors, is one of the few research-based health intervention programmes.<sup>75</sup> The outcome indicates that Tongan adults responded well to a weight loss initiative, in which a fun-centred communal approach was applied to generate interest and continuous participation. More women than men registered and completed the programme. Strong governmental support, the

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<sup>xii</sup> Details in Appendix L.

involvement of local community groups and businesses and the royal participation contributed to the success of the programme.

Rowley et al. found that community control and ownership enabled the embedding and sustainability of a healthy lifestyle programme in a remote Aboriginal Australian community. Social environmental policy changes were found to be important in generating lifestyle behaviour change.<sup>188</sup>

Formative research was carried out in the Marshall Islands by Cortes et al.<sup>189</sup> to collect information that could be used to develop an intervention to prevent diabetes. The study focused on understanding beliefs and perceptions relating to food, activity, illness, and the valuation of body size in the Marshall islands. One important finding relating to healthy eating is that not only had the diet changed in the past one to two generations but so had the most common methods of preparing foods - particularly in urban areas. Informants highlighted the convenience of processed packages and prepared foods compared to the alternative of hardwork gathering and preparing food.

Ulijaszek defined PA behaviour and energy expenditure of adults living in Rarotonga, in the Cook Islands.<sup>152</sup> He found that urban male Cook Islanders are typically more active than their female counterparts during the working week. PA levels of adult Cook Islanders do not vary by occupation category. The activity recall diary method was used to estimate PA behaviour.

Afele-Fa'amuli et al. tested the effectiveness of culturally tailored exercise and nutrition interventions for adults living in Tutuila, American Samoa<sup>68</sup> and found that weight loss can be achieved through culturally-tailored interventions, particularly those that combine nutrition education and exercise. Afele-Fa'amuli underlines the need to embrace and respect the local culture as described in detail by Kreuter.<sup>190</sup>

In recent years, an emphasis on educational approaches to improve lifestyles was observed. Evidence that this has had an impact on lifestyle behaviours is lacking.<sup>4,191</sup> The recently completed and published Pacific Obesity Prevention in Communities (OPIC) project showed minimal impacts on adolescents in Fiji and Tonga.<sup>192,193</sup> Several interventions in schools,<sup>192</sup> communities<sup>68</sup> and with policy<sup>194</sup> have included evaluation and provide some information about what works and what does not work. Snowdon suggests conducting more policy interventions, given that policy environments were identified as unsupportive of healthy lifestyles.<sup>115</sup> Overall, more in-depth research is needed in order to use data and hands-on evidence to inform actions.

Since several decades now, both researchers and practitioners have called for an increased attention to the complexities involved in compromising the health of people living in LMICs and

other marginalised communities.<sup>195</sup> In the 1940s Kurt Lewin<sup>196</sup> coined the term “action research” as a means to overcome social inequalities. Two decades later, Paulo Freire emphasised the need for communities to identify their own problems and solutions. Community-based participatory research (CBPR) approaches have gained popularity over the past decades and have been defined as collaborative approaches “that equitably involves, for example, community members, organisational representatives, and researchers in all aspects of the research process.”<sup>195</sup> Other common terms for the CBPR are community-based action research or community participatory action research.<sup>197</sup> In summary, CBPR is “not a strict methodology but an orientation to research that guides decision making and allows for the use of qualitative and quantitative methods”.<sup>197</sup> Kirkness and Barnhardt<sup>198</sup> suggested rules for CBPR methodologies: “the 4 Rs” should assist the researcher in conducting culturally sensible and ethically sound research. The four Rs include a consideration of a) respect, b) relevance, c) reciprocity and d) responsibility. For a more in-depths discussion of CBPR, the reader is referred to the Review of Community-Based Research by Israel et al..<sup>195</sup>

Given the context of this thesis, it is clear that the integration of research and practice must be given priority and community involvement may be a first step for success in health promotion initiatives. For that reason, participatory-approaches were used in this thesis, highlighting the need for a) developing health promotion interventions in a collaborative approach (Chapter 4) and empowering participants on the ground (Chapter 5, Chapter 7).

### **Cross-cultural health research – challenges and opportunities**

There has been a considerable increase in cross-cultural health research in the past decades. Whilst initially, global health research focussed on infectious diseases in low-income countries, it is now covering a wider range of research topics, including both infectious diseases and chronic diseases in both low-, middle- and high-income countries.

Several important obstacles can arise in conducting cross-cultural health research, including methodological, logistical and ethical challenges.<sup>199</sup> Especially, there is a growing concern for ethical particularities that can be encountered by researchers from HICs working in LMICs.<sup>199–202</sup> And despite the increasing attention to formalised training on global health ethics in general,<sup>203</sup> concrete guidance in facing the challenges of global health research in practice is still often lacking.<sup>201</sup>

As such, carrying out health research or field work in Vanuatu raises many ethical and personal challenges for Western researchers - such as in this thesis’ intervention study - particularly so in

respect to the power relations inherent as 'relatively privileged' researchers study individuals who may be living in less privileged conditions.<sup>204</sup>

Generally, issues relating to context which must be taken into account include a) the relevance of research aims and b) project management. It is essential to carefully develop research aims and to understand how they were decided; the project must be seen a priority for and by prospective participants and the research must fit in the national health plan to be culturally relevant and appropriate. Regarding project management, it is important to define and justify the target group and to identify the best possible ways to organise an externally generated project so as to ensure and encourage local ownership, maximum participation and sustainability after project completion. On this point, the building of local human capacity, knowledge and understanding of project goals and processes as well as commitment to these goals is essential. Language is another factor that needs careful consideration. Questions such as what language should sessions be carried out in, and whether brochures and information sheets need to be in the participant's mother tongue(s) must be addressed carefully. In many cases, the value of a project advisory team or person such as a cultural adviser is invaluable in addressing these and other culturally related issues which may arise.

Prior to my research work in Vanuatu, I had some experience in working in and with Pacific nations (e.g. Fiji: 2008, Tuvalu & Tonga: 2010). I was very aware that while there are commonalities of experiences within and between PICs there are also many differences relating to time and place. A major concern of this work is that this research should *empower* rather than *disempower* local community members.<sup>202</sup> And so it is important to firstly *understand* the target population prior to 'elaborating on solutions' and that the participants' acceptance and/or adoption of the new approach would be the important starting point. Knowing what community members see as important and relevant to them is essential in this cross-cultural health-related research. CBPR approaches are useful in identifying potential avenues for future health advancement in this case.

As a first step, an intense desk research on Vanuatu and on women's status in Vanuatu was undertaken to gain a deeper understanding of the actual research context.  
30,35,39,51,58,65,77,123,157,161,166,171-173,205-213 Local knowledge and tradition must be taken into account in research design for maximum understanding between the two parties involved (researcher, participant).

Second, the research was planned as a collaborative research approach. These approaches have been suggested to assure ethical research that 'respect local knowledge, cultural factors, the



social determination of health, community participation and partnership'.<sup>202</sup> Social accountability must be given paramount consideration.

The following steps were taken to warrant ethical conduct of this research:

- A consultation process with both the Ministry of Health Vanuatu and the World Health Organization South Pacific Office took place prior to commencing the actual research to confirm the relevance and appropriateness of this project;
- The method of group approaches has reportedly worked well both in Vanuatu<sup>153</sup> and in other LMIC contexts.<sup>214,215</sup> Health in the Pacific is often seen as a communal rather than an individual responsibility,<sup>174</sup> therefore group approaches were assumed to lead to maximum impact;
- The research process includes a tiered approach aimed at capacity building for running PA health promotion programmes at many levels. As will be seen, training for conducting health screenings, managing a large number of programme participants, conducting health workshops, preparing social marketing and health education materials has been conducted to increase local ownership;
- Language barriers were overcome by the mutual agreement by participants of guaranteeing that all team members understand programme content and health information. Translation among team members was encouraged where needed. Importantly, English is a national language of Vanuatu and the need for translated information was minor.

With these aspects in mind I addressed the complexities that are involved in these cross cultural research processes. The continuous interaction and communication with participants, the sourcing of local information and collaborative and reciprocal approaches maximises the ethically sound conduct of this work. I am aware that a truly ethically correct research may only be feasible if the studies were undertaken by a local researcher that resides in the country. However, ethical challenges that may arise during this project were addressed to the best of the researcher's knowledge and have been approved by the Vanuatu Ministry of Health and WHO South Pacific.

How these and other issues were addressed is discussed more fully in the research method section in Chapter 2 (Theoretical background and frameworks).

## Workplaces

Workplaces have been internationally recognised as a priority setting for health promotion and disease prevention.<sup>216</sup> The importance was addressed as early as 1950 and later updated in a 1995 joint International Labour Organization (ILO) / WHO session on Occupational Health.<sup>91,217</sup> Subsequently, workplace health promotion has been recommended by international bodies through several charters and declarations, including the Ottawa Charter for Health Promotion (1986),<sup>93</sup> the Jakarta Declaration on Leading Health Promotion into the 21st Century (1997),<sup>218</sup> the Bangkok Charter for Health Promotion in a Globalized World (2005),<sup>219</sup> and the WHO Global Plan of Action on Workers' Health (2008-2017) where point 14 states: "Health promotion and prevention of noncommunicable diseases should be further stimulated in the workplace, in particular by advocating healthy diet and PA among workers, and promoting mental health at work".<sup>220</sup>

The workplace setting has several attributes that make it a popular setting for health promotion. Not only does it offer access to a large adult population,<sup>221</sup> but it can also serve as a vehicle for delivering interventions across multiple levels of influence, enhanced by its inherent support system.<sup>91,222</sup> In addition to the organisational policy and environmental influences on employees, "the potential to influence the health of related community groups can yield important public health benefits".<sup>223</sup>

Healthy workplace programmes generally aim to promote employees' health through the reduction of individual risk-related behaviours such as tobacco use, sedentary lifestyles, unhealthy eating habits, stressors and other preventable health behaviours.<sup>91</sup> Through the workplace direct influences can be imposed on the employees' physical, mental, economic and social well-being. Workplaces can reach a significant proportion of employed adults and their families and have been shown to be an effective means of promoting healthy lifestyle behaviour.<sup>90,91,224-227</sup> A plethora of intervention studies has been carried out on workplace health promotion, seeking to improve employees' health. Hartmann, for example, found that an 8-week educational workplace health intervention in the USA resulted in significant health effects in blood lipid profiles. Total blood cholesterol decreased an average of 0.22 mmol/liter, low-density lipoproteins (LDLs) decreased an average of 0.30 mmol/liter, and triglycerides decreased an average of 1.91 mmol/liter whilst high-density lipoproteins (HDLs) increased an average of 0.68 mmol/liter.<sup>224</sup> Cook et al. found that workplace health programmes in New Zealand men are effective in reducing caloric fat intake ( $-3.4 \pm 7.4$ ), improving dietary behaviour, increasing PA levels and in reducing SBP ( $-5.8 \pm 15.3$ ) after 12 months.<sup>225</sup> A deeper review of the latest empirical evidence on workplace health promotion has been provided by Goldgruber.<sup>90</sup>

Workplace interventions can affect the health of the employee, the employees' families, communities and the societies at large.<sup>216</sup> Multiple levels of influences can be addressed through the workplace: Direct efforts, such as health education, provision of healthy food and increased opportunities for PA and indirect efforts, such as fostering social support and promoting health behaviour can stimulate individual health behaviour.<sup>222</sup> Moreover, workplace interventions may be more sustainable than other settings, as they can be employer funded if successful "in assisting with business-level outcomes such as reducing absenteeism and improving work performance".<sup>223</sup>

The workplace is a key setting in which PA can be promoted. Workplace PA programmes have shown to be highly effective in decreasing risk for musculoskeletal disorders, fatigue and exhaustion and reducing workplace injuries.<sup>92,228</sup> Moreover, research indicates that healthy workplace programmes that target PA and diet can improve health related outcomes such as obesity, diabetes and cardiovascular risk factors.<sup>229</sup>

Workplaces provide important environments for comprehensive PA interventions: individually tailored health promotion education and individual counselling can increase awareness and participation, group competitions, support groups and peer-led programmes may promote group solidarity and cohesion.<sup>111</sup> Environmental modifications such as time off from work can encourage participation in PA.<sup>92,230,231</sup>

Research indicates for example that employees who engage in route-based walking have increased their workday step counts and reduced NCD risk factors.<sup>232,233</sup> Positive effects of PA on work performance, fitness and absenteeism have likewise been observed.<sup>234</sup> I presume that innovative and proactive strategies can reach largely inactive and sedentary individuals who would not typically join an 'organised' PA programme. I suggest the promotion of more incidental PA such as stair use, lunch hour walks, interoffice competitions and the incorporation of social support for PA to increase habitual PA levels. Increasing active transport to and from work and interrupting prolonged periods of sitting may prove effective in promoting incidental walking in the workplace.

Management support and the integration of health interventions into the organisational workplace structure have been shown to be particularly effective.<sup>235</sup> This detail was taken into account with the intervention presented with this thesis. The collaboration with an organisation in which management had previously embraced a healthy workplace programme was an optimal prerequisite for continuous management support and for the creation of a more credible and sustained "healthy culture" at the workplace.

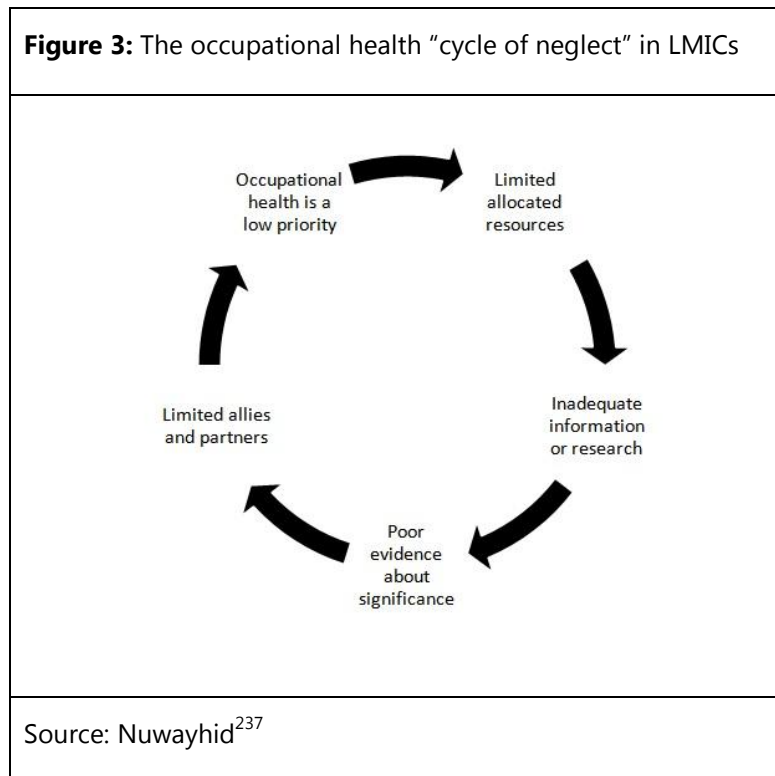
I conclude with an overview of rationales for using workplaces as a setting for health promotion.

**Key rationales:**

- Workplace health promotion can reach a significant proportion of the adult population<sup>221</sup>;
- Workplace health promotion can enhance teamwork: a social support network enhances group dynamics<sup>20</sup>;
- Workplace health promotion can revitalise health and productivity at the workplace<sup>236</sup>;
- Workplace health promotion fosters a supportive environment; existing social contacts can be used for mutual support<sup>227,231</sup>;
- Workplace health promotion embraces every participant regardless of their age and fitness level and helps them set achievable short and long-term targets;
- Above all, workplace health promotion can be fun and makes exercise a fun activity.

**Workplace health in low- and middle income countries (LMICs)**

Workplace health is an understudied field in LMICs. Moreover, social, economic and political challenges often hinder workplace health programme implementation per se. In actual fact, the lack of governmental interest, poor data and data collection systems, and a weak enforcement of health and safety regulations limit the progress of workplace health in LMICs.<sup>237</sup> It is questionable why LMICs are largely unconcerned with workplace health and why it is not more widespread where it is most needed.<sup>238</sup> According to Elgstrand, workplace interventions in LMICs that focus on occupational hygiene and ergonomic practices could potentially break the cycle of poverty.<sup>239</sup>



Decision-makers in LMICs have been identified to frequently associate workplace health programmes as luxury adjuncts, thus often refrain from programme implementation. A stronger and more convincing case for the importance of workplace health in LMICs is therefore needed. Nuwayhid suggests generating a fundamental change in attitude towards the day-to-day exposure of occupational risk. He further suggests firstly addressing social and political issues at the top, and then narrowing down and addressing particularities of the workplace. This would allow interrupting the “vicious cycle of neglect” (Figure 3). He further highlights the need for targeted workplace programmes that address the cultural and social contexts of the underlying country where programmes are implemented.

### **Pacific workplace health programmes**

The WHO has worked with Member States in the Western Pacific Region on the development of healthy workplaces.<sup>240</sup> A healthy workplace is herein defined as a place where “everyone works together to achieve an agreed vision for the health and well-being of workers and the surrounding community”.<sup>240</sup>

Whilst research on workplace health programmes is extremely limited in the PICs, a stocktake of PA programmes identified 26 programmes that had been implemented in Pacific workplace settings.<sup>116</sup> No systematic approach, let alone, evaluation had been carried out, thus the health impact of these programmes remains unknown.

In 2010, I carried out formative assessments of workplace health programmes in three PICs; Findings indicate a lack of resources, and limited capacity and information for programme progress.<sup>241</sup> A successful workplace health programme was implemented in Vanuatu in 2007 (details Appendix L). Regrettably, due to change in government and the loss of key supporters, the programme terminated in 2011.

## **Physical activity**

The WHO has recognised that physical inactivity is a global health concern, largely contributing to the NCD burden.<sup>242</sup> Recent data rank physical inactivity fourth in terms of overall mortality burden.<sup>243</sup> Scientific evidence suggests that physical inactivity carries major negative health consequences throughout the lifespan.<sup>17</sup> It causes 9% of premature mortality due to NCDs in 2008, and if decreased by only 10%, more than 533,000 deaths could be avoided annually.<sup>17</sup> Increasing population PA levels is thus one of the most promising strategies for improving population health and for reducing the NCD burden.<sup>87,101,244</sup>

Regular PA is associated with several benefits to overall health.<sup>95,97-101</sup> Epidemiological research has demonstrated protective effects between PA and NCD risk factors including coronary heart diseases, hypertension, non-insulin-dependent diabetes mellitus, osteoporosis, colon cancer, and anxiety and depression.<sup>103</sup> PA is also a key element in obesity prevention,<sup>104</sup> is a critical component of energy balance and it is associated with positive mental health.<sup>105</sup> Research suggests that higher levels of regular PA are associated with lower mortality rates for both older and younger adults.<sup>100</sup> Inactive lifestyles, however, have adverse health effects and are associated with markedly increased all-cause mortality rates.<sup>103</sup>

Research assumes that higher levels of regular PA are associated with lower mortality rates for both older and younger adults.<sup>100</sup> PA can be achieved through structured and unstructured activities. It can include occupational activities, such as household chores, gardening, carrying out domestic tasks, and recreational activities, such as volleyball, football, dancing or swimming. Lifestyle-based PA, as opposed to structured exercise programmes (gym, walking trainers, supervised programmes) is more likely to be successful in increasing PA levels over the long-term.<sup>245</sup>

PA is an important element in health promotion, particularly so in disease prevention.<sup>246</sup> It was recognised as one of the four key prevention strategies by the 2011 United Nations high-level meeting on prevention and control of NCDs.<sup>132</sup>

PA interventions can reduce the incidence of type 2 diabetes by up to 58%.<sup>247</sup> and a combination of dietary and physical interventions can reduce obesity in high-risk populations within twelve months.<sup>191</sup> Research has shown that even moderate-intensity PA can reduce risks of cardiovascular diseases, hypertension, some cancers and type 2 diabetes.<sup>103,248,249</sup> The uptake of PA in midlife years is associated with a decreased risk of overall mortality.<sup>103</sup>

Few successful population-wide PA interventions exist. Informational, environmental and policy approaches have been identified to be effective for increasing population PA levels.<sup>246</sup> For example, Canada<sup>250</sup> and Finland<sup>251</sup> have invested in mass media, community programmes, and environmental strategies over two decades and demonstrated an increase in population prevalence of regular PA. More recently, Brazil<sup>252</sup> and Colombia<sup>253</sup> have implemented comprehensive national programmes, indicating the feasibility of these strategies in LMICs.

Whilst a review of *Best Practice in Interventions to Promote Physical Activity in Developing countries* found that intervention design and messages (e.g. recommending 30 minutes of PA on most days of the week, and increasing consumption of fresh fruits/vegetable) in LMICs are not different to those used in PA interventions in high income countries,<sup>254</sup> the author suggests that culturally-specific health promotion approaches prove more effective. Social structures must be taken into consideration in the design of PA interventions, because the culture that encompasses socially transmitted behaviours, beliefs, and institutions may influence PA participation.<sup>255</sup> The incorporation of cultural traditions and partnerships with community advisory boards may be strategies to address this concern.<sup>256</sup> PA promotion should ideally develop and utilise options in the local community or Church, "be economically feasible, and consider the patriarchal or matriarchal beliefs and practices".<sup>257</sup>

Numerous structured and unstructured approaches have been advocated for increasing PA levels, among which walking seems the easiest, most appropriate, most accessible and most cost-effective strategy.<sup>258,259</sup> Importantly, incremental increases in PA behaviour have been found to be effective in improving health indicators.<sup>260</sup> This is an important finding for the promotion of habitual PA: three 10-minute bouts of walking during the day are similarly effective like one continuous 30-minute session. Formative work from Vanuatu indicates that walking is the preferred mode of exercise in Ni-Vanuatu women and a targeted promotion may lead to increased PA behaviour.<sup>154</sup>

Walking has been recognised as an important form of PA that can be easily incorporated into daily life.<sup>103,261</sup> It is a popular mode of PA in the Pacific region where hot and often rainy weather conditions can hinder vigorous running or other outdoor sports. Moreover, walking is the main mode of transport in both urban and rural settings in the Pacific Islands. It can be performed on

an individual basis, with a partner, family member, neighbour, colleague or in groups during recreational activities, for transportation, occupational tasks and activities of daily living. It therewith a practical all day form of PA. Moreover, walking is an important strategy to increase habitual PA for both participants and researchers: it is the easiest activity to assess PA levels of sedentary populations precisely.<sup>262</sup> and the simplest way for people to increase their activity levels and sustain it over the long term.<sup>263</sup>

Walking can be very important for overweight and obese individuals as it is a low-impact activity with little risk of injury.<sup>245</sup> Walking does not require equipment, facilities or special techniques that need to be learned.<sup>264–266</sup> Moreover, walking is an ideal form to initiate a PA programme for sedentary people – it has been shown that incremental changes lead to positive health outcomes.<sup>98</sup>

Research indicates that pedometer-based PA programmes are effective strategies and have positive and moderate effects to increase participants' activity levels.<sup>261,267–269</sup> The success of PA interventions is often enhanced through the use of objective measures of PA that provide individuals with immediate feedback.<sup>19,270</sup> Since the 1970s, Japanese researchers have recommended 10,000 steps for optimal health as an alternative approach of recommending 30 minutes of moderate PA.<sup>271</sup> Hatano suggests that the accumulation of 10,000 steps per day is indeed comparable to achieving 30 min of PA per day.<sup>110</sup> Several countries have adopted the 10,000 steps recommendation for increasing population PA levels<sup>272</sup> and it has become a popular health promotion recommendation.<sup>273</sup> The approach of 10,000 steps is low-literacy friendly, easy to remember, provides the participants with a concrete goal for activity levels and is immediately understandable for end users. Moreover, as with any daily step goals, the recommendation is focused on behaviour (not the metabolic cost of that behaviour) and therefore applies to individuals of various body sizes.<sup>274</sup>

Pedometers have demonstrated validity and reliability in pedometer-assessed PA and have become increasingly popular for researchers.<sup>268,275</sup> An objective daily step number is fairly reflective of overall energy expenditure in individuals.<sup>262,276,277</sup> and has shown to increase awareness of PA behaviour.<sup>113</sup> It is a descriptive tool, an outcome measure in lifestyle interventions, and a motivational tool itself,<sup>112,113</sup> if realistic goals are set. Yamax SW-200 has been shown to be accurate and reliable for measuring step numbers in adults<sup>278</sup> and thus will be used in the intervention presented in this thesis.

Given the high prevalence of sedentary lifestyles in urban settings in the Pacific,<sup>76</sup> it is important to identify ways to assist the population become more active. The use of pedometers can help Pacific populations realise how little they actually move.<sup>156</sup> The goal of accumulating 10,000



steps per day is effective in increasing daily walking behaviour. Research indicates that programmes that encourage PA in the absence of a goal have shown no significant improvements in steps/day opposed to those that have promoted the use of the 10,000 steps/day goal with increases of 2,000 steps/day in programmes.<sup>268</sup> Research further suggests that low active, overweight women undertake more PA in combination with a daily 10,000 step goal and monitoring PA levels with a pedometer, rather than when they were asked to achieve 30 minutes of walking/day.<sup>279</sup>

Based on the best available evidence to date, the following recommendations have been developed as a guide on how many daily steps are sufficient for health benefits in generally healthy adults:

<b>Table 2:</b> Schematic presentation of potential steps/day zone groupings and associated descriptive categories: Healthy adults	
<b>Steps/day Zone</b>	<b>Descriptive Category</b>
≥ 12,500	Highly active
10,000 – 12,499	Active
7,500 – 9,999	Somewhat active
5,000 – 7,499	Low active
≤ 5,000	Sedentary

Source: Tudor-Locke<sup>274</sup>

Research indicates the positive impact of pedometers: pedometer-based increases in PA levels are more likely to be sustainable than structured exercise programmes (gym, supervised programmes).<sup>245</sup> and the daily use of pedometers is associated with significant increases in PA.<sup>268,280</sup> Direct feedback from pedometers prompt lifestyle behaviour change as they raise awareness of current walking behaviour,<sup>281</sup> they can serve as motivation tools,<sup>270</sup> they enable self-monitoring<sup>110,282</sup> and they objectively evaluate changes in PA levels.<sup>232</sup>

An exploratory analysis of factors related to pedometer-intervention adherence revealed that those most likely to complete a pedometer intervention programme were overweight or obese class I individuals.<sup>283</sup> The Vanuatu NCD survey from 2007 revealed that 66% of screened participants were overweight and obese.<sup>284</sup> While this secondary data is promising, empirical research is required to examine whether similar results and overall positive development can be expected in a LMIC context.

There is a plethora of evidence that walking reduces NCD risk factors: step increases by 2,000 steps daily are associated with improved serum lipid profiles<sup>98</sup> and BP<sup>282</sup>. Greater PA levels are associated with a substantial reduction in risk of type 2 diabetes.<sup>285</sup> Manson et al. demonstrated that walking is associated with reductions in the incidence of cardiovascular events among postmenopausal women,<sup>99</sup> and previously inactive women can lower their BP<sup>286,287</sup> and decrease their BMI.<sup>286</sup> The prevalence of metabolic syndrome and cardiovascular disease decreases with increased step numbers.<sup>288</sup> An 8-week walking intervention in the USA proved that daily walking (10,000 steps) can significantly improve glucose tolerance and reduce diabetes risk.<sup>287</sup> Middle aged women who accumulate 10,000 steps per day are more likely to experience health benefits and are more protected against obesity than women who accumulate less steps per day.<sup>272</sup>

In 2011, the “Prioritized Research Agenda for Prevention and Control of Noncommunicable Diseases” with a special focus on NCD prevention research in LMICs was published.<sup>289</sup> Regarding PA behaviour, various research priorities for LMICs were identified. The initiation of surveillance methods to collect population PA prevalence, the detection of individual, social and environmental determinants of PA, the implementation of whole-of-community approaches and the effect of modifications of the urban environments were suggested as PA research priorities for LMICs.

In 2009, the Council for Global Advocacy for Physical Activity (GAPA) developed an advocacy tool (Toronto Charter for Physical Activity) to create sustainable opportunities for physically active lifestyles for all.<sup>290</sup> It is a call for action that encourages and supports governments to adopt certain guiding principles. As a first step, the WHO has issued global recommendations on PA.<sup>102</sup> and several countries have implemented their own national PA recommendations aiming to increase nation-wide PA levels. Governments are now challenged to provide supportive environments and to implement affordable interventions that aid in the adoption of national PA guidelines – a particular challenge for LMICs.

Worldwide prevalence of physical inactivity is higher in women 23.7% than in men (18.9%).<sup>291</sup> Moreover, women appear to be particularly susceptible to NCDs.<sup>72</sup> Thompson et al. found that inactive women (less than 6,000 steps/day) had a less favourable body composition profile and more total and abdominal fat,<sup>272</sup> whereas Lee et al. found that at least one hour of walking per week predicted a lower risk for cardiovascular diseases in women.<sup>97</sup> Evidence is available that the 10,000 steps recommendation is suitable for promoting health in women aged 40–66 years.<sup>19,97</sup> Brown et al. found that women were more likely to adopt the 10,000 steps messages than men in urban Australia<sup>21</sup> and Englberger found that Tongan women were more likely to participate in

a healthy lifestyle intervention than men.<sup>75</sup> Research is required to investigate whether trends are similar in a different cultural and economical context.

Globally, physical activity rates are declining.<sup>292</sup> The decline is associated with an increase in technology which dominates the global population. An evolutionary explanation may aid in understanding the more deeply rooted origin of human behaviour modifications. The globally experienced shifts in diet and activity are not new phenomena. Rather they are adaptive trends that have happened throughout human evolution.<sup>39</sup> In fact, a trademark of human evolution has been the ability to increase the efficiency with which we extract food from our environment.<sup>39</sup> Low energy expenditure with a high energy intake was an evolutionary success. Whilst more traditional and self-subsistence lifestyles are still characterised by high levels of PA and energy expenditure,<sup>293</sup> the more contemporary lifestyles turn out to be victims of their own success: low levels of PA are required for survival and large food supplies contribute to positive energy balances, causing growing rates of overweight and obesity.<sup>39</sup> The rapid and unplanned urbanisation in many PICs produced large imbalances between “energy in” and “energy out”. Leonard calculated the amount of PA that is required for urban individuals to approximate the PA levels of more traditionally living societies. He found that by replacing one hour of sitting with daily vigorous-intensity exercises, both men and women would come closer to the PA levels of people living traditional lifestyles.<sup>39</sup> This finding is important for the understanding and adoption of Pacific public health PA recommendations which currently promotes 30 minutes of moderate-intensity PA on five days per week.<sup>76</sup>

For the best possible future well-being of Pacific people, the ideal, but, unethical and unrealistic solution is the re-adoption of the traditional way of life: a lifestyle where movement and eating is an approach to survival in a “clean” environment. Traditional ways of living seemed to ensure more permanence and sustainability.<sup>294</sup> A shift in understanding of the meaning of contemporary lifestyle behaviour is needed. Whilst it is generally well understood that, in times of hunting and gathering, lifestyle behaviour used to be a strategy for survival, the more modern understanding is that lifestyles are realised primarily by choice (*Lebensführung*) within the social context provided by chance (*Lebenschancen*).<sup>295</sup> Importantly, lifestyles *remain* to be a strategy for survival, even more so in environments with limited chances, as experienced in the PICs. The coin, however, has flipped: whereas insufficient food used to threaten survival, it is now the abundance of food, and a limited need for movement that puts lives at risk. A well-defined, culturally-*meaningful* promotion of traditional lifestyle behaviour may help the population understand that, broadly speaking, imported goods from overseas can harm individuals and populations; may threaten culture and health, and, most importantly, can lower the well-being of the population at large. The understanding that the traditional lifestyle, characterised by high

levels of PA, prevented the onset of NCDs in the first stage may aid in a) increasing PA levels and in b) preventing further NCDs.

## **Using social marketing strategies to increase PA behaviour and enhance health**

Social marketing strategies can play an important role “as part of a sustained and coordinated multi-level strategy to initially change community norms towards inactivity, and then to increase population-level physical activity”.<sup>296</sup> In fact, few other options are available that influence social norms and attitudes and that indeed lead to changes in behaviour. Importantly, social marketing strategies tend to be implemented for a short duration, assuming that human behaviour changes “over night”.<sup>296</sup> More long-term thinking, planning and financial support are essential for more sustained effects of social marketing campaigns. As such, Bauman et al. suggest more profound social marketing campaigns to increase PA levels globally.<sup>297</sup>

Research indicates that a successful social marketing campaign can influence the public agenda and increase the amount and quality of information spread throughout communities.<sup>296</sup> Interventions that aim to influence population-level thinking and social norms are ideally designed in a way to reach a large number of people at a relatively low cost and to influence communities’ beliefs. “Behaviour change is neither a likely nor a necessary early outcome of mass media campaigns”.<sup>296</sup> Rather, it is a positive change in belief, social norms or intention.

The theory of reasoned action and the theory of planned behaviour.<sup>298</sup> state that “social norms and attitudes to a behaviour are important determinants of behavioural intention, which itself is an antecedent to physical activity behaviour”.<sup>299</sup> Raising awareness of PA, influencing social norms about everyday habitual activity and influencing beliefs about PA levels could be a useful component of PA promotion.<sup>296</sup>

The principal challenge for social marketing to increase PA often lies in the communication of a single message for public education purposes.<sup>296</sup> On a micro-scale, this thesis seeks to communicate clear, direct messages on the quantity and quality of PA to the target population. Latimer et al. emphasise that in order to encourage individuals to adhere to PA recommendations, social marketing tools must be supplemented with messages that convey *why* and *how* to achieve the recommended activity level.<sup>300</sup> Rather than promoting exercise per se, campaigns are advised to promote ideas such as feeling good and having increased energy or longevity.<sup>296</sup> These approaches were taken into consideration during the distribution of health education materials sent to all participants per email on a weekly basis during the *Wokabaot Jalens*.

It is important to understand that health behaviour change as a result of social marketing campaigns is more likely to occur in individuals who already contemplate about healthy lifestyle adoption.<sup>296</sup> This is in line with the Transtheoretical Model suggested and developed by Prochaska.<sup>301</sup> The key challenge then, is to ensure that social marketing campaigns really do improve population health and not only that of certain socio-economic groups. Two key principles must receive particular attention: understanding the target audience (in the case of the intervention: female civil servants) and making sure that the social marketing campaign is reinforced by long-term policy and environmental changes which support PA (Ministry of Health). Regrettably, the majority of the ongoing or small-scale social marketing approaches is not evaluated or reported in the literature.<sup>296</sup>

Pacific islanders tend to have higher PA participation rates when programme emphasis is placed on the "fun" part of the intervention.<sup>156</sup> As such, the *Wokabaot Jalens* is centred on fun approaches in PA and healthy lifestyle behaviour change. A variety of fun-centred activities was promoted and included cultural dance lunch-hour sessions, stair climbing, cultural mass aerobic sessions etc. Rather than including competitive elements, the enjoyment of team-based activities has helped in programme participation and lured healthy lifestyle changes.

Research indicates that the main motivating factor for the continuation of regular walking or PA after an intervention is the improvement of the individual health status.<sup>270</sup> To take these findings into account, social marketing slogans that focus on the rewarding experience of PA (i.e. improved health) in combination with promoting the enjoyment of PA may aid in the process of changing the populations' lifestyle behaviours.

As early as 1982, Zimmet suggested addressing the socio-economic factors that influence community health in the PICs through more intense marketing campaigns, high taxes on imported food and the promotion of PA and sports.<sup>71,302</sup> Research indicates, however, a lack of interest in conventional public health educational methods in the Pacific region.<sup>69</sup> Further, explorative work from Vanuatu in 2009 revealed that social marketing strategies are a major challenge due to lack of resources and expertise.<sup>116</sup> This thesis seeks to avoid conventional public health education methods, but designs novel and culturally appropriate strategies to transmit the message of healthy lifestyles. The intervention approach taken in this thesis has incorporated a number of social marketing strategies, ranging from media (TV, Radio, local newspaper, internet) involvement, to tailored health information materials, and culturally meaningful posters and flyers. Efforts were all enforced by the Ministry of Health Vanuatu.

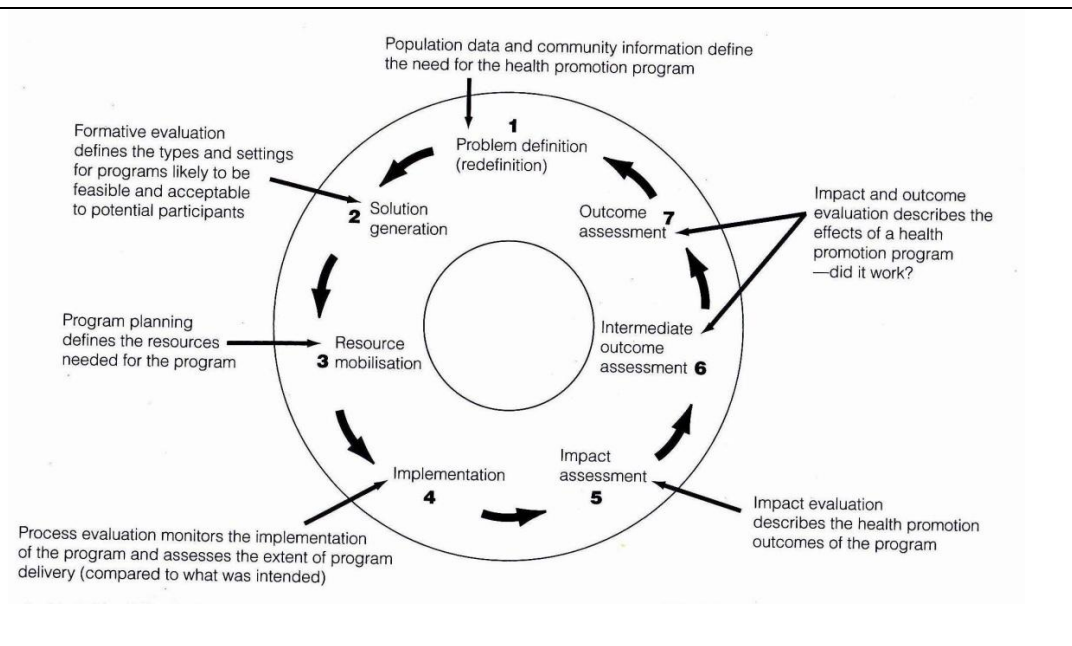
## **Theoretical background on evaluation**

A thorough evaluation of any health promotion programme is essential for understanding programme success. Evaluation is a continuous process that commences with the initial idea of an intervention and is often maintained until after programme completion. Evaluation processes produce information to describe, improve, adapt, and make decisions about programmes.<sup>303</sup> Various definitions have been provided for the word *evaluation*. In general, "evaluation is a process of reflection whereby the value of certain actions in relation to projects, programs, or policies are addressed".<sup>304</sup> Nutbeam and Bauman define evaluation as "the formal process of judging the 'value' of something" or, more health promotion focussed, as an approach that "[...] will determine the extent to which a program has achieved its desired health outcomes, and [that] assess the contribution of the different processes that are used to achieve these outcomes."<sup>305</sup> The following section will detail the evaluation approaches that were taken for this thesis.

For the design of the studies that are presented in this thesis, several systematic steps were undertaken which are in accord with Nutbeam's structured approach to best achieve successful evaluation outcomes.<sup>305</sup> Initially, a thorough analysis of the health situation in the PICs was conducted to indicate the scope for a targeted intervention. Following, clearly defined and feasible programme goals and objectives were identified (see Statement of Purpose). A formative study (Chapter 3) followed in order to develop the intervention giving attention to the materials, resources and human capacities required for successful implementation. The health promotion programme was implemented as planned and was of "sufficient size, duration and sophistication to be proven effective or ineffective".<sup>305</sup> Evaluation processes were clearly laid out and provide sufficient and relevant information to those who will decide the programme's value.

This thesis has embedded the evaluation approaches into the health promotion planning and evaluation cycle that is presented in Figure 4. The different stages in the planning, implementation and evaluation of a health promotion programme are herein displayed in the form of a cycle.

**Figure 4:** Health promotion planning and evaluation

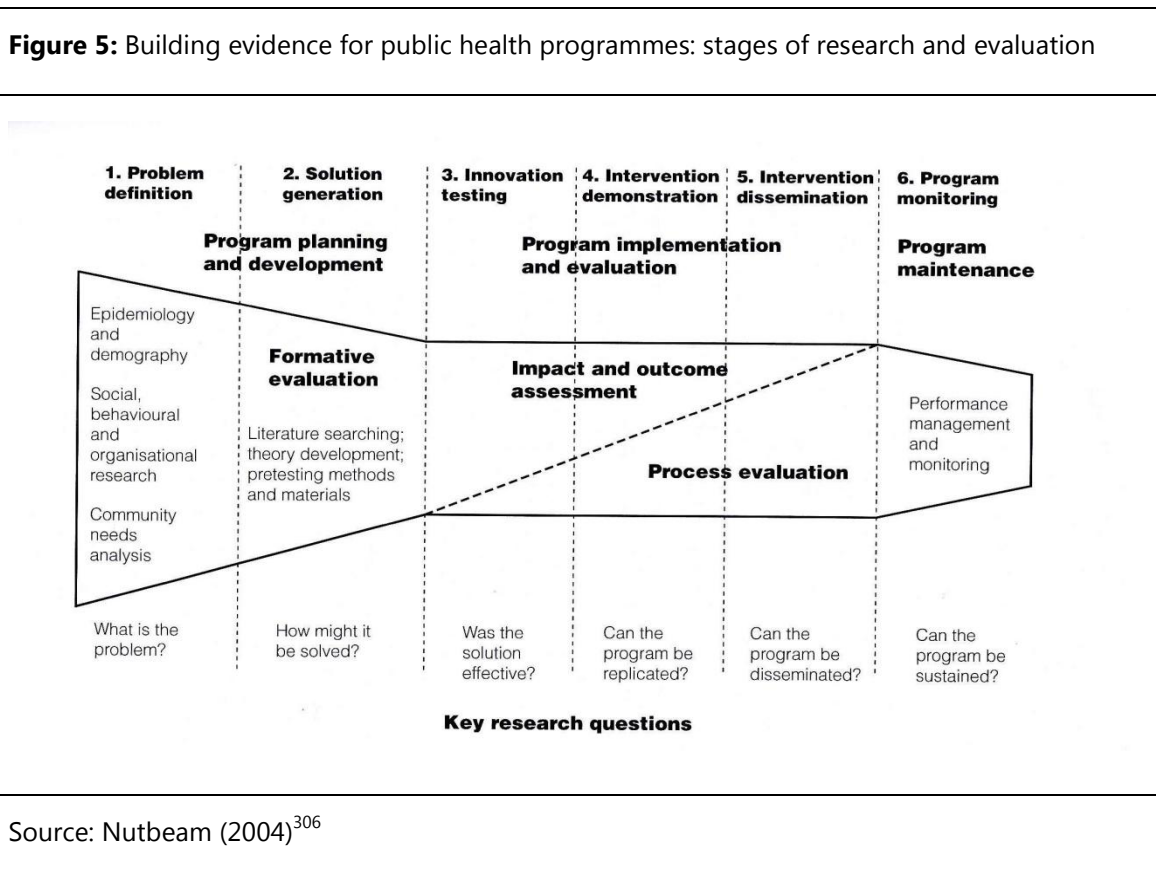


Source: Nutbeam (2004)<sup>306</sup>

Figure 4 illustrates the different stages and their relationships in the development of a health promotion plan of action, including implementation and evaluation. The cycle visualises the continuous redefinition that is required for constant programme improvement. This model serves as a guide for the studies presented. It is important to acknowledge that whilst following this cycle in detail would be the ideal case, real-life situations often drift from these theoretical steps. The close adaption to prevailing circumstances will be aimed at.

Evaluating health promotion interventions is a complex process. The definition of evaluation designs<sup>xiii</sup> helps take adequate steps that are required for a planned health promotion programme. Nutbeam and Bauman<sup>306</sup> suggest an evaluation framework, displaying different research and evaluation questions that need to be addressed stage by stage in the planning, evaluation and dissemination of a health promotion intervention (Figure 5).

<sup>xiii</sup> Evaluation design: a set of procedures and tasks to be carried out in order to systematically examine the effects of a health promotion intervention.<sup>306</sup>



Based on this evaluation framework, this thesis encompasses the three key types of health promotion evaluation, namely formative, process and outcome evaluation.<sup>306</sup> Formative evaluation aims to answer questions of relevance to an identified health problem, and the practicality of different intervention methods; process evaluation seeks to answer questions “concerning the process of implementation, and recording the extent to which the programme was implemented as planned”; and outcome evaluation “is directed towards answering questions concerning whether the program successfully achieved its goals”.<sup>306</sup> Further details about the specific evaluation designs are provided in the relevant chapters of this thesis.

### Theoretical frameworks on behaviour change

When attempting to change individuals’ health-related behaviour, it has long been assumed that the provision of information alone may lead to behaviour change. It was then realised, however, that information alone does not suffice to generate behaviour change.<sup>307</sup> A number of theoretical models and frameworks have since been developed in response to the lack of success in early attempts to promote health behaviour change. Many of these models form the basis for current knowledge about behavioural change theories and were published in the 1970s and 1980s. Numerous models are available. Fishbein and Ajzen’s Theory of Reasoned Action,<sup>308</sup> Bandura’s writing on Social Cognitive Theory<sup>309</sup> and Prochaska’s work on the Transtheoretical



Model<sup>301</sup> outline the major health behaviour change theories. All are designed to “explain or predict why people behave as they do” and they can provide insight into the redevelopment of existing interventions to be more effective.<sup>307</sup> These are now briefly discussed to explain the methods used for the intervention in this thesis.

The Theory of Reasoned Action (TRA) is a model for the prediction of behavioural intentions, including both attitude and behaviour.<sup>308</sup> It supports the notion that an individual’s thoughts and perceptions are important determinants of behaviour.<sup>307</sup> According to this model, the most important factor in determining whether individuals will actually perform a desired behaviour is their behaviour intent which is influenced by personal attitudes and perceived social pressure. The latter refers to beliefs which individuals have about what opinions their close reference groups (i.e. family, friends, peers) hold. The model assumes that individuals who have positive attitudes towards performing a particular behaviour and who believe that their close peer groups support the desired behaviour, will be more likely to attempt behaviour change. However, for some people, an individual’s own attitude will have a stronger influence on their behaviour than perceived social pressure, and vice versa for others.<sup>307</sup> This imbalance was considered as too strong in the context of Ni-Vanuatu women for using the TRA as a foundation for the intervention study.

The Social Cognitive Theory (SCT) explains human behaviour as a multi-dimensional process.<sup>309</sup> It assumes that individuals interact continuously with their social environment. As such, they influence, and are influenced by their social milieu (family, friends, colleagues). Observation and effective role models are important in learning new behaviours. In this model, practice, trial and error are defined as the most powerful source of learning. Human beings learn by experience - the more an individual practices a certain behaviour, the more it is capable of accomplishing the task, and the more motivated they will be to attempt a desired action.<sup>307</sup> Self-efficacy, the belief that one can perform a behaviour even though it is challenging, has been shown to be an important predictor of actual health behaviour change.<sup>310</sup> For behaviour change to be effective and sustainable, it is important to address individual beliefs and attitudes of the target population.<sup>298,311</sup> Whilst the application of this model of behaviour change to this thesis could provide important detail, the author believes that the communal nature of the target population may be so critical that a focus on individual beliefs is not appropriate.

Research suggests that a *stages of change approach*<sup>301</sup> may be a useful strategy to tailor an intervention to the participants’ needs. It is “based on the premise that behaviour change is a process and explains [that] the psychological processes that people undergo are iterative in nature.”<sup>307</sup> Prochaska et al. suggest that behaviour change interventions are ideally adjusted to

the individual and their respective stages in the change process.<sup>301</sup> The approach characterises five change stages, i.e.: Precontemplation, Contemplation, Decision, Action, and Maintenance. These stages can well be used to explain why people behave the way they do. They may also aid in targeted intervention design. Whilst a large audience with individualised goal-setting strategies can be targeted,<sup>92,226</sup> it requires a detailed understanding of each participants' psychological stage. Due to time and financial constraints, a detailed consideration of this approach for the thesis' intervention study was unrealistic.

A small selection of theoretical models that explain and predict behaviour change was presented to illustrate the complexities of human behaviour change attempts. It is important to mention that most of these frameworks and models were developed in the Western countries and haven't proven effective when applied to other cultural contexts.<sup>312</sup> Aggleton<sup>312</sup> noted that some of these models do not sufficiently take the social context into consideration within which particular actions become meaningful. He further observed that "efforts to transplant such frameworks to developing countries have encountered difficulties; because social norms, duties and obligations may be different in strength and kind to those encountered in the West."<sup>307</sup> Moreover, the relevance of individual behaviour over communal activity needs to be put into question: in social contexts, where personal behaviour is often a community-based process, these models and framework may need to be adjusted and revised. The relevance and applicability in the context of Ni-Vanuatu women would need to be tested prior to utilising these models. As early as 1986, Hubley<sup>313</sup> found that difficulties in health promotion planning processes in LMICs can be attributed to "targeting an intervention at the individual levels without taking into account the influence of "significant others", at community and national levels."<sup>307</sup> Therefore, it is not clear that the application of these behaviour change models is relevant for this thesis. In fact, research suggests that using generic frameworks in Pacific health research has not worked for Pacific people<sup>174</sup> as it is vitally important to ensure respect for Pacific values, beliefs and the knowledge Pacific people bring to a research project. I therefore suggest using a more holistic approach for this thesis.

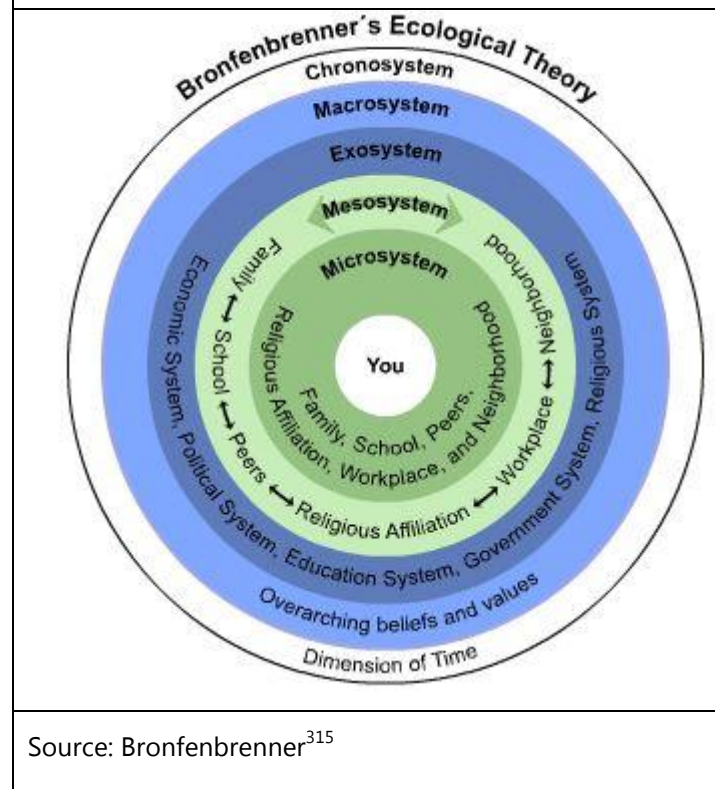
A shift away from an individual-focused approach in behaviour change theories to an environmentally based and community-oriented approach may be more relevant in the context of Vanuatu. In the 1950's, Lewin proposed that human behaviour was a function of the person and his or her environment.<sup>314</sup> His work led to the development of social ecological models for understanding human behaviour (Figure 6).<sup>230,315</sup> Social ecological models address multiple levels of behaviour influence, leading to a more comprehensive approach to behaviour change theories. Bronfenbrenner has proposed the social ecological model as a conceptual framework of human development which emphasises and examines the interaction between the individual

and the environment, social settings, cultural influences and economic factors. He suggests four levels of environmental influences that represent degrees of intimate interactions and that influence human behaviour: the micro-, meso-, exo- and macrosystems.<sup>315</sup> Addressing these different levels in health promotion interventions may lead to a more holistic approach of behaviour change, as the ecological perspective implies reciprocal causation between the individual and the environment. I assume that it is this model that is particularly relevant in a context that is characterised by strong communal attributes and social networks such as Vanuatu. As such, I chose to use the social ecological model as a theoretical framework for the intervention study of this thesis. For a detailed overview of ecological approaches in this field, the reader is referred to *“Ecological Perspectives in Health Promotion”*, by McLeroy.<sup>230</sup>

Marshall suggests that due to the distinct levels of potential behaviour influence, workplaces provide promising environments for using social-ecological approaches.<sup>235</sup> They can be applied to understand and impact health behaviour. The philosophical groundwork is the concept that behaviour does not occur within a vacuum, but that human health behaviour is affected by various influences:

- Interpersonal or individual, i.e. family, workplace (Microsystem)
- Mutual support, i.e. family, workplace (Mesosystem)
- Organisational, i.e. workplace management (Exosystem)
- Community, i.e. societal beliefs, values, attitudes (Macrosystem)

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**Figure 6:** Social ecological model / Bronfenbrenner

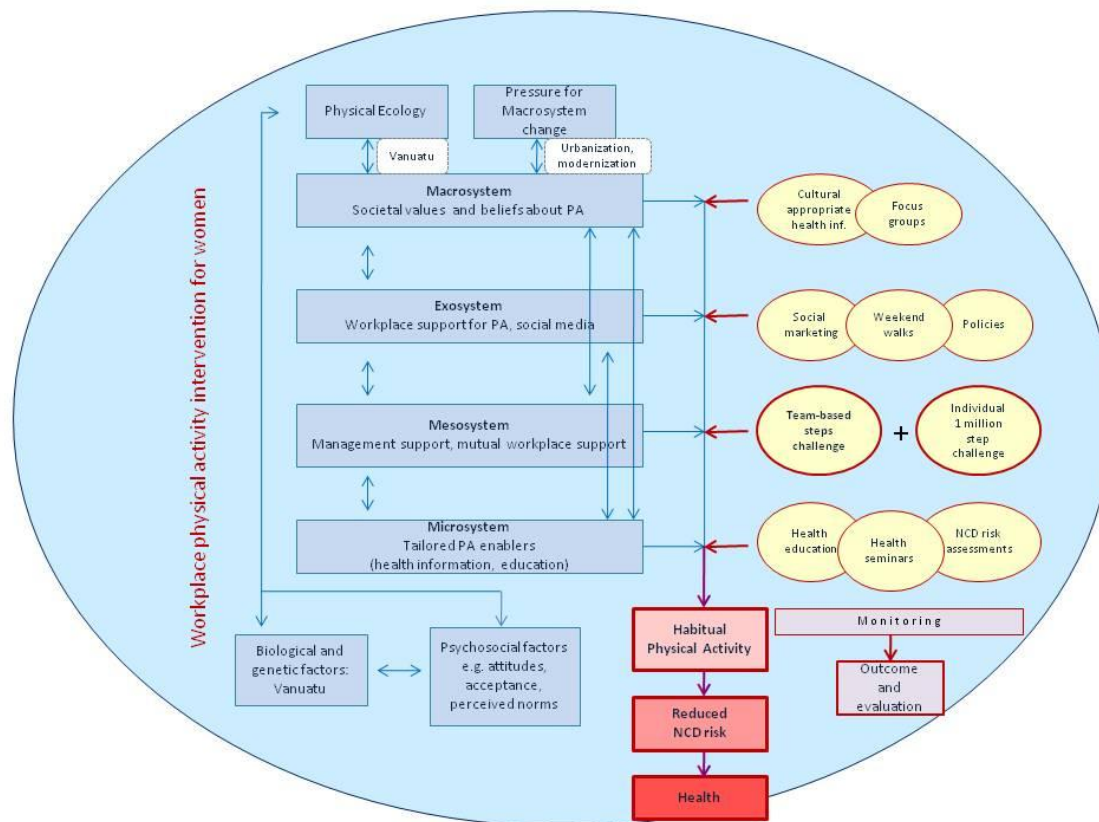
Importantly, these different levels are all interconnected and any health intervention grounded in this model needs to address each of these distinct levels for maximum programme outcome.

The inherent organisational structure of workplaces can serve as a crucial stimulator to support lifestyle behaviour change: management and supervisor support, changes in policies and regulations (e.g. smoking restrictions, fresh water provision), changes in benefits (e.g. insurance coverage and child care), and changes in the structure of work (e.g. time off to participate in health related activities) all have the potential to promote behaviour change.<sup>91</sup> Workplaces further offer a practical setting to build social support systems<sup>91</sup> and workplace policies have been proposed to strengthen the success of healthy workplace programmes.<sup>226</sup> Taking the social attributes of the target population into account, the author considers the social ecological model after Bronfenbrenner<sup>315</sup> as relevant and appropriate to embed the intervention study into this model.

The approach taken in the intervention presented in Chapter 5 can address the distinct levels of influences in the workplace. Starting at the *Microsystem*, participants can be provided with information and educational messages that may impact attitudes towards healthy lifestyle behaviour and physical activity in particular. The *Mesosystem* can be addressed through social support mechanisms and team-based activities. The *Exosystem* may be targeted through

management support (Ministry of Health) and through the embedding of the intervention into the existing healthy workplace programme of the Vanuatu Government. The *Macrosystem* can be targeted through the individuals' direct involvement (i.e. participation in walks, sport days) and indirect involvement through social marketing tools and the encouragement for further community distribution may impact beyond the individual employee. Importantly, no one single action suffices to generate lasting behaviour change, but actions across the layers, presented in Figure 7, are needed. Figure 7 displays the socio-ecological model approach taken for the design of this intervention. Multiple actions in some layers may lead to best outcomes.

**Figure 7:** The workplace PA intervention *Wokabaot Jalens* applied to the ecological model after Spence.<sup>317</sup>



## CHAPTER 3

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### **A stocktake of physical activity programmes in the Pacific Islands**

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#### **Preface**

It was during the years prior to commencing my doctoral research when I realised the true need for sustained health promotion practices. I witnessed the real burden of NCDs on a daily basis during my time in the Pacific: the observation of a preference towards eliminating any unnecessary, voluntary physical activity (*"Why do you take the stairs, Katja?"*, I was asked by colleagues) and to frequently consume convenience food (*"Fish and chips are cheapest!"*) was just the beginning of my Pacific health journey. It seemed that a trend towards more technology had invaded the country which was experienced as a "positive movement" by the majority of the population. Rarely did I enter a home where the television was switched off. Coming closer to "Western standards" seemed like an aspiration for many. As a result, many Pacific islanders are already overweight or obese. In actual fact, the Pacific Islands have overweight and obesity rates higher than virtually anywhere in the world.

The underlying tasks of Pacific health professionals to counteract this trend are to urgently identify and define locally effective health promotion programmes. In 1997 the WHO emphasised in its Jakarta Declaration the value of different settings for implementing comprehensive strategies and for providing an infrastructure for health promotion - much needed in LMICs. This body of work identifies PA health promotion strategies in different settings, aiming to advance Pacific health promotion through a critical programme review.

The purpose of this chapter is to understand PA programme scope, target and reach as an initial step for enhancing Pacific health promotion to reduce chronic disease. Gaps in programme provision were reviewed and guidance for future programme design and implementation is provided.

The manuscript resulting from this chapter has been published by the journal *Health Promotion International*<sup>xiv</sup>

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<sup>xiv</sup> Siefken K, Macniven R, Schofield G, Bauman A, Waqanivalu T. A stocktake of physical activity programs in the Pacific islands. *Health Promotion International*. 2012;27(2):197-207.



## Abstract

**Background:** Population NCD risk is among the highest in the world in the Pacific region. Increasing PA levels may be effective in reducing NCD risk in the developing and culturally diverse Pacific region.

**Methods:** Programme<sup>xv</sup> information was sourced from NCD representatives from nineteen countries during the Pacific NCD Forum, 2009. Additional online searches were undertaken; health officials from the twenty-two countries and NCD key informants from the Secretariat of the Pacific Community and from the World Health Organization were contacted.

**Results:** Eighty-four PA initiatives were identified in 20 PICs: 37 took place in the community setting, 26 took place in the workplace setting, 17 occurred in the school setting and four in a clinical or health sector setting. 17 programmes reached 100-500 individuals, nine programmes reached 500-1,000 participants, 13 programmes reached over 1,000 participants and three programmes targeted the whole population. The majority (51/84) of the programmes commenced since 2006.

**Conclusions:** There is a notable increase in development of PA programmes in multiple settings across the Pacific. Lead agencies are often the Ministry of Health offices with leadership support from high level government positions.

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<sup>xv</sup> Note: Some of the following PA initiatives are PA projects (with a definite duration), rather than PA programmes (ongoing). For reasons of practicality, the term PA programme is used throughout.

## Introduction

The World Health Organization (WHO) Western Pacific Region comprises 22 Pacific Island countries and areas (PICs). The region has experienced a major shift in disease burden: NCDs have overtaken communicable diseases and are a critical health and development issue.<sup>78</sup> In 2004, the PICs experienced economic consequences of NCDs totalling US\$ 1.9 million.<sup>47</sup> The prevalence of NCD risk factors in the Pacific region is among the highest in the world.<sup>3,5,6,30</sup> The leading NCD risk factors in the Pacific have been identified as unhealthy diets, physical inactivity, tobacco use and alcohol misuse.<sup>78,88,89</sup> The prevalence of these primary risk factors and the high rates of intermediate risk factors (obesity, hypertension, hyperglycaemia) portray the current and future NCD epidemic.<sup>89</sup> American Samoa, Tokelau and Nauru have overweight and obesity rates as high as 93.5%,<sup>7</sup> 86.2%<sup>8</sup> and 82.2%<sup>9</sup> respectively and diabetes rates are found to be 47.3% in American Samoa,<sup>7</sup> 33.6% in Tokelau<sup>8</sup> and 32.1% in Micronesia.<sup>10</sup> The proportion of deaths from NCDs is projected to rise globally from 59% in 2002 to 66% in 2030.<sup>42</sup> HICs have experienced increases in life expectancy due to prevention and treatment measures.

While NCDs account for 60% of global deaths,<sup>34</sup> NCDs account for approximately 75% of deaths in the Pacific region.<sup>146</sup> A significant proportion of NCD morbidity, disability and premature deaths within the region could be prevented through population-based lifestyle interventions and the control of preventable risk factors.<sup>55,86,87</sup>

The benefits of regular PA include reduced risk of heart disease, stroke, diabetes, osteoporosis and some cancers<sup>100,318</sup> and it is a key element in obesity prevention.<sup>104</sup> Moreover, PA is a critical component of energy balance and is associated with positive mental health.<sup>105</sup> The WHO has recognised that physical inactivity is a global health concern.<sup>242</sup> Recent data rank physical inactivity fourth in terms of risk factor-related overall mortality burden, being responsible for 6% of deaths globally<sup>17</sup> after high blood pressure (BP) (13% of deaths globally) and tobacco use (9%).<sup>243</sup> Hence, increasing population PA levels is one of the most promising strategies for improving population health and reducing NCD burden.<sup>87,101,244</sup>

Interventions to increase and sustain PA participation among populations are an important component of health promotion. This review provides a stocktake of existing PA programmes in PICs, aiming to facilitate the sharing of ideas, methods and experiences across the region. Moreover, the stocktake intends to identify programme scope, target and reach, so to examine best practices and improve national NCD prevention campaigns. Current gaps in programme provision and population reach will be reviewed and guidance and directions for future PA programme development and implementation will be provided.

Research on PA behaviour of Pacific islanders is scarce. This stocktake describes PA programmes in twenty out of twenty-two PICs and thus contributes to the growing body of work in the field of Pacific NCD prevention. Few previously established programmes have been evaluated in peer-reviewed studies. Monitoring and evaluation of programmes is important in order to improve programme effectiveness and improve population health. Research outcomes may provide evidence to further stimulate programme implementation in other small island states or communities.

## **Methodology**

Various strategies were undertaken to identify current PA programmes in the different PICs. Electronic literature searches on PA programmes were undertaken in the Scopus, MEDLINE and SPORTdiscuss database. Searches used the following key words: Physical activity, physical inactivity, exercise, sport program, sport programme, sport programs, sport programmes, prevention of noncommunicable diseases, prevention of NCDs AND Pacific Islands, PICs, Oceania, Polynesia, Melanesia, Micronesia or the country name of the 22 PICs. The most successful search approach, however, was through Google. Several PA programmes were found that had not been scientifically peer-reviewed, but were in existence in the PICs.

Where programmes / interventions were found, NCD focal persons of the Ministry of Health office from the respective country were contacted via telephone to report on and confirm current status of the programme. Independently of literature searches, each NCD focal person of the Ministry of Health office of each PIC was contacted first via email, thereafter via telephone to provide information on current PA programmes. A structured email template requested programme information about the programme's name, guiding plan / NCD plan, aim, year, setting, target group, location and reach. The majority of Ministries of Health were reached (20/22); but two Ministries (Wallis and Futuna, French Polynesia) could not be reached.

Simultaneously, programme information was sourced from NCD representatives from nineteen countries and other NCD agencies during the Pacific NCD Forum joint SPC-WHO meeting in Nadi, Fiji, 2009.<sup>88</sup> A semi-structured interview template was developed containing questions on the professional role and location of the respondent, details of plans and documents relating to PA, background, aims and components of PA programmes, target population(s), setting(s) and geographical area(s), process and impact evaluation, main achievements and challenges. Interview responses were recorded and collated into a summary format for each country. Country summaries were then emailed to the relevant interviewee for review and comment, and additional relevant information was requested for inclusion.

Programme reach has been operationalised as an absolute number of individuals of the target population in accordance to the first stage of the RE-AIM framework,<sup>319</sup> thus representing the target population. RE-AIM is a well-known framework to evaluate the impact and thus to understand the utility of health promotion and public health programmes.<sup>320</sup> It “offers a comprehensive approach to considering the five dimensions that are important for evaluation: (a) Reach - the percent and representativeness of individuals willing to participate; (b) Effectiveness, the impact of the intervention on targeted outcomes and quality of life; (c) Adoption, the percent and representativeness of settings and intervention staff that agree to deliver a programme; (d) Implementation, the consistency and skill with which various programme elements are delivered by various staff and (e) Maintenance, the extent to which individual participants maintain behaviour change long term and, at the setting level, the degree to which the programme is sustained over time within the organisations delivering it.”<sup>320</sup> Whilst a reach of 100% is realistic in small interventions and/or programmes, a key limitation of RE-AIM is that 100% reach is almost impossible in whole-of-population health promotion approaches.

NCD representatives from the Secretariat of the Pacific Community (SPC) and from the World Health Organization Office of the South Pacific (WHO SP) were contacted for additional information.

## Findings

Table 1 presents details of the PA programmes. Key information is arranged according to country, specifying the title of each programme, guiding plan, aims, year of commencement, setting, target group, location and reach where available. These attributes allow a summary to be made of Pacific regional PA programmes.

Programmes were designed by local authorities and developed within local and cultural realities. Traditional activities such as beach walks, (traditional) dancing, canoeing and swimming were as much represented as modern activities such as aerobics, gym attendance and awareness walks.

A total of 84 PA programmes were described across 20 of the 22 PICs. Of these, 48 programmes in 17 countries were confirmed during the interviews at the Pacific NCD forum in Nadi, Fiji 2009. The other 36 programmes were confirmed by Ministry of Health officials through telephone conversations and email correspondence. Three countries were involved in delivering one PA program; 17 countries delivered multiple programmes.

Whilst no country had adopted a specific national PA plan guiding programmes, in the majority of countries (18/22), PA was a component of a wider NCD, obesity or lifestyle plan, with

countries at different stages in the development of national NCD plans. Several countries were implementing programmes in conjunction with the Pacific Physical Activity Guidelines.<sup>76</sup>

The majority (28) of the programmes' aims related directly to PA such as meeting the PA guidelines<sup>76,318</sup> or, more generally, to increase PA levels. Ten programmes' aims were broader in reducing NCD risk factors, preventing obesity or promoting a healthy lifestyle. In addition to PA and NCD objectives, two countries cited increased social cohesion as key aims of PA programmes.

Of the 84 programmes, 26 took place in the workplace setting, 17 occurred in the school setting, 37 in the community setting and four in a clinical or health sector setting. Thirty one programmes, mainly workplace programmes, took place in urban areas only. Another 31 programmes occurred in both urban and rural areas and 7 programmes only occurred in village communities in rural areas. Location was unknown for 15 programmes.

Key achievements of programmes include increased awareness of environments for walking, increased awareness and interest in PA and higher walking participation in communities. Challenges encountered included limited time, lack of financial resources, human resource constraints, limits to venues and equipment and necessary skills and resources for evaluation. Communication in relating PA to health benefits, motivation of participants, changing attitudes and cultural constraints (e.g. female involvement in PA) were found to be challenges. Difficulties in reaching hard-to-reach groups such as those of low socioeconomic status and rural populations were often a reality. Remote islands faced additional geographical barriers.

Environmental constraints such as unsafe conditions for walking due to absence of footpaths and street lighting, dangerous stray dogs, wet weather, high temperatures and acute health emergencies such as H1N1 influenza created additional challenges.

Regarding population reach, 13 programmes were estimated to reach fewer than 100 participants, 17 programmes reached 100-500 participants, nine programmes reached 500-1,000 participants, 13 programmes reached over 1,000 participants, three programmes were estimated to reach the whole population. For 29 programmes, the population reach was unknown or the concept of 'reach' did not apply.

Thirty one programmes targeted community-dwelling individuals, 24 targeted adults in employment, 15 targeted school children, six targeted health service/PA professionals, five targeted adults at risk of NCDs, one targeted the whole population, one targeted villages, and one programme targeted women.

Ministries of Health were often implementing programmes working in partnership with multiple agencies such as other government departments of sport, education, parks, planning and public affairs, NGOs, local communities and traditional groups, WHO, SPC and international aid agencies such as Unicef, AusAid (Australian Government Overseas Aid program) and NZAid (New Zealand International Aid & Development Agency).

Cross-sectoral partnerships, a growing profile of PA among policy makers, high level government endorsement and community initiated programmes were seen as indicators of programme success. The ability to address PA and nutrition both together and independently was also regarded as a positive outcome of some projects.

Impact evaluation results such as weight loss, increases in PA and health independent of weight loss, reducing or ceasing medication were also measures of success in some programmes. Smoking cessation among participants was another cited achievement. At the time of writing, 15 PICs have collected baseline population data through STEPS surveys<sup>79</sup> to profile their NCD risk factors and disease prevalence.<sup>146</sup>

**Table 3:** Findings: PA programmes in the PICs

Country and total population size *	Programme	Guiding plan	Aims	Year of implementation	Setting	Target group	Location	Reach
<i>American Samoa</i> (65,896)	Programmes are sponsored by Department of Health, American Samoa National Olympic Committee, and Faith based groups.	No NCD plan	n/a	n/a	Workplace, Churches, schools, community	n/a	n/a	Unknown
<i>Cook Islands</i> (15,708)	Community gym	PA and healthy eating is a component of the NCD strategy & action plan	Get people doing 30 minutes of PA on most days of the week	2009	Community	Adults	Urban	150
	Health Promoting Schools			2007	Schools	School children and parents	All	500 in 2009
	'Live smart, be active, eat wisely'			2006	Community	Adults	Urban	Unknown
	Ministry of Health Workplace programme			2006	Workplace	Working adults	Urban	Unknown
	Performing Arts smoke free challenge – raising awareness on tobacco issues among youth			Since 2002/3, every two years	Schools	School children	Urban	500 in 2009
	The Strengthening Project			2002	Schools	School children	Urban	Unknown
	'Vaevae' (foot challenge)			2007	Workplace	Working adults, Church and family groups	All	500+
	Wellness Checks			2006	Community, Churches, Sport groups	Working adults	Urban	Unknown
<i>Fiji</i> (847,793)	Build it and lose it!	National NCD Plan 2004-2008 Pacific PA Guidelines PA in Public Service Commission Policy	Reduce NCD burden/obesity, Promote 30 min. daily PA for adults & 60mins for young people	2008	Workplace	Working adults	Urban	140
	Bula 5:30			2009	Community	All		50,000
	BulaBula			2009	Workplace	Clinical workers		Unknown
	Community projects and sports camps			n/a	Schools & community	All		Unknown
	Green Prescription			2004	Health sector	At NCD risk adults		30,000 scripts
	Ministry of Health workplace			n/a	Workplace	Working adults		500

	PA							
	Move for Health							
	Operation Shape up!							
	WHO SP							
<i>Federated States of Micronesia</i> (111,364)	Diabetes Prevention	PA is one of five areas of the NCD strategy	Prevent diabetes	n/a	Community	All	All	Unknown
	Exercise project		Reduce NCD risk factors and overweight prevalence	2008	Community	Women	All	Unknown
	Health Promoting Schools				Schools	School children		3,200+
	Healthy workplace PA				Workplace	Working adults		100
<i>French Polynesia</i> (268,767)	'Move for your health' school programme	PA is part of the Obesity Plan	Promote healthy lifestyle	2008	Schools	School children	All	Unknown
	No car days				Community	All		
	PA in clinics							
<i>Guam</i> (187,140)	Fitness Fiesta	No NCD Plan	Be healthier, lower NCD risk factors, lose weight	n/a	Community	Village community	Rural	Unknown
	Free Workouts, Dept of Park and Recreation		Walking path, swimming pool	n/a	Community	All	All	unknown
	Get Healthy Guam		n/a	2005	Community	All	All	Unknown
	Get Up & Move		Be healthier, lower NCD risk factors, lose weight	n/a	Workplace	Govt. workers	Urban	200
	Guam Walking Association		Promote tourists from Japan to Guam	2008	Community	Tourists	All	250 each year
	Island Girl Power and Guam Skipjacks		Promote health and fitness within the local community	2005-2010	Schools & community groups	All	All	200
	New Start – Exercise every day		Be healthier, lower NCD risk factors, lose weight	1999	Wellness centre	All, especially high risk	Urban	250 each year



	Project sustantia childhood obesity prevention		Reverse childhood obesity through policy changes	2009-2010	Community	Age group 5-18 and their families	Rural	At least 13,000 youth and 47,000 families
<i>Kiribati</i> (100,835)	Workplace PA programme	NCD Plan 2010 - 2011	Employees take programme to their families. Marketing PA programmes Reduce BMI	2008	Workplace	Govt. workers	Urban	Several hundred
<i>Marshall Islands</i> (54,439)	Healthy Lifestyle Champion	PA is part of the NCD Plan	Promote a healthy lifestyle, including 30 minutes of exercise a day	n/a	Clinical	Diabetic patients	All	350
	Kalimo 30+ Campaign			n/a	Community	All	n/a	50
	Ministry of Health workplace programmes			n/a	Workplace	Government workers	n/a	Unknown
	Physical education programmes			n/a	Schools	School teachers/ students	n/a	Unknown
<i>Nauru</i> (9,976)	Aerobic dance programme	PA is part of the NCD Plan 2007-2012	Promote PA in government department and community	2008	Community and government department	Community and public health	Urban	25
	New Nauruan – eat healthy – live healthy		Healthy Nutrition and Diet	2009/10	Schools	School children	All	2,000
	PA training workshop		Promote PA in community and workplace	2009	Workplace and community	PA workers and Stomp de Fat participants	Urban	313
	‘Stomp da fat’		Weight reduction and PA promotion	2005	Community & health department	Overweight & obese adults (BMI over 25)	All	582
	Walk around the island events		Promote PA within community and health dept.	2008	Community and workplace	All	All	40
	Workers Walk on Wednesday (WWW)		Promote PA in government workers and communities.	2007	Workplace and community	Government workers & community	All	50

			To reduce weight To increase understanding & advocate for PA & to be a role model					
<i>New Caledonia</i> (254,525)	'Eat and move for your health' school programme	NCD Plan	Be physically active on at least 30 minutes per day	2009	Schools	School children	Urban	45,000
	'Mange mieux, bouge plus' (eat better, move more)		Replace TV watching and driving with PA	2009	Community	All	All	245,000 (potentially whole population)
	'Sport action'		Initiation into the sports practice, social action	2006	Schools, Municipal Sport trays	Adolescents	Urban	300
<i>Niue</i> (1,479)	Health Promoting Schools	PA is one of four objectives in NCD Plan 2009-13 Niue Moui Olaola	Address health & well-being through PA to contribute to weight reduction	n/a	Schools	School children	All	400
	Healthy village		n/a	2009	Villages	All	Rural	Unknown
	'Let's Beat the Bulk' Tuapa Obesity campaign		Address health & well-being through PA to contribute to weight reduction	2006	Villages	All	Rural	50
	Workplace sports		n/a	Workplace	Government workers	Urban	100	
Northern Marianas (CNMI)	Club Hinemlo'ta – Water aerobics	NCD Plan 2008-2013	Reach people who cannot exercise in a	2007	Community	Working adults with chronic pain	All	70

(63,072)			gym for health reasons (obese and arthritic)					
	Family fit for Life walk		Create a more active lifestyle & reduce obesity	2008	Community	Employees, their families & friends	All	150
	MWA - Mariana Walking Association		n/a	n/a	Community	Working adults	Urban	Unknown
	Weekly Beach walks		To raise health awareness	n/a	Community	n/a	n/a	Unknown
	Wise Women Village Project		Screening for NCDs	2007-2010	Community	Working adults	Rural	500 per year
<i>Palau</i> (20,518)	Bicycles for the community	PA is part of the NCD Plan 2009-2014	Increase PA	2009	Community	All	All	Unknown
	'Green' prescriptions to encourage PA		Increase MVPA & reduce low intensity activity by 10%	n/a	Health sector	Primary health care patients	n/a	Unknown
	Health promoting schools		Increase to 20% students doing 60mins PA	n/a	Schools	Students age 13-15	All	Unknown
	Healthy workplace wellness		Increase MVPA & reduce low intensity activity by 10%	2009	Workplace	Adults	Urban	Unknown
	Improving capacity of community health workers		Provide health promotion & preventive services	n/a	Health sector	Primary health care staff	n/a	Unknown
	Palau in Motion		n/a	n/a	Community	All	All	Unknown
	Walk and Talk		n/a	n/a	Workplace	Working adults	n/a	Unknown
<i>Pitcairn Islands</i> (48)	No NCD plan and no PA programmes uncovered							
<i>Papua New Guinea</i> (6,744,955)	No NCD plan and no PA programmes uncovered							

Samoa (183,123)	'Get Moving Samoa'	Health Sector Plan 2008-2018, MoH Corporate Plan 2007-2010, NCD Strategy 2004-2008; Draft Strategy 2009. Pacific PA Guidelines	Reduce NCD risk factors	2006	Community	All	Rural	7,500
	Health Promoting Schools		Increase MVPA & reduce low intensity activity by 10%	2009	Schools	School children	All	Starting off with all Pre and Primary Schools but planning to include private and Church schools
	PA Programmes		Increase PA	2006	Villages & workplaces & schools	All	All	1,000+
	Prime Minister's 30 mins challenge		Increase students' PA levels by 20%	2008	Community	All	All	5 people involved in this TV show challenge, but more people have been enrolled in this program
	Workplace Awareness Programmes		Increase PA in workplaces	1990s	Workplace	Government workers	All	100 - 500
	Workplace health programme		Provide health promotion	2001	Workplace	Government workers	Urban	400
	A committee made up of representatives from the Ministries of Health, Finance and Women and Community Development approved 90 proposals for PA programmes and 61 for vegetable gardens. Samoa also has a community PA programme and a television programme on the Prime Minister's 30-minute challenge.							
Solomon Islands (549,574)	Social Marketing	National Healthy Lifestyle Plan (2007 - 2017)	n/a	n/a	Community	All	n/a	Unknown
	Workplace PA programme		Reduce NCD risk factors. Health workers as role models.	2009	Workplace	Government workers	Urban	100
Tonga (103,365)	Auhani	National NCD Plan 2004-2009	Promote physical exercise	2004	Workplace	Working adults	Urban	500
	Fiefia Tonga Sports		Promote healthy lifestyle through physical exercise, work spirit, team	2007	Workplace	Adult workers	Urban	3,000

			work, unity, knowing each other					
	Health Promoting Churches		Promote physical exercise/activities	2008	Community	Church members	Rural	1,000
	Sporting Competitions		Provide opportunity for physical exercise	1926	Schools	Adolescent	All	10,000
	Walking paths		Provide safe walk path for people	2004	Community	All	All	Whole population 100,000
<i>Tokelau</i> (1,165)	Women's Group PA programmes	Draft NCD and Strategic Plan	Get people moving, increase PA, strength & social time	2008	Workplace, schools, community	Whole population	All	1,500 (whole population)
<i>Tuvalu</i> (11,149)	Healthy workplace programmes	PA is one of six areas in Tuvalu National Strategic Plan for NCDs and Nutrition 2009-2013	Empower staff with information, skills and knowledge necessary for healthy lifestyle.	2009	Workplace	Health workers	Urban	70
	PA spaces and equipment		Promote healthy environment for a healthy living. Formulate and implement healthy office programmes.	2009	Workplace	Hospital and general Public	Urban	60
	Red Cross obesity reduction programme		Assist the population in reducing the number of	2008	Community	Obese adults	Urban	50

			obese people					
	School Physical Education		Strengthen PE in schools; Improve sport facilities; Develop workplace PA; Create PA policies; Integrate PA into community programmes	2004	Schools	School children	Urban	60
	Your daily 10,000		Allow staff to be role models to the general Public especially in delivering the message across in terms of PA	2009	Workplace	Government workers	Urban	47
<i>Vanuatu</i> (245,036)	Health Promoting Schools	National NCD Plan 2004-2009 2010-2015 plan in progress	Reduce NCD risk factors	n/a	Schools	School children	n/a	7,000-8,000
	Parks & pavements development			n/a	Community	All	Urban	30,000
	'Walk for Life' programme			2007	Workplace	Govt. workers	Urban	600-700
<i>Wallis &amp; Futuna</i> (13,256)	"Haele Hee Lela" (Walk is Good), walking group	Draft NCD and Strategic Plan for 2010	Reduce NCD risk factors, maintain healthy lifestyle	2006	Community	Adults	All	40
Source population size: Secretariat of the Pacific Community. <sup>321</sup>								

## Discussion

This stocktake has identified a large number of PA programmes across the Pacific region. This may be a country-level response towards the Tonga commitment to promote healthy lifestyles and supportive environments<sup>191</sup> and WHO's development of the Global Strategy on Diet, Physical Activity and Health in 2004.<sup>242</sup> A workshop on the implementation of the Global Strategy on Diet, Physical Activity and Health in the Pacific was held in Suva, Fiji in 2006.<sup>322</sup> The majority (51/84) of the defined programmes in the Pacific Islands have been implemented since 2006.

In most countries in the Pacific, national PA plans are usually embedded in national NCD plans, instead of a standalone PA plan. Of note was that twelve countries had established NCD strategies and policies or are currently in the stage of development and implementation. The place of PA programmes within NCD policy and planning is likely to serve as an effective and sustainable way of an integrated approach to NCD prevention and control but at times can also make intersectoral work more challenging. It is recommended that programmes continue to be embedded within relevant strategies.

To respond to the growing need for country-level trends in NCD risk factors, WHO developed the STEPwise approach to Surveillance of NCD Risk Factors (STEPS).<sup>79</sup> By using the same standardised questions, it is possible for all countries to use "STEPS information not only for monitoring within-country trends, but also for making between-country comparisons".<sup>79</sup> This approach encourages the data collection of NCD risk factors in adults on a regular basis. It focuses on a minimum number of risk factors that predict the major NCDs. Importantly, surveys provide an estimate of population NCD risk. If carried out on a continuous basis, findings can be used to estimate the change in NCD risk. However, participants are not tracked over the years, but are chosen randomly with each new survey. A more detailed approach that follows the individuals over the years would provide more accurate data and allows for inferences of change in NCD risk factors.

Further, these STEP surveys do not segregate findings by location, i.e. urban and rural differences in NCD risk factors remain unclear. It is assumed that NCD risk factor differences in urban and rural individuals are strong<sup>323</sup> and a more detailed analysis may help understand the true NCD burden in urban and rural Pacific regions.

Whilst 15 PICs have collected baseline population data through STEPS surveys<sup>79</sup> to profile their NCD risk factors and disease prevalence,<sup>146</sup> these national NCD STEPS surveys have yet to be

repeated. The Fiji STEPS survey, for example, was carried out in 2002 and is planned to be repeated in 2011. Recurrent STEPS surveys are recommended as they can serve as reliable NCD surveillance tools.

Several countries are delivering programmes across multiple settings, target groups and geographical locations. Focusing programmes and their resources on particular groups, settings and locations may increase the likelihood that programmes reach high-risk groups such as women, children, rural populations and older people.

Programme reach findings reveal a wide range of numbers of participants taking part in programmes, from small programmes with under 50 participants to large programmes reaching the entire population. However, for 26 programmes reach is unknown. Direct enquiries via telephone and email about estimated reach did not reveal any information. Hence, the efficacy of the stocktake is limited in that programme reach is unknown in one third of the findings.

A major weakness of the findings is the lack of consistent evaluation procedures. Few attempts have been undertaken to systematically measure participants' lifestyle behaviour, programme participation and most importantly change in lifestyle behaviour and health outcome. Programmes are not linked to population surveillance systems, such as the WHO NCD stepwise approach to surveillance (STEPS) survey,<sup>79</sup> the Mini-STEPS survey (minimised version of the WHO NCD STEPS survey for the community setting)<sup>322,324</sup> or the Health Behaviour and Lifestyle of Pacific Youth (HBLPY) survey.<sup>325</sup> These tools could provide standardised, quality NCD data and be used as ongoing surveillance for conducting impact evaluation.

The majority of the programmes identified had not set specific aims, but seek to generally reduce NCD risk factors and overweight prevalence or increase PA behaviours. SMART objectives have not been identified.<sup>xvi</sup> These could help in a) reaching programmes overall goals and b) in evaluating the programmes. It is therefore suggested to include SMART objectives in future programme planning.

It is essential to document reach and participation rates through process evaluations to measure programme efficacy. Several programmes reported time constraints and lack of technical expertise or resources for evaluation processes. Partnership support from funding agencies, universities and technical experts may aid in overcoming these barriers. More robust monitoring and evaluation may support future sustainability and programme effectiveness. The SWOT analysis can be used to identify programme strengths, weaknesses, opportunities and threats in

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<sup>xvi</sup> SMART is an acronym used to set specific objectives. SMART stands for Specific, Measurable, Achievable, Realistic.<sup>326</sup>



order to assess programme effectiveness. The RE-AIM framework can analyse essential programme elements to improve sustainable adoption. Both SWOT and RE-AIM can serve as assessment tools.

Monitoring PA participation through self-reported or objective measures like pedometers, body mass index (BMI) and other anthropometrical measures occurs in some programmes and their continued use is recommended. Systematic programme evaluation is planned for some countries<sup>146</sup> and recommended for all to profile patterns and prevalence of lifestyle characteristics so that interventions can be revised and cross-country comparisons be made.

Most countries reported achievements resulting from PA programmes as positive outcomes. Achievements ranged from increased awareness and interest in PA, to visible increases in PA levels in communities, to government endorsements at the Presidential level and to a growing profile of PA among policy makers. However, no tangible outcomes of NCD risk changes, or increase in health-related PA has been recorded. It is recommended to standardise health outcomes and to move beyond the 'awareness' of NCD risks towards implementation and evaluation in order to estimate programme efficacy. Findings should be shared with colleagues both nationally and regionally in order to accelerate the establishment of best practices and to experience the development of PA programmes in different settings. The Asia Pacific Physical Activity Network (APPAN)<sup>327</sup> can serve as a communication vehicle for these matters.

Most programmes were initiated and developed by the Ministry of Health as the lead agency. High-level government support has been shown to be an effective strategy for programme feasibility.<sup>75,146</sup> Cross-sectoral partnerships with national public, private, non-governmental organisations, community groups and international agencies can contribute to programme success and sustainability.

To address reported challenges, partnership collaboration is recommended in order to pool resources, expertise and scope opportunities for possible additional funding and training. Challenges relating to ongoing participant motivation, recruitment and retention were apparent across many programmes, particularly in hard to reach populations, such as remote countries and remote outer islands within countries. Key decision makers could draw on ideas and experiences of others involved in programme delivery and established evidence in this area in an effort to overcome this challenge. Social marketing of PA to participants was also reported as a challenge. Finally, barriers to PA relating to the physical environment can be addressed through environmental and policy modifications, such as improving infrastructure and safety for walking, led by cross-sectional government departments with the assistance of the private

sector and community groups. Overall, drawing on international best practice for implementing PA programmes in LMICs is advisable.<sup>254,328</sup>

## **Conclusion**

This stocktake provides a snapshot of the increasing numbers, scope and reach of PA programmes across the PICs. PA professionals from the region, NCD key stakeholders and Public Health experts in and around PICs are advised to share ideas, best practices and evaluation methods in order to improve regional programme efficacy and to learn from neighbouring countries. Governments of small island countries and communities outside the Pacific region are encouraged to similarly respond to the WHO's Global Strategy on Diet, Physical Activity and Health. Pacific programmes that prove to be successful can be culturally adapted and implemented in other small island states. Cross-country comparisons can be used to identify global best practice and distribute programmes further.

Cost-effective resources and innovative approaches are needed to halt or reverse the growing NCD epidemic in the Pacific region. Culturally appropriate policies and high-level political support, not only from the health ministry, but across government ministries of transport, education and municipality, can increase programme reach. Current programmes must be consistently monitored and evaluated in order to achieve measurable health improvements and to enhance programme sustainability. More persistent and professional reporting of programmes is required for effective monitoring and evaluation processes. The RE-AIM framework could serve as a tool for process evaluation and the STEPS survey for impact evaluation. It is recommended to harmonise monitoring and evaluation frameworks, processes and systems across the Pacific to facilitate cross-country comparisons.

NCD interventions at the individual and community level are as much recommended as environmental and policy approaches at the national and regional level. Wherever practical, PICs' efforts to reduce NCD burden should be consistent with international and regional frameworks for NCD prevention and control.

Research on PA outcomes and, more broadly, on the effectiveness of NCD prevention interventions in the Pacific region is scarce. Objective four of the Western Pacific Action Plan for NCDs advises governments to promote research for the prevention and control of NCDs.<sup>78</sup> Continuous and sustained research should generate innovative and culturally appropriate NCD prevention programmes which will assist in increasing population levels of PA to reduce the burden of disease in the Pacific region.

## CHAPTER 4

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### **Laefstael jenses: An investigation of barriers and facilitators for healthy lifestyles of Ni-Vanuatu women**

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#### **Preface**

In 2009, I assessed a healthy workplace programme which had been implemented in the Vanuatu government in 2007 in Port Vila, Vanuatu. The programme, called *Walk for Life*, released civil servants from official duties across the government at 3.00 PM on Wednesday afternoons in order to engage in physical activities. The evaluation (Appendix L) showed that female civil servants were least likely to partake in the exercises offered. After consultation and discussion with relevant stakeholders, I aimed to develop a workplace programme that would specifically target female civil servants.

Knowing that a significant proportion of NCD morbidity can be prevented and reduced through lifestyle interventions, I aimed at developing a culturally meaningful programme that engages Ni-Vanuatu women in the adoption of sustained health behaviour change. Pacific women play a crucial role in health care and NCD prevention programmes and have a significant impact on community life. Focusing the intervention on women is therefore also a promising strategy to disseminate the message of healthy lifestyles to the wider community.

One of my goals for this project was to ensure that the programme I designed resulted from a community-based participatory approach, to warrant cultural attractiveness. I further aimed at designing a programme that was realistic to be run by local health professionals in neighbouring PICs.

The purpose of this study was to gain insight into Ni-Vanuatu female civil servants' ideas and perceptions regarding healthy lifestyle behaviour and to seek their opinions in what is an effective workplace programme. This would enhance my understanding of the cultural

characteristics and ensure that the final programme was meaningful. Another reason for the formative work was to engage with a selection of potential participants from the Vanuatu government to gain their trust by designing a programme in a collaborative approach, rather than delivering a programme that was brought from overseas. The resulting programme design, implementation and evaluation provide the base for this thesis.

The manuscript resulting from this chapter has been accepted for publication by the *Journal of Physical Activity and Health* and is currently in press.<sup>xvii</sup>

Ethics approval can be found in Appendix B. Appendix C and Appendix D provide the information sheet and consent form for this study.

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<sup>xvii</sup> Siefken K, Schofield G, Schulenkorf N. Laefstael jenses: An investigation of barriers and facilitators for healthy lifestyles of women in an urban Pacific island context. *Accepted for publication by the Journal of Physical Activity and Health*. 2014;11(1).

## **Abstract**

**Background:** The Pacific region has experienced rapid urbanisation and lifestyle changes which lead to high rates of NCD prevalence. There is no information on barriers and facilitators for healthy lifestyles in this region. In response, the first stage of a rigorous development of an urban Pacific health intervention programme is presented. This paper describes formative work conducted in Port Vila, Vanuatu. The objective of this paper was to understand cultural barriers and facilitators in Ni-Vanuatu women to lifestyle change and use the findings to inform future health interventions.

**Methods:** Semi-structured focus groups with 37 female civil servants divided into six groups were held verbally to understand barriers and facilitators for healthy lifestyles.

**Results:** Several perceived barriers and facilitators were identified. Inter alia, barriers include financial limitations; time issues; family commitments; environmental aspects; and motivational hindrances that limit time and opportunities for healthy lifestyle behaviour. Facilitators include more supportive environments; social support mechanisms; and the implementation of rigorous health policies.

**Conclusions:** Formative work is essential in designing health intervention programmes. Uncovered barriers and facilitators help inform the development of culturally relevant health interventions.

## Introduction

The Pacific region has experienced a major shift in disease burden: NCDs have overtaken communicable diseases and are a critical health and development issue.<sup>5,78,329,330</sup> Rapid lifestyle changes of Pacific islanders towards a modernised way of life are central to this change in disease patterns.<sup>60,61,64</sup>

As a response, the WHO has initiated NCD surveillance strategies through the 'STEP'wise Approach to Surveillance of Risk Factors for NCDs (STEPS).<sup>79</sup> Though numerous health and PA programmes prevail in the region,<sup>116</sup> systematic programme evaluation appears lacking.<sup>115,116</sup> Best-practice evaluation involves the use of formative evaluation, process evaluation and outcome evaluation. The present research is the first effort to become more rigorous in the design, implementation and evaluation of a lifestyle intervention programme.

The purpose of this study is to conduct formative work in order to understand cultural barriers and facilitators in Pacific women in urban Vanuatu to lifestyle change (Bislama: laefstael jense), and subsequently use these factors to inform the development of a culturally meaningful lifestyle intervention.

Research has shown that lifestyle behaviour is an important and often context specific issue.<sup>331,332</sup> In sociological theory lifestyles are considered a key sociological concept<sup>331</sup>: lifestyles are ways of living adopted by individuals that reflect personal, group, and socioeconomic identities.<sup>333</sup> In *Wirtschaft und Gesellschaft* Weber argued that lifestyles were realised primarily by choice (Lebensführung) within the social context provided by chance (Lebenschancen).<sup>295</sup> Hence, lifestyles are choices which are dependent on the individuals' chances to realise them. In Bourdieu's approach the gap between life chances and life choices is reduced through the concept of habitus: although individuals choose their lifestyles, they do not do so with complete free will, as the habitus predisposes them toward certain choices.<sup>334</sup> The selection of and participation in a particular lifestyle is therefore affected by life chances to a much greater extent. Bourdieu indicates that lifestyle choices are not only constrained but shaped by life chances.

To explore life chances and thus to understand healthy lifestyle choices, motives for health behaviour must be identified. For example, barriers for PA and other healthy lifestyle behaviours are complex and arise culturally-specific. Caperchione et al.<sup>335</sup> found a number of barriers in different cultural groups from less developed countries. Barriers include knowledge and awareness, socio-cultural factors (e.g. family commitments and domestic duties), environmental factors, and perceptions of ill-health and injury. Research from Brazil indicates that barriers of PA

among women differ according to their socio-economic status. Naldino<sup>336</sup> identifies barriers in high socio economic groups in Brazilian women as lack of social support, time constraints and weather conditions, whilst those for low socio-economic groups include financial barriers, time barriers and safety issues. Booth et al.<sup>337</sup> found related barriers for engagement in PA in the Australian population with insufficient time, lack of motivation and childcare duties. Whilst some formative work was conducted in Fijian, Tongan and Auckland youth<sup>13</sup> and in Marshallese adults,<sup>189</sup> no formative work on Pacific women is available.

### **Context**

Vanuatu is an island nation located in the south west Pacific ocean with a total population of 230,023.<sup>170</sup> The capital is Port Vila with 44,040 inhabitants. The official languages of Vanuatu are Bislama, English and French; the latter two are used as the principal languages of education.<sup>166</sup>

Whilst the rural population follows a predominantly subsistence lifestyle, the urban population has adopted a more westernised way of life.<sup>166</sup> The traditional diet consists of root crops (maniok, taro, yam), green cabbage, coconut cream, fresh fish and other seafood. Pigs are eaten at important ritual occasions. Seasonal fruits are part of the daily diet. The general source for drinking is rainwater catchment or spring water.<sup>323</sup> According to the 1998 Vanuatu Non-Communicable Disease Survey Report, the consumption of traditional foods is lowest in the urban areas, whereas the consumption of imported food such as rice, fat/oils, canned and fresh meat/fish, milk and bread is highest.<sup>148</sup> The population is increasingly urbanised, replacing local produce with imported, calorie dense processed food, and relying more on labour saving devices for chores and transport. PA levels have been observed to be lower in urban areas where motorised transport and technology is widely available. An interesting observation from the researcher is the impact of telephone towers on PA behaviour: where telephone towers are absent, bipedian activity is higher: communication is only possible through direct face to face talks. Due to the villages' locations, daily walks of five hours are often the norm.<sup>323</sup> In urban areas, however, communication via technology (short messages and telephone calls) has become the norm for many urban residents, thus PA levels have decreased.<sup>338</sup>

Vanuatu was chosen as a research location for various reasons. Firstly, the country faces increasing NCD risk factors. Secondly, a governmental healthy workplace programme is in place since 2007 and provides access to a population that is being supported with healthy lifestyle advice by the government.<sup>16</sup>

## Methods

This study is of qualitative nature and can be referred to as formative research. Formative research is conducted during the development of an intervention, in order to best understand the factors that influence the target audience's behaviours, attitudes and practices and to determine the best strategy to reach them.<sup>339</sup>

Findings from this research were derived by conducting six one-hour semi-structured focus group discussions with 37 female civil servants in Port Vila, Vanuatu. This specific target group had been identified to be at high risk for physical inactivity in a previous formative evaluation.<sup>16</sup> It is further documented that women in the Pacific region are more likely to be physically inactive, have a higher mean BMI and higher percentages of overweight and obesity than their male counterparts.<sup>7-10,80,81</sup> For practicality and access it was considered appropriate and useful to explore this target group's healthy lifestyle behaviour perceptions in greater detail. Findings will help in the design of an intervention for female civil servants in Port Vila.

The increasing popularity and use of focus groups in formative work is well justified; they help achieve a greater understanding of a previously vague phenomenon, as its participants are likely to express opinions and ideas more openly in a group setting.<sup>340</sup> This is considered especially important in this cultural context where collective communal core values prevail.<sup>341</sup> The communal approach and the social components of the focus groups are important in this context to stimulate meaningful exchange and to facilitate participant-researcher knowledge exchange. A one-on-one approach, as used in interviews, was not considered relevant due to a) the communal nature of the participants and b) potential language barriers that can be overcome in a group setting, but not in a one-to-one session. Another option to collect qualitative data is participant observation which is a data collection method that comprises informal interviews, direct observation, participation in the life of the group participants and an analysis of personal documents. For practicality and time reasons, focus groups were chosen over participant observation.

In this context, I would like to introduce the Bislama term *storian* – an umbrella term indicating "semi-structured interview, informal interview, and opportunistic discussion as part of observation".<sup>342</sup> *Storian* is essentially a Vanuatu term of *talanoa* – a culturally appropriate Pacific research methodology which is established and acknowledged widely among Pacific researchers.<sup>343</sup> Essentially, *talanoa* refers to 'a personal encounter where people story their issues, their realities and aspirations'.<sup>343</sup>



Whilst *storians* are considered the most relevant method to collect data, it is important to acknowledge their limitations in this context: ideally, they involve a group of homogeneous participants who do not know each other and therefore will not be influenced by the responses of others in the group.<sup>307</sup> In this case, focus groups were conducted with members from the same workplace and responses may be biased by relationship.

Neuman<sup>344</sup> concludes that the formative researcher aims to learn what is meaningful or relevant to the people being studied, and how individuals experience and manage daily life. In this study, focus groups had the potential to uncover – from an inside perspective – the most significant barriers and facilitators of urban Ni-Vanuatu women ('Ni-Vanuatu' refers to nationals and citizens of Vanuatu) for healthy lifestyles. The focus groups were conducted by the lead researcher. My role was to provide a social context where meaningful exchange can take place. The researcher carefully stepped back from the discussion and encouraged participants to openly share their opinions. No previous relationships with participants existed.

Morgan suggests a focus group framework in which the ideal number for participants is between 8 and 12.<sup>345</sup> The focus groups conducted aimed at reaching this number and comprised groups between 4 and 8 participants. In particular, individuals from three different Ministries (the Ministry of Health, the Ministry of Education, the Prime Minister's office) were selected; mean age was 36 years. No selection was made regarding job ranking; both higher and lower job positions were involved. Interviewers were of European descent. Prior to conducting the interviews, all participants agreed to hold interviews in the English language. Ethical approval was obtained from the Auckland University of Technology Ethics Committee. The standard university guidelines of informed consent, voluntary participation, confidentiality, and anonymity were rigorously followed. All participants gave written and verbal informed consent prior to each focus group session.

During the focus groups, the lead researcher helped stimulate discussion by enabling participants to speak freely about their thoughts and ideas. In particular, four general questions were raised: (1) Is a healthy diet and exercise important to you? (2) What are the barriers for you to eat healthily and to exercise regularly? (3) What would help you be more active and eat healthier? (4) What can your workplace do to make you live healthier? Focus groups were recorded with a digital voice recorder. Further, notes were taken throughout the sessions to supplement the voice recordings.

Focus groups were conducted in English, as English is a national language in Vanuatu. Further to asking the questions verbally, they were also projected to a screen to maximise understanding. Individuals that did not feel confident with the English language, however, were encouraged to

freely speak in Bislama or French. Their comments were translated back into English by other participants. With hindsight, the visual presentation of questions on the screen in the three national languages is recommended.

All data was transcribed verbatim, then coded and prepared for analysis. Thematic induction, a common method for data analysis in qualitative research,<sup>346</sup> was used to understand focus groups findings. The major objective of this exploratory study was to gain new knowledge from the findings. The thematic analysis process followed the descriptive, interpretive and pattern coding as described by Miles and Huberman.<sup>347</sup> An initial broad coding of all themes relevant to barriers and facilitators of PA and healthy lifestyles was carried out in order to identify emerging and reoccurring themes. The codes were then analysed and condensed into dominant themes. Themes were derived from participants' ideas, thoughts and experiences (see<sup>348</sup>); in this case it were the contributions pertaining to healthy lifestyle adoption. A cross-examination between the contributing authors was conducted to see whether themes were representative of the transcripts.

The qualitative interrogation of the data was supported by the NVivo 9.0 software package, which assisted the researchers in storing, integrating, indexing, and coding the data collected.<sup>349</sup>

## **Findings**

The focus group discussions revealed critical information needed to understand Ni-Vanuatu women's perceptions towards healthy lifestyles. Overall, the different focus groups raised similar concerns and issues. The prominent evaluative themes identified in relation to barriers towards PA and healthy lifestyles are: financial limitations; family commitments; environmental aspects; motivational hindrances; and cultural concerns. Perceived solutions include facilities; social support; motivation and fun; and more insistent health policies.

By drawing on representative comments from the focus group discussions, the different themes are now presented from the perspective of the participants. It is important to acknowledge that for linguistic and cultural reasons, responses of the Ni-Vanuatu population tend to be shorter and less lucid when compared to communiqué within Western societies. This has to a degree influenced the length and the style of quotes presented below.

## **Barriers**

### ***Financial limitations***

Financial limitations were raised as the main barrier to live a healthy lifestyle in an urban setting. Locally produced fresh food items were generally defined as 'too expensive', while cheaper imported food such as instant noodles, white rice, macaronis and tinned tuna were listed as the most popular and common lunch options. For example, it was suggested:

The healthy food, like the local food, is more expensive. In the market, you can go and buy a basket of tapioca or taro (root crops) and it lasts only for a few days. Whereas if you use the same amount of money and buy something from the shop, it will last you longer.

Many women – particularly those with a family to look after – suggested that they *"have to eat rice"* simply because *"[...] local food from the market is unaffordable"*. Interestingly, the women also mentioned that the preparation of local food is rather expensive, because *"it consumes more firewood than food from the shops"*. Moreover, it was mentioned that people who live in the urban areas are less likely to be able to grow their own fruits and vegetables in their gardens.

Those who have lands can grow their fruits in the garden, yes. But most of us come from the islands and we don't have land here in the city. We rent houses, so there is no garden to grow vegetables.

For some of the wealthier participants the healthy option of purchasing and consuming local food presented an expensive but nevertheless alternative to their daily diet. *"Yes, some of us can buy that expensive stuff, but only few"*.

### ***Time issues and family commitments***

There are strong traditional roles assigned to Ni-Vanuatu women that often result in limited leisure time. Ni-Vanuatu women are often given the task of child rearing, household management, family health and obligations to the immediate and extended families, hospitality services to visitors and community activities.<sup>206</sup> In this study, limited time and workload was often cited as a barrier to engage in more regular PA. *"We have to finish our work and look after the kids too"*. Some participants therefore suggested having a workshop on time management skills: *"Yes, we need to know how to plan the day"*. It is clear that limited time combined with traditional roles inhibits regular engagement in leisure-time PA.

Some participants suggested that a reduction in workload and more spare time would assist them in being more physically active. For example, *"time off from work before it is getting dark"* was suggested in order to allow outdoor activities such as walking for leisure and/or transport. Road safety is a critical issue in Port Vila (pot holes, stray dogs), thus exercising after sunset (6 pm) is rather uncommon.

Furthermore, it was mentioned that the workload would hinder people to take time off for exercises. *"Most of the time I stay back in the office and finish my work"*. Wednesday afternoon officially releases all civil servants from work duties to engage in exercises. However, a number of participants reported that their current workload does not allow this to happen.

With exercise, like on Wednesday afternoon everyone is informed. But sometimes we want to go to sport but we cannot because we have to finish our work, too. Even though we want to go to sport, we have to work.

As indicated, women are given responsibility to look after the children. Clearly, many women put priority to their kids' well-being *"So sometimes I just want my kids to have their food again and then I don't have time to exercise"*. It was mentioned that having children reduces leisure time thus hinders participation in leisure PA. For example, it was mentioned:

I think for me the big thing that stops me [from exercising] is the children. When I finish work I have to go back home. And I suppose that is what keeps me from participating all the time on these Wednesday exercises.

Interestingly, PA is often understood as leisure time exercise and not merely physical movement that can be accumulated over the course of the day through different forms of activity (transport, leisure, occupational). Whilst some participants cite walking as an activity to stay healthy, it is not necessarily regarded as a form of PA.

### ***Environmental aspects***

A more exercise-friendly environment was requested by several participants. One participant mentioned there is a demand for exercise equipment at work, because it would allow women to exercise without being scared of dogs, traffic or other unsafe conditions outside.

If we had stair masters and treadmills and bikes, then and I think it would be a good. Staff could come in after work or even during the lunch hour and exercise. That would be a great motivation for us. It would also allow us to exercise when it rains and keep us away from the danger of the streets.

Researcher: Do you think a lot of people would go on those treadmills?

Yes, because a lot have come and asked for it.

Moreover, road safety and increasing traffic congestion were mentioned as hindrances of regular outdoor physical activities. Port Vila has recently experienced an increase in motorised vehicles which reduces PA levels not only through the use of the vehicles, but also through people being discouraged to exercise outdoors: *"One evening I went for a walk and I noticed the fumes! It has gotten really terrible, the amount of traffic."*

A number of women emphasised safety issues as a personal barrier, as some women feel unsafe being outdoors by themselves. *"Where I live, you're "frait long man" (scared of the man), it is not safe anymore. You might be raped or something."*

Finally, all focus groups reported that healthy food opportunities at the workplace are very limited. One participant said *"There is no healthy option here"* and suggested to create a healthier food environment in and around the workplace. In confirmation of these comments, the lead researcher observed that nearby shops mainly sell Chinese noodles, crackers, tinned food and other non-nutritious food options. It was suggested that walking groups could be organised within the ministries to arrange for healthy food options from the local market. Yet, food prices have to be taken into account.

### ***Motivational hindrances***

The majority of participants reported that a lack of incentives discourages them from engaging in regular exercise. Team support and walking buddies were suggested to motivate participants and increase commitment. *"I just need someone to motivate me, friends or a team"*. In relation to this, participants also reported on the need of more incentives to adapt healthier lifestyles overall. Different suggestions were provided by participants, such as regular weight control mechanisms and other regular health checks. For example, one participant said:

I suppose if they took our blood cholesterols [that would motivate us]. [It is] something that would give us a reason to exercise.

Such incentives could positively impact health status of participants as they monitor actual health changes over time, particularly if conducted on a regular basis. Interestingly, provided incentives were all related to individual health status control and not external awards.

### **Cultural concerns**

Cultural aspects were raised throughout the discussions by several participants, from both the younger and older generations. In particular, missing support from the husband, the cultural dress codes and insufficient understanding from the neighbourhood or local community were mentioned as potential barriers to PA. Gender roles are strong in the Ni-Vanuatu culture which was confirmed during the discussion: *"You know, in our custom, ladies are back at home"*. It was further mentioned that spouses could potentially envy their wives if they engaged in exercises: *"[The husband] may be jealous and asking 'What are you doing, no, stay at home and look after the children'"*. Mentality and cultural concerns seem to portray crucial barriers for regular PA of ni-Vanautu women. Finally, for older women is it not necessarily accepted to engage in activities of "young people", i.e. physical activities. One participant commented:

One thing to take into account is our custom. I am a grandmother already (50 yrs). Wearing shorts - I cannot do that. It's a taboo. How to dress in front of men, dressing up etc. is very important.

### **Perceived solutions**

The focus group discussion further turned towards perceived opportunities that would support participants in taking up healthier lifestyles. Findings were categorised into four emerging themes, i.e. 1) Supportive environment & facilities 2) Social support 3) Motivation/fun and 4) Workplace health policies. Each theme is now presented and discussed in relation to similar studies and previous work in the area.

### **Supportive environment & facilities**

A more supportive environment and workplace facilities were suggested as facilitators for healthier lifestyles. Overall, the discussions underline that workplaces could be valuable support mechanisms to promote healthy lifestyles in and around the workplace. Workplaces have been internationally recognised as a priority setting for health promotion and International bodies recommend them as health promotion settings through several charters and declarations.<sup>93,218-220</sup> My study suggests that a supportive environment for healthy lifestyles at the workplace requires the provision of suitable and functional resources and facilities, including basic exercise equipment (e.g. changing rooms, treadmill), small kitchen areas and water fountains.

### **Social support**

Numerous participants reported on the importance of social support mechanisms that would assist them in adopting healthier lifestyles. These findings are in line with previous research that indicates that social support mechanisms can lead to increased levels of internal control, commitment and confidence<sup>350</sup> and to a more sustainable health behaviour change.<sup>351</sup> Three mechanisms of support were identified by the participants: team support, leadership support and family support. Each will be described and discussed below.

### **Team support**

Arguably, one of the most prominent approaches to support female civil servants in healthy lifestyle behaviour is an exercise team or buddy support system (as already flagged under motivational hindrances). Participants described that due to the existing community structures and the strong emphasis on sharing and doing things together, it is impracticable to attempt to exercise on an individual basis: *"I think it is best to group people together"*. This finding supports previous work conducted in the U.S. which suggested that social contacts (team-mates) and network characteristics (team characteristics) positively impact individual PA levels.<sup>352</sup> This might be even more important in the Ni-Vanuatu cultural context, where exercise by women is often regarded as inappropriate and where communal activities are favoured over individual pursuits.

### **Family support**

Interpersonal relationships have been identified as important sources of influence in individual health related behaviour<sup>230</sup> and family support mechanisms play crucial elements in NCD risk reduction.<sup>353</sup> For example, research demonstrated that PA levels increase with family support mechanisms.<sup>351,354</sup> While these studies were conducted in a European and an Asian cultural environment, the challenges for Ni-Vanuatu women seem even greater. Participants implied that family support, particularly from husbands, is a crucial element in the engagement of regular PA. One woman suggested dividing house chore duties between spouses in order to allocate more free time which could be used for exercises. However, others highlighted that it would not be feasible to convert this idea into reality. *"I think it is a good idea, yes, but most partners won't do it"*. The lead researcher asked all groups whether support from their spouses is crucial in adopting healthier lifestyles. All participants agreed and clearly nodded their heads, which highlights the vast discrepancy between personal demands and social restrictions prevalent in a Pacific island context.

### **Leadership support**

Good leadership qualities have shown to be an essential psychosocial factor for sustainable and improved work-related health among employees.<sup>355</sup> As such, participants reported on the importance of involving supervisors and other superiors in the adoption of healthy lifestyles. Although Wednesday afternoon is officially reserved for exercises (for male and female civil servants), numerous participants indicated that work obligations do not allow them to partake. The discussions revealed that many superiors schedule meetings for this exact time and secretaries or assistants are asked to be on-site.

In order to serve as a motivating and positive role model to the employees, it was suggested that *"the bosses themselves should take part in these Wednesdays, because you don't see the bosses"*.

### **Motivation / fun**

Findings indicate the high value of fun-elements for Ni-Vanuatu women. *"We want to have fun just within in the group of friends. We want to laugh."* Fun and enjoyment has previously been identified as a crucial element of PA interventions.<sup>356</sup> For example, a successful weight loss programme in Tonga has proven that an emphasis on fun and enjoyment stimulates participation in physical exercises in Pacific people.<sup>75</sup> What this study contributes in addition to previous work is that participants are least encouraged to exercise if serious competition is central to the activity.

It was further suggested to provide incentives to partake in more physical activities, such as regular measurements of health indicators, including weight, BMI, BP and blood glucose. It is important to realise that these indicators are rarely available to people in Vanuatu as public health services are often less advanced. Hence, they are expected to stimulate and support participants in lifestyle changes. This is an important finding which may have wider implications for the allocation of financial resources within government agencies. Findings suggest that the provision of regular health checks is likely to result in a better 'healthy work environment' capable of improving work motivation and efficiency.

### **Workplace health policies**

A joint effort between different local ministries can result in effective policies that improve employees' health.<sup>244</sup> A study from Tonga found that the local population favours their local and traditional diet over imported food but generally consumes the latter. Thus, it was suggested that a combination of import bans, the development of indigenous fishing and farming industries, combined with informational approaches can result in the consumption of more traditional foods.<sup>357</sup> A collaborated effort between the health, agriculture and trade sector was



suggested to improve population health. A similar approach on the micro level could be used to create a healthier food environment at the workplace in Vanuatu: workplace health policies could be introduced to assist employees in adopting healthier lifestyles. Participants suggested outlawing unhealthy food options (such as instant noodles) and investing in and installing small kitchen areas. This would allow and encourage women to bring fresh food to work.

Moreover, a stronger official focus on the current Wednesday afternoon-activities was suggested. One woman argued that if these activities were in fact compulsory, it would allow everyone, irrespective of job rank position to engage in the weekly physical exercises. While this change towards compulsory participation is considered by some as a step in the right direction, this form of forced participation bears the danger of minimised exercise enjoyment which can result in even lower PA levels, as explained by Deci and Ryan in the Self-Determination Theory.<sup>358</sup>

### ***Popular modes of physical activities and reasons to live a healthy lifestyle***

During the discussions, popular modes of PA were identified as side outcomes of the study. Whilst walking has previously been referenced as a popular mode of PA in the Pacific region in non-academic reports<sup>76</sup> there is no scientific evidence that confirms or rejects this claim. This study confirmed that walking is a popular mode of exercise for Ni-Vanuatu women. When participants were asked for their favourite exercise, *wokabaot* was the most common answer. The Bislama term *wokabaot* translates into 'walking' in the English language. Importantly, the women mentioned they would walk as a mode of transport to and from places and also as a leisure-time activity. Many suggested they "*do some wokabaot to stay healthy.*" This suggests that in the attempt to attract women for exercises, future health programmes should focus on different types of walking as the main activity or at least include aspects of walking exercises into the overall programme.

The group meetings also revealed participants' motives to live a healthy lifestyle, ranging from improved body functions to enhanced quality of life. One woman commented: "*Healthy lifestyle? Yes, for life! To live longer. To have a good health!*" Moreover, increased productivity was mentioned as an incentive to live a healthy lifestyle. Finally, the lead researcher observed that although participants were generally aware of the benefits of healthy lifestyles, limited opportunities and cultural concerns hinder the female population from regular exercises and healthy eating behaviour.

## Conclusion

This chapter has presented the results of formative research aimed at developing best practice health promotion programmes for urban women in Port Vila, Vanuatu. Formative evaluation means to explore and understand human behaviour and should be integral in the design of any programme dealing with behaviour change. This can be particularly useful in a region where overweight and obesity have become a rather normal phenomenon and where 75% of deaths are attributable to lifestyle diseases. It is suggested that, in order to understand and respond to the region's health challenges, more formative work (i.e. understanding healthy lifestyle behaviour in men and children, additional female focus groups with larger samples) and a stronger emphasis on evaluation is needed. This study describes the initial phase of a systematic evaluation effort for a healthy lifestyle intervention. Findings from this exploratory study will aid in the design of a PA intervention for public servants in Vanuatu.

Previous health research in Pacific island contexts revealed that women are at higher NCD risk than men<sup>7-10,80,81</sup> and are crucial gatekeepers for promoting healthy lifestyle behaviour to communities.<sup>162</sup> To the author's knowledge, this is the first time formative work on female lifestyle behaviour from the Pacific region has been conducted, presenting perceived barriers and solutions for the adoption of healthy lifestyles.

The different focus groups reported similar barriers and facilitators and revealed important findings that will assist in the development of future health programmes. Given that life chances<sup>(295,334)</sup> differ significantly among nations, it was found that perceived life choices do not differ greatly: consistent with previous literature,<sup>335,336</sup> findings suggest that financial limitations, family commitments, time constraints, and road safety issues restrict healthy lifestyle behaviour in Ni-Vanuatu women. However, contrary to the general belief that overweight in low- and middle income countries (LMICs) is associated with higher socio-economic status<sup>359</sup> – my findings were that financial limitations are the major culprit for increasing NCD risk factors. Less expensive food options (imported food) are generally favoured over more costly local options such as fresh fruits and vegetables. Hence, it is not a matter of individual preference, but rather a financial issue that limits locals in purchasing healthy food options. In addition, family commitments, environmental aspects, motivational hindrances and cultural concerns were elicited as barriers for living a healthy lifestyle.

Perceived solutions provide valuable ideas for programme development. It is assumed that a stronger emphasis on social support mechanisms (including friends and/or colleagues for co-exercises and family support) is likely to result in active participation. The adoption of team-based approaches to overcome the barrier of personal safety and a focus on family involvement

is recommended. Future research may aim at discovering how men perceive healthy lifestyle behaviour in women which may be an important way to design appropriate interventions that involve men, women and the family as a whole.

As for activity preferences, findings indicate that women are more likely to choose walking for leisure time PA over any other sport activity. At the same time, they confirm they favour a team-approach over individual exercise activities. Taking these personal preferences into account it is assumed that a team-based walking programme can result in increased PA levels and potentially reduce NCD risk. This approach would also help overcome the barrier of limited equipment, as walking requires minimal tools. Further, findings suggest that fun aspects are of central importance in programme development, rather than programmes focussing on stern competition. I understand that a fun-loving culture needs an appropriate fun-activity approach and I suggest embracing this in programme development. Further suggestions for facilitating lifestyle changes include an adjustment of health related policies at the workplace. The provision of cost-effective solutions is much needed. Noticeably, findings demonstrate that local community input is fundamental in designing relevant and attractive activities.

It is widely recognised that a multi-sectoral approach is one of the key approaches required to respond to the NCDs crisis in all their aspects, given that many factors influencing NCDs lie outside of the health sector.<sup>88</sup> For example, key elements have been identified as environmental changes, lifestyle changes, clinical services, surveillance and advocacy. This research contributes to the literature in that it highlights barriers and facilitators for lifestyle changes for an understudied population in the remote Pacific Islands.

Whilst ideally, the focus groups would be carried out by local MoH staff, this was not feasible at the point of research because the delegated MoH staff were mainly male. As a result, I conducted these myself, assuming that it would be more appropriate to conduct the research by a European female, rather than by a local male individual. For maximum research outcome in the future, I suggest the recruitment of female local individuals. Where support from the Ministry of Health is absent, support from a local NGO may aid in the processes.

Findings of this study are limited in that the time-frame in which information was gathered was relatively short. However, the researchers have attempted to provide significant detail to this study through the in-depth research approach applied. In the future, pre-existing personal relationship with respondents and communities may allow for a deeper cultural understanding that may help uncover further details that currently remained unknown. Furthermore, a truly anthropological and ethnographic approach to researching healthy lifestyles in Vanuatu would make a valuable contribution to this interpretive study.

## CHAPTER 5

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### **Programme structure *Wokabaot Jalens***

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#### **Preface**

Chapter 5 is not structured as a scientific paper but provides a detailed account of the intervention that was developed based on the formative study (Chapter 4) and implemented in the Vanuatu government sector. The purpose of the intervention was to increase habitual PA levels through a team-based walking competition and to simultaneously reduce NCD risk factors. The programme was developed by a team comprising the author, another researcher from AUT University and two local staff from the Ministry of Health Vanuatu/Non-communicable Disease section.

The ideas for the programme contents were developed in the months prior to the focus groups (Chapter 4) and were based on a combination of the researchers' expertise, local health staff suggestions and relevant literature in the field. Findings from the formative study (Chapter 4) were utilised to develop and adapt the programme to local needs. After consultation with the Ministry of Health Vanuatu, the final product was named '*Wokabaot Jalens* – Evri dei 10,000 steps' which is a Bislama term and translates into 'walking challenge – every day 10,000 steps'. The Bislama term *wokabaot* is broadly used to describe walking behaviour; this can be in the mode of transport, structured exercise (fast walking) or a stroll with friends of family along the seawall or at the beach.

## Guiding principles

The culture in Vanuatu is characterised by strong gender roles which can result in disadvantages for women in relation to sport and recreation activities.<sup>149</sup> Several key informants stated during the *Walk for Life* assessment that exercise activities are often not seen as appropriate for older women (Appendix L). Addressing the PA needs of women as the highest risk sub-group is therefore the central intention of this research intervention.

If organised and structured accurately, a workplace PA intervention can engage and motivate populations to accumulate habitual PA and adopt healthy eating behaviour. Research indicates that women are particularly prone to participate in walking programmes in Australia.<sup>21</sup> and in the United States of America.<sup>22</sup> Further investigation is needed to determine whether similar effects will be found in more traditional cultures that differ vastly in attitudes and values and is dominantly marked by a lower socio-economic lifestyle.

The proposed intervention addresses three of the four core strategies (2-4), proposed by the Ministry of Health, Vanuatu.<sup>360</sup>

- A workplace PA intervention will promote regular walking activities;
- Social marketing tools and health information will increase the awareness of healthy lifestyles and PA;
- Cross-agency competitions will develop PA opportunities

*Wokabaot Jalens* was developed in a collaborative approach: both researchers and prospective participants contributed to programme content. The objective was to invent a novel, culturally-meaningful health intervention for urban Ni-Vanuatu women. Importantly, during the discussions, the researcher's role was to serve as a facilitator and to create an environment in which meaningful exchange was possible. The final "product" was a result of an equally balanced input of both the researcher and the participants. Whilst the participants suggested a programme that focuses on walking behaviour which could be monitored by pedometers, the researcher responded to this idea and suggested additional tools that have shown to be successful. This includes, for example, the walking map - a model of best practice.<sup>361</sup>

The programme was developed in accordance to participants' previously identified needs and wants in a collaborative approach. Findings from formative work (Chapter 4) were utilised to develop this programme. A central aspect of the programme was to emphasise that PA can be arranged in fun activities, rather than in stern competitive elements. This findings is in line with

other research which found that PA participation rates are higher when programme emphasis is placed on the "fun" part of the intervention.<sup>156</sup>

Further, one of the key design features was that lifestyle activities were performed in a group-based format rather than taking an individual approach in order to respond to the communal nature of Pacific people.<sup>174</sup> This component of social support forms a very important part of the programme. The positive relationship of social support in general has been recognised by many researchers. Since the 1970s, scientists have studied the effect of social support on various health outcomes and collectively found positive effects on improved personal competence, health maintenance behaviours, perceived control, positive affect, recognition of self-worth and psychological well-being.<sup>362</sup> Many attempts have been made to define social support and a large variety of definitions is available.<sup>363</sup> It is broadly defined as "the assistance and protection given to others, especially to individuals".<sup>362</sup> Traditionally four types of social support are suggested, including emotional, instrumental, appraisal, and information support.<sup>364</sup> Instrumental support refers herein to the direct support, such as financial support, transportation, and exercise equipment, whereas motivational support refers to aspects such as direct encouragement to participants for their participation in PA. Modelling support refers to the provision of support as a role model for PA involvement. Both instrumental and motivational support is provided through the programme.

Evidence is available documenting the relationships between physical activity and social support<sup>365</sup> and Leahey et al.<sup>352</sup> suggest that social support can lead to increased PA levels. The social ecological model aids taking social structures into consideration that may impact on PA behaviour. Social support approaches are essential for this programme. It is the instrumental support that only allows female civil servants to enter such programme and it is the motivational support that means to engage individuals in PA who are physically inactive, thus need it most. In the context of LMIC, social support mechanisms may play an even larger role than in Western contexts; basic infrastructure is often limited and it is culturally often not accepted for adult women to engage in PA. Culturally-sensible motivational support may help these individuals become active.

Human behaviour is greatly influenced by complex patterns of underlying social norms, the environment and an individual's attitudes, values and beliefs<sup>307</sup> and has been studied in-depths in many academic disciplines. The behaviour change theories presented in Chapter 2 help explain why individuals behave the way they do. As an important aspect for behaviour change to occur, reinforcement approaches and anticipated future rewards may assist the individual in maintaining a desired behaviour.<sup>366</sup> These kind of incentives may include physical consequences

(e.g. looking better), extrinsic rewards (e.g. receiving a T-shirt, winning an award), and intrinsic rewards (e.g. experiencing a feeling of accomplishment from reaching a personal milestone). Importantly, whilst providing external incentives may assist people in adopting changing lifestyle behaviours, they may not be reliable in sustaining long-term change.<sup>367</sup> For that reason, an emphasis on intrinsic motivation is essential for sustained behaviour change to occur. The improvement of individual health has been described as a major intrinsic incentive for behaviour change to occur and last.<sup>270,368</sup> As such, whilst physical consequences and external rewards are important aspects of the intervention, intrinsic incentives are considered more relevant.

Since the most successful approach for individuals to improve their performance and change their behaviour is to provide feedback,<sup>369</sup> participants were equipped with pedometers that help to a) monitor step levels and b) motivate participants to engage in continuous PA. The Yamax SW-200 has been shown to be accurate and reliable for measuring step numbers in adults<sup>278</sup> and was used in this programme. Moreover, participants were updated on a weekly basis about their teams step progress via email. Direct feedback by the researcher was provided.

Social marketing strategies can play an important role in generating behaviour change.<sup>296</sup> After consultation with prospective participants (Chapter 3), the author understands that there is a desire for the provision of social marketing tools. Further, previous explorative work from Vanuatu in 2009 revealed that social marketing strategies are difficult to implement due to a lack of resources and expertise.<sup>116</sup> Whilst it is not in the scope of this thesis to provide social marketing tools that profoundly affect the population's social norms, efforts are made to impact individual lifestyle behaviour to the maximum with materials provided. This programme seeks to deliver novel and culturally appropriate strategies to transmit the message of healthy lifestyle adoption. The intervention approach taken in this thesis incorporates a number of social marketing strategies, ranging from media (TV, Radio, local newspaper, internet) involvement, to tailored health information materials, and culturally meaningful posters and flyers. Efforts are all enforced by the Ministry of Health Vanuatu. For more in-depths information regarding social marketing theories, the reader is referred to Chapter 2.

The name of the programme resulted from the focus group discussions. When participants were asked for their favourite exercise, *wokabaot* was the most common answer.

The programme was accompanied by baseline and follow-up health screenings. The Mini-STEP questionnaire served as a tool to collect essential health information. The tool is a minimised

STEPS version<sup>xviii</sup> that has been adapted for community settings in the Pacific region. It has proven useful for surveillance and evaluation at local levels.

## **Programme components**

Based on the findings from Chapter 4, the programme was designed to consist of four components:

- Team-based step challenge
- 1 million individual step challenge
- Social marketing tools
- Health education materials.

Each component is now described in greater detail below.

### **Team-based step count challenge**

Formative work identified walking for leisure time PA to be the favourite exercise activity for urban Ni-Vanuatu women. It was further found that a team-based approach would yield better participation outcomes than any other individual exercise activity. Social support mechanisms were identified as potential facilitators. It was therefore assumed that a team-based walking activity can result in positive health outcomes. Participants formed teams of two to eight participants. Grouping occurred based on departments, friendship, residential location and/or getting along, in order to enhance mutual motivation and walking participation. On a fun basis, groups competed against each other and aimed for the highest weekly and total team step number.

Several approaches were applied to enhance social support mechanisms:

- Step captains: step captains were appointed for each team. They motivated and encouraged team members, initiated team activities and reported total team step numbers back to the researcher. An initial step captain session trained appointed step captains and provided further instructions.

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<sup>xviii</sup> STEPS survey: The WHO STEPwise approach to Surveillance (STEPS) is a simple, standardised method for collecting, analysing and disseminating data in WHO member countries.<sup>79</sup> The Mini-STEPS survey is an abbreviated STEPS version that was recommended as an excellent tool to promote surveillance and evaluation as part of community initiatives.<sup>180</sup>



- Bonding: each team appointed his own team name to generate bonding, communal feeling and feeling of responsibility;
- Motivation: each group member was instructed to motivate and encourage one another. A pre- and post health screening, as identified above as a potential motivator, was conducted to examine health outcomes. Weekly team activities supported individuals with lifestyle changes. Weekly external support was provided through the researcher via health educational emails.

### **1 million individual step challenge**

Participants were encouraged to engage in a concurrent individual 1 million step challenge. Individuals who accumulate 1 million steps in 100 days would achieve the 10,000 steps/day recommendation and therewith the official Pacific physical activity recommendation.<sup>76</sup>

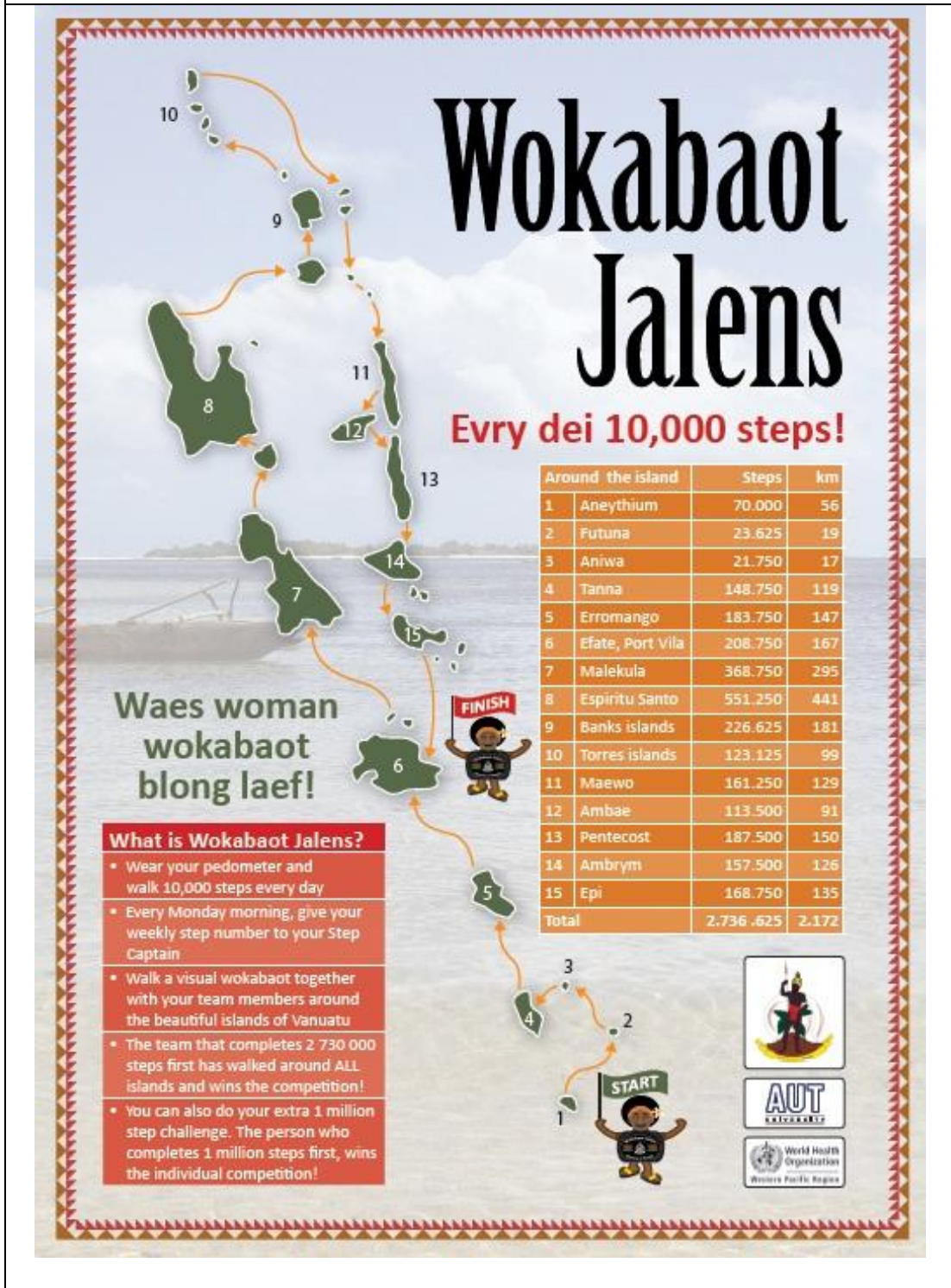
The intention was to motivate participants for further action. Where team members' participation was lower than expected, an incentive for the more motivated team members' remained and they were not excluded from competing with other teams. Since some individuals might favour individual activities (due to timing difficulties) over team activities, they continued to be fully included in the programme.

### **Social marketing tools**

Social marketing tools were designed in order to raise awareness, motivate, facilitate exchange and stimulate for action for the adoption of healthy lifestyles. The following presents a selection of materials. More detailed information can be found in Appendix O-V.

A visual walking map (A0 poster) of the islands of Vanuatu that pictures walking distances and step numbers (Figure 8) was handed out to each participating Ministry/Department – 18 in total.

**Figure 8:** Visual walking map



T-shirts were designed for the step captains to create a feeling of importance, trustfulness, respect and responsibility; T-shirts were also given to team challenge winners.

A walking log was provided to each participant. The walking log (*Dei Wokabaot Buk*, translates into *Daily Walking Book*) included information about healthy lifestyles, programme components and charts for daily step numbers to be recorded and reported to the step captain.

**Figure 9:** Walking log: Dei Wokabaot Buk

**What is a healthy lifestyle?**

- A healthy lifestyle is living our life in a way that promotes physical and mental well-being.
- A healthy lifestyle helps us prevent deadly diseases such as heart attacks, strokes, cancer and diabetes.
- A healthy lifestyle will bring health improvements in all aspects of our well-being.
- A healthy lifestyle is not expensive. We need to invest discipline and commitment.

**Some tips for your healthy lifestyle:**

- Choose a variety of foods. Local foods are best
- Eat plenty of fresh fruits and vegetables – it is great as a snack and full of vitamins!
- Include one BIG serving of vegetables in two meals every day
- Eat less deep fried food and less meat
- Drink plenty of clean water
- Get off a bus stop earlier and walk the rest
- Don't smoke, take drugs or chew betel nuts
- Be active every day
- WALK MORE!

**What is overweight?**

Overweight and obesity are defined as “abnormal or excessive fat accumulation that presents a risk to health”.

Overweight and obesity develop slowly over the years. We might not feel any discomfort today, but our blood sugar levels, blood pressure and arteries may have started the deadly process already.



When we are overweight or obese, we have a higher risk for noncommunicable diseases (NCDs).

**NCDs are lifestyle diseases. They include:**

- type 2 diabetes
- cardiovascular diseases (stroke, heart diseases)
- hypertension
- gall bladder disease and
- certain types of cancer.


The good thing is: overweight and obesity, as well as NCDs, are preventable and reversible!

**Prevention is the easiest option for controlling our health.**

### How to wear your pedometer

A pedometer is a small, portable device that measures how many steps you take. It's a great way not only to monitor your activity levels, but also to motivate you to walk even more!

To achieve your exercise goals and to make your pedometer as effective as possible, you should know how and where to wear it. If you don't wear the pedometer nicely, you may miss or add steps, giving you a wrong reading. Check your pedometer placement frequently throughout the day.



**STEP 1**  
Your pedometer came with a little clip on the back so that you can easily attach it to your clothes (pants, skirt or waistband). Make sure that it is placed at your hip, under your armpit. If you are wearing a dress without a waistband slide the clip of the pedometer onto the waistband of your underwear.

Do NOT hook the pedometer to the front or back of your pants, on your shoe or inside your pants pocket. You won't get an accurate reading.


**STEP 2**  
Make sure that the pedometer is attached correctly, with the numbers facing up, and hooked straight down onto your pants or dress. Be sure that you always wear the pedometer on the same side of your body each time so that your results are consistent.

**STEP 3**  
Test the pedometer to be sure it's accurate. Set the pedometer to zero, and walk at least 50 steps, counting your steps mentally. Make sure that the reading is no more than two steps off your count. If it's off, reposition the pedometer and try it again.

**STEP 4**  
Record your results. At the end of each day when you take the pedometer off your waistband or pants, write down your daily step number into this book. At the end of this book there are some pages for you to note down our daily step numbers. Please do this every day for every week until your Step Captain tells you about the end of the Wokabaot Jalens. Please give our total week step number on every Monday morning to your Step Captain.

**STEP 5**  
Know how much you're moving. If you're walking 2,500 steps per day, that's about 2 km. You can walk much more than that by changing a few simple things in your daily routine and by making a bigger effort to be more active. Set goals to increase your steps and walk with your team to win the Jalens!

**STEP 6**  
Increase your steps! Walk to work, take a short walk a few times a day on breaks at work, get off a bus stop earlier and walk the rest. Plan a daily after dinner walk with a friend or your partner, or do some house cleaning. Each step counts as exercise, and it's another step towards your better health!



### Have you reached your 10,000 steps yet?

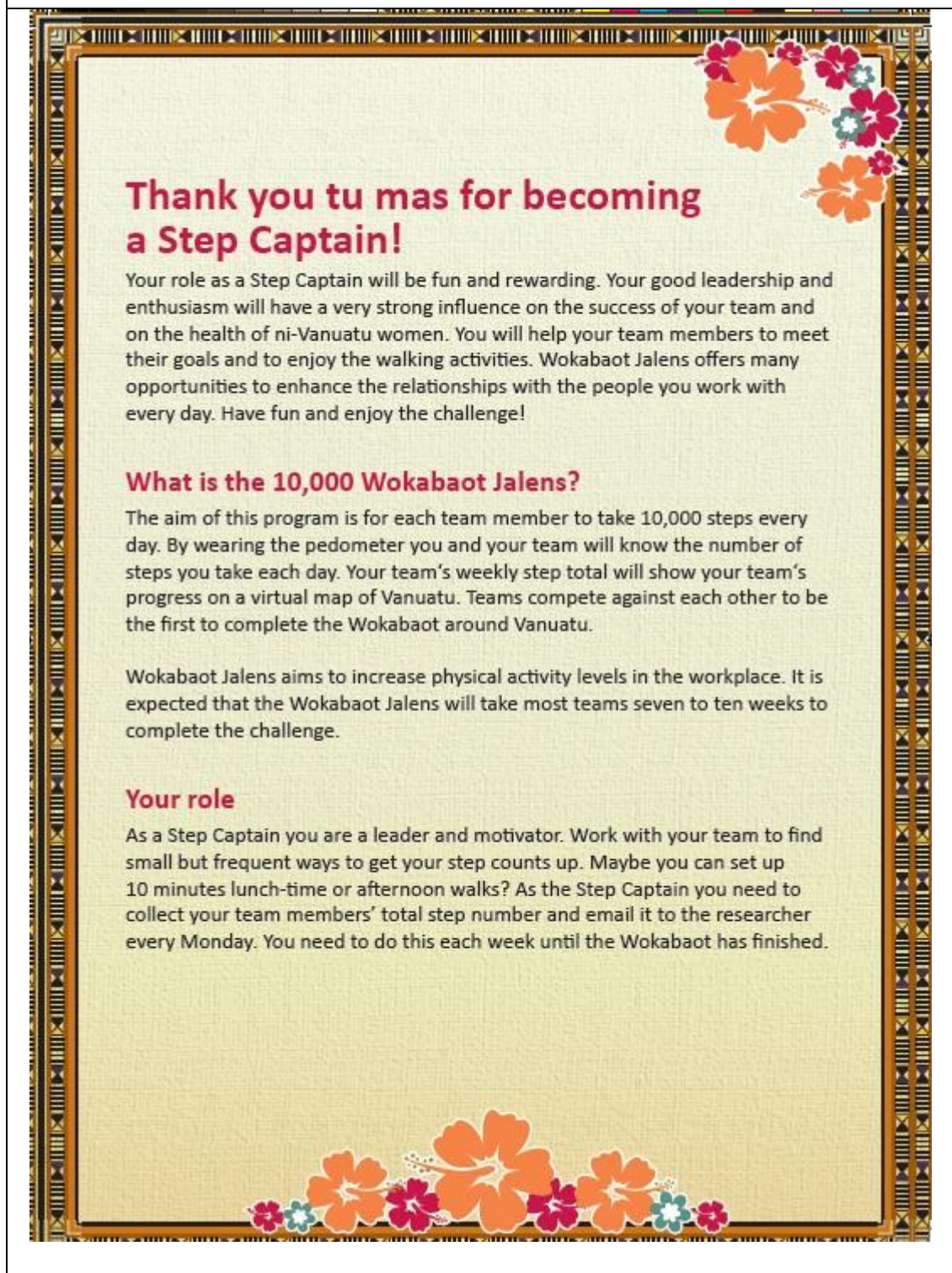
**Some easy tips for you**

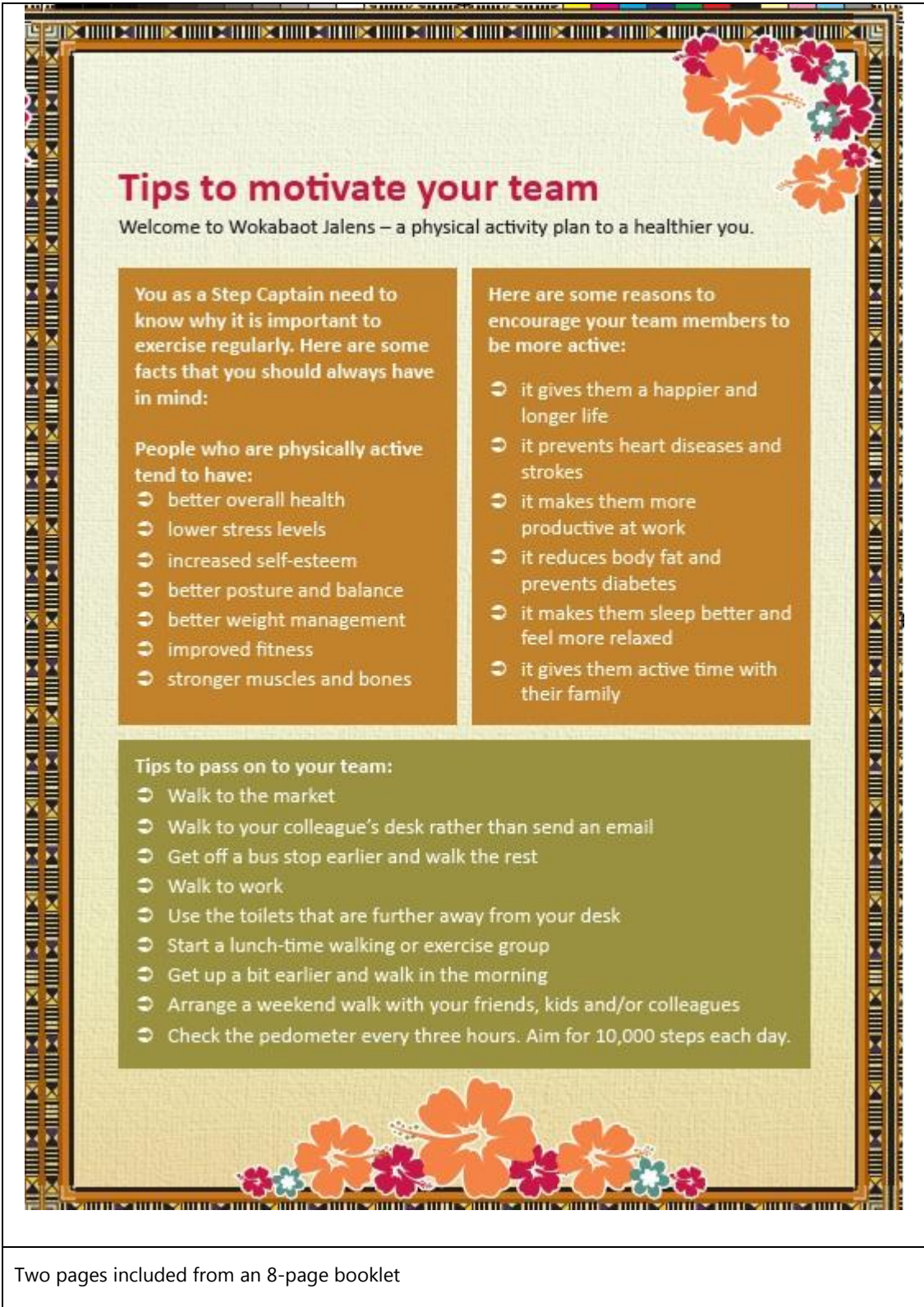
- Walk 10 minutes three times a day
- Walk to the shop which is not the closest
- Check your pedometer every three hours
- Get off a bus stop earlier and walk the rest
- Walk to your colleague instead of sending her an email or calling her by phone
- When you reach home take your family on a fun walk
- Call a friend and make a Wokabaot appointment. You are more likely to walk when you have a walking date.
- Think of the positive effects on your health and your future
- Think of activity as an opportunity, not an inconvenience
- Change your attitude

**Change happens one step at a time. Walk!**

Four pages included from an 11-page booklet

**Figure 10:** Step captain manual





## Tips to motivate your team

Welcome to Wokabaot Jalens – a physical activity plan to a healthier you.

You as a Step Captain need to know why it is important to exercise regularly. Here are some facts that you should always have in mind:

People who are physically active tend to have:

- ⇒ better overall health
- ⇒ lower stress levels
- ⇒ increased self-esteem
- ⇒ better posture and balance
- ⇒ better weight management
- ⇒ improved fitness
- ⇒ stronger muscles and bones

Here are some reasons to encourage your team members to be more active:

- ⇒ it gives them a happier and longer life
- ⇒ it prevents heart diseases and strokes
- ⇒ it makes them more productive at work
- ⇒ it reduces body fat and prevents diabetes
- ⇒ it makes them sleep better and feel more relaxed
- ⇒ it gives them active time with their family

Tips to pass on to your team:

- ⇒ Walk to the market
- ⇒ Walk to your colleague's desk rather than send an email
- ⇒ Get off a bus stop earlier and walk the rest
- ⇒ Walk to work
- ⇒ Use the toilets that are further away from your desk
- ⇒ Start a lunch-time walking or exercise group
- ⇒ Get up a bit earlier and walk in the morning
- ⇒ Arrange a weekend walk with your friends, kids and/or colleagues
- ⇒ Check the pedometer every three hours. Aim for 10,000 steps each day.

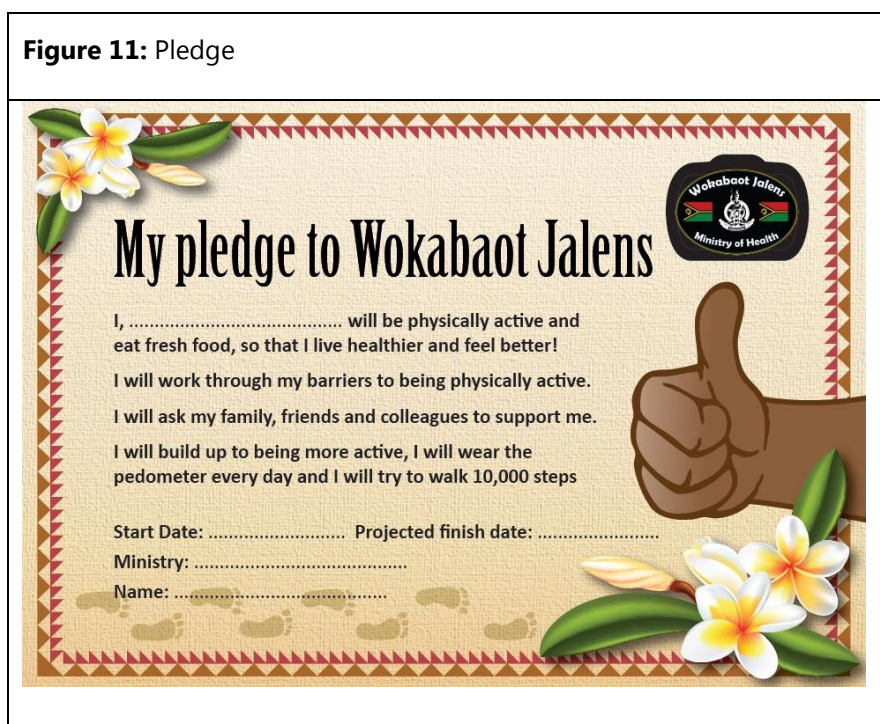
Two pages included from an 8-page booklet

Posters with health information and advices were distributed as hard-copies and electronically;

A website was designed to collect information from the teams' activities and provide easy access to all participants. Consent of participants was sought prior to posting on website. All information remains anonymous. (<http://wokabaot.blogspot.com/>)

Healthy lifestyle information was provided on a weekly basis to all participants by email. Participants were encouraged to share information with their colleagues, families and further communities.

A pledge (Figure 11) was signed by each participant prior to programme implementation.



### Health education

Various health information approaches were applied in order to inform participants about lifestyle choices. Local food consumption and locally attractive activities were promoted to stimulate action and encourage lifestyle changes.

Initial health seminars informed participants about the relevance of healthy lifestyles, NCD prevention, PA and healthy eating behaviour.

- Step captains were specifically trained during a seminar prior to programme commencement to encourage and support team members and to provide them with adequate health information;

- During the initial eight weeks participants received tailored health messages from the researcher per email;
- Step captains reminded and encouraged group members to achieve their daily step goals and to eat healthily. Team sessions were conducted fortnightly in order to enable sharing of experience, thoughts and challenges;
- Following the programme termination participants were repeatedly encouraged to continue monitoring their step numbers and to maintain the lifestyle change. Moreover, the programme was handed over to the Ministry of Health who may decide whether the programme should be adjusted to male participants. A repeated health screening twelve months after implementation was recommended to determine long-term health effects of the intervention.

## **Procedure**

The programme preparation phase consisted of designing social marketing materials and collecting all female civil servants' email addresses by contacting the different ministries since no official list could be provided. The lead researcher gathered approximately 300 email addresses and sent invitations to all recipients to partake in the opening of the *Wokabaot Jalens*. Upon arrival in the country, the researcher was confirmed that the large majority of the email recipients were indeed female civil servants. It remains unclear whether every single female civil servant was invited, given the lack of a systematic email list. Since I was previously informed about approximately 200 female civil servants being recruited by the Vanuatu Government, it is assumed that the email list was relatively complete. More details about programme logistics can be found in Chapter 7 and Chapter 8.

A total of 207 individuals registered for the programme with the lead researcher following the opening talk. No information is available regarding those individuals who did not register. Participants self-selected their teams (2-8 members) prior to programme commencement and appointed a step captain for each team. Step captains were responsible for coordinating and facilitating team meetings, collecting team members' step numbers and forwarding them to the researcher on a weekly basis. Prior to programme commencement, step captains underwent a seminar session conducted by the researcher which covered strategies of how to motivate and encourage team members. Remarkable enthusiasm was noted and the need for more action was clear. Overall, teams were based on Ministries, but some teams formed based on friendship and/or residential location. Eventually, 37 teams from 18 ministries/departments and 2 teams from the private sector were formed. All participants were equipped with a Yamax SW200



pedometer, which had been shown to be accurate and reliable for measuring step numbers in adults,<sup>278</sup> an Actical waist band (details Chapter 7), a pledge and a log book.

The programme's official opening was convened by the Director of Public Health, the NCD team from the Ministry of Health and the researcher. A healthy lunch was provided to all participants; *Vanuatu Water* sponsored the initiative. TV Vanuatu and Radio Vanuatu recorded a short video and interview about the activities which were broadcasted the following evening.

Scheduled health assessments were arranged for the collection of anthropometric and health indicator data prior to and following the monitored phase of *Wokabaot Jalens*. Assessments were conducted before week 1 and at week 15. Each assessment was identical and included 1) PA levels (step counts), 2) anthropometric measures (light clothing, no shoes), 3) BP, 4) blood samples for determination of fasting glucose and blood lipid parameters and a lifestyle questionnaire (see Appendix K). Changes in BMI, waist circumference, fasting glucose, blood lipids and BP were evaluated. Health assessments were managed by the researcher and carried out with assistance of the Ministry of Health personnel and health students.

*Wokabaot Jalens* was externally monitored for twelve weeks by the researcher. Teams were expected to meet as a group once each week and undertake fun-based exercise activities, discuss their any issue encountered and share healthy lunch options where feasible. Each step captain emailed her team member's step numbers back to the researcher on a weekly basis. The researcher set up step overview charts and sent a weekly step update to each participant via email. The visual walking map (Figure 8) illustrated teams' progress: the map displays the major islands of Vanuatu. Real circumference of each island was measured in km with the geographical information programme Google Earth. Knowing that 10,000 steps equal approximately 8km, step numbers were calculated for each island showing on the map. The right hand table indicates how many steps it takes to surround each island. If each team member takes approximately 10,000 steps per day in a team of five, all showing islands can be surrounded within 8 weeks by a team. Each teams' total step count was adjusted to a teams of five team members. The visual map was utilised to include a fun element in the walking competition.

A variety of physical activities were arranged by the teams. More details about programme activities can be found in Appendix N.

At the end of the 12-week monitored phase, an official gathering was conducted to conclude the first phase of the programme (alongside a provided healthy lunch). The Director of Public Health reiterated the need for healthy lifestyle behaviour in his speech and encouraged continuous action. At this point the maintenance phase was explained. The gathering further

included a review with information about participants' lifestyle change behaviour from the previous 12 weeks and was closed with an exercise session for all to set the participants on track for their independent long-term lifestyle change. Again, TV Vanuatu recorded the gathering and the activity sessions were broadcasted the following evening in the Vanuatu news.

After 15 weeks the 2<sup>nd</sup> health screening (data collection) was conducted. Procedures in the 2<sup>nd</sup> health screening were carried out in the same mode as in the first screening, as described in Chapter 7.

During the maintenance phase, participants had sporadic email contact with the researcher. No formal expectation was set for teams to continue with their activities and lifestyle changes after programme termination. However, it was strongly encouraged to keep the momentum.

Three months following the monitored phase, all participants were encouraged by researcher through personal communication to partake in an online pedometer challenge, organised by the Australian government, free of charge. The author is aware of at least 25 individuals who subsequently formed new walking teams. Although not involved, the researcher was in email contact with some participants and observed outstanding commitment among participating teams. Some minor external support was sought by participants (in terms of registering online), but overall, participants demonstrated independency and were able to compete with 1,800 individuals from Australia. This 4-week walking challenge resulted in utmost commitment and very high step numbers, as reported back to the researcher in private email communication. Three teams from Vanuatu ranked among the first 10 teams (of 444 teams) with mean step numbers of 24,000 per day. This form of proactive dedication illustrates the potential of sustained pedometer-based walking initiatives.

After these four weeks, participants contacted the researcher via email to report on their largely positive experiences. Interestingly, several statements regarding future suggestions came up:

- a) Health authorities to take an active leading role in promoting PA such as walking to all citizens especially in towns. Raise awareness on the importance and benefits of walking as a form of exercise.
- b) Make walking challenges regular events through the Government. Public servants can take the lead in educating the public on the importance of regular exercises and healthy lifestyles. Walking challenges are very effective – “many working women can only do this kind of exercise after work and they can find the time to do this on their own.”

- c) Involve the whole families in these walking challenges
- d) Promote the consumption of local food grown in Vanuatu
- e) Ban the import of unhealthy processed food from overseas.

A repeated participation in the Australian online pedometer challenges was recorded by some participants 14 months after programme termination. Further, the researcher coincidentally met some participants 15 months after programme termination and the continuous use of pedometers was recorded.

A strong demand to obtain pedometers for family members and for colleagues was observed. "People here are happy to purchase the pedometers at their own cost, but at the moment we just cannot access any pedometers here in Vanuatu. It would help many people to take up a healthier lifestyle."

Table 2 displays the lead processes of the *Wokabaot Jalens* in order to report on the programme phases and the researcher's involvement. Consideration to the researcher's location is given. All research participants were located in Port Vila, Vanuatu.

**Table 4:** Phases of the *Wokabaot Jalens*

<b>Timeline</b>	<b>Activity</b>	<b>Researcher's location</b>	<b>Duration</b>
Sept 2009	Walk for Life evaluation, Vanuatu government	Port Vila, Vanuatu	10 days
Oct 2009 - Sept 2010	Desktop research	Auckland, New Zealand	12 months
Oct 2010	Focus groups	Port Vila, Vanuatu	7 days
Nov 2010- Dec 2010	Transcribing and analysing focus groups	Auckland, New Zealand	6 weeks
Jan 2011 – Mar 2011	Programme design, based on findings from focus groups	Auckland, New Zealand	3 months
Apr 2011	Programme implementation, Baseline health screenings	Port Vila, Vanuatu	7 days
Apr 2011	Training of local leaders	Port Vila, Vanuatu	2 days
Apr 2011 – Jul 2011	Externally monitored programme duration	Auckland, New Zealand	12 weeks
Jul 2011	Programme termination, follow-up health screenings	Port Vila, Vanuatu	7 days
Jul 2011	Process evaluation	Port Vila, Vanuatu	2 days
Aug 2011 – Feb 2012	Write-up of process- and outcome evaluation	Auckland, New Zealand	6 months
Aug 2011 – today	Informal programme maintenance in Port Vila.	Auckland, New Zealand	ongoing

## CHAPTER 6

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# Novel techniques to visualise evaluation data and to communicate health promotion programme successes and challenges

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### Preface

The following two chapters focus on the effect of the *Wokabaot Jalens*. Firstly, in Chapter 6 a process evaluation provides insights into programme success and challenges; a novel approach of data visualisation and communication is presented. An outcome evaluation follows in Chapter 7 and presents the effects of the intervention.

The purpose of this following chapter is to evaluate the *Wokabaot Jalens* by identifying programme perceptions in participants in order to provide recommendations for the adjustment, improvement and presentation of future culturally centred lifestyle programmes. From field observation I knew that often Pacific people are frequently inclined to assent with external ideas and suggestions and critique to the researcher's effort is rare. For that reason, it can be difficult to know whether proposed ideas from the researcher are actually well received or whether agreements are culturally related assents. The researcher responded to the identified field observation and included open-ended questions in evaluation questionnaires to facilitate the voicing of true ideas and/or opinions on the programme. It is important to acknowledge that for lingual and cultural reasons, responses of the Ni-Vanuatu population tend to be shorter and less lucid when compared to communiqué within Western societies. The author assumes that suggestions provide just an entry point to a potentially deeper investigation.

This study helps understand participants' perceptions of a targeted PA programme in the context of Vanuatu. Further, a new data visualisation technique (DVT) is introduced; it presents a new approach in health promotion research aiming to engage local health practitioners to understand and communicate academic data to relevant stakeholders and beyond. Findings aid in programme improvement and wider programme rollout.

The manuscript resulting from this chapter has been submitted to Global Health Promotion. The ethics approval can be found in Appendix F. The consent form for this study is part of the consent process associated with Appendix I.

## Abstract

**Background:** The South Pacific region is experiencing significant rates of chronic diseases. Well evaluated health promotion programmes are needed as a central piece of a strategic solution. Just as important as the evaluation itself is how that evaluation can be communicated for future programme use by local programme planners. A 12-week physical activity programme was developed and evaluated targeting female civil servants in their workplace in Port Vila, Vanuatu. I present the process evaluation and suggest new techniques to display data that support the understanding and communication of programme success and challenges.

**Methods:** Data collection methods included quantitative Likert scale questions and qualitative open-ended questions. The new analysis technique visualises open-ended process evaluation data. Themes are presented using word sizes proportional to the frequency of the themes identified through thematic analysis.

**Results:** The likert scale technique revealed little meaningful information; almost all participants rated most elements of the programme highly. This may be related to many Pacific people being frequently inclined to assent with external ideas. Open-ended questions provided more significant insights. For example a stronger change in eating habits (68.9%) than in exercise behaviour (28.2%) was found.

**Conclusion:** The first pedometer-based PA intervention from the Pacific region is presented. The study responds to the paucity of process evaluations that have been carried out in the context of low- and middle income countries. Moreover, the new thematic data visualisation (TDV) aids in understanding complex and cluttered data in a constructive and coordinated way; a new approach in health promotion research is presented.

## Aim

The objective of this study is to evaluate a PA programme that was designed for Pacific women in urban Vanuatu, and subsequently provide recommendations for the adjustment, design and presentation of future lifestyle programmes that are culturally centred and attractive.

## Introduction

*Wokabaot Jalens* (Bislama term for “walking challenge”) describes a 12-week PA programme for female civil servants who reside in an urban Pacific context in Port Vila, Vanuatu. The culturally centred programme was designed by a group of international health experts in a collaborative approach with local civil servants: a team-based pedometer challenge, accompanied by social marketing and health education tools, was implemented and monitored for twelve weeks between April and June in 2011, using the workplace as a setting. 207 participants were grouped into teams and competed – on a fun basis – against each other with the overall aim of virtually walking enough kilometres to have traversed the islands of Vanuatu. A step captain was appointed for each team who reported team members step numbers to the lead researcher on a weekly basis. *Wokabaot Jalens* was accompanied by electronic weekly health information, motivational support mechanisms and self-organised exercise opportunities. Health screenings measured the physical effect of the intervention. Pedometers were used to objectively monitor individual PA behaviour.<sup>xix</sup>

To understand participants’ experiences and inform future programme roll out in the region, a process evaluation was conducted. A process evaluation is a systematic method for collecting, analysing, and using information to answer questions about the effectiveness of programmes.<sup>117</sup> It can assist in understanding the intervention outcomes and it provides ideas as to why certain results were achieved and others were not.<sup>370</sup>

Process evaluations frequently use both quantitative and qualitative methods; qualitative methods can include field visits, structured observations and open-ended questions, whilst quantitative methods include likert scale questions. The present process evaluation included both methods; it is thought to yield rich details about research outcomes that neither method could achieve alone.<sup>371,372</sup> In my study, Likert scale results regarding programme effect, structure, and satisfaction showed little variation (all high). This was probably not because the programme was not without possible improvement but more likely because the local target population

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<sup>xix</sup> A detailed explanation of the programme can be found in the outcome evaluation of *Wokabaot Jalens*.



rarely critiques international researchers' efforts.<sup>373</sup> To identify participants' actual perception of the programme and to understand programme effectiveness in greater detail a thematic analysis approach was subsequently employed, coding open-ended question responses.

As an important element of this study – and in response to local critiques regarding the complexity of academic data presentations – I aimed at presenting and communicating research findings in locally attractive and acceptable ways. This may engage local health practitioners and potential donor agencies for future action. Clear-cut presentations of data outcome are provided: wordle, a web-based tool for visualising text proportionally to frequency, was used to create visual representations of the data and provided the reader with images of findings. Whilst this thematic data visualisation (TDV), based on word clouds or tag clouds, has been used in education research,<sup>374</sup> sociology,<sup>375</sup> and web research,<sup>376</sup> it has not been employed in the field of health promotion. Importantly, from field experience in the Pacific region I understand that such approach is crucially relevant for collaborative research efforts with health practitioners from the Pacific where a) research capacity and the familiarity with research language is lacking, b) the visual transmission of knowledge is generally favoured over reading lengthy research documents and c) fluency in English is often restricted due to linguistic varieties. Wordle displays words proportionally to frequency, thus reliability is high. Validity is less lucid and another avenue for future research as it largely depends on the researchers' interpretive analysis. Cross analysis among researchers, as conducted in this study, is therefore recommended.

## **Literature**

Overall, and beyond the local and regional context of this work, few pedometer-based workplace health promotion process evaluations are available. In particular, there is a paucity of lifestyle intervention process evaluations from LMICs. Rabiei et al. identified barriers for conducting lifestyle interventions at the workplace in Iran, a middle income country. However, whilst seven barriers were identified, the degree of relevance remains unclear.<sup>377</sup> Moreover, all barriers identified related to the management aspect of running interventions, rather than participants' experiences. Fotu and colleagues identified inconsistent patterns of intervention reach, frequency, and dose in a process evaluation of an obesity prevention project in conducting a study in Tonga.<sup>378</sup> Findings were explained with insufficient health research infrastructure and capacity. Matsudo et al. provide a detailed process evaluation of the Agita São Paulo Programme, a multi-level plan that coordinates PA and interventions among more than 40 million inhabitants of the state of São Paulo, Brazil.<sup>379</sup> Matsudo et al. suggest allocating a specific budget for process evaluation purposes during the strategic planning stages. It is important to note that evaluation is an ongoing and repeatable process and it does not suffice

to evaluate on one single occasion. For PA interventions to be sustainable and successful, the evaluation should be carried about continuously and independently. A major challenge for many health promotion programmes is the sustainability after project termination. If evaluation procedures depend on funds from within project budget, an independent and continuous evaluation is not realistic.

An increase in the number of regularly active people and a decrease in the percentage of sedentary people was detected.<sup>379</sup> Importantly, Matsudo et al. relate the general dearth of evaluation procedures to societal influences. They further underpin the need to not only conduct a process evaluation, but to also provide feedback for process improvement. As such, this study responds to previously identified gaps in PA research in the context of LMICs.

Across the Pacific, health infrastructure is often poor. More importantly, there is a shortage of an appropriately trained health workforce, especially in the field of health promotion.<sup>380</sup> Extra strategies for communicating research results in the local and regional public health context are therefore much needed. As such, the visual presentation of data is an indispensable tool to communicate findings because it allows a basic understanding of the data at hand.<sup>381</sup> As well, aesthetic designs are perceived as easier to use and understand and people are inclined to have a more positive attitude toward them.<sup>382</sup> A possible culturally-rooted reluctance toward “research language” may be overcome. The new approach is transferrable to other local, regional and global contexts.

## Methods

The present study was designed to investigate and communicate the successes (or otherwise) of a pedometer-based healthy lifestyle intervention on PA behaviour (especially walking activity) and health outcomes among urban Ni-Vanuatu female civil servants. A questionnaire was developed that used generic qualitative and quantitative approaches; 11 Likert scale questions and 6 open-ended questions were designed to evaluate the potential of the intervention in terms of feasibility and effectiveness. The questionnaire was adapted from a tool used by Vitality works – a New Zealand based workplace health specialist. The tool has been used for assessment of Vitality Works' 10,000 Steps programme which is very similarly run in many ways to *Wokabaot Jalens*. The tool has been in use for at least ten years with Pacific and New Zealand individuals. The questionnaire was distributed to each participant (N=133) and was returned by 130 individuals (Ø age 36.2 yrs; Ø BMI 29.1) who attended the follow-up health screening in July 2011 upon completion of the 12-week monitored intervention (participation rate: 62.8%).

Likert scale responses were recorded on a four-point Likert scale ranging from 'strongly agree' to 'strongly disagree'. Data analysis for the 11 closed-end questions comprised summing the number of responses for each of the four points of the Likert scale and calculating percentages based on the total number of responses for that question.

Building on previous experiences from the Pacific Islands, it is expected that the target population would often be inclined to assent with external suggestions and critique of international researchers' effort is rare. For that reason, additional open-ended questions are appropriate to uncover true opinions on the programme. Open-ended questions focused on individual experiences, such as likes, dislikes and challenges; furthermore, suggestions for programme improvement were sought. Questions were analysed through a thematic induction approach.<sup>347</sup> For each question, an initial broad coding of all themes was carried out in order to identify emerging and reoccurring themes. The codes were then analysed and condensed into dominant themes, as suggested by Miles and Huberman (see also<sup>348</sup>). The qualitative analysis software package NVivo 9.0 assisted the researchers in storing, integrating, indexing, and coding the data. To avoid a biased representation of data, a cross-examination of occurring themes was conducted between contributing authors. During this process, the total number of responses relating to common themes was summed. Wordle, a free internet tool that creates word clouds from text and emphasises words proportionally to their frequency in the source text, was used to visualise the occurring themes proportionally to their prominence.<sup>383</sup>

## **Findings**

In April, 2011, a total of 207 individuals registered for the *Wokabaot Jalens*. Of this initial group, 133 individuals attended the 2<sup>nd</sup> health screening in July 2011 where process evaluation sheets were distributed. Reasons for absence at the 2<sup>nd</sup> health screening were provided via word of mouth, personal stories and email correspondence between the researcher and those participants who did not attend the 2<sup>nd</sup> health screening. Reasons were largely explained with a) being out of the country/island, b) being ashamed because of no weight loss, c) payday, and d) programme drop-out. Complete questionnaires were returned by 95.5% of the 133 individuals which in itself is a clear indication of the interest generated by the PA programme.

### ***Programme ratings***

Eleven statements about the programme elements were rated on a four-point Likert scale, ranging from "strongly agree" to "strongly disagree". Few participants indicated dissatisfaction with the programme. A précis is provided below.

### **Programme outcome**

Almost all respondents (96.1%) agreed or strongly agreed that the *Wokabaot Jalens* was enjoyable and an overwhelming majority (93.7%) indicated that the programme made them exercise more. It was reported by 91.3% that the programme increased their activity levels and that the programme made them live healthier. Although 60.6% indicated that the programme positively affected their family life, only 53.6% agreed or strongly agreed that the 'women only' approach was indeed beneficial. Lastly, 96.8% agreed or strongly agreed that they would recommend the programme to others.

### **Programme elements**

The majority of respondents (94.5%) agreed or strongly agreed that they enjoyed the team approach. Further, 94.5% of respondents agreed or strongly agreed that they enjoyed the 1 million step challenge. The health information was rated to be useful by 95.3%. Likewise, most participants (93.5%) agreed or strongly agreed that the posters were motivating. The duration of the programme was rated to be appropriate by 90.5%, with the remaining 9.5% suggesting it needed to be either longer or shorter.

### **Open-ended questions**

To provide a more detailed understanding of participants' experiences, a deeper investigation of responses is now provided through a qualitative analysis of a number of open-ended questions. Prominent evaluative themes were identified and are categorised in relation to six questions asked: 1) Did you finish the programme? If not – what made you stop?; 2) Which healthy ideas did you incorporate into your daily life?; 3) What did you like about the programme?; 4) What did you not like about the programme?; 5) How can the programme be improved?; and 6) What was the biggest challenge for you participating in the programme?.

Overall, the qualitative investigation uncovered additional and at times unexpected outcomes which remained latent in Likert scale questions alone. For example, although the primary intention and focus of the *Wokabaot Jalens* programme was to increase PA levels, one crucial finding from the thematic analysis was a change in participants' eating behaviour. This highlights the necessity of open questions and an appropriate analysis, as they assist the reader to understand programme effectiveness, challenges and opportunities for improvement in significantly greater detail.

Moreover, the newly identified themes led me to use a creative and stimulating technique to visualise key findings. In particular, the TDV presents a visual indication of the different responses provided by participants. The subsequent diagrams were created with Wordle in accordance with the data analysis output generated by NVivo 9. The diagrams give greater prominence to more eminent themes, i.e. the larger the word display, the more often the theme occurred. Furthermore, they show the link between key themes and relevant sub-themes. Overall, the new technique aids in understanding complex and cluttered data in a constructive and coordinated way; it presents a new approach in health promotion research. This approach seems important when collaborating with local staff in a region with little research capacity and where linguistic variety prevails. The TDV method resulted from the findings of this study and reliability and validity has not yet been tested in detail. The TDV approach was well received by local stakeholders who presented these process evaluation findings at regional conferences. The next step is to test the TDV approach in greater depths.

Using the TDV, the different themes are now presented in the diagrams below, followed by detailed explanation.

**Question: Did you finish the programme – if not, what made you stop?**

119 (of 133) respondents completed the programme, and 14 respondents report they did not finish the programme. Of those who did not complete the programme, five participants stated that the pedometer was not working properly and four individuals indicated they lost the pedometer. Four additional individuals reported a lack of motivation as the reason for not finishing the programme and one participant indicated that other commitments did not allow her to finish the full programme.

**Question: What did you like about the programme?**

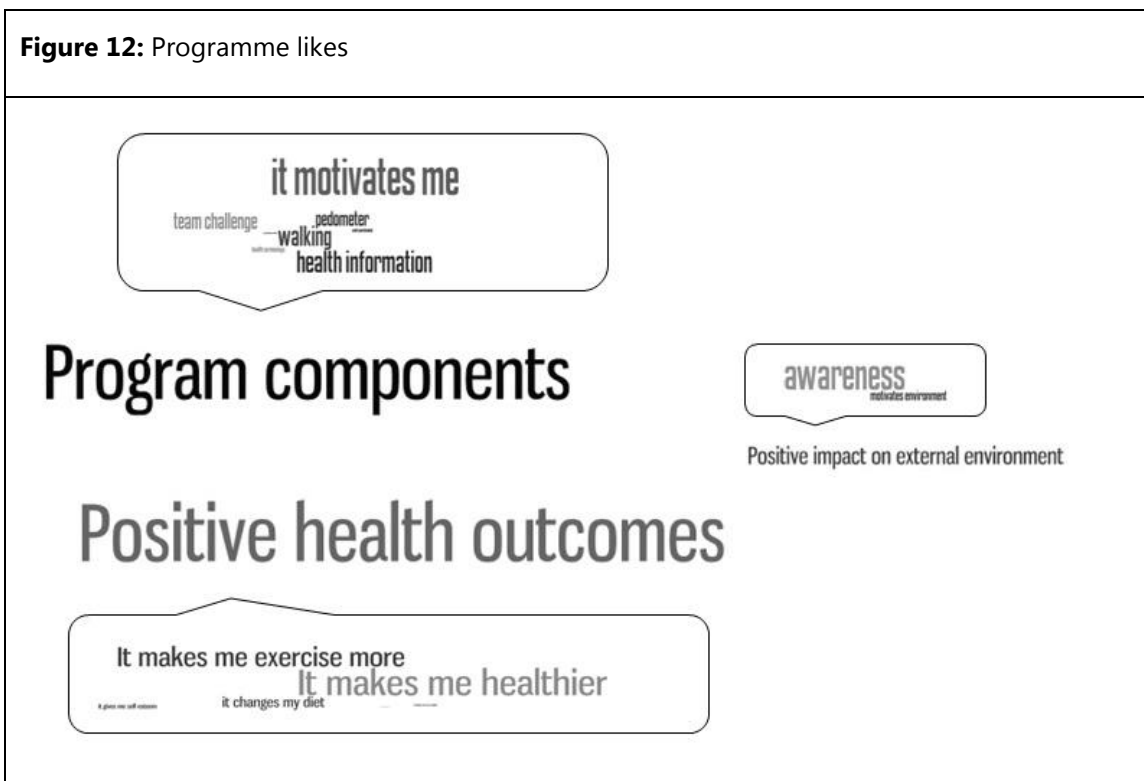


Figure 12 indicates what participants enjoyed most about the intervention. The most desired programme outcomes were positive health outcomes, as indicated by 44.2% of participants. A variety of examples was provided, ranging from becoming a healthier person, doing more exercise, changing eating habits, having more self-esteem and eventual weight loss. In fact, some participants perceived the programme to be associated with weight loss which may be contributing factor for the high response rate.

Similarly, a slightly smaller number of 42.2% referred to the programme components in their feedback and endorsed various programme elements. For example, the programme's motivational effect was cited as an incentive for participation: "It encourages me to walk to places – I never walked before." Further, the provision of weekly health information and the actual walking was well received. "The programme really helped me in becoming a healthier person. Sometimes I have a lot of stress at work and then wokabaot [Bislama term for walking] helps me and I go for a walk." Moreover, it was mentioned that participants came to realise they enjoyed the walking experience. The team approach and the pedometer were mentioned as their favorite programme components. Besides, health screenings, programme coordination and the ease of programme participation (no qualification needed) were mentioned as favorable elements.

Some participants cited the beneficial effect on the external environment (families, neighbourhood, communities, Church) as favourable programme outcomes, with an increase in awareness about healthy lifestyles having the main impact. "I am taking all the health information to my Church and we realise the true importance of our health and of course how to keep ourselves and our communities healthy". Some respondents indicate that the programme motivated the nearby communities to rethink about their lifestyle.

**Question: Which healthy ideas do you incorporate into your daily life?**



Figure 13 highlights which of the health tips participants would incorporate into their lives. The majority of participants (68.9%) reported a change in eating habits, with an increase in consumption of fruit and vegetables (45.6%) being the major modification. "I now eat a lot of island cabbage and veggies" was one of many similar statements. Concurrently, it was mentioned that participants reduced their unhealthy food options such as use of oil, butter, sugar, and soft drinks. "I really cut down on processed food" and "I drink less sugar, and eat less fatty foods". Further, it was indicated that take-away foods (street food such as fish and chips, fried rice etc.) were limited and healthy lunch options were brought to the workplace. "I don't drink coffee during my break times anymore. I always have an apple or banana for in between meals instead." It was further mentioned that the programme resulted in less food consumption "I eat less at night, less white bread, less sugar, less rice and more local food."

A total of 30% reported an increase in exercise behaviour. "I do a few walks rather than sitting long hours in my working environment." Regular morning, lunch hour and after-work walks were cited as programme outcomes. Further, participation in the programme led to more interest and

open attitudes towards PA. "I am more interested in exercise and I am playing more outdoor games with my kids." Vehicle transport was avoided since commencement of the *Wokabaot Jalens* and replaced with walking by several participants.

**Question: What did you not like about the programme?**

**Figure 14:** Programme dislikes

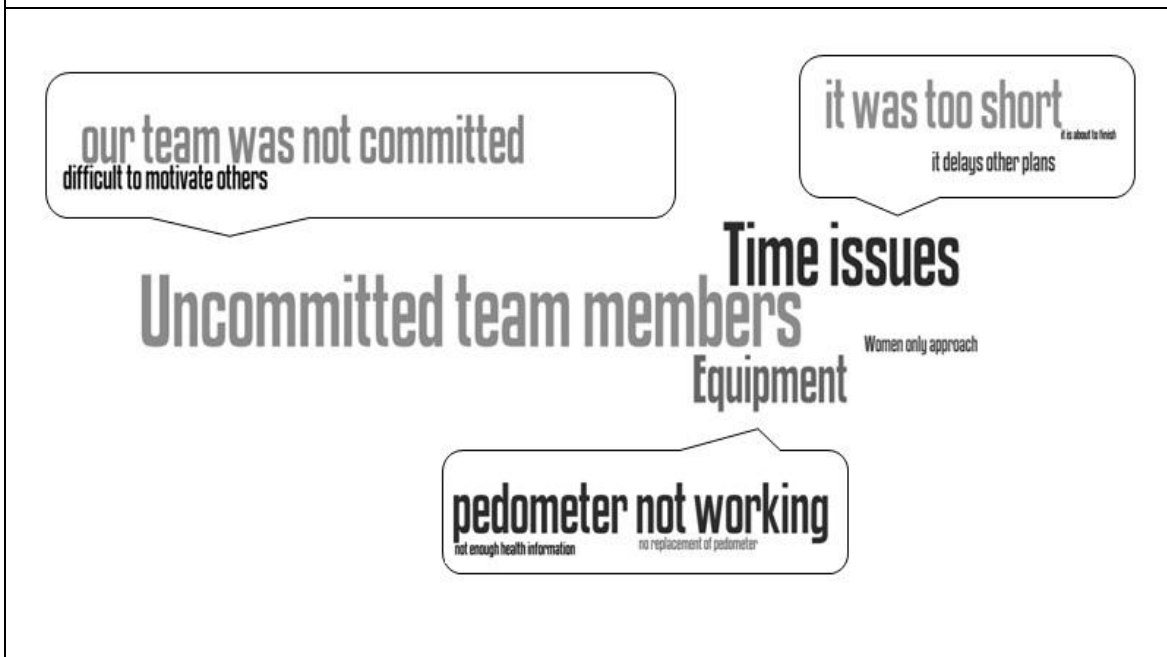


Figure 14 displays what participants did not like about the programme. Uncommitted team members were cited by 36% as the major dislike of the programme. It was mentioned that an apathetic team often hindered full participation. For instance, one participant mentioned "Being in a team with team members who have so many other commitments and do not actively participate no matter how much I try to motivate them – that is what I did not like." Differences in commitment within the team seem to be significant challenges for some participants. It was indicated that team members were not faithful enough in providing the weekly step numbers to the step captain on time.

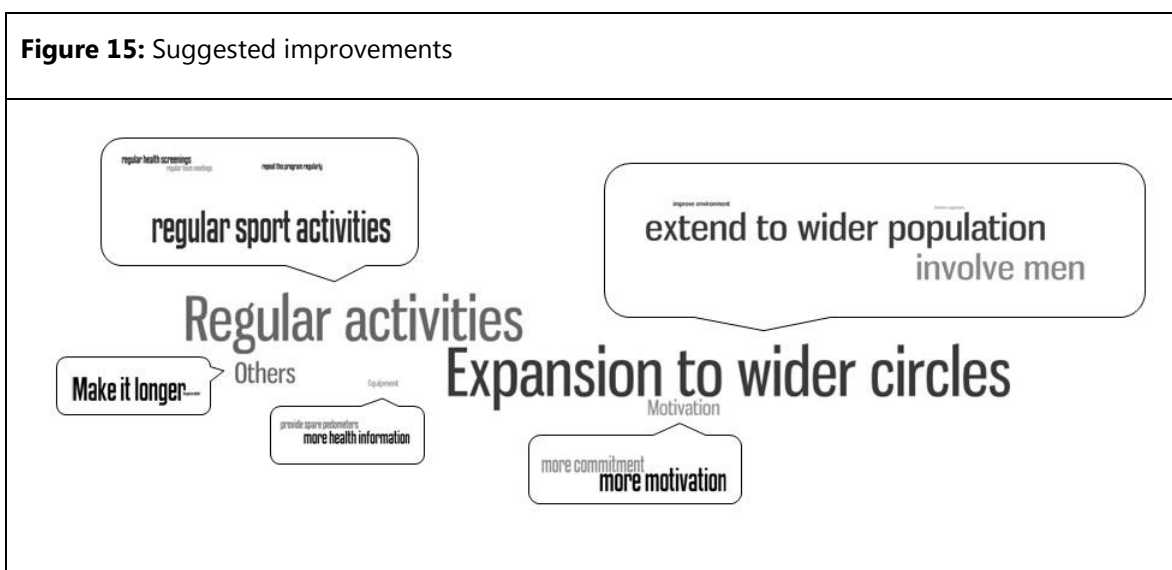
Time issues were reported as a dislike by 32%. Respondents reported that programme duration was too short and long-term continuation with the Ministry of Health was suggested. It was further mentioned that the programme delays other plans. These would include family commitments, Church attendances and other communal activities.

Regarding programme tools, four respondents reported the pedometer did not work properly, thus limited participation resulted. Pedometer replacement was suggested to avoid discouragement after pedometer is lost or broken.



Finally, it was suggested to involve men in the programme. One lady mentioned “Men should be included too as they face the same (health) situation.” On the other hand, a majority (53.6%) of participants favoured the gender separation approach, as indicated through responses to the closed-end questions. In the future, a more detailed investigation with potential target groups may resolve this issue.

**Question: How can the programme be improved?**



Suggested programme improvements are displayed in Figure 15. Various suggestions were made by participants. In particular, it was suggested to expand the programme to the wider community, e.g. bringing more awareness to the communities and providing more pedometers so that each interested person can participate. One respondent mentioned “We need to share our experiences with others. We could extend the programme to the community and give them something to encourage them as well.”

Regular sport activities were likewise cited as potential improvement areas. In particular, it was suggested to arrange more team and inter-team sport activities. Different disciplines were proposed, including netball, aerobics, basketball and beach walks. Various respondents recommended that the Ministry of Health arrange regular sport activities. One respondent suggested having mass walks for civil servants on Saturday morning; others recommended regular walking sessions during lunch hours.

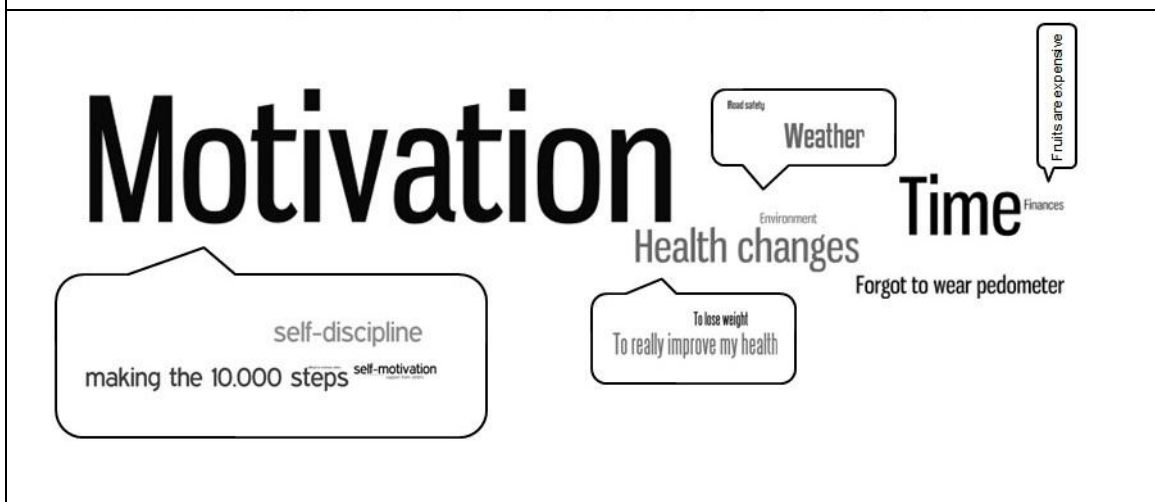
Programme duration was criticised by several respondents, indicating that 12 weeks are too short and it was suggested that the Ministry of Health could possibly continue the monitored programme. “It would be good to continue for another 6 months.” Moreover, it was proposed

that “someone from the health department should follow up and organise weekly physical exercises for those interested.”

Other suggestions for programme improvement include more external motivation, more health information, the provision of spare pedometers and more commitment by team leaders.

**Question: What was the biggest challenge for you participating in the programme?**

**Figure 16:** Programme challenges



The majority of respondents indicated that motivational issues were the biggest challenge for participating in the programme, as shown in Figure 16. Self-commitment and self-discipline appear to be key issues in staying on track. “The biggest challenge was when I have to give up some of the unhealthy food that I love eating.” Others were finding it challenging to bring the healthy lifestyle change across to the family.

Time issues were mentioned as a major challenge, since Church, family, and work commitments hinder participants from regular exercise. “My biggest challenge is to set time aside to do my exercises.” It was further found that dietary changes present a challenge as well. Respondents indicated they found it difficult to “stop eating the junk I used to crave for everyday” and to control their dietary intake. Others indicated that healthy food options such as fresh fruits and vegetables were too expensive. In addition, some respondents found it difficult to lose weight. A few respondents mentioned they often forgot to wear the pedometer which hindered them from accurate step submission. Environmental aspects were cited with road safety issues and rainy weather being the major challenges.

## Discussion

The purpose of this study was to evaluate a PA programme that was designed for Pacific women in urban Vanuatu, and subsequently provide recommendations for the adjustment, design and presentation of future lifestyle programmes that are culturally centred and attractive. Overall, the outcome of my process evaluation indicates a successful lifestyle change programme in which the designed components were largely considered to be effective.

The evaluation found the strongest programme challenge to be a lack of motivation. This, to a certain degree, could be addressed through more targeted support mechanisms. Research confirms that social support mechanisms can lead to increased levels of motivation, commitment and confidence<sup>270,350,384</sup> and to a more sustainable health behaviour change.<sup>351</sup> In particular, the evaluation found that family involvement was insufficiently addressed for some participants. As family or partner support had previously been identified as a potential motivator for lifestyle changes,<sup>270</sup> the inclusion of family walks, family sport activities, family shopping/cooking programmes combined with healthy school programmes that could eventually lead to increased levels of commitment is recommended. Previous formative work with urban women in Vanuatu had found that strong support systems were essential in bringing about lifestyle behaviour change.<sup>154</sup> This aspect was considered through the specific focus on women, the team approach, and the supportive workplace environment. However, stronger support mechanisms might prove beneficial (e.g. family, Church) and future Pacific healthy lifestyle programmes may benefit from a stronger focus on social support mechanisms.

The controversial and at times contradictory views about gender separation are an important finding of this study that needs further investigation in future Pacific health programme developments. While previous researchers have indicated that pedometer-based health interventions have a greater effect if restricted to women only,<sup>269</sup> this finding might not be culturally relevant for individuals in the Pacific region.

Programme duration was ambiguously judged. Interestingly, when rating programme duration on the likert scale, the majority of respondents indicated that programme duration was adequate; however, the open-questions indicate a different scenario. This finding also supports the use of qualitative analysis as adjacent to likert scales, as it allows an in-depth investigation to fully understand particular programme issues. In this case, the open ended questions for example revealed that programme continuation with the Ministry of Health is favoured by most participants. In a related finding, the majority of participants suggested a wider involvement of the external environment. This may have two positively interrelated effects. Firstly, it can be a

motivational factor, as research shows that external support is a strong motivator.<sup>270</sup> Second, the positive impacts of the initiative may be leveraged to the wider community itself, which can result in increased overall healthy lifestyle awareness and contribute to improved population health. Schulenkorf & Edwards suggest that support from different levels of government can and should be sought to leverage sport initiatives for wider social and health-related outcomes. To achieve this, the government could use the *Wokabaot Jalens* as a 'hook' to stage relevant social marketing and health campaigns, for instance informing the population on the importance of healthy lifestyle behaviour.<sup>385</sup>

Overall, this study suggests that targeted programmes such as *Wokabaot Jalens* contain essential elements that may contribute to lifestyle changes. The prospect of positive health outcomes has previously been identified as a powerful motivator for lifestyle change adherence.<sup>270,368</sup> In my study, 44.2% of respondents indicated that positive health outcomes were the most important motivator. Concurrently, 68.9% reported a change in eating habits and 28.2% reported an increase in exercise behaviour. Future health data analysis will reveal whether the programme lead to actual changes in BMI, waist-circumference, fasting blood glucose, HDL cholesterol levels and a triglyceride levels.

One limitation of these findings is that non-response bias may have influenced outcomes of participant evaluation. Whilst 207 individuals initially registered for the programme and attended the 1<sup>st</sup> health screening in March 2011, 133 individuals attended the 2<sup>nd</sup> health screening in July 2011. Of those, 130 completed the process evaluation sheets. However, in combination with the qualitative enquiry, the data presents valuable insights into participants' individual experiences. Furthermore, the contribution of qualitative data and the presentation of local voices help present a realistic feedback on the *Wokabaot Jalens* programme. As a next step, an outcome evaluation will uncover whether health changes occurred due to programme participation.

Finally, by using the innovative TDV technique it is possible to present research findings to local health staff and non-expert community members in a simple and efficient way. Using Wordle as a support software, the combination of qualitative data with frequency allows to communicate complex health data effectively – an approach which seems crucial when conducting field research and presenting findings in regions where healthcare systems are not well advanced and where a relatively poor infrastructure prevails. It is assumed that a visual presentation of data affects and attracts health promoters in the region to a greater extent than long text files. Whilst English is a spoken language in many Pacific Islands, fluency and proficiency is often limited. It is

therefore important to use a presentation tool which allows for a simple understanding of data. Local health practitioners may thus apply findings to programme enhancement and may even communicate outcomes to neighbouring PICs. Further, an aesthetic visual representation of findings is thought to yield favourable actions of relevant stakeholders (donor agencies) which may advance and support future health promotion initiatives. This new approach of visualising data may further be applied in other regional and global contexts. The strategy contributes substantially to presenting and communicating process evaluations, particularly in LMIC-contexts.

## **Conclusion**

The outcome of this study shows that the researchers were successful in developing and delivering a healthy lifestyle programme that was culturally attractive and had utility for the target group. All intervention components were perceived by the participants as important for motivating them to adapt a healthier lifestyle. The present process evaluation provides a useful resource for those wishing to implement similar health promotion programmes in neighbouring PICs.

Regarding programme elements, the gender separation approach needs further investigation. Gender roles are strong in many Pacific island contexts and it is assumed that each target group will respond differently to this approach, depending on age, social class and workplace culture. Targeted focus groups prior to programme design and implementation can assist in detecting relevance. Future researchers may also aim at detecting men's perception about healthy lifestyle behaviours which may have a significant influence on overall participation and the design of appropriate interventions that involve men, women and the family. Family involvement is recommended to be addressed further.

Following the closure of the monitored phase, participants were strongly encouraged to maintain the lifestyle change they had made. The Ministry of Health was recommended to support participants continuing with their lifestyle change throughout the subsequent year and beyond. Interestingly, it was repeatedly requested to arrange pedometers that can be purchased at participants' and other interested people's own cost. Media coverage informed the wider population about this initiative and local external requests were made. The Ministry of Health and other relevant stakeholders are urged to facilitate the provision of pedometers embedded in structured programmes and other additional healthy lifestyle resources.

The Ministry of Health has been prepared to run and monitor this programme independently for long-term lifestyle changes. It is advised to arrange well-coordinated and regular activities for participants, so to stimulate exercise participation and motivation further, as repeatedly requested by participants. Besides, it is suggested to expand the programme (communities, schools, workplaces), as this can impact both the external environment and the participants. As such, opportunities of leveraging health initiatives for wider community benefit should be sought.

In summary, a substantial and unique contribution to the body of knowledge in public health and health promotion is presented in three ways: first, findings help understand participants' perception of a targeted PA programme in the Pacific context. No pedometer-based intervention study has been conducted in the Pacific region where walking is often favoured over any other sport activity and forms part of a daily routine. Success factors and potential areas for programme improvement are highlighted. Second, the study responds to the paucity of lifestyle intervention process evaluations that have been carried out in the context of LMICs. And last, a novel technique to display process evaluation data that assists in communicating programme success in the region and elsewhere was produced. Importantly, the TDV approach is not limited to process evaluations but may be transferred to evaluation data in general.

## CHAPTER 7

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### **An outcome evaluation of a workplace-based physical activity intervention in Vanuatu**

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#### **Preface**

*Wokabaot Jalens* was delivered to urban female civil servants from the Vanuatu government sector. The large majority of participants were of Vanuatu descent (98.2%). No selection was made regarding job ranking; both higher and lower job positions were involved. Prior to programme implementation, I was informed by the Ministry of Health Vanuatu that approximately 200 female civil servants are employed by the government, a share of approximately 30%. My intention was to reach the largest possible number and, as such, I was equipped with supplies for a maximum of 200 participants. Approximately 250 individuals expressed interest, both civil servants and additional individuals from the private sector who were informed about my intention word-to-mouth. Eventually, 207 individuals enrolled for the programme, a small number of individuals (N=12) from the private sector. Additional equipment was provided by the Ministry of Health (pedometers) and photocopies were made of the materials (walking log, pledge, small posters). The objective of the outcome evaluation was to assess the effect of the *Wokabaot Jalens* on participants' PA levels and health.

Knowing that 80% of NCD occur in LMICs, immediate action is much needed. Evidence on effective interventions is very limited and it is not known whether pedometer-based PA interventions are effective in the region. Further, pedometry data from LMICs are needed in order to understand lifestyle behaviour in greater detail. This body of work is the first pedometer-based physical activity evaluation from the region. Baseline and follow-up health screenings measured the physical effect of the intervention, whilst participants used pedometers to measure and report their PA behaviour over the course of the intervention. The overall aim of the outcome evaluation was to investigate whether a pedometer-based healthy lifestyle

intervention results in increases in PA levels and measurable health changes in the target population.

The approach of magnitude-based-inferences was used in order to quantify the magnitude of the intervention's effects rather than simply identifying the presence or absence of an effect.<sup>386</sup>

The manuscript resulting from this chapter has been submitted to the *Journal of Sport for Development*.



## Abstract

**Background:** The epidemic of chronic diseases is threatening the health and wealth of the South Pacific region. This study is a response to the need for evidence-based solutions in increasing physical activity and healthy eating in the South Pacific. Urban Ni-Vanuatu citizens are addressed whose health is largely impacted by rapid unplanned urbanisation. This is the first Pacific workplace-based intervention that has been rigorously evaluated.

**Methods:** A team-based 10,000 steps challenge was developed and monitored over a 12-week period targeting female civil servants (N=207) in Port Vila, Vanuatu. Health screenings measured the physical effect of the intervention, whilst pedometers measured PA behaviour. A sub-group analysis was conducted, examining low- and high risk individuals. Clinical inferences were based on the span of 90% confidence intervals in relation to thresholds for small, moderate and large effects of as 0.2, 0.6, and 1.2 of the standard deviation of the pooled sample.

**Findings:** The programme showed beneficial small effects; a mean step increase from baseline to follow-up of  $2,510 \pm 6,922$  steps was observed (+26.1%). A change in mean waist circumference (cm) showed likely beneficial small effects ( $-3.9 \pm 10.3$ ). High risk individuals benefitted most from the intervention: beneficial effects were found for PA behaviour (steps; large, +229%), waist circumference (cm; moderate, -6.2%) serum glucose (mmol/l; small, -15.9%) and triglycerides (mg/dl; moderate, -31%).

**Conclusion:** The programme was successful in increasing PA levels and aided in keeping healthy individuals at low risk and in reducing NCD risk factors in high risk individuals. The sustained effect of the intervention is unknown. Future research may involve men in programme activities.

## Objective

To describe a PA intervention programme in an urban Pacific island context and to present the outcome evaluation of the programme.

## Introduction

It is widely accepted that the most serious health problem facing Pacific nations today is the rapid growth of NCDs. Vanuatu, an island nation in Melanesia, consists of 83 islands and has a population of 234,023.<sup>170</sup>

Whilst NCDs remained rather uncommon in Vanuatu until the 1960s, a health transition resulted in the hidden onset of chronic diseases. Research suggests that this health transition is associated with migration to urban areas along with modernisation and increases in economic development.<sup>205</sup> In fact, since 1999 the urban population has increased by 42%.<sup>170</sup> Findings from a recent national health survey from 2011 indicate that Ni-Vanuatu women are more likely to be physically inactive and overweight than their male counterparts.<sup>182</sup> My sample from 2011 (N=207) showed a mean BMI of 29.9 for urban women.

Health infrastructure across the Pacific region is often poor and there is a shortage of appropriately trained health workforce, particularly so in the field of health promotion.<sup>380</sup> Under-diagnosis of NCDs and under-treated costs are projected to rise sharply with increasing awareness of chronic disease complications.<sup>12</sup> Importantly, average treatment costs of NCDs are considerably higher than non-NCD admissions in the country.<sup>35</sup> Where health services, diagnosis and treatment opportunities are limited, the prevention of lifestyle diseases is distinctly important.

Insufficient PA has been identified as a leading risk factor for the development of NCDs.<sup>366</sup> It is the fourth leading risk factor for mortality globally,<sup>96</sup> responsible for 9% of premature deaths.<sup>17</sup> Increasing PA levels is an important strategy for improving population health and reducing the NCD burden.<sup>87,101,244</sup> To engage individuals in PA various strategies have proven effective. For example, research indicates that pedometer-based programmes can help increase PA behaviour and may reduce NCD risk.<sup>280</sup> Hatano suggests that the accumulation of 10,000 steps per day is comparable to achieving 30 min of PA per day.<sup>271</sup> The 10,000 steps message is an approach of PA promotion that initially came from researchers in Japan two decades ago. This approach has become a popular tool for PA promotion internationally. The Pacific Guidelines for Physical Activity suggest using a pedometer to monitor PA behavior.<sup>76</sup> The 10,000 steps message from Japan is therefore considered an appropriate tool in this context.

The Pacific public health recommendations for PA recommend the accumulation of 30 minutes or more of daily moderate intensity PA, regardless of age and gender. Ideally, extra vigorous activity should be accumulated for extra health outcomes.<sup>76</sup> Notably, the lack of research regarding PA behaviour limits the evidence on *how* to engage the Pacific population in PA behaviour. For example, it is unclear whether a) Pacific people would respond to pedometer-based PA interventions and b) whether interventions reduce NCD risk in this population. In a region where walking forms part of the daily routine and is used as a means of transport and leisure-time PA, no pedometer-based study has been conducted.

In fact, a great number of pedometry data from HICs is available,<sup>280,387</sup> but little is known about step data from LMIC-contexts.<sup>388</sup> This study can be a first step in closing the gap and contributes to the collection of step data from a LMIC context, as encouraged by Cook.<sup>388</sup> Clearly, the sample of this study is not representative for the entire population of Vanuatu. However, findings do give an indication of baseline step counts from Ni-Vanuatu female civil servants. Pacific PA research is in its infancy and if findings from this study are brought on to relevant stakeholders (i.e. SPC, WHO, AUSAID) they may invest in additional population-based step count collections, as called for by Cook.

The first systematically evaluated workplace health intervention conducted in the Pacific is presented. Workplaces have been shown to be an effective means of promoting PA behaviour.<sup>91,226</sup> They may affect the health of the employee, the employees' families, communities and the societies at large.<sup>216</sup> Whilst systematic evaluations are available from a number of workplace health programmes in higher income countries, there is a paucity of workplace health evaluations from LMICs. Overall, very little step data is available from LMICs.<sup>388</sup> Whilst some pedometry data is available from Africa<sup>388</sup> and Brazil,<sup>389</sup> these data have not been collected in the workplace setting and do not indicate PA levels of urban employees.

The Ottawa Charter for health promotion and the WHO's 'healthy workplace settings' approach provided the conceptual basis for the approach taken.<sup>93</sup> Prior to this study, formative research investigated barriers and facilitators for healthy lifestyle behaviour and participants' suggestions for programme content were sought. A team-based pedometer challenge, accompanied by social marketing and health education tools, was implemented and monitored for twelve weeks between April and June in 2011.

To understand the effectiveness of the programme an outcome evaluation was conducted. Outcome evaluations aim to assess treatment effectiveness<sup>390</sup> and examine whether a programme has achieved its goals.<sup>15</sup> Whilst findings do not allow to make conclusive assumptions of the effect of this intervention due to the study design (uncontrolled pre-post),

findings do give an indication of how this programme has had an impact on participants. For more accurate conclusions regarding the effect of walking interventions, a cross-sectional study could be employed in future interventions where control groups are not feasible. For example, a random sample of female individuals who are employed by NGOs and/or the private sector could be used for baseline and follow-up assessments in future interventions. Due to a limitation in funding options and time constraints, a cross-sectional study was not feasible in this context.

To quantify the magnitude of the effects, rather than simply identifying the presence or absence of effects, I chose to use the approach of magnitude based inferences for data analysis. Effect sizes were calculated using the unequal-variance t-statistic to identify the effect on health indicators and to understand programme effectiveness in greater detail. This also allowed covariate inclusion to calculate the differences in changes of each variable mean between the timeframe 0-12 weeks.<sup>391</sup> An advantage of the magnitude based inference approach over the use of p-values is the guaranteed conclusion of the analysis. Effects can be either clear or unclear. Where unclear effects are found, sample sizes were not large enough and more data is needed to draw accurate conclusions about the effect. As such, the magnitude based inference approach also indicates the appropriateness of sample sizes.

Evidence is presented highlighting that culturally-centred programmes are likely to increase PA behaviour and to improve health outcomes. Success factors and potential areas for programme improvement were highlighted elsewhere.<sup>392</sup>

## **Methods**

### **Participants & recruitment**

A total of 207 individuals were recruited and equipped with pedometers and accompanying materials; 195 individuals (97.5%) were from the Vanuatu Government, the remaining 12 individuals were from the private sector. Selection criteria were to be able to walk and to have a desire to partake in the programme. No further exclusion criteria were set in order to involve a large group that can benefit from health effects. Pregnant participants were given special advice. Through a close collaboration with the Ministry of Health Vanuatu it was possible to access the population. They further aided in recruitment purposes.

133 individuals completed the programme and provided follow up data. Pregnant participants were excluded from analysis, leaving a total of 125 individuals for data analysis. The youngest participant was 21 years, whilst the oldest was 55 years old ( $36.3 \pm 8.3$ ). The majority of the sample was either overweight (33%) or obese (46%). 18% were normal weight and 3% were underweight. Mean BMI was  $29.6 \pm 5.7$ ; mean waist circumference was  $96.0 \pm 15.0$  cm.

## Study design

This pre-experimental study<sup>xx</sup> presents an intervention lasting twelve weeks in duration. The intervention was implemented in the Vanuatu Government sector in Port Vila, Vanuatu. Participants underwent two identical health screenings measuring PA levels (steps), anthropometric measures, BP, and blood samples for determination of fasting serum glucose (mmol/l) and blood lipid (mg/dl) parameters. A lifestyle questionnaire was filled out by each participant. For the duration of twelve weeks, participants were encouraged to increase their PA levels which were measured by pedometers.

This study investigates two effects: the first part tested for modifications in objectively measured PA behaviour; the second part analysed the intervention's effect on health measures. The study was approved by the AUT University Ethics Committee.

## Intervention

*Wokabaot Jalens*, designed in collaboration with local health practitioners and participants, has been described in full detail elsewhere.<sup>393</sup> Briefly, *Wokabaot Jalens* is a 12-week healthy lifestyle intervention based on the simple premise that walking can be increased gradually during the day at work, at home and during leisure time. Participants were grouped into teams and competed – on a fun basis – against each other with the overall aim to visually surround the islands of Vanuatu. A step captain was appointed for each team. Over the twelve weeks, step captains arranged team meetings and exercise activities. *Wokabaot Jalens* was accompanied by electronic weekly health information, motivational support mechanisms and self-organised exercise opportunities. The programme used pedometers as motivational tools to objectively monitor individual PA behaviour.

Participants were equipped with a daily walking log book, an elastic waist band to secure the pedometer, culturally sensitive health brochures, as well as charts for self-monitoring steps/day. Each step captain received a step captain manual. Individuals who agreed to participate in the study were asked to form teams of five based on ministries and friendship.

During the full monitored phase (12 weeks), participants were required to use their pedometers and calendars for goal-setting and self-monitoring. A walking log was provided to record daily step numbers. Participants were asked to complete the walking log at the end of each day for the duration of the intervention. Each step captain emailed each team members' weekly step

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<sup>xx</sup> A pre-experimental design (pre-post study) can provide observations about change in the objects of interest. The causal relations, however, of observed change are limited. However, this evaluation design provides an estimate of change.<sup>305</sup>

number to the researcher. Each team's step number was adjusted to a team of five participants. Mean steps/day were calculated and a step overview was provided. The visual walking map indicated step progress.

It was hypothesised that *Wokabaot Jalens* would increase participants' PA levels and improve health indicators in those with poor baseline health data. In addition to the primary outcome (measured steps/day) programme effects on health parameters were also measured (waist circumference (cm), BP (mmHg), fasting serum glucose (mmol/l), cholesterol levels (mg/dl)).

### **Assessment procedures**

The primary outcome was a change in step numbers, measured by Yamax SW-200. The Yamax SW-200 has been shown to be accurate and reliable for measuring step numbers in adults.<sup>278</sup> Secondary outcomes were changes in waist circumference (cm), fasting serum glucose (mmol/l), lipid profile (mg/dl) and BP (mmHg).

Participants were assessed at baseline and after 15 weeks. The *Wokabaot Jalens* had terminated after 12 weeks – the additional three weeks were maintained to investigate whether independent changes were maintained after programme termination. Health assessments were managed by the researcher and carried out with assistance of the Ministry of Health personnel. Importantly, staff aided with local language expertise in filling out lifestyle questionnaires.

Baseline PA levels (steps/day) were assessed prior to the monitored phase, after the accurate pedometer placement and use was demonstrated. Participants were instructed to wear pedometers for 24 hours during waking hours while engaging in usual activities.

Scheduled health assessments were arranged for the collection of anthropometric and health indicator data prior to and following the monitored phase of *Wokabaot Jalens*. Each assessment was identical and included 1) PA levels (steps), 2) anthropometric measures (light clothing, no shoes), 3) BP, and 4) blood samples for determination of fasting serum glucose and blood lipid parameters. Changes in BMI, waist circumference (cm), BP (mmHg), fasting serum glucose (mmol/l) and blood lipids (mg/dl) were evaluated.

BMI was calculated ( $\text{kg/m}^2$ ) using a portable digital scale, measuring weight to the nearest 0.1 kg. A fiberglass tape measure seamstress butterfly brand was used to measure height and waist circumference. Waist and hip girths were measured using standard protocols over light clothing. BP was measured twice (using OMRON, Automatic Blood Pressure Monitor, IA1B model). The 2nd reading was used for analysis. For the determination of fasting serum glucose tolerance, participants were asked to fast overnight. Serum glucose, HDL cholesterol and triglycerides were determined using the CardioChek® PA system.

## Data treatment and statistical analysis

Excel spreadsheets designed to analyse controlled trials using unequal-variance t-statistic and allowing for covariate inclusion were used to calculate the mean differences on each variable between the timeframe 0-12 weeks.<sup>391</sup> Differences for high-risk and “normal” groups were also investigated for the effects of step numbers, waist circumference (cm), systolic blood pressure (SBP; mmHg), diastolic blood pressure (DBP; mmHg), blood serum glucose (mmol/l), high-density lipoprotein (HDL; mg/dl) and triglycerides changes (mg/dl). The baseline value of each variable was included as a covariate to minimise confounding by the phenomenon of regression to the mean.<sup>391</sup> All the variables were log-transformed with outcomes expressed both as percentages and raw units. Uncertainty in statistics is shown as 90% confidence limits. Effects thresholds were interpreted as 0.2, 0.6, 1.2 of the standard deviation of the pooled sample as trivial, small and moderate effects, respectively.<sup>394</sup>

Qualitative and quantitative probabilities were used to assess the magnitude of inference as follows: a clinically clear beneficial effect was almost certainly not harmful (<0.5% risk) and at least possibly beneficial (>25% chance); an unclear effect was at least possibly beneficial (>25%) with an unacceptable risk of harm (>0.5%); the effect was otherwise clearly trivial or harmful, depending on which outcome had the greater probability. The quantitative probabilities are not shown, but the qualitative terms were applied to each clear effect with its qualitative magnitude (e.g., *likely* small benefit). Conclusions are based on inferential statistics that emphasise precision of estimation rather than null hypothesis testing. For a more detailed explanation, readers are referred to Hopkins et al..<sup>386</sup> All data are presented as mean  $\pm$  SD unless otherwise stated.

## Findings

207 individuals registered for the programme and provided baseline data. Those who completed both assessments (n=133, 64%) recorded twelve weeks of step/day data and attended the final health assessment after 15 weeks. Partial completers, programme dropouts and pregnant participants were excluded from data analysis. Partial completers and dropouts were vindicated with lack of motivation, lack of time, staff turnover and frequent travelling. Further, 74 participants did not attend the 2nd health assessment and were excluded from data analysis. Reasons for absence were explained with being out of the country/island; being ashamed because of no weight loss; payday; and programme drop out due to broken or lost pedometer. 14 individuals reported a lost or broken pedometer and were not able to continue the programme.

The mean age for the 74 individuals who did not attend the 2<sup>nd</sup> health screening was 36 years. 30% were classified as normal weight, whilst 26% were classified as overweight and 27% as obese. Whilst 41% were classified as sufficiently active, 18% were classified as active and 23% classified as highly active. Mean baseline step data for these individuals was slightly higher (10,650 steps) than mean baseline step data for all completers (9,164 steps).

Those individuals who provided data for both health screening, were categorised as low risk (LR) or high-risk (HR) for each variable, depending whether their values exceeded certain thresholds or not. Thresholds were based on literature and/or official guidelines that identified high risk cut-off points. These cut off values have been defined by experts in their respective fields. Although reference is made to non-Pacific populations, I believe that thresholds that were defined in international contexts are more appropriate than no cut-off values. Further, these cut-off values are in line with WHO thresholds used during national STEPS surveys. Variables included PA (<5,000 steps),<sup>274</sup> waist circumference (>88cm),<sup>395</sup> SBP (>140 mmHg),<sup>396,397</sup> DBP (>90 mmHg),<sup>396,397</sup> fasting serum glucose (>6.1mmol/L),<sup>398</sup> HDL (>40mg/dl)<sup>399</sup> and triglycerides (>200 mg/dl)<sup>399</sup> Changes in these variables over the course of the intervention on three groups are presented: 1) all participants, 2) LR individuals and 3) HR individuals.



**Table 5:** Effect of the *Wokabaot Jalens*. Findings by variable, separated into LR and HR groups. Presenting effect sizes.

	<b>Group</b>	<b>Pre ± SD</b>	<b>Post ± SD</b>	<b>Change ± SD</b>	<b>% Change</b>	<b>Effect size</b>	<b>Magnitude of effect</b>
<b>PA</b> (steps)	All	9,164 ± 3,783	11,676 ± 5,784	2,513 ± 6,922	26.1%	Small	Most likely beneficial
	Low risk	10,053 ± 3,263	11,532 ± 5,565	1,478 ± 6,315	8.3%	Small	Possibly beneficial
	High risk	3,510 ± 1,047	12,484 ± 7,385	8,975 ± 7,497	228.9%	Large	Most likely beneficial
<b>Waist</b> (cm)	All	96.0 ± 15.0	92.1 ± 13.6	-3.9 ± 10.3	-4.0%	Small	Likely beneficial
	Low risk	80.3 ± 6.1	81.1 ± 8.2	0.9 ± 6.3	1.1%	Small	Likely trivial
	High risk	103.7 ± 11.6	97.5 ± 12.4	-6.2 ± 11.1	-6.2%	Moderate	Possibly beneficial
<b>SBP*</b> (mmHg)	All	118.34 ± 15.46	119.32 ± 16.66	0.98 ± 14.2	0.7%	Trivial	Very Likely trivial
	Low risk	114.9 ± 11.5	116.5 ± 13.3	1.55 ± 12.2	1.2%	Trivial	Likely trivial
	High risk	145.3 ± 18.9	142.2 ± 23.5	-3.1 ± 25.9	-2.4%	Unclear	Unclear
<b>DBP**</b> (mmHg)	All	75.4 ± 10.7	78.1 ± 10.7	2.7 ± 9.6	3.7%	Small	Likely harmful
	Low risk	73.5 ± 8.8	76.7 ± 9.0	3.2 ± 9.1	4.4%	Small	Likely harmful
	High risk	96.5 ± 6.5	93.7 ± 14.8	-2.7 ± 13.1	-3.7%	Unclear	Unclear
<b>Glucose</b>	All	5.1 ± 1.8	5.05 ± 1.95	-0.1 ± 2.1	-1.3%	Trivial	Likely trivial

(mmol/l)	Low risk	4.6 ± 1.3	4.6 ± 0.8	0.1 ± 1.4	5.6%	Trivial	Possible trivial
	High risk	7.5 ± 1.4	6.8 ± 3.7	-0.8 ± 3.6	-15.9%	Small	Likely beneficial
<b>HDL</b>	All	66.1 ± 15.9	54.0 ± 14.3	-12.2 ± 15.6	-18.0%	Small	Most Likely harmful
(mg/dl)	Low risk	68.6 ± 12.8	54.3 ± 13.9	-14.3 ± 11.4	-22%	Small	Possibly harmful
	High risk	28.4 ± 11.7	49.2 ± 21.0	20.8 ± 32.2	79%	Unclear	Unclear
<b>Triglycerides</b>	All	122.5 ± 86.9	148.3 ± 74.2	25.8 ± 87.0	32%	Moderate	Most likely harmful
(mg/dl)	Low risk	96.4 ± 42.3	139.0 ± 65.2	42.6 ± 70.2	46%	Moderate	Very likely harmful
	High risk	293.4 ± 110.5	209.1 ± 101.2	-84.3 ± 108.1	-31%	Moderate	Possible beneficial

\*= Systolic Blood Pressure; \*\* DBP= Diastolic Blood Pressure

**Table 6:** Subgroup analysis: Effect of the *Wokabaot Jalens* on PA behaviour change, indicated by group

		Variable				PA behaviour (in steps)				PA e.s.*	PA effect
		Pre ± SD	Post ± SD	Change	%Change	Pre ± SD	Post ± SD	Change	%Change		
<b>Waist</b> (cm)	All	96.0 ± 15.0	92.1 ± 13.6	-3.9 ± 10.3	-4.0%	9,164 ± 3,783	11,676 ± 5,784	2,513 ± 6,922	27.4	Small	Most likely beneficial
	Low risk	80.3 ± 6.1	81.1 ± 8.2	0.9 ± 6.3	1.1%	9,644 ± 4,381	13,115 ± 7,040	3,471 ± 8,453	35.9	Small	Likely beneficial
	High risk	103.7 ± 11.6	97.5 ± 12.4	-6.2 ± 11.1	-6.2%	9,004 ± 3,490	10,570 ± 4,456	1,566 ± 5,548	17.4	Small	Likely beneficial
<b>SBP</b> (mmHg)	All	118.34 ± 15.46	119.32 ± 16.66	0.98 ± 14.2	0.7%	9,164 ± 3,783	11,676 ± 5,784	2,513 ± 6,922	27.4	Small	Most likely beneficial
	Low risk	114.9 ± 11.5	116.5 ± 13.3	1.55 ± 12.2	1.2%	9,309 ± 3,767	11,782 ± 5,834	2,473 ± 6,923	26.6	Small	Very likely beneficial
	High risk	145.3 ± 18.9	142.2 ± 23.5	-3.1 ± 25.9	-2.4%	7,731 ± 3,615	10,402 ± 5,120	2,671 ± 6,946	34.6	Unclear	unclear
<b>DBP</b> (mmHg)	All	75.4 ± 10.7	78.1 ± 10.7	2.7 ± 9.6	3.7%	9,164 ± 3,783	11,676 ± 5,784	2,513 ± 6,922	27.4	Small	Most likely beneficial
	Low risk	73.5 ± 8.8	76.7 ± 9.0	3.2 ± 9.1	4.4%	9,280 ± 3,819	11,720 ± 5,867	2,440 ± 6,922	26.3	Small	Very likely beneficial
	High risk	96.5 ± 6.5	93.7 ± 14.8	-2.7 ± 13.1	-3.7%	7,937 ± 3,128	10,628 ± 5,186	2,690 ± 7,150	33.9	Unclear	unclear
<b>Glucose</b>	All	5.1 ± 1.8	5.05 ± 1.95	-0.1 ± 2.1	-1.3%	9,164 ± 3,783	11,676 ± 5,784	2,513 ± 6,922	27.4	Small	Most likely beneficial

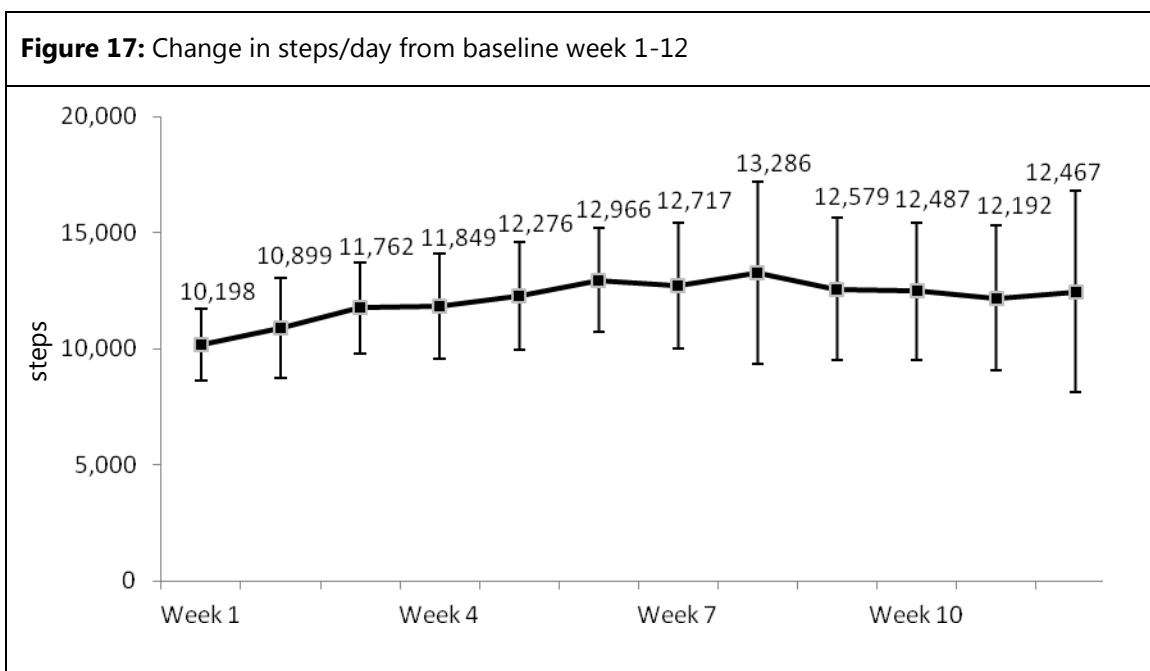
(mmol/l)						3,783	5,784	6,922				beneficial
	Low risk	4.6 ± 1.3	4.6 ± 0.8	0.1 ± 1.4	5.6%	9,227 ± 3,884	11,733 ± 5,931	2,507 ± 7,088	27.2	Moderate	Possibly moderate beneficial	
	High risk	7.5 ± 1.4	6.8 ± 3.7	-0.8 ± 3.6	-15.9%	9,268 ± 3,523	11,684 ± 5,527	2,416 ± 6,705	26.1	Unclear	unclear	
<b>HDL</b>	All	66.1 ± 15.9	54.0 ± 14.3	-12.2 ± 15.6	-18.4%	9,164 ± 3,783	11,676 ± 5,784	2,513 ± 6,922	27.4	Small	Most likely beneficial	
(mg/dl)	Low risk	68.6 ± 12.8	54.3 ± 13.9	-14.3 ± 11.4	-20.8%	9,162 ± 3,821	11,734 ± 5,874	2,572 ± 7,044	28.1	Moderate	Possibly beneficial	
	High risk	28.4 ± 11.7	49.2 ± 21.0	20.8 ± 32.2	73.2%	9,203 ± 3,145	10,392 ± 3,278	1,189 ± 3,295	12.9	Unclear	unclear	
<b>Triglycerides</b>	All	122.5 ± 86.9	148.3 ± 74.2	25.8 ± 87.0	32.2%	9,164 ± 3,783	11,676 ± 5,784	2,513 ± 6,922	27.4	Small	Most likely beneficial	
(mg/dl)	Low risk	96.4 ± 42.3	139.0 ± 65.2	42.6 ± 70.2	45.8%	9,581 ± 3,442	11,712 ± 6,316	2,131 ± 6,963	22.4	Small	Likely beneficial	
	High risk	293.4 ± 110.5	209.1 ± 101.2	-84.3 ± 108.1	-30.6%	9,003 ± 2,940	9,352 ± 3,319	349 ± 4,074	3.9	Unclear	unclear	

\*=e.s.= Effect Size

### All participants

Table 3 indicates that PA levels increased by 26% for all participants (90% confidence limits  $\pm$  11%). Mean daily step count (mean  $\pm$  SD) was 9,160  $\pm$  3,780 at baseline and 11,680  $\pm$  5,780 at follow-up. For all programme completers, there was a most likely small beneficial increase of 2,510  $\pm$  6,920 on the number of steps. Adjustments for age did not alter programme effects. Step data were recorded by individual participants and were not cross checked. The likelihood that good adherers to recording their step count were more likely to record step increases must not be overseen.

Figure 17 shows the mean total steps per day on a week to week basis from week 0 until week 12. Data from 116 participants were used and adjusted to daily step numbers. Overall, a mean step increase of 2,510 steps was detected by week 12. A peak of mean step numbers was reached after week 8. The duration to reach an average step number of 1,000 steps more than usual was three weeks. During the first six weeks, the mean change in steps per day was 2,770 steps.



It is important to acknowledge the limitations in step data analysis. Clearly, step data do not represent total PA. Neither are intensity, nor frequency and duration measured by pedometers. However, step data do give an indication of total PA, particularly so in a context where walking is the most popular mode of PA and where vigorous PA is rather uncommon. For that reason, I consider Tudor Locke's PA classification as an appropriate and practical tool that can be used to understand PA changes that occurred in the target population.

Based on the PA classification provided by Tudor-Locke, positive changes in step categories were detected (Table 7).

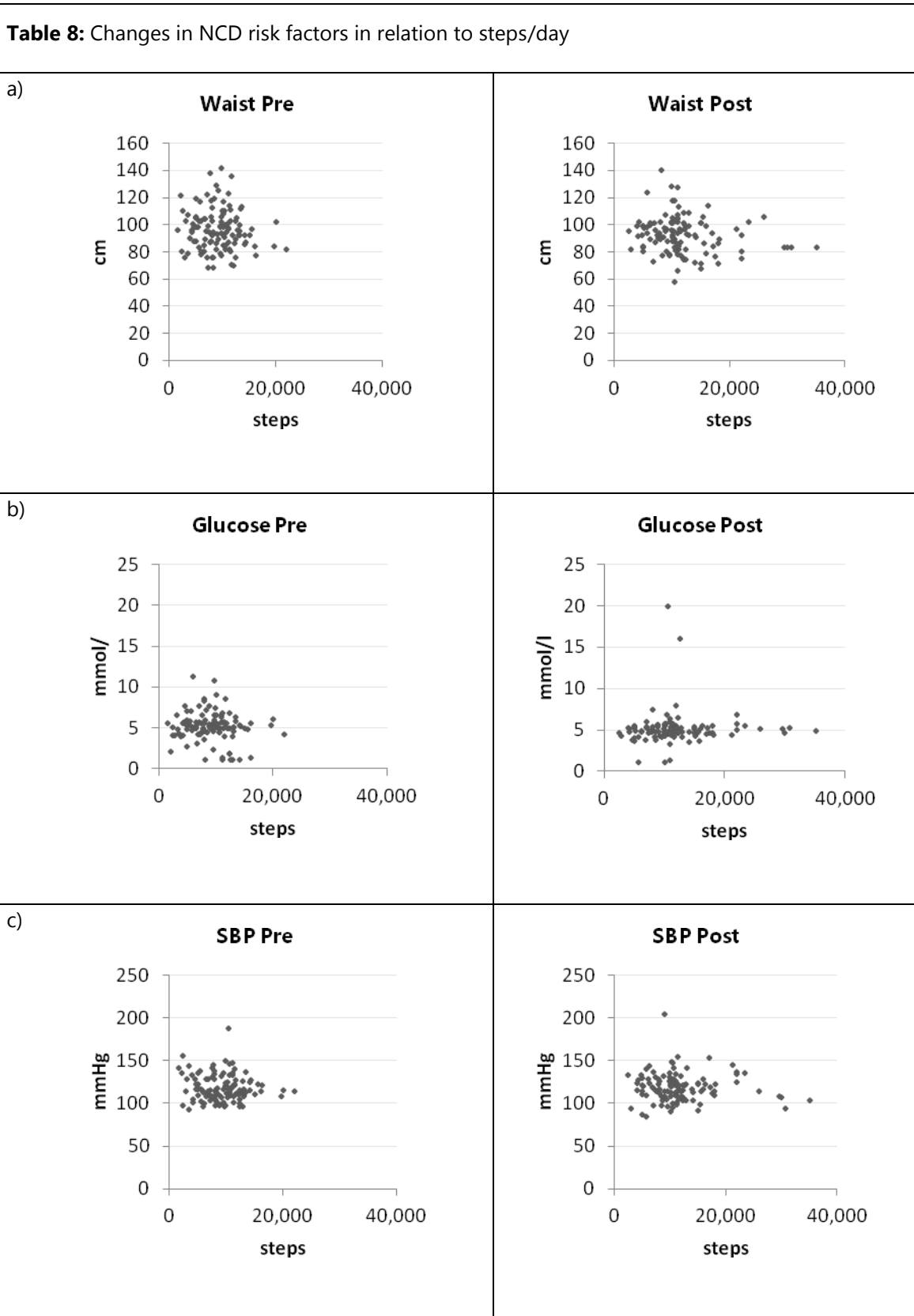
- Individuals classified as being sedentary dropped by 63%
- Individuals classified as being low-active dropped by 23%
- Individuals classified as being somewhat active dropped by 43%
- Individuals classified as being active increased by 47%
- Individuals classified as being highly active increased by 78%

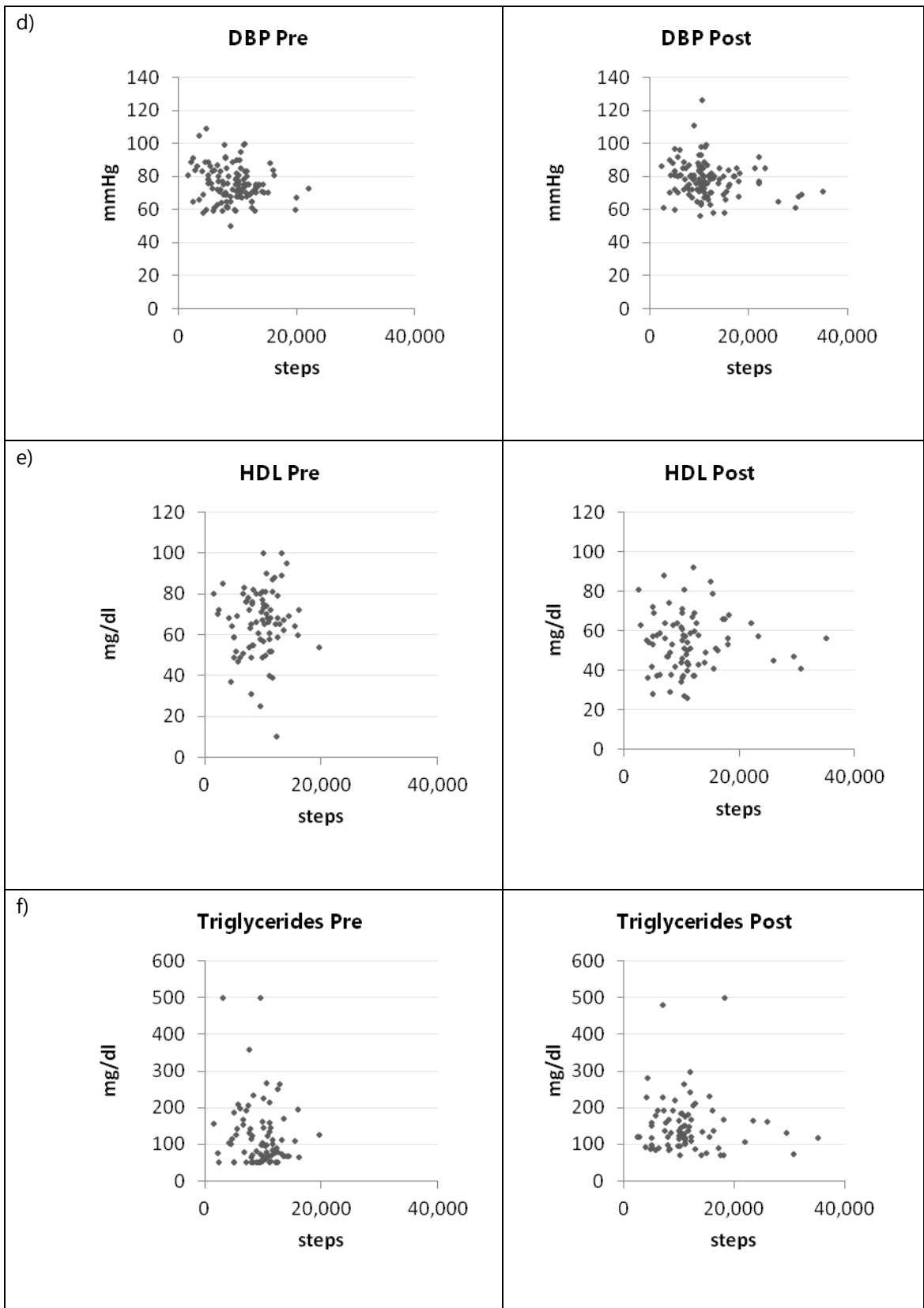
Importantly, whilst 14% were classified as being sedentary at baseline, this number has come down to 5% at follow up. 38% were classified as being active after the 12-week programme (as opposed to 26% before the programme).

<b>Table 7: Change in PA classification*</b>					
<b>Step numbers</b>	<b>Classification</b>	<b>Pre N</b>	<b>%</b>	<b>Post N</b>	<b>%</b>
<=5,000	Sedentary	16	14	6	5
5,000-7,499	Low-active	22	19	17	15
7,500-9,999	Somewhat active	30	26	17	15
10,000-12,499	Active	30	26	44	38
>=12,500	Highly active	18	16	32	28

\*Classification based on Tudor-Locke<sup>274</sup>

Changes in all other variables measured for the periods 0-12 weeks are shown in Table 5. Table 8 further displays steps/day in relation to NCD risk factors at baseline and follow. Whilst data visualise the meaningful change in waist circumference (a) and in fasting serum glucose levels (b), these scatterplots also visualise the increase in PA (steps) over the course of the intervention.





Changes in DBP, HDL and triglycerides did not track in their anticipated direction, all of them showing harmful outcomes. DBP increased by 4% representing a likely small harmful effect. HDL levels decreased by 18% showing possibly moderate harmful effects, whilst triglycerides levels increased by 32% representing most likely harmful effects. The harmful effect on DBP occurred



in low-risk individuals only and may be related to either white coat hypertension<sup>xxi</sup> and an increased nervousness upon arrival, to the increased number of participants walking (in the heat) to where the follow-up study took place or to measurement error. The possibly harmful decrease in HDL levels likewise occurred in low-risk individuals only. The effect on HDL levels in high-risk individuals remains unclear as insufficient data was available. Further research with more detailed dietary measures are needed to understand these trends. The very likely harmful effect on triglycerides in low-risk individuals may be related to an increased consumption of local food. The traditional diet in Vanuatu is based on root crops (cassava, taro, yam) which are high in simple carbohydrates.<sup>148</sup> The consumption of large amounts of carbohydrates is associated with increases in triglycerides and explains the findings.<sup>401</sup> Importantly, high-risk individuals experienced a beneficial effect on triglyceride levels and further research is needed to understand these trends in greater detail.

### **Low risk individuals**

Individuals were classified as low risk if their values did not exceed certain thresholds (see above). The large majority (N=101) of the sample was at low risk for PA behaviour, meaning that the mean step number exceeded the threshold of 5,000 steps for most individuals; <5,000 steps is the category for being classified as sedentary.<sup>274</sup>

The health effect of the intervention on LR individuals did not always track in the anticipated direction. Trivial (waist circumference, SBP, serum glucose) and harmful (DBP, HDL, triglycerides) effects were encountered. Importantly, PA behaviour showed possibly beneficial effects with a percent change of +8.3%. Interestingly, the LR group on waist circumference showed the strongest percent change in PA behaviour with +35.9%, representing a small likely beneficial effect.

### **High risk individuals**

The majority of individuals were classified as HR for at least one variable. In detail, 84 individuals were classified as HR for waist circumference, 23 were classified as HR for fasting serum glucose, 13 were classified as HR for SBP, 11 were classified as HR for DBP and 15 were classified as HR for PA.

The HR PA group experienced the strongest increase in PA behaviour with a percent change of +229% representing a large most likely beneficial effect. A subgroup analysis indicates that the

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<sup>xxi</sup> White coat hypertension is a phenomenon in which patients exhibit hypertension in clinical settings but not in other setting. This may be related to increased anxiety that can be experienced during a clinical visit.<sup>400</sup>

change in PA behaviour is larger in the HR SBP group (+35%) and in the HR DBP group (+34%) than the overall PA increase (+26%).

Importantly, data analysis indicates substantial effects on metabolic indicators for HR individuals: The HR HDL group experienced an increase in HDL levels of 79%. Further, the HR waist circumference group showed a decrease of waist circumference by 6%, representing a moderate possibly beneficial effect. Both SBP and DBP decreased for HR, showing unclear effects. A small likely beneficial effect on fasting serum glucose (-16%) was detected. Whilst mean triglycerides increased for the LR group, they decreased in the high risk group by 31%, representing a moderate possibly beneficial effect.

## Discussion

The purpose of this study was to evaluate a PA programme that was designed for Pacific women in urban Vanuatu. Overall, findings indicate a successful lifestyle change programme that had beneficial effects on PA behaviour and on some health indicators, particularly so in high risk individuals.

Findings were mostly consistent with those from other research. Overall, the use of pedometers has been found to be associated with substantial increases in PA, at least short term.<sup>98,280,286</sup> A systematic review investigated the effect of pedometers on PA levels, studying 26 interventions. Whilst observational studies indicate significant step increases of 2,183 steps/day over baseline,<sup>280</sup> my intervention showed an increase of 2,513 steps/day over baseline. Translated into percentages, PA increases by 26.1% were found, whilst other studies showed increases by 26.9%; rather similar findings from different contexts.<sup>280</sup>

Whilst the review on the effects of pedometers on PA and health by Bravata<sup>280</sup> provides evidence that pedometers can be used to increase PA levels, some limitations were found in this review. For example, less than half of the studies reviewed (N=8) were randomised control trials. Further, inclusion criteria for this review were studies that included more than five participants only. Sample sizes were partly small and the power of some studies little. Moreover, most participants were female (85%), overweight and relatively inactive prior to the walking programme. It is therefore not possible to draw conclusions to the general adult population. The large majority of the studies reviewed were implemented in either the U.S. or in Canada, and international evidence is barely considered. The sustainability of the effects of pedometer-based interventions was not investigated. Mean duration of the studies reviewed was 18 weeks. Sustainability in health promotion efforts is an important aspect that often lacks attention and enforcement. More randomised, controlled studies on longer-term pedometer use are needed.

Baseline step numbers from the participants were higher ( $9,164 \pm 3,787$ ) than in other studies ( $7,029 \pm 3,100$ ).<sup>232</sup> This is probably related to the different living conditions and less car ownership in Vanuatu.

Findings from other populations indicate a small decrease in BP through pedometer-based PA interventions.<sup>280</sup> A small change at the whole group level was observed. Importantly, mean BP dropped in the high-risk group by -2.4% (SBP) and -3.7% (DBP). The effect was unclear due to a small sample size in high-risk BP group.

Knowledge gained from this outcome evaluation includes the understanding that team-based pedometer PA programmes can be successful in engaging urban Ni-Vanuatu women in PA. The programme aided in keeping healthy individuals at low-risk and in improving health risk in the group most at risk. Some modest weight loss was experienced.

Findings indicate that 26% of the sample met the Pacific PA recommendations (>10,000 steps) and only 14% were classified as sedentary (<5,000 steps) prior to intervention. The wider implication of this finding is that due to the high mean baseline step number, the promotion of daily additional 3,000 steps or daily additional 30-minutes of moderate-intensity PA is more feasible than the promotion of 10,000 steps/day in this context

Whilst pedometer-based PA interventions have shown to be effective in the short run, long-term strategies are lacking.<sup>270,274</sup> Due to staff turnover in the host country and limited funding options, the sustained effect of this intervention likewise remains unknown.

Limitations of this study include the following: because my objective was to investigate the effect of the intervention in adult women, the results cannot be used to draw conclusions for men (gender bias). Additionally, the large majority (98.9%) in this study were Ni-Vanuatu, and results may not be consistent across other PICs (selection bias). Further, the study includes a social bias: only employed civil servants took part in the intervention and it is not clear whether similar effects are true for unemployed female civil servants. Individuals who did not attend the follow-up health screening were excluded from analysis, creating an exclusion bias. From field experience, I assume that urban residents of Melanesia tend to be more physically active than their neighbours from Polynesia due to the less advanced infrastructure: whilst the use of cars and buses for transport is more affordable in Apia (Samoa) or Nuku'alofa (Tonga), walking is a more common mode of transport in Vanuatu. Evidence for this observation is lacking.

Participants were not randomly chosen from the population, but were a sample recruited through the Ministry of Health Vanuatu. It is important to note that the sample was a self-selected group of volunteers. The possibility of prior motivation for behaviour change must not

be overlooked. Further, findings are limited through the lack of a control group and it remains unclear whether external programmes (TV advertisements, newspaper, other sport programmes) contributed to the increase in PA behaviour.

Future research is needed to determine whether lifestyle changes have been maintained in the long term. Similar research approaches to assess the effect of such interventions on male individuals can help understand local PA behaviour in greater detail. A comparison of urban/rural pedometer data may aid in the process of defining local and more traditional lifestyle behaviour. Finally, more research on Pacific PA policy is strongly encouraged in order to respond to the lack of evidence from the region.

## **Conclusion**

The first evaluated pedometer-based workplace health intervention from the Pacific region is presented. The intervention has been successful in increasing participants' PA behaviour with consequent improvements in some health indicators. I believe that pedometer-based lifestyle research need to be explored more widely in the region where walking is often favoured over any other sport activity and forms part of the daily routine for both men and women. I understand that the intervention aids in keeping healthy individuals at low risk – a largely meaningful finding for NCD prevention research in LMICs. Based on the findings, I conclude that high risk individuals benefit most from this simple to administer and largely cost-effective intervention and the adaptation and further distribution in other local and regional contexts is encouraged. The move away from promoting 10,000 steps/day towards promoting additional 3,000 steps/days is suggested. The author endorses the investigation of male inclusion in prospective health programmes. Future investigators are encouraged to expand the programme to wider circles, for example to families and communities; external support mechanisms have been found to be essential for programme effectiveness and opportunities of leveraging health initiatives for wider community benefit should be sought. Finally, the importance of locally centred health promotion approaches is recognised, and their use in future health promotion practices in the region is advocated.<sup>373</sup>

## CHAPTER 8

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### **Pacific health promotion: exploring methodological physical activity health promotion approaches**

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#### **Preface**

The material presented in the previous chapters was analysed using either qualitative or quantitative approaches. The current chapter discusses health promotion practices and programme management issues that were experienced during the implementation and evaluation phases of the *Wokabaot Jalens* and while working in neighbouring PICs. Due to the particular context of the intervention, this chapter is descriptive in nature and highlights experienced logistical challenges and successes. I sought to understand barriers and facilitators for Pacific PA health promotion in order to enhance current and future practice. An overall idea of how Pacific mentality and attitude may affect programme management issues is presented. Experiences from additional work in neighbouring PICs<sup>xxii</sup> and in rural Vanuatu<sup>xxiii</sup> add value to the content of the following.

This chapter was also a section of a book chapter. The initial part embraces a description of the *Wokabaot Jalens* which is not included in the following to avoid repetitiveness.

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<sup>xxii</sup> Siefken K, Schofield G, Schulenkorf N. Formative assessments of healthy workplace initiatives in Tuvalu, Tonga and Kiribati: May 2011-February 2012. Report prepared for WHO Western Pacific Regional Office (WPRO); Auckland, New Zealand 2012.

<sup>xxiii</sup> Siefken K, Schofield G, Schulenkorf N. NCD elimination in Vanuatu: Experiences from and recommendations for NCD elimination strategies in Tafea province in Vanuatu. Process evaluation of the government-based physical activity policy "Walk for Life". Report prepared for WHO Western Pacific Regional Office (WPRO); Auckland, New Zealand 2010.

The content of this chapter has been published in the book "Global Sport-for-Development: Critical Perspectives"<sup>xxiv</sup>.

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<sup>xxiv</sup> Siefken K, Schofield G, Schulenkorf N. Inspiring Pacific women to realise sustainable lifestyle changes: an attempt to halt the spread of chronic diseases". In: *Schulenkorf, Adair (Ed.) – Global Sport-for-Development: Critical Perspectives*: Palgrave Macmillan; 2014.

## Introduction

This chapter intends to acquaint the reader with the challenges and successes of PA health promotion initiatives in the Pacific island countries. The research-based lifestyle change programme *Wokabaot Jalens* (Bislama term for 'walking challenge'), implemented in Vanuatu, serves as an example to describe hands-on experiences; *Wokabaot Jalens* engages urban Ni-Vanuatu women in regular exercises and encourages for healthy eating behaviour. The chapter reports on programme logistics, on-site issues (communication, collaboration), opportunities and challenges for programme sustainability, limitations and success stories. Examples from neighbouring Pacific island countries accentuate management challenges. The presentation of this reflective praxis has the potential to aid future practitioners and/or researchers in programme design and management and enhance collaboration with local personnel and authorities.

The starting point for exploring health promotion in the Pacific is Table 9 which summarises context specific issues that were observed during a number of health promotion programmes in several PICs, including Vanuatu, Tuvalu, Kiribati and Tonga. Thematic findings are compared to issues that are typically presented in a Western context. The Western country context is provided through secondary research and by the author's observations and experiences in developed world environments.

<b>Table 9: Barriers and facilitators for Pacific PA health promotion</b>			
		<b>Pacific island context</b>	<b>Western country context</b>
<b>Individual</b>	Attitude	Health screening is seen as a positive and encouraging action	Health screening might not be well received given that health data is treated more privately and taken by General Practitioners on a regular basis. <sup>402,403</sup>
	Perception	Population generally welcomes new ideas from overseas	Individuals from Western countries are often overloaded with health promotion efforts and are less open to trying new ideas
	Feedback	Population is inclined to agree with researchers' efforts, critique is rare	Tendency to openly comment and critique. <sup>404</sup>
	Acceptance	Pedometers are well received	Pedometers are well received. <sup>113</sup>
	Distribution	Participants are likely to bring message across to community/church groups. Opportunities for wider community roll out due to communal structures	Participants are less involved in communal activities thus less likely to distribute programmes and knowledge to community. Limited opportunities for wider programme roll out. <sup>405</sup>
<b>Culture</b>	Cultural structures	Strong hierarchical structures may hinder full participation	Hierarchical structures are less relevant and present no particular barrier for programme participation. <sup>331</sup>
	Preferences	Culture favours communal	Culture favours



	activities	individualistic activities. <sup>405</sup>
	Communication	Creation of initial contact and gaining trust from local staff takes time due to strong hierarchical structures
	Language	Linguistic challenges – has everybody fully understood the programme components?
	Gender equality	Husbands may not support the initiative– gender issues
	Dress code	Dress code poses challenges for accurately wearing pedometers
	Data precision	Lack of data accuracy. <sup>408</sup>
	Sustainability	Sustainability is often restricted due to limited capacity and expertise. <sup>128</sup>
<b>External influences</b>	Climate	Technical devices do not function accurately in humid conditions and in temperatures above 30°C
	Funding	Funding for sustainable programmes is often limited. <sup>409,410</sup>
	Conduct	Conduct of health screening can be very restricted due to limited facilities
	Geographic location	Remoteness of PICs limits access to equipment. <sup>127</sup>
		Communication is often easier to initiate due to less hierarchical structures. <sup>406</sup>
		Generally no linguistic challenges
		Gender equality is well developed. <sup>407</sup>
		Dress code seldom poses extra challenge. <sup>113</sup>
		Data accuracy well-advanced
		Sustainability (self-initiated actions) more feasible
		Funding for sustainability is often limited, but self-organisation more feasible
		Procedure of health screening is often easier due to more advanced facilities
		Good access to equipment

## Health promotion context

According to the World Health Organization, "Health promotion is a cornerstone of primary health care and a core function of public health".<sup>411</sup> WHO argues that health promotion is both practical and cost-effective in reducing the burden of disease and in mitigating the social and economic impact of diseases.<sup>411</sup> The interrelated connections between health promotion, health status, and human and economic development are widely acknowledged.<sup>411</sup> Various health promotion approaches have been defined in the literature. In 1986, the Ottawa Charter for Health Promotion defined health promotion as a 'process of enabling people to increase control over, and to improve their health'.<sup>93</sup> Clearly, human health behaviour is affected by various influences. Lewin proposed that human behaviour was a function of the person and his or her environment.<sup>314</sup> His work led to the development of the social ecological model for understanding health behaviour.<sup>230,315</sup> Social ecological models address multiple levels of behaviour influence, including individual, cultural and external influences, and lead to a more comprehensive approach to health promotion.

Over the past decades, health promotion has established itself as an accepted approach to health development in several contexts, though especially in high income countries.<sup>412</sup> However, LMICs struggle to achieve similar outcomes, which has been explained in the literature by three key factors: a) the flooding of health development due to multi-sectoral influences, i.e. practitioners and students from a wide range of backgrounds, b) challenges of resource allocation, legislation, policy, information and advocacy due to existing jostling for power, and c) imbalance between health promotion and health development practitioners.<sup>413</sup>

Importantly, deviation in health promotion approaches for different country contexts has received little attention in the literature, and it is seldom clear how an approach that proved successful in a high-income country differs to an approach in a low- and middle-income country context. As a result of my work in several Pacific Islands, I present the first recorded overview of differences in health promotion approaches informed by cultural contexts. In doing so, I compare barriers and facilitators of Pacific and Western health promotion approaches. This information is crucial for future health promotion initiatives in the Pacific region. As a summary, Table 9 highlights issues that need careful consideration in PA health promotion planning in the Pacific region.

Undoubtedly, culturally targeted health promotion programmes are essential.<sup>190,197</sup> For initiatives in the Pacific region, the unique value and belief systems need particular consideration in programme design. Following Bronfenbrenner's social ecological model, the macrosystem

(societal beliefs, values, attitudes) levels strongly impact on lifestyle behaviour.<sup>186</sup> The macrosystem is based on socio-cultural factors that have been defined as the 'structure of the society, the values in relation to the meaning of food and body size', as well as the attitudes and expectations of community members.<sup>186</sup> Designing health promotion interventions that are culturally centred and that build on the existing social structure may be a promising approach to create change in the region. With the *Wokabaot Jalens*, the author has attempted to design a relevant programme to meet the needs for urban female civil servants in Vanuatu. Additional health promotion assessments conducted in Tuvalu, Kiribati and Tonga contribute to the findings and discussion of this chapter. From my experience, health promotion efforts in the Pacific region need careful planning and culturally centred approaches.

### **Programme impacts and outcomes**

The *Wokabaot Jalens* was successful in increasing participants' PA levels. There was an objective daily mean step increase of  $2510 \pm 6922$  steps in all participants during the time of programme implementation (details Chapter 7).

While the *Wokabaot Jalens* was considered a great success for participants and their groups, programme sustainability has been identified as both an opportunity and a challenge. Clearly, sustainability is dependent on a) management capacities and b) individuals that aim to create lasting lifestyle changes. The most committed individuals demonstrated sustained actions through the participation in a subsequent international online pedometer challenge which was arranged by the Australian Government and free of charge – an ideal example that sustained actions are feasible. Several women formed new walking teams and signed up to participate in the challenge. Participants demonstrated autonomy and were able to compete with 1800 individuals from Australia. Some participants even aimed for 30,000 steps a day which resulted in self-reported weight loss, better sleep, feeling better and increased well-being. Importantly, to accumulate 30,000 steps in a walking pace, three to four hours of walking is required.

As a further challenge for sustainability, local expertise and finances in programme management appeared lacking. While capacity building for programme managers is generally seen as essential for sustained programme success,<sup>241</sup> significant staff turnover and the loss of key supporters in the Vanuatu Government brought the *Wokabaot Jalens* spirit to an end. *Wokabaot Jalens* was somehow related to and supported by the *Walk for Life* policy – a workplace health policy that was in place in the Vanuatu Government since 2007.<sup>16</sup> In 2011, political changes in the Vanuatu Government resulted in a policy discontinuation. Reasons provided include the abuse of the programme. "Some people do not participate, but instead go home during the Wednesday afternoon activity". Strategic enforcement procedures may have prevented the

standstill. Regrettably, to the researcher's knowledge, no future plans to re-activate the programme are currently in place despite the great amount of informal and formal requests from both civil servants and the private sector. Fourteen months after programme termination, eight participants reported to repeatedly participate in a global online pedometer challenge. Further, the researcher randomly met three participants fifteen months after programme termination: the continuous use of pedometers was recorded. Whilst these individual actions suggest that sustained actions are feasible, the programme is limited in effective means of prolonged actions. The assumption that the Ministry of Health would continue the programme after tailored capacity building proved wrong for the reasons provided above. A formal commitment for sustained intentions from trained staff and from the employer prior to programme implementation may help to sustain future interventions. Importantly, lifestyle behaviour change is a process that happens within an individual. Whilst the programme that initiates the change may be essential to kick-start behaviour change, the intention of the *Wokabaot Jalens* was to create independent long-term behaviour change; the continuous programme may be redundant. For accurate information, however, whether sustained behaviour change action has occurred, regular follow-up health screenings are essential. I recommend both the employer (in this case MoH) and the donor (in this case WHO) to commit to repeated health screenings.

Individual feedback often illustrates the perceived success of programmes such as the *Wokabaot Jalens*.<sup>xxv</sup> I would therefore like to share some of the feedback and comments provided by programme participants. This feedback was not systematically collected, but is part of the numerous individual emails and messages the author received without asking for it. For example, one hypertensive and diabetic participant reported that after 15 years of seeking doctors' advices without positive results, *Wokabaot Jalens* was the single best prescription she had received. This programme improved her quality of life to the extent that she was able to sense her limbs and see long distances. She reports that regular exercise is the best medication she has received and the pedometer assists her in monitoring her activity levels. Upon programme termination she was able to actively play with her children, which had been impossible for her previously.

Another participant commented in email correspondence after programme termination:

'Thank you to help us Ni-Vanuatu women and to encourage us to do the *Wokabaot Jalens*. It is a very important programme for our health and I am very glad and proud

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<sup>xxv</sup> An abundance of individual feedback emails was received by the researcher from participants. A selection is available at the *Wokabaot Jalens* website (<http://wokabaot.blogspot.co.nz/>).

that we, Ni-Vanuatu women, finally come to realise that we can do our best for our own health. There are lots of women left to be part but no more pedometers. Is there any chance to get more of them? The message is going around mouth to mouth to other women who are not working for government but for the private sector. They are interested in participating in the programme and are asking when will the next round be starting? Many thanks again and our male colleagues also told me they want to do this too. When?’

Comments like these suggest that both parties – local women and researchers – have greatly benefitted from their cooperation during the *Wokabaot Jalens* experience: participants learned how to make healthy choices in their everyday lives and reduce NCD risk factors, whereas the researchers were able to enhance their understanding of the local state of knowledge around healthy lifestyle behaviour and the cultural particularities regarding programme design and implementation.

Overall, the *Wokabaot Jalens* suggests that a community participation approach can result in meaningful health programmes. It also suggests that in a low- and middle income world context, communities are often dependent on some form of external support when realising their development efforts. However, such approach to development requires reciprocal engagement and participation. Looking at the *Wokabaot Jalens*, the reciprocal learning experiences of local communities and external researchers are a great example: while locals received expert advice in regards to planning, implementing and managing a health programme, the researchers learned about the significance of walking as the preferred type of exercise for Ni-Vanuatu women and other perceived barriers and facilitators. It can be said that if the cooperation between locals and researchers is one of engagement and respect, the ability of the target population to build their own future programmes and skills can be strengthened, so that they are better able to define their objectives and achieve their targets of conducting, sustaining, growing and leveraging future health projects.

### ***Challenges encountered and ideas for programme improvement***

Reflecting on the *Wokabaot Jalens*, a number of challenges have been identified. Clearly, challenges should not hinder future programme implementation, but should be considered as thought stimulating and lead to continuous programme improvement.

The official languages of Vanuatu are Bislama, English and French. Bislama is the first language of many urban Ni-Vanuatu. For the urban population, the majority speak Bislama and French or Bislama and English. Prior to programme design, the researchers were informed that all civil

servants were fluent in the English language and all materials were designed in English. However, upon programme implementation, a small number of participants requested documents to be translated into French, since both English and French are principal working languages. Regrettably, this request was received after the official opening when all materials had been printed in New Zealand. Subsequently, it was agreed that participants consult with the researcher in person should there be any questions or concerns. Nevertheless, for future programme design it is suggested to have all brochures and programme instructions in all three official languages available for best programme outcomes.

Following this experience, the researchers questioned whether all participants had understood all programme elements in full detail, given that the opening discussion and programme explanation was conducted in the English language. A detailed visual instruction of wearing the pedometer accurately aimed at avoiding step miscalculations. Further, team captains were continuously encouraged to explain all programme elements to team members accurately in respective languages. While there was no incident in which a participant indicated that she did not know or understand programme elements in the process evaluation, questions remain if this outcome is related to the cultural tendency to agree, as many Pacific individuals have been found to frequently assent with external ideas.<sup>392</sup>

Our initial formative work revealed that husbands may not support the *Wokabaot Jalens* since it was directed at women only.<sup>154</sup> Their cultural expectations were often cited to be the major hindrance for women to engage in regular exercise programmes. Women are 'supposed to stay back home and look after the children' instead of exercising outdoors. Future research may aim at discovering how men perceive healthy lifestyle behaviour in women, which may be an important way to design appropriate interventions that involve men, women and the family as a whole.

### **Lessons learnt - running Pacific PA health promotion interventions**

The Pacific region is a multinational region with a large variety of cultures, languages and customs. Clearly, it is challenging and complex – if not impossible - to report on the management of *Pacific* health programmes. However, based on personal experiences an overall idea of how Pacific attitudes can affect programme management issues is meant to be provided, so that future programme development can be enhanced.

Earlier in this chapter, Table 9 opposed findings from a Pacific island context to a Western context and outlined important differences which are crucial for future Pacific PA programme design and management. Based on Bronfenbrenner's social ecological model,<sup>315</sup> I categorised

findings into individual, cultural and external influences that impact health promotion activities. Each category is now discussed in greater detail below.

### **Individual**

On the individual level, personal and social values play an important role for programme management. Attitudes, perceptions, and the social connectivity that shape many Pacific individuals need consideration in programme management. Earlier in this chapter in Table 9, I identified *attitudes* as potential facilitators for health screenings, as I experienced the turnout for health screenings that measure weight, Body Mass Index, blood pressure and blood glucose levels to be particularly high in PICs. For example, in my research sites I experienced response rates of almost 100 percent. Often, people in PICs seem to handle health data differently, and it is of little concern if, for example, colleagues know each other's blood pressure or other data. Rather, participants would exclaim 'oh, [I've got] high sugar, and you?' This action differs significantly to dealing with health data in a more Western context where it is handled more privately. Accordingly, health screening response rates in Western countries are significantly lower. For example, New Zealand's health target for 2012 is to increase response rates to 60 per cent.<sup>403</sup> Such high response rates in PICs are an important finding and are in accord with findings from STEPS studies in the region. Stakeholders, interested in surveillance mechanisms, may allocate financial resources accordingly.

Table 9 lists *perception* as a potential facilitator for Pacific PA health promotion. Overall, open-mindedness towards new ideas and suggestions for programme design were experienced in various PICs. This is important for future programmes and should be valued. For example, the use of pedometers was very well received by Ni-Vanuatu women, despite women generally wearing dresses which complicate the actual use of pedometers. Participants showed an open attitude towards using an extra elastic waist-band underneath their dresses that allows the pedometer to function accurately, albeit this being potentially uncomfortable for some. The use of pedometers is generally also well received in participants from a Western context but is also more appropriate due to the dress codes in Western countries.

The provision of individual feedback was identified as a potential barrier in Pacific PA health promotion, as listed in Table 9 under *feedback*. An important side-observation from my evaluation efforts is that Pacific people are frequently inclined to assent with external ideas and suggestions, while critique towards the researchers' efforts is rare. For that reason, it can be difficult to know whether ideas from the researcher's/programme implementer's side are actually well received or whether agreements are culturally related. I suggest including open-ended questions (in initial and evaluation work) and open discussion sessions to uncover true

ideas and opinions on the planned programme. These can focus on individual suggestions of what works best; previous experiences of what did and did not work; individual experiences, such as likes, dislikes and challenges; and suggestions for programme improvement. In a Western context, critique to programme elements is often readily available which may assist in continuous programme improvement.

A sharp difference has been identified in communal *distribution* of new information. Table 9 lists this health promotion facilitator as a distributor. Due to the existing communal structures in the PICs and the 'sharing and caring' attitude,<sup>157</sup> many Pacific people are more likely to bring health messages across to communities and churches. For instance, some participants from the *Wokabaot Jalens* distributed all health information materials further to their churches and social groups to engage the community in healthy lifestyle behaviour. This proactive communication approach is an important finding as the Church plays a vital role in Pacific lifestyles: it is the central meeting point of many communities where knowledge and experiences are shared. With Pacific lifestyles being more centred on communal activities, opportunities for wider community roll out are stronger than in a more individualistic Western lifestyle. I conclude that using the church setting for health promotion initiatives in the Pacific region may be successful in raising awareness about healthy lifestyle behaviour, in providing access to healthy food options and may thus contribute to improvements in family and community health. A systematic health promotion approach, developed in collaboration with pastors and other church and community members may be one of the solutions to bring about health changes in the region.

## **Culture**

Cross-cultural collaboration may pose management challenges due to varying expectations and ideas and extra linguistic obstacles. A number of cultural issues for PA health programme management were defined and should be taken into consideration for any Pacific PA programme development intention.

Table 8 lists *cultural structure* as a potential barrier for health promotion initiatives. The communal nature of Pacific people produces a series of common values and behaviours, despite varying traditions among Polynesian, Melanesian and Micronesian communities. However, certain generalisations can be made: one important associated core value that has been identified is the obedience to authority.<sup>341</sup> For Polynesian countries, traditional leadership has been defined as based on hereditary rank in a context of social hierarchy and for Melanesian countries based on achieved status in a context of competition.<sup>414</sup> Irrespective of regional affiliation, leadership and authority strongly impact every day behaviour and attitude in Pacific cultures.<sup>341</sup> This system can pose remarkable difficulties when running health promotion



programmes, both in the development and in the implementation phase. For example, programme leaders may be perceived to have a lower status rank than some participants, which may cause tension and discomfort in both parties during programme activities and in usual office work hours. The system can further lead to reluctance towards communicating with individuals that do not form part of the communal system (e.g. researcher – as outsider). Hence, I conclude that formative research prior to programme design will assist in the development of culturally centred approaches that are supported by all contestants involved.

In a region where authority systems prevail strongly, a first hurdle may be the creation of initial contact with respective local staff.<sup>341</sup> Table 9 highlights this as *communication* issues. Distinct reluctance was felt towards the researchers' effort in some countries in an attempt to initiate communication with local health professionals, particularly in Polynesian countries. This reluctance is culturally rooted and can be explained with the particular authority system. However, this first obstacle can be overcome through continual culturally targeted communication efforts. A change in attitude was felt once researchers were in direct face to face contact with local staff. This insight is crucial for future programme planners: for an effective collaboration with local Pacific health professionals it is of utmost importance to collaborate face to face wherever possible and to understand the existing authority system. Whilst emailing is common in the region, it has not reached the plausible standards it has in some higher income countries. Moreover, expectations differ in terms of timing and the need for immediate responses and email replies.

*Gender* inequalities are strong in the Pacific region.<sup>157</sup> Among the major gender issues in the region are high rates of gender-based violence of men against women, low proportions of women in all levels of decision-making, significant under-representation of women in the normal economy, and inequitable access to clean water and sanitation.<sup>161</sup> As discussed, formative work in the region found that men may not support Ni-Vanuatu women to engage in regular exercises due to child rearing and household expectations.<sup>154</sup>

A particular challenge in running pedometer-based health promotion programmes in the Pacific region is the *dress code* of women (and in fact, sometimes men). Traditional dress codes of women are expected in different Pacific countries and the particular style often defines national or regional origin. Clearly, the use of pedometers becomes challenging when wearing dresses that are generally loose, not tight. Further, in some Pacific Island countries, individuals (both men and women) wear sarongs at home – large pieces of cloth that are wrapped around the hip and resemble a long skirt. This clothing poses similar challenges to a) fastening the pedometer and b) attaining accurate step count results, as pedometers are ideally clipped to a belt. Clearly,

innovative solutions are needed. From my experience, elastic belts that are worn underneath the dresses have proven effective and were well received by participants. A side-observation during the implementation phase was the need for accurate explanation of how to wear the pedometer. Whilst being common sense for many Westerners, detailed explanation, including do's and don'ts are essential for a target audience that is not familiar with the devices.

During the conduct of health screenings, differences in data measurement *precision* were observed among the researchers and the local staff team which resulted in an observed measurement bias. Whilst the researchers intended to explain the exact use of tape measurements and height scales prior to health screening commencement, colleagues from the Ministry of Health (mainly nurses) indicated the accurate procedure was known and no further instruction was needed. However, during the health screenings, I observed that data accuracy varies widely and attitudes towards precise measurements did not always prevail. For example, it was observed that a second blood pressure reading was not considered relevant because 'He's my friend, I know he is healthy'. This issue, though culturally delicate, was raised instantly to avoid data imprecision. The necessity of data precision was explained in detail. With hindsight, it is recommended to include an element of data measurement quality in which cross measuring takes places intermittently.

In relation to *sustainability*, I encountered another challenge when conducting research work in the Pacific. Whilst I was informed by WHO that all relevant Ministry of Health offices are equipped with well-functioning health screening devices, I experienced a different scenario. Where devices existed, they were often not functioning – either due to broken batteries, insufficient knowledge of operating the devices, or maintenance issues such as expired blood testing strips. Clearly, this hinders health screenings to be run efficiently by the respective local offices and it clarifies the request for continuous external support with health screenings.

### **External influences**

The *climate* may pose challenges to data collection in the Pacific region. Where temperatures exceed 30°C, inaccurate readings of health data may occur. Given that air-conditioned facilities are rare, health screenings commonly occur in open-air community houses. Technical devices are generally defined to be well-functioning to up to 30°C only. Whenever possible, it is therefore recommended to arrange health screening in air-conditioned rooms to allow accurate functioning of devices and to make the health screening procedure more enjoyable for all. Fans may be used where air-condition is not feasible. In remote region, where electricity is limited, it is suggested to conduct data collection in the very early morning hours when temperatures are generally below 30°C.

The large majority, if not all, of PICs strongly rely on external aid such as WHO, the Secretariat of the Pacific Community (SPC) and the Australian Government Overseas Aid Programme (AUSAID). Clearly, countries that are largely dependent on foreign aid require thorough capacity building approaches in order to achieve sustained programme outcomes. A major problem related to donor-supported health projects in LMICs is their lack of sustainability once external assistance has ceased: Often, there is a significant lack of long-term approaches which means that upon programme termination and usage of project grants, the local staff – often highly motivated – is left without adequate resources for programme continuation. I suggest that a re-thinking of the funding models with a more sustained approach towards health promotion management and delivery is one of the most important issues for international donor organisations to be resolved.

A further logistical challenge is the remoteness of the Pacific Islands, listed in Table 9 under the section *geographical location*. Researchers have previously described the detrimental effects of geographical distance and the linked dependency on imports from overseas.<sup>4,30,56</sup> The unfavourable effects are indeed obvious and can be seen particularly in many urban areas in the Pacific region. Regarding technical PA equipment I experienced the heavy dependency on imports first hand. Whilst myriad requests were made in Vanuatu to provide the public with opportunities to purchase pedometers at their own cost, no action has been taken. This same issue was further found to be of importance in Tuvalu, Tonga and Kiribati where local health staff had wished they could provide the population with these simple to use and relatively affordable PA monitor tools. During planning and implementation this issue can become significant when equipment brought from overseas stops functioning properly and needs to be renewed. I do not call for more technological devices to be on the market in the respective countries, but I recommend being stocked up with more equipment than actually needed to be able to replace devices whenever needed. Disappointment has been felt in *Wokabaot Jalens* participants when pedometers went missing or were broken and could not be replaced.

Further research is needed to investigate whether long-term lifestyle change has occurred and been maintained. Whilst the Vanuatu Ministry of Health and relevant stakeholders (donors) were repeatedly encouraged to initiate a 12-month follow up health screening with all participants, this has not taken place by the time of writing (December 2012). From a practical perspective, the Ministry of Health Vanuatu has been prepared to run and monitor this programme independently for long-term lifestyle changes. Staff turnover and work overload in the health personnel, however, was reported to hinder continuation. A formal commitment to long-term planning prior to programme implementation on the sides of the donor and targeted

organisation and the creation of a formal job description for the person running the programme is suggested to aid in programme maintenance.

The researchers strongly recommended the Ministry of Health personnel supporting participants with their lifestyle change throughout the subsequent year and beyond. Whilst this has happened informally via face to face conversations of health personnel and participants, no systematic approach was taken. Besides, it was suggested to expand the programme beyond the workplace focus (communities, churches, schools), as this can impact both the external environment and the participants. As such, opportunities of leveraging health initiatives for wider community benefit should be sought. Regrettably, to the researchers' knowledge, no action has been taken since programme termination.

To conclude, a successful health promotion programme was developed and implemented. I provide evidence that lifestyle behaviour change is feasible, albeit evidence is available for a short duration only. The depletion of funds and the loss of key supporters in the Ministry of Health caused programme discontinuation and prevented me from experiencing and evaluating lasting change. Whilst long-term plans were included in programme planning by the researcher, no sustainable funding and support on the part of the donor were intended. This illustrates the complexity of donor-implementer-recipient relation: whilst the programme proved successful and the target audience was highly motivated to create change, sustained success eventually depends on both the donor's actions and the key supporters' drive. I assume that donors funding is an essential piece for sustained programme continuation; moreover, the loss of key drivers and the loss of support from the Government play an even larger role for programme sustainability. The lesson learnt is that capacity building, local training and transfer of responsibilities do not necessarily suffice to generate sustained programme success. Ultimately, the donor, the targeted community and supporting organisation are required to commit to long-term intentions prior to programme commencement.

### **Summary and future paths in Pacific PA health programme planning**

It is widely accepted that the most serious problem facing Pacific nations today is the rapid growth of NCDs. Clearly, there is a need to encourage many Pacific urban adults to adopt healthier lifestyles. This chapter highlighted challenges and opportunities for Pacific PA health promotion programmes. When investigating the management challenges in detail, three phenomena are apparent. First, I found that cultural issues pose notable challenges to programme success and community involvement is of utmost importance during the design, implementation and evaluation phase. Second, there is often a lack of local capacity available to

secure the monitoring and evaluation of programmes, and third sustaining the projects beyond the time of international funding is particularly difficult.

Interestingly, health promotion interventions are usually directed towards increasing an individual's control over their health.<sup>93</sup> However, according to WHO's Ottawa Charter, directing action towards changing social, environmental and economic conditions can help individuals 'achieve their fullest health potential'...'by taking control of those things which determine their health'. Community participation was first adopted as a health-promotion strategy by the World Health Organization (WHO) in 1978<sup>415</sup> and has been described as a social process in which groups with shared needs living in a 'certain geographical area' actively identify needs, make decisions, and set up mechanisms to achieve solutions.<sup>416</sup> Evidence suggests that, specifically, health interventions that incorporate cultural contextualisation are more effective than those that do not.<sup>417</sup> As a consequence, for Pacific health professionals to design culturally meaningful health programmes, community-based participatory approaches are essential.

Throughout this chapter I have provided examples from the PICs that highlight the importance of cooperation between health experts and the local community. In the attempt to achieve culturally-centred health outcomes, I support Stokol's<sup>316</sup> recommendation to shift from a person-focused approach to a community-oriented health promotion approach to foster socially supportive norms and community participation in health promotion programmes. For example, I found that pedometer-based health programmes using team approaches and including nutrition education components can be effective approaches in improving female Ni-Vanuatu civil servants' health. Importantly, programme components and materials must be acceptable to participants and must build on existing cultural structures. Sustained actions are likely to result in health benefits, or as Aristotle phrased it: 'We are what we repeatedly do. Excellence then, is not an act, but a habit.'

Against this background, a systematic approach for structuring, implementing, monitoring and evaluating programmes both internally and externally is indispensable for sustained programme success and underpinning all this, finances that make sustained programme (and thus sustainable impacts) possible. Whilst a large number of health and PA programmes prevail in a variety of settings in the Pacific region, the majority of these programmes are not embedded in regular evaluation, let alone ongoing monitoring mechanisms or evaluations of programme effectiveness.<sup>115,116</sup> I argue that best-practice programme planning can only be achieved through the use of formative research, inclusive process evaluation and cooperative outcome evaluation because the success or failure of a programme can only be understood through evaluation work

conducted with the support and/or leadership of those who are the intended beneficiaries of health interventions.<sup>118</sup>

## CHAPTER 9

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### General discussion

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#### **Pacific health intricacies**

The Pacific region is facing monumental health challenges. Whilst globally NCDs are projected to increase to 70% of the global health burden by 2020, the Pacific region already exceeds this level at 75%, with this percentage continuing to rise.<sup>31</sup> Left unabated, this escalating rate of NCDs will not only lead to increasing numbers of premature death, higher levels of disability and a lower quality of life, but will likely overwhelm health resources, economies and Pacific nations at large.

A complex interaction of factors is responsible for the Pacific NCD crisis. The high prevalence rates of overweight and obese individuals in the Pacific population is symptomatic of the problem and likely the result of a complex interaction of genetic susceptibilities<sup>66</sup> and contemporary environments,<sup>418</sup> which are aggravated by individual dietary<sup>419,420</sup> and PA behaviours.<sup>421</sup> The underlying origins may be linked to socio-cultural<sup>186</sup> and political factors which are strongly shaped by the forces of globalisation.<sup>4</sup>

Importantly, PA is modifiable through socio-cultural approaches<sup>186,335,422</sup> and the research questions of this thesis (Chapter 1; thesis objectives) address these socio-cultural factors. Focus groups seek to identify socially and culturally appropriate approaches of increasing PA and a socially and culturally relevant programme was developed, implemented and evaluated. Suggestions for programme improvement are provided taking socio-cultural aspects into account (expanding programme to the wider community, involving families).

Whilst the findings from this doctoral work are novel and contribute to the body of research around Pacific health, they only represent a small step towards more evidence-based Pacific PA health promotion practice. It is clear that these strategies will not by themselves, suffice to

generate change in the health of Pacific populations. An often toxic food supply system and a substantial shift in activity patterns towards sedentarism directly impact individual lifestyle behaviour and health. Moreover, the shift towards more sedentary lifestyles is indirectly promoted through external aid efforts. The building of physical infrastructures (such as roads), the importation of technological devices, the use of motorised vehicles and the creation of employment opportunities in offices, all of which have resulted from good-will external aid processes discourage physical exertion. Consequently, contrary to the intention of external aid efforts, it has had a profound and somewhat counterproductive impact on the health of many Pacific populations, by boosting sedentarism. Furthermore, in addition to the heavy dependence on external aid, the progression of Pacific health is often hindered by a limited Pacific health workforce, underfunded and unstable political systems, and globalisation.

Given HICs are struggling to control the NCD epidemic with often extensive resources allocated to the problem, it is questionable whether NCDs can be brought under control in countries where there are few resources, where health workforce capacity is largely limited and where governments' investment in NCD prevention and control is minimal. Nevertheless, findings from this thesis suggest that community-led interventions can make a small – yet significant – contribution to prevent, control and reduce NCDs in Vanuatu.

## **Research summary and implications**

This body of work provides a unique contribution to the existing knowledge-base of Pacific NCD prevention and control and PA health promotion in several ways. The results and implications of the studies presented are summarised below.

In order to increase PA levels and thus contribute to Pacific health advancement, the first step was to identify current PA practice. Study 1 presents a stocktake of PA programmes from the Pacific region, the aim being to a) understand health promotion practice, b) to facilitate the sharing of ideas across the region and c) to provide guidance and directions for future PA programmes. Eighty-four PA initiatives were identified in 20 PICs. What was more important, though, was that none of these programmes had been assessed, let alone systematically evaluated. It is this finding which led to the design of the first rigorously and systematically evaluated PA health promotion programme in a Pacific Island context.

Despite a large investment and commitment to reduce Pacific NCD risk through these PA programmes, a lack of evaluation and thus a lack of evidence regarding Pacific lifestyle behaviour change, per se, were defined. The first study to investigate lifestyle behaviour in detail is presented with this thesis in Chapter 4. Several barriers and facilitators were identified.



Observatory findings indicate that, contrary to the general belief, Pacific NCDs are more likely to occur among financially disadvantaged individuals in urban centres than in individuals with more financial opportunities. Whilst this finding is important, a deeper investigation may reveal more clear results.

It was further found that fun-centred, team-based walking programmes are the preferred mode of exercise for urban Ni-Vanuatu women. The team-approach is of crucial relevance and relates to the cultural dominance of communal core values over individualistic pursuits that mark Western cultures.<sup>341</sup> This finding is essential for the targeted re-design of existing PA programmes and for the design of future health programmes in the region.

Workplaces are promising settings for health promotion, particularly so in LMIC, because they provide a setting with an existing infrastructure which is often lacking elsewhere in the LMIC context. Importantly, using the workplace as a setting for improving health may increase health inequalities among urban residents.<sup>423</sup> Given the provided infrastructure, I consider the workplace as an important setting for health promotion initiatives. The involvement of all female employees, independent of job rank, was central to this intervention and I feel that particularly low-rank individuals (cleaning staff) benefitted from this programme. The suggested future recommendations for programme improvement (family involvement, dissemination to wider community) may further reduce health inequalities that may arise from a workplace-based health programme.

The lack of evidence on the effectiveness of Pacific workplace health promotion warrants further research. Whilst 26 workplace-based PA programmes were identified (Chapter 3), no research had been undertaken to understand the effectiveness of these programmes and it remains unknown whether such approaches and what types of approaches are successful. In response to the absence of evaluation procedures, this thesis presents the first rigorously evaluated workplace health programme developed and implemented in Vanuatu. Findings from Chapter 4 were used to design the programme, using a collaborative approach with Ni-Vanuatu civil servants. Chapter 5 describes this intervention in detail. Addressing the underlying model and the complex interplay of its constituents (Figure 6) is important in generating behaviour change. Embedding the intervention into the social-ecological model therefore assists in addressing the different societal factors that influence health behaviour. If a change at one level is made, all other levels may be affected.<sup>317</sup> *Wokabaot Jalens* sought to address the different levels, as outlined in Figure 6. Whilst some were addressed in detail (e.g. Micro-, Meso- and Exosystem), others were not. To address the Macrosystem in depths, a longer duration of the intervention is needed. Further, given the scope of this thesis, it was impossible to create changes in some

levels (e.g. the build environment; such as creating foot paths or safer roads). For a longer and more in-depths intervention, the interdependence of the constituents may be addressed in greater detail in order to create long-lasting behaviour change.

In Chapter 6 the first evidence-based and effective mode of increasing PA behaviour in Pacific women of urban Vanuatu is identified. The outcome evaluation indicates both an immediate and large change in PA behaviour as shown by mean steps which increased by 2,510 ( $\pm$  6,922 SD) from baseline to follow-up (an increase of 26.1%), and improvements in health indicators (a drop in waist circumference of -3.9cm ( $\pm$ 10.3 SD)). A change in step data is not necessarily a change in PA behaviour; the limitations of step data analysis are provided in Chapter 7. Nevertheless, a change in steps is very likely to be a result of a change in PA behaviour and is, as such, considered as relevant. This is the first available evidence demonstrating that team-based pedometer interventions are an effective means of increasing PA levels in the Pacific context of urban Ni-Vanuatu civil servants.

Baseline steps were higher in this study conducted with urban women in Vanuatu ( $M=9,200 \pm 3,783$ ) than those found in women in a Western country (USA) ( $M=5,210 \pm 3,518$ ).<sup>424</sup> Furthermore, almost half the population studied was classified as active prior to the intervention. This high baseline step count is assumed to be related to walking, which is a common mode of transport for many Pacific people. Where finances are limited, and bus and taxi fares are high, walking provides a cost-effective alternative in moving to and from places. In addition, some participants' occupations involved varying degrees of activity (for example cleaning and domestic jobs) which logically results in higher step counts. The step data outcomes are important findings, indicating that PA behaviour needs to be studied in greater detail in PICs, in order to effectively tailor health promotion programmes.

There were however some participants with considerably lower baseline step counts. Based on personal observation I noted that individuals with a higher socio-economic status (SES) (higher job ranks) often accumulated fewer steps over the day than those individuals with a low SES. This is directly related to the observed increased use of, and reliance on, motorised vehicles in higher SES individuals. Interestingly, this finding is inconsistent with that of Western countries where low SES is associated with lower PA levels.<sup>103</sup> It is important to note though, that this finding is not reflected by domain specific PA prevalence. Lee et al.<sup>425</sup> suggest that although women from a low socio-economic status (in the U.S.) undertake less moderate- or vigorous intensity PA, they show a greater overall energy expenditure which may be due to high work or travel demands. This is in line with the observations from this study. More domain specific PA research is suggested for more detailed information and more targeted health programmes.

A subgroup analysis investigating PA differences in SES could also reveal more detail in this regard and is recommended for future research in order to tailor health promotion efforts: I now assume that individuals from higher SES may benefit most from interventions that focus on PA increases, whilst individuals from lower SES may benefit most from interventions that aid in dietary behaviour changes.

Cross-national comparisons may also be useful in uncovering differences in PA levels among nations. From field experience in different PICs I learnt that Melanesian adults are generally more prone to walking than Polynesian adults in the urban centres. Often, motorcycles are available in Polynesia, making motorised transport more affordable. In Tuvalu it seems like the use of motorcycles has fully replaced bipedian activity and any distance, whether short or long, is travelled by motorcycle. These comparisons highlight once more that there is no “one size fits all” solution for the Pacific NCD crisis.

It is of utmost importance that the high baseline step counts encountered in this Melanesian context do not discourage future research and health promotion efforts, as it is only continuous research and promotion of PA that will aid in the maintenance of these levels. In addition, with the expansion of contemporary environments and the overall move towards towns, PA levels will inevitably decrease, resulting in higher NCD risk factors, slowly attaining the appalling NCD risk factor proportions experienced in some Polynesian PICs. To ensure the best possible health efforts are provided in the Pacific it is essential to know how to avoid the NCD risk factors that are emerging in these countries.

Individuals with high baseline PA levels were not excluded from the intervention for several reasons. Firstly, an exclusion of individuals in this communal context raises ethical concerns. Further, anyone can benefit from additional PA. An important component of the intervention was the distribution of health information to the families and wider communities (e.g. Church). Therefore, all female civil servants who expressed interest in joining the programme were included, independent of baseline step count.

A reason for the success of *Wokabaot Jalens* is likely due to the intervention being integrated into, and utilised with an existing cultural structure. Prior to the intervention, the Vanuatu Government had a healthy workplace programme in place and was supportive in encouraging healthy lifestyle behaviour. The workplace culture capitalised on the additional more targeted intervention.

Inferential statistical analysis indicates that the intervention was effective for both healthy individuals with low-NCD risk (i.e. keeping them healthy) and in reducing NCD risk factors in

high risk individuals. Whilst these findings are indicative in nature (uncontrolled), this is a meaningful contribution for NCD prevention research in the PICs. Understanding and utilisation of this finding has the potential to a) avert future NCD risk factor increases and b) reduce NCD risk factors. Programme roll out to larger communities may prove most beneficial. A controlled study is recommended to understand programme effectiveness in greater detail.

Overall, few pedometer-based workplace PA process evaluations are available, particularly from LMICs. This thesis contributes to the body of knowledge in responding to the paucity of process evaluations in PA intervention research. Through Chapter 6 it is now understood that likert scale techniques reveal little meaningful information in the context of urban Ni-Vanuatu women. It is assumed that the use of likert scales in other Pacific contexts reveals similarly little information and a deeper investigation is recommended. This is due to almost all participants rating most of the programme elements highly which may be related to Pacific people being frequently inclined to assent with external ideas. Open-ended questions provide more significant insights and revealed, for example, a more substantial change in eating habits than in self-reported PA behaviour. Chapter 6 further presents a novel technique of displaying complex data. This technique is meant to aid local health professionals in communicating data in a simple and locally attractive way. I present a new approach of displaying qualitative data in the field of health promotion.

Chapter 8 presents an overview of contextual differences in PA health promotion practice. Barriers and facilitators that are likely to occur in Pacific Island regions and Western contexts are presented and discussed in detail. Thematic findings are presented and categorised into individual, cultural and external influences. A major barrier was found to be the sustainability of health promotion programmes. Staff turnover and the loss of key supporters hindered long-term programme success in the *Wokabaot Jalens*. The experience further showed that capacity building does not suffice to generate sustained programme success. Instead, both the donor and, in this case, the Vanuatu Government must ultimately commit to long-term intentions prior to programme commencement. Additional barriers and facilitators for Pacific PA health promotion practice were highlighted. For example, cultural issues were found to pose notable challenges to programme success and community involvement is of utmost importance during the design, implementation and evaluation phases. The presentation of this reflective praxis has the potential to aid future practitioners and/or researchers in programme design and management as well as enhance collaboration with local personnel and authorities.

This thesis provides an essential piece of an effective solution for PA health promotion action in the Pacific. The remaining pieces are most likely to be found within the cultural structures

themselves. The assumption that Western approaches may enhance population health in culturally diverse systems that were efficient prior to contact with the outside world, is questionable. Contrary, researchers and practitioners are advised to search for solutions that are rooted in the current Pacific systems themselves.

### **Is there a way out of the Pacific health crisis?**

On reviewing the experiences and knowledge gained from this research, it is difficult for me to complete this project with a sense of delight and achievement. Whilst the presented findings provide sound evidence for effective health promotion initiatives for the future, it remains debatable as to whether the overarching theme of generating sustained health change in PICs is feasible in principle.

After an extensive examination as to the causes of the Pacific NCD crisis, I am less optimistic now than I was prior to the research journey. In fact, there is no one solution that can help PICs to re-achieve the health status they possessed prior to European contact. The following section describes key determinants that limit Pacific health progress, as well as some potential novel pathways for future Pacific public health action. It is important to understand that traditional Pacific island economic and social systems were largely well-functioning until European colonisation took place.<sup>157</sup> The contact with Europeans has largely aggravated their economic, social and health situation. I conclude that only culturally-centred health approaches that stem from within the Pacific system are feasible to generate a sustained change. The following section draws attention to some areas (e.g. food supply, external aid, health systems) in which the Western world may have negatively had an impact on PIC structure and development.

#### **Pacific commitment**

Pacific commitment to reverse the NCD crisis is clear. Important political steps have been taken in the region to reduce NCD prevalence, including the Yanuca Island Declaration,<sup>426</sup> the implementation of the STEPwise approach to surveillance (STEPS)<sup>xxvi79</sup> and the Tonga Commitment in 2003.<sup>191</sup> The Yanuca Island Declaration, adopted at the Conference of the Ministers of Health of the Pacific Islands, embraced the concept of “healthy islands” as early as 1995. Health and well-being have been placed at the centre of national development plans with the declaration committed to enhancing the well-being of Pacific people. The WHO STEPwise approach to surveillance (STEPS) was initiated in 2002 when Fiji and the Federated States of Micronesia first conducted national STEPS surveys to collect NCD risk data.<sup>10,80</sup> Political

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<sup>xxvi</sup> STEPS survey: The WHO STEPwise approach to Surveillance (STEPS) is a simple, standardised method for collecting, analysing and disseminating data in WHO member countries.<sup>79</sup>

commitment to work against the continuing escalation of NCDs has also increased considerably since the Tonga Commitment to Promote Healthy Lifestyles in 2003, with a plethora of regional and local policies, plans, declarations and strategies having been developed since. Between 2008 and 2010, political commitment to NCD activities was particularly high. During this time, annual Pacific NCD meetings were introduced; twelve new national NCD plans were set up; 18 major contracts of up to AUD 500,000 were made with SPC for both the implementation of national NCD plans and for building capacity; twelve health professionals were appointed as national NCD coordinators; 78 small grants to 18 PICs were provided for community NCD projects; ten country interventions were implemented; eleven national, multisectoral NCD committees were formed and in four countries modifications to food taxation, progress towards health promotion foundations and/or other funding mechanisms were made.<sup>427</sup> To date, 15 PICs have collected baseline population data through STEPS surveys<sup>79</sup> to profile their NCD risk factors and disease prevalence.

Despite these initiatives, progress in NCD prevention and control efforts, let alone reduction, is disappointingly slow.<sup>4</sup> Systematically generated evidence on 'Best Practice' is lacking. In almost all PICs serious attempts have been made to integrate NCD policies using a multisectoral approach, comprising government, civil society and the private sector as suggested by the WHO.<sup>24,289</sup> Rarely, however, have they been translated into positive fiscal support for preventive NCD activities, instead being invested into tertiary care.<sup>55</sup> It seems like a déjà vu from 1986 when, 26 years ago, the Ottawa Charter for Health Promotion defined five action areas for health promotion: 1) building healthy public policy, 2) creating supportive environments, 3) strengthening community action, 4) developing personal skills and 5) re-orientating health care services toward prevention of illness and promotion of health.<sup>93</sup> Yet today, these five action areas continue to be the primary areas that have not been addressed sufficiently and require immediate action in the Pacific region and beyond.

### **Food supply**

Diet-related NCDs have been identified as the single greatest cause of death in the region<sup>428</sup> and an alteration of the Pacific food supply system is needed to reverse current trends and prevent further deterioration. The feasibility of this approach, however, is questionable. An investigation into the intricacies of food provision to PICs is provided below. It is essential that the complexities of these food supply systems be understood in order to inform NCD policy research and generate change.

Over the past few decades rapid changes in the food supply system have taken place to such an extent that many PICs are barely in control of their own food sources. Whilst the change in food

supply is a global phenomenon, the impact seems strongest in the PICs: opportunities for agriculture are often limited due to land restriction, local capacity and limited resources; and rapid urbanisation processes generate a food demand that cannot be responded to.

A state of nutrition transition resulted since the introduction of new food items that were brought to the PICs by colonists and missionaries. The dietary change was largely characterised by the replacement of staple foods with refined cereals and white sugar, by the replacement of fresh fish with meat, by an increase in the consumption of sugar, oil, salt, and alcohol and by a decrease in the consumption of fruits and vegetables.<sup>65,73,74</sup> Nutrition transitions have been identified as a major contributor to the increase in NCD risk factors.<sup>74,147,428</sup>

Further, food security<sup>xxvii</sup> has been put under the control of foreign interests.<sup>4,430</sup> The “new colonialism” has been identified as one where “high-income countries design and use political and economic policies to control and expropriate low-income countries”.<sup>4</sup> Multinational food companies are the main reason for the worldwide shift from traditional, simple diets to highly processed foods that lack nutrients and are high in sugar, salt and saturated fats.<sup>431–433</sup>

Chapter 4 highlights underlying causes for the shift in food consumption patterns. The primary reason for this preference for imported food over local food lies in financial constraints, whereby imported processed food, such as white rice and white flour, is less expensive than local produce. Furthermore, the preparation of food has also been found to be of significance. Traditional food preparation often requires the use of firewood, which, while readily available in rural areas, is expensive to purchase in urban centres. This finding is highly significant in understanding contemporary dietary behaviour and in the search of effective solutions. A reduction in tariffs in energy supply (gas) might assist in the necessary return to the consumption of local foods.

During field work in remote and rural settings in Melanesia I was exposed to situations where villagers believed that white rice, sugar and salt were healthy options and beneficial to human health. After all the ‘white man’ had brought those food items to the islands. “Why would white man bring food that is not good for us?” they asked. This statement encapsulates the remarkably high value attributed to imported food in small island states. This experience is in line with the general perception that ‘all foreign goods and services are superior’, as suggested by Hughes.<sup>4</sup> Effective food awareness approaches and changes to food importation policies may generate change in this perception and understanding in the Pacific population as to their nutritional needs.

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<sup>xxvii</sup> Food security is defined as a state “when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life”.<sup>429</sup>

Food regulation can be a powerful instrument that can help change food composition, availability and accessibility, and aid in the process of food security.<sup>434</sup> Some research on Pacific food policy is available. Findings on taxing soft drinks found a lack of impact on effectiveness, and studies on the restriction of fatty meat supply indicate either weakly enforced policies or interferences with World Trade Organization (WTO) agreements.<sup>435</sup> In 2002, the Samoan Minister of Health highlighted the intricacy of food policy interventions, underlining the need to ban fatty mutton flaps and turkey tails, "but the government is looking at joining the World Trade Organization ... so if we banned these products, it will interfere with policies of WTO".<sup>436</sup> Hughes and Lawrence describe in detail the challenges of Pacific food regulatory systems and food policy making on the example of WTO membership. Currently, six of the 22 PICs are WTO members (Fiji, Papua New Guinea, Samoa, Solomon Islands, Tonga, Vanuatu)<sup>437</sup> Whilst not being a WTO member allows countries to be more flexible in food regulations, non-members may be at greater risk of suffering restricted access to development aid if trade restrictive behaviours are implemented, as suggested by Hughes.<sup>4</sup> Apart from these intricacies with WTO membership, several trade agreements of PICs are in existence (e.g. the Cotonou Agreement which is a treaty between the European Union and the Africa, Caribbean and Pacific Group of States (ACP)). A deeper investigation of these will aid in the process of understanding Pacific food security issues further.

Although many PICs have invested in the development and implementation of National Plans of Action on Nutrition, and attended regional meetings to advance food security and health protection,<sup>159</sup> food security is declining whilst nutrition-related NCD risk factors are rising.<sup>147,420,438</sup> Hughes and Lawrence suggested three groupings of regulatory approaches to help alleviate the negative health impacts of global food trade on local food supplies and dietary consumption patterns: These regulatory approaches include 1) restrictions on the supply of certain foods; 2) pricing controls on foods and 3) food labelling requirements.<sup>4</sup> Whilst these suggestions seem reasonable, there are challenges for PICs to implement such regulatory approaches. These include, for example, a lack of capacity to collect, analyse and interpret scientific data; meeting technical and financial demands required to administer and enforce regulatory approaches, and being able to fully participate in the international policy-making process.<sup>4</sup>

Findings from Chapter 4 indicate that two of the three suggested food regulatory approaches seem necessary on a micro-scale system in the PICs. Whilst the restriction of certain food was requested as a means of changing lifestyle behaviour at the workplace, food prices were cited as a major barrier for the purchase of local food. The study did not, however, identify a need for food labelling processes. On the contrary, it was clear that urban female civil servants are



capable of distinguishing between healthy and unhealthy food without further instruction. The simple promotion of local food over imported food aids in this process and may make costly food labelling processes redundant.

Solutions to enhance the Pacific food system are scarce, if not absent. Economic reforms that involve a ban on unhealthy imported foods (in particular mutton flaps and turkey tails), increased tariffs on unhealthy imported food, reduced tariffs on healthy imported foods, and the development of sustainable indigenous fisheries and farming, may provide some Pacific populations with a consistent supply of healthier traditional foods.<sup>357</sup> Problems with local agriculture production, however, add challenges to the situation, as explained by Temo Waqanivalu.<sup>439</sup> The stagnation of agricultural productivity is a severe challenge for existing farming systems to produce enough food to meet the needs of the growing population.<sup>159</sup> This is a direct consequence of the rapid and unplanned urbanisation that has taken place. I experienced the shortage of fresh food produce firsthand in 2011, whereby the purchase of locally grown fruits and vegetables was rationed in Tuvalu, with a limitation of no more than two papayas per capita per week.<sup>241</sup> Whilst this case in Tuvalu presents an extreme scenario (experienced in Polynesia) it underpins the potential future burden that could arise if unplanned urbanisation continues to expand in other PICs and if extra initiatives for local agriculture production are not adopted.

It is clear that a functional local agricultural sector is essential for food security in the Pacific. It would “mean more jobs, more income and more food for the poor”, as noted by Vili Fuavao, FAO Subregional Representative for the Pacific Islands.<sup>440</sup> A focus on local agriculture production may generate substantial changes, but it must be borne in mind that fertile soil, a key requirement, is not available everywhere. Natural disasters, such as cyclones, may further largely impede local agricultural production, as noted by Thow.<sup>74</sup>

Another reason for limited agriculture production lies in the geography of very remote Pacific Islands. Local food production is increasingly challenged by environmental factors such as infertile soils and raising sea levels as well as rapid population growth. In urban Tuvalu, for example, only 17.6% of total household food consumption is of local produce, with the remaining 82.4% brought in from overseas.<sup>441</sup> Imported products are typically food with little nutritional value, such as white rice, white flour, tinned meat and tinned fish, salt, oil and sugar.<sup>56</sup> Only food policy regulations can enhance the quality of these small island populations’ food availability.

Policy and legislation is thought to aid in the fight against NCDs in the region.<sup>442</sup> This thesis found there is a need for country specific policy approaches that address the needs of the

different Pacific populations. Whilst an emphasis on food importation regulations is essential for improving the local diet in Tuvalu, a different approach, focusing on reducing tariffs on energy supply (i.e. gas), may increase local food consumption in Vanuatu. From this I have concluded that there is no “one size fits all” solution that would aid in the process of enhancing Pacific food supply.

To conclude, a number of factors impede food security in the Pacific. Of particular importance are national food regulation processes; local agricultural production which a) has stagnated in some PICs and b) cannot respond to national demand due to population growth; island atolls with infertile soils (e.g. Kiribati, Marshall Islands, Tuvalu) that limit the production of local produce and food items provided by global food companies which are often high in energy and salt and low in essential nutrients.

### **External aid**

In 2012, the WHO and SPC advocated more investment in surveillance and evaluation approaches to combat the NCD emergency. In fact a Pacific Crisis Response Package (CRP) was suggested as the next step to counteract the Pacific health crisis. As part of the CRP, PICs are asked to prioritise “Best Buy” interventions and surveillance components necessary to reduce the NCD burden in their respective country<sup>129</sup> with these initiatives then forming the base for further external support. The approach taken requires cautious consideration. Whilst on-going support from regional partners might prove effective in the short-run, sustained changes are unlikely. Health projects funded by external partners have demonstrated little success in terms of sustainability. In fact, the reliance on foreign aid has been identified as a contributing factor of ill-health.<sup>4</sup>

Given the size of their economies and populations some PICs receive some of the largest external aid budgets in the world.<sup>208,443</sup> Between 2002 and 2009, external funding for NCDs in the Pacific totalled US\$ 32,910,778.<sup>208</sup> Aid, however, is not a solution to tackling development issues of PICs. In fact, aid has resulted in government structures that are unsustainable given PIC resources. Several attempts have been made to reduce the PICs aid dependence; however, little progress has been made. Whilst the concept of “Aid for Trade” was suggested to accelerate economic development,<sup>444</sup> this concept is strongly impacted by the traditional socio-cultural attitudes to land, and if these cultural values remain unchanged the region will struggle in “freeing itself from the clutches of aid dependence”.<sup>445</sup> The negative impacts of foreign aid have been studied. Hughes announced it has ‘not only failed to foster development’, but has contributed to ‘the regions slide into chaos’ and suggested to suspend aid flow in order to assist

Pacific economies to reform, highlighting that “development can only be overcome by the Pacific societies themselves”.<sup>444</sup>

For externally funded health programmes to be systematically run, a gradual development process may prove more successful. Clearly, capacity building for local key personnel and health experts is essential. An adaption of the Sport-for-Development (S4D) Framework, a holistic management tool suggested by Schulenkorf, may help in the design of effective solutions. The S4D Framework is divided into the three interrelated areas of management, impact and outcomes which aim to create change in communities.<sup>446</sup> In utilising this approach for health programme management it is suggested that regional partners (e.g. WHO, SPC) initially aid in the budgeting, management, organising and implementation of an intervention, but reduce their influence and financial support over time, aiming to generate an effective intervention that is independent and locally run.

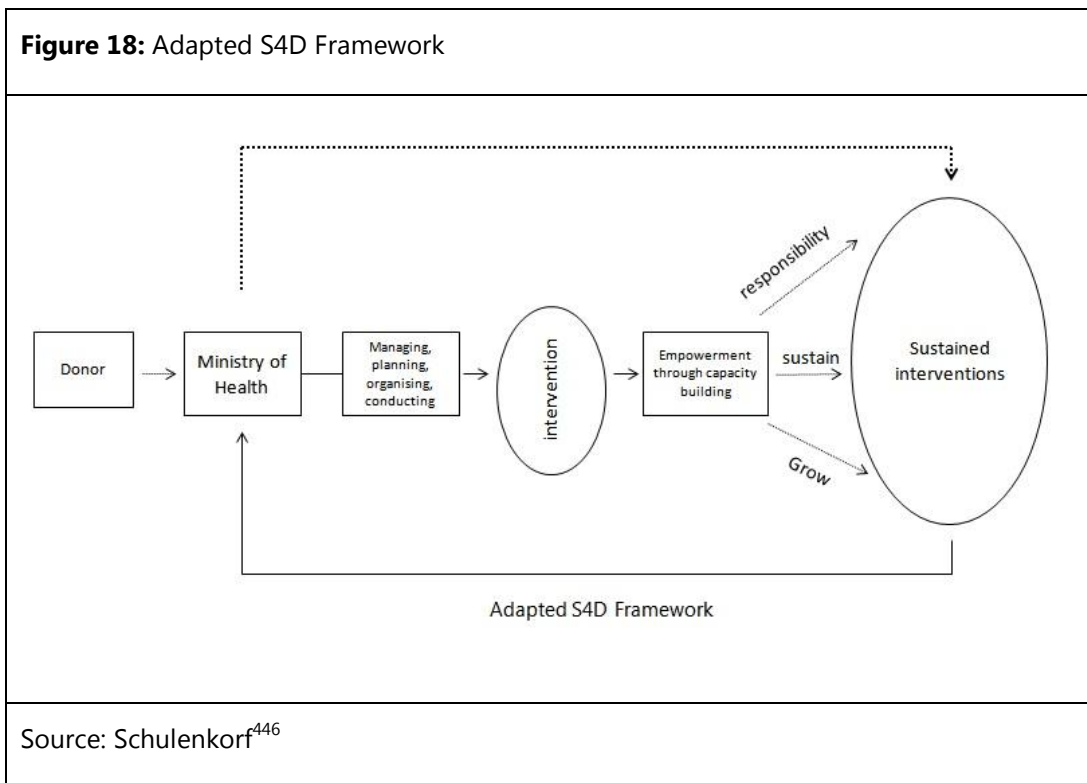


Figure 18 suggests an adapted version of the S4D Framework. The dotted line refers to a strategic planning process from the beginning of a project by the Ministry of Health, whilst the continuous lines refer to feedback from the donor to the Ministry. To realise sustainable health change local key personnel need to be empowered by receiving an increased amount of responsibility over time. This means, rather than only providing the funds, tangible capacity building is needed. Once the key health decision makers are empowered, regional partners reduce their influence and financial support, aiming to sustaining the intervention.

### Health system

In understanding why Pacific health progress is often limited one must look towards the underlying health system. PICs frequently experience weak health systems for varying reasons which include inefficient management, lack of human resources of sufficient quality and quantity, inaccessibility to appropriate technologies and inadequate information for decision making.<sup>127</sup> It is important to bear in mind that Pacific public health laws were largely imported by British colonists. Laws were originally “drafted to address the health challenges and facilitate the accepted approach to communicable disease in Britain in the 19<sup>th</sup> and early 20<sup>th</sup> century”.<sup>128</sup> As such, public health laws are not culturally rooted.

The provision of health services to a population that is scattered over many islands poses additional challenges. The logistical problems of ensuring reliable and good quality primary health care on remote islands are compounded by infrequent transport opportunities (up to the

extent that fuel for motor boats to reach the next larger island cannot be afforded), costly communication and high operational cost.<sup>127</sup> While located in a remote island in southern Vanuatu, I observed the impossibility of evacuating and treating patients due to a shortage of funding for transport. Furthermore, whilst remote dispensaries are often equipped with NCD testing supplies (e.g. glucose, cholesterol strips) frequently these are found to be expired. The reason for this stems from local health staff being unfamiliar with the tools. The reluctance towards using supplies and the preference to wait for more knowledgeable health staff from larger islands to visit limits local capacity. As a result, advanced diabetes cases were found in remote villages.

Chronic underfunding largely contributes to the health challenge. Some PICs spend less than 5% of gross domestic product (GDP) on health.<sup>88</sup> Given that GDP is already low, the amount spent on health is considerably little. Many health systems depend on donors' funding for public health functions and for human resource development.<sup>127</sup> Globally, it is estimated that less than 3% of total donor funding goes to addressing NCDs.<sup>447</sup> In 2005, NCD funding from the four largest health donors was estimated at \$3 per death annually, compared to \$1,030 for HIV/AIDS.<sup>448</sup> Global spending on NCDs is decreasing. Whilst the WHO's investment on global NCDs peaked in 2002 at \$64.5 million, it dropped to \$43.7 million in 2009.<sup>449</sup> Of the little funds made available in PICs to deal with the burden of NCDs, most is invested in tertiary care, rather than in preventive efforts.<sup>55</sup> For example, 60% of health budgets in some PICs was allocated to tertiary care that was sought abroad.<sup>208</sup> The Yanuca Island declaration adopted by the Ministers of Health of the Pacific Islands, recognised the urgent need for training human resources for health in order to address the health needs of Pacific people in PICs.<sup>426</sup> Until today, a shortage of well-trained and capable health professionals in PICs continues to impede the advancement of Pacific health, particularly when the majority of the few trained Pacific health professionals tend to migrate overseas.<sup>88,450</sup>

A new health system approach embedded into the specific culture of PICs may prove more effective. I doubt that the implementation of "Western" health systems is an appropriate option. In Vanuatu, for example, basic health care is extremely limited with a total of only 29 physicians in 2010 representing 0.1 physicians per 1,000 individuals.<sup>451</sup> This situation is aggravated further by the fact that the population of Vanuatu is spread out over an archipelago of 82 islands. As a consequence it is much more difficult to provide cost-effective health services to the outer islands. In many places of the country basic medical care simply does not exist. A deeper anthropologic investigation may provide the information necessary for the design of a culturally-rooted health system.

## **Policies**

Research on global health policy identified effective health interventions that reduce NCD risk.<sup>139</sup> Beaglehole et al. proposed a focus on population-wide, rather than targeted interventions, because a larger proportion of the population can be reached, the costs are generally low, it does not require the strengthening of the health system while individuals already exposed to high NCD risks would likewise benefit.<sup>139</sup> This approach appears to be of particular relevance to PICs where limited funding hinders the implementation of more targeted interventions. However, not only are health sectors frequently underfunded, but are affected greatly by the stability of a nation's government. Consequently, where PICs are politically unstable<sup>452</sup> it is questionable as to whether sustained government action can be pursued. Clearly, political instability challenges sustained government action and political leaders might be inclined to pursue short-term outcomes, i.e. investments in treatment programmes might be more attractive than investments in population-health strategies to improve long-term-health outcomes.<sup>413</sup> To present an example from my own field experience, a unique PA policy was in place in the Vanuatu Government from 2007-2011. Upon a change in government this policy was lifted, leaving trained and highly motivated local staff behind. Whilst health policy has been identified to have lasting effects on global population health, it is debatable, whether similar effects can be attained with unstable or underfunded governments. Howse<sup>128</sup> correctly calls for laws that are better suited to the Pacific environment. These could eventually aid in improved support for health policies, more sensitivity to cultures and customs and better management of public health risks.

## **A need for culturally specific approaches**

The potential lack of progress from previous health promotion efforts may be due to the absence of specific solutions. At a micro-scale, this thesis presents a culturally-meaningful PA health programme, embedded into both a supportive environment (workplace) and the Pacific culture. Effective means of increasing urban Ni-Vanuatu female civil servants' PA levels and reducing NCD risk were defined and improvements in health indicators were achieved. Importantly, the intervention included the promotion of traditional lifestyle behaviour (i.e. a move away from imported food and the promotion of walking as a mode of transport). Findings suggest these strategies were beneficial to keeping low NCD risk individuals healthy and to reducing NCD risk factors in high risk individuals. If these findings can be applied to a macro-scale, substantial change is more feasible. To achieve this, however, will require local capacity building and sustained commitment - the most challenging aspect of all.

One pertinent aspect that remains to be discussed and unanswered is whether NCD initiatives and programmes should focus on Pacific adults or on children only. On one side there are some experts in the field who have moved away from NCD prevention in Pacific adults arguing that a) it is too difficult to create lifestyle change in the adult population and b) that NCD rates have escalated in a way that preventive measures are not feasible. These experts also suggest that children are more easily reached through setting approaches (schools); that they are environmentally more dependent (and easier influenced) and that there is a societal need to protect and support children. On the other side, there are those experts who point towards the important fact that the bond of Pacific children to their parents differs significantly to Western parents-children relationships and a focus on only children would not prove effective due to strong authoritative relationships within the families.<sup>186</sup> A targeted family focus might be part of the pending solution.

### **The Pacific in Crisis**

The big question is still whether the Pacific NCD burden can ever be brought under control. A considerable amount of political effort has been invested in regional and local policies, plans, declarations, statements and strategies in the past decades, yet no clear progress has been felt on population health. In fact, the burden has worsened. Boyd Swinburn, Professor of Population Nutrition & Global Health at Auckland University, New Zealand, and Director of the World Health Organization Collaborating Centre for Obesity Prevention at Deakin University, has focused on effective solutions for reducing obesity in PICs. Whilst Swinburn found evidence that community capacity can produce reductions in overweight and obese Australians, these approaches did not prove effective in Fiji and Tonga. Swinburn believes that additional approaches are needed to achieve the same level of success for obesity prevention in PICs. As the Pacific NCD crisis escalates, he now believes that health promotion strategies need to be embedded into existing structures in order to become part of the culture. After a five-year project to obesity levels in the Pacific (one which worked well in Australia but was less effective in Fiji, Tonga and in the Pacific streams in South Auckland), Swinburn acknowledged that successful health promotion needs to address socio-cultural barriers. In fact, he suggested that the Pacific region will be one of the last regions to reduce obesity levels, not only because of the very high prevalence rates, but also because of socio-cultural barriers that hinder population-wide efforts. Swinburn indicates that while capacity is a limitation, cultural norms have a much stronger impact on the health situation. "We have to build on cultural strengths [...] we can get significant change if it comes from the top – Churches tend to be the most important custodian". If a shift in cultural norms is the solution for the Pacific NCD crisis, spiritual leaders in

the region are now asked to act as a vehicle for change. (B. Swinburn, in a conversation, 27 July 2012).



## **Strengths and Limitations**

As with any field-based intervention health promotion work there are cautions one might make before drawing conclusions. As such it is important to acknowledge this thesis' strengths and limitations. The following section is aimed at identifying and discussing these in detail.

### **Strengths**

First and foremost the intervention study demonstrates that behaviour change is possible in this particular context. This finding is crucially relevant for future PA health promotion efforts. Importantly, behaviour change has not only occurred in individuals that were already largely active prior to the intervention, but a particular effect on PA behaviour was detected in high-risk individuals who needed the behaviour change most. This finding contributes to the body of knowledge in that it underlines the potential of reducing NCD risk through cost-effective pedometer-based PA programmes.

Further, findings indicate that PA as a modifiable risk factor can be used to reduce NCD risk in Ni-Vanuatu female civil servants. This is an important finding and provides the first evidence from the region that PA health promotion not only increases PA levels, but also reduces NCD risk. In a region where NCD rates are escalating, this finding is essential and can build the first step for a stronger and bigger evidence-based Pacific health promotion picture.

Another strength of this thesis is the provision of evidence that socially supportive environments can stimulate behaviour change action in this particular context. The team-approach of the intervention study and the embedding into the existing workplace structure aided in maximising social support mechanisms. The success is likely to be related to the value the culture places on communal activities and I strongly suggest including this approach in future Pacific health programme design. Notably, the use of pedometers in the intervention study was only one small element of the programme. The use of teams in this context added value and contributed to the success of the intervention. The provision of pedometers alone does usually not lead to desired effects. It is the social component, the systematic programme approach that makes pedometer-based PA programmes successful.

## **Limitations**

Due to the intervention's explorative pre-experimental design, several limitations were identified and it is not possible to make definitive causal inferences about the effects of the intervention.

The objective of programme evaluation, as described in Chapter 2, is to understand whether the intervention produced the results that were expected. For maximum evaluation outcome, several steps need to be taken. For example, alternative explanations for the results must be excluded.<sup>305</sup> The intervention that was conducted and is presented in this thesis is limited in that alternative explanations for the results cannot be fully excluded, due to the lack of a randomised trial and the uncontrolled pre/post measurement study design.

For reasons of practicality and access, no randomised-control trial was included in the presented studies. As highlighted previously, the Vanuatu Government provided access to a large at-risk population. The existing infrastructure aided in reaching out to more than 200 individuals. Only through the use of the workplace setting was it possible to include email communication in programme design – an essential element of the programme. For these reasons, the application of a randomised control trial was not feasible and limits the external validity of the study. However, findings do give an indication that the intervention can increase PA levels in urban Ni-Vanuatu women.

The lack of a control group limits the internal validity of the intervention study. The exclusion of a control group was considered in-depth during the study design. Since the cultural context is largely marked by communal activities and defines everyday behaviour, both at work and at home, I did not find a cultural-acceptable approach of separating female civil servants into two groups, risking that close friends and/or colleagues would be negatively impacted by this separation. Moreover, I did not find it ethically acceptable to withhold the potential positive health effects of the intervention from some individuals. For that reason, a control group was not considered to be essential for this study design. The lack of the control group, however, makes causal inferences about the intervention's effect less lucid. It is unclear, whether the increase in PA levels is related to the intervention or whether other external factors (e.g. a general desire to walk more due to TV or radio announcements) contributed to the increase in PA levels. A practical approach would have been a wait-list control study, but given the resources and timeframe of this thesis a wait-list control was not feasible.

Using pedometers to measure PA levels can be put into question. Whilst pedometers have been found to be relatively reliable in step data provision, errors have been reported at slower

walking speed and at a BMI above 30.<sup>278</sup> Moreover, they do not measure PA behaviour while swimming or other water-based activities. They further provide no information regarding intensity, frequency and duration of PA, hence it is difficult to draw conclusion on overall PA change. However, for reasons of practicality, I decided to use pedometers as a tool to measure PA levels for the following reasons: Firstly, funding options limited study design and it was not realistic to use accelerometers to measure PA behaviour. Secondly, swimming and other water-based sport activities are extremely rare in this cultural context. Walking had been identified to be the most common mode of exercise in this target group. Since pedometers measure step data, their use seemed reasonable. Further, pedometers are simple to use devices that not only measure step data, but can also serve as a motivational tool to increase PA levels. Whilst no conclusion regarding intensity, frequency and duration of PA levels can be drawn, pedometers provide an approximate number of step data.

For future research-based interventions, where funding does not limit study design, accelerometers may provide crucial additional information. Given the cultural context, however, and the strong preference towards walking as a mode of exercise, I consider the use of pedometers to understand PA behaviour as relevant.

Overall, the intervention research may have led to different results if it was carried out by a local Ni-Vanuatu female individual. These limitations and challenges were addressed to the best of the researcher's knowledge, as explained in Chapter 2.

More detailed limitations that relate to the specific chapters are now provided:

Study 1 was partly carried out via telephone conversation and emails. Since these communication approaches are often less effective than face-to-face communication in the region, respondents may have been reluctant to provide information and some information may have been held back.

Study 2 was limited due to a relatively short time-frame for gathering information. Further, findings could have been better validated if focus groups involved larger numbers of participants. However, the researcher has attempted to provide significant detail to this study through the in-depth research approach applied. In the future, pre-existing personal relationships with respondents and communities may allow cultural understanding to be maximised which may help uncover additional details that currently remain unknown. Furthermore, a truly anthropological and ethnographic approach to researching healthy lifestyles in Vanuatu could make a valuable contribution to this interpretive study. The recruitment of local support for undertaking the interviews and analysis could have added

important value to the study to allow for a deeper level of engagement in the process. Due to the sensitive nature of the study, i.e. requesting information from women only on their individual lifestyle behaviour, it was considered appropriate to conduct focus group by a female individual. Whilst local support was available, the potential individual was male. A male individual to conduct the focus groups was not considered to add value in this particular context. In future studies, I suggest the involvement of external female individuals (e.g. from an NGO) if internal staff is not available. As such, a deeper level of engagement may add further value to the study. Where necessary, focus groups can then be conducted in individually preferred language(s).

Study 3 suffers social desirability bias which refers to the tendency of respondents to answer questions in a manner that will be viewed favourably by the researcher. To minimise social desirability bias, questionnaires were handed out anonymously.

Study 3 suffers exclusion bias. Individuals who did not attend the follow-up health screening and who did not complete the programme were not included in the process evaluation for reasons of access and practicality. Further, pregnant individuals were excluded from data analysis. Men were excluded from this study in general and conclusions cannot be drawn for male individuals.

Whilst 207 individuals were recruited in Study 4, only 133 individuals provided follow-up data. Reasons for retention are unclear.

Reactivity bias does not play a significant role in Study 4. Participants wore the pedometer under un-sealed conditions and were able to regularly check on their current step count. The objective of the study was to increase PA levels, rather than understanding whether the effect of the study was related to the pedometer or to other factors. As such, I do not find reactivity bias as one that impacts findings.

The use of a case study approach in Study 4 enabled an in-depth analysis. The case study, however, limits generalising the findings to a wider context. Social and cultural differences are vast within PICs and further empirical research in different settings is needed to validate the effect of the intervention.

The objective of the intervention was to reach the largest possible number of female civil servants from Port Vila in order to allow maximum health benefits for all. Whilst the lack of a control group limits the internal validity, it is equally important to understand the uptake of health promotion activities. For further information, refer to the RE-AIM Framework.<sup>319</sup>

The statistical approach used in the outcome evaluation is based on inferential statistics that emphasise precision of estimation rather than testing the null hypothesis. Instead of using statistical significance and P-values to make inferences about true values of effects, this approach uses magnitude-based inferences based on probabilities.<sup>386</sup> Some of the findings from the sub-group analysis are unclear due to the small sample size of high-risk individuals. Percent changes are presented in order to indicate health changes that were experienced.

The statistical approach used is an unadjusted approach and limited as such. A more complex analysis using covariates could provide more precise estimates. This approach would equate baseline differences in a between groups comparison and it would reduce the likelihood of mediating variables being assumed as the reason for the difference. As my intervention is a pilot, quasi-experimental, single group design, I decided not to use these more complex models.

## Suggestions for future research

Despite my pessimistic stance that the Pacific NCD crisis is out of control, it is important to understand that many small steps may eventually add up to meaningful progress. This thesis presents an essential piece of evidence for lifestyle behaviour change on a micro-scale. Whilst this evidence does not suffice to tackle the NCD crisis, additional effective solutions may add to this first step resulting in many effective solutions. A regional political structure is needed that assembles Pacific health solutions and merges them into an evidence-based NCD prevention and control toolkit for the region. The Pacific Public Health Association (as suggested at the 4<sup>th</sup> Pacific NCD Forum in June 2012 to strengthen networking for NCD prevention and control and other public health causes) may be a first step for regional health advancements.<sup>129</sup> The suggested toolkit could be the entry point for making the Pacific an exemplary region for effective NCD prevention and control activities.

Future collaboration with the WHO has been formulated and will eventually lead to a regional *Best Practice tool for workplace NCD prevention* in the Pacific. The necessity to have evaluation mechanisms has been emphasised over the course of this work and I repeatedly underline that any future health promotion effort needs embedded evaluation mechanisms. Evaluation is the single best strategy for understanding the effectiveness of approaches taken and, accordingly, for tailoring programmes to best suit the target audiences.

Additional evidence-based solutions to tackle the Pacific NCD epidemic are needed. The following areas have been identified as potential research fields that may contribute to health improvements.

- Whilst the intervention presented in this thesis provides an estimate of effectiveness, the study design can be enhanced in maximising internal validity through a control group or through a cross-sectional study.
- Addressing health issues through the workplace setting is a promising way to initiate lifestyle behaviour change. This is even more important in LMICs where infrastructure is generally limited but provided by the workplace setting. The governments of the PICs are urged to investigate incentives that promote an uptake in more workplace health programmes. This may provide a good starting point for deeper academic investigation.
- Evaluating an intervention's impact on attitudes, beliefs and knowledge would provide important detail to the findings and is recommended for future studies.

- The need for interventions that are sustainable and that create long-term lifestyle changes is clear. Focussing on work productivity as an effect of a health promotion programme may be the most attractive approach to an employer for sustained programme support.
- The intervention discussed in this thesis was specifically designed for the needs of urban Pacific women. Strategies for the involvement of men may differ and need to be established for wider programme roll out. Meanwhile, an understanding of lifestyle behaviour of more traditionally living individuals in the outer islands may prove advantageous when promoting local lifestyle behaviour in urban centres. The collection on pedometry data from individuals residing in remote islands can be a first step in understanding Pacific behaviour in greater detail.
- More research is needed to advance the field of health promotion and NCD prevention to achieve success on a broader scale. Pacific health promotion research is in its infancy. More formative research is needed to investigate additional socio-cultural factors and to inform culturally-relevant opportunities for PA promotion.
- Multisectoral research is needed. Through the direct involvement of the municipality it may be feasible to provide a more attractive physical environment to the urban population which may affect PA behaviour. The instalment of street lights, the repair of potholes and other environmental factors may eventually result in increased PA uptake. The involvement of the Ministry of Agriculture may affect food policies and the involvement of the Ministry of Youth and Sport could provide more opportunities for PA.
- Finally, after in-depths analysis of the intricacies encountered in the region and after analysing socio cultural aspect in detail, I conclude that the involvement of faith-based institutions may be an appropriate approach to enhance population health. The Church may be used as a vehicle to shift cultural norms and therefore change perceptions and behaviour. As a first step, health promotion Churches in Tonga are underway.<sup>453</sup> Church-based Pacific health promotion has not been widely researched and further investigation of their health-enhancing effect is needed.

## Conclusion

This thesis presents the first rigorous approach of systematically evaluating PA health promotion practice in the Pacific region. Evidence of effective strategies that aim to reduce and control NCD risk is provided.

Following a deeper analysis of Pacific health intricacies, however, it seems that the reversal of the Pacific NCD crisis is hardly feasible in principle. Even if the identified new approaches became standard practice, they would not suffice for generating population health changes.

The intervention that is presented in this thesis was embedded into the social ecological model which is characterised by multiple levels of behaviour influences. I assume that this model is of particular relevance in a context where communal attributes and social networks are dominant. Given the scope of this work it was only possible to address a limited number of levels in depth whilst others were not addressed. For example, the Exo-, Meso- and Microsystem were addressed through social media, workplace management support and tailored PA enablers. It was impossible, however, to address more complex influences such as the physical ecology, societal values, urbanisation processes and biological factors. For a more comprehensive and sustained change on a broader scale, it is suggested to address more levels in more detail.

It is questionable, whether all levels can be addressed in the first instance. Clearly, it is impossible to change biological factors that may contribute to an NCD susceptibility. Changing urbanisation processes is likewise very difficult to achieve, if not impossible. The impact urbanisation processes had on many Pacific Islands has been mentioned earlier in this chapter. I doubt that these processes can be changed via a health promotion intervention.

A more comprehensive intervention can, however, address the physical ecology of the target audience in greater detail. The construction of safer footpaths free of potholes, the provision of recreational facilities (e.g. parks, exercise equipment) and the instalment of street lighting are just some suggestions that could aid in addressing more levels of the social ecological model in depths. For more comprehensive approaches, it is strongly recommended to directly involve multiple stakeholders (e.g. the Municipality, Ministry of Agriculture, the Department of Youth and Sport etc.), rather than collaborating only with the Ministry of Health. This would also be in line with the whole-of-government approach which has long been endorsed by major international health bodies, such as the World Health Organization.<sup>454</sup>

Several key determinants that limit Pacific health progress and their complexities have been described in detail. Each determinant presents an essential stream that contributes to the



aggravation of Pacific health. The food supply system, urbanisation, a limited health workforce, aid dependency and the assumption that Western approaches enhance health all contribute to Pacific ill-health. Solutions are largely unknown.

The Pacific context now requires culturally-centred health promotion approaches that address the cultural environment (i.e. attitudes and beliefs) in greater detail. Shared local leadership and action that understands no single intervention or profession is going to fix the NCD epidemic, is required. In essence, a stronger focus on the cultivation of leaders and champions is needed. Most importantly, *shared* leadership is essential. Neither a hierarchical nor an individual sector-based approach will prove effective, and what is required is leadership that identifies priorities which can be controlled and influenced to facilitate action. Leadership should not be a one-person focused approach. A different type of leadership is now required, one which is culturally centred and multi-sectoral. A leadership-driven and well-evaluated approach may result in favourable health changes, changes which are long overdue.

Clarke described PICs as living laboratories in which the results of social, economic, and environmental experiments are visible in ways that are not visible in larger land masses.<sup>455</sup> As such, if Pacific leaders manage to get the NCD crisis under control, the region could serve as a starting point for global public health advances.

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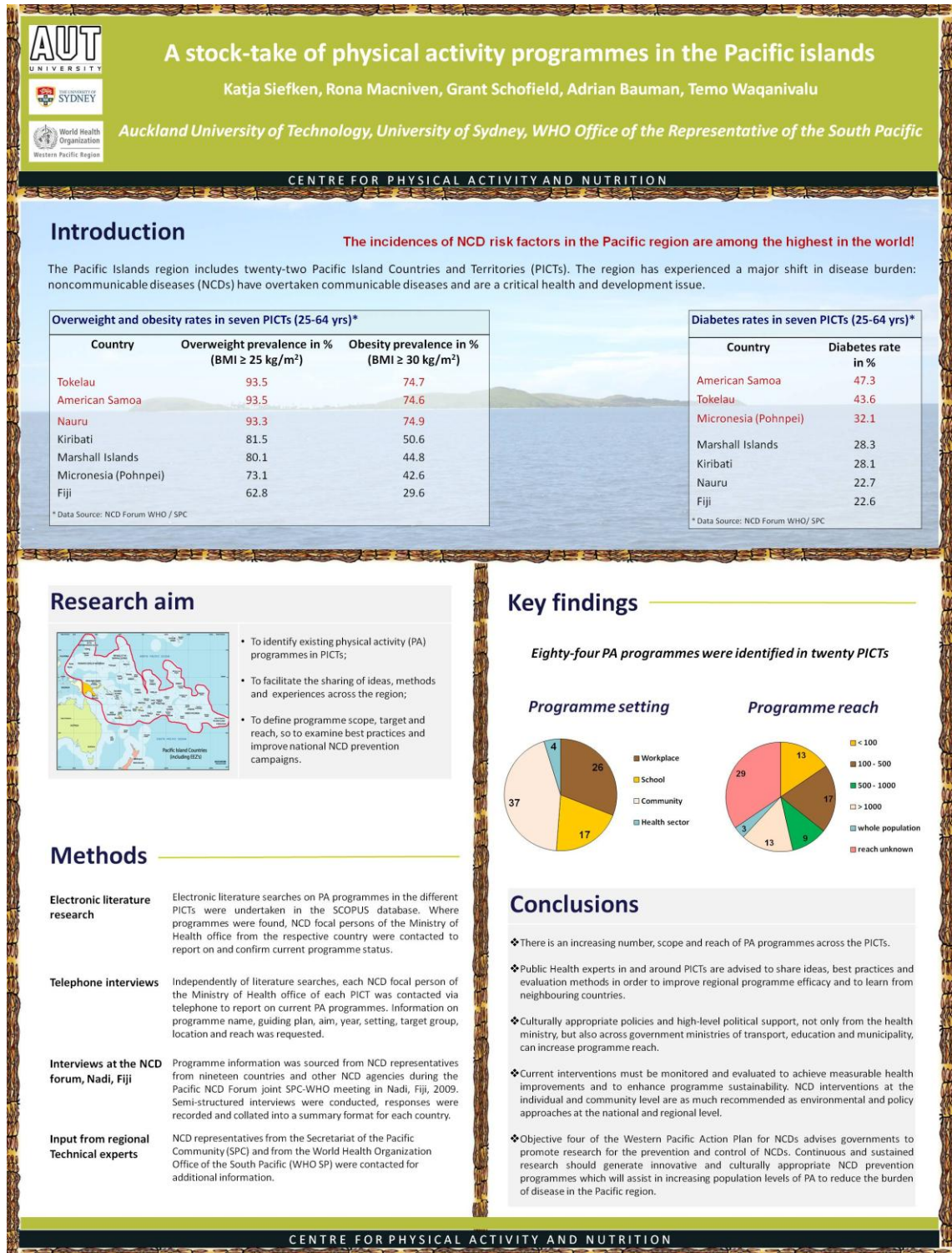
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## **APPENDICES**

## Appendix A: Poster presentation resulting from Study 1

Presented at the 3rd ICPAPH International Congress on Physical Activity and Public Health. May 2010, Toronto, Canada





## Appendix B: AUT University Ethics Committee approval for Study 2



### MEMORANDUM

#### Auckland University of Technology Ethics Committee (AUTEC)

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To: Grant Schofield  
From: **Madeline Banda** Executive Secretary, AUTEC  
Date: 3 November 2010  
Subject: Ethics Application Number 10/240 **Ni-Vanuatu civil servant input into a healthy lifestyle programme: formative work.**

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Dear Grant

Thank you for providing written evidence as requested. I am pleased to advise that it satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC) at their meeting on 11 October 2010 and that the Chair of AUTEC and I have approved your ethics application. This delegated approval is made in accordance with section 5.3.2.3 of AUTEC's *Applying for Ethics Approval: Guidelines and Procedures* and is subject to endorsement at AUTEC's meeting on 13 December 2010.

Your ethics application is approved for a period of three years until 3 November 2013.

I advise that as part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/research/research-ethics/ethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 3 November 2013;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/research/research-ethics/ethics>. This report is to be submitted either when the approval expires on 3 November 2013 or on completion of the project, whichever comes sooner;

It is a condition of approval that AUTEC is notified of any adverse events or if the research does not commence. AUTEC approval needs to be sought for any alteration to the research, including any

alteration of or addition to any documents that are provided to participants. You are reminded that, as applicant, you are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

Please note that AUTEK grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to make the arrangements necessary to obtain this. Also, if your research is undertaken within a jurisdiction outside New Zealand, you will need to make the arrangements necessary to meet the legal and ethical requirements that apply within that jurisdiction.

When communicating with us about this application, we ask that you use the application number and study title to enable us to provide you with prompt service. Should you have any further enquiries regarding this matter, you are welcome to contact Charles Grinter, Ethics Coordinator, by email at [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz) or by telephone on 921 9999 at extension 8860.

On behalf of the AUTEK and myself, I wish you success with your research and look forward to reading about it in your reports.

Yours sincerely



Madeline Banda

**Executive Secretary**

**Auckland University of Technology Ethics Committee**

Cc: Katja Siefken [katja.siefken@aut.ac.nz](mailto:katja.siefken@aut.ac.nz)

## Appendix C: Information sheet Study 2: Focus groups

Information sheet

November 2010

### Ni-Vanuatu civil servant input into a healthy lifestyle programme



My name is Katja Siefken and I would like to invite you to participate in my research study which forms part of my doctoral degree. I am studying at Auckland University of Technology (AUT) in Auckland, New Zealand.

The Ministry of Health oversees Vanuatu's government's healthy workplace programme "Walk for Life". We want to help develop this programme further, especially for women in the civil service. The study is funded and supported by the World Health Organization and the Ministry of Health Vanuatu. Aims of my research focus are to help develop this programme further, especially with regard to women working in the civil service.

I would like to talk to you about what kind of exercise ideas you see as valuable to you and also your views on some of the ideas we have come up with already. This would involve you taking part in group meetings with other women (also from your workplace) in two sessions about one week apart. Each session will take about one hour.

Your participation is voluntary and you may withdraw any information that you have provided for this project at any time. Withdrawing won't affect you in any way. The Vanuatu government will not see your name, nor will your name be attached to anything you say.

Please read this form and ask any questions you may have before signing the statement of consent. Answers to some of the questions you may have are provided below.

#### **What is the purpose of this research?**

The purpose of this study is to explore the perceptions and attitudes of ni-Vanuatatu women to healthy lifestyles especially physical activity (exercise) as well as how healthy lifestyles can be promoted.

The findings will also contribute to my doctoral research at AUT University (Auckland, New Zealand). As part of this process I will try to publish findings in a scientific journal.

#### **How was I identified and why am I being invited to participate in this research?**

Mr Jerry Iaruel from the Ministry of Health and the Walk for Life focal person from your Ministry have recommended me to invite you.

#### **What will happen in this research?**

I will sit down and talk to you and some colleagues together like in a group meeting. I will encourage you to voice your opinions about healthy eating and exercise that pertain to you. There are no right or wrong answers.

If there are any questions you don't want to answer that's fine, just say so.

I need to record what you and the rest of the group says so we have an accurate record of what everyone said and we can go back over this again later to more fully understand what you are saying.

There is no financial cost involved if you decide to participate in the study. Group meetings will be conducted during your workday on two days and your employer has agreed to allow the work time off. Each session will take approximately 60 minutes.

**Are there any risks to me?**

There are no risks involved in participating in this study. Just to say again that your name will not be associated with what you say and the audio files will only be available to me and my supervisor (Professor Grant Schofield).

**How will my privacy be protected?**

The records of this study will be kept private. In any report we publish, we will not include information that would make it possible to identify you in any way. Research records will be kept in a locked file and sorted by number codes, not by names; My supervisor, Professor Schofield and I, Katja Siefken, are the only people who will have access to the records. We will store data for 10 years and we will permanently destroy them afterwards.

**What opportunity do I have to consider this invitation?**

If you wish to participate in this study, please return the signed consent form to me by the day of the group meeting. Whether or not you participate will not affect your current or future relations with your employer.

If you do not wish to participate before or during the interviews that's fine.

**Will I receive feedback on the results of this research?**

If you wish to receive information on the final results of the study, please indicate so by ticking the appropriate box on the Consent Form. Again the results will not be associated with your name.

**What do I do if I have concerns about this study?**

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Professor Grant Schofield, grant.schofield@aut.ac.nz, +64 (0) 9921 9999 ext 9169.

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEK, Madeline Banda, madeline.banda@aut.ac.nz, +64 (0) 9921 9999 ext 8044.

**Researcher Contact Details:**

If you have any queries or wish to know more please do not hesitate to contact Katja Siefken

Katja Siefken

Doctoral Student

AUT University

Email: katja.siefken@aut.ac.nz

***Approved by the Auckland University of Technology Ethics Committee on 3rd of November, 2010 AUTEK***

***Reference number 10/240.***

## Appendix D: Consent form for Study 2: Focus groups

# Consent Form



*Project title:* Ni-Vanuatu civil servant input into a healthy lifestyle programme: formative work

*Project Supervisor:* **Grant Schofield**

*Researcher:* **Katja Siefken**

- I have read and understood the information provided about this research project in the Information Sheet dated 03.11.2010.
- I have had an opportunity to ask questions and to have them answered.
- I understand that identity of my fellow participants and our discussions in the focus group is confidential to the group and I agree to keep this information confidential.
- I understand that notes will be taken during the focus group and that it will also be audio-taped and transcribed.
- I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- If I withdraw, I understand that while it may not be possible to destroy all records of the focus group discussion of which I was part, the relevant information about myself including tapes and transcripts, or parts thereof, will not be used.
- I agree to take part in this research.
- I wish to receive a copy of the report from the research (please tick one): Yes  No

Participant's signature.....

Participant's name:.....

Participant's Contact Details (if appropriate):

.....

Date:

**Approved by the Auckland University of Technology Ethics Committee on 3rd of November, 2010 AUTEK Reference number 10/240.**

*Note: The Participant should retain a copy of this form.*

## Appendix E: Poster presentation resulting from Study 2

Presented at *Be Active 2012*, International Congress on Physical Activity and Public Health, Sydney, Australia 2012



HUMAN POTENTIAL CENTRE  
UNIVERSITY OF TECHNOLOGY SYDNEY

# Womens' healthy lifestyle behaviour in urban Vanuatu

## – an in-depth investigation

Katja Siefken, Grant Schofield, Nico Schlenker

Auckland University of Technology (AUT), University of Technology Sydney (UTS)

### Introduction





The Pacific region has experienced rapid urbanisation and lifestyle changes which lead to high rates of noncommunicable disease (NCD) risk factors. There is no information on barriers and facilitators for healthy lifestyle behaviour in the region.

We present the first stage of a rigorously evaluated urban Pacific health intervention. This paper describes formative work conducted in Port Vila, Vanuatu. The objective was to understand barriers and facilitators of Pacific women to lifestyle change. Findings will be used to inform future health interventions.

### Aim

- To understand barriers and facilitators of Pacific women in urban Vanuatu for lifestyle change;
- To use these factors to inform the development of a culturally meaningful lifestyle intervention.



### Methods

Semi-structured focus groups with 37 female civil servants divided into six groups were held verbally to understand barriers and facilitators for healthy lifestyle behaviour.



### Key findings

Several perceived barriers and facilitators were identified.

- Barriers include financial limitations; time issues; family commitments; environmental aspects; and motivational hindrances that limit time and opportunities for healthy lifestyle behaviour.

time family  
finances environment  
motivation

- Facilitators include more supportive environments; social support mechanisms; and the implementation of rigorous health policies.

### Conclusion

- Findings indicate that women are most likely to choose walking for PA over any other sport activity.
- They further favour a team-approach over Individual exercise activities.
- We assume that a team-based walking program can result in increased PA levels and potentially reduce NCD risk.

More details: Siefken, K., Schofield, G., & Schlenker, N. (in press). Laefstael-jenses: An investigation of barriers and facilitators for healthy lifestyles of women in an urban Pacific island context. *Journal of Physical Activity and Health*.

www.humanpotentialcentre.aut.ac.nz
AUT HUMAN POTENTIAL CENTRE
contact: katja.siefken@aut.ac.nz

## Appendix F: AUT University Ethics Committee approval for Study 3 and Study 4



# MEMORANDUM

## Auckland University of Technology Ethics Committee (AUTEC)

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To: Grant Schofield  
From: **Madeline Banda** Executive Secretary, AUTEC  
Date: 29 March 2011  
Subject: Ethics Application Number 11/18 **Implementation and evaluation of a Pacific workplace physical activity intervention for urban women in Vanuatu.**

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Dear Grant

Thank you for providing written evidence as requested. I am pleased to advise that it satisfies the points raised by the Auckland University of Technology Ethics Committee (AUTEC) at their meeting on 14 February 2011 and that on 23 March 2011, I approved your ethics application. This delegated approval is made in accordance with section 5.3.2.3 of AUTEC's *Applying for Ethics Approval: Guidelines and Procedures* and is subject to endorsement at AUTEC's meeting on 11 April 2011.

Your ethics application is approved for a period of three years until 23 March 2014.

I advise that as part of the ethics approval process, you are required to submit the following to AUTEC:

- A brief annual progress report using form EA2, which is available online through <http://www.aut.ac.nz/research/research-ethics/ethics>. When necessary this form may also be used to request an extension of the approval at least one month prior to its expiry on 23 March 2014;
- A brief report on the status of the project using form EA3, which is available online through <http://www.aut.ac.nz/research/research-ethics/ethics>. This report is to be submitted either when the approval expires on 23 March 2014 or on completion of the project, whichever comes sooner.

It is a condition of approval that AUTEK is notified of any adverse events or if the research does not commence. AUTEK approval needs to be sought for any alteration to the research, including any alteration of or addition to any documents that are provided to participants. You are reminded that, as applicant, you are responsible for ensuring that research undertaken under this approval occurs within the parameters outlined in the approved application.

Please note that AUTEK grants ethical approval only. If you require management approval from an institution or organisation for your research, then you will need to make the arrangements necessary to obtain this.

When communicating with us about this application, we ask that you use the application number and study title to enable us to provide you with prompt service. Should you have any further enquiries regarding this matter, you are welcome to contact Charles Grinter, Ethics Coordinator, by email at [ethics@aut.ac.nz](mailto:ethics@aut.ac.nz) or by telephone on 921 9999 at extension 8860.

On behalf of AUTEK and myself, I wish you success with your research and look forward to reading about it in your reports.

Yours sincerely



Madeline Banda

**Executive Secretary**

**Auckland University of Technology Ethics Committee**

Cc: Katja Siefken [katja.siefken@aut.ac.nz](mailto:katja.siefken@aut.ac.nz)



### Appendix G: Process evaluation questionnaire: Study 3

**Thank you for participating in the *Wokabaot Jalens* study!**

This questionnaire has two sections and should take about 10 to 15 minutes to complete.

Please answer every question and remember that there *are no right or wrong answers*.

Please ask the researchers if you have any questions - thank you for your time.

How old are you?	_____ years
Date of Interview	□□/□□/2011 <b>Day / Month / Year</b>

*Please use this scale to rate the following statements, indicating your satisfaction. 1 is the highest satisfaction and 4 the lowest.*

1. Strongly agree
2. Agree
3. Disagree
4. Strongly disagree

**On a scale from 1 to 4, please indicate the following**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
I found the program overall enjoyable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The program made me exercise more	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It was good that the program was for women only	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Program structure**

I enjoyed the team-based challenge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoyed the 1 million step challenge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The health information was useful

The posters motivated me to walk more

**Program timeline**

The duration of the program was good

**Program effects**

The program made me walk more

The program made me live healthier

The program positively affected my family life

**General questions**

Did you finish the program? If not, what made you stop?

---

Did you move up in the step-zone category? If so, by how much?

---

Do you incorporate healthy ideas into your daily yes? Give examples.

---

What did you like about the program?

---

---

What did you not like about the program?

---

---

How can the program be improved?

---

---

What was the biggest challenge for you participating in the program?

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---

Age (please circle)      under 25      26-39      40 – 55      above 55

## **Appendix H: Information sheet Study 4: *Wokabaot Jalens***

Information sheet

March 2011

# **Workplace physical activity study for women in Vanuatu government**

My name is Katja Siefken and I would like to invite you to participate in my research study which forms part of my doctoral degree. I am studying at Auckland University of Technology (AUT) in New Zealand.

The Ministry of Health oversees Vanuatu's government's healthy workplace program "Walk for Life". I want to help develop this program further, with a special focus on women. This study is funded and supported by the World Health Organization and the Ministry of Health Vanuatu. Aims of my research focus are to help urban Pacific women become more active and healthier.

In November I interviewed approximately 22 women from the Vanuatu government and asked them about what kind of exercise ideas they see as valuable. With their input and ideas, I have come up with a program for you.

Your participation is voluntary and you may withdraw at any time. Withdrawing will not affect you in any way. The Vanuatu government will not see your name, nor will your name be attached to files.

Please read this form and ask any questions you may have before signing the statement of consent. Answers to some of the questions you may have are provided below.

### **What is the purpose of this study?**

The purpose of this study is to increase physical activity behaviour of Ni-Vanuatu women in order to improve their and their family's health.

The findings will also contribute to my doctoral research at AUT University. As part of this process I will try to publish findings in a scientific journal. The findings will help me evaluate whether or not the program has been successful.

### **How was I identified and why am I being invited to participate in this research?**

All women working for the Vanuatu government are invited to partake in the physical activity study. Women with unmanaged high blood pressure or on  $\beta$ -blocker medication cannot partake in the study. Every participant will undergo a health screening before we start with the program. If the screening identifies uncontrolled high blood pressure you will be asked to seek medical advice from your doctor for your participation in the programme.

### **What will happen in this research?**

Firstly, I would like to take some of your measurements (called NCD screening). This includes height, weight, blood pressure and some blood measures to test the status of your health and also for you to

see if you improve your measurements over the course of the study (lose weight, improve blood sugar, improve blood pressure etc.).

Every participant will be equipped with a health activity book and a pedometer.

I will then group all the women into teams of 5-6 women. Each Ministry will have at least one team. One team captain will be appointed for each team. The team captain is responsible for collecting step numbers from each participant and for encouraging team members to live healthily. Every participant is encouraged to walk 10,000 steps every day. Please handle the pedometer with care but don't be overly anxious should it be lost or damaged. In case of loss or damage, please contact the Ministry of Health and a replacement may be provided.

The pedometer will be placed on the hip and will record your step numbers. The teams compete against each other. However, there is no loser. Everyone is a winner. The idea is to have fun and to enjoy the course of the study.

You will be asked to record your daily step numbers for eight weeks into an activity book. Every week you will send your step numbers to your team captain. The team captain will collect the team members' step numbers and report back to me. I will update every participant each week on the team's progress to show which team is leading.

I will regularly provide you with information about healthy lifestyles. We will first have a health seminar in which you will learn about healthy eating and healthy lifestyles. I will also email weekly information on healthy eating, healthy cooking and how to incorporate more activity into your day. At the end of the study, I will take the same body measurements (NCD screening) again, to see if the walking has actually improved your health status.

If you don't want to participate, that's fine, just say so.

There is *no financial cost* involved if you decide to participate in the study. Group meetings will be conducted every two weeks to motivate each other for participation. Each session will take approximately 15 minutes and will be lead by the team captain.

### **Are there any risks to me?**

There are no risks involved in participating in this study. Just to say again that your name will not be associated with what you do and the data will only be available to me and my supervisor.

### **What are the benefits of participating in the study?**

Previous studies have shown that increasing physical activity levels of civil servants can reduce the risk of diabetes, heart diseases, high blood pressure and other noncommunicable diseases. Moreover, you will contribute to Pacific public health research and assist me in making Pacific people healthier people.

### **How will my privacy be protected?**

Over the course of the study, the team captains will have access to their team members' step numbers. Upon termination of the study, team captains will permanently delete their files.

The records of this study and the consent form that you need to sign to partake in this study will be kept private and stored in New Zealand. In any report we publish, we will not include information that would make it possible to identify you in any way. Research records will be kept in a locked file and sorted by number codes, not by names; My supervisor, Professor Schofield and I, Katja Siefken, are the only people who will have access to the records. We will store data for 10 years at AUT University in New Zealand and we will permanently destroy them afterwards.

### **What opportunity do I have to consider this invitation?**

If you wish to participate in this study, please return the signed consent form to me by the day of the group meeting. Whether or not you participate will not affect your current or future relations with your employer. If you do not wish to participate before or during the study, that's fine.

**Will I receive feedback on the results of this research?**

If you wish to receive information on the final results of the study, please indicate so by ticking the appropriate box on the Consent Form. Again the results will not be associated with your name.

**What do I do if I have concerns about this study?**

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Professor Grant Schofield, grant.schofield@aut.ac.nz, +64 (0) 9921 9999 ext 9169.

Concerns regarding the conduct of the research should be notified to the Executive Secretary, AUTEK, Madeline Banda, madeline.banda@aut.ac.nz, +64 (0) 9921 9999 ext 8044.

**Researcher Contact Details:**

If you have any queries or wish to know more please do not hesitate to contact me

**Project Researcher**  
Katja Siefken, Researcher

CPAN, AUT University

email: katja.siefken@aut.ac.nz

**Project Supervisor**  
Professor Dr. Grant Schofield

CPAN, AUT University

email: grant.schofield@aut.ac.nz

***Approved by the Auckland University of Technology Ethics Committee on AUTEK Reference number 11/18.***

## Appendix I: Consent form Study 4: *Wokabaot Jalens*

# Consent Form



*Project title:*            *Workplace physical activity study for women in Vanuatu government*

*Project Supervisor:*    **Grant Schofield**

*Researcher:*            **Katja Siefken**

- I have read and understood the information provided about this research project in the Information Sheet dated 23.03.2011.
- I have had an opportunity to ask questions and to have them answered.
- I understand that identity of my fellow participants and our data are confidential to the group and I agree to keep this information confidential.
- I understand that I will undergo a health screening before we start and after termination of the program. The health screening will measure blood pressure, blood glucose and blood cholesterol levels. If the screening identifies uncontrolled high blood pressure I will be asked to seek medical advice for my participation in the programme. I will receive a copy of my health screening results.
- I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- If I withdraw, I understand that while it may not be possible to destroy all records of the data, the relevant information about myself including questionnaires, or parts thereof, will not be used.
- I agree to take part in this research.
- I wish to receive a copy of the report from the research (please tick one): Yes  No

Participant's signature:.....

Participant's name:.....

Participant's email : .....

Participant's Contact Details (if appropriate): .....Date:

***Approved by the Auckland University of Technology Ethics Committee on 23rd of March, 2011 AUTEK Reference number 11/18. Note: The Participant should retain a copy of this form.***

**Appendix K: Study 4 Wokabaot Jalens: Mini STEPS questionnaire**

**Workplace physical activity study**

**QUESTIONNAIRE**

**Identification information**

<b>I 1</b>	Family name (in <b><u>CAPITAL</u></b> letters)	
<b>I 2</b>	Given name (in <b><u>CAPITAL</u></b> letters)	
<b>I 3</b>	Baseline step number	
<b>I 4</b>	Date of Interview	□□/□□/2011  Day / Month / Year

**Demographic Information**

<b>C 1</b>	How old are you?	___ years
<b>C 2</b>	What is your ethnic background?	Ni-Vanuatu <input type="checkbox"/> Others <input type="checkbox"/>



## STEP 1 Behavioural Measures

The questions that follow are on various health behaviours. This includes things like smoking, drinking alcohol, drinking kava/yaqona and physical activity. Let's start with smoking.

<b>Tobacco Use (Section S)</b>		Please tick only <b>ONE</b>
<b>S 1</b>	Have you <b>ever smoked</b> any tobacco products such as cigarettes, cigars or pipes?	Yes <input type="checkbox"/> No <input type="checkbox"/>
		<i>If NO, go to Betel nut section</i>
<b>S 2</b>	<u><b>If Yes,</b></u> Have you smoked any <b>tobacco products</b> , such as cigarettes, cigars or pipes in the <b>past 12 months?</b>	Yes <input type="checkbox"/> No <input type="checkbox"/>
		<i>If NO, go to Betel nut section</i>
<b>S 3</b>	<u><b>If Yes,</b></u> How frequently have you smoked in the past 12 months?	5 or more days a week <input type="checkbox"/> 1-4 days per week <input type="checkbox"/> 1-3 days a month <input type="checkbox"/> Less than once a month <input type="checkbox"/>

<b>Betel nut (Section T)</b>		Please tick only <b>ONE</b>
<b>T 1</b>	Have you <b>ever chewed</b> betel nuts?	Yes <input type="checkbox"/> No <input type="checkbox"/>
		<i>If NO, go to Alcohol Section</i>
<b>T 2</b>	<u><b>If Yes,</b></u> Have you chewed betel nuts in the <b>past 12 months</b> ?	Yes <input type="checkbox"/> No <input type="checkbox"/>
		<i>If NO, go to Alcohol Section</i>
<b>T 3</b>	<u><b>If Yes,</b></u> How frequently have you chewed betel nuts in the past 12 months?	5 or more days a week <input type="checkbox"/> 1-4 days per week <input type="checkbox"/> 1-3 days a month <input type="checkbox"/> Less than once a month <input type="checkbox"/>
<b>Alcohol Consumption (Section A)</b>		Please tick only <b>ONE</b>
The next three questions are on the consumption of alcohol.		
<b>A 1</b>	Have you <b>ever consumed</b> a drink that contains alcohol such as beer, wine, spirit, fermented cider?	Yes <input type="checkbox"/> No <input type="checkbox"/>
		<i>If NO, Go to Kava Section</i>
<b>A 2</b>	<u><b>If Yes,</b></u> Have you consumed <b>alcohol</b> within the <b>past 12 months</b> ?	Yes <input type="checkbox"/> No <input type="checkbox"/>
		<i>If NO, Go to Kava Section</i>

<b>A 3</b>	In the past 12 months, how frequently have you had at least one drink?	<p style="text-align: right;">5 or more days a week <input type="checkbox"/></p> <p style="text-align: right;">1-4 days per week <input type="checkbox"/></p> <p style="text-align: right;">1-3 days a month <input type="checkbox"/></p> <p style="text-align: right;">Less than once a month <input type="checkbox"/></p>
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**Kava / Yaqona (Section K)**

Please tick only **ONE**

The next three questions are on the consumption of kava/yaqona.

<b>K1</b>	Have you <b>ever</b> tried or drunk kava/yaqona?	Yes <input type="checkbox"/> No <input type="checkbox"/>	If NO, go to fruits and vegetable section	
<b>K 2</b>	<u>If Yes,</u> Have you tried or drunk kava/yaqona in the <b>past 12 months?</b>	Yes <input type="checkbox"/> No <input type="checkbox"/>		If NO, go to Fruits and vegetable section
<b>K 3</b>	<u>If Yes,</u> How frequently have you consumed Kava had in the past 12 months?	<p style="text-align: right;">5 or more days a week <input type="checkbox"/></p> <p style="text-align: right;">1-4 days per week <input type="checkbox"/></p> <p style="text-align: right;">1-3 days a month <input type="checkbox"/></p> <p style="text-align: right;">Less than once a month <input type="checkbox"/></p>		

**Fruits and Vegetable Consumption (Section D)**

<b>D1</b>	In a typical week, on how many days do you <b>eat fruit?</b>	Number of days <input type="checkbox"/>
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<b>D2</b>	How many <b>servings</b> of fruit do you eat on <b>one</b> of those days?	Number of servings <input type="checkbox"/> <input type="checkbox"/>
<b>D3</b>	In a typical week, on how many days do you <b>eat vegetables</b> ?	Number of days <input type="checkbox"/>
<b>D4</b>	How many <b>servings</b> of vegetables do you eat on <b>one</b> of those days?	Number of servings <input type="checkbox"/> <input type="checkbox"/>

**Physical Activity (Section P)**

Please tick only **ONE**

The next three questions are on physical activity during work, travel and leisure. Answer the questions thinking of your **AVERAGE TYPICAL DAY**.

<b>P 1</b>	Does your <b>work</b> involve <u>active</u> walking or other physical activities that last for <b>more than 10 minutes at a time</b> on a <b>typical day</b> ?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>P 2</b>	Do you <b>walk or use a bicycle</b> for at <b>least 10 minutes continuously</b> <u>to get to and from places</u> on a <b>typical day</b> ?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>P 3</b>	Does your <b>leisure time</b> involve <u>physical activity</u> that lasts longer than <b>10 minutes at a time</b> on a <b>typical day</b> ?	Yes <input type="checkbox"/> No <input type="checkbox"/>

**History of Blood Pressure and Diabetes (Section H)**

Please tick only **ONE**

<b>H 1</b>	During the <b>past 12 months</b> , have you been <b>told</b> by a doctor or other health worker that you have <b>elevated blood pressure or hypertension</b> ?	Yes <input type="checkbox"/> No <input type="checkbox"/>	<i>If NO, go to H3</i>
<b>H 2</b>	<b>If Yes.</b> For the <b>last 2 weeks</b> , have you <u>taken any drugs (medication)</u> for <b>high blood pressure</b> prescribed by a doctor or other health worker?	Yes <input type="checkbox"/> No <input type="checkbox"/>	
<b>H 3</b>	Have you <b>ever been told</b> by a doctor or other health worker that you have <b>diabetes</b> ?	Yes <input type="checkbox"/> No <input type="checkbox"/>	<i>If NO, THE END</i>

<b>H 4</b>	<p><b>If Yes.</b></p> <p>For the <b>last 2 weeks</b>, have you taken any <u>drugs (oral medication) or insulin or special prescribed diet for diabetes</u> prescribed by a doctor or other health worker?</p>	Yes <input type="checkbox"/> No <input type="checkbox"/>
------------	---	--

## STEP 2 Physical Measurements

Height and weight				Coding Column
<b>M 1</b>	Height	(in centimetres)		□□□.□
<b>M 2</b>	Weight <i>If too large for scale, use two scales</i>	(in kilograms)		□□□.□
<b>M 3</b>	Are you pregnant?	Yes      1 No        2		□
Blood pressure				Coding Column
<b>M 4</b>	Cuff size used	Standard      1 X-Large        2		□
<b>M 5a</b>	Reading 1	<b>Systolic BP</b>	Systolic    mmHg	□□□
<b>M 5b</b>		<b>Diastolic BP</b>	Diastolic    mmHg	□□□
<b>M 6a</b>	Reading 2	<b>Systolic BP</b>	Systolic    mmHg	□□□
<b>M 6b</b>		<b>Diastolic BP</b>	Diastolic    mmHg	□□□
<b>M7</b>	Waist	(in centimetres)		□□□.□

## STEP 3 Biochemical Measurements

<b>Blood glucose</b>		<b>Coding Column</b>	
<b>B 1</b>	Since 10pm last night, have you had anything to eat or drink, other than water?	Yes    1	<input type="checkbox"/>
		No    2	
<b>B 2</b>	Blood glucose		mmol/l <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/>
		Low 1 High 2 Unable to assess 3	OR <input type="checkbox"/>
<b>Blood Lipids</b>			
<b>B 3</b>	Total cholesterol		mmol/l <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/>
		Low 1 High 2 Unable to assess 3	OR <input type="checkbox"/>
<b>B4</b>	High density cholesterol		mmol/l <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/>
		Low 1 High 2 Unable to assess 3	OR <input type="checkbox"/>
<b>B5</b>	Low density cholesterol		mmol/l <input type="text"/> <input type="text"/> . <input type="text"/> <input type="text"/>
		Low 1 High 2 Unable to assess 3	OR <input type="checkbox"/>

<b>STEP 4 Healthy lifestyle questions</b>		Please tick only <b>ONE</b>
<b>D1</b>	What do you expect from this healthy lifestyle project?	
<b>D2</b>	<b>Do you think you live a healthy lifestyle?</b>	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>D3</b>	If <b>yes</b> , what do you do to live a healthy lifestyle?	
<b>D4</b>	If <b>no</b> , what can you do to live a healthier lifestyle?	
<b>D5</b>	<b>In a normal day, what is your favourite activity for exercising?</b>	
<b>D8</b>	<b>Do you do any structured exercise</b> (Aerobics, swimming, dancing class, volleyball etc)	Yes <input type="checkbox"/> No <input type="checkbox"/>

<b>D9</b>	<b>If yes</b> , how many times per week do you exercise?	
<b>D10</b>	<b>If no</b> , why do you <i>not</i> do any structured exercise?	

Thank you for participating in this study!



## Appendix L: WHO report: Assessment of the Walk for Life Policy

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# ASSESSMENT: *WALK FOR LIFE* POLICY VANUATU GOVERNMENT PUBLIC SERVICE

*Experiences from and recommendations for  
a government-based healthy workplace programme  
in Vanuatu*

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Report prepared for WHO Western Pacific Regional Office



Prepared by Professor Grant Schofield and Ms Katja Siefken

October 2009

Auckland University of Technology

Centre for Physical Activity and Nutrition

## EXECUTIVE SUMMARY

*Walk for Life* is a policy to increase Public Service employees' physical activity levels through Wednesday afternoon activities and beyond. It was launched in 2007.

The policy is unique in releasing public servants from official duties across the whole of government at 3.00 PM Wednesdays. It is seen as a positive action by almost everyone we interviewed.

Process evaluation undertaken showed limited, although sustained, uptake (we estimate around 15% of employees). The best model for engaging seems to be the integration of the physical activity policy and activities into departmental social clubs. Both sports and walking are popular activities. Some, probably those at most risk, do not participate in the programme. There are no data available to understand the efficacy in terms of health risk, or health outcomes for this policy.

Given sufficient resources, continuation and revision of the programme is recommended. The uptake of Wednesday afternoon activities in each ministry is seen as a positive step towards NCD prevention. Interviews showed that female adults, above 40 years of age need particular attention in the engagement of physical activities. Other non-sport activities such as pedometer challenges could serve to stimulate further interest and participation. Personnel, funding, and training constraints hinder the Ministry of Health from engagement in further activities (i.e. inter government competitions).

For maintenance and improvement of the *Walk for Life* programme, we recommend the programme continue with the following (resource dependent) improvements considered:

1. Further training of the NCD team and focal people in programme implementation, and NCD risk assessment;
2. Regular NCD screenings across government to raise awareness and serve as a regular outcome evaluation tool;
3. Communicate a written policy to all staff members to raise awareness of the programme to all;
4. Use alternative means to help engage those most at risk and not currently engaged in physical activity (e.g., pedometer challenge);
5. Development of role descriptions for focal people and incorporation of this role into formal job descriptions;
6. Regular inter-agency sport competitions / events coordinated by the Ministry of Health, and/or Ministry of Youth and Sport;
7. Address expanded national and expanded community strategies, outlined in National Strategy to Prevent and Control Non-Communicable Diseases Vanuatu (2004-2009). Within these is a need for the social marketing of physical activity. Such a marketing campaign could initially fall under the '*Walk for Life*' brand and start within the Public Service sector;
8. Develop an arching settings approach to support healthy workplaces across the Pacific. This would assist in translating the successes of the *Walk for Life* programme to other Pacific countries, and make available resources to assist Vanuatu in future work.

## PURPOSE AND RATIONALE OF THIS REPORT

This report assesses and evaluates the government-based healthy workplace programme *Walk for Life* in the Vanuatu public service. It describes the present programme, assesses the programme's impact and evaluates the efficacy. The analysis involves a stock-take of existing interventions to identify how new interventions can be used to improve the programme. We have also assessed opportunities and provide recommendations for future work with the programme.

The assessment seeks to understand - within local, cultural and social structure – the implementation and effectiveness of the *Walk for Life* policy in the Vanuatu government public service.

## TARGET AUDIENCE

This report serves as a record and guide for the government and public service in Vanuatu for consideration in the future of the *Walk for Life* policy.

It can further assist policy makers and coordinators of healthy workplace initiatives at the national level in Pacific Island Countries and Areas (PICs). The report can serve as an entry point for government-based healthy workplace programme implementation in other PICs.

## MANDATE

The World Health Organization (WHO) recognises the workplace as a priority setting for health protection and health promotion in the 21<sup>st</sup> century (World Health Organization 2008). The workplace is considered an ideal setting for interventions designed to prevent non-communicable diseases (NCDs) through diet and physical activity. The WHO describes the workplace as an effective setting to improve health related outcomes such as obesity, diabetes and cardiovascular disease risk factors. The Ministry of Health Vanuatu is responsible for the provision of preventive health services. The policy objectives for the health sector are

- to improve the health status of the people;
- to improve access to services;
- to improve the quality of the services delivered; and
- to make more effective use of resources.

## ACKNOWLEDGEMENTS

This report was researched and written by Professor Grant Schofield and Ms Katja Siefken from Auckland University of Technology, Auckland, New Zealand. We would like to thank the *Walk for Life* key informants, the Ministry of Health Vanuatu and the whole Vanuatu government who provided information for this report for their time and support. We particularly acknowledge the assistance of Jerry Iaruel and Hillary Garae. We also acknowledge the support and guidance of Dr Temo Waqanivalu in the conception and development of this assessment.

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## Introduction

In response to the growing burden of non-communicable diseases (NCDs), the World Health Organization (WHO) developed the Global Strategy on Diet, Physical Activity and Health (DPAS), which was formally adopted by the 57<sup>th</sup> World Health Assembly in May 2004. Herein, the workplace setting is clearly identified as an important area of action for health promotion and disease prevention (World Health Organization 2004).

This document reports the formal assessment of the healthy workplace programme *Walk for Life* which has been implemented in 2007 in the Vanuatu Government public service.

The National Nutrition Survey (Carlot-Tary et al.), the NCD Survey (Ministry of Health Vanuatu) and the Mini-STEPS Survey (Ministry of Health Vanuatu) showed increasing levels of NCD risk factors in Vanuatu. Consequently the Ministry of Health Vanuatu government has developed an initial NCD plan in 2002 (Ministry of Health Vanuatu / Secretariat of the Pacific Communities 2002). In response to the 2003 Health Ministers' Conference in Tonga, the Healthy Island Vision and the World Health Reports, the Ministry of Health in Vanuatu developed a *National Strategy to Prevent and Control Non-communicable Diseases* (Ministry of Health Vanuatu) in Vanuatu, based on the STEPwise framework. As a result of the *National Strategy to Prevent and Control Non-communicable Diseases* in Vanuatu, the Ministry of Health has implemented a government-wide healthy workplace programme in 2007 to harness a healthier and more productive Public Service workforce.

## Background: healthy workplaces in the PICs

The regional guidelines for the development of healthy workplaces define healthy workplaces as places "where everyone works together to achieve an agreed vision for the health and well-being of workers and the surrounding community". It provides all members of the workforce with physical, psychological, social and organisational conditions that protect and promote health and safety and enables managers and workers to increase control over their own health and to improve it, and to become more energetic, positive and contented. In return, the workforce is more stable, committed and productive (World Health Organization for the Western Pacific).

The implementation of the Vanuatu government's *Walk for Life* programme is an example of this sort of initiative for health promotion and health protection at the workplace. The settings approach stems from the WHO *Health for All* strategy and, more specifically, the Ottawa Charter for Health Promotion (World Health Organization).

The regional guidelines for healthy workplaces in the Western Pacific Region recommend workplaces to:

- create a healthy, supportive and safe work environment;
- ensure that health promotion and health protection become an integral part of management practices;
- foster work styles and lifestyles conducive to health;
- ensure total organisational participation; and
- extend positive impacts to the local and surrounding community and environment.

It is advisable to address these five major areas in the design of healthy workplace policies. The principle must be comprehensive, participatory and empowering. Adjustment to rural and urban settings and to the social and cultural context and the involvement of leadership positions and management is essential.

## **General recommendations for healthy workplaces in the PICs**

Healthy workplace programmes in the Pacific Islands are recently becoming more popular. Several countries have programmes running with varying outcomes and success stories. In-depths assessment of the programmes and cross-country comparisons could reveal crucial results for further improvement and improved health outcomes.

As a general recommendation, we would like to advise responsible stakeholders to consider the following steps when implementing a healthy workplace programme in the Pacific Islands.

### **Essential prerequisites**

- **Leadership commitment:** Commitment from influential individuals in high-level positions, preferably high-level government positions is imperative, as it may drive healthy workplace policy promotion on the political agenda. For provincial areas this involves commitment of the head of provinces and the executive head. For urban areas this involves the ministries, prime ministers and high-ranking officers within Ministry of Health and the workplace.
- **Coordinating team:** For the implementation of healthy workplace programmes, it is essential to establish coordination mechanisms. High levels positions need to be involved in the coordinating team.
- **Needs assessment:** for prioritisation of health needs, an assessment of employees' health and safety needs must be conducted. Health actions can be developed accordingly. The Mini-STEPS survey (WHO) can serve as an instrument.
- **Action Plan:** a 3 to 5 yrs action plan includes achievable short- and long term goals, goals and objectives, strategies, activities, budget, timetable, a designation of roles and responsibilities for implementation, plus an evaluation approach.
- **Funding:** Allocation of financial resources to implement healthy workplace programmes is essential for action towards implementation. Funding can be needed for the various steps, such as the provision of water tanks, the organisation of sport events, the use of facilities, transport, equipments and social marketing.
- **Employees' empowerment:** Health information and health education must be made locally available and appropriate to the Pacific culture and understanding. It is essential to direct health information to the target audience: adolescents, mothers, Church leaders etc. need different information material. Education levels and different health needs in provincial areas must likewise be regarded.

### Optimal prerequisites

- **Integration of programme to work policy:** both in provincial and urban settings, healthy workplace programmes should be ideally integrated into the general workplace policy at all levels of governance so as to ensure sustainability of and respect towards the intervention.
- **Health training on NCD prevention, physical activity, healthy diet and social marketing:** Training on Pacific health issues and social marketing is essential for focal persons to run the programme. Focal persons can be appointed by management or policy initiators. Training information can be obtained from the Ministry of Health.
- **National NCD research agenda:** the agenda addresses not merely health effects and NCD risk factors of the programme but also socioeconomic aspects. The results are much needed in the PICs.
- **Multiple intervention strategies:** the promotion of the healthy workplace programme within the workplace setting is recommended to comprise a combination of several intervention strategies: raising awareness on the health effects of physical activities, locally appropriate healthy eating advices, regular sport events and monthly sport fun days with other companies / organisations, the provision of setting-adjusted health information and clean-up campaigns.
- **Implementation of within “local reality”:** the cultural context and social structure of the Pacific needs to be taken into account for any health intervention. Implementation of physical activities may interfere with cultural ties, values, customs and gender roles. Involvement of the whole family might be an effective strategy, so to involve older women (>40 yrs).
- **Dissemination of the intervention:** involvement of surrounding workplaces will promote the message of healthy workplaces to a larger audience in the population and community. Dissemination may occur through various channels (e.g. invitations to sporting activities, health fares, emails, electronic media, public events, role models, influential individuals, radio, TV, boards etc).
- **Monitoring and Evaluation:** national surveys may measure NCD risk factors and prevalence rates. Process and impact evaluation is needed to identify strategies that have been implemented effectively / ineffectively and to monitor health status of staff members.

We have developed these general recommendations in accordance to the ‘Review of Best Practice in Interventions to Promote Physical Activity in Developing Countries’ (World Health Organization), the regional guidelines for healthy workplaces in the Western Pacific Region (World Health Organization for the Western Pacific) and our understanding of Pacific culture and social context.



## ***Walk for Life***

### **Walk for Life - background and policy development**

In response to the National Nutrition Survey (1996) and the NCD survey (2002), the Ministry of Health in Vanuatu has developed an initial NCD control plan in 2002 which resulted in the design of a National Strategy to Prevent and Control Non-communicable Diseases in Vanuatu. This was officially launched in 2004. Using the STEP-wise framework, designed by the WHO, the four components were further divided into three categories, that is:

- **Core** – those activities that could be undertaken within a two-year timeframe with existing human and financial resources;
- **Expanded** – those that would require up to five years to be successfully implemented and frequently require additional resources; and
- **Optional** – those that are aspired to after a five-year timeframe and that will require external funding.

The Ministry of Health proposed to initially address Strategies 3-6 of the core community section of component 3 in the *Walk for Life* programme: Physical Activity (Ministry of Health Vanuatu), namely:

- To support the walking environment;
- To increase awareness of benefits of physical activities;
- To promote physical activity events; and
- To develop physical activity opportunities.

To achieve these strategies, the following activities were proposed:

- To create a physical activity friendly environment (clear roads, clean-up campaigns, creation of footpaths in urban areas);
- To develop a coordinated social marketing programme to promote physical activity;
- To implement a social marketing programme (impact indicator: community awareness);
- To encourage inter-business competitions, sport competitions between government departments and NGOs;
- To introduce physical activity at the workplace and in rural areas (impact indicator: participation).

(Ministry of Health, Vanuatu).

### **Walk for Life - cultural context and opportunities**

The Ministry of Health, Vanuatu has set an example and designed an initiative to combat non-communicable diseases in the workplace and to increase employees' wellbeing and productivity. The *Walk for Life* policy is a government response that aims to increase physical activity levels of

government employees and to decrease the burden of NCDs in the Vanuatu Government's Public Sector.

Recent urbanisation trends and modern technology have led to major lifestyle changes in urban Vanuatu. Government employees are mainly involved in sedentary computer-based work with little or no dedicated physical activity interruptions.

Ni-Vanuatu have a strong cultural connection to sports and recreation activities, particularly to team sports (rugby, football, volleyball, beach volleyball, netball). Walking is a dominant form of transport (to and from workplaces) and therewith a common activity for most Ni-Vanuatu. Bus fares are relatively expensive and cars are unaffordable to all but a few minority. The use of bicycles as a means of transport is scarce. Roads, especially in Port Vila, have no bike lanes, high traffic density, many potholes and people who walk do not regard these roads as safe for bicycle use.

Older age groups (above 40 yrs) and women in urban settings are generally less engaged in physical activities (especially team sports). This is due in part to family commitments and cultural and social constraints. Some comments expressed to the assessment team were "It is hardly tolerated for women to be active" and "Women are expected to prepare food for the family, instead of doing sports".

## ***Walk for Life* - assessment methods**

Professor Schofield and Ms Katja Siefken carried out the assessment activities listed below in September and October 2009. We also took part in the Wednesday afternoon sports activities.

### **Policy analysis and development**

Information on policy development has been obtained mainly through telephone and face to face conversations with Mr Iaruel, Ministry of Health Vanuatu.

### **Audit and stocktake of activities**

A variety of activities and sports have been identified in the different ministries and departments.

### **Onsite interviews**

Face to face interviews have been conducted with key informants at each of 15 different government departments and ministries plus two nongovernmental organisations. A detailed key informants list can be found in the Appendix.

### **SWOT analysis**

A SWOT analysis has been conducted to identify strengths, weaknesses, opportunities and threats to the *Walk for Life* programme.

## **Re-aim analysis**

The RE-AIM framework (see [www.re-aim.org](http://www.re-aim.org)) has been used to understand the utility of the programme through a public health lens. RE-AIM is a systematic way for researchers, practitioners, and policy makers to evaluate health behaviour interventions. It can be used to estimate the potential impact of interventions on public health. Thus we have summarised the data on known reach, efficacy, adoption, implementation, and maintenance across the Vanuatu Government's Public Service sector in response to the *Walk for Life* programme.

## ***Walk for Life* – Assessment**

### **Policy analysis and development**

In response to the National Strategy to Prevent and Control Non-Communicable Diseases, the Ministry of Health and the Ministry of Youth and Sport in Vanuatu have strongly supported and lead the implementation of the *Walk for Life* programme. In presenting evidence of healthy lifestyles and physical activities to the Prime Minister's Office in 2006, the Council of Ministers had ratified 1.5 hours of physical activities each Wednesday afternoon for government employees if they chose to participate. After ratification, the secretary of the Public Service Commission distributed the memo to the ministries and departments. Focal physical activity persons were appointed for each ministry. The focal people would provide a communication and action network coordinated by the NCD team at the Ministry of Health. A government-wide health screening was conducted by the Ministry of Health in 2007, using the Mini-STEPS survey, provided by the WHO. The NCD screening has had a lasting motivational impact on the employees. Every key informant has suggested repeating the NCD screening on a regular basis (preferably every 6-12 months).

The policy of the *Walk for Life* programme included that government employees are advised that they may wish to finish work at 3 PM at Wednesdays and get involved in sports and other physical activities. Currently these activities are dominated by social sporting events, including volleyball, basketball, and football. Also available are other activities such as swimming, walking, community clean-ups and flower planting.

The approach is culturally acceptable, has been embraced, and seen as positive by the majority of key informants we interviewed in the Vanuatu government. The policy has been supported by the WHO and SPC. Several non-government organisations (NGOs) (e.g. Save the Children, Wan Smol Bag) have likewise embraced this policy. Cross-government activities have taken place, involving the different Ministries and NGOs. Since 2006 TVL limited has sponsored inter-business house competitions.

To the assessing team's knowledge the policy of regular sports and physical activities across the whole of the public service is unique in the Pacific and most probably in the world - at least for the whole of government.

**Other government related policies:**

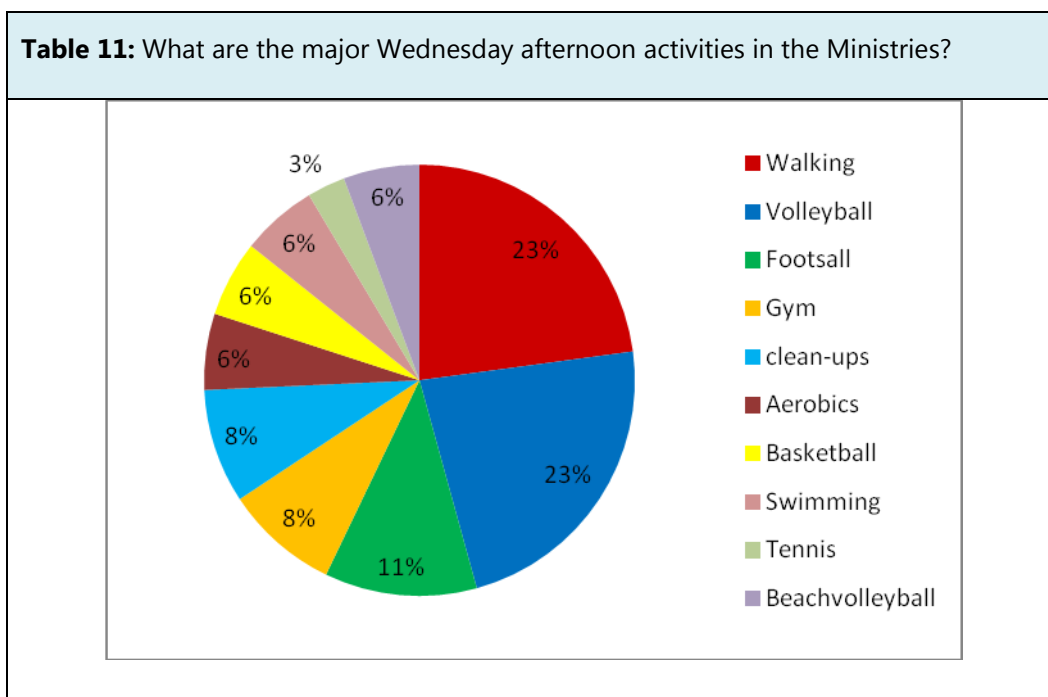
- Ministry of youth and sport 2009 business plan
- Vanuatu mental health policy and plan 2009 – 2015
- Republic of Vanuatu National Plan of Action for Women 2007 – 2011
- Pacific Framework for prevention and control of NCDs

**Audit and stocktake of activities**

<b>Table 10: Performed activities of the Ministries</b>		
<b>Ministry</b>	<b>Activity</b>	<b>Comment</b>
Ministry of Trade	n/a	
Ministry of Public Utilities and Public Works	n/a	No facilities for rugby, aerobics is costly
Ministry of Internal Affairs	Walking	Limited facilities
Ministry of Youth and Sport	Futsal, Volleyball, Aerobics, Gym, walking	Monday, Wednesday, Friday lunchtime aerobics offered for the public. Big drop in number of participants
Ministry of Education	Futsal, Volleyball, Aerobics, Gym, walking	Often combined with Ministry of Youth and Sport
Municipal Council	Cancelled the policy	No activities
Department of Foreign Affairs	Volleyball, walking	Some people are too busy
Ministry of Public Service	Not much involved in activities	
Ministry of Lands	Not much involvement in any formal activities	IT section runs its own programme (5 people: swimming, gym, tennis)
Ministry of Finance (combined with statistics)	Volleyball, walking	Involve more people
Ministry of Health	Basketball, volleyball, walking,	More variety is needed

	footsall	
Prime Minister's Office	Walking (10-12 km), swimming, volleyball, beach volleyball, clean-up campaigns	
NGO Save the Children	Volleyball, clean-up campaigns, flower planting	
NGO Wan Smol Bag	Footsall, walking, basketball, volleyball and all sorts of sport activities	

### Major Activities



Key informants mentioned that sports were the most popular physical activities. Walking is also popular both as a means for transport and Wednesday afternoon activities. Transport walking is often out of necessity than as part of the *Walk for Life* programme. The major recreational and team sport activity is volleyball (23%), followed by footsall (soccer) with 11% participation. Interviews have shown clear gender differences: while women and men engage in volleyball activities, mostly men play footsall. The gym and clean-up campaigns are with 8% the 3<sup>rd</sup> leading activities of the *Walk for Life* programme. Aerobics was mentioned by only 6% although the Ministry of Youth and Sport offers free aerobic classes on Monday, Wednesdays and Fridays. Transport to the Ministry of Youth and Health seems the biggest barrier for involvement of staff from other ministries.

## Onsite interviews

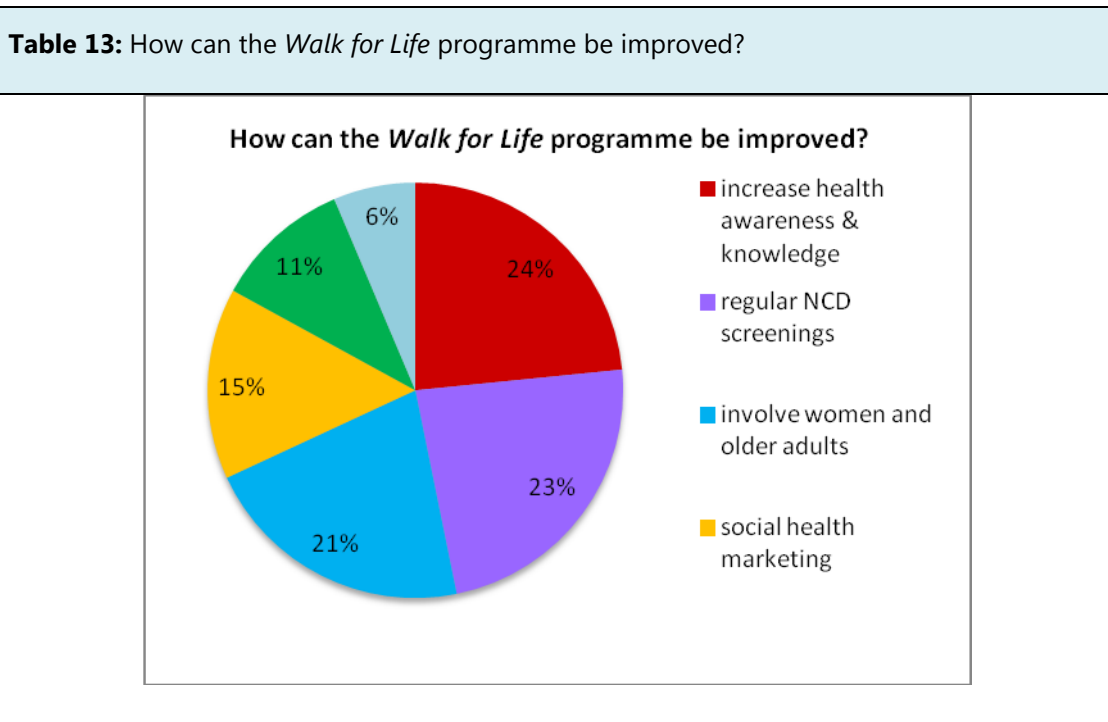
- Semi-structured interviews (see Appendix) have been used to gather data;
- Interviews were carried out by Ms Katja Siefken and Professor Grant Schofield;
- Answers to these questions were interpreted quantitatively.

The four core community sections to be addressed in the *Walk for Life* programme, outlined in the National Strategy to prevent and control non-communicable diseases (Vanuatu 2004-2009) have been addressed with varying effort and success.

<b>Table 12: Core Community sections / National Strategy to Prevent and Control NCDs</b>		
<b>Activity Plan</b>	<b>What has been done</b>	<b>What can be done</b>
<ul style="list-style-type: none"> <li>• To support the walking environment</li> </ul>	Footpaths have partly been developed, clean-up campaigns	More footpaths are needed. Roads are not safe to walk.
<ul style="list-style-type: none"> <li>• To increase awareness of benefits of physical activities</li> </ul>	No social marketing activities have been performed on the <i>Walk for Life</i> programme	Develop and implement a coordinating social marketing programme to promote physical activity and healthy lifestyles. Impact indicator: community awareness.
<ul style="list-style-type: none"> <li>• To promote physical activity events</li> </ul>	Inter-business between ministries competitions have been taken place in some ministries	Continuation is recommended, involvement of NGOs and more ministries
<ul style="list-style-type: none"> <li>• To develop physical activity opportunities</li> </ul>	Volleyball, beach volleyball and fussball activities have taken place in some ministries.	More facilities are needed for everyone to participate in the programme. Coordinated transport system should be arranged.

Given the above framework, we interviewed the informants and have summarised their answers to key questions (developed using the above framework) about the *Walk for Life* programme's policy development, implementation, challenges and and future direction.

From September 23, 2009 to September 29, 2009, 18 key informants (mainly focal persons from the Ministries, but also key positions from the Ministry of Health) have been interviewed about the *Walk for Life* programme. The following points were identified by key informants. The complete interview schedule and list of key informants can be found in the Appendix.

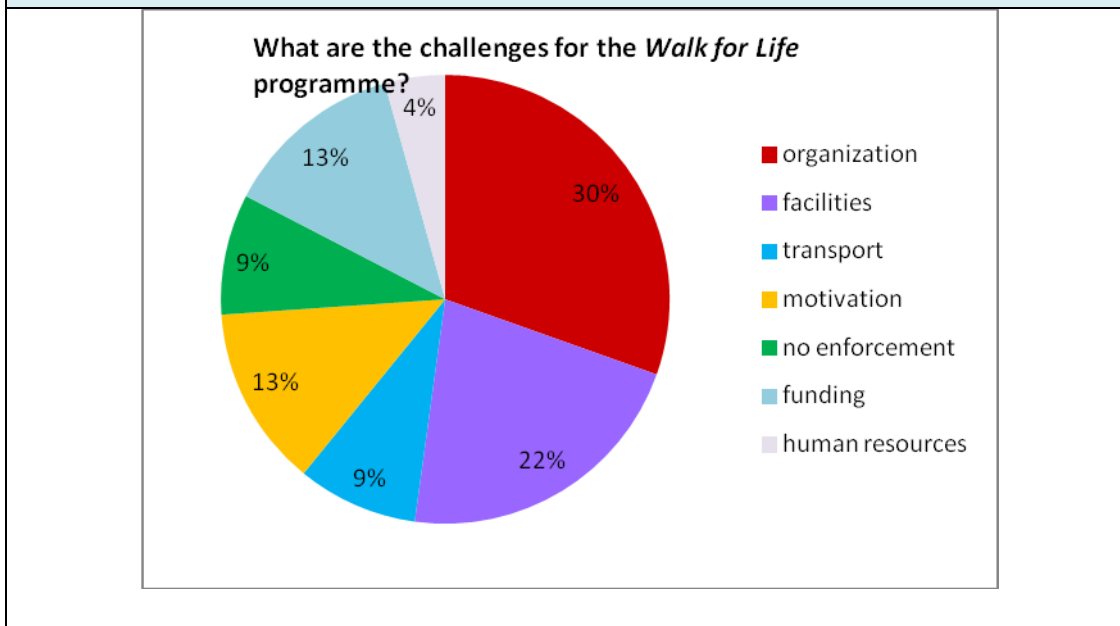


More direct health information for programme improvement has been suggested by 24% of key informants. This includes health education material (emails, posters, flyers), radio announcements, and press media about the benefits of physical activity and healthy living. The demand for regular NCD screenings, preferably every six months, was likewise high (23%). It has been suggested by 21% of key informants to pay particular attention to the involvement of high risk groups, i.e. women and older adults - cultural constraints and family commitments often hinder them from participation. It was also stated that older people (above 40 yrs) would not see the need for them to be physically active.

Several ministries (15% of key informants) have asked for more advertising and social marketing about the programme and about physical activity in general. Tools like radio, TV, the government intranet, posters, and flyers were suggested to increase awareness about the programme and about physical activity in general.

It has been suggested by 11% of the key informants to have more cross-agency sporting competitions and 6% mentioned that the involvement of more high-level positions from the Ministries could be helpful.

**Table 14:** What are the challenges for the *Walk for Life* programme?



Organisational issues have been identified as the major challenge for continuous participation in physical activities by 30% of the key informants. We were told that focal persons find it difficult to organise the activities well (due to time constraints) and to plan in advance. Some Ministries have Wednesday afternoon meetings which hinder participation in activities.

The lack of facilities has been identified as a major issue for continuous participation in the *Walk for Life* programme by 22% of the key informants. The only chance to engage in physical activities is walking at the beach site for several ministries.

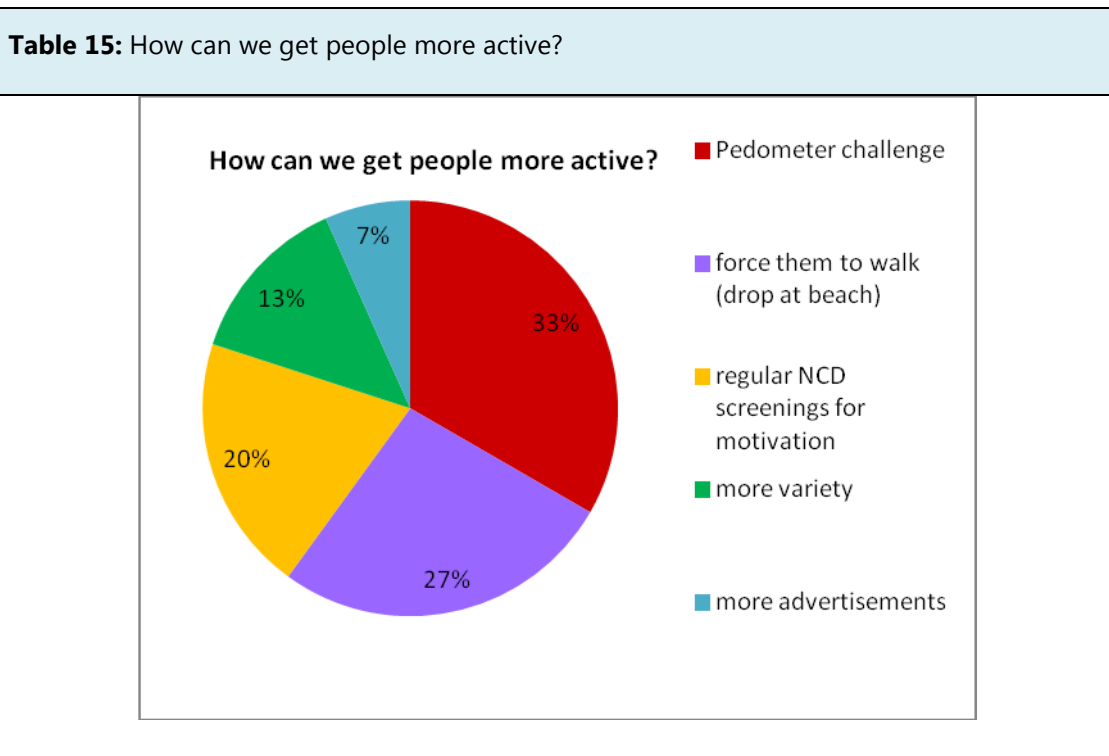
Motivation has been identified by 13% of the key informants as a major challenge for physical activity participation. This can be tackled with motivational interviews, health education and other incentives such as pedometer challenges (create team spirit, mutual motivation) and award systems.

Budget issues is considered as a major challenge for the *Walk for Life* programme by 13% of the key informants. "Doing sports is expensive here", said the sport coordinator from the NGO Wan Small Bag. If funding was better, more people could use the gym, invest in sporting equipment (e.g. pedometers) and organise more cross-agency sporting competitions.

Transport is considered to be a challenge for 9%. Although the Ministry of Youth and Sport offers regular lunchtime aerobics on Monday, Wednesday and Fridays and has a Gym which is open for the public for reasonable fees, many ministries would not be able to afford and/or organise the transport.

A minority (4%) of the key informants considered Human Resources as the major challenge for the programme. We were told that focal persons would not have enough time to organise activities, plus they would lack expertise in social marketing strategies.

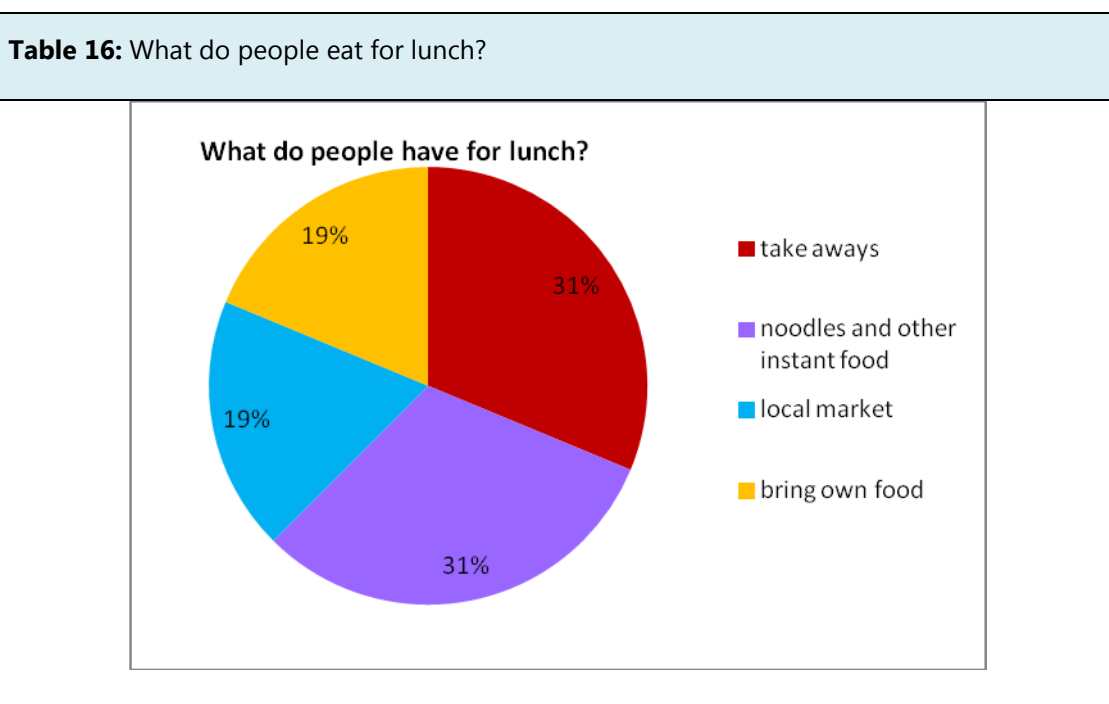




A pedometer challenge is seen as a positive tool to increase participation in physical activities by 33%. Another 27% consider compulsory walking as effective tools to increase employees' participation.

Regular NCD screening were mentioned by 20% of the key informants because it would increase employees' motivation to participate in activities.

More sport varieties (facilities) were mentioned by 13% of the key informants and 7% think that continuous advertisement would raise awareness and therewith activity levels.



When we asked the focal persons what staff members in their ministry would normally have for lunch, 31% of key informants stated that lunch would consist of instant noodles, tinned food (corned beef, tuna), bread and rice. Another 31% state that Chinese 'takeaways' are common options for employees.

Fresh food from the nearby market or food from home was mentioned by 19%.

It has been observed that lunch choices largely depend on the location of the ministry.

## **SWOT Analysis**

On the basis of the policy analysis and the onsite interviews we conducted a SWOT analysis (strengths, weaknesses, opportunities, threats) for programme analysis - a strategic planning method to evaluate the strengths, weaknesses, opportunities, and threats of the *Walk for Life* programme.

### **Strengths**

- Leadership of, support by and involvement of the prime minister's office (prime minister himself);
- NCD team from the Ministry of Health is highly committed to the programme;
- Ministry of Youth and Sport is highly committed and runs auxiliary programmes;
- Appointed focal people for activities in each ministry;
- Exemplary policy for Wednesday sports and physical activities;
- Focal people are often involved with social committee and they take a wider approach, e.g. with walking, swimming, clean ups and flower plantings;
- NCD screenings are well received by employees;
- Commitment from NGOs to use the same policy and engage in cross-institutional sport competitions;
- Programme fits nicely with the important role that sport and physical activity plays for Ni-Vanuatu.

### **Weakness**

- *Walk for Life* is not universally recognised within all ministries;
- Lack of commitment and/or engagement with leadership positions in each organisation, Director Generals and other senior management;
- Lack of formal training in NCD section, especially physical activities for the NCD team, Ministry of Health;
- Focal people are not always highly committed and have not necessarily high importance within the ministry;
- Transport, facilities and availability would be an issue if everyone participated;
- Funding, i.e. resources for transport, equipment, sport events;
- Not all staff are engaged in the programme and activities sometimes excludes older staff and female staff;
- No enforcement: some (a small minority) misuse policy and go home instead of doing sports;
- Municipal has no real commitment to the programme, has cancelled their policy and has no intention to create footpaths, and/or other sport facilities;

- Lack of a dedicated and organised person with sufficient time to communicate activities (Human Resources);
- Not all people are aware of the importance of physical activity and health (health awareness).

### **Opportunities**

- Engagement of senior management in the programme for each ministry;
- Cross-agency sporting competitions, which are already starting;
- Regular NCD screenings:
  - To raise awareness and motivation;
  - To refer clinically relevant outcomes;
  - To help with outcome assessment (monitoring);
- Further development of social committee model which is already used by some ministries;
- Further development of the *Walk for Life* brand for youth and social marketing (posters, intranet, national physical activity day).

### **Threats**

- Policy could be stopped by public service commission;
- Public criticism and/or reaction to the government time spent on physical activities;
- Focal people within each ministry are distracted by other duties (meetings).

## RE-AIM analysis

We used the RE-AIM framework as defined below to understand the *Walk for Life* programme. This framework provides a useful method for categorising the known and unknown outcomes of public health interventions. We have outlined any data we collected pertaining to each item below.

<b>Table 17: RE-AIM</b>	
<p><b>Reach</b></p> <p>The absolute number, proportion, and representativeness of individuals who are willing to participate in <i>Walk for Life</i>.</p>	<ul style="list-style-type: none"> <li>• The programme has been effective in reaching a majority of departments and ministries;</li> <li>• The depths of reach is limited, it attracts particularly young and active people;</li> <li>• Approximately 15% (135 of approximately 700) employees engage in regular activities, i.e. the majority does not make use of the programme.</li> </ul>
<p><b>Efficacy</b></p> <p>The impact of the programme on important outcomes, including potential negative effects, quality of life, and economic outcomes. Fr <i>Walk for Life</i> this would include Physical Activity levels and NCD risk.</p>	<ul style="list-style-type: none"> <li>• No NCD monitoring data exist that could reveal changes in physical activity levels or changes in NCD risks;</li> <li>• Another NCD screening is recommended to collect further NCD data and monitor reach of the programme.</li> </ul>
<p><b>Adoption</b></p> <p>The absolute number, proportion, and representativeness of settings and intervention agents (people who deliver the programme) who are willing to initiate the programme</p>	<ul style="list-style-type: none"> <li>• Good uptake by the departments and/or ministries means that all have a focal person and therefore some form of programme;</li> <li>• Some key informants have stated that they do not know much about the <i>Walk for Life</i> programme, but they would have Wednesday afternoon sport activities. The brand <i>Walk for Life</i> needs better marketing;</li> <li>• Significant variation in uptake of activities across ministries. In some ministries (e.g. Ministry of Health, Ministry of Youth and Sport) there is an excellent uptake and it is probable that this is contributing to the health profiles of people working in these ministries.</li> </ul>
<p><b>Implementation</b></p> <p>At the setting level, implementation refers to the intervention agents' fidelity to the various elements of an intervention's protocol, including consistency of</p>	<ul style="list-style-type: none"> <li>• Initial NCD screening in 2007 has been performed and almost all those invited to screening participated;</li> <li>• Strong political support exists for the continuation of the policy;</li> <li>• Strong support from a committed NCD team in the Ministry of Health;</li> <li>• There is variation in how well the programme is implemented</li> </ul>

<p>delivery as intended and the time and cost of the intervention. At the individual level, implementation refers to clients' use of the intervention strategies.</p>	<p>across Ministries and Departments. Some do very little while others are highly committed;</p> <ul style="list-style-type: none"> <li>• There are some at risk groups excluded by some activities in some Ministries (e.g., older women) the types of activities (mostly sports) offered.</li> </ul>
<p><b>Maintenance</b></p> <p>The extent to which a programme or policy becomes institutionalised or part of the routine organisational practices and policies. Within the RE-AIM framework, maintenance also applies at the individual level. At the individual level, maintenance has been defined as the long-term effects of a programme on outcomes after 6 or more months after the most recent intervention contact.</p>	<ul style="list-style-type: none"> <li>• The programme is very likely to continue and at this stage is well known and institutionalised into the public service culture;</li> <li>• The programme is very likely to improve with more resourcing and more time for focal persons;</li> <li>• We have no data on how individuals have come in and out of being physically active as a result of this programme (see efficacy above). This we have no way of ascertaining individual maintenance.</li> </ul>

## ***Walk for Life* – summary and recommendations**

Overall the *Walk for Life* programme should be regarded as a successful physical activity health promotion policy action. Although there are no outcome results for NCD risk changes, or increases in health-related physical activity there is ample process evidence for successful outcomes. That said, the people most at risk are still those least touched by this programme, and therefore there is some possibility of this programme at least perpetuating existing social and health inequalities. Sport is a strong cultural tradition and is seen as socially acceptable in Vanuatu and for this reason engages many people. However, other activities such as walking are popular but could become more central to the programme.

The implementation of the programme through committed government policy and development of human infrastructure (the focal people at each Ministry and the commitment of the NCD team) are particular strengths and innovations of this programme.

The following recommendations have been made after a thorough evaluation of the *Walk for Life* programme: on-site assessment, face-to-face interviews with *Walk for Life* focal people, various Ministry and Department officials from 17 government areas, Ministry of Health officials, and interviews with the NCD coordinator. For the continuation of the *Walk for Life* programme and for improved health outcomes of the Vanuatu Public Sector, we recommend the following:

Clearly some of these recommendations have resource requirements which will likely exceed the government's commitment to the programme. These are a best-case scenario guide and should be taken in that context.

## Overall recommendation

<b>Table 18:</b> Overall <i>Walk for Life</i> recommendations
<b>The policy of Wednesday afternoon sports and physical activity should continue.</b>
<b>In order to increase participation, the following may be considered:</b>
<ul style="list-style-type: none"> <li>➤ Further training of the NCD team and focal people in programme implementation, and NCD risk assessment;</li> <li>➤ Regular NCD screenings across government. Every 12-24 months would be sufficient;</li> <li>➤ Communicate a written policy to all staff members;</li> <li>➤ Use alternative means to help engage those most at risk and not currently engaged in physical activity (e.g. pedometer challenge);</li> <li>➤ Development of role descriptions for focal people and incorporation of this role into formal job descriptions;</li> <li>➤ Regular inter-agency sport competitions / events coordinated by the Ministry of Health and/or the Ministry of Youth and Sport;</li> <li>➤ Address expanded national and expanded community strategies, outlined in National Strategy to Prevent and Control Non-Communicable Diseases Vanuatu (2004-2009). Within these is a need for the social marketing of physical activity. Such a marketing campaign could initially fall under the <i>Walk for Life</i> brand and start within the Public Service sector;</li> <li>➤ Develop an arching settings approach to support healthy workplaces across the Pacific. This would assist in translating the successes of the <i>Walk for Life</i> programme to other Pacific countries, and make available resources to assist Vanuatu in future work.</li> </ul>

## **Training for NCD team and focal people**

The NCD team in the Ministry of Health may benefit from further training in physical activity programme implementation and social marketing. Focal persons in each ministry could benefit from training (a workshop) on Pacific health, physical activity health promotion, and project planning. This will strengthen team spirit (within focal people), increase cross-agency communication and competitions, and give focal persons more functional expertise and credibility within each Ministry.

The focal people could meet more regularly (once a month) for programme planning and organisation of cross-agency sporting events. The focal group can be an important element of programme empowerment. The group is meant to consist of well-trained individuals that demonstrate high level motivation and engagement in the programme. The focal group ideally received special training for peer educators.

## **Regular NCD screenings**

Overwhelmingly NCD screening was seen as a positive and constructive assessment tool. Regular NCD screening (every 12-24 months) and health advice is advised to be promoted and implemented by the Ministry of Health. This will require appropriate resourcing and is important for

- Raising health awareness;
- Referring clinically relevant outcomes;
- Helping with outcome assessment.

## **Communicate the Walk for Life policy to all members of the setting**

A written policy, combined with some social marketing material promoting the *Walk for Life* programme would support the programme. Currently most employees know of the Wednesday sports policy, but do not all necessarily understand that this is the *Walk for Life* programme, and the reasons for the programme. Social marketing tools can be used to raise awareness. A flyer / poster could be uploaded in the intranet and put on the Ministry's blackboard. Health marketing can be highly effective: posters, flyers and other means of communication constantly remind employees about the *Walk for Life* programme and the need to be physically active.

## **Engage the highest risk population**

For the involvement of all Public Sector staff members, it is crucial to give particular attention to those people who are at highest risk for non-participation. Interviews reveal that the older population is less engaged in, and less motivated to participate in the *Walk for Life* activities. Those above 40 years and all women need direct involvement.

The Ni-Vanuatu culture is characterised by strong gender roles which can result in disadvantages for women when it comes to participation in sport and recreation activities. Several key informants stated that activities are often not seen as appropriate for older women because of cultural constraints. We recommend especially addressing the physical activity needs



of women above age 40 as the highest risk sub-group. There are committed female health staff such as Jennifer Timothy in the Ministry of Health who may be willing to assist in this area.

A 10,000 steps pedometer challenge is an activity which has been shown to engage and motivate the high risk population in similar settings in other countries, i.e. to involve older adults and women in daily walking. It would further raise awareness of the benefits of accumulating the habitual physical activity. Cross-agency step competitions can serve as an entry point for habitual walking.

### **Formal Job descriptions**

Formal job descriptions for focal persons should be designed in each ministry which should become incorporated into the overall job descriptions and performance management process. Formal job descriptions for focal persons should contain roles and responsibilities that are required for the organisation of *Walk for Life* events. This includes project planning, management, role modelling and regular participation. More dedicated time, resources, formal responsibility and mandate to carry out that responsibility is likely to be highly beneficial in some ministries. This would allow focal persons to organise, lead and implement the *Walk for Life* programme activities.

### **Regular inter-agency sport competitions**

Continuation of existing plans to organise regular inter-agency sport and competitions. Non-competitive events for sporting and physical activity, clean-up campaigns and other activities that involve the community are advised to be included.

### **Involvement of target group in design of the programme**

In order to fully convince employees of the *Walk for Life* programme (especially the high risk groups mentioned previously) it is crucial to involve the group in the decision-making process. Behaviour change will only occur if the behaviour is addressed and framed within its social environment since it both influences and is influenced by its social context (McKee 2000). Emphasis on individual behaviour can be inadequate in a community where personal behaviour is as much a community-based process. Informal consultations / agreements prior to Wednesday afternoon activities with employees involve the whole team in the decision-making process.

### **Address expanded national and expanded community strategies**

For the extension and sustainability of the programme, expanded national and strategies, as outlined in the National Strategy to Prevent and Control Non-Communicable Diseases, Vanuatu 2004-2009 are advised to be addressed. This includes to expand physical activity opportunities through provision of equipment (sports equipment, more gyms and aerobic classes, reduced fees) the support for local resources and the support of further walking environments (more parks, footpaths and lights and footpaths).

## **Develop an overarching settings approach to support healthy workplaces in the Pacific**

We believe that an overarching settings approach to support healthy workplace programmes in Pacific countries would benefit both Vanuatu, and the wider Pacific region. A wider settings approach would mean that the successes of the *Walk for Life* programme could be translated to other countries. At the same time, the *Walk for Life* programme could benefit from resources developed to cover a wide settings approach across the region.

We recommend the design and application of tools and strategies that have evidence-based outcomes for NCD prevention using workplaces as settings. These tools would be flexible and adjustable to different Pacific cultural and social contexts.

### **For the setting approach, we suggest the following as broader regional strategies:**

- Design a physical activity toolkit for the workplace in the Pacific region;
- Do research on healthy workplaces activities, i.e. answering the 'what works' question through involvement in current healthy workplace programmes as external assessors. Carry out evaluation of progress - covering formative, process and outcome evaluation;
- Create a network for healthy workplaces in the Pacific;
- Assist in the development of flexible resources for programmes running in workplaces.

## **Appendices**

- Table of key informants for consultation on this report
- Interview schedule

<b>Appendix 1: Key Informants</b>			
<b>Organisation</b>	<b>Name</b>	<b>Title / Responsibility</b>	<b>Contact details</b>
Ministry of Trade	Joe Pakoa, George, and Kally Iopa	Focal points	jpakoa@vanuatu.gov.vu kiopa@vanuatu.gov.vu
Ministry of Public Utilities and Public Works	Harrison Luen	Assistant coordinator	hluen@vanuatu.gov.vu
Ministry of Internal Affairs	Ien Abbil	Coordinator, focal point	iabbil@live.com
Ministry of Youth and Sport	Richi Kipe	Assistant focal point	rkipe@vanuatu.gov.vu
Ministry of Education	Liku Jimmy, Maxime, Pierre	Social Committee	ljimmy@vanuatu.gov.vu
Municipal Council	Robert	Assistant focal point	No email
Ministry of Public Service	Neti Dick	Coordinator, focal point	ndick@vanuatu.gov.vu
Ministry of Lands	Josiana Jackson	IT section	jjackson@vanuatu.gov.vu
Department of Foreign Affairs	Henlyn Saul	President of social committee	hsaul@vanuatu.gov.vu
Ministry of Finance (combined with statistics)	Seres Simeon	Manager payment section	csimeon@vanuatu.gov.vu
Ministry of Health	Jennifer Timothy	NCD	jtimothy@vanuatu.gov.net
Ministry of Health	Jerry Iaruel	NCD	jiaruel@vanuatu.gov.vu
Ministry of Health	Graham Tabi	NCD	gtabi@vanuatu.gov.vu
Ministry of Health	George Taleo	Acting Director of Public Health	gtaleo@vanuatu.gov.vu
Prime Ministers Office	Bethuel Solomon	Senior Policy Analyst	bsolomon@vanuatu.gov.vu
NGO Save the Children	Hilson Toaliu	CEO	cpdirector@sca.org.vu
NGO Wan Small Bag	Jo Dorras	Director	jopet@vanuatu.com.vu
NGO Wan Small Bag	Peter	Sports coordinator	pbellpakoa@gmail.com

<b>Appendix 2: Interview Schedule</b>		
<b>DATE</b>	<b>NAME OF ORGANISATION</b>	<b>MEETING TIME</b>
23 <sup>rd</sup> September 2009	Ministry of Agriculture	8:00am – 9:00am
	Ministry of Trade	9:00am – 9:15am
	Ministry of Lands	9:15am – 10:00am
	Ministry of PU& Public Works	10:00m – 12:00am
	Ministry of Internal Affairs	2:30pm – 3:00pm
	Ministry of Justice	3:00pm – 4:00pm
	Ministry Of Finance	4:00pm – 4:30pm
24 <sup>th</sup> September 2009	Ministry of Youth & Sport	8:00am – 9:30am
	Ministry of Education	9:30am – 10:00am
	Port Vila Municipality	10:00am – 10:30am
	Foreign Affairs	10:30am – 12:00am
	Public Service Commission	1:30pm – 4:30pm
25 <sup>th</sup> September 2009	Ministry of Health	8:00am – 12:00am
	Save the Children Australia	1:30pm – 2:00pm
	Youth Challenge International	2:00pm – 2:30pm
	World Vision Vanuatu	2:30pm – 3:00pm
28 <sup>th</sup> September 2009	Ministry of Health/ Food Submit	8:00am – 5:00pm
29 <sup>th</sup> September 2009	Prime Minister Office	9:00am – 11:20am
	Wan Smol Bag	1:30 pm – 2:00pm

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## Appendix M: Poster presentation resulting from the Walk for Life evaluation.

Presented at the 20th IUHPE World Conference on Health Promotion. July 2010, Geneva, Switzerland



### Evaluation of the *Walk for Life* healthy workplace policy: Vanuatu Government Public Service

Katja Siefken, Grant Schofield, Temo Waqanivalu, Rona Macniven, Adrian Bauman  
*Auckland University of Technology (AUT), WHO Office of the Representative of the South Pacific, University of Sydney*


TP-MON-255

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#### Introduction

The Pacific Island region includes twenty-two Pacific Island Countries and Territories (PICTs). The region has experienced a major shift in disease burden: noncommunicable diseases (NCDs) have overtaken communicable diseases and are a critical health and development issue.

The incidences of NCD risk factors in the Pacific region are among the highest in the world!



Country	Overweight prev.	Obesity prev.
Tokelau	93.5 %	74.7 %
American Samoa	93.5 %	74.6 %
Nauru	93.3 %	74.9 %
Kiribati	81.5 %	50.6 %
Marshall Islands	80.1 %	44.8 %
Micronesia (Pohnpei)	73.1 %	42.6 %
Fiji	62.8 %	29.6 %

\* Data Source: NCD Forum WHO / SPC, 2009

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#### NCD Mini Step Survey Vanuatu 2007\*

Body Mass Index (BMI)	
Obesity	28.5%
Overweight	37.6%
Overweight and obesity	66.1%
Normal	32.7%
Underweight	2.0%

Physical Activity	
Only sedentary activities	67.1%
Doing nothing	31.0%
Physically active during leisure-time	55.6%

\* Data Source: Ministry of Health Vanuatu, 2007

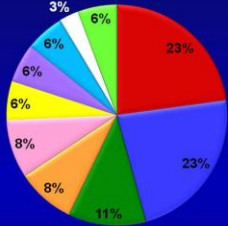
#### What is Walk for Life?

*Walk for Life* is a policy and a government response that aims to increase physical activity levels of government employees and to decrease the burden of NCDs in the Vanuatu Government's Public Sector.

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#### What are the major afternoon activities?

The policy is unique in releasing public servants from official duties across the whole of government at 3.00 PM Wednesdays to engage in PA. It is seen as a positive action by almost everyone interviewed.



#### Key findings

The uptake of Wednesday afternoon activities in each ministry is seen as a positive step towards NCD prevention. Interviews showed that female adults, above 40 years of age need particular attention in the engagement of physical activities.



The implementation of the programme through committed government policy and development of human infrastructure (the focal people at each Ministry and the commitment of the NCD team) are particular strengths and innovations of the programme.

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#### Aim

- To define reach, effectiveness, adoption, implementation, maintenance (RE-AIM) and strength, weakness, opportunities and threats (SWOT) of *Walk for Life*, so to examine best practices and improve NCD prevention campaign.
- To encourage the sharing of ideas, methods and experiences across the region.


#### Recommendations

**The *Walk for Life* policy should continue.**

- Further training of the NCD team in programme implementation and NCD risk assessment;
- Conduct regular NCD screenings across government. Every 12-24 months;
- Use alternative means to help engage those most at risk and not currently engaged in physical activity;
- Develop role descriptions for focal people and incorporation of this role into formal job descriptions;
- Organize regular inter-agency sport competitions / events coordinated by the Ministry of Health and/or the Ministry of Youth and Sport;
- Develop an arching settings approach to support healthy workplaces across the Pacific. This would assist in translating the successes of the *Walk for Life* programme to other Pacific countries.

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#### Methods & Location



- ✓ Formative analysis
- ✓ Policy analysis
- ✓ Audit and stocktake
- ✓ Onsite interviews
- ✓ SWOT analysis
- ✓ Re-aim analysis

www.cpan.aut.ac.nz      AUT CENTRE FOR PHYSICAL ACTIVITY AND NUTRITION      contact: katja.siefken@aut.ac.nz

## Appendix N: WHO Technical report: *Wokabaot Jalens*

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A workplace healthy lifestyle intervention for female civil servants in Port Vila,

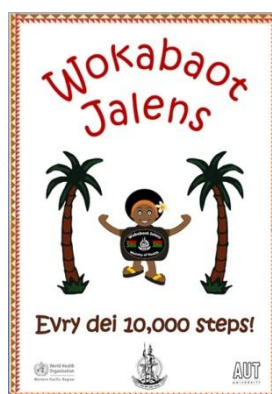
Vanuatu, 2011

# Wokabaot Jalens

Waes woman wokabaot blong laef – Evry dei 10,000 steps!

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Report prepared for WHO Western Pacific Regional Office



Prepared and researched by Ms Katja Siefken and Professor Grant Schofield

October 2011

**AUT University**

Centre for Physical Activity and Nutrition



## **EXECUTIVE SUMMARY**

In our *Walk for Life* workplace evaluation in Vanuatu (2009) we found that female civil servants are least likely to engage in physical exercises offered by the government. After consultation with the Ministry of Health and the World Health Organization, we aimed to design a novel program that particularly engages women in more exercises. Formative work was carried out in November 2010. The outcome assisted in the design of a culturally meaningful research-based workplace health intervention targeting female civil servants. In March 2011 Ms Katja Siefken (AUT University), Jerry Iaruel (MoH) and Hillary Garae (MoH) implemented the workplace program. It was externally monitored by the researcher for 12 weeks. Thorough data analysis indicates changes towards positive health outcomes, whilst evaluation processes highlight program strengths and areas for program improvement. The program was presented at the NCD forum in Tonga, 2011 and at the Pacific Health Research Symposium in Nadi, Fiji, 2011.

## **PURPOSE AND RATIONALE OF THIS REPORT**

This report presents a robust evaluation approach consisting of formative, process, and outcome evaluation. It describes the program from the initial stage of formative work, analyses and presents pre and post health screening outcomes and evaluates the program following program termination. We assessed opportunities and provide future recommendations. The report seeks to understand - within local, cultural and social structure - the effectiveness of a pedometer-based healthy lifestyle intervention in an urban Pacific island context. High demand on research findings from the Ministry of Health indicates strong interest and is likely to result in continued workplace policies or programs.

## **TARGET AUDIENCE**

This report serves as a record and guide for the Ministry of Health Vanuatu and for other Pacific health officials. It can serve as an entry point for the implementation of healthy workplace and community NCD prevention programs. Distribution to relevant stakeholders is recommended. The third Pacific NCD Forum in Tonga, August 2011, suggested each country to adopt this intervention – stakeholders are advised to aid in this process.



## **ACKNOWLEDGEMENTS**

This report was researched and written by Katja Siefken and Professor Grant Schofield from AUT University, Auckland, New Zealand. We would like to thank the Ministry of Health Vanuatu and the participants who provided crucial information for this program. We particularly acknowledge the assistance of Jerry Iaruel and Hillary Garae. We also acknowledge the support and guidance of Dr Temo Waqanivalu in the conception and development of this program.

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## **Introduction**

It is widely accepted that the most serious problem facing Pacific nations today is the rapid growth of non-communicable diseases (NCDs). Vanuatu is not excluded from this trend: in recent years, the urban population in Vanuatu has adopted a predominantly westernised way of life (FAO, 2003). According to the 1998 Vanuatu Non-Communicable Disease Survey Report, the consumption of traditional foods is lowest in the urban areas, whereas the consumption of non-nutritious imported food such as rice, fat/oils, canned and fresh meat/fish, milk and white bread is highest (Carlot-Tary & Hughes, et al., 2000). At the same time, habitual physical activity levels are considerably lower in urban areas than in rural areas where motorised vehicles and telephone communication are often non-existent (Siefken & Schofield, et al., 2010).

As a result, Vanuatu faces increasing overweight and obesity rates and NCD risk factors in urban areas. Whilst the burden of chronic diseases has not yet reached the dimension of neighbouring Polynesian countries, the urban population is advised to act and prevent the further spread of NCDs. Little research has been carried out in the country on healthy lifestyle behaviour. The outcome of this report will provide evidence on how to best design health interventions that may assist in reversing the growing NCD epidemic.

### **NCDs in Vanuatu**

Research from the 1980s indicates that NCDs were not a major health problem in Vanuatu, the Solomon Islands or Papua New Guinea (Gani, 2009). This is due to the relative prominence of infectious diseases (especially malaria, tuberculosis, pneumonia and intestinal infection), and a high proportion of rural population. However, anecdotal and some epidemiological evidence indicates that NCD rates started to increase in certain socio-economic groups in Melanesia since the 1950s - particularly in urban-dwelling civil servants, politicians, and professionals (King & Taylor, et al., 1984; Taylor, 1983; Taylor & Jalaludin, et al., 1991; Taylor & Ram, et al., 1984).

In 2007, the Ministry of Health Vanuatu and WHO carried out a first NCD risk factor Mini-Steps survey within government ministries and nongovernmental organizations in Vanuatu. Table 1 displays the health screening outcome.

<b>Table 1: NCD Mini Step Survey Vanuatu 2007</b>	
<b>Physical activity</b>	
Only sedentary activities	67.1%
“Doing nothing”	31.0%
Physically active during leisure-time	55.6%
<b>Body Mass Index (BMI)</b>	
Obese	28.5%
Overweight	37.6%
Overweight and obese	66.1%
Normal	32.7%
Underweight	2.0%
<b>Blood pressure</b>	
Low blood pressure	-
Normal blood pressure	85.0%
High blood pressure	15.0%
<b>Blood glucose</b>	
Normal glucose	88.2%
High glucose	11.8%
<b>Blood lipids</b>	
Normal cholesterol	66.3%
High cholesterol	22.6%
<b>Tobacco</b>	
Current Tobacco smokers	62.0%
Daily Tobacco smokers	49.0%

Regarding the modifiable risk factors the survey revealed that 67.1% of the screened population is involved in only sedentary activities and 62% are current tobacco smokers. No data have been collected on dietary intake.

Regarding the intermediate risk factors, 15% of the screened population has hypertension, 11.8% has high blood glucose levels and 22.6% show high cholesterol levels. 66.1% of the screened participants were either overweight or obese. Regrettably, this survey was not desegregated by gender.

The Vanuatu Government has acted upon these screening outcomes and implemented the *Walk for Life* program.

### ***Walk for Life assessment***

In 2007, the Ministry of Health implemented the *Walk for Life* program in order to increase physical activity levels of government employees and to decrease the burden of NCDs in the Vanuatu Government's Public Sector. *Walk for Life* is a workplace health program, releasing civil servants from official duties across the whole of government at 3.00 PM Wednesdays in order to engage in physical exercises. It is seen as a positive action by almost everyone interviewed during the evaluation process in September 2009. Regrettably, there are no data available to understand the efficacy of the program in terms of health risk, or health outcome.

The program has been described in detail in the *Assessment: Walk for Life Policy – Vanuatu Government Public Service* report (Schofield & Siefken, 2009). One of the report's key findings is that women participate least in the physical exercises offered by the government. This is due in part to family commitments, cultural and social constraints. Some comments expressed to the assessment team were "It is hardly tolerated for women to be active" and "Women are expected to prepare food for the family, instead of doing sports". We decided to investigate further in female's barriers and facilitators of adapting healthier lifestyles.

### **Formative work**

Little work has been carried out in the region in order to *understand* barriers and facilitators for healthy lifestyle behaviour. We have therefore conducted focus groups with female civil servants in order to inform the development of a culturally meaningful and acceptable health intervention program. The increasing popularity and use of focus group in formative work is well justified by various researchers (Barbour & Schostak, 2005; Sim, 1998; Veal, 2006). The researcher aims to learn what is meaningful or relevant to the people being studied (Neuman, 2005). Our work revealed – from an inside perspective – the most significant barriers and facilitators of ni-Vanuatu women for healthy lifestyles.



## Group discussions

In November 2010, two researchers visited the Vanuatu government and, after consultation with and with the assistance of the Ministry of Health, conducted six one-hour focus group discussions with 37 female civil servants in three ministries. Mean age of participants was 36 years. The intention of the group discussions was explained to participants. Clearly, participation was voluntary and all participants were asked to give written consent prior to the discussions.

During the focus groups, four general and rather broad questions were raised: (1) Is a healthy diet and exercise important to you? (2) What are the barriers for you to eat healthily and to exercise regularly? (3) What would help you be more active and eat healthier? (4) What can your workplace do to make you live healthier? Focus groups were recorded with a digital voice recorder. All data was transcribed verbatim, then coded and prepared for analysis. The qualitative interrogation of the data was supported by the NVivo 9.0 software package, which assisted the researchers in storing, integrating, indexing, and coding the data collected (Bazeley & Richards, 2000).

Figure 17: Focus groups\* Prime Minister Office



\*Focus group participants gave verbal consent to have this photo displayed in this report.

## Findings

The group discussions revealed crucial information needed to understand ni-Vanautu women's perceptions towards healthy lifestyles. Barriers and facilitators are outlined below.

### Barriers

The major evaluative themes identified in relation to barriers towards physical activity (PA) and healthy lifestyles were identified as:

- financial limitations
- family commitments
- environmental aspects
- motivational hindrances
- cultural restrictions

Financial limitations were raised as the main barrier for living a healthy lifestyle in an urban setting. Locally produced fresh food items were generally defined as 'too expensive', while cheap imported food such as instant noodles, white rice, macaronis and tinned tuna were listed as the most popular and common lunch options. Financial aspects were generally pointed towards food items, rather than exercise equipment.

Further, limited time and workload was cited as a barrier to engage in more regular PA. "We have to finish our work and look after the kids too". Some participants therefore suggested having a workshop on time management skills: "Yes, we need to know how to plan the day".

A more exercise-friendly environment was requested by several participants. Exercise facilities and healthy food provision in and around the workplace can contribute to living a healthier lifestyle. One participant mentioned there is a demand for exercise equipment at work, because it would allow ladies to exercise "without being scared of dogs, traffic or other unsafe road conditions". All groups reported that healthy food options at the workplace are currently very limited. One participant said "There is no healthy option here" and suggested to create a healthier food environment in and around the workplace. In confirmation of these comments, the lead researcher observed that nearby shops mainly sell Chinese noodles, tinned food and other non-nutritious food options. A number of women emphasised safety issues as a personal barrier, as some women feel unsafe being outdoors by themselves. "Where I live, you're "frait long man" (scared of the man), it is not safe anymore. You might be raped or something."

It was mentioned that a lack of incentives hold women back from engaging in regular exercise. Team support and walking buddies were suggested to motivate participants and to increase commitment. *"I just need someone to motivate me, friends or a team"*. In relation to this, participants also reported on the need of more incentives to eat healthier food and adapt healthier lifestyles overall. Different suggestions were provided by participants, such as weight control mechanisms and other regular health checks.

Cultural aspects were raised throughout the discussions by several participants, from both the younger and older generations. In particular, a lack of support from the husband, cultural dress codes and a lack of understanding from the neighbourhood or local community were mentioned as potential barriers to PA. *"You know, in our custom, ladies are back at home"*. It was further mentioned that spouses could potentially envy their wives if they engaged in exercises: *"[The husband] may be jealous and asking 'What are you doing? No, stay at home and look after the children'"*. Mentality and cultural restrictions seem to portray crucial barriers for regular PA of ni-Vanautu women.

Interestingly, PA is generally understood as leisure time exercise and not merely physical movement that can be accumulated over the course of the day through different forms of activity (transport, leisure, occupational).

### **Facilitators**

The discussions further turned towards opportunities that would support participants in taking up healthier lifestyles. Findings were categorised into four emerging themes. Identified facilitators include:

- supportive environment and workplace facilities
- social support
- motivation and fun
- health policies

A more supportive environment and workplace facilities were suggested as facilitators for healthier lifestyles. Our study suggests that a supportive environment for healthy lifestyles at the workplace requires the provision of suitable and functional resources and facilities, including basic sport equipment (e.g. changing rooms, treadmill), small kitchen areas and water fountains.

Numerous participants reported on the importance of social support mechanisms that would assist them in adopting healthier lifestyles and, particularly, engage in more regular PA. Three

mechanisms of support were identified by the participants: team support, leadership support and family support.

Findings further indicate the high value of fun-elements for ni-Vanuatu women. *"We want to have fun just within in the group of friends. We want to laugh."* Fun and enjoyment has previously been identified as a crucial element of PA interventions (Zimmerman, 2009). For example, a successful Tonga Healthy Weight loss program has proven that an emphasis on fun and enjoyment stimulates participation in physical exercises in Pacific people (Englberger & Halavatau, et al., 1999).

It was further proposed to provide incentives for the target group to partake in more physical exercises. The initiation of regular measurements of health indicators, including weight, Body Mass Index (BMI), blood pressure and blood sugar was suggested. These indicators are rarely available to people in Vanuatu. Hence, they are expected to stimulate and support participants to take up a healthier lifestyle. This is an important finding which may have wider implications for the allocation of financial resources within government agencies. Our findings suggest that the provision of regular health checks will improve regular PA levels, which is likely to result in a more 'healthy work environment' capable of improving work motivation and productivity.

Several participants suggested introducing workplace health policies which could assist employees in adapting healthier lifestyles. It was recommended to outlaw unhealthy food options (such as Chinese instant noodles and macaronis) in the workplace and invest in and install small kitchen areas in order to enhance the supportive environment. This would allow and encourage women to bring fresh food to work.

Moreover, a stronger official focus on the current Wednesday afternoon-activities was recommended. For example, one woman argued that if these activities were in fact compulsory, it would allow everyone, irrespective of job rank position to engage in the weekly physical exercises.

Overall, we argue that in order to enhance population health in the Pacific it is crucial to implement healthy lifestyle programs that takes these barriers and facilitators into account.

## **Program design of Wokabaot Jalens**

In an attempt to design a novel, culturally meaningful health intervention for ni-Vanuatu women, barriers and facilitators for healthy lifestyles identified above were taken into account.

The Wokabaot Jalens program was designed in accordance to participants' needs and wants. Individual suggestions were taken into account, aiming to design a locally meaningful program. Based on interviewees' thoughts and input, the program consists of four components:

- Team-based step challenge
- 1 Million individual step challenge
- Social marketing tools
- Health education materials.

Each component is described in greater detail below.

### **Team-based step challenge**

From our formative work outcome we understand that ni-Vanuatu women are more likely to choose walking for leisure time PA over any other sport activity. At the same time, they confirmed they favoured a team-approach over individual exercise activities. A potential facilitator identified was social support, thus it was assumed that team-based health activities can result in positive health outcomes, thus the team-based step challenge was designed. Participants were grouped into teams and were advised to take 10,000 steps per day. On a fun basis, groups compete against each other and aim for the highest weekly and total team step number.

Participants form teams of two to eight. Grouping occurs based on departments, friendship, residential location and/or getting along, in order to enhance mutual motivation and walking participation.

- Social support: several approaches are applied to enhance social support mechanisms:
  - Step captains: step captains motivate and encourage team members, initiate team activities and report total team step numbers back to the researcher. An initial step captain session trains appointed step captains and provides further instructions.
  - Bonding: each team appoints his own team name to generate bonding, communal feeling and feeling of responsibility;

- Motivation: each group member is instructed to motivate and encourage one another. A pre- and post health screening, as identified above as a potential motivator, is conducted to examine health outcomes. Weekly team activities support individuals with lifestyle changes. Weekly external support is provided through the researcher via health information emails.

## **1 million individual step challenge**

Participants are encouraged to engage in an individual 1 million step challenge. Individuals who accumulate 1 million steps in 100 days would achieve the 10,000 steps/day recommendation and therewith the official Pacific physical activity recommendation (WPRO & SPC, 2008).

The intention of the 1 million step challenge is to motivate participants for further action. If, for example, some team members' participation is lower than expected, an incentive for the more motivated team members' will remain and they are not excluded from competing. Since some individuals might favour individual activities (due to timing difficulties) over team activities, they continue to be fully included in the program.

## **Social marketing tools**

Social marketing tools were designed in order to raise awareness, motivate, facilitate exchange and stimulate for action for the adoption of healthy lifestyles.

- A visual walking map (A0 poster) of the islands of Vanuatu pictures walking distances and step numbers (see Appendix);
- T-shirts were designed for the step captains to create a feeling of importance, trustfulness, respect and responsibility; T-shirts were also given to team challenge winners.
- A walking log was provided to each participant. The walking log (Dei Wokabaot Buk) includes information about healthy lifestyles, the program and tables for daily step numbers to be recorded and reported to the step captain.
- A step captain manual was provided to each step captain with further information regarding team motivation, program adherence and further health advice. A log for the teams' step numbers is provided.
- Posters with health information and advices were distributed as hard-copies and electronically;

- A website was designed to collect information from the teams' activities and provide easy access to all participants. Consent of participants was sought prior to posting on website. All information remains anonymous. (<http://wokabaot.blogspot.com/>)
- Healthy lifestyle information was provided on a weekly basis to all participants. Readers are encouraged to share information with their colleagues, families and further communities.

## **Health education**

Various health information approaches were applied in order to inform participants about lifestyle choices. Local food consumption and locally attractive activities were promoted to stimulate action.

- Initial health seminars informed participants about the relevance of healthy lifestyles, NCD prevention, PA and healthy eating behaviour.
- Step captains were specifically trained to encourage and support team members and to provide them with adequate health information;
- Participants received tailored health messages from the researcher during the first eight weeks per email;
- Step captains reminded and encouraged group members to achieve their daily step goals and to eat healthily. Group sessions were conducted fortnightly in order to enable sharing of experience, thoughts and challenges;
- Sustainability: after program termination participants were repeatedly encouraged to continue monitoring their step numbers and to maintain the lifestyle change. Moreover, the program was handed over to the Ministry of Health who may decide whether the program should be adjusted to male participants. A repeated health screening twelve months after implementation is recommended to determine long-term health effects of the intervention.

## Program implementation

After an extensive process of preparing materials, collecting information and communicating with the Ministry of Health, the Wokabaot Jalens (which is a Bislama term and translates into 'walking challenge' in the English language) was implemented in Port Vila, Vanuatu on March 28, 2011. The Assistant Director of Public Health, the NCD team from the

Figure 18: Participants lining up for program registration



Ministry of Health and the researcher from AUT University initiated the official opening. All female civil servants (~200) from Port Vila were invited by email to attend the opening. Approximately 150 interested female civil servants attended the session in Ex-FOL. After the opening remarks, given by the Assistant Director of Public Health, the researcher gave a 60 minute presentation about current NCD challenges in the Pacific region, followed by the program that could help prevent chronic diseases in the future. An open discussion was encouraged during the talk in order to involve the audience. TV Vanuatu and Radio Vanuatu were present and recorded a short stream and interview about the planned activities. After the talk, participants were given the opportunity to register for the program and an overwhelming number of 207 participants signed up. There was a higher demand than opportunities to involve all interested individuals, as the research team was equipped with supplies for a maximum of 200 participants. Approximately 250 individuals showed interest and the NCD team was told that many more friends and colleagues wish to join. Regrettably, some individuals could not partake in the program.

Individuals who registered for the program were equipped with a Yamax SW200 pedometer, an Actical waist band (the majority of ni-Vanuatu women wears dresses, the waist band assists in wearing the pedometer) and the Dei Wokabaot Buk (walking log). Participants wore the pedometer for 24 hours in order to collect a baseline step number which was used in the health screening the following day. At the same time, they were asked to form teams of 5-6



participants to their liking. Generally, teams were based on Ministries. However, some individuals joined teams of nearby ministries or those of friends. The Ministry of Health provided a few extra pedometers of the same brand. Eventually, 39 teams with a total of 207 individuals registered for the program.

## Health screening

The NCD team from the Ministry of Health was trained for the upcoming NCD health screening. Questionnaires were explained, the taking of health measurements was demonstrated and room for questions and discussion was provided. The NCD team felt overall familiar with the processes and was motivated to conduct the health screenings in the subsequent 4 days.

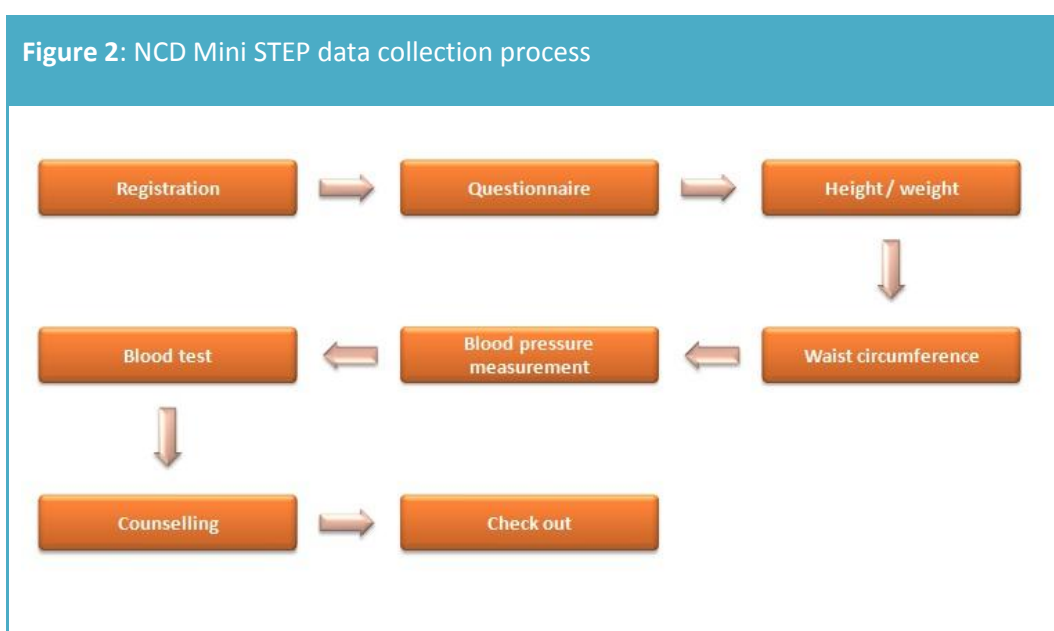


Figure 2 illustrates the processes of the health screening. Each program participant attended a face-to-face structured interview in which questions on behavioural risk factors, i.e. tobacco use, alcohol consumption, fruit and vegetable intake and exercise behaviour were asked. A copy of the adapted Mini STEP questionnaire can be found in the Appendix of this report. Interviews were conducted by the local Ministry of Health NCD team in the preferred local language.

Physical measurements of height, weight, waist circumference and blood pressure were taken after registration. Height was measured once using a portable tape measurement to the nearest whole centimeter. Weight was measured once using a portable scale to the nearest 0.1 kg. Participants were measured without shoes and wearing only light clothing. Waist circumference was measured once using the tape measurement and recorded to the nearest .1cm. A digital blood pressure unit was used to measure systolic and diastolic blood pressure (BP). Resting (sitting without talking) BP was measured first, followed by a second measurement taken with

one minute interval. Both readings were recorded for each participant. The 2<sup>nd</sup> reading was used for analysis.

Biochemical measures include fasting blood glucose, HDL cholesterol and triglycerides. Participants were instructed to fast from 10:00pm the previous night until when their blood



samples were collected the next morning. A small drop of blood was placed on a disposable test strip and inserted into the Cardiocheck analyser. After completion of these biochemical measurements, participants were counseled by the researcher and recommendations for health change were provided.

All completed questionnaires were collected and checked for completeness by survey personnel at the checkout

station. Each participant received a result form with their individual health screening result. The questionnaires were kept by the researcher. Participants, who were identified during the measurements as high risk or chronic patients, were referred for further counseling and monitoring with Mr Iaruel, Ministry of Health.

Baseline qualitative questions were included in the questionnaire in order to detect perception, knowledge and attitude towards healthy lifestyle. Follow-up surveys will detect changes in attitudes, beliefs and knowledge on PA and healthy lifestyle behaviour.

## Equipment

Measurements: Materials for the NCD screening include a portable scale, measurement tapes, an electronic blood pressure unit, Cardiocheck analyser (HDL cholesterol, triglycerides and fasting glucose), and the adapted WHO Mini STEPS survey.

WHO Mini Steps survey: A hard copy of this questionnaire was given to all participants and asked to be completed with the Ministry of Health assistants while waiting for their allocated measurement time.

Pedometers of the brand Yamax SW200 are considered to be one of the most reliable pedometers for research. Each participant was equipped with Yamax SW200.

Actical waist band: It is local tradition for women in Vanuatu to wear island dresses. In order to encourage everyone to wear the pedometer (especially older adults), Actical waist bands were provided to all participants.

Individual activity logs (Dei Wokabaot Buk) were used to document the history of each participant's step accomplishments and occurrences related to her goals and objectives. Activity logs have been shown to document participants' actual levels of participation in team activities better than do recalls alone. The brochure further includes information and tips on healthy lifestyle behaviour.

Team's activity logs (Step captain manual) are used to document the history of the team's accomplishments and occurrences related to the teams' goals and objectives. Each step captain received a copy of the Step captain manual. The brochure further includes information on how to motivate team members and healthy lifestyle tips.

### **Step captain training**

Prior to program commencement two step captain training workshops were held. Each step captain (team leader) was required to attend one training workshop. The workshop covered various topics about NCD prevention, healthy lifestyle, team leadership and motivation skills etc. It was an interactive group workshop; each attendant was required to contribute to the discussions and conversations. Role plays were included in order to prepare for the step captain role. The researcher received positive feedback about the content of the workshop and assumes that this preparation was essential for taking the role of responsible and successful step captains. Step captain feedback can be found in Chapter 5.3.

Figure 4: Step captain\* training session



\*Step captains gave verbal consent to have this photo displayed in this report.

## Aerobics opening for everyone

Figure 5: Aerobics opening



On Friday, April 1, 2011 an aerobics opening was initiated for all participants. Approximately 100 participants attended the exercise opening and were encouraged to use this initiative as an entry point for a sustainable long-lasting health behaviour change. TV Vanuatu attended the aerobics and

recorded a short stream which was broadcasted the following evening.

## Program monitored phase

From April 1<sup>st</sup> until July 27, the Wokabaot Jalens was monitored externally by the researcher Ms Katja Siefken. Each step captain was required to email each team member's step numbers back to the researcher on a weekly basis. The researcher set up step overview charts and sent a weekly step update to each participant via email. A minority of participants had no email access. The respective step captain was asked to forward the step and health information on to her team member via hard copy.

Figure 6: Share the healthy lunch / Ministry of Education\*



\*This photo was provided by participants who gave written consent to have this photo displayed in this report.

During the monitored phase, participants were encouraged to arrange walking and other sport activities with their team. Several teams reported they had organised lunch hour walks, lunch hour aerobics, afternoon walks, volleyball, office stretch session, beach walks on Saturday morning etc. Further it was mentioned that healthy eating arrangements were made within the teams. For example, the Ministry of Education arranged a "Share the healthy lunch" activity, in which each team member brought fresh fruits and vegetables to the workplace which was shared during lunch

hour. Other Ministries arranged a "walk down to the market" to increase their step numbers and

to purchase healthy food options. Different activities have taken place, some of them can be found at the website <http://wokabaot.blogspot.com>.

Participants were repeatedly encouraged to individually compete in the 1 million step challenge. If 10,000 steps are taken on a daily basis, this aim can be reached within 100 days, i.e. ~ 3 months. The researcher updated each participant on their weekly 1 million step progress via tables (see Figure 7). Surprisingly, the first individual completed the 1 million step challenge after only 6 weeks. This ambitious individual was interviewed by Vanuatu Daily post where she shares her success story (<http://www.dailypost.vu/content/wokabaot-jalens-program-very-successful?page=5>).

**Figure 7: Example 1 Million step challenge overview**

1 Million Step Challenge Week 1-8		
1.	Agnes David	1411612
2.	Carol Samuel	1379983
3.	Martine Bong	1359010
4.	Lehi Jimmy	1338356
5.	Lynette Yakume	1246007
6.	Marie Anna Markia	1203311
7.	Sandra Natuka	1088292
8.	Nairine Ala	1083486
9.	Adeline Gwero	1052515
10.	Leitangi Morris	1030938
11.	Esther Moses	1008431
12.	Nadine Alatoa	989286
13.	Irene Alick	987344
14.	Ruth Moise	966799
15.	Gina Barang	956984
16.	Jenita GARAE	939562
17.	Carolyn Mahana	936729
18.	Marie Sam	884701
19.	Christine Kapere	883702
20.	Touasi Tiwok	868868
21.	Kalli Babcock	863569
22.	Audrey George	847074
23.	Lina Doel	842130
24.	Monique Surai	836772
25.	Liah Noses	833754

During the 12 weeks of the monitored phase, participants were externally motivated through weekly health education emails, containing information about healthy eating, PA and healthy lifestyle behaviour. These emails were generally regarded as very helpful and several individuals reported to have them forwarded to their communities and churches.

Social marketing tools, such as a poster of the Vanuatu islands, the Dei Wokabaot Buk, the step captain manual, the pledge, health brochures, posters (see Appendix) and the pedometers all contributed to the seriousness of the program and participants felt 'important' when holding their Dei Wokabaot Buk. T-shirts with the Wokabaot Jalens logo were given to step captains as a symbol of responsibility that needs to be maintained over the 12 weeks and beyond.

## Program health outcomes

After 12 weeks the monitored phase had come to an end and the follow-up health screening was initiated. Katja Siefken conducted the health screening with the support of health students, arranged by the Ministry of Health Vanuatu. Whilst 207 participants had initially registered for the program and attended the 1<sup>st</sup> health screening in April, 133 individuals attended the 2<sup>nd</sup> health screening in July.

Reasons for absence were explained as

- a) being out of the country/island;
- b) being ashamed because of no weight loss;
- c) payday; and
- d) program drop out due to broken or lost pedometer.

## Health screening outcome pre vs. post

Table 3: NCD Mini STEPS surveys PRE and POST 2011		
<b>N=133</b>	<b>PRE %</b>	<b>POST %</b>
<b>Physically inactive</b>	47.0	25.8
<b>Overweight</b>	32.8	38.4
<b>Obesity</b>	45.6	37.6
<b>Mean BMI</b>	29.6	29.2
<b>Mean waist circumference</b>	96.0 cm	92.1cm
<b>Hypertension</b>	9.9	9.9
<b>Diabetes</b>	10.4	4.8
<b>Low HDL</b>	4.5	12.1
<b>High triglycerids</b>	16.8	25.6

Procedures in the post health screenings were carried out in the same mode as in the first screening, as described in chapter 4.1.1

**BMI**

Table 4: BMI Pre and Post		
BMI	Pre %	Post %
<b>underweight: 16-18.4</b>	1.6	1.6
<b>normal weight: 18.5-24.9</b>	20.0	22.4
<b>overweight: 25.0-29.9</b>	33.6	38.6
<b>obese: &gt;30.0</b>	45.6	37.6

The most commonly used measure for overweight and obesity is the Body Mass Index (BMI) - a simple index to classify overweight and obesity in adult populations and individuals. It is defined as the weight in kilograms divided by the square of the height in meters (kg/m<sup>2</sup>).

Mean BMI has changed from 29.6 to 29.2. The most significant change was a change from being classified as obese to being classified as overweight, which was experienced by 8% of participants. Overweight levels have changed from 33.3% to 38.6%. This increase is associated with a decrease in obesity levels. Obesity levels were lowered from 45.6% to 37.6%.

Mean BMI has changed from 29.6 to 29.2. The most significant change was a change from

Table 5: BMI PRE and POST by age		
Age category	BMI PRE	BMI POST
<b>15-24</b>	22.4	22.6
<b>25-45</b>	29.6	28.9
<b>46-65</b>	32.9	32.7

Interestingly, the youngest age group has experienced weight gain over the course of the program. However, mean BMI in this age group remains below 25.0 which is classified as normal weight.

The middle age group experienced the strongest change in BMI of 0.7 units.

The middle and the older age group experienced a drop in BMI, from pre 29.6 to post 28.9 in middle age participants and pre 32.9 to post 32.7 in older participants.

**Weight loss**

Table 6: Mean weight loss by age				
Age category	Mean weight PRE	Mean weight POST	Mean weight loss (kg)	
<b>15-24</b>	58.5	58.9	-.4	
<b>25-45</b>	75.1	73.5	1.6	
<b>46-65</b>	80.7	80.2	.5	

Mean weight loss for all ages is .9 kg.

The middle age group experienced the strongest mean weight loss with 1.6kg.

50.4% of participants experienced a weight loss of 0.1 kg-5 kg whilst 6.8% lost between 5-10 kgs.

<b>Table 7: Mean waist circumference by age</b>			
<b>Age category</b>	Mean waist circumference	Mean waist circumference	
	PRE	POST	
<b>15-24</b>	80.6	75.5	
<b>25-45</b>	95.6	91.7	
<b>46-65</b>	104.1	100.7	
<b>All</b>	96.0 cm	92.1 cm	

Waist circumference is important in calculating the risk of obesity co-morbidities. Changes in waist circumference reflect changes in risk factors for cardiovascular diseases and other forms of NCDs. There is an increased risk of metabolic complications for women with a waist circumference of  $\geq 88$ cm.

Findings show a mean reduction of 3.9 cm in waist circumference. Mean waist circumference after program

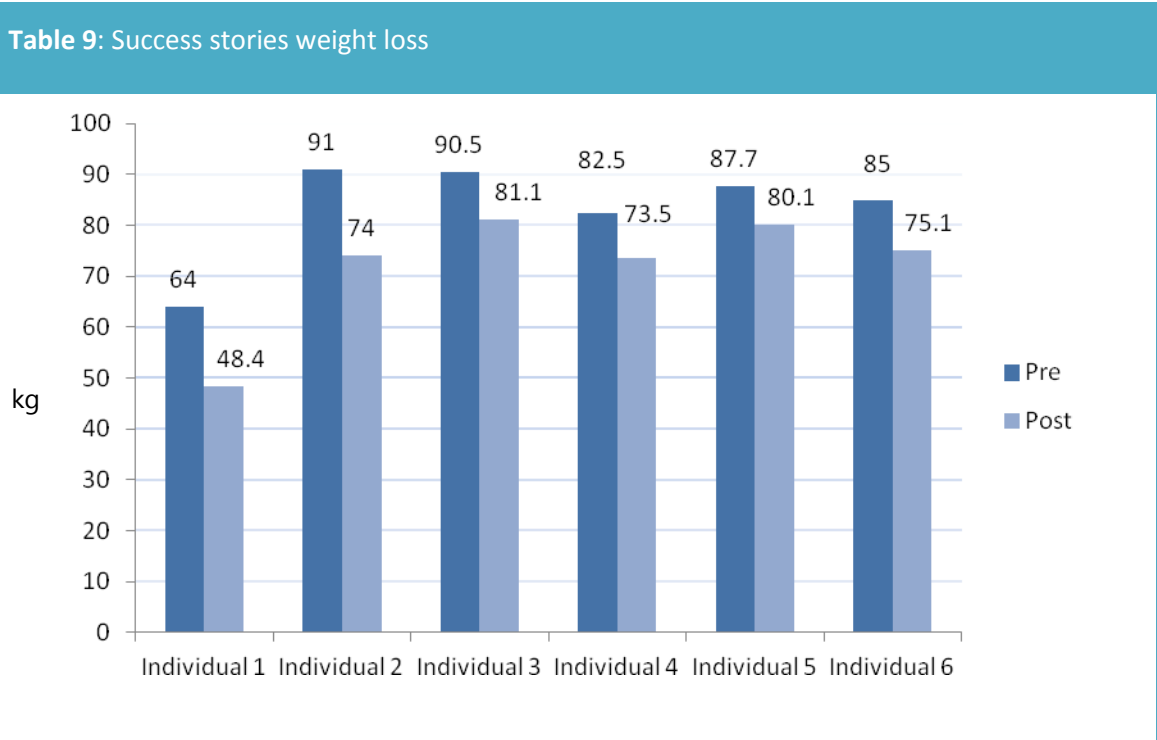
termination is 92.1 cm (still high CVD risk).

<b>Table 8: High CVD risk</b>		
	Pre %	Post %
<b>Normal</b>	32.8	37.6
<b>High CVD risk (&gt;88cm)</b>	67.2	62.4

Prior to program implementation, 67.2% of participants were classified as high CVD risk (>88cm), whilst after program termination 62.4% were classified as such. A decrease of 4.8% in the CVD high risk category was observed.

Several individuals experienced a significant change in body weight. Table 9 outlines the six most successful individuals regarding weight loss success. The biggest weight loss can be seen in the participant named Elsie Dick who also experienced a change in one full BMI category and moved from being overweight to being normal weight. Mean weight loss in these six individuals is 11.4kg.





### Hypertension

Hypertension is a risk factor for cardiovascular diseases.

The change in mean systolic blood pressure observed was an increase from 116 to 119 mmHg as shown in Table 10. Since a systolic blood pressure of 120 is considered to be normal, we regard this increase as insignificant. The middle age group has the lowest increase in BP.

The older age group has the highest mean systolic blood pressure (126.2) which is expected due to age.

Overall, the population has a desirable mean blood pressure.

**Table 10: Blood systolic pressure(BP) by age**

Age category	Mean systolic BP PRE	Mean systolic BP POST
15-24	105.5	112.6
25-45	115.8	117.9
46-65	123.4	126.2
All	116.4	119.1

### Fasting blood glucose

Table 11: Blood glucose levels		
	Pre %	Post %
<b>No risk</b>	80.8	90.4
<b>Impaired blood GT</b>	7.2	3.2
<b>Diabetic</b>	10.4	4.8

High blood glucose levels can cause long-term health problems associated with diabetes, including eye, kidney, heart disease and nerve damage. Fasting plasma glucose should be below 6.1 mmol/ml. Fasting levels between 6.1 and 7.0 mmol/ml are defined as impaired glucose tolerance and fasting levels at or above 7.0mmol/l are

diagnostic of diabetes (WHO & IDF, 2006).

80.8% of participant had normal fasting blood glucose levels prior to program implementation. This is an overall desirable number and improved to 90.4% after program termination. Generally, the target population has fairly healthy blood glucose levels. However, some individuals were diagnosed with impaired blood glucose tolerance (GT) and diabetes. Prior to program implementation 7.2% (9 individuals) had impaired blood GT, whilst after program completion only 3.2% (4 individuals) had impaired blood GT. Whilst 10.4% (13 individuals) had diabetic blood glucose levels before program implementation, only 4.8% (6 individuals) were diagnosed after the program. Mean blood glucose levels dropped from 95.2mg/dl to 89.3 mg/dl. Blood glucose levels below 110mg/dl are considered to be normal.

As shown in Table 12, the younger age group (15-24 yrs) had all normal glucose levels, both pre and post. Of the middle age category (25-45 yrs), 7.9% had impaired GT and 10.1% were diagnosed with diabetes during the first health screening. After the intervention, only 3.4% had impaired GT and only 4.5% were diagnosed with diabetes in this age category. The older age group (46-65 yrs) experienced a similar change in blood glucose levels. Whilst 8% were diagnosed with impaired GT and 16% were diagnosed with diabetes before program implementation, only 4% were diagnosed with impaired GT and 8% with diabetes. Both impaired blood GT and diabetes prevalence dropped by 50% in this age category.

**Table 12: Fasting blood glucose by age**

Age cat.	Glucose levels	PRE		POST	
		N	%	N	%
<b>15-24</b>	no risk	11	100	11	100
<b>25-45</b>	no risk	71	79.8	81	91.0
	Impaired GT*	7	7.9	3	3.4
	Diabetes	9	10.1	4	4.5
<b>46-65</b>	no risk	19	76.0	21	84.0
	Impaired GT	2	8.0	1	4.0
	Diabetes	4	16.0	2	8.0

**\*GT~ Glucose tolerance**

### Triglycerides

High levels of triglycerides in the bloodstream have been linked to atherosclerosis and, by extension, the risk of heart disease and stroke. High triglyceride levels are associated with the over-consumption of processed food and simple carbohydrates.

Pre mean triglycerides were 121.4 for all age groups, whilst post intervention 146.8. Normal triglyceride levels are below 150 mg/dl, thus this increase is not considered to be of significance. However, we recommend the MoH to strongly encourage local food consumption and raise more awareness about the risk of processed food.

**Table 13: Triglycerides categories**

<b>Low risk</b>	< 150.1 mg/dl
<b>Suspect</b>	150.1 – 203.1
<b>High</b>	203.2 – 407.1
<b>Very high</b>	>= 407.2

Before program implementation, 21 individuals (16.8%) were diagnosed with high triglyceride levels (suspect + very high). Of these 21 individuals, only 12 individuals had high triglycerides post intervention, thus there was a decrease in high triglyceride levels of 57.1%. However, previously low risk individuals were diagnosed as suspect or high risk in the post screening.

**Table 14: Triglyceride levels**

Triglyceride cat.	PRE %	POST
Low risk	50.4	44.8
Suspect	8.8	16.8
Very high	8.0	8.8

Mean triglyceride levels were 122.5 mg/dl prior to program implementation and 142.8 mg/dl after program termination. During the intervention, local food consumption was heavily promoted and self-reported lifestyle change indicates a significant move towards local food consumption. The ni-Vanuatu diet is high in coconut milk which is high in saturated fat. Research findings are not 100% clear

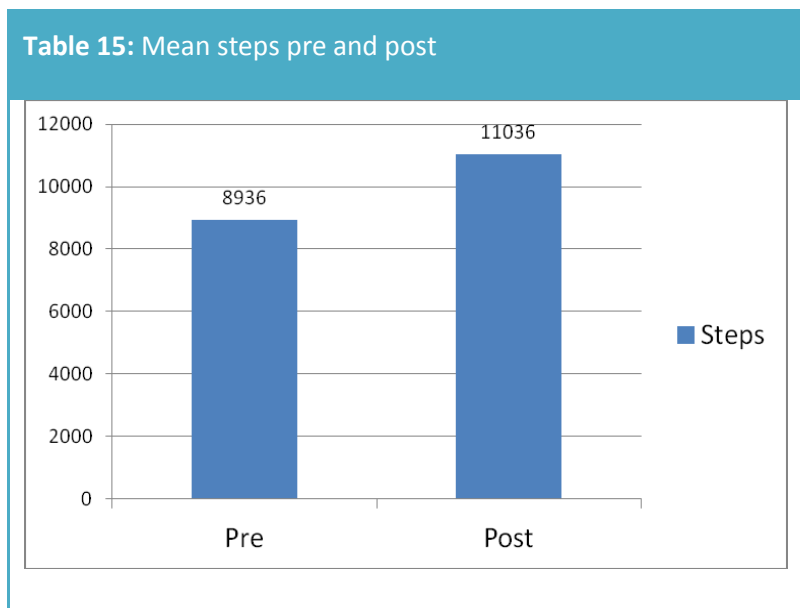
whether the consumption of coconut products raises triglyceride levels, but it could possibly explain the increase in triglyceride levels.

Mean *high* triglyceride levels was 293.3 before program implementation. This number dropped to 209.1. It is assumed that continued lifestyle changes will further lower these numbers.

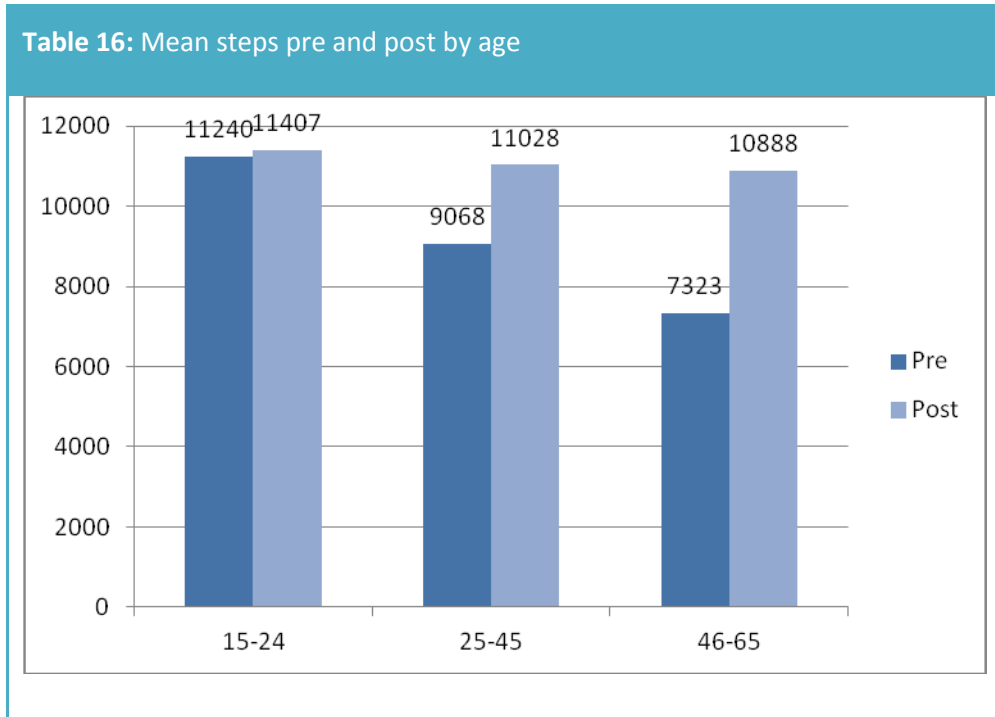
**Physical activity behaviour and step numbers**

Objectively measured and self-reported PA behaviour has increased over the course of the program. The following charts present the step number increases in greater detail.

Table 15 illustrates that mean step numbers have increased from baseline 8,936 on the first day to 11,036 on the last day of the study. This indicates a daily mean increase of 2,100 steps.



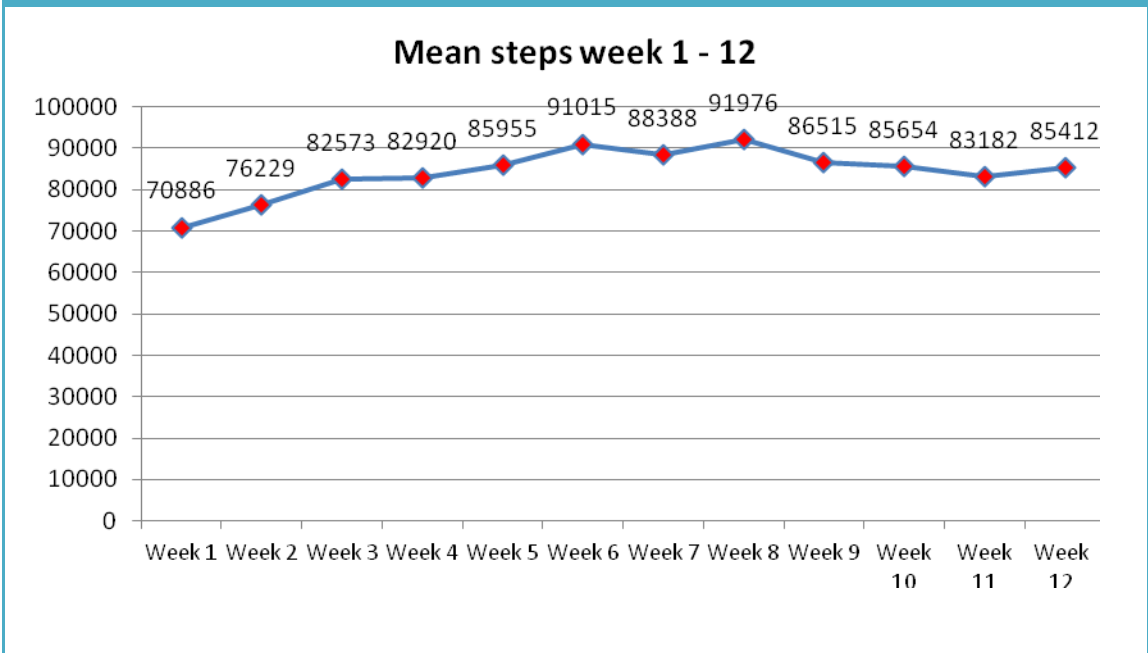
As shown in Table 16, participants in the age group from 15-24 have experienced a smaller increase in step numbers than older participants. Whilst participants from 15-24 years have a mean step increase of only 167 steps, participants in the age group from 25-45 have a mean step increase of 1960 and the oldest age group has the highest increase in step numbers, i.e. 3,565 steps. This indicates that this pedometer-based PA intervention has a particularly strong impact on the older population.



As shown in Table 17, there is a mean step increase of 20,129 steps/week (i.e. 2,875 steps/day) from week 1 until week 6, starting with 70,886 steps in week 1 and moving up to 91,015 steps in week 6. After week 6 step numbers are decreasing, ending with 85,412 in week 12. There remains a mean step increase from week 1 until week 12 of 14,526 steps/week, i.e. 2,075 steps/day.

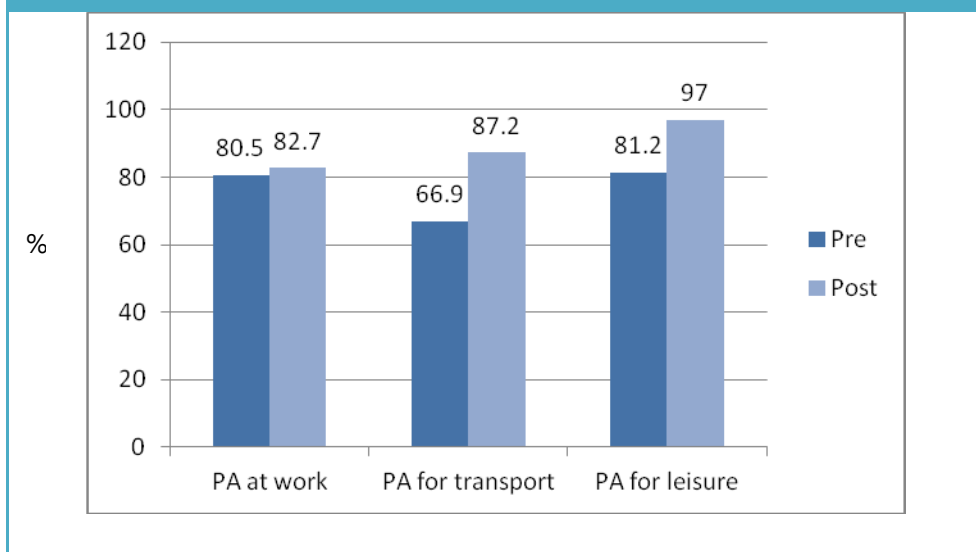
Research indicates that step increases of 2,000 steps daily are associated with improved serum lipid profiles (Sugiura & Sugiura, et al., 2002) and blood pressure (Tudor-Locke & Myers, et al., 2002). Greater PA levels are associated with substantial reduction in risk of type 2 diabetes (Hu & Sigal, et al., 1999).

Table 17: Mean steps week 1-12



Self-reported PA behaviour has changed over the 12 weeks. The largest change can be observed in the PA for transport category. Whilst prior to program implementation 66.9% of participants indicate they would be physically active in terms of transport issues (walking to and from places, i.e. work, shopping etc), 87.2% do so after program termination. This finding indicates that participants have realised that PA levels can be increased through the avoidance of vehicle transport, such as busses and cars (common transport in Port Vila).

Table 18: Self-reported PA behaviour



### Self-reported eating behaviour

To assess fruit and vegetable intake, respondents were asked to report on the amount and frequency of their weekly fruit and vegetable consumption.

Table 19: Self-reported eating behaviour / fruits per week

**In a typical week, on how many days do you eat fruit?**

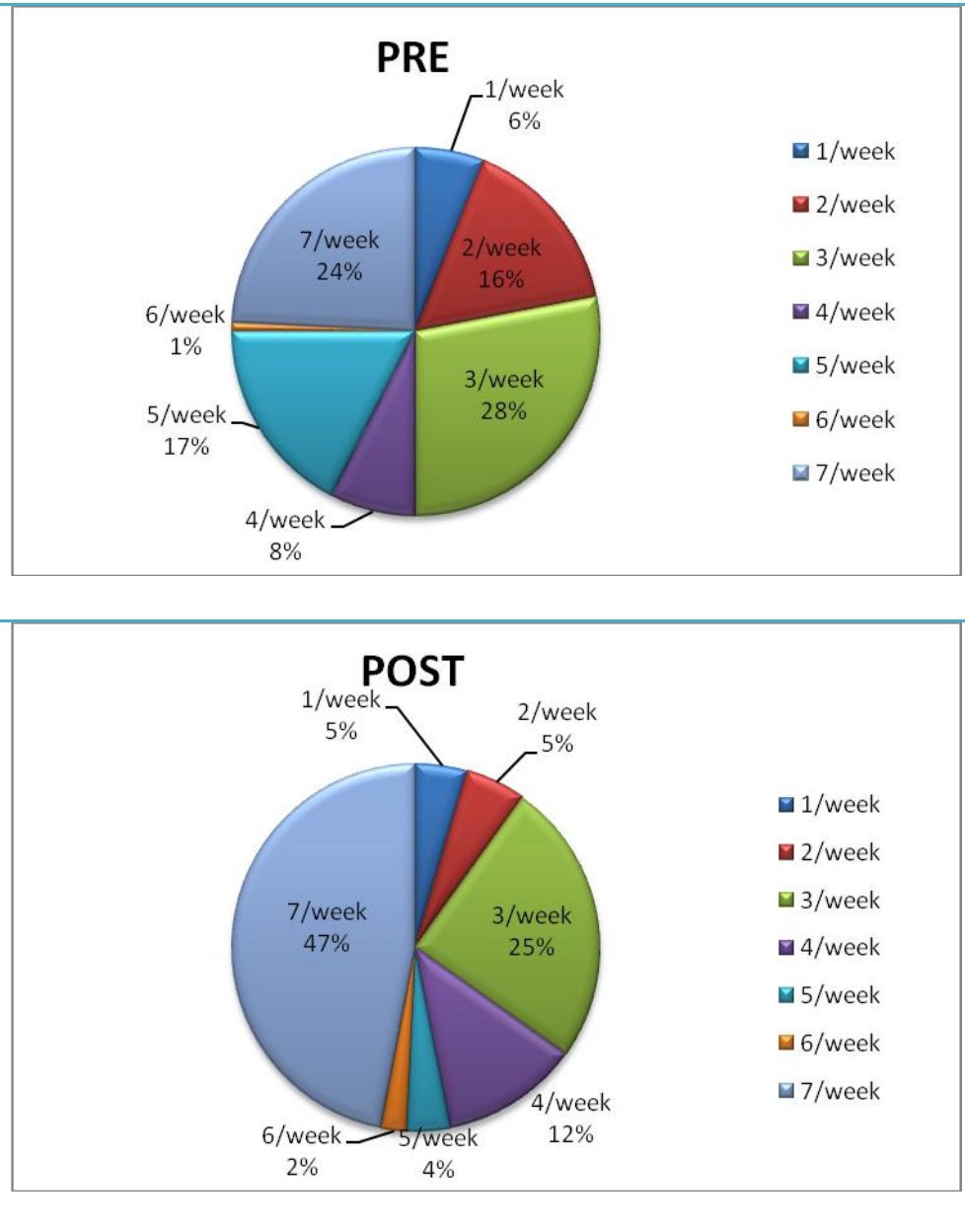


Table 19 illustrates changes in self-reported eating behaviour. Whilst 24% reported to eat fruits on a daily basis prior to program implementation, 47% report so after program termination. Weekly fruit consumption has increased significantly.

Additionally, the number of fruit servings has increased with program implementation as shown in Table 20. Whilst 18% indicated they had consumed 3 servings of fruit per day before program implementation, 38% do so after program termination. Further, 2% had consumed 4 servings of fruits before program implementation, whilst 22% do so after program termination.

Table 20: Self-reported eating behaviour / servings of fruit

**How many servings of fruit do you eat on one of those days?**

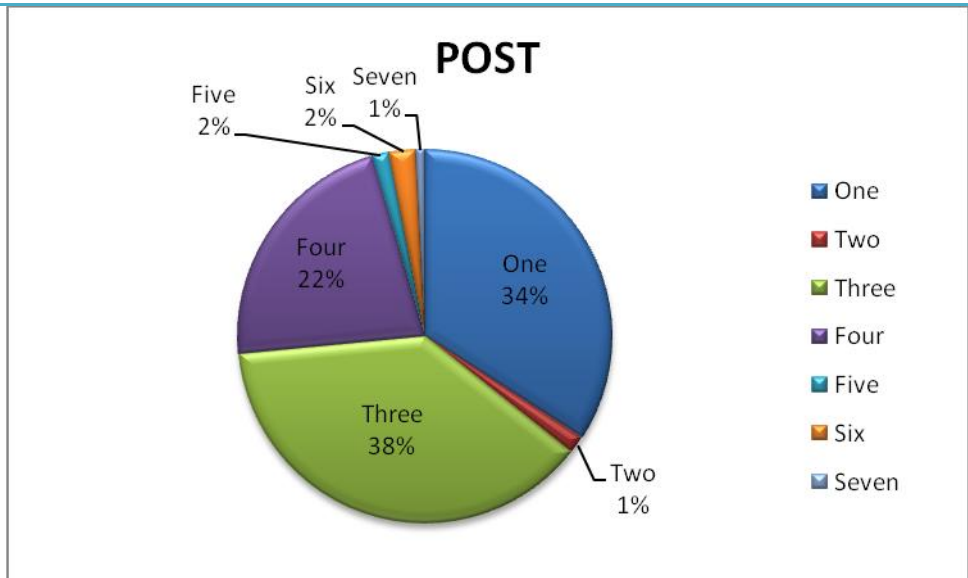
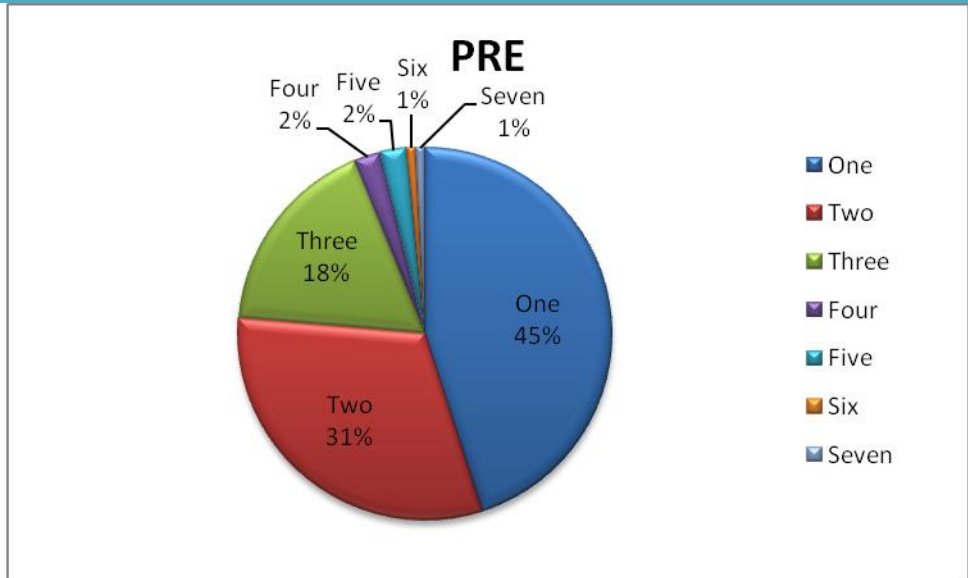
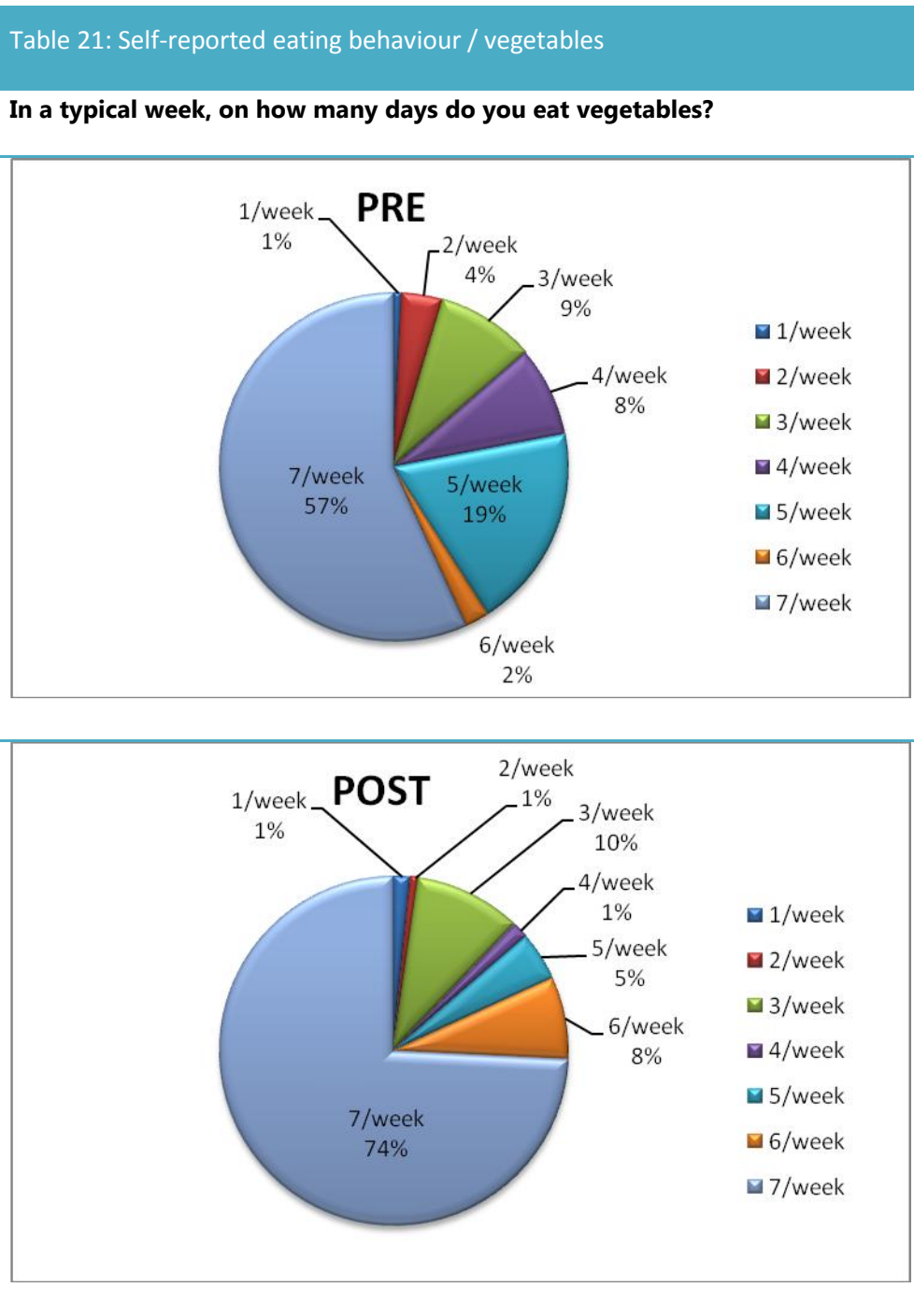




Table 21 illustrates there is an observed increase in vegetable consumption. Whilst 57% report to consume vegetables on a daily basis (7/week) before program implementation, 74% do so after program termination.



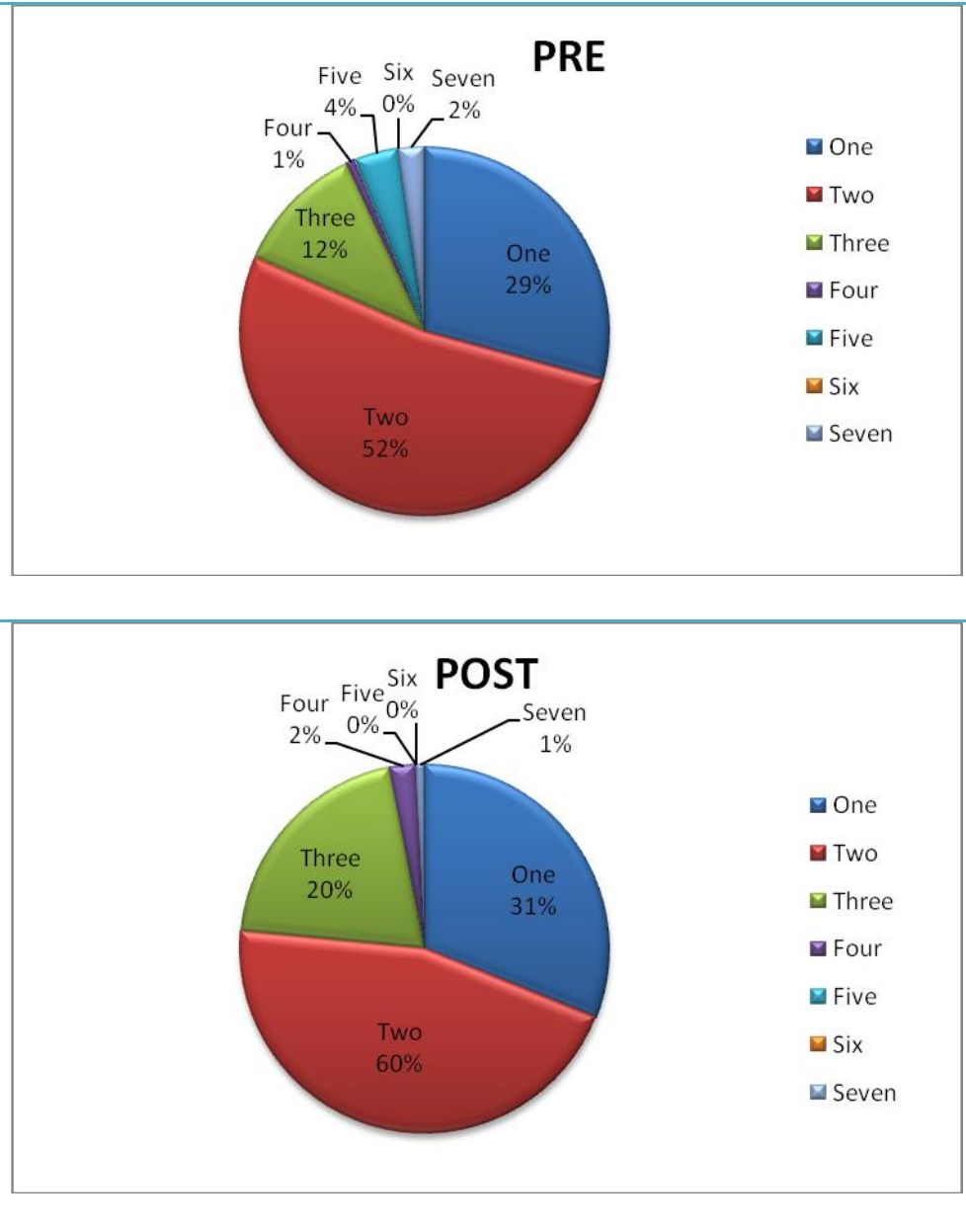
Regarding the number of servings, 12% indicate they consume 3 servings of vegetables per day prior to program implementation whilst 20% report so after program termination, as shown in Table 22.

Prior to program implementation, 52% of participants reported an average consumption of two servings of vegetables per day. This number increased to 60% after program termination.

Besides, while 12% indicated the consumption of three servings of vegetable per day, after program completion this number increased to 20%.

Table 22: Self-reported eating behaviour / serving of vegetables

**How many servings of vegetables do you eat on one of those days?**



There is a self-reported overall increase in fruit and vegetable consumption. During the intervention, participants were continuously reminded and encouraged to avoid processed foods and to include five servings of fruits and/or vegetables per day in their diet. Local food options were strongly promoted.

## Wokabaot Jalens review and feedback

On July 4, 2011 an official gathering for all participants was arranged in ExFOL in Port Vila. Both the researcher and staff from the Ministry of Health prepared the “Welkam” which was attended by approximately 100 participants.

Figure 8: Wokabaot Jalens review meeting



The Director of Public Health, launched the session with opening remarks, followed by Jerry Iaruel, NCD focal point, Ministry of Health Vanuatu and a review with information about participants’ lifestyle change behaviour by Ms Katja Siefken. The gathering was closed with an exercise session to set the participants on the track for their independent long-term lifestyle change. TV Vanuatu was present and recorded the “Welkam” and the activity sessions which were broadcasted the following evening in the Vanuatu news.

## Step captain feedback

On July 5 and July 7, 2011 two step captain sessions were held to investigate step captains' experiences, challenges and feedback. 20 step captains attended the sessions, held at ExFOL.

Several questions were discussed in teams and presented to the group. Responses are provided below and can inspire future program design.

- If you were asked to participate in this program again, what would you do differently?
  - Stick with healthy eating ideas at home
  - Create a healthier environment at home and at the workplace
  - Think more positive
  - Involve all superiors to participate in the same program to have their full support
  - Get men involved
  - Organise more different physical activities
  - Find a more suitable time for PA
  - Do more health screenings
  
- What is the best success story of your team?
  - One of our team members lost 10kg
  - Our team feels physically fit and much more alert
  - Change of lifestyle and careful eating
  - One of our team members is diabetic and she tells us she can feel her limbs again which she could not before the program.
  
- What do you think works best to motivate participants?
  - Regular health checks
  - A more supportive environment
  - More awareness about lifestyles and food
  - Stories of positive experiences
  - Pictures and posters
  - More announcements in TV and radio about healthy lifestyles
  
- What was the most difficult part for you as a step captain?
  - Motivating the team members
  - Getting everyone together
  - There are always some other commitments (time)
  - Broken / lost pedometer and no replacement
  - Changing jobs / staff turnover
  - To get all step numbers together, some ladies submitted really late or not at all
  - Some ladies did not take the program serious

- How can we improve the program?
  - More regular health checks, maybe every 4 weeks
  - More information about the right food to eat
- How can we sustain the lifestyle changes people made?
  - Organise more sport activities
  - More health checks

Overall, step captains suggested providing more incentives for the target group which can potentially lead to more commitment and motivation. For example, it was suggested to initiate regular measurements of health indicators, as previously found in the focus group discussions. It is important to realise that these indicators are rarely available to people in Vanuatu as public health services often remain less advanced. Hence, they are expected to stimulate and support participants in lifestyle changes, particularly if conducted on a regular basis. It was further mentioned that these kind of walking competitions are very effective, because “a lot of working women can only do this exercise after work. And they can find the time to do this, on their own.”

### **August 2011: presentation of initial findings in Fiji and Tonga**

Initial findings of the Wokabaot Jalens were presented by Professor Grant Schofield at the “Claiming Healthy Futures Conference 2011” in Nadi, Fiji (August 2011) and by Mr Jerry Iaruel at the “3<sup>rd</sup> NCD Forum” in Tonga (August 2011). Mr Iaruel reported that the forum suggested distributing this intervention to all Pacific Islands with a special focus on women and children.

### **External interest - Pacific Petroleum Company**

Due to TV broadcasting and media releases in the local newspaper, several individuals expressed interest in the program. A group of women from the local market approached the researcher and requested to be included in the next round of the program, should there be one. The researcher further received various emails from participants, asking to include their male colleagues in the next round should there be one. Moreover, several companies from the private sector expressed interest and requested to assist in program implementation.

## **Email Hillary Garae**

Hillary Garae, Health Promotion Officer / Ministry of Health Vanuatu reported back to the researcher three weeks after program implementation.

*Hi Katja*

*This intervention program is in big progress. I've been to a few ministries and I can tell that these women who registered for the Wokabaot Jalens program are now proactive to TOP up their STEPs everyday to 10,000. To me this is important in a sense that it helps these ladies in the ministries and vulnerable groups really come to understand the importance physical activity and healthy lifestyles.*

*I can say there is a big progress and improvement in the MoH within the ladies. They are doing really well and not only in getting physically fit, but also there's improvement in their diet control during lunch as I saw every day. Most of them have lost some weight already. They really work hard to achieve their targets everyday and I would like to also say thank you to A/Director PH, Shirley Laban for being a big motivator to all these women to be part of these intervention and also always supportive to push things go forward. Thank you also to Mr Jerry Iaruel as the man behind the logistic preparation and administration work that had been done in time as result of this program turned successful.*

*Keep the good work and thank you for helping our women in Vanuatu*

*Hillary*

## **Participants' feedback**

An abundance of individual feedback emails was received by the lead researcher from participants. A selection of those meaningful notes was uploaded to the Wokabaot Jalens website with previous consent of respondents. Overall, these feedback emails illustrate the success of the program best. For example, one hypertensive and diabetic lady reports that, no doctor could help her improve her health status (having numb legs and consequently not being able to partake in any sport activities, not being able to see long distance) since the past 15 years. This program however, improved her quality of life so much that she feels her legs again and she can see long distances. She reports that regular exercise is the best medication she has received and the pedometer assists her in monitoring her activity levels. She is now able to run around and play with her children, which she was not able to do before.

Another participants reports:

"Thanks Katja to be here to help us ni-Vanuatu women and to encourage us to do the Wokabaot Jalens. It is a very important program for our health and I am very glad and proud that we, ni-Vanuatu women, finally come to realise that we can do our best for our own health. There are lots of women left to be part but no more pedometers. Is there any chance to get more of them? The message is going around mouth to mouth to other women who are not working for government but for the private sector. They are interested in participating in the program and are asking when will the next round be starting? Many thanks again and our male colleagues also told me they want to do this too. When?"

Another participant writes:

"Hi Katja. I wish to take this opportunity to thank you personally for initiating this program which I was very fortunate to participate in. I thank you sincerely because I have found it to be very successful compared to my previous attempts to reduce my body weight. With this program I have indeed lost a lot of weight and my blouse and skirts are starting to hang loose.. I also feel smarter and alert every day I come to work and I am feeling very cool about it. I am very proud of this achievement and I wish to continue to participate in the next program should there be another one after this one ends. Thank you tumas."

### ***Walk for Life* pause**

In June 2011, the new government in Vanuatu has discontinued the *Walk for Life* program which was in place since 2007. The Ministry of Health reacted with regret and desires to reactivate the program as soon as possible. We were asked to assist in designing a new policy paper that highlights the effects of the Wokabaot Jalens. It is hoped that the evidence of this report will assist in the reactivation of the *Walk for Life* program.

### **Wokabaot Jalens long-term effects: Walktober walking challenge, Australia**

After the monitored phases came to an end in July 2011, the lead researcher remained in email contact with all participants. In September 2011, all Wokabaot Jalens participants were encouraged by the researcher to partake in an online pedometer challenge, organised by the Australian government, free of charge. Several individuals formed new walking teams and signed up to participate in the challenge. The researcher was in close email contact and observed outstanding commitment among participating teams. Some minor external support was sought by participants, but generally speaking, participants showed independency and were able to compete with 1,800 individuals (444 teams) from Australia. Some participants aimed for

30,000 steps a day which resulted in self-reported weight loss, better sleep, feeling better and increased well-being. Direct feedback to the researcher can be found at the Wokabaot Jalens website <http://wokabaot.blogspot.com/>.

The 4-week walking challenge resulted in utmost commitment and very high step numbers. Three teams from Vanuatu ranked among the first 10 teams (of 444 teams) with mean step numbers of 24,000 per day. Participating teams were from the Vanuatu Magistrate court, the Vanuatu Prime Minister's Office/Department of Youth and Sport, the Vanuatu Police force and the Ministry of Health. This form of proactive dedication illustrates the potential of further pedometer-based walking initiatives and is strongly encouraged to be continued.

After the 4 weeks, participants' were asked to report on experiences. Interestingly, several statements regarding future suggestions came up:

- f) Health authorities to take an active leading role in promoting PA such as walking to all citizens especially in towns. Raise awareness on the importance and benefits of walking as a form of exercise.
- g) Make walking challenges regular events through the Government. Public servants can take the lead in educating the public on the importance of regular exercises and healthy lifestyles. Walking challenges are very effective – "many working women can only do this kind of exercise after work and they can find the time to do this on their own."
- h) Involve the whole families in these walking challenges
- i) Promote the consumption of local food grown in Vanuatu
- j) Ban the import of unhealthy processed food from overseas.

A strong demand to obtain pedometers for family members and for colleagues was observed. "People here are happy to purchase the pedometers at their own cost, but at the moment we just cannot access any pedometers here in Vanuatu. It would help many people to take up a healthier lifestyle."



## **Process evaluation**

To understand the participants' program experiences in greater detail, a process evaluation was carried out. A process evaluation is a systematic method for collecting, analysing, and using information to answer questions about the effectiveness of programs (Office of Planning Research and Evaluation, 2010). We aimed to identify key components that were effective and to identify for whom the intervention was most effective. The outcome highlights success factors whilst areas for program improvement are detected.

Methodology involved seeking participants' subjective opinion on the Wokabaot Jalens components. A questionnaire was developed that used generic qualitative and quantitative approaches; 11 likert scale questions and 6 open-ended questions were designed to evaluate the potential of the intervention in terms of feasibility and effectiveness (see appendix).

Complete questionnaires were returned by 95.5% of the participants taking part in the post health screening in July 2011. The closed question responses were recorded on a four-point Likert scale that ranged from 'strongly agree' to 'strongly disagree'. Data analysis comprised summing the number of responses for each of the four points of the Likert scale and calculating percentages based on the total number of responses for that question.

## **Program ratings**

### **Program satisfaction**

Almost all respondents (96.1%) agreed or strongly agreed that the Wokabaot Jalens was enjoyable. Almost all (93.7%) participants indicate that the program made them exercise more. Lastly, 53.6% agreed or strongly agreed that it was beneficial that the program was for women only.

### **Program components**

Almost all respondents (94.5%) agreed or strongly agreed that they enjoyed the team approach. Further, almost all respondents (94.5%) agreed or strongly agreed that they enjoyed the 1 million step challenge. Moreover, the majority of participants (95.3%) agreed or strongly agreed that the health information was useful. Likewise, most participants (93.5%) agreed or strongly agreed that the posters were motivating.

### **Program timeline**

The vast majority (90.5%) of respondents agreed or strongly agreed that the duration of the program was good.

### **Program outcome**

The majority of the respondents (91.3%) reported that the program increased their activity levels. 91.3% agreed that the program made them live healthier. Further, the majority (60.6%) indicates that the program positively affected their family life.

### **Program tools**

Questions about program tools and program satisfaction were answered by a small group of participants only (N=31). This results from the fact that these questions were emailed to all participants after the field visit was completed. A rather low response rate of 14.9% presents the following results: all participants (100%) agreed or strongly agreed to continue using the pedometer in the future to monitor their PA levels. Likewise, all respondents (100%) agreed or strongly agreed that the pedometer is a useful device to monitor PA levels.

### **Program outlook**

96.8% agreed or strongly agreed to recommend the program to others. Likewise, all respondents (100%) agreed or strongly agreed that they would like to repeatedly partake in the program.

### **Open question results**

It was previously observed by the researchers that the target population is inclined to assent with external suggestions and critique to the researchers' suggestions is rare. For that reason, we considered additional open-ended questions as essential to uncover true opinions on the program. Open-ended questions focused on individual experiences, such as likes, dislikes and challenges. Moreover, participants were asked to provide suggestions for program improvement.

A thematic induction of the open-ended questions was conducted. To present a visual indication of the different responses provided by participants, the subsequent diagrams were created with Wordle in accordance to the data analysis output generated by the qualitative software NVivo 9.0.

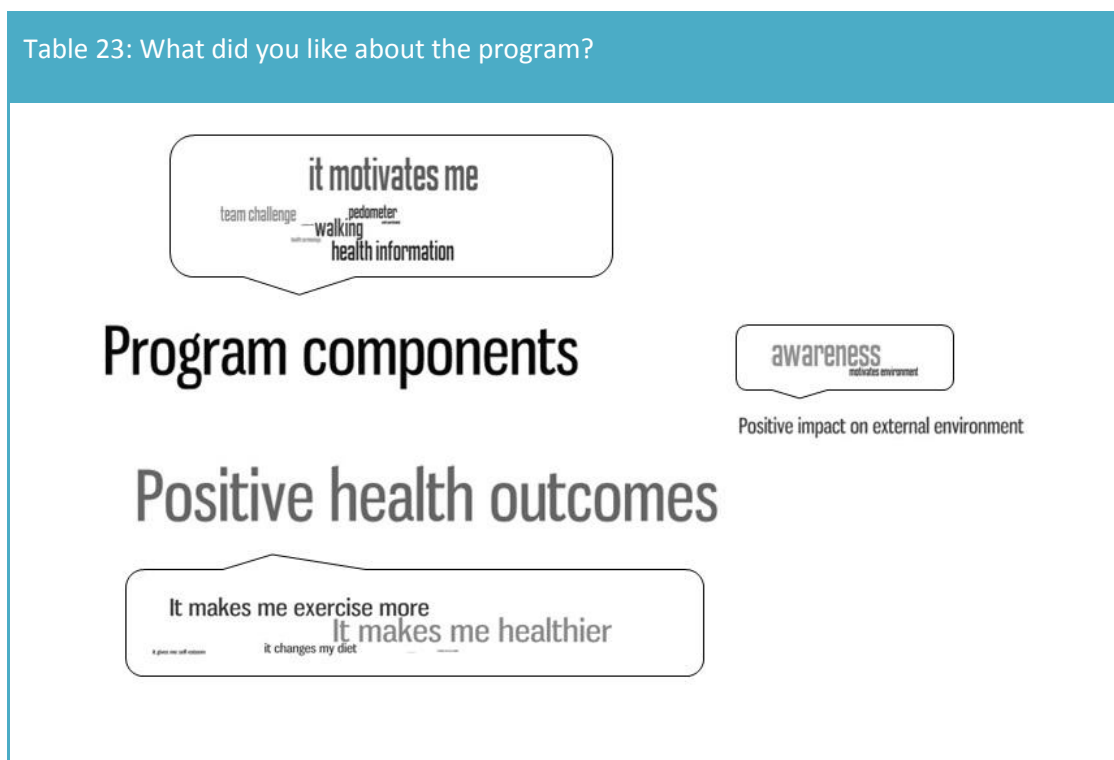
This novel technique of combining qualitative data with frequency provides a basic understanding of the data at hand. Wordle presents word sizes proportionally to the frequency

of the themes identified through the thematic analysis: diagrams give greater prominence to more eminent themes, i.e. the larger the word display, the more often the theme occurred.

**Did you finish the program – if not, what made you stop?**

A total of fourteen respondents (of 133) reported they did not finish the program. Of those, five participants stated that the pedometer was not working properly whilst four individuals lost the pedometer. Four additional individuals reported a lack of motivation as the reason for not finishing the program and one participant indicated that other commitments did not allow her to finish the full program.

**What did you like about the program?**



44.16% indicate that positive health outcomes are the preferred program outcomes. A variety of statements was provided, ranging from becoming a healthier person, doing more exercise, changing eating habits, having more self-esteem and eventual weight loss.

Similarly, 42.2% referred to program components in their feedback and endorsed various program elements. The program’s motivational effect was cited as the preferred program outcome. For instance, it was mentioned “It encourages me to *walk* to places – I never walked before”. Further, the provision of weekly health information and the actual walking was cited as a favourite program outcome. “The program really helped me in becoming a healthier person. Sometimes I have a lot of stress at work and then wokabaot [Bislama term for *walking*] helps me and I go for a walk.” Moreover, it was mentioned that participants came to realise they enjoy the

walking experience. The team approach and the pedometer were mentioned as their favourite program component. Besides, health screenings, program coordination and the ease of program participation (no qualification needed) were mentioned as favourable elements.

Some participants cited the beneficial effect on the external environment (families, neighbourhood, communities, church) as favourable program outcomes, with an increase in awareness about healthy lifestyles having the main impact. "I am taking all the health information to my church" and "It has caused me to have a healthier look at my life, it changed my perception and it influences the rest of my family too." Another participant mentioned "We realise the true importance of our health and of course how to keep ourselves and our communities healthy". Some respondents indicate that the program motivated the nearby communities to rethink about their lifestyle.

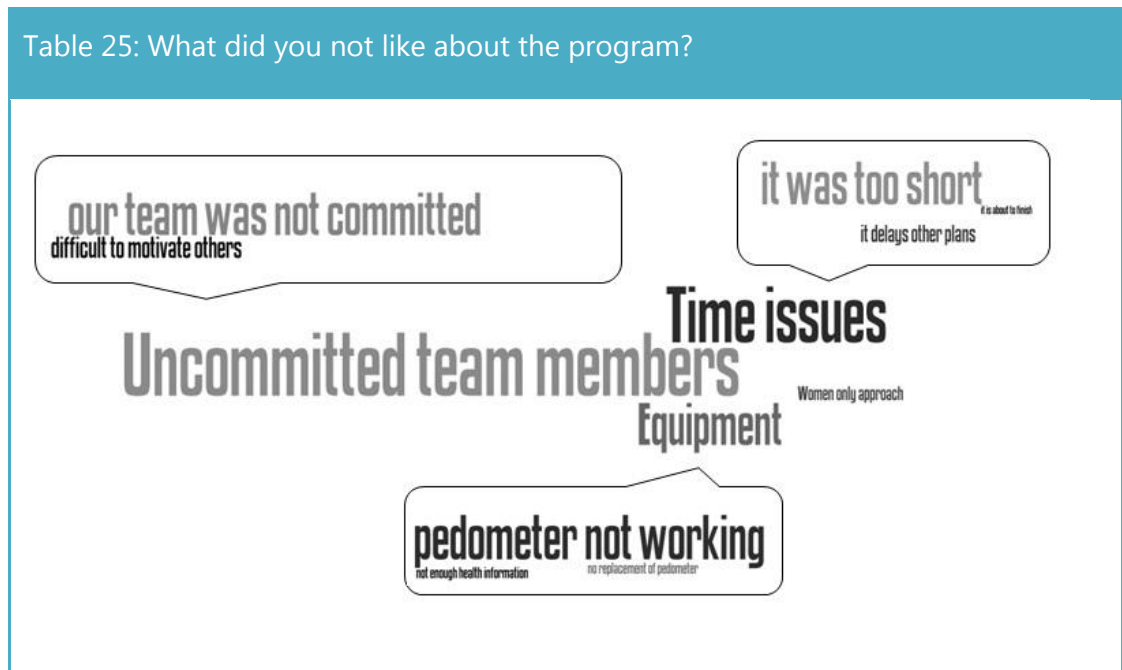
**Which healthy ideas do you incorporate into your daily live?**



The majority of participants (68.9%) reported a change in eating habits, with an increase in consumption of fruit and vegetables (45.6%) being the major modification. "I now eat a lot of island cabbage and veggies" was one of many similar statements. Concurrently, it was mentioned that participants reduce unhealthy food options such as oil, butter, sugar and soft drinks. "I really cut down on processed food" and "I drink less sugar, and eat less fatty foods". Further, it was indicated that take-away foods were limited and healthy lunch options were brought in to the workplace. "I don't drink coffee during my break times anymore. I always have an apple or banana for in between meals instead". It was further mentioned that the program resulted in less food consumption "I eat less at night, less white bread, less sugar, less rice and more local food".

A further 30.3% reported lifestyle change that resulted from the program is an increase in exercise behaviour. "I do a few walks rather than sitting long hours in my working environment". Regular morning, lunch hour and after-work walks were cited as program outcomes. Further, the program led to more interest and open attitudes towards physical activities. "I am more interested in exercise and I am playing more outdoor games with my kids". Vehicle transport is avoided since commencement of the Wokabaot Jalens and replaced with walking.

**What did you not like about the program?**



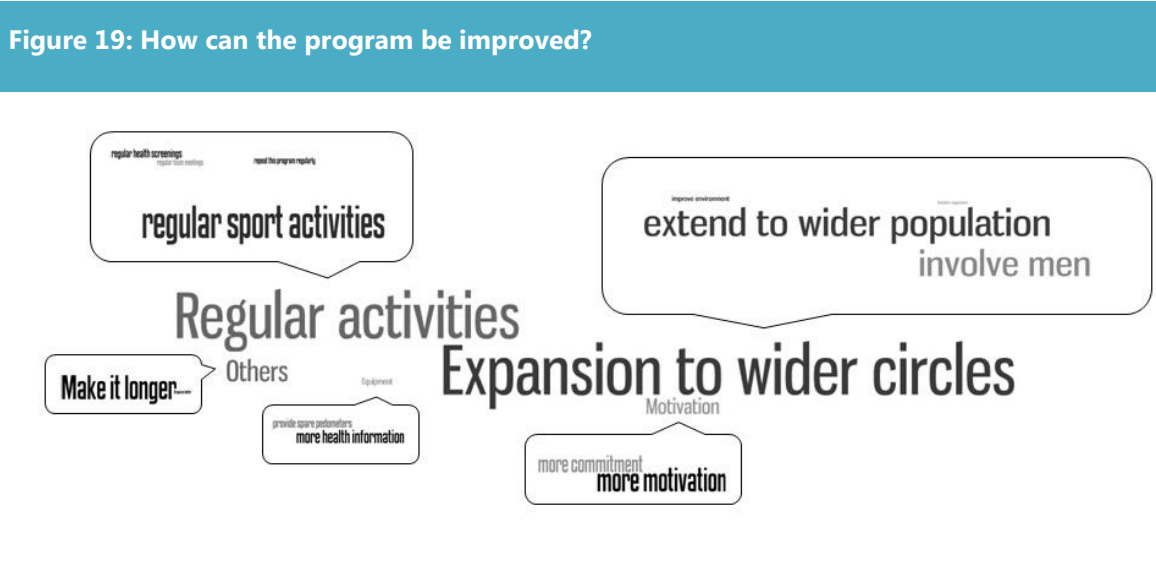
Uncommitted team members were cited by 36% as the major dislike of the program. It was mentioned that an uncommitted team often hindered full participation. For instance, one participant mentioned "Being in a team with team members who have so many other commitments and do not actively participate no matter how much I try to motivate them – that is what I did not like." Differences in commitment within the team seem to be significant challenges for some participants. It was indicated that team members were not faithful enough in providing the weekly step numbers to the step captain on time.

Besides, time issues were reported as a dislike by 32%. Respondents report that program duration was too short and long-term continuation with the Ministry of Health was suggested. It was further mentioned that the program delays other plans.

Regarding program equipment, four respondents reported the pedometer was not working properly, thus limited participation resulted. Pedometer replacement was suggested to avoid discouragement after pedometer is lost or broken.

It was further suggested to involve men (colleagues and husbands) in the program. One lady mentioned "Men should be included too as they face the same (health) situation". On the other hand, a majority (53.6%) of participants likes the gender separation approach, as indicated in the closed questions. More detailed investigation with potential target groups can resolve this issue.

**How can the program be improved?**



Various suggestions were made by participants regarding program improvement. In particular, it was suggested to expand the program to the wider population; bringing more awareness to the communities and providing more pedometers so that each interested person can participate. One lady mentioned "We need to share our experiences with others. We could extend the program with them and give them something to encourage them as well".

Regular sport activities were likewise cited as potential improvement areas. In particular, it was suggested to arrange more team and inter-team sport activities. Different disciplines were proposed, including netball, aerobics, basketball and beach walks. Various respondents recommended the Ministry of Health to arrange regular sport activities. One respondent suggested having mass walks for government ladies on Saturday morning; others recommended regular walking sessions during lunch hours.

Program duration was criticised by several respondents, indicating that twelve weeks are too short and it was suggested that the Ministry of Health could possibly continue the monitored program. "It would be good to continue for another 6 months". Moreover, it was proposed that "someone from the health department should follow up and organise weekly physical exercises for those interested".

Other suggestions for program improvement include more external motivation, more health information, the provision of spare pedometers and more commitment by team leaders.

**What was the biggest challenge for you participating in the program?**

**Figure 20: What was the biggest challenge for your participating in the program?**



The majority of respondents indicate that motivational issues were the biggest challenge for participating in the program. Self-commitment and self-discipline appear to be key issues in staying on track. “The biggest challenge was when I have to give up some of the unhealthy food that I love eating”. Others were finding it challenging to bring the healthy lifestyle change across to the family.

Time issues were mentioned as a major challenge, since Church, family and work commitments hinder participants from regular exercises. “My biggest challenge is to set time aside to do my exercises”.

It was further found that dietary changes present a challenge as well. Respondents indicate they found it difficult to “stop eating the junk I used to crave for everyday” and to control their dietary intake. Others indicate that healthy food options such as fresh fruits and vegetables are too expensive. In addition, some respondents found it difficult to lose weight.

A few respondents mentioned they often forgot to wear the pedometer which hindered them from proper step submission. Environmental aspects were cited with road safety issues and rainy weather being the major challenges.

## Conclusion

The Wokabaot Jalens initiative resulted from the outcome of a previous healthy workplace evaluation (Walk for Life 2009) which uncovered potential areas for program improvement (Schofield & Siefken, 2009). After discussion with the Ministry of Health and the World Health Organization, we suggested to direct a novel program to the target population that profited least from the existing workplace program. The idea of Wokabaot Jalens was born after thorough formative work was conducted. It is a robust research-based and systematic evaluation effort for a healthy lifestyle intervention in an urban Pacific context, composed of formative, process and outcome evaluation.

In order to explore and understand the target population's perceptions about lifestyle behaviour, formative work was carried out in November 2010. We believe that formative work should be integral in the design of any program dealing with behaviour change and suggest that, in order to understand and respond to the region's health challenges, more formative work is needed. During these discussions, popular modes of PA and motives to live healthy lifestyles were identified. We found that women are more likely to choose walking for leisure time PA over any other sport activity. At the same time, they confirmed they favour a team-approach over individual exercise activities. Taking these personal preferences into account we assumed that a team-based walking program can result in increased PA levels in this population and potentially reduce NCD risk. Importantly, the women mentioned they would walk as a mode of transport to and from places and also as a leisure-time activity. Many suggested they "*do some wokabaot to stay healthy.*" This suggests that in the attempt to attract women for exercises, health programs should focus on different types of walking as the main activity or at least include aspects of walking exercises into the overall program. The design of pamphlets, t-shirts, posters and brochures was discussed with participants and the Ministry of Health in order to be culturally meaningful. The Bislama term Wokabaot Jalens translates into 'walking challenge' in the English language. The term was discussed during the focus groups and participants agreed for this term to be attractive and culturally relevant.

The program implementation phase was successful in increasing participants' PA levels. Self-reported PA behaviour increased from 53% to 74.2%. Moreover, there is an objective daily mean step increase of 2,100 steps in all participants. Desegregated by age groups we found that the older population experienced the highest step number increase (3,565 steps) which is an important finding for the initiation of future health programs.

Concurrently, health indicators improved over the course of the program. Overweight levels increased from 32.8% to 38.4 which is associated with a decrease in obesity levels (pre: 45.6%;



post 37.6%). The most significant positive health change was a drop in waist circumference from 96.0 cm to 92.1cm, i.e. a drop of 3.9cm. Moreover, diabetes prevalence was reduced by 45.9%. Surprisingly, low HDL levels have increased and it is assumed that this is associated with increased local food consumption which often consists of coconut products (high in saturated fats). High triglyceride levels have dropped from 16.7% to 9.8% which is associated with a change in eating behaviour (less processed food) as reported by participants. Given that these health indicators occurred after only 12 weeks, we assume that continuation and re-implementation of this program can significantly contribute to further health improvements.

The process evaluation outcome highlights that we were successful in developing and delivering a healthy lifestyle program that was culturally meaningful and had utility for the target group. All intervention components were perceived by the participants as important for motivating them to adopt a healthier lifestyle. Gender roles are strong in many Pacific island contexts and we assume that each target group will respond differently to the gender separation approach, depending on age, social class and workplace culture. Initial formative work to program design is recommended.

Following the closure of the monitored phase, participants were strongly encouraged to maintain the lifestyle change they had made. The Ministry of Health was recommended to support participants continuing with their lifestyle change throughout the subsequent year and beyond. Interestingly, it was repeatedly requested to arrange pedometers that can be purchased at participants' and other interested peoples' own cost. We suggest arranging well-coordinated and regular activities for all, so to stimulate exercise participation and motivation further, as repeatedly requested by participants. Lamentably, to our observation, no activities were arranged after July 2011 which is related to the discontinuation of the *Walk for Life* program.

Participants' feedback and individual success stories highlight the true value of this program. Life-changing experiences were cited by a number of participants and continued commitment (Walktober, Online Corporate Challenge Australia, October 2011) demonstrates that independent long-term behaviour change is realistic. Long-term effects are to be evaluated through a 12-month follow-up health screening in April 2012.

## **Future directions**

Wokabaot Jalens provides useful resources for those wishing to implement similar health intervention programs in neighbouring Pacific island countries. Initial formative work is recommended for any health intervention prior to program design, whilst outcome and process evaluations are essential in detecting program effectiveness and potential areas for program improvements.

The Ministry of Health Vanuatu has been prepared to run and monitor this program independently for long-term lifestyle changes. It was strongly recommended to support participants continuing with their lifestyle change throughout the subsequent year and beyond. Following the closure of the monitored phase, participants were repeatedly encouraged to maintain the lifestyle change they had made. The researcher maintained sporadic email contact for a period of 12 weeks after program termination. Interestingly, various requests were made to continue with the program. In particular, it was requested to arrange more pedometers that can be purchased at participants' and other interested peoples' own cost. Media coverage (TV, newspaper, radio) informed the wider population about the initiative and local external requests were made regarding program implementation. We urge the Ministry of Health and other relevant stakeholders to facilitate the provision of pedometers and other additional healthy lifestyle resources. In saying this, it is vital to integrate the use of pedometers into structured monitored programs, since the raw provision of pedometers has *not* shown to be effective in increasing peoples' activity levels.

Future work may detect men's perception regarding healthy lifestyle behaviour, which may have a significant influence on future program design. Meaningful interventions can then be designed, addressing men, women and the family. Both, the involvement of men and the family can be valuable support mechanisms for lifestyle changes. As participants repeatedly indicated that support mechanisms need to be strengthened, these are potential domains that can assist participants in program adherence and, moreover, initiate family lifestyle change as a whole. We suggest the inclusion of family walks, family sport activities, family shopping/cooking programs combined with healthy school programs that could eventually lead to increased levels of commitment.

Besides, it is suggested to expand the program (communities, churches, schools, workplaces), as this can impact both the external environment and the participants. As such, opportunities of leveraging health initiatives for wider community benefit should be sought.

There is a clear need to encourage Pacific urban adults to adapt healthier lifestyles. Structured pedometer-based healthy lifestyle interventions with additional nutrition education components can be effective approaches in improving population health. Interventions must be cost-effective, and pamphlets, posters and other intervention materials must be flexible to allow for differing cultural adaptations. Importantly, intervention processes and materials must be acceptable to participants.

<b>Table 28: Future directions</b>
<b>Wokabaot Jalens has proven successful in creating lifestyle change in participants.</b>
<b>In order to halt and prevent future chronic diseases, the following may be considered:</b>
<p style="text-align: center;"><b>Recommendations for program improvement</b></p> <ul style="list-style-type: none"> <li>➤ Conduct a 12-month follow-up health screening in April 2012</li> <li>➤ Arrange regular sport activities for all</li> <li>➤ Expand adapted program to wider circles in urban areas (workplaces, churches, communities)</li> <li>➤ Initiate additional support mechanisms (settings approach)</li> <li>➤ Involve the family in program activities</li> </ul> <p style="text-align: center;"><b>Recommendations for the Ministry of Health Vanuatu</b></p> <ul style="list-style-type: none"> <li>➤ Reactivate the Walk for Life program and arrange regular sport activities for all</li> <li>➤ Provide more resources regarding healthy lifestyles (e.g. pedometers integrated into structured programs, health information, eating advice)</li> <li>➤ Create peer-support networks for individuals to be more physically active, and lose weight where appropriate</li> <li>➤ Initiate health promotion campaigns regarding healthy lifestyles (media)</li> <li>➤ Heavily promote walking as a healthy form of exercise</li> <li>➤ Provide regular health checks to community.</li> </ul> <p style="text-align: center;"><b>Recommendations for relevant stakeholders</b></p> <ul style="list-style-type: none"> <li>➤ Support Pacific governments in the initiation of structured healthy lifestyle interventions</li> <li>➤ Make monitoring and evaluation processes a requirement</li> <li>➤ Provide opportunities for sustainable program effects.</li> </ul>

## Opening remarks

**GOVERNMENT  
OF THE  
REPUBLIC OF VANUATU**



**GOVERNEMENT  
DE LA  
REPUBLIQUE DE VANUATU**

**MINISTRY OF HEALTH**

**MINISTERE DE LA SANTE**

**PRIVATE MAIL BAG 009**

**SAC POSTAL PRIVE 009**

**TEL. 22512 – FAX: 26204**

**TEL. 22512 – FAX: 26204**

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**28/03/2011**

### **DIRECTOR GENERAL OF HEALTH SPEECH**

#### **Women Physical Activity Intervention Opening**

**Wokabaot Jalens**

**Opening Address**

**Ol Directors**

**Ol Walk for Life Focal Points**

**Ol participants**

#### **Bodi blong toktok**

Hemi wan hona mo wan privilej blong stap ia mo witesem okesen ia mo mekem remaks regadem ofisiol opening blong helti laefstael program blong ol women”.

Everi yia, long wol I kat abaot 2 million ded attributem long fisikal inaktivi. Wan sedentary laefstael hemi wan long liding cause blong ded mo disabiliti long wol. Fisikal inaktiviti incrisem motaliti, doublem risk blong sik blong hae blad presa, hat, wan saed bodi ded, sik suka mo fatfat tumas.

Hemi incrisem tu ol risk blong colon and breast cancer, ol sik blong lipid mo sik blong tingting.

3 aot long 4 ded long Pacific Islands oli attributem long NCDs.

OI data infomesen blong risk factors long Pacific region hem 75% mo hemi hae moa long wol! Ol common risk factors long Vanuatu oli unhelti kakae, fisikal inaktiviti, tobacco mo alcohol misuse.

Good nius se 80% blong sik blong hat, 90% sik blong suka mo abaot owan third blong cancer save avoidem tru laefstael jenses. Regular exesaes hem benifitem everiwan, long everi age grup. Benefits hemi includem improvem helt, well being mo privensen blong fulap sik. Ova pas 50 – 60 yias yumi experensem wan major leafstael jenses long populesen blong yumi.

Movmen blong pipol long ol tufala bigfala city – Port Vila or Lugainville – long hop blong gat wan wok, wan gud edukasen mo nara promising perspectives.

Be rapid urbanization hemi lid long moa long ol sendary leafstael mo posem yumi longol risk blong yumi suffer long ol NCDs.

Long urban cities I kat 2 major laefstael cjenses:

Jenses blong kakae: usem local kakae blong yumi (yam,taro,etc.) instead of rice mo waet suka. Fres fis mo fres mit replacem tin fis mo tin mit, increasem consumption blong frut mo vegetabols mo reducem consumption blong suka, sol mo alcohol wetem nara substances.

Jenses blong Aktiviti : Replacem fisikal labour long field o solwota instead long machines. Movmen long urbanise area hemi causem wan increase blong sedentary occupations mo motorized transpot mo wan reduction long Fisikal aktiviti levels.

Wan efektif public helt measures nid blong promotem fisikal inaktiviti mo improvem helt long populasen.

Jalens blong promotem fisikal aktiviti hemi hamas responsibiliti olsem govman, pipol mo individual oli takem aksen long hem.

Mi highly endorsem program ia mo expectem blong lukem commitment mo hae participation rates.

Aktiviti hem jut pat long daily laef blong yumi. God hemi mekem man blong move mo active everi dei. Yumi save se sam long ol family mo friends long islands oli move everi dei mo oli moa heltia tan yumi! Hemi makem se hae blad presa mo sik suka rate hem low long rural areas tan Vila mo Lugainville.

Fisikal aktiviti ino min yumi nid blong kam wan professional athletletes. Wanem hemi moa beneficial hemi 30 minits fisikal aktiviti, olsem wokabaot, most long fulap dei long wik.

Blong makem smol shift long habits blong yumi, yumi nid inaf exesaes long daily lives blong yumi – usem stairs insted blong tekem elevator, wokabaot from place to place insted blong tekem bus, taxi , car etc long sot distance, mekem Karen, dancing, cycling, play wetem ol pikinini blong yu mo nara moa.Ol past nutrisen mo NCD surveys mo 2009 Vanuatu Workforce NCD Mini STEPS (MOH) showem se I kat increase blong levels blong NCD risk factors long Vanuatu.

Govman blong Vanuatu tru Ministri blong Helt mo nara partners blong hem oli implementem govman wide helti wokfos program Walk for Life in 2007 to harness wan heltia mo wan productif public service wokfos.

Walk for Life hemi wan fisikal aktiviti program blong Vanuatu wokfos blong yumi. Hemi impoten se yumi lidem way mo positif rol models long ol populesen blong yumi.

Ni Vanuatu women oli kat wan impoten rol blong plei: women oli rol models long familis, communitis mo populesen at large. Women hemi priperem kakae mo raisem ol pikinini long home. Ni-Vanuatu women oli lidem way blong wan helti populesen!

Reaserchers long New Zealand togeta wetem Ministri blong Helt oli designem wan helti laefstael program, mekem specificali blong adresem nids blong ol women Vanuatu.

Sapos ol women set exampol mo positif rol models , yumi save mekem mo buildem wan heltia Vanuatu mo yumi save give mol pikinini blong yumi wan heltia mo hapi fuja laef.

Helti laefstael program ia yumi callem Wokabaot jalens. Wan wakabaot jalens bae hemi helpem yumi blong stat adoptem wan helti laefstael. Program hemi base long wol liding evidence.

Yumi save se program bae hemi saksesfuli helpem ol patisipens blong kam heltia persons.

Wan wan long yufala bae hemi equip wetem ol heltia laefstael tools mo mi aksem yu blong lukaotem gud mo usem olgeta properli.

Hemi fes taem bae yumi implementem program ia long Pacific Island countris.

Sapos ihemi provem sucesful tan ol nara friends blong yumi long Pacific oli save adoptem tu.

*Again women yu lidem way blong heltia Pacific!*

Bae yumi groupem yumi long ol tims mo yumi mas doem 1 million step challenge. Mi advisem yufala blong makem most of the program. Kipem track wetem step numbers blong yu, always givem daily record blong yu long step captain mo makem sua se captain hemi kat contact wetem researcher Mrs Katja. Mrs Katja bae hemi encouragem yufala blong keep moving mo bae hemi sendem yufala infomesen abaot helti kakae mo fisikal aktiviti tips mo tricks . Hemia hemi wan novel mo unique program in Vanuatu. Plis makem use long program blong wan heltia mo productif Vanuatu

Remember, urgency blong helti laefstael hemi no aplaem nomo long yumi , be everiwan.

Letem yumi everiwan karem mesej blong helt benefits blong fisikal aktiviti long ol communities, families, friends,mo villages.

Note: Lets us all become more active physically, eat and drink wisely, adopt healthier habits and keep our Vanuatu beautiful, clean and safe to live in for all generations. THANK YOU FOR YOUR ATTENTION.

## Press release *Wokabaot Jalens* April 2011



### Press Release

## SHAPING UP: NI-VANUATU WOMEN IN ACTION!

### *Waes women wokabaot blong laef*

**Port Vila, Vanuatu. 1 April, 2011.** The Vanuatu government acts upon threatening Pacific health trends with a new healthy lifestyle program: Wokabaot Jalens. With the assistance of Auckland University of Technology (AUT) in New Zealand, the Ministry of Health Vanuatu launches the program for female civil servants to reduce risk factors for noncommunicable diseases (NCDs) and to harness a healthier and more productive workforce. The official opening was on March 28, 2011, at 11.30am at the EX-FOL near the Department of Youth & Sport.

More than 200 women registered for the program, have undergone a health screening and demonstrate high motivation to take up a healthier lifestyle for themselves and for their families. The launching of the Wokabaot Jalens will take place today, April 1 at 3 PM at the Ex FOL. All participants will come together for an initial exercise which will be the first step for many more to come.

The groundbreaking new physical activity program specifically targets the needs of ni-Vanuatu women and invites all female civil servants to lead the way for a healthier Vanuatu. The goal is to increase physical activity levels and local food consumption and concurrently improve health. Wokabaot Jalens is a step challenge – 1 million steps in total! Participants will aim for their personal recommended step count of 10,000 per day which they also contribute to a team goal. 200 participants are expected and will be equipped with healthy lifestyle tools to monitor lifestyle habits during the 8 weeks of the project. The women will undergo health screenings to test blood pressure, cholesterol and blood sugar in order to visualise improvements over the course of the program. The project is monitored by Public Health experts from AUT University, New Zealand.

The program is funded by the World Health Organization and is based on world leading evidence as it has proven to be successful in other countries, such as the USA, Australia and New



Zealand. Now is the first time of an implementation in a Pacific island country, adapted to ni-Vanuatu custom and culture. If successful in Vanuatu, it can be adapted to neighbouring island countries to advance Pacific population health.

Ni-Vanuatu civil servants lead the way. In 2007, the Ministry of Health Vanuatu implemented the *Walk for Life* program – a government response which aims to halt and reverse the spread of NCDs and to increase employees' well-being and productivity. In 2007, Government workers set the role model to the population. "It is time to stimulate ni-Vanuatu women with more physical activity and health awareness if we want to improve population health. In our assessment of the *Walk for Life* program we found that women participate least in the activities", says Public health researcher Ms Katja Siefken. "By adopting a long-term healthy lifestyle they can influence their family, friends and neighbours for a healthier future of the country." Health marketing tools will motivate the ladies to adapt healthier lifestyles and to add years to their life and life to their years.

For additional information, please contact Hillary Garae, Health Promotion Officer, Ministry of Health. We acknowledge the generous support and assistance of the Auckland University of Technology (AUT) and the World Health Organization.

**About:** The Ministry of Health

The Ministry of Health Vanuatu aims to raise awareness and promote healthy lifestyles within all Public Sector departments with the intention to harness a healthier and more productive Vanuatu workforce and to set a positive role model to the whole population of Vanuatu.

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## Press release *Wokabaot Jalens* July 2011



### Press Release

## WOKABAOT JALENS: NI-VANUATU WOMEN TAKING THE LEAD!

### *Waes women wokabaot blong laef*

**Port Vila, Vanuatu. June 28, 2011.** In April 2011 the Vanuatu government has implemented a novel healthy lifestyle program for women: *Wokabaot Jalens. 10,000 steps evri dei!* With the assistance of Auckland University of Technology (AUT) in New Zealand, and the support of the World Health Organization, the Ministry of Health Vanuatu launched the program for female civil servants to reduce risk factors for noncommunicable diseases (NCDs) and to harness a healthier and more productive workforce. The official opening was on March 28, 2011.

More than 200 women have undergone a health screening and took part in the program. Participants were equipped with a pedometer – a small device that measures each step a person takes. Each participant was recommended to aim for 10,000 steps a day. Participants were grouped in to teams. Each team had a team leader who reported back to the researcher Ms Katja on a weekly basis. Ms Katja has monitored this program for 12 weeks and is now coming back to Port Vila to conduct the 2<sup>nd</sup> health screening. "It will be interesting to see the health changes. Some ladies have lost up to 10kg, I am so very proud of them. This, by living a healthy lifestyle, not through a weight loss program! The screening will show us how weight, blood sugar, blood cholesterols and blood pressure has changed over the course of the program", she says.

The program is funded by the World Health Organization and is based on world leading evidence as it has proven to be successful in other countries, such as the USA, Australia and New Zealand. It was now the first time implemented in a Pacific island context, adapted to ni-Vanuatu custom and culture. If successful in Vanuatu, it can be adapted to neighbouring island countries to advance Pacific population health.

Ni-Vanuatu civil servants lead the way. In 2007, the Ministry of Health implemented the *Walk for Life* program – a program which aims to halt and reverse the spread of NCDs and to increase employees' well-being and productivity. "In our assessment of the *Walk for Life* program we found that women participate least in the activities", says Ms Katja Siefken. "We have therefore designed this program for ladies, so that they realise how simple it can be to live a healthy life." Ms Katja will now reduce the contact with the participants and hopes that the ladies continue doing their regular exercises and buy their fresh and healthy food. "The ladies have learned how to make small changes for a healthier life. I am sure they can keep it up and I hope to come back again in 2012, do another health screening and find out about the long-term results of this program."

For additional information, please contact Hillary Garae, Health Promotion Officer, Ministry of Health. We acknowledge the generous support and assistance of the Auckland University of Technology (AUT) and the World Health Organization (WHO).

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## **Press release *Wokabaot Jalens* November 2011**

### **WOKABAOT JALENS: ONE STEP FURTHER!**

#### **Ni-Vanuatu women competing in Australia!**

**Port Vila, Vanuatu. November 4, 2011.** In April 2011 the Vanuatu government has invited all female civil servants to take action and help prevent the spread of non-communicable diseases. A special healthy lifestyle program named “Wokabaot Jalens” was designed by public health researchers from New Zealand with local ideas. Wokabaot Jalens was a research-based monitored 12-week program that encouraged 220 women to step up for a healthier lifestyle in order to harness a healthier and more productive ni-Vanuatu workforce.

Ms Katja analysed the data and found positive health changes. “Many women lost a lot of weight, they can concentrate better at work, they sleep better and most of all they feel better. It amazes me how simple lifestyle changes can change an individual’s well-being”, says Ms Katja. “You don’t necessarily need medication when you have high blood sugar, but discipline and good will. Regular exercises and healthy eating can do a lot!”

The main idea of the program was to create a sustainable lifestyle change. Ms Katja is hoping that the first 12 weeks will serve as an entry point for a long-term healthy lifestyle. “I kept telling them that they are not doing this for me, but for their life”.

In October 2011, 6 committed teams (25 women) took her words and signed up to compete in an online pedometer challenge, organised by the Australian Government. This program is free of charge and all you need is a pedometer, a team of 4 and internet access. It is a very challenging program – 1,700 (!) individuals from Australia participated, both men and women. “After the first week we realised that our Vanuatu teams are in the top scoring teams!” Four weeks of hard walking have come to an end and three of the Vanuatu teams are among the top 10 teams of all 444 teams! These enthusiastic teams were highly committed and managed to walk up to 40.000 steps a day. That is the equivalent to 32km per day.

One participant reports “I was so happy with the program. I wanted our team to be in the 1<sup>st</sup> ten and we are in the 1<sup>st</sup> 5. It is indeed tremendous! We did a similar program earlier this year for 3 months (Wokabaot Jalens) which motivated me to follow this recent one organised by the Department of Transport in Western Australia. The program is great! Nowadays, I just tell everybody to walk more. My nieces who did not think of walking much like it now and we will be doing our own program, on weekends. There is a lot of work to be done yet because a lot of people don’t know the benefits of walking!”

"I always encourage my friends to walk now. It is a cheap activity and it will help them be healthier, feel fresher, reduce body pains and feel much better." "I take my family for my morning walks, and they really like it!"

The reasons for participating in this 2<sup>nd</sup> challenge were said to be the challenge itself. "After the Wokabaot Jalens, I just couldn't stop walking. I was looking for ways to challenge myself and this program was ideal." "I knew that I needed to lose more weight so I decided to go for it – during the 4 weeks I lost 4kg, only through walking and healthy eating."

The participants' suggestions for the Vanuatu future include

- Health authorities to take an active leading role in promoting physical activity such as walking to all citizens especially in towns. Raise awareness on the importance and benefits of walking as a form of exercise.
- Make walking challenges regular events through the Government. Public servants can take the lead in educating the public on the importance of regular exercises and healthy lifestyles.
- Involve the whole families in these walking challenges
- Promote the consumption of local food grown in Vanuatu
- Ban the import of unhealthy processed food from overseas

The number one challenge is to bring the pedometers into the country and relevant stakeholders are strongly encouraged to help overcome this challenge. "People here are happy to purchase the pedometers at their own cost, but at the moment we just cannot access any pedometers here in Vanuatu. It would help many people to take up a healthier lifestyle!"

It is time to encourage the population to adopt healthier lifestyles. Prevention is better and so much cheaper than cure.

**Benefits of regular walking include:**

it gives you a happier and longer life

it prevents heart diseases and strokes

it makes you more productive at work

it reduces body fat and prevents diabetes

it makes you sleep better and feel more relaxed

it gives you active quality time with your family

**Tips to include more exercise in your day:**

Walk 10 minutes three times a day

Walk to the shop which is not the closest

Get off a bus stop earlier and walk the rest

Walk to your colleague instead of sending her an email or calling her by phone

When you reach home take your family on a fun walk

Call a friend and make a Wokabaot appointment. You are more likely to walk when you have a walking date.

Think of the positive effects on your health and your future

Think of activity as an opportunity, not an inconvenience

Change your attitude.

For additional information, please contact Katja Siefken.

**About:** The Ministry of Health

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## Media releases

- Vanuatu Daily Post, April 2011  
Wokbaot Jalens: Ni-Vanuatu women taking the lead  
<http://www.dailypost.vu/content/wokbaot-jalens-ni-vanuatu-women-taking-lead?page=18>
- Vanuatu Daily Post, April 2011  
"Waes woman wokabaot blong laef" Wokabaot Jalens Health and Exercise Program in Vanuatu  
<http://www.dailypost.vu/content/%E2%80%9Cwaes-woman-wokabaot-blong-laef%E2%80%9D-wokabaot-jalens-health-and-exercise-program-vanuatu>
- TV Vanuatu, April 2011  
News, short stream about Wokabaot Jalens opening
- Vanuatu Daily Post, July 2011  
Wokabaot Jalens Program very successful  
<http://www.dailypost.vu/content/wokabaot-jalens-program-very-successful>
- TV Vanuatu, July 2011  
News, short stream about Wokabaot Jalens closure of monitored phase
- Vanuatu Daily Post, November 2011  
Wokabaot Jalens: One step further. Ni-Vanuatu women competing in Australia!  
<http://www.dailypost.vu/content/ni-vanuatu-women-competing-australia>

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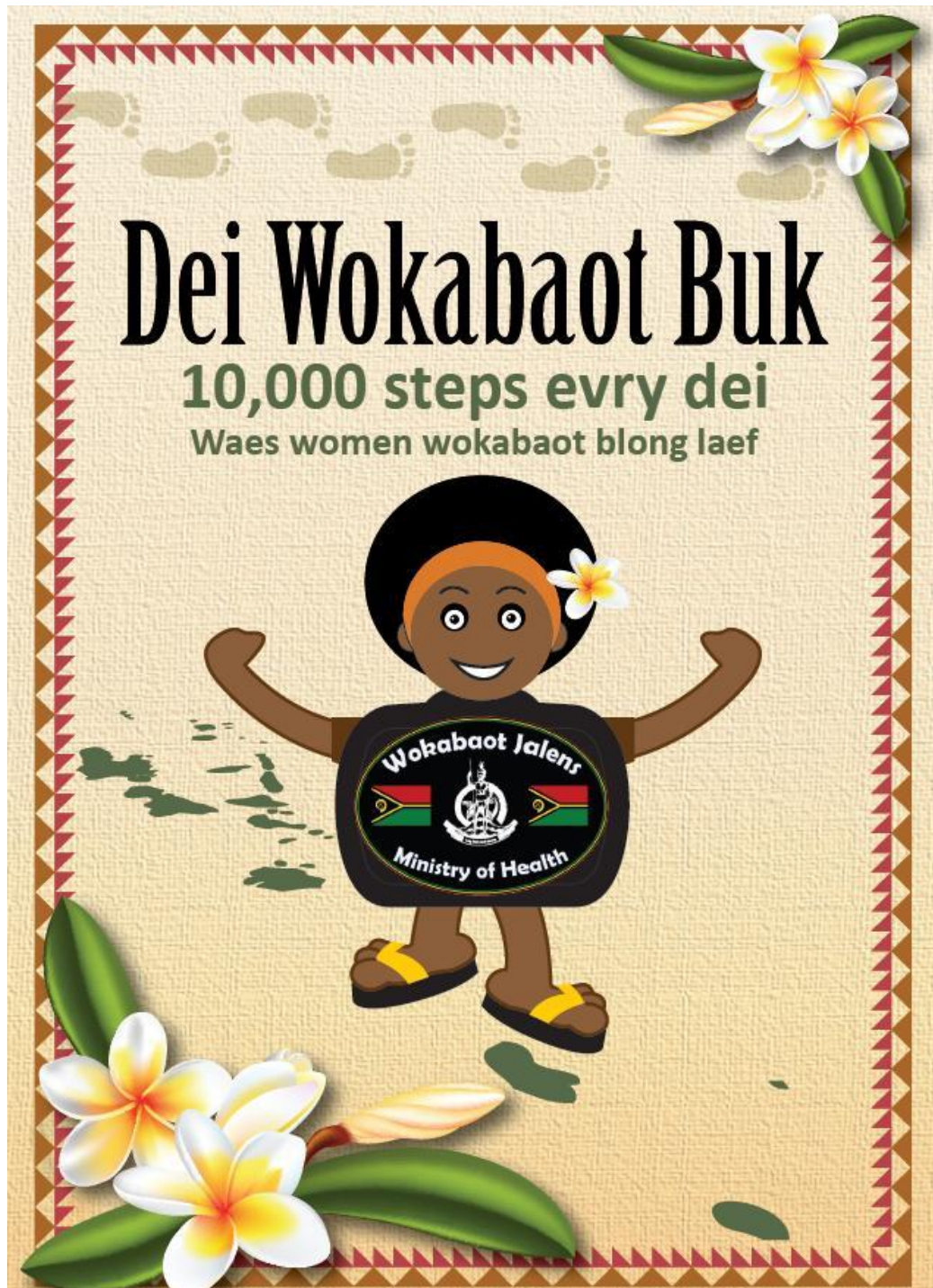
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**Appendix O: *Wokabaot Jalens* social marketing tool: Pedometer design**



**Appendix P: Wokabaot Jalens social marketing tool: Dei Wokabaot Buk**

Cover page



*Each participant received a copy of the 20-page Dei Wokabaot Buk (~Daily walking book). The book contains information about the programme processes, health information and tables to record daily step numbers. The cover page is presented.*

**Appendix Q: Wokabaot Jalens social marketing tool: Vanuatu walking map**

# Wokabaot Jalens

**Evry dei 10,000 steps!**

**Waes woman wokabaot blong laef!**

**What is Wokabaot Jalens?**

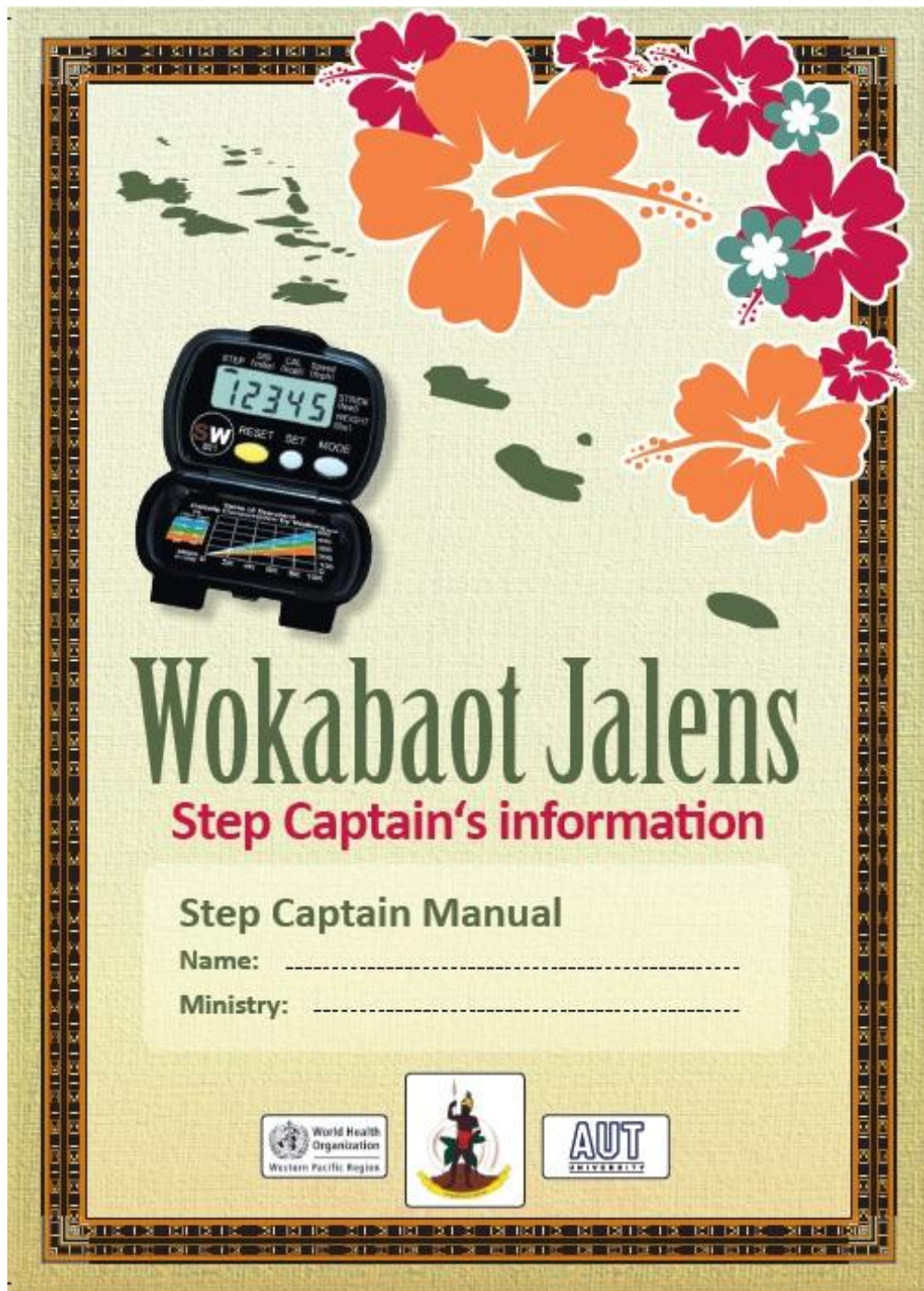
- Wear your pedometer and walk 10,000 steps every day
- Every Monday morning, give your weekly step number to your Step Captain
- Walk a visual wokabaot together with your team members around the beautiful islands of Vanuatu
- The team that completes 2 730 000 steps first has walked around ALL islands and wins the competition!
- You can also do your extra 1 million step challenge. The person who completes 1 million steps first, wins the individual competition!

Around the island		Steps	km
1	Aneityum	70.000	56
2	Futuna	23.625	19
3	Aniwa	21.750	17
4	Tanna	148.750	119
5	Erromango	183.750	147
6	Efate, Port Vila	208.750	167
7	Malekula	368.750	295
8	Espiritu Santo	551.250	441
9	Banks islands	226.625	181
10	Torres islands	123.125	99
11	Maewo	161.250	129
12	Ambae	113.500	91
13	Pentecost	187.500	150
14	Ambrym	157.500	126
15	Epi	168.750	135
Total		2.736.625	2.172

Each participating Ministry received one A0 sized poster, printed on canvas. The poster was hung at the entrance of each Ministry to raise awareness about the initiative. The major islands of Vanuatu are displayed on the map. Real circumference of each island was measured and step numbers calculated. The right hand table indicates how many steps it takes to surround each island. If each team member walks ~ 10,000 steps per day in a team of five, all islands can be surrounded within ~8 weeks.

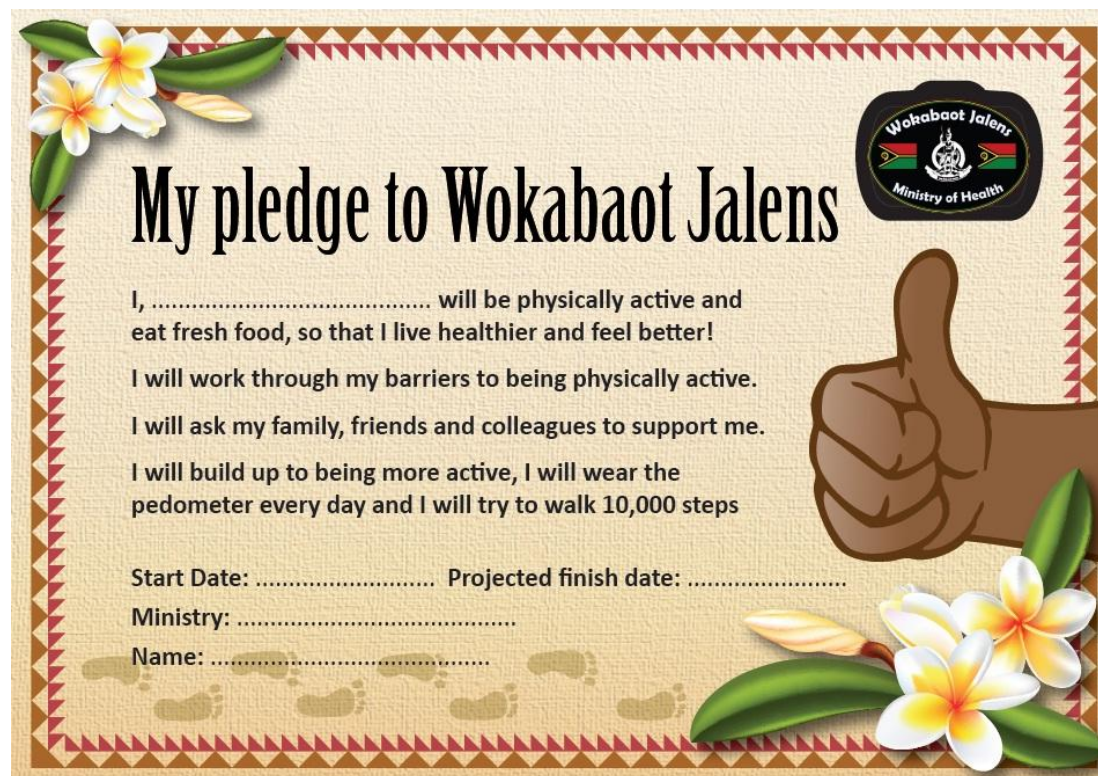
## Appendix R: *Wokabaot Jalens* social marketing tool: Step Captain manual

Cover page



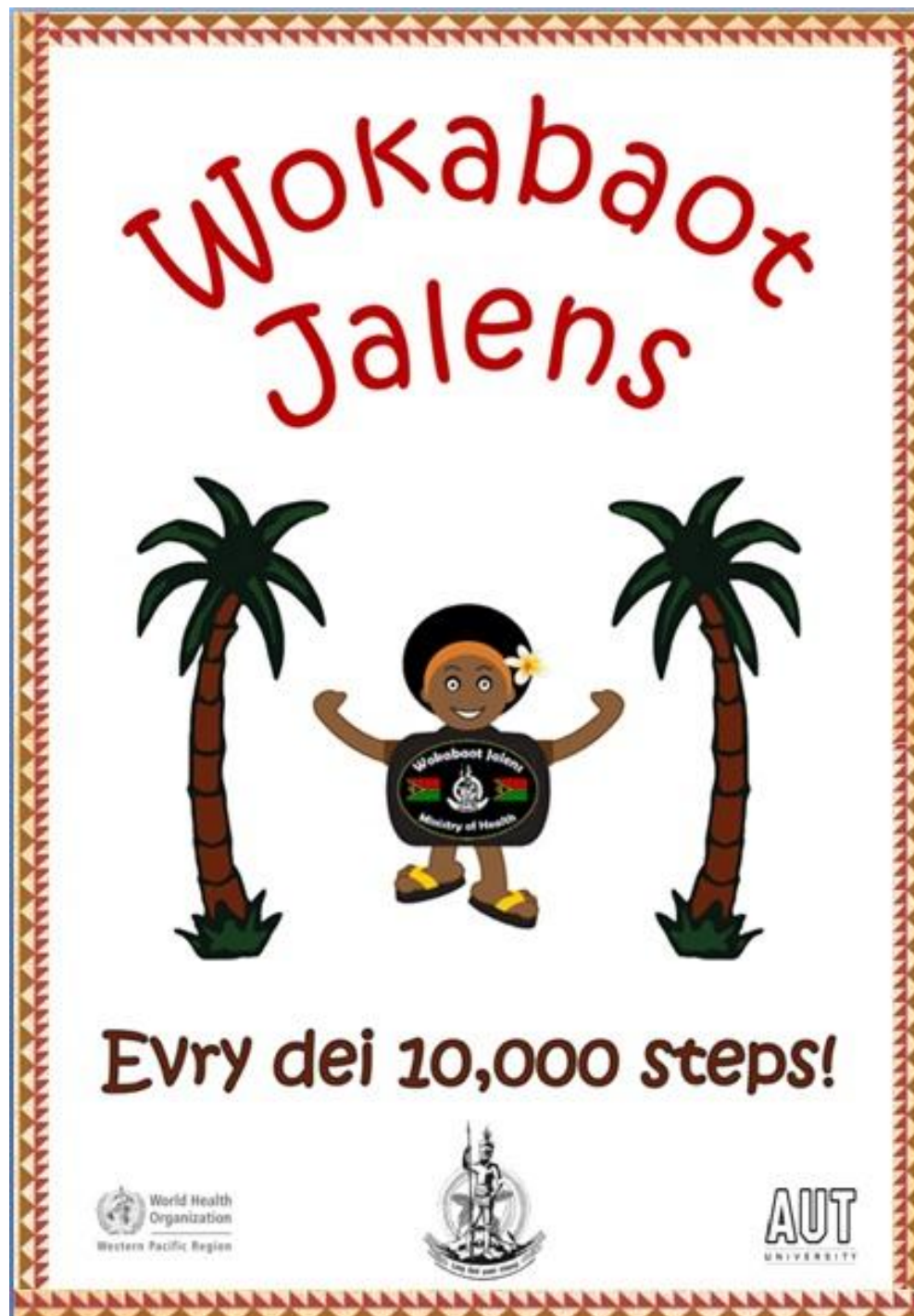
*Each step captain received a copy of the 8-page Step Captain Manual. The manual contains Frequently Asked Questions regarding programme processes, information on motivation and leadership, health information and tables for the team's step progress.*

**Appendix S: Wokabaot Jalens social marketing tool: Pledge**



*Each participant was asked to sign the pledge (A6) prior to programme commencement and was encouraged to attach it somewhere close to working desks in visual proximity.*

**Appendix T: *Wokabaot Jalens* social marketing tool: Flyer poster**



*Each team received copies of this A5 poster and was encouraged to attach it on office doors in visual proximity.*

## Appendix U: *Wokabaot Jalens* social marketing tool: Website:

<http://www.wokabaot.blogspot.com>



**WELKAM**

**Waes woman wokabaot blong laef. Evry dei 10.000 steps!**

Welkam to Wokabaot Jalens!

This site informs you about the unique Wokabaot Jalens (walking challenge) currently taking place in urban ni-Vanuatu women.

Wokabaot Jalens is a monitored and research-based hands-on action to prevent and reverse the NCD epidemic in civil servants in Vanuatu. Start date: April 4, 2011



**WEDNESDAY, NOVEMBER 2, 2011**

### looking back at the walktober challenge 2011. One participants shares her story:

We thought we (our team) give this challenge a try: Not only were we walking, it was a great way of sharing and learning about new healthier experiences that we are facing through the challenge.

We were also looking for ways to improve our fitness (i.e climbing hills, walking certain distances, or walking at a **certain pace**). We were walking constantly to shops, bus stops, to pick up print outs instead of sending someone else to pick it up etc :)))

Personally this online challenge has boosted my energy to where I am now. I have been walking already so the online challenge enabled me to increase my steps and gradually try and increase it daily over the course of the challenge.

We have a great team leader who continuously encouraged our team to walk more. The results during the challenge for me is; some weight loss and an increase in my energy levels.

Our team (Vanuatu Eagles) is continuing to walk twice a week eventhough the challenge ended and we have other interested friends who want to join our team to walk.

Thank you for making it possible for us to participate. And if there is another one in the future, please count us in!

Best regards  
XXX

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**TUESDAY, NOVEMBER 1, 2011**

### Continued commitment

Hi again,



## Appendix V: Wokabaot Jalens social marketing tool: T-shirt design

**\*NOTE VISUAL IS AN APPROXIMATE MEASUREMENT OF A T-SHIRT BASED ON A MENS SIZE MEDIUM**

Measurement from top of neckband

	xs	s	m	l	xl	xxl
Girls						
Guys						
All						

Measurement from top of neckband

	xs	s	m	l	xl	xxl
Girls						
Guys						
All						

Client Information

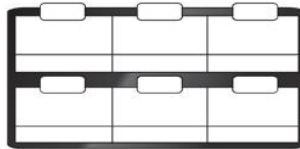
Client	
Job	
Date	



Front



Back



Print colours

**DESIGN  
DIMENSIONS**  
**FRONT - 30 CM WIDE x 40.5cm tall**  
**BACK top - 27.5 CM WIDE**