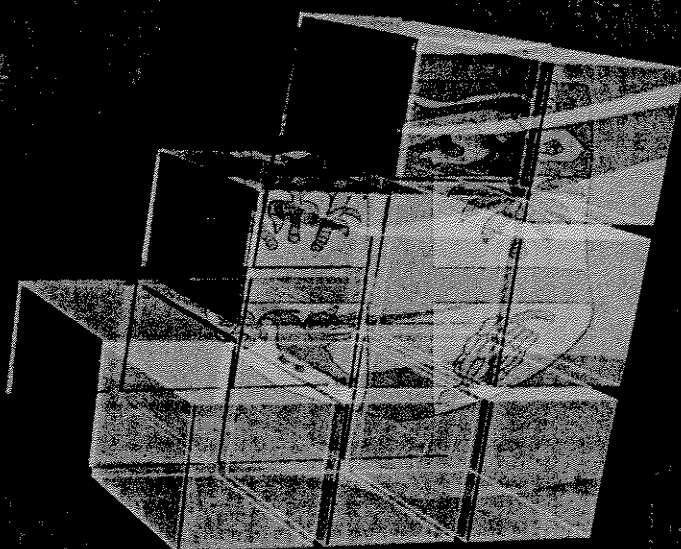
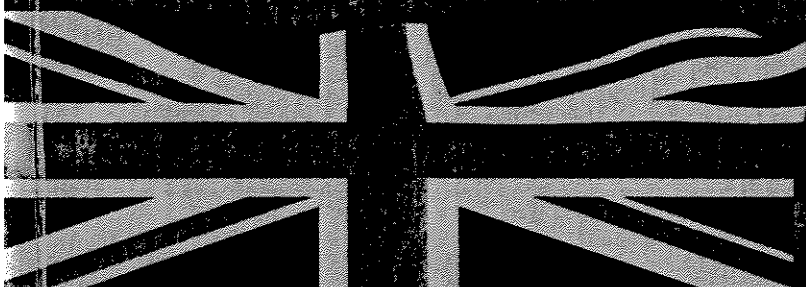


# MINISTRY of Health

SHAPING FIJI'S FUTURE



## FIJI NON-COMMUNICABLE DISEASES (NCD) STEPS SURVEY 2002

*A collaborative effort between the Ministry of Health, World Health Organization (WHO), the Fiji School of Medicine (FSM), and the Menzies Center for Population Health Research of the University of Tasmania, supported by the Australian Agency for International Development (AusAID)*

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## Acknowledgement

The Fiji NCD STEPS survey would not have been made possible if it was for the untiring efforts of the following organization and personnel:

Director Public Health - MOH

Dr. Lepani Waqatakirewa

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### Institutional acknowledgements

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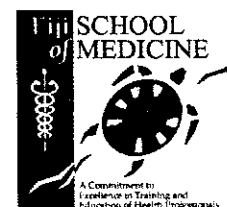
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**Australian Government**  
**AusAID**



## Foreword



Minister of Health Honorable Mr Solomon Naivalu

The Fiji NCD STEPS survey 2001 - 2002 has proved to be an important milestone and has provided the platform of necessary baseline information for the formulation of the National Strategic Plan on Prevention and Control of Non-communicable Diseases 2004-2008.

From its inception as a World Health Organisation (WHO) initiative, Fiji was quick to embrace the STEPS surveillance leading to the planning and implementation of this important national survey which was to be a big start of an on-going surveillance system for NCD and its direct and associated risk factors.

The Ministry of Health is indeed grateful to WHO, Menzies Center and the Fiji School of Medicine for the technical assistance provided that guided the survey from planning to implementation and analysis. The Ministry also acknowledges financial assistance from AusAID and WHO.

The previous national surveys on NCD dates back to the 1980s in which prevalence of NCDs were ascertained for the age group 20 years and above but little was done in terms of documentation of the risk factors that is common across most of the common NCDs. This was the component ushered in by the Fiji NCD STEPS survey presenting the ministry the opportunity to also re-look at its NCD prevention and control strategies and consider "Risk Approach" at the individual but more so at the community or population level.

Like any other National survey, the Fiji NCD STEPS survey project team experienced some grueling times in the planning and implementation of a survey that is a first of its kind for Fiji and all credit goes to the team for the

hard work and persistent effort put into making the survey what this report says it is.

The Fiji NCD STEPS survey is a milestone for medical research in Fiji for it entails validated methodology and research instruments for NCD never undertaken before. It is also a milestone as it marks the beginning of an era of renewed commitment by the Ministry of Health and government of Fiji in the fight against Non-communicable diseases and its risk factors as it resulted afterwards in the formulation of the comprehensive National NCD Strategic Plan 2004 - 2008.

I sincerely hope that through this report every reader will grasp the magnitude of NCD and its risk factors and move individuals and communities towards a much healthier lifestyle.

A handwritten signature in black ink, appearing to be 'S. Naivalu', written in a cursive style.



World Health Organisation Representative in the South Pacific  
Dr Chen Ken

The World Health Organisation is proud to be part of this collaborative effort between the Ministry of Health, the Fiji School of Medicine and the Menzies Centre for Population Health Research of the University of Tasmania (Australia) supported by AusAID

The publishing of the Fiji Non-Communicable Diseases STEPSwise Approach Risk Factor (NCD STEPS) survey marks a milestone in medical research in Fiji as it provides baseline data that will assist the Ministry of Health in addressing the escalating issue of non communicable diseases (NCDs).

Fiji was one of the four countries selected to pilot the WHO NCD STEPS Survey with Marshall Islands, The Federated States of Micronesia and Samoa. The STEPSwise Approach is a simple, standardized method for collecting, analysing and disseminating data for NCD risk factors in WHO member countries.

By using the same standardized questions and protocols, all countries can use STEPS information not only for monitoring within country trends, but also for making between country comparisons. The approach encourages the collection of small amounts of useful data information on a regular and continuing basis adopting standard methodology and sample size to detect trends in age and sex group.

STEPS risk factors is a sequential process, starting with gathering information on key risk factors by the use of interviewer administered questionnaires (STEP 1), then moving to simple physical measurements (STEP 2), and only then recommending the collection of blood sample for biochemical assessment (STEP 3).

The baseline data provided by NCD STEPS will ensure that the right emphasis is placed on the risk factors that need to be addressed in the efforts to control obesity, high blood pressure, diabetes, and physical inactivity.

WHO is grateful to AusAID for their financial assistance, the Menzies Centre for Population Research and the Fiji School of Medicine for their technical assistance and the staff of the Ministry of Health who traveled the length and breadth of the country to obtain this much-needed data.

WHO congratulates you all on this tremendous effort as we continue to work together to tackle the concerning issue of Non Communicable Diseases which is on the rise in Pacific Island countries. The Fiji STEPS survey is a landmark in the implementation of the Tonga Commitment to Healthy Lifestyle and Supportive Environments made by the Ministers of Health of Pacific Island Countries in March 2003.



## List of Abbreviations

Term	Meaning
AD	Atherogenic Dyslipidemia
AusAID	Australian Agency for International Development
BP	Blood Pressure
BMI	Body Mass Index
CEO-Health	Chief Executive Officer - Health
Cent-East	Locally used for Central Eastern Health Services
CI	Confidence Interval
CVD	Cardiovascular Diseases
DBP	Diastolic Blood Pressure
DM	Diabetes Mellitus
FBS	Fasting Blood Sugar
FSM	Fiji School of Medicine
FNASUS	Fiji National Adult Substance Abuse Survey
HDL	High Density Lipoprotein
HP	Health Promotion
HTN	Hypertension
MOH	Ministry of Health
NCEP	National Cholesterol European Project
NA-NCD	National Advisor on Non-communicable Diseases
NFNC	National Food and Nutrition Center
NHRC	National Health Research Committee
NIDDM	Non-insulin Diabetes Mellitus
NCHP	National Center for Health Promotion
NCD	Non communicable diseases
NDC	National Diabetic Center
PA	Physical Activity
SD	Sub-division
SBP	Systolic Blood Pressure
SDHS	Sub-divisional Health Sister
SDMO	Sub-divisional Medical Officer
SEARO	South East Asia Regional Office of WHO
WPRO	Western Pacific Regional Office of WHO
WHO	World Health Organisation
WHO-EPI	World Health Organisation Expanded Program of Immunisation
WHR	Waist Hip Ratio

### 3 Executive Summary

The Fiji NCD-STEPS survey was a nation-wide cross-sectional assessment of 15 to 64 year olds carried out from February to May 2002 using the WHO NCD STEPS surveillance methodology and instruments with these main objectives:

- To investigate and document the prevalence of key NCDs in Fiji.
- To determine the prevalence of and better understand the major risk factors and their associations for common NCDs in Fiji.

Using random cluster sampling, the targeted sample size was 7050 but data was obtained from 6788 individuals with 6783 valid participants following the data cleaning process. For the 3rd STEP of biochemical measurements blood samples were drawn only from the 25-64 year age group.

The overall prevalence of current smokers was 37% and among them, 43% were daily smokers with manufactured cigarettes being the most frequent form of tobacco used (77%).

As for alcohol use, binge drinking was more common in the 35-44 year age group in both genders as compared to other age groups and amongst current kava users, 47% reported smoking tobacco and 20% reported drinking alcohol during or after kava consumption.

There was generally low consumption of fruits and vegetables with 66% of survey participants eating less than one serving of fruit per day and 26% eating less than one serving of vegetables per day.

Generally, the least active segments of the population surveyed in many of the physical activity variables examined were women, people in the age groups over 35 years, those living in urban areas and Indo-Fijians.

For biochemical risk factors, there was a trend of an increasing mean cholesterol level with age, with a persistent tendency for levels in each age group to be higher for males than females.

There was a higher proportion of urban males (49%) in the high-risk triglyceride group ( $\geq 1.70$  mmol/L) as compared to either rural males (24%) or urban females (28%).

HDL cholesterol levels were used to categorize individuals into a high-risk group. The proportion of males in this high-risk group ( $\leq 0.90$  mmol/L) was 31% and for females was 35%, a difference that was not statistically significant.

The overall proportion of overweight (BMI: 25-29.9) in the Fiji population between the ages of 15-64 was 29% and for obesity 18%. Generally females had higher BMI than males (Mean BMI - 26.7 vs 24.2) and Fijians more than Indo-Fijians.

There is a rapid increase in the proportion of overweight / obesity in both genders prior to the age of 30 years. By measurement of waist-hip ratio (WHR) there was a significantly higher rate of high-risk central obesity among females (45%) than males (4%).

The prevalence of hypertension in the population of 15-64yrs was 19.1%, and 63% of them were newly diagnosed. There is a higher proportion of hypertension among Fijians (21%) as compared with Indo-Fijians (16%) and the proportion of uncontrolled previously diagnosed cases is higher among Fijians (81%) than among Indo-Fijians (58%).

The prevalence of diabetes in Fiji was 16% for the age group 25-64 yrs and among them the proportions of newly diagnosed cases was 53.2%. There is a much higher proportion of diabetes among Indo-Fijians (21.2%) as compared with Fijians (11.5%). There is also a difference in the overall prevalence of diabetes by locality with a prevalence of 24.7% in the urban area and 12.8% in the rural area.

Approximately one-fifth of all those with a previous diagnosis of diabetes and/or hypertension reported current use of herbs or traditional remedies.

These results are milestone achievements in NCD research and are keys to the development of effective strategies for the prevention and control of non-communicable diseases in Fiji.

In conclusion the NCD STEPS 2002 revealed not only high prevalence of health conditions in Hypertension, Diabetes and Obesity in the Fiji population surveyed but also the high rates of risk factors associated with it. There is a need to address these in a comprehensive and holistic way at National, Community and individual level in order to prevent and control the continuing rise in Non-communicable Disease burden arising from it.



## 4 Introduction

### 4.1 Background Information and Rationale

The growing burden of non-communicable diseases (NCD) represents a major challenge to health development as it is a burden that cannot be countered simply by accessing greater internal or external funding to spend within the system, due to the astronomical cost factor. A WHO report on the NCD burden in the Pacific countries identified the essential need to mount preventative programs to halt the rapid rise in risk factors that underpins the disease increase.

In recognition of the increased burden of NCDs, WHO has given NCD prevention control and surveillance some priority in its program of work. NCD Surveillance is seen as a necessary tool in designing prevention and control programs with specific goals and measurable outcomes. Country specific data on risk factors is essential in order to set priorities, develop targeted programs and monitor interventions on NCDs. It is this approach that has been implemented by Fiji, while adding items of local relevance.

Primary Prevention and Health Promotion through both community based strategies together with individual high risk clinical intervention has been identified as the key components for the prevention and control of NCDs. The description and quantification of the major risk factors of NCDs is the opportunity that the WHO STEPwise Approach to Risk Factor Surveillance (NCD-STEPs) presents for the prevention and control of a disease group that has been neglected long enough.

As identified in the WHO STEPwise Approach, the underlying principle is that all surveillance sites gather the same core items on a limited number of risk factors, with the option of including additional items of local relevance. The WHO STEPS surveillance programme aims to ensure that the STEPS implementation at the country level is strategic, coordinated, builds capacity and is sustainable.

A vast body of knowledge now exists about the risk factors for NCDs and experience in the prevention and control of them. It also has been shown in a number of countries, both developed and developing, that a comprehensive, long term approach has the potential to reduce risk factors in the population and in turn disability and death. In this sense, the risk factors of today predict the diseases of the future.

A risk factor refers to any attribute, characteristic or exposure of an individual, which increases the likelihood of developing a non-communicable disease. The major risk factors for one NCD are also likely to affect one or more of the other NCDs.

In addition some of the NCD "risk factors" tend to appear in 'clusters' in individuals (i.e. physical inactivity often clustering with obesity and high blood pressure). It has been estimated, for example that social class, tobacco and alcohol use, obesity, blood pressure and diabetes explain about half of the variance in stroke in males and two thirds in females.

Table 4.1 Risk factors common to major non communicable conditions

Risk factor	Condition			
	Cardio-vascular disease*	Diabetes	Cancer	Respiratory conditions**
Smoking	/	/	/	/
Alcohol	/		/	
Nutrition	/	/	/	/
Physical inactivity	/	/	/	
Obesity	/	/	/	/
Raised blood pressure	/	/	/	
Blood glucose	/	/	/	
Blood lipids	/	/		

\*Including heart disease, stroke, hypertension

\*\* Including chronic-obstructive pulmonary disease and asthma

### 4.2 The National Context

#### 4.2.1 Geography

Fiji lies in the heart of the Pacific Ocean midway between the Equator and the South Pole and between longitudes 175 and 178 west and latitudes 15 and 22 south. The Fiji Islands are made up of approximately 330 islands of which, one third are inhabited. There are two major islands Viti Levu and Vanua Levu. Fiji's total land area is 18, 333 square kilometers.

#### 4.2.2 Population

On August 25 1996, the population of Fiji stood at 775,077 with 359, 495 persons in the urban areas and 415, 582 in the rural areas. Of the total, 393 575 were Fijians, 338 818 were Indo Fijians and the remaining made up the other races. Fiji has a relatively young population with about 53 percent or 413,100 persons below the age of 25 years. The economically active-population in 1986 was 62 percent of the total population or 441, 852 persons and in 1996 it was estimated at 67 percent or 523, 428 persons. The number of people aged 60 years and over was estimated at 47,027 persons or 6 percent of the total projected population in 1996.

Fiji is becoming increasingly urbanized as internal migration to towns and cities continue with the extension of urban boundaries also contributing to this trend. By 1996, some 46 percent of the total population were living in urban areas, up from 39 percent in 1986.

#### 4.2.3 Economy

Fiji's economy has improved considerably following the political crisis of 2000 with all sectors performing relatively well with the exception of sugar. According to a document prepared by the Ministry of Information, the economy was on track in 2002 to expand by 4.4 percent compared to 4.3 percent in 2001 with an outlook for the economy to grow by 5.7 percent in 2003. The tourism sector is expected to lead economic growth this year (2003) with strong contributions also from the wholesale and retail sector and the building and construction sector as a result of Fiji hosting the 2003 South Pacific Games.



#### 4.2.4 Government

Fiji is a former British colony that gained independence from Great Britain in 1970. Fiji became a republic in 1987 and is currently run by the democratically elected government. Fiji complies with the spirit of the WHO constitution, which states that health is the right of the individual. The country's health status meets or exceeds most of the WHO goals for the year 2000 and this can be attributed to improved health standards, sound comprehensive health care programmes of the Ministry of Health and otherwise. The Government's focus for health lies in preventative health care, whilst at the same time recognizing curative health care needs as an important entity that is all inclusive in a national health system.

#### 4.2.5 Social Services and Health Status

Fiji generally has a good standard of health and people are living longer with life expectancy of 67.0 years for males and 67.9 years for females. Infant mortality has fallen by 62 percent in the past 20 years and is now at 16.3 deaths per 1000 live births. Good obstetrical services contribute to the lower infant death rate with about 95% of births being attended to by trained medical personnel all resulting in a marked decrease in Maternal Mortality rate to 43 per 100 000 by 2002.

#### 4.2.6 NCDs in Fiji

NCDs have been the leading cause of deaths in Fiji over the past three decades. In the year 2000, it was noted that 82% of all deaths recorded in Fiji were attributed to NCDs, with Coronary Heart diseases and Stroke responsible for one third of all deaths in the 40-59 age group. This is a marked increase from the figures released following a national survey in 1980, which placed the deaths caused by NCD at just over 50 percent.

According to a WHO report, based on the current trends, by the year 2020 NCDs are expected to account for 73 percent of deaths and 60 percent of the global disease burden. As quoted in the report, most of the increase will result from the epidemiological transition in developing countries, although the burden of NCDs in developed countries also continues to increase.

Studies have confirmed that the incidence of chronic NCDs, have been increasing markedly in many developing countries especially in urbanized populations with a link between crude mortality rates from cardiovascular diseases and per capita national income.

In Fiji, changes have taken place rapidly over the last three decades with the prevalence of diseases such as diabetes, hypertension and heart disease increasing in populations with which they have previously not been associated. The change in disease patterns has been accompanied by increasing westernization, which results in social, cultural and economic change, most evident in the urban populations. The burden of disease caused by NCDs is increasing rapidly and is expected to have significant social, economic and health consequences on the country and the rest of the world.

Type II Diabetes Mellitus is one of the major NCDs in Fiji with its severe complications and chronicity affecting the adult population mainly in their working age group. Over the past thirty years, the prevalence of diabetes, in Fiji, has increased progressively with an estimated 500 new cases reported per year through the Diabetes notification and in-patient reporting system of the Ministry of Health. In 1999, it was estimated that F\$5.8m or 6% of the total health budget was expended on diabetes.

A study conducted in 1999 on the cost of diabetes in the Western Pacific region revealed a total estimated expenditure of NZ\$2,316,568 for diabetes related admissions at all hospitals in Fiji in 1999. The study revealed that medical and nursing staff interviewed indicated an increasing number of persons presenting with uncontrolled diabetes and advanced stage complications. It was also suggested that the reason for admission for persons with diabetes is less likely to be recorded as diabetes and more likely to be for a complication.

The study also revealed that senior medical and surgical staff at the Colonial War Memorial Hospital in Suva and the National Diabetes Centre and in community services stated that there was a significant increase in persons presenting with late stage complication. The study estimated that there was either:

- a) an increase in the number of persons with diabetes;
- b) there is a failure in the service delivery model resulting in persons not being diagnosed with early stages of the disease; or
- c) persons with diabetes are not accessing regular clinical services for ongoing management.

Surgical staff at the CWM Hospital stated that people are increasingly presenting with advanced ulceration of lower limbs. The study showed that for the year 2000, 5.15% of the admissions to the surgical unit were for persons with diabetes. The rate for amputations was 5.73%, whereas for a three-month period in 2001 the rate for admissions had increased to 15%. In many cases 5 to 7 surgical procedures were undertaken prior to amputation.

#### 4.2.7 NCD Management Structure and Services

Following the National Survey in 1980, the National Diabetes Centre was established to strengthen efforts to prevent and control diabetes mellitus with a non-governmental arm, the National Diabetes Foundation formed to support the diabetes prevention and control programme.

A national NCD Taskforce was formed in 1991 to coordinate activities in place for the prevention and control of NCDs and to establish interventions to improve the status. Fiji adopted the Healthy Islands concept as the unifying theme for health promotion and health protection in the country for the 21st Century as endorsed by the Pacific Islands Ministers of Health who met in Yanuca Fiji in 1995.

Five priority areas of action for the control of NCDs were identified in the 1998-2002 National Health Plan. These were:-

1 Ministry of Health

2 Fiji Medical Journal, Vol 13, No 11 & 12 Nov Dec 1985

3 Fiji Medical Journal Vol 13, No 11 & 12 Nov Dec 1985

4 Fiji medical Journal July/August 1983.

(Healthcare Decision Making in the Western Pacific Region, Diabetes and the Care Continuum 2001: Carol M Beaver)

- a. Tobacco use, alcohol consumption, high fat intake, physical inactivity, obesity, and high blood pressure.
- b. Strengthening acute care services - and prevention of complications [Secondary prevention]
- c. Disease management and rehabilitation
- d. Reorientation and reorganization of services and new development
- e. Strengthening of the Health System Surveillance
- f. Supporting Research activities.

A national NCD stock take workshop was held in 1999 to address the five major NCDs, diabetes, hypertension, heart diseases, stroke and cancers. The main objectives of the workshop were to assess the burden caused by NCDs, assess the prevalence of risk factors for the major NCDs, take stock of existing initiatives and activities, to identify gaps, and to prioritise ongoing activities and develop a National NCD plan of action. Outcomes of the workshop included recommendations for addressing prevention and management of diabetes and diabetes related complications.

The NCD Taskforce, which was established in 1991 had membership drawn from various government and non governmental bodies. The Taskforce which had seen a number of members withdraw and seen very little activity was reactivated with membership drawn from Ministry of Health, Ministry of Education, Ministry of Youth, Employment Opportunities and Sports, Ministry of Agriculture, Counterstroke Association of Fiji, National Heart Foundation, National Diabetes Foundation in 2001.

The Taskforce is chaired by the Assistant Director Primary and Preventive Health Services and has four subcommittees: Research, Nutrition Policy in Schools, Diabetes Mellitus Management Prevention and Control, Rheumatic Fever Management and Prevention of Rheumatic Heart Disease.

Whilst a number of initiatives, namely those mentioned above, have been carried out to curb the rise in NCDs, the increasing number of deaths caused by NCDs and the increase in the number of adults and children suffering from NCDs reflects the need for further implementation of plans to control the emerging NCD epidemics. It is evident that a holistic approach needs to be taken when addressing the NCD epidemics with "Healthy Lifestyles" marketed as a product that can be achieved across all sections of the community.

Risk intervention both at community or population level and high risk individual level was realized to be the way forward in the battle against rising but neglected of NCDs. There was a need to develop a national strategic plan for such approach but the absence of baseline data especially of the risk factors hindered such activity to a certain extend.

The NCD STEPS is the WHO recommended surveillance tool which offers a simplified approach to surveillance and provides standardized materials and methods as part of technical collaboration with countries.

#### 4.3 Developing WHO STEPS in Fiji

The WHO STEPwise approach aimed to see the collection and analysis of data in a regular and systematic way with Fiji being the first country to initiate NCD-STEPS survey in the Pacific. The Ministry of Health in adopting the WHO STEPwise Approach recognizes the need for a comprehensive long-term approach in order to reduce risk factors and in turn reduce the numbers of disabilities and deaths caused by NCDs.

In early 2001, Fiji began developing the NCD STEPS survey through a collaborative effort between the Fiji Ministry of Health, WHO, the Fiji School of Medicine (FSM), and the Menzies Center for Population Health Research (University of Tasmania, Australia). The comprehensive process of setting up the survey involved initial consultation between the Ministry of Health, WHO and the Fiji School of Medicine.

In preparation for the implementation of the project in Fiji, NCD Project Officer, Dr Asinate Boladua, Epidemiologist Dr Salanieta Saketa and Assistant Director Nursing Community Service Litia Cava attended training for the WHO STEPwise approach for the surveillance of risk factors for NCDs for the countries in the WPRO and SEARO held at Menzies Center for Population Health Research, University of Tasmania.

Following a series of meetings, the NCD Task force Research Subcommittee was given the responsibility to plan and implement the NCD Prevalence and Risk Factor Survey. Consecutive meetings followed to:

- Define study population,
- Agree on objectives of the activity and data elements to be collected,
- Study methodology,
- Budget for the entire process,
- Identify funding sources,
- Identify and negotiate with relevant parties regarding personnel,
- Prepare training materials and operational manual,
- Study proposal for submission to National Health Research Council for funding grant and to the Research Ethics Review Committee at the Fiji School of Medicine,
- Identify, price and procure all required equipment and materials, and
- Scouting of proposed data collecting sites and information dissemination on proposed survey to field staff.

A Pilot Study was carried out which involved 60 participants from an enumeration area in the city of Suva called Edenville. Training and data collection was conducted over a three-day period. Data collectors included (9) Red Cross volunteers as interviewers while nurses, doctors and laboratory technicians attended to the physical measurements and blood tests for glucose, cholesterol and triglycerides. The pilot identified many areas that were improved upon prior to the initiation of the training and data collection for the actual study population.

Training on the NCD STEPS survey was conducted for data collectors in the Central Eastern Division and representatives from the three Pacific Island countries [Samoa, Federated

States Of Micronesia and Marshall Islands] who were piloting the first phase of the study.

Following the completion of data collection, data entry was conducted at the Ministry of Health and was followed by a lengthy data cleaning process, before the data was transmitted to the Menzies Centre for scanning using the teleform system.

#### 4.4 Purpose

The overall aim of the Fiji NCD STEPS survey is to determine the prevalence of and better understand NCD and its major associated risk factors to provide baseline information and assist in the development of comprehensive National Strategic Plan on Prevention and Control of NCDs.

For surveillance purposes the survey aims to assist with:-

- Defining the magnitude of trends of the NCD risk factors.
- Planning and evaluation of health promotion activities to reduce prevalence of NCD risk factors.
- Predicting likely future demands for health services.

#### 4.5 Objectives

The main specific objectives of the Fiji NCD STEPS survey are:

- To investigate and document the prevalence of key NCDs amongst the target population
- To determine the prevalence of and better understand the major modifiable risk factors for common NCDs. These include, physical inactivity, poor diet, obesity, high blood cholesterol and lipids, tobacco, alcohol and kava abuse.
- To study and compare NCD and its risk factors across different strata of age, gender, ethnicity, and locality.

### 5 Methodology

The implementation of Fiji-STEPS involved months of planning, a week-long training activity, and a pilot survey, and was accomplished through the formation of MOH survey teams comprised of various staff including a Team Leader, field officers, doctors, medical assistants, nurse practitioners, laboratory technicians and administrative staff. The survey was conducted from February to May 2002.

#### 5.1 Survey Design

The 2002 Fiji-STEPS survey was designed as a population-based cross-sectional survey of 15 to 64 year olds and involved the collection of data across 3 "steps" as follows:

**STEP 1:** Interview data on selected health risk behaviors including smoking, alcohol consumption, fruit and vegetable consumption, physical inactivity, and kava consumption.

**STEP 2:** Physiological measures of health risks including blood

pressure, height, weight, waist circumference, and hip circumference.

**STEP 3:** Biochemical measures of health risks including fasting blood glucose, total cholesterol, HDL cholesterol, and triglycerides.

#### 5.2 Sampling

With the intention of using a variant of the WHO-EPI multi-stage cluster sampling methodology, initial sample size calculations were performed assuming a prevalence of approximately 10% for major variables of interest (e.g. diabetes), an ability to ascertain an estimated prevalence within 1% of the true prevalence, a 95% confidence level, and a design effect of 2. These calculations suggested that a total sample size of approximately 6,900 in the target population of 15 to 64 years would be sufficient for the purposes of this study.

As the WHO-EPI multi-stage cluster sampling methodology calls for the selection of 30 clusters, it was decided to target the collection of STEP 1 and STEP 2 data from 235 participants in each of 30 clusters totaling a target sample size of 7050. Given that biochemical abnormalities are quite rare in the 15 to 24 year age group and that the logistics and costs to collect these STEP 3 data are considerable, it was decided that STEP 3 data would only be collected from one-half of those in the 25 to 64 year age group. As the Fiji population data suggested that the total 25 to 64 year age group would comprise approximately 68.4% of the target population in the 15 to 64 year age group, it was estimated that STEP 3 data would be collected on around 2411 individuals (i.e.  $7050 \times .684 \times 0.5$ ).

A multi-stage cluster sampling methodology was used to select the 30 clusters. The entire Fiji population is distributed among a total of 86 tikinas throughout three administrative divisions. The sampling frame for the sampling process comprised all tikinas with a population of 2,500 or more. The smaller tikinas ( $n = 35$ ) were eliminated from the sampling frame as they largely included tikinas in very remote areas that if chosen would impose significant logistical challenges with little yield in terms of potential numbers of participants. Of the total of 86 tikinas, 51 were included in the sampling frame representing over 95% of the total Fiji population. The first stage of the sampling process involved the probability-proportional-to-size selection of 18 of these tikinas that would include the 30 clusters.

The second stage of the sampling process involved the selection of enumeration areas, which defined a cluster, within the 18 tikinas chosen in stage one. In the case of tikinas with a single cluster, this single cluster was chosen randomly from a list of enumeration areas within that tikina. In the case of tikinas with more than one cluster, these were chosen with PPS. The third stage of the sampling process involved the selection of starting households within the chosen clusters using recognized WHO EPI cluster sampling methodology.

Within each cluster the selection of participants within the target population of 15 to 64 year olds for STEPS 1 and 2 was performed in a house-to-house search and with informed consent irrespective of age, gender or ethnicity, until the target participant number of 235 was reached. From those chosen for STEPS 1 and 2, participants for STEP 3 were chosen randomly



(via a coin flip) as approximately one-half of those aged 25 to 64 years who had been selected for the other two STEPS.

For each cluster, data was also collected regarding the total number of households approached, the number of those who refused consent to being a participant, and the number of those in STEP 1 who also participated in STEP 2 and STEP 3. This data was included in a weighting formula used to calculate STEP-specific weighting factors for data analysis.

## 5.2.1 Data Collection Process

### 5.2.1.1 STEP 1 - Behavioral Risk Factors

Data for behavioral risk factors was collected using a face-to-face structured interview with questions on selected health risk behaviors including smoking, alcohol consumption, fruit and vegetable consumption, physical inactivity, and kava consumption. The questions were mainly derived from the WHO STEP wise Approach to Risk Factor Surveillance generic questionnaire. There were some adoptions and additions to the questions including kava and questions about NCD conditions and treatment. The questionnaire is in the appendix.

While the interview form was in English, the actual interview was conducted in either English, Fijian or Hindi depending upon the wishes of the participant. Interviews in Fijian or Hindi followed a standardized script translated from the original English version. All interviews followed a standardized informed consent process and was conducted in a private setting as individually arranged by one of approximately 40 interviewers, all of whom were Fiji MOH personnel specifically trained in the NCD-STEPS methodology. The MOH interviewer also made arrangements with the participants to come to a central site for STEPS 2 and 3 (usually on the following day), and in the case of those participating in STEP 3, the interviewer also provided the participant with fasting instructions.

### 5.2.1.2 STEPS 2 and 3

Selected nursing stations and hospitals were used as a temporary survey base for STEPS 2 and 3 where stations were set up for registration, physical measurements, biochemical measurements and checkout. Approximately 50 participants a day attended the STEP 2 and 3 stations each day.

## STEP 2 - Physical Measurements

Targeted physiological measures of health risks for NCDs were measured including blood pressure, height, weight, waist circumference, and hip circumference. Selected MOH personnel were trained in conducting these measurements through the use of specific protocols with quality control monitored through the use of periodically conducted performance checklists for each measurement.

Blood pressure (BP) was measured with the Omron HEM 907 BP monitor. BP was measured twice and if the difference between the first and second readings was 10 mm Hg or more then a third reading was taken. For those with two readings, the mean value of the two readings was used in the analysis. For those with three readings, the mean value of the second

and third readings was used in the analysis.

Height was measured twice with a body meter to the nearest 0.1 cm and the mean of these two measurements was used in the analysis. Weight was measured once to the nearest 0.1 kg with the Heine Portable Professional Adult Scale, which was checked for accuracy against standard weights at the beginning and end of each day. Waist and hip circumference were measured twice to the nearest 0.1 cm with the Figure Finder constant tension tape. If there was a difference between the first and second readings of 2 cm or more, then a third reading was taken. For those with two readings, the mean value of the two readings was used in the analysis. For those with three readings, the mean value of the closest two readings was used in the analysis. Neither waist nor hip circumference were measured in female participants who responded affirmatively to a question as to whether or not they were pregnant.

## STEP 3 - Biochemical Measurements

Targeted biochemical measures of health risks for NCDs were measured including fasting blood glucose, total cholesterol, HDL cholesterol, and triglycerides. MOH laboratory personnel were trained in conducting these measurements through the use of specific protocols with monitored quality control. A venous blood sample was collected and prior to spinning the venous sample down to obtain a serum sample, a drop of whole blood was applied to a glucose test strip and measured in a hand-held glucometer. The serum samples were transported on ice to a hospital laboratory facility where the other three biochemical measurements were conducted using standard methods with a Reflotron analyzer.

## 5.3 Data Entry and Cleaning

Data for all three STEPS were hand-entered onto coded forms with unique computer-generated identification numbers that were designed to be electronically read by a software application called Teleform that then populated an EpiInfo 6.04d database. Additionally, a random selection of 10% of all completed forms were also entered manually using EpiInfo 6.04d to test for consistency between the two data entry methods.

The process of automated data entry using Teleform was followed by a series of activities to yield a "cleaned" and valid dataset. These activities included identifying, investigating, and resolving as necessary, various issues related to duplicate records, data values outside of preset ranges, and inconsistencies between answers to different but related questions.

## 5.4 Weighting of Data

Due to the complex multi-stage cluster sampling methodology used in Fiji-STEPS, it was necessary to devise a weighting formula to accommodate weighted data analysis (Appendix 2). This formula includes three factors related to the probability of selecting the study population using the Fiji-STEPS multi-stage sampling methodology, one factor to accomplish a post-stratification adjustment related to the sample's distribution of ethnic/gender/age groups relative to the total Fiji population aged 15 to 64 years, and one factor related to the STEP 2 response rate. Inadequate data on STEP 3 participation precluded calculation of a response rate factor similar to that

used for STEP 2.

## 5.5 Data Analysis

Data analysis was accomplished using the Windows-based EpiInfo 2002 - Version 2. Frequency distributions with 95% confidence intervals were calculated using weighted complex sample frequencies for all categorical variables. Descriptive statistics including weighted complex sample means with 95% confidence intervals were calculated for all numeric variables.

Associations between variables were analyzed for the major exposure variables of interest including 10-year age groups, gender, ethnicity and area (i.e. rural vs. urban). These associations were calculated using EpiInfo's complex sample table function. Statistically significant differences between groups were identified by non-overlapping 95% confidence intervals for either weighted proportions or weighted means. The Physical Activity section of the survey however was analysed by Dr Ben Smith at the Center of Physical Activity and Health in Sydney Australia using the Statistical Package for Social Sciences (SPSS).

## 6 RESULTS

### 6.1 Description of the sample

The targeted sample size was 7050 (235 participants from 30 clusters). Data were obtained from 6788 individuals with the data being reduced to 6763 following the data cleaning process and details of sample characteristics are outlined in table 6.1 and Figure 6.1 below.

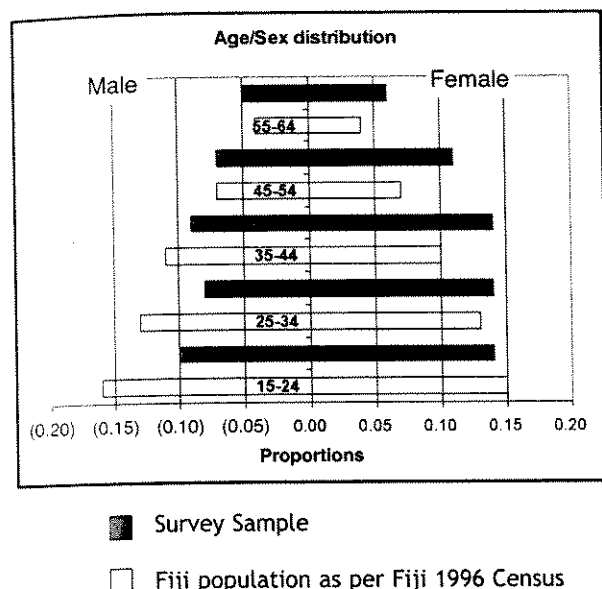
#### 6.1.1 SURVEY SAMPLE CHARACTERISTICS

Table 6. 1: Demographic Description of Study Sample and Sampling Frame\*

Demographic Characteristic	Study Sample				Sampling Frame*	
	Number	Unweighted Proportion	Weighted Proportion	95% CI	Number	Proportion
<b>Gender</b>						
Male	2752	40.7%	53.2%	+/- 2.8%	241,379	50.6%
Female	4011	59.3%	46.8%	+/- 2.8%	235,186	49.4%
Total	6763				476,565	
<b>Ethnicity</b>						
Indigenous Fijian	3805	56.3%	57.2%	+/- 17.9%	230,878	48.4%
Indo-Fijian	2768	40.9%	38.9%	+/- 18.0%	219,150	46.0%
Others	190	2.8%	3.8%	+/- 2.7%	26,537	5.6%
Total	6763				476,565	
<b>Agegroup</b>						
15-24 years	1647	24.4%	30.9%	+/- 2.5%	150,637	31.6%
25-34 years	1505	22.3%	25.8%	+/- 1.8%	122,501	25.7%
35-44 years	1580	23.4%	21.0%	+/- 1.8%	99,959	21.0%
45-54 years	1241	18.3%	13.7%	+/- 0.7%	65,764	13.8%
55-64 years	790	11.7%	8.6%	+/- 1.1%	37,704	7.9%
Total	6763				476,565	
<b>Locality</b>						
Rural	3793	56.1%	73.2%	+/- 20.2%	243,776	51.2%
Urban	2970	43.9%	26.8%	+/- 20.2%	232,789	48.8%
Total	6763				476,565	

Of the 6763 respondents in the survey 2752 were males and 4011 were females. In terms of ethnicity Fijians made up 56.3% of the surveyed population with Indo-Fijians at 40.9% and other groups namely Chinese, other Pacific Islanders and Part Europeans making up 2.8%. Of all these, 56.1% resided in rural areas whilst 43.9% in urban centers and highest proportion of population was in the 15-24 years age group.

Figure 6.1: Age and gender distribution of Fiji Population and Survey Sample

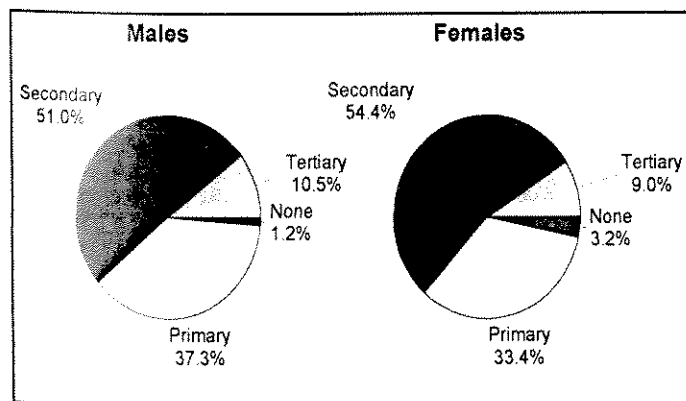


## 6.1.2 Level of Education

In line with other research done in Fiji, the survey indicated that Fiji had a well-educated population with only a very small percentage having not completed primary school (males: 1.2%; females: 3.2%). A large number of the sample population had completed lower secondary school (males 59.9%; females: 54.3%) with more than 10% of all surveyed males and females completing secondary school (males: 13.2%; females: 14.9%). Earlier studies done in Fiji indicate that over 98% of children between the ages of 6-14 are attending primary school.

There is no significant difference between the numbers of years spent in school by males (9.6 years) and females (9.7 years). As expected, the mean number of years spent in school decreased from 10.7 to 7.2 as the age increased 15 to 64 years, reflecting what is commonly known that the younger age-group spend more time in school than the older age group.

Figure 6.2: Frequency of level of education by gender



## 6.2 Behavioural Risk Factors

### 6.2.1 Tobacco Use

(Detail tables in Appendix Table 2.1 - 2.12)

Prevalence of tobacco use was assessed according to smoking status that each participant reported on as response to the questions. These are defined as follows:

- Current smokers - those who have smoked any tobacco products (such as cigarettes, cigars or rolled tobacco) in the past 12 months
- Daily smokers - those who are smoking any tobacco products every day.

These categorizations of smoking status are of common use as it also gives insight into the addictive characteristics of tobacco smoke.

This survey showed that the overall proportion of current smokers was 36.6% ( $\pm 5.9$ ) among whom 42.7% ( $\pm 6.3$ ) reported daily smoking. The overall prevalence of current smoking in the NCD-STEPS survey is comparable with the results of the Fiji National Adult Substance Use Survey conducted in 1999 that identified the overall prevalence of smoking at 38%.

There was a greater proportion of current smokers being male (53.0%  $\pm 6.5$ ) than female (18.0%  $\pm 5.3$ ). Amongst current smokers, there were also a higher proportion of daily smokers among males (49.0%  $\pm 6.3$ ) than among females (21.4%  $\pm 6.8$ ).

While there was no statistically significant difference in the proportion of current smokers by age group among females, it is notable that there is a statistically significant increase in the proportion of male smokers in the 25-34 year age group (60.6%  $\pm 10.2$ ) as compared to the 15-24 year age group (38.6%  $\pm 7.0$ ). The proportion of current male smokers after this remains statistically similar.

The survey revealed that there were a higher proportion of current smokers in rural areas (40.7%  $\pm 7.1$ ) as compared to urban areas (25.7%  $\pm 3.9$ ). However, among current smokers there was no statistically significant difference in the proportion of daily smokers in rural areas (42.4%  $\pm 7.8$ ) as compared to urban areas (44.0%  $\pm 2.7$ ).

There were also a higher proportion of current smokers among Fijians (45.1%  $\pm 4.8$ ) as compared to Indo-Fijians (24.1%  $\pm 3.7$ ). Table 6.2 reveals that this higher proportion of current smokers among Fijians was found for both genders. However, among current smokers, there were a higher proportion of daily smokers among Indo-Fijians (59.0%  $\pm 7.0$ ) as compared to Fijians (36.2%  $\pm 5.8$ ). Further analysis of this data revealed that these ethnic differences in both current smoking (Fijian > Indo-Fijian) and in daily smoking (Indo-Fijian > Fijian) were found to be statistically significant for both genders. While this might be explained by differences in tobacco use related to kava consumption, the analysis of this relationship was inconclusive.



Table 6. 2: Current smoking status by gender and ethnicity

Ethnic Group	N	Males								
		Daily Smokers			Non-daily Smokers			Non-smokers		
		%	95% CI	n	%	95% CI	n	%	95% CI	n
Fijian	1651	26.4	± 6.0	410	34.7	± 3.1	573	38.9	± 5.0	668
Indian	1033	25.4	± 5.5	289	17.1	± 3.4	203	57.6	± 6.2	541
Others	66	26.3	±11.1	16	15.3	±11.9	12	58.4	±19.7	38
<b>TOTAL</b>	<b>2750</b>	<b>26.0</b>	<b>± 4.5</b>	<b>715</b>	<b>27.0</b>	<b>± 4.8</b>	<b>788</b>	<b>47.0</b>	<b>± 6.5</b>	<b>1247</b>

Ethnic Group	N	Females								
		Daily Smokers			Non-daily Smokers			Non-smokers		
		%	95% CI	n	%	95% CI	n	%	95% CI	n
Fijian	2149	5	± 2.0	126	22.2	± 3.3	470	72.8	± 3.9	1553
Indian	1733	1.4	± 0.6	35	1.6	± 0.5	32	97	± 0.9	1666
Others	123	10.5	± 5.5	14	21.1	±14.6	20	68.4	±10.4	89
<b>TOTAL</b>	<b>4005</b>	<b>3.9</b>	<b>± 1.4</b>	<b>175</b>	<b>14.2</b>	<b>± 4.6</b>	<b>522</b>	<b>82.0</b>	<b>± 5.3</b>	<b>3308</b>

### 6.2.1.1 Age of Initiation

The mean age of initiation for the total population was 21.4 years ( $\pm 0.6$ ). The youngest age of initiation was 7 years of age. Table 6.3 reveals that the mean age of initiation of smoking among current smokers was lower among males (20.7 years  $\pm 0.6$ ) as compared to females (25.0 years  $\pm 2.1$ ). However, this difference in age of initiation by age group only existed for the two oldest groups and is probably biased by recall. This could suggest that females in the younger cohorts are beginning to smoke as early as males.

Table 6. 3: Age started smoking for current smokers by gender

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95% CI
15-24	135	18.3	$\pm 0.5$	24	18.9	$\pm 1.3$
25-34	165	20.0	$\pm 0.9$	47	21.2	$\pm 2.0$
35-44	170	21.3	$\pm 0.8$	37	24.1	$\pm 4.1$
45-54	144	23.2	$\pm 1.2$	44	30.6	$\pm 3.9$
55-64	95	23.6	$\pm 1.8$	22	36.4	$\pm 9.6$
<b>TOTAL</b>	<b>709</b>	<b>20.7</b>	<b><math>\pm 0.6</math></b>	<b>174</b>	<b>25.0</b>	<b><math>\pm 2.1</math></b>

### 6.2.1.2 Years of smoking

Although the total mean number of years of smoking by gender was similar, some differences were noted when stratified by agegroup as evident in table 6.4. The only difference in years of smoking since initiation between genders is in the two oldest 10-year agegroups. The only statistically significant difference however, was in the 45-54 years agegroup. This could suggest that females generally give up smoking more than males.

Table 6. 4: Years of smoking for current smokers by gender

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
15-24	135	3.5	$\pm 0.5$	24	3.2	$\pm 1.2$
25-34	165	9.7	$\pm 1.1$	47	9.2	$\pm 2.2$
35-44	170	18.6	$\pm 0.9$	37	17.0	$\pm 4.1$
45-54	144	26.1	$\pm 1.2$	44	19.1	$\pm 4.0$
55-64	95	35.9	$\pm 1.8$	22	24.1	$\pm 10.4$
<b>TOTAL</b>	<b>709</b>	<b>15.1</b>	<b><math>\pm 1.6</math></b>	<b>174</b>	<b>13.5</b>	<b><math>\pm 2.4</math></b>

### 6.2.1.3 Types of tobacco

Analysis of the data reveals that approximately 3/4 of all current smokers reported using manufactured cigarettes, 1/4 of all current smokers reported using hand-rolled cigarettes, and that approximately 1/10th reported using cigars and cheroots. These proportions are not statistically different by either age group or gender.

### 6.2.1.4 Quantity of tobacco smoked

The total mean number of both types of cigarettes smoked daily (i.e. manufactured and hand-rolled) by current smokers was 8.3 ( $\pm 0.7$ ), with a higher mean number smoked daily for males (8.6  $\pm 0.7$ ) as compared to females (5.7  $\pm 1.4$ ).

However, Table 6.5 shows that the number of cigarettes smoked per day by current smokers, of either manufactured or hand-rolled cigarettes did not vary by either agegroup or gender. While the mean number of cigarettes smoked was consistently higher among males as compared to females for either type of cigarette, this difference was not statistically significant.

Table 6. 5: Consumption of manufactured and hand-rolled cigarettes/day for current smokers by gender

Age	Manufactured Cigarettes					
	Males			Females		
	Mean	95%CI	N	Mean	95%CI	N
15-24	6.3	±1.4	123	4.2	±3.3	24
25-34	7.1	±1.3	142	5.7	±1.2	42
35-44	7.9	±0.9	127	6.5	±1.4	30
45-54	8.2	±1.3	111	5.6	±1.6	32
55-64	8.0	±2.1	72	3.5	±2.4	10
TOTAL	7.3	±0.8	575	5.4	±1.3	138
Age	Hand-rolled cigarettes					
	Males			Females		
	Mean	95%CI	N	Mean	95%CI	N
15-24	4.3	±1.4	22	3.0	-	3
25-34	5.4	±1.9	34	4.5	±1.6	6
35-44	7.6	±1.0	44	7.5	±6.4	10
45-54	7.5	±1.9	42	2.5	±1.4	10
55-64	7.7	±1.9	32	3.7	±1.2	7
TOTAL	6.5	±1.4	174	4.6	±2.0	36

## 6.2. Conclusion

Tobacco use (i.e. current smokers) has an overall prevalence of 36.6% (±5.9) with 42.7% (±6.3) of the current smokers smoking on a daily basis for the 15-64 year olds in Fiji. Generally, although the age of initiation are similar, the males smoke a higher number of cigarettes per day, has a higher proportion of current and daily smokers and also are less likely and later to quit than females.

In terms of ethnicity, there were more current smokers amongst the indigenous Fijians but a higher prevalence of daily smokers among Indo-Fijians. This could be indicative of the higher addictive behaviors among Indo-Fijians.

There were also a significantly higher proportion of current smokers in the rural area than the urban whilst the variations in age groups were inconclusive except to note that the mean age of initiation of tobacco use for both genders is approximately 18 years. These figures should guide planned activities carried out on Tobacco control especially in defining specific target groups of focus.

## 6.2.2 Alcohol Consumption

(Detail tables in Appendix Tables 4.1 - 4.22)

Prevalence of alcohol consumption was assessed by status of usage and the consumption behaviour of "binge drinking" was specifically assessed due to its associated cardiovascular risks. Below were the definitions used:

- Ever drinkers - those who have ever consumed a drink that contains alcohol (such as beer, coolers, wine, spirits, home brew or fermented cider).
- Current drinkers - those who have consumed a drink that contains alcohol in the past 12 months.
- Binge drinking - 5 or more drinks per drinking day for males; 4 or more drinks per drinking day for females.

Overall, the survey revealed that 45.0% (±5.0) had ever consumed alcohol. There was noted to be a higher proportion of males (70.0% ± 5.9) that had ever consumed alcohol as compared to females (16.5% ± 5.9). There was also a higher proportion of Fijians (50.0% ± 4.8) who had ever consumed alcohol as compared to Indo-Fijians (37.1% ± 6.6). However, the difference by ethnicity was only found among females with Fijian females having a much higher proportion of ever use (21.0% ± 6.7) as compared to Indo-Fijian females (7.6% ± 4.3).

There was no difference in having ever consumed alcohol by area. While overall there was little difference in the proportion of those who had ever consumed by age group, Table 6.6 reveals a clear trend for an increasing proportion of ever use in younger age groups among females.

Table 6. 6: Ever consumption of alcohol by agegroup and gender

Age	Total population				Male				Female			
	N	Ever Consumed			N	Ever Consumed			N	Ever Consumed		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
15-24	1645	38.8	±6.9	601	690	57.6	±8.3	413	955	16.5	±6.3	188
25-34	1505	51.6	±5.7	695	565	77.4	±7.4	444	940	21.7	±7.4	251
35-44	1579	48.3	±6.3	678	632	76.4	±6.5	491	947	16.9	±7.1	187
45-54	1240	44.8	±5.0	478	499	74.1	±5.8	375	741	12.1	±6.1	103
55-64	788	39.2	±5.9	289	362	70.9	±7.4	251	426	7.6	±5.7	38
Total	6757	45.0	±5.0	2741	2748	70.0	±5.9	1974	4009	16.5	±5.9	767

Current alcohol use was defined as having had any alcohol consumption in the past 12 months. Overall, 23.8% (±3.0) were current consumers. As with ever consumers, there was noted to be a higher proportion of males (39.9% ± 4.3) that had ever consumed alcohol as compared to females (5.5% ± 3.0). However, in contrast to ever consumers, there were no differences in current consumption by ethnicity with the exception of "other" females who showed a much higher proportion of current use (17.8% ± 7.6) as compared to either Fijian females (5.9% ± 3.4) or Indo-Fijian females (3.7% ± 2.4). There was also no difference in current alcohol consumption by area.

Table 6.7 reveal that current consumption of alcohol tended to increase among the younger agegroups overall and in both genders.

Table 6. 7: Current alcohol consumption (in the past 12 months) by agegroup and gender

Age	Total population				Men				Women			
	N	Current Consumers			N	Current Consumers			N	Current Consumers		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
15-24	1645	26.4	±5.5	406	690	42.0	± 7.8	305	955	7.8	±3.8	101
25-34	1505	29.3	±3.9	382	565	49.4	± 6.4	296	940	6.1	±3.9	86
35-44	1579	22.8	±4.6	312	632	39.2	± 7.2	248	947	4.4	±3.7	64
45-54	1240	16.6	±6.6	177	499	28.0	±10.5	142	741	3.9	±2.6	35
55-64	788	11.7	±3.9	86	362	22.1	± 8.1	79	426	1.2	±1.1	7
Total	6757	23.8	±3.0	1363	2748	39.9	± 4.3	1070	4009	5.5	±3.0	293

### 6.2.2.1 Quantity of alcohol consumed

Standard drink is defined as drink with 10g of alcohol and is approximated as a 1 glass/can/bottle(375ml) of regular beer or 1 gla of wine.

Type of Beverage	Volume of Standard Drink
Beer	330 ml
Wine	120 ml
Spirits (Vodka, Rum, Gin, Home brew, etc.)	40 ml

Table 6.8 shows that among current drinkers, the average number of standard drinks consumed per drinking day for males (14.4 drinks ±2.7) was approximately twice that consumed by females (7.0 drinks ±1.1). Not with standing the possibility of bias in the way the question could have been interpreted, the results are not at all surprising considering the culture of drinking alcohol and kava in the country. There was also trend for younger age groups to consume a higher mean number of drinks per drinking day overall and in both genders.

Table 6. 8: Average number of standard drinks per drinking day among current consumers of alcohol by agegroup and gender

Age	Total population			Men			Women		
	Mean	95% CI	N	Mean	95% CI	N	Mean	95% CI	N
15-24	13.9	±2.0	405	14.8	±2.1	305	7.6	±1.6	100
25-34	16.0	±2.9	377	16.9	±3.1	293	7.5	±1.7	84
35-44	13.2	±3.9	307	13.8	±4.4	245	7.0	±2.7	62
45-54	8.8	±1.5	171	9.3	±1.5	139	3.7	±1.5	32
55-64	6.9	±2.6	85	7.1	±2.9	78	3.0	±2.5	7
Total	13.6	±2.5	1345	14.4	±2.7	1060	7.0	±1.1	285

Overall there was no difference in the mean number of drinks consumed per drinking day by area. However, the mean number of standard drinks consumed by urban females per drinking day (7.9 drinks ±0.9) was marginally more than that for rural females (5.9 drinks ±1.1). Table 6.9 shows that the mean number of standard drinks consumed per drinking day was approximately twice as much for Fijians (17.4 drinks ±2.0) as compared to Indo-Fijians (8.4 drinks ±1.7) and that this difference was seen in both gender:

Table 6. 9: Average number of standard drinks per drinking day by ethnicity and gender

Ethnic Group	Total population			Men			Women		
	Mean	95%CI	N	Mean	95%CI	N	Mean	95%CI	N
Fijians	17.4	±2.0	746	18.7	±2.0	568	8.3	±1.9	178
Indians	8.4	±1.7	542	8.8	±1.8	464	3.1	±1.3	78
Others	15.3	±5.7	57	18.1	±8.2	28	8.2	±1.9	29
Total	13.6	±2.5	1345	14.4	±2.7	1060	7.0	±1.1	285

### 6.2.2.2 Binge Drinking

Binge drinking was defined as having a mean of 5 or more standard drinks per drinking day for males and a mean of 4 or more standard drinks per drinking day for females. Table 6.10 shows that overall 77.3% ( $\pm 6.3$ ) of current alcohol consumers were binge drinkers, with a higher proportion for males (79.5%  $\pm 6.8$ ) as compared to females (58.6%  $\pm 8.0$ ). There was also a trend for a higher proportion of binge drinking in younger age groups.

Table 6. 10: Proportion of current drinkers who binge drink on drinking days by agegroup and gender

Age	Total population				Men				Women			
	N	Binge drink*			N	Binge drink*			N	Binge drink*		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
15-24	405	83.5	$\pm 5.7$	325	305	86.2	$\pm 5.0$	261	100	65.4	$\pm 10.5$	64
25-34	377	84.0	$\pm 6.3$	308	293	86.3	$\pm 6.5$	258	84	62.3	$\pm 16.0$	50
35-44	307	68.1	$\pm 10.6$	206	245	70.0	$\pm 11.9$	172	62	48.4	$\pm 21.4$	34
45-54	171	67.4	$\pm 7.9$	113	139	70.9	$\pm 9.0$	99	32	36.9	$\pm 22.0$	14
55-64	85	40.9	$\pm 15.5$	32	78	41.0	$\pm 16.4$	30	7	39.0	$\pm 51.2$	2
Total	1345	77.3	$\pm 6.3$	984	1060	79.5	$\pm 6.8$	820	285	58.6	$\pm 8.0$	164

\* 5 or more drinks for men and 4 or more drinks for women

Also, Table 6.11 shows an overall higher proportion of binge drinking among both Fijians (88.5%  $\pm 3.6$ ) and "Others" (84.6%  $\pm 7.5$ ) as compared to Indo-Fijians (61.3%  $\pm 4.7$ ). While this pattern is found in both genders, the proportion of Fijian females (71.3%  $\pm 11.0$ ) and "Other" females (71.7%  $\pm 12.7$ ) who binge drink on drinking days is approximately three times the proportion in Indo-Fijian females (19.9%  $\pm 11.0$ ).

Table 6. 11: Proportion of current drinkers who binge drink on drinking days by ethnicity and gender

Ethnic Group	Total population				Men				Women			
	N	Binge drink*			N	Binge drink*			N	Binge drink*		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Fijians	746	88.5	$\pm 3.6$	643	568	90.9	$\pm 3.5$	512	178	71.3	$\pm 11.0$	131
Indians	542	61.3	$\pm 4.7$	297	464	64.2	$\pm 4.6$	283	78	19.9	$\pm 11.0$	14
Others	57	84.6	$\pm 7.5$	44	28	89.8	$\pm 10.5$	25	29	71.7	$\pm 12.7$	19
Total	1345	77.3	$\pm 6.3$	984	1060	79.5	$\pm 6.8$	820	285	58.6	$\pm 8.0$	164

### 6.2.2.3 Conclusion

45% ( $\pm 5.0$ ) of Fiji's population between the ages of 15-64 had ever used alcohol and 23.8% ( $\pm 3.0$ ) have consumed alcohol within the past 12 months. Generally, there is higher rates of alcohol consumption amongst males than females and a higher prevalence of consumption among the indigenous Fijians than the Indo-Fijians.

77.3% of current drinkers were binge drinking and it was more common in younger males of Fijian descent but those of other ethnic origin also compared well with the two main ones in a few of the strata analysis.

### 6.2.3 Kava Consumption

(Detailed tables in Appendix Tables 3.1 - 3.11)

Unlike alcohol use, Kava prevalence was only measured by two status of usage and is defined as follows:

- Ever kava user - those who have ever tried or drunk kava.
- Current kava user - those who have drunk kava in the past 30 days.

The study revealed that 65.0% ( $\pm 7.6$ ) had ever consumed kava. Among ever consumers of kava, 79.6% ( $\pm 4.3$ ) were current users.

#### 6.2.3.1 Differences in ever consumption and current consumption by gender, ethnicity and area

Table 6.12 provides a more detailed breakdown of ever users and current users by gender and ethnicity. More males (78.9%  $\pm 5.7$ ) were ever consumers than females (49.1%  $\pm 10.4$ ) and similarly, more males (88.6%  $\pm 3.1$ ) were current consumers than females (63.1%  $\pm 6.5$ ).

Table 6.12 also shows that while a higher proportion of Fijian Males (86.4%  $\pm 4.3$ ) are ever users as compared to Indo-Fijian Males (69.6%  $\pm 8.6$ ), there are no ethnic differences among current male users. However, Fijian females have a much higher proportion of ever use (67.9%  $\pm 6.4$ ) than do Indo-Fijian females (20.1%  $\pm 7.0$ ), and a higher proportion of current use (66.9%  $\pm 5.9$ ) than Indo-Fijian females (45.6%  $\pm 13.8$ ). For both genders, there were no differences in the proportions of either ever or current kava consumption by area.

Table 6. 12: Ever and current kava consumption by gender and ethnicity

Ethnic Group	Males						
	N	Ever Consumed			Current Consumers *		
		%	95%CI	n	%	95%CI	n
Fijian	1651	86.4	± 4.3	1439	88.3	± 2.9	1254
Indian	1033	69.6	± 8.6	780	90.7	± 3.2	699
Others	66	64.5	±13.9	46	71.3	±29.2	29
<b>TOTAL</b>	<b>2750</b>	<b>78.9</b>	<b>± 5.7</b>	<b>2265</b>	<b>88.6</b>	<b>± 3.1</b>	<b>1982</b>
Ethnic Group	Females						
	N	Ever Consumed			Current Consumers *		
		%	95%CI	n	%	95%CI	n
Fijian	2153	67.9	± 6.4	1492	66.9	± 5.9	968
Indian	1733	20.1	± 7.0	387	45.6	±13.8	151
Others	124	59	±13.5	75	56.4	±16.5	34
<b>TOTAL</b>	<b>4010</b>	<b>49.1</b>	<b>±10.4</b>	<b>1954</b>	<b>63.1</b>	<b>± 6.5</b>	<b>1153</b>

\* Current consumers are reported as a proportion of ever consumers, and are defined as those who reported drinking kava at least once in the past 30 days

### 6.2.3.2 Age of initiation of kava use among ever users

Table 6.13 shows the mean age at which males and females in ten-year age groups report having first tried kava. Overall, Males report earlier use ( $20.7 \pm 0.5$  years) than do females ( $24.2 \pm 0.9$  years). However, as was also noted in tobacco and alcohol use, the difference in mean age of first use between males and females has become less over time. Furthermore, this table also reveals a trend over time for both males and females of earlier age of first use of kava.

Table 6. 13: Mean age first tried kava by gender and agegroup among ever users

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
15-24	453	17.7	± 0.4	395	18.2	± 0.4
25-34	481	20.4	± 0.5	514	21.8	± 0.6
35-44	559	21.3	± 0.5	496	26.2	± 1.4
45-54	450	23.3	± 1.0	339	29.6	± 2.3
55-64	312	24.6	± 1.3	195	34.3	± 3.2
<b>TOTAL</b>	<b>2255</b>	<b>20.7</b>	<b>± 0.5</b>	<b>1939</b>	<b>24.2</b>	<b>± 0.9</b>

### 6.2.3.3 Frequency of kava consumption among current users

Current kava consumers were asked how many days they had drunk kava in the last 30 days. Overall, 81.5% ( $\pm 3.6$ ) of current users reported drinking kava from 1-19 days in the last month and the remainder ( $18.5 \pm 3.6$ ) reported drinking kava on 20 or more days in the past month. Daily use was reported by 10.4% ( $\pm 2.9$ ) of current users.

Males represented a higher proportion than females for drinking kava on 20 or more days in the past month and for daily

use. While 23.7% ( $\pm 4.2$ ) of males reported drinking kava on 20 or more days in the past month, only 5.2% ( $\pm 1.8$ ) of females reported this frequency of use. Similarly, while 13.7% ( $\pm 3.5$ ) of males reported daily use, only 1.9% ( $\pm 0.9$ ) of females reported daily use.

There were no differences in frequency of kava drinking by ethnicity, agegroup or locality.

### 6.2.3.4 Use of other substances and eating habits in association with kava use

As earlier surveys had indicated a strong association between kava consumption and the use of other substances respondents were asked if they were likely to smoke tobacco or drink alcohol during or after kava consumption. Among kava users, 47.0% ( $\pm 3.8$ ) reported smoking tobacco during or after kava consumption, and 20.2% ( $\pm 2.1$ ) reported drinking alcohol during or after kava consumption.

Table 6.14 shows more detailed data by gender and age group regarding the likelihood among kava users of smoking tobacco or drinking alcohol during or after kava consumption.





**Table 6. 14: Proportion of ever kava users likely to smoke tobacco or drink alcohol during or after kava consumption by gender and age group**

Age	Males						Females					
	Smoke tobacco			Drink alcohol			Smoke tobacco			Drink alcohol		
	%	95%CI	N	%	95% CI	N	%	95% CI	N	%	95% CI	N
15-24	49.4	±9.9	217	37.1	± 5.1	178	26.6	± 5.7	92	9.7	± 5.0	39
25-34	63.7	±6.3	304	37.8	± 6.4	195	30.5	± 5.5	157	5.9	± 3.2	40
35-44	57.2	±5.1	316	21.5	± 3.2	127	28.9	± 6.3	142	5.0	± 2.5	29
45-54	59.7	±5.3	268	17.3	± 3.8	81	24.6	±24.6	86	0.6	± 0.8	5
55-64	58.9	±7.9	174	7.8	± 3.5	26	21.3	± 6.3	40	0.6	± 0.9	2
Total	57.6	±4.9	1279	28.1	± 3.7	607	27.4	± 3.5	517	5.4	± 2.1	115

This table shows that a higher proportion of males (57.6% ± 4.9) were likely to smoke tobacco in association with kava than were females (27.4% ± 3.5). This is consistent with the higher proportion of males overall who smoke tobacco as compared to females. Also, this tendency to smoke tobacco in association with kava consumption shows no differences by agegroup in either gender.

There were also a higher proportion of males (28.1 % ± 3.7) who were likely to drink alcohol in association with kava than among females (5.4% ± 2.1). This is again consistent with the higher proportion of males overall who drink alcohol as compared to females. This practice is referred to locally as "wash down". As opposed to tobacco use with kava, the data reveal that the practice of using alcohol with kava is increasingly prevalent in younger age groups among both males and females.

When asked what type of food was consumed during or after a kava drinking session, high proportions reported eating "lollies" (i.e. sweet candies) among both males (33.6% ± 4.9) and females (52.1% ± 7.7). This is reported to be a common practice during a kava drinking session to eliminate the taste and numbness associated with drinking kava. High proportions also reported eating "cooked food" among both males (52.1% ± 8.2) and females (43.7% ± 8.8). This is reportedly most often done at the end of a kava drinking session.

### 6.2.3.5 Conclusion

Amongst the Fiji population of 15-64 years of age, the survey revealed that 65% (±7.6) had ever consumed kava and 79.6% (±4.3) have consumed kava within the past 30 days. There are a higher proportion of ever and current users of Kava among males compared to females and indigenous Fijians compared to Indo-Fijians however, no difference between populations residing in the urban and rural areas was found.

Kava proves to be an important associated risk factor of NCDs because of its close linkage to tobacco and alcohol usage. Hence, there is a need to address Kava use in any comprehensive planning or activities against NCDs in Fiji and the Pacific where it is commonly used.

### 6.2.4 Fruit and Vegetable Intake

(Detailed tables in Appendix Tables 5.1 - 5.14)

In order to assess the eating pattern of the surveyed population, the respondents were asked how often they ate fruit and vegetables and the type of oil or fat used in food preparation.

Low consumption of fruit and vegetables has been identified as a risk factor in the development of a range of chronic diseases, including coronary heart disease, stroke and many forms of cancer.

The survey revealed that only 1.2% (±0.7) of males and 0.6% (±0.1) of females consumed 5 or more servings of fruit per day. For vegetable consumption, only 2.9% (±1.2) of males and 2.2% (±1.1) of females reported consuming 5 or more servings per day. Certain research has indicated that the required intake of fruit for optimal health benefits is seven daily serves of fruit and vegetable. Clearly, there is a very small proportion of the surveyed population consuming adequate amounts of fruits and vegetables.

This low level of consumption is mostly seen for fruits with 65.9% (±3.8) of survey participants reporting eating less than one serving of fruit per day. The high proportions eating this very small amount of fruit was consistent across age group, gender, ethnicity and area with no statistically significant differences.

While the low level of consumption of vegetables was not as bad as with fruits, still over one-quarter of participants (26.4% ±4.6) reported eating less than one serving of vegetables per day. Overall there were no differences in this by gender, age group or locality. However, as noted in table 6.15, there was a difference by ethnicity such that a larger proportion of both Fijians (32.4% ±9.6) and Others (38.5% ±11.3) reported eating less than one serving of vegetables per day as compared with Indo-Fijians (16.2% ±5.8). In other words, Indo-Fijians eat larger amounts of vegetables as compared to either Fijians or Others.

Figure 6.3. Percentage of population by servings of fruit consumed per day

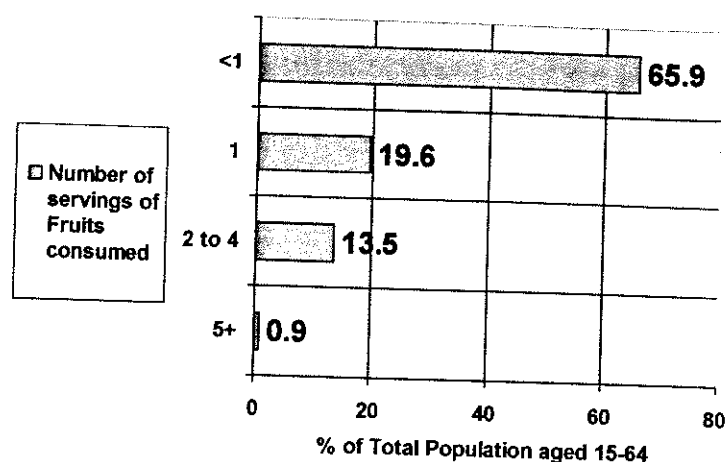


Table 6. 15: Servings of vegetables consumed per day by ethnicity and gender

Males													
Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1651	32.4	± 9.6	570	18.2	±3.1	303	46.2	± 9.5	723	3.3	± 1.3	55
Indian	1034	16.2	± 5.8	189	28	±7.1	285	53.7	±12.1	536	2.1	± 1.3	24
Others	66	38.5	±11.3	29	23.7	±8.4	14	31.6	±11.6	21	6.2	±12.4	2
Total	2751	26.3	± 6.2	788	22.3	±4.4	602	48.5	± 6.9	1280	2.9	± 1.2	81
Females													
Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	2151	34.1	± 9.1	783	18.6	± 2.2	427	44.9	± 8.5	95	2.4	± 1.5	46
Indian	1732	15.3	± 5.1	297	27.6	± 5.5	489	55.5	± 9.4	920	1.5	± 0.7	26
Others	124	25.1	±13.1	43	24	±11.0	29	44.3	±16.3	49	6.6	±13.6	3
Total	4007	26.5	± 5.8	1123	22.3	± 3.6	945	50	± 5.7	1864	2.2	± 1.1	75

\*Includes "Don't eat vegetables at all"

\*Includes "Don't eat vegetables at all"

In regards to the use of the type of oil most often used for food preparation at home, among those who usually prepare food, the vast majority reported using vegetable oil (96.5% ±1.9). There were no differences in this by gender, age group, ethnicity, or locality (Appendix tables 5.13 and 5.14).

#### 6.2.4.1 Conclusion

There is generally low consumption of fruit and vegetables in the Fiji population aged 15-64 years with 65% (±3.8) consuming less than one fruit serving per day. Indo-Fijians consume more vegetables and fruits compared to Fijians and other ethnic groups. The most common type of oil used in preparation of food in Fiji is vegetable oil.

#### 6.2.5 Physical Activity

##### 6.2.5.1 Measurements

Physical activity participation in the Fiji STEPS survey was measured by asking participants to report on the frequency and amount of different types of activity they undertook on a

typical day as part of work, travel and leisure.

In the work and travel domains of activity, respondents were required to rate the frequency that they participated in different types of activity on a four-point ordinal scale, ranging from 'almost always' through to 'almost never'. A strength of this form of question is that it enables a categorization of activity levels without requiring respondents to undertake what can be the difficult task of quantifying the time they spent in activities of different intensities (i.e. moderate or vigorous). A limitation of this approach is that it does not provide sufficient detail to determine how much of each individual's work and travel activity contributes towards the accumulation of the recommended amounts of activity for health gain, which are stated in terms of the frequency and duration of moderate- and vigorous-intensity activity.

In the Fiji STEPS survey, it is only in the leisure-time domain that respondents were required to report the amount of time that they spent in moderate- or vigorous-intensity activities. This provides data that can be used to estimate the proportion of people who meet established criteria for 'sufficient activity' in the leisure domain. However, it should be noted that only people who reported 'almost always' or 'usually' undertaking

moderate- or vigorous-intensity activity were asked to report an amount of time. Therefore, in order to estimate a weekly duration of moderate- and vigorous-intensity leisure time activities, frequency values needed to be ascribed to 'almost always' and 'usually', which were six and four times per week respectively.

### 6.2.5.2 Analyses

In the analyses of the physical activity data collected in the Fiji STEPS survey, each domain of activity was firstly addressed separately. This enabled examination of the extent to which leisure, work and travel activity are a major part of physical activity participation in Fiji. In addition, when these questions are repeated in future, participation in each type of activity can be used as separate indicators of the impact of physical activity promotion strategies in this nation.

For each of these domains of physical activity, respondents are categorized as undertaking 'nil', 'low', 'moderate' or 'high' levels of activity. The criteria for defining each category are given in each of the following sections that present the participation levels in different types of activity. A common feature of the criteria for categorising participation in each domain of activity is that vigorous-intensity activity is given greater weight than moderate-intensity activity. Hence, to be categorized as high in each domain participants can report 'usually' undertaking vigorous-intensity activity, but must report 'almost always' undertaking moderate-intensity activity.

As well as examining levels of participation in each type of activity, variables were created to estimate the proportion of participants who undertook sufficient physical activity for health gain. The criteria for sufficient activity were drawn from the widely cited recommendation to undertake moderate-intensity activity for 30 minutes or more on most days of the week, or 20 minutes of vigorous-intensity activity on at least three days per week. As noted above, however, it was only in the leisure domain that the duration of activity was given by respondents, therefore the data concerning leisure-time activity are the primary basis used for determining sufficient physical activity participation.

### Definition Of Categories Within Each Domain

Categories of participation in work activity were defined as follows:

Nil	Usually or almost always sitting or standing and almost never undertaking moderate or vigorous activity
Low	Sometimes undertaking moderate or vigorous activity
Moderate	Usually or almost always undertaking moderate activity or usually undertaking vigorous activity
High	Almost always undertaking moderate and vigorous activity

The criteria used to define levels of participation in active commuting were:

Nil	Almost never traveling by public transport, bicycle or walking
Low	Sometimes traveling by public transport, bicycle or walking
Moderate	Usually traveling by public transport, bicycle or walking
High	Almost always traveling by public transport, bicycle or walking

The criteria used to define levels of participation in leisure-time activity were:

Nil	Almost never undertaking moderate or vigorous leisure-time activity
Low	Sometimes undertaking moderate or vigorous leisure-time activity OR; undertaking moderate or vigorous activity usually or almost always but moderate minutes < 30, vigorous minutes < 20 and total (mod + vig) < 30
Moderate	Usually or almost always undertaking moderate or vigorous activity and moderate minutes ≥ 30, vigorous minutes ≥ 20 OR total minutes ≥ 30
High	Almost always undertaking moderate activity and moderate minutes ≥ 60 OR total minutes ≥ 60 OR; undertaking vigorous activity usually or almost always and vigorous minutes ≥ 60

For all domains:

Insufficient = Nil + Low

Sufficient = Moderate + High

### Results

(Detailed tables in Appendix Table 6.1 - 6.9)

Overall, the proportion of the Fiji population reporting insufficient physical activity in the three domains was 41% (work domain), 14.8% (travel domain) and 76.1% (leisure domain) (Appendix Table 6.1 - 6.9). This generally shows that whilst the Fiji population in the age group 15 - 64 years may be quite active at work and travel there is not a big proportion taking up physical activity at leisure time for possible additional health gain.

### Work and Travel

In both work and travel domain a big proportion of the surveyed population reported either moderate or high levels of physical activity and this is consistent even when stratified into specific age, gender, ethnicity and locality (Appendix Table 6.1 - 6.6) groups. This means that the Fiji population is quite active in daily functionality of work and travel.

In these two domains, the least active segments of the population are females, those of Indo-Fijian descent and living in the urban areas. It is interesting to note that in the work domain the age group 35 years and above reported higher levels of activity than the younger age group like 15-24 years

(Figure 6.4). This could be partly due to the fact that a big proportion of the 15-24 years considered themselves not working as compared to the 35-44 years, which is actually the working age group in Fiji. This is further evidenced in the travel domain where this difference is not observed.

Figure 6.4. Insufficient physical activity participation by age group across the three domains

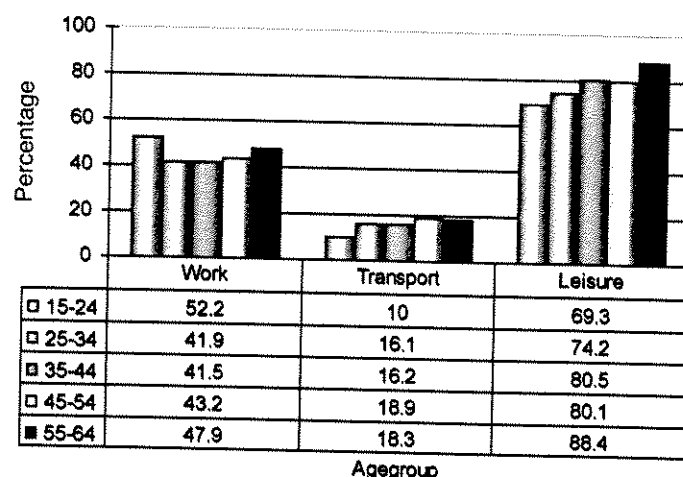
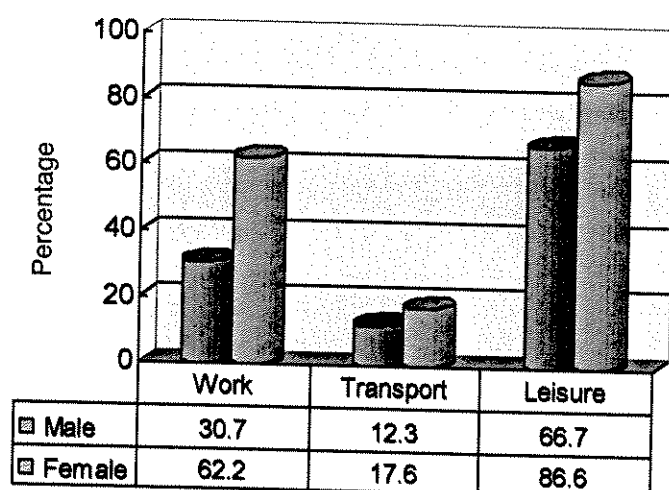


Figure 6.5. Insufficient physical activity participation by gender across the three domains

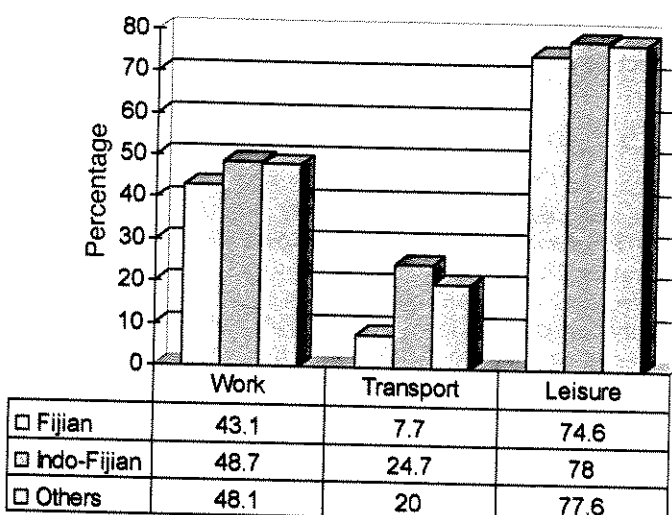


## Leisure

Measuring activity in the leisure domain gives an indication of the proportion of the population that does additional physical activity for sporting or health gain hence the attempt to quantify the measurements.



Figure 6.6. Insufficient physical activity participation, stratified by ethnicity



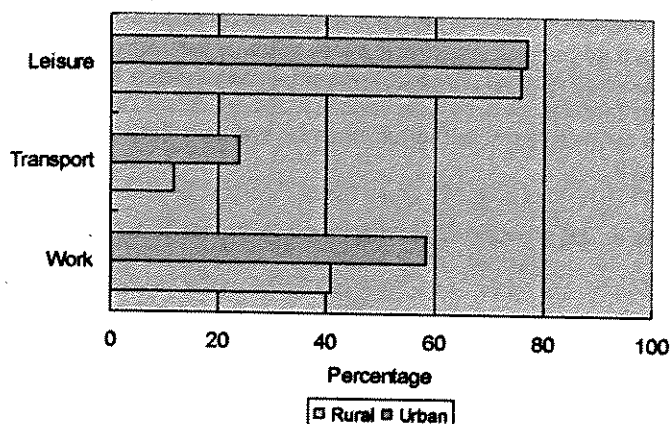
A distinctive overall finding was the low proportion of the adult Fiji population (15-64 years) who were in the moderate or high categories of leisure-time activity, which was just under 25% (Appendix table 6.6 - 6.9). In a number of countries where physical activity has been monitored at the population level using questions that measure leisure-time activity, such as Australia, the United States and Canada, the prevalence of sufficient physical activity has been reported to be between 35% and 55%.

This suggests that adult Fiji population (15-64 years) are relatively inactive, however, it must be understood that the questions used to measure leisure-time activity in Fiji were not as detailed as those used in these other nations. For instance, in Fiji, respondents were required to classify the frequency of their leisure-time activity on an ordinal scale and not report the actual number of sessions they usually undertook, and only those people who reported 'usually' or 'almost always' undertaking leisure-time activity were required to report on the duration of this.

This question structure may have increased the likelihood of under-recording of leisure-time activity, at least for some respondents. Another consideration is that leisure-time activity was measured in the Fiji STEPS survey following a series of questions about travel behavior, and therefore the time spent walking to and from places would have been filtered out of the responses about leisure-time activity, which may not have been the case in physical activity instruments used in other nations.

Insufficient physical activity participation in the leisure domain is generally higher in older age group (Figure 6.4) and female gender (Figure 6.5) group. The ethnic (Indo-fijian > Fijian) and locality difference (urban > rural) seen in the domain of work and travel is similar in the leisure domain but not as marked (Figure 6.6 and 6.7).

Figure 6.7. Insufficient physical activity participation by locality across the three domains



### 6.2.5.3 Conclusion

These findings present a snapshot of physical activity participation in Fiji across various domains of activity (work, commuting and leisure) and among a range of major population sub-groups in this nation. An important outcome from these analyses was the identification of the least active segments of the Fijian population, who could be considered priority groups for strategies to address this risk factor. Women, people in the age groups over 35 years, those living in urban areas and Indo-Fijians, were the least active groups in many of the physical activity variables examined.

In contrast with leisure-time activity participation, almost half of respondents reported moderate or high levels of work activity and over 80% reported moderate or high levels of active commuting. These findings suggest that the adult Fiji population (15-64 years) is more likely to accrue their regular physical activity participation through functional rather than leisure-time activities, but this cannot be truly ascertained without quantification of time spent in activities of moderate or vigorous-intensity in the work and travel domains. The physical activity variables derived from the analyses of the STEPS survey will fulfill the important role of providing a set of indicators that can be used to monitor trends in physical activity in Fiji and to evaluate the impact of strategies to address this major chronic disease risk factor at the population level.

## 6.3 Non-communicable Disease Biochemical Risk Indicators

### 6.3.1 Total Cholesterol

(Detailed tables in Appendix Tables 10.6 - 10.11)

Elevated blood cholesterol is recognized as an important risk factor for coronary artery disease. The mean cholesterol of surveyed males was 5.39 ( $\pm 0.19$ ) mmol/L and of surveyed females was 5.02 ( $\pm 0.16$ ) mmol/L a difference of borderline statistical significance. For both males and females, there was a trend of an increasing mean cholesterol level with age and with a persistent tendency for rates in each age group to be higher for males than females. However, as noted in Table 6.16, the only age group with a statistically significant difference between males and females was among 35-44 year olds with a mean cholesterol of 5.54 ( $\pm 0.21$ ) mmol/L for males and 4.86 ( $\pm 0.19$ ) mmol/L for females.

Table 6. 16: Mean total fasting cholesterol (mmol/L) by gender and age group

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
25-34	205	5.04	$\pm 0.32$	350	4.68	$\pm 0.16$
35-44	255	5.54	$\pm 0.21$	436	4.86	$\pm 0.19$
45-54	222	5.62	$\pm 0.32$	401	5.39	$\pm 0.26$
55-64	166	5.53	$\pm 0.24$	216	5.43	$\pm 0.21$
TOTAL	848	5.39	$\pm 0.19$	1403	5.02	$\pm 0.16$

The mean cholesterol for each subject was used to categorize individuals into a high risk-group with a total cholesterol  $\geq 5.20$  mmol/L. The proportion of males in this high-risk group was 49.1% ( $\pm 5.8$ ) and for females was 37.8%  $\pm 5.6$ , a difference that was not statistically significant. As with mean cholesterol, Table 6.17 reveals that there was a trend for both males and females of an increasing proportion in the high-risk cholesterol group with age with a persistent tendency for rates in each age group to be higher for males than females. However, again the only age group with a statistically significant difference between males and females was among 35-44 year olds with 50.5%  $\pm 8.7$  in the high-risk group for males and 28.7%  $\pm 7.1$  in the high-risk group for females.

Table 6. 17: Total fasting cholesterol high-risk category by gender and agegroup

Age	Males				Females			
	N	Elevated ( $\geq 5.2$ mmol/L)			N	Elevated ( $\geq 5.2$ mmol/L)		
		%	95%CI	n		%	95%CI	n
25-34	205	39.9	$\pm 11.6$	85	350	29.7	$\pm 6.4$	108
35-44	255	50.5	$\pm 8.7$	124	436	28.7	$\pm 7.1$	128
45-54	222	55.4	$\pm 8.7$	129	401	49.8	$\pm 8.1$	206
55-64	166	58.8	$\pm 6.7$	95	216	54.0	$\pm 6.9$	116
Total	848	49.1	$\pm 5.8$	433	1403	37.8	$\pm 5.6$	558

In regards to ethnicity, while there were no ethnic differences among males or females in either mean cholesterol or the proportion in the high-risk cholesterol group, Table 6.18 reveals that there was a difference among Indo-Fijians by gender for the proportion in the high-risk cholesterol group such that 52.6%  $\pm 8.5$  of Indo-Fijian males were in the high-risk group, compared to only 34.6%  $\pm 7.6$  of Indo-Fijian females.

Table 6. 18: Total fasting cholesterol high-risk category by gender and ethnicity

Ethnic group	Males				Females			
	N	Elevated ( $\geq 5.2$ mmol/L)			N	Elevated ( $\geq 5.2$ mmol/L)		
		%	95%CI	n		%	95%CI	n
Fijian	499	45.3	$\pm 8.3$	232	732	39.9	$\pm 6.3$	294
Indian	333	52.6	$\pm 8.5$	191	636	34.6	$\pm 7.6$	249
Others	16	66.6	$\pm 28.2$	10	35	40.5	$\pm 28.7$	15
Total	848	49.1	$\pm 5.8$	433	1403	37.8	$\pm 5.6$	558



There were no differences for either mean cholesterol or high-risk cholesterol by locality for either gender.

### 6.3.2 Triglycerides

(Detailed tables in Appendix Tables 10.12 - 10.17)

Elevated blood triglyceride is an independent risk factor for coronary artery disease. The mean triglyceride of surveyed males was  $1.47 \pm 0.16$  mmol/L and of surveyed females was  $1.31 \pm 0.11$  mmol/L although this difference was not statistically significant. As compared to cholesterol, an increasing trend for mean triglyceride level with age did not exist for either males or females, and there was no consistent tendency for rates in each age group to be higher for either gender.

The triglyceride level for each subject was used to categorize individuals into a high-risk group with a triglyceride level  $\geq 1.70$  mmol/L. The proportion of males in this high-risk group was  $29.6\% \pm 7.1$  and for females was  $23.3\% \pm 5.1$ , a difference that was not statistically significant. As with mean triglyceride, Table 6.19 reveals that a trend of an increasing proportion in the high-risk triglyceride group with age did not exist for either males or females, and there was no consistent tendency for rates in each age group to be higher for either gender. However, there was a statistically significant difference between males and females among 35-44 year olds with  $31.2\% \pm 7.4$  in the high-risk group for males and  $18.4\% \pm 4.5$  in the high-risk group for females.

Table 6. 19: Fasting triglyceride high-risk category by gender and age group

Age	Males				Females			
	N	High ( $\geq 1.7$ mmol/L)			N	High ( $\geq 1.7$ mmol/L)		
		%	95%CI	n		%	95%CI	n
25-34	205	24.9	$\pm 9.8$	58	349	19.7	$\pm 6.0$	69
35-44	255	31.2	$\pm 7.4$	84	436	18.4	$\pm 4.5$	86
45-54	223	40.1	$\pm 10.4$	92	400	29.1	$\pm 8.7$	121
55-64	167	20.6	$\pm 9.4$	43	215	31.2	$\pm 7.6$	68
Total	850	29.6	$\pm 7.1$	277	1400	23.3	$\pm 5.1$	344

In regards to ethnicity, whilst there were no differences among males or females in either mean triglyceride or in the proportion in the high-risk triglyceride group, there was a difference among Indo-Fijians by gender for the proportion in the high-risk triglyceride group such that  $37.6\% \pm 10.6$  of Indo-Fijian males were in the high-risk group, compared to only  $21.4\% \pm 4.9$  of Indo-Fijian females.

Table 6.20: Fasting triglyceride high-risk category by gender and ethnicity

Ethnicity	Males				Females			
	N	High ( $\geq 1.7$ mmol/L)			N	High ( $\geq 1.7$ mmol/L)		
		%	95%CI	n		%	95%CI	n
Fijians	499	22.5	$\pm 9.2$	126	730	24.5	$\pm 7.3$	184
Indo-Fijians	335	37.6	$\pm 10.6$	144	635	21.4	$\pm 4.9$	152
Others	16	43.4	$\pm 18.8$	7	35	24.1	$\pm 18.2$	8
Total	850	29.6	$\pm 7.1$	277	1400	23.3	$\pm 5.1$	344

As opposed to total cholesterol, there were differences for both mean triglyceride and high-risk triglyceride by locality between the gender groups.

Table 6.21 reveals that urban males had a higher mean fasting triglyceride level ( $1.85 \pm 0.25$ ) as compared to either rural males ( $1.36 \pm 0.16$ ) or urban females ( $1.45 \pm 0.13$ ). The difference between rural and urban females was not statistically significant.

Table 6. 21: Fasting mean triglyceride (mmol/L) by area and gender

Area	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
Rural	557	1.36	$\pm 0.16$	700	1.25	$\pm 0.14$
Urban	293	1.85	$\pm 0.25$	700	1.45	$\pm 0.13$
TOTAL	850	1.47	$\pm 0.16$	1400	1.31	$\pm 0.11$

Similarly, table 6.22 shows that a higher proportion of urban males were in the high-risk triglyceride group ( $48.8\% \pm 7.9$ ) as compared to either rural males ( $24.0\% \pm 6.8$ ) or urban females ( $27.9\% \pm 4.9$ ).

Table 6.22: Fasting triglyceride high-risk category by area and gender

Area	Males				Females			
	N	High ( $\geq 1.7$ mmol/L)			N	High ( $\geq 1.7$ mmol/L)		
		%	95%CI	n		%	95%CI	n
Rural	557	24.0	$\pm 6.8$	136	700	21.0	$\pm 6.7$	151
Urban	293	48.8	$\pm 7.9$	141	700	27.9	$\pm 4.9$	193
Total	850	29.6	$\pm 7.1$	277	1400	23.3	$\pm 5.1$	344

### 6.3.3 HDL

(Detailed tables in Appendix Tables 10.18 - 10.23)

Higher levels of HDL cholesterol are known to be protective against cardiovascular disease. As such, low levels of HDL cholesterol are recognized as an independent risk factor for coronary artery disease. The mean HDL cholesterol of surveyed males was  $1.11 \pm 0.05$  mmol/L and of surveyed females was  $1.05 \pm 0.04$  mmol/L although this difference was not statistically significant. No trend for difference in mean HDL cholesterol level was shown with age for either males or females. Although HDL cholesterol levels were consistently lower in females than in males this difference was not statistically significant.

The HDL cholesterol level for each subject was used to categorize individuals into a high-risk group with a HDL cholesterol level  $\leq 0.90$  mmol/L. The proportion of males in this high-risk group was  $30.9\% \pm 4.8$  and for females was  $35.4\% \pm 4.3$ , a difference that was not statistically significant. As with mean HDL cholesterol, there was no trend identified for difference in the proportion in the high-risk HDL cholesterol group with age for either males or females. Similarly, although the proportions of females with a high-risk HDL cholesterol level were consistently higher than in males this difference was not statistically significant.

In regards to ethnicity, there were no differences among males

or females in either mean HDL cholesterol or in the proportion in the high-risk HDL cholesterol group.

In regards to locality, there was a borderline difference for mean HDL cholesterol between urban males (1.04mmol/L  $\pm$ 0.03) and rural males (1.14mmol/L  $\pm$ 0.07). Similarly, table 6.23 shows that there was a higher proportion of urban males with a high-risk HDL cholesterol (37.4%  $\pm$ 1.7) than in rural males (29.1%  $\pm$ 5.7).

**Table 6. 23: Fasting HDL cholesterol risk categories by area: Males and Females**

Area	Males				Females			
	N	Low ( $\leq$ 0.9 mmol/L)			N	Low ( $\leq$ 0.9 mmol/L)		
		%	95%CI	n		%	95%CI	n
Rural	558	29.1	$\pm$ 5.7	160	701	35.3	$\pm$ 6.1	249
Urban	293	37.4	$\pm$ 1.7	112	701	35.5	$\pm$ 4.2	240
Total	851	30.9	$\pm$ 4.8	272	1402	35.3	$\pm$ 4.3	489

### 6.3.4 Atherogenic dyslipidemia

Atherogenic dyslipidemia is defined by elevation of serum triglycerides, presence of small LDL particles, and low HDL cholesterol levels (see ATP-3, NCEP). For clinical purposes, we can define atherogenic dyslipidemia (AD) as an elevated triglyceride ( $\geq$  1.70mmol/L) plus a low HDL cholesterol ( $<$  1.04mmol/L).

Of all those with fasting results for the biochemical measures, 17.7%  $\pm$ 4.2 met the criteria for AD. Overall, there were no statistically significant differences in the proportion of those with AD by either gender or age group. However, as was with fasting total cholesterol and fasting triglycerides, table 6.24 shows that there was a difference among Indo-Fijian participants wherein the prevalence of AD in males was 24.6%  $\pm$ 7.5 and in females was 13.7%  $\pm$ 2.7.

**Table 6. 24: Prevalence of Atherogenic Dyslipidemia by ethnicity and gender**

Ethnic group	Males				Females			
	N	Yes*			N	Yes*		
		%	95%CI	n		%	95%CI	n
Fijian	499	14.8	$\pm$ 7.4	84	729	17.5	$\pm$ 5.4	128
Indian	335	24.6	$\pm$ 7.5	87	635	13.7	$\pm$ 2.7	93
Others	16	28.0	$\pm$ 20.4	4	35	15.1	$\pm$ 21.4	4
Total	850	19.4	$\pm$ 4.7	175	1399	15.9	$\pm$ 3.3	255

\*Fasting Triglyceride  $\geq$  1.7 mmol/L and Fasting HDL  $<$  1.0 mmol/L

Also, similar to the data seen for fasting triglycerides, table 6.25 shows that there was a higher proportion of AD among urban males (30.8%  $\pm$ 4.3) as compared to either rural males (16.1%  $\pm$ 5.6) or urban females (18.1%  $\pm$ 3.0). This suggests that urban males have contributory dietary and other lifestyle habits different from those in females and rural males.

**Table 6. 25: Prevalence of Atherogenic Dyslipidemia by area and gender**

Area	Males				Females			
	N	Yes*			N	Yes*		
		%	95%CI	n		%	95%CI	n
Rural	557	16.1	$\pm$ 5.6	88	700	14.9	$\pm$ 4.5	103
Urban	293	30.8	$\pm$ 4.3	87	699	18.1	$\pm$ 3.0	122
Total	850	19.4	$\pm$ 5.1	175	1399	15.9	$\pm$ 3.3	225

\*Fasting Triglyceride  $\geq$  1.7 mmol/L and Fasting HDL  $<$  1.0 mmol/L

### 6.3.5 Conclusion

The main analysis was done in strata of gender since the differences are of clinical relevance. In the surveyed population in Fiji, the overall proportion of those with high risk cholesterol level was 49.1% ( $\pm$ 5.8) for males and 37.8% ( $\pm$ 5.6) for females. This gender difference was also observed with triglyceride risk levels even when stratified by age although for both lipids statistical significance was only in the 35-44 years age group.

The opposite was seen in HDL Cholesterol risk levels where females had higher proportion although not statistically significant but when combined with triglyceride to define dyslipidemia, the higher proportion of risk level in males remained.

With biochemical fat levels being direct indicators of coronary heart diseases, more measures should be employed in Fiji to reduce such high risk levels in the population.

## 6.4 Health Conditions

### 6.4.1 Overweight and Obesity

(Detailed tables in Appendix Tables 9.1 - 9.13)

The height and weight measurements were used to calculate body mass index, and waist and hip measurements were used to calculate waist-hip ratio. Body mass index (BMI) was calculated for each participant as the weight in kilograms over the height in meters<sup>2</sup>. Risk categories were calculated for BMI as follows:

Normal	BMI $<$ 25.0
Overweight	BMI = 25.0 to 29.9
Obese	BMI $>$ 29.9

#### 6.4.1.1 Height and Weight

Males had a mean height of 173.4cm ( $\pm$  1.2) and a mean weight of 73.2kg ( $\pm$  2.9). In comparison, females had a mean height of 161.2cm ( $\pm$  1.6) but were not significantly lighter with a mean weight of 69.6kg ( $\pm$  3.5). For males and females, both the mean height and weight were higher for Fijians than for Indo-Fijians. There were no significant differences for mean height and weight by area.

### 6.4.1.2 BMI and risk factor categories

Table 6. 26: Body mass index (kg/m<sup>2</sup>) by gender, age group and ethnicity

Age	Males			Females*		
	N	Mean	95%CI	N	Mean	95%CI
15-24	674	22.1	±0.7	680	23.5	±0.9
25-34	548	24.4	±0.8	643	27.1	±1.0
35-44	615	25.3	±0.8	680	27.7	±0.8
45-54	489	26.0	±1.1	527	29.4	±1.1
55-64	359	26.1	±0.7	329	30.0	±1.0
Ethnicity	N	Mean	95%CI	N	Mean	95%CI
Fijian	1631	25.3	±0.5	1566	28.0	±0.7
Indo-Fijian	990	22.5	±0.5	1206	24.4	±0.4
Others	64	26.7	±1.0	87	29.3	±2.2
<b>TOTAL</b>	<b>2685</b>	<b>24.2</b>	<b>±0.7</b>	<b>2859</b>	<b>26.7</b>	<b>±0.8</b>

\* Pregnant females excluded

Table 6.26 shows the mean BMI by gender, age group and ethnicity. The table shows that the mean BMI was higher for females (26.7 ± 0.8) as compared to males (24.2 ± 0.7) and that there was a trend of increasing BMI by age group for both genders. Furthermore, for both genders, Fijians had a higher mean BMI as compared to Indo-Fijians.

As noted in Table 6.27, the proportion of obesity increases with age in both genders, and there are a significantly higher proportion of females with obesity in all age groups as compared to males. Also, for both genders, Fijians tend to have a higher proportion of obesity than do Indo-Fijians, although this difference is only of borderline significance for males.

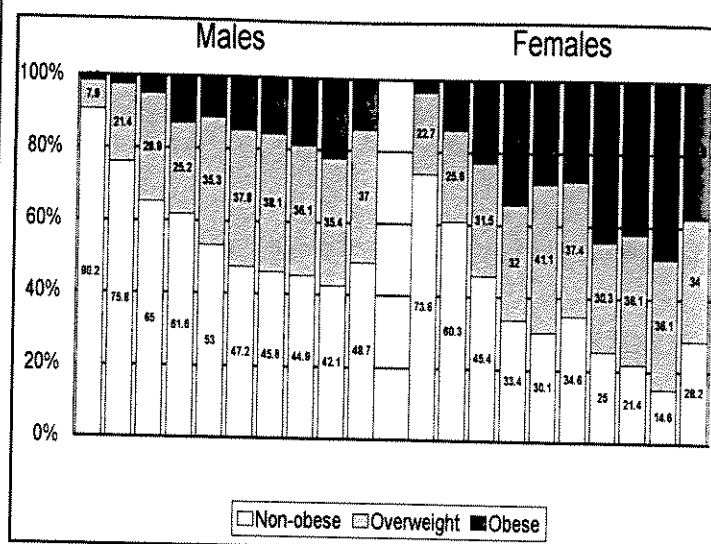
Figure 6.8 shows the distribution of BMI risk categories by gender in 5-year age groups and illustrates a rapid increase in the proportion of obesity in both genders up to the age group 30-34 years. The proportion of overweight/obesity in males levels at approximately 50% before a decline in the much older age group. However, in females the proportion of overweight/obesity tends to gradually increase with age to a level of 70-80% for females aged 50 years or more. This would have tremendous implications in selection of target groups for intervention programmes.

Table 6. 27: Proportion of obesity (BMI>29.9) by gender, agegroup and ethnicity

Age	Males				Females†			
	N	Obese			N	Obese		
		%	95%CI	n		%	95%CI	n
15-24	674	2.3	±1.4	20	680	8.9	± 2.3	67
25-34	548	9.2	±4.6	56	643	29.2	± 6.3	192
35-44	615	13.2	±4.9	93	680	28.5	± 6.1	213
45-54	489	17.3	±6.7	91	527	43.6	± 8.8	228
55-64	359	18.9	±5.7	69	329	44.8	± 6.9	148
Ethnicity	N	%	95%CI	n	N	%	95%CI	n
Fijian	1631	11.3	±3.6	249	1566	32.0	± 4.6	583
Indo-Fijian	990	5.9	±2.0	62	1206	15.8	± 2.5	222
Others	64	26.4	±8.9	18	87	39.7	±17.4	43
<b>TOTAL</b>	<b>2685</b>	<b>9.8</b>	<b>±3.0</b>	<b>329</b>	<b>2859</b>	<b>26.4</b>	<b>± 4.3</b>	<b>848</b>

† Pregnant females excluded

Figure 6.8 Prevalance of BMI categories by gender and age group



### 6.4.1.3 Waist/Hip measurements and risk categories

The measurement of waist-hip ratio (WHR) is used as a measure of central obesity and has been suggested to be a risk factor more specific to cardiovascular disease as visceral fat is more a predictor of morbidity and mortality than cutaneous or other types. Table 6.28 shows an increasing trend of central obesity with age. There is also a significantly higher rate of high-risk central obesity among females (44.6% ± 5.1) than in males (4.0% ± 1.0). There were no differences in the proportion of high-risk WHR in both genders by either ethnicity or area.

It is notable that the magnitude of difference for high-risk WHR between males and females is considerably greater than that noted for obesity as measured by BMI. This suggests that females may be at a relatively increased risk for cardiovascular disease than for other consequences of obesity as compared to males but other factors and further studies are needed to ascertain such in Fiji.

Risk categories for waist measurement only were also calculated (see Detailed Results in Appendix 1) and revealed a similar pattern of risk as with the high-risk WHR category. The only notable difference was that there were a considerably higher proportion of Fijian females at high risk (44.5% ± 5.3) as compared to Indo-Fijian females (25.4% ± 5.1). This difference by ethnicity among females was not found in the high-risk WHR category and likely relates to the fact that Indo-Fijian females are generally of a smaller build as compared to Fijian females, such that waist measurement alone shows them to be at a lower risk relative to WHR and may have implications on the decision of which measurement should be used in Fiji for measurement of abdominal obesity.

**Table 6. 28: Risk categories for waist-hip ratio (WHR) by gender, age group and ethnicity**

Age	Males				Females†			
	N	High-risk WHR (>1.0)			N	High-risk WHR (>0.85)		
		%	95%CI	n		%	95%CI	n
15-24	674	0.1	±0.3	1	680	18.8	± 4.8	114
25-34	548	1.5	±1.0	10	644	43.4	± 7.6	261
35-44	616	4.6	±2.1	32	680	57.5	± 7.2	381
45-54	489	11.2	±3.1	58	527	65.0	± 6.1	348
55-64	359	13.8	±4.8	64	329	72.5	± 6.8	235
Ethnicity	N	%	95%CI	n	N	%	95%CI	n
Fijian	1631	3.1	±0.9	68	1568	47.8	± 5.3	779
Indo-Fijian	990	5.7	±2.0	95	1205	40.5	± 8.0	524
Others	65	2.1	±3.3	2	87	34.0	±15.2	36
<b>TOTAL</b>	<b>2686</b>	<b>4.0</b>	<b>±1.0</b>	<b>165</b>	<b>2860</b>	<b>44.6</b>	<b>± 5.1</b>	<b>1339</b>

† Pregnant females excluded

#### 6.4.1.4 Conclusion

The overall proportion of the Fiji population aged 15-64 years who were overweight (i.e. with a BMI between 25 - 29.9) was 29% and obese (i.e. with a BMI  $\geq 30$ ) was 18%. Females in Fiji were by far more obese than males both by measure of overall BMI (26.4% verse 9.8%) and WHR (44.6% verse 4.0%) for abdominal obesity.

In terms of ethnicity, Fijians almost double the rate of obesity compared to Indo-Fijians. It was also observed that there is monotonic rapid increase of obesity with age up to the 30 - 34 years age group implying that maximal weight gain is occurring in the younger generation in Fiji.

### 6.4.2 Hypertension (High Blood Pressure)

(Detailed tables in Appendix Tables 9.14 - 9.22)

To assess the health status of the surveyed population, the participants were asked questions relating to recent blood pressure measurements, and medication for hypertension. STEP 1 data regarding hypertension, included information on when participants had last had their blood pressure measured by a health professional, on whether they had ever been told by a health worker that they had high blood pressure, and whether they were currently receiving any treatment for high blood pressure. STEP 2 data regarding hypertension included the mean systolic and diastolic measurements as noted in the section on Methodology. Summary data on the prevalence of hypertension includes those with:

- a mean systolic pressure  $> 139$  mmHg, whether or not they had previously been told by a health worker that they had high blood pressure, OR
- a mean diastolic pressure  $> 89$  mmHg, whether or not they had previously been told by a health worker that they had high blood pressure, OR
- normal mean systolic and diastolic pressures (i.e. normotensive) AND who were currently receiving anti-hypertensive medication, whether or not they had previously been told by a health worker that they had high blood pressure.

Those participants who reported having been ever told by a health worker that they had high blood pressure but who were normotensive and NOT on anti-hypertensive medication were NOT included among those considered to have hypertension.

#### 6.4.2.1 Most recent measurement of blood pressure

The results indicated that more than 90% of the population had their blood pressure measured within the last five years. 62% ( $\pm 4.3$ ) of males and 60.1% ( $\pm 4.5$ ) of females reported having had their blood pressure measured within the last 12 months. Only 7.2% ( $\pm 1.9$ ) of males and 8.8% ( $\pm 2.1$ ) of females had not had their blood pressure measured in the last five years. There were no significant differences in time since most recent blood pressure measurement by gender, age, ethnicity or locality.

#### 6.4.2.2 Prevalence of Hypertension

As shown in Figure 6.9, 19.1% ( $\pm 1.9$ ) (n=1402) of those surveyed were hypertensive. Among those, 63.3% ( $\pm 5.2$ ) were previously unrecognized cases (n=787).

The remainder of those with hypertension was previously diagnosed cases with 10.4% (n=174) not being on medication, 15.4% (n=259) being on medication but not under control, and only 10.9% (n=182) being on medication and having a controlled blood pressure.

Table 6.29 provides a more detailed analysis of those with hypertension and indicates that while the prevalence of hypertension by gender was the same, that there were a greater proportion of newly diagnosed cases among males. This difference may suggest that females utilize health care services more than males. There is a greater proportion of hypertension with increasing age but a lesser proportion of newly diagnosed.

**Figure 6.9: Prevalence of hypertension with distribution of cases by previous diagnosis, treatment status and control**

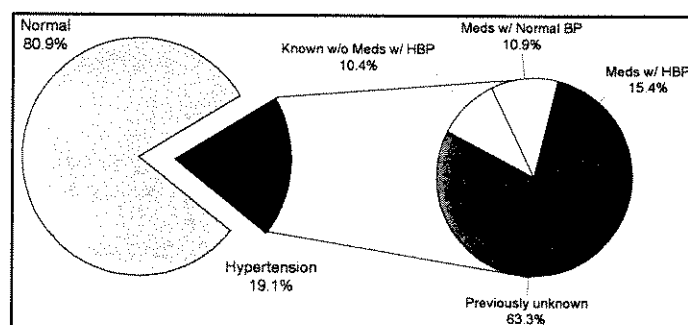


Table 6.29 also indicates that there is a higher proportion of hypertension among Fijians (20.7%  $\pm 2.8$ ) as compared with Indo-Fijians (16.3%  $\pm 1.6$ ). Furthermore, the proportion of newly diagnosed cases is higher among Fijians (70.9%  $\pm 4.4$ ) than among Indo-Fijians (50.6%  $\pm 5.4$ ), and the proportion of uncontrolled previously diagnosed cases is higher among Fijians (80.8%  $\pm 6.9$ ) than among Indo-Fijians (57.5%  $\pm 6.5$ ). This suggests that hypertension is not being as well recognized among Fijians as compared to Indo-Fijians, and that when it is recognized that it is not being as well controlled among Fijians as compared to Indo-Fijians. These differences could relate to

disparities in access to health care or variations in health seeking behaviour. There was no difference in the prevalence of hypertension by locality.

Table 6. 29: Prevalence of Hypertension with Status of Diagnosis by Gender, Agegroup, Ethnicity and Area

Group		Hypertension (among all in group)			Newly diagnosed (among hypertension)			Previously diagnosed but uncontrolled*		
Gender	N	%	95%CI	n	%	95%CI	n	%	95%CI	n
Male	2681	19.8	±2.3	590	73.0	± 6.8	396	62.6	± 8.2	125
Female	3929	18.3	±1.8	812	51.4	± 4.7	391	75.5	± 7.2	308
Agegroup	N	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	1598	9.1	±2.3	120	92.0	± 4.8	108	44.0	±34.3	5
25-34	1470	12.1	±2.9	164	84.0	± 6.1	124	63.8	±18.7	23
35-44	1544	18.3	±2.2	275	61.8	± 7.6	167	70.9	±10.5	77
45-54	1217	34.8	±4.0	433	52.2	± 6.8	212	65.5	± 7.3	150
55-64	781	52.1	±5.7	410	44.3	± 7.2	176	77.8	± 6.4	17
Ethnicity	N	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	3760	20.7	±2.8	828	70.9	± 4.4	538	80.8	± 6.9	236
Indian	2665	16.3	±1.6	540	50.6	± 5.4	233	57.5	± 6.5	18
Other	185	23.7	±7.2	34	53.3	±19.7	16	78.9	±23.7	13
Area	N	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	3715	19.7	±2.4	827	65.4	± 5.4	497	72.3	± 8.7	238
Urban	2895	17.4	±1.8	575	56.9	± 8.3	290	65.2	± 5.3	195
Total	N	%	95%CI	n	%	95%CI	n	%	95%CI	n
	6610	19.1	±1.9	1402	63.3	± 5.2	787	70.3	± 7.2	433

\* "not controlled" indicates a systolic BP > 139mmHG or a diastolic BP > 89mmHG

### 6.4.2.3 Treatment for hypertension

As noted in Table 6.30, among those with a previous diagnosis of hypertension, less than half were on anti-hypertensive medication. This table also indicates that even smaller proportions were receiving other treatments for hypertension (e.g. special diet, advice to lose weight or stop smoking, herbal or traditional remedies). Of all treatments, only advice to stop smoking showed a statistically significant difference by gender, likely due to the fact that males are more likely to smoke tobacco.

It is notable that over one-fifth of all those with a previous diagnosis of hypertension reported current use of herbal or traditional remedies. This observation is consistent with the reported frequent use of traditional health practices by many of Fiji's ethnic populations.

Table 6. 30: Type of treatment among those with a previous diagnosis of hypertension by gender

Treatment	Males			Females		
	%	95%CI	N	%	95%CI	N
Drugs	47.3	±10.0	110	47.1	±8.0	282
Diet	46.8	± 8.6	112	48.6	±6.8	292
Weight	33.9	± 8.5	80	34.0	±5.9	206
Smoking	28.8	± 6.9	69	11.6	±4.7	67
Herbal	25.9	± 8.2	62	21.0	±5.8	115

### 6.4.2.4 Conclusion

The prevalence of hypertension in the 15-64 years age group in Fiji is 19.1% (± 1.9), with Fijians having a higher proportion (20.7%± 2.8) than Indo-Fijians (16.3 ± 1.6) and 63% of these were previously unknown.

There were similar proportions between genders and dwelling area. and as expected there was a monotonic increase in hypertension with age. It was also established that when hypertension is recognized, Indo-Fijians do better in controlling it than Fijians and overall 20% were using traditional or herbal medicine.

These findings have important implications in intervention strategies for hypertension.

### 6.4.3 Diabetes

(Detailed tables in Appendix Table 10.1 - 10.5)

To assess the health status of the surveyed population, the participants were asked questions relating to recent blood sugar measurements, and treatment for diabetes. Summary data on the prevalence of diabetes for those in the 25-64 year age group includes those with:

- a fasting blood glucose greater than or equal to 6.1 mmol/L, whether or not they had previously been told by a health worker that they had diabetes, OR



- a normal fasting blood glucose (i.e. < 6.1 mmol/L) AND who were currently receiving anti-diabetes medication or were on a special diet prescribed by a health worker.

This is generally in accordance with the WHO guidelines on the diagnosis of diabetes.

Those participants who reported having been ever told by a health worker that they had diabetes but who had a normal fasting blood glucose and who were NOT on anti-diabetes medication or on a special diet prescribed by a health worker were NOT included among those considered to have diabetes.

### 6.4.3.1 Measurement of blood sugar in the last 12 months

Table 6.31 indicates that only 28.0% of the population had their blood glucose measured within the last 12 months with a significant difference between males (23.6%) and females (33.0%). As was similarly noted when participants had their blood pressure last measured, this difference by gender may be attributable to higher utilization rates of health services by females, although the routine practice of screening for diabetes during pregnancy could be a confounding factor.

There were also an increasing proportion of those who had their blood glucose measured in the last 12 months with increasing age. This trend for increased testing of blood glucose with age was not noted with the practice of taking blood pressure measurements. This is probably due to the fact that blood pressure measurements are routine in the primary care setting whereas blood glucose measurements are more likely to be conducted in older individuals in whom there is a greater suspicion of diabetes.

Table 6. 31: Blood sugar measured in the last 12 months: Males and Females

Age	Males				Females			
	N	Yes			N	Yes		
		%	95%CI	n		%	95%CI	n
15-24	690	8.8	± 2.7	62	956	14.7	± 2.7	150
25-34	564	17.5	± 5.0	105	939	30.6	± 3.3	294
35-44	632	28.4	± 3.3	183	946	37.2	± 3.9	352
45-54	498	44.7	± 5.5	234	740	49.9	± 6.6	398
55-64	364	52.4	± 6.4	204	426	64.1	± 5.8	267
TOTAL	2748	23.6	± 2.7	788	4007	33.0	± 2.9	1461

### 6.4.3.2 Prevalence of Diabetes

As shown in Figure 6.10, of those who had their fasting blood sugar (FBS) tested, 16.0% ( $\pm 3.1$ ) (n=435) were diabetic and a further 10.5% (n=261) had an impaired fasting glucose (i.e. FBS > 5.6 mmol/L and < 6.1mmol/L). Among those with diabetes, 53.2% ( $\pm 6.6$ ) were previously unrecognized cases (n=215). The remainder of those with diabetes was previously diagnosed cases with 2.1% (n=12) not being on medication, 32.2% (n=151) being on medication but uncontrolled, and only 12.5% (n=57) being on medication and having a normal fasting blood glucose.

Figure 6.10: Prevalence of Diabetes with distribution of cases by previous diagnosis, treatment status and control

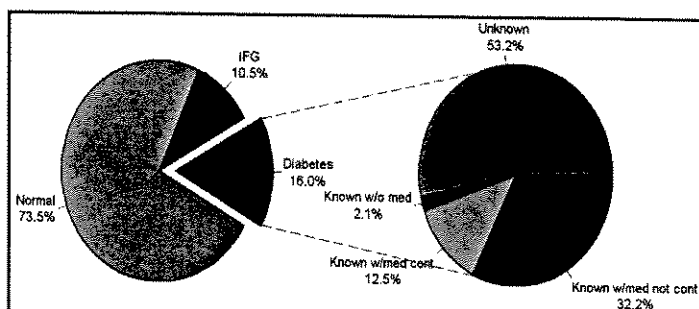


Table 6.32 provides a more detailed analysis of those with diabetes and indicates that the prevalence of diabetes by gender was the same. In regards to differences in prevalence by age group, not surprisingly there is a greater proportion of diabetes with increasing age. Similarly, there is a lesser proportion with newly diagnosed diabetes with increasing age.

Table 6.32 also indicates that there is a higher proportion of diabetes among Indo-Fijians (21.2%  $\pm 3.4$ ) as compared with Fijians (11.5%  $\pm 3.1$ ). Furthermore, the proportion of uncontrolled previously diagnosed cases of diabetes is higher among Indo-Fijians (80.2%  $\pm 8.1$ ) than among Fijians (54.5%  $\pm 13.2$ ). This suggests that when diabetes is recognized that it is not being as well controlled among Indo-Fijians as compared to Fijians.

This difference by ethnicity is opposite of that seen or observed in clinical setting as Fijians have higher rate of complications than Indo-Fijians. One needs to understand that one-off glucose measurement is not the best measure of good diabetes control.

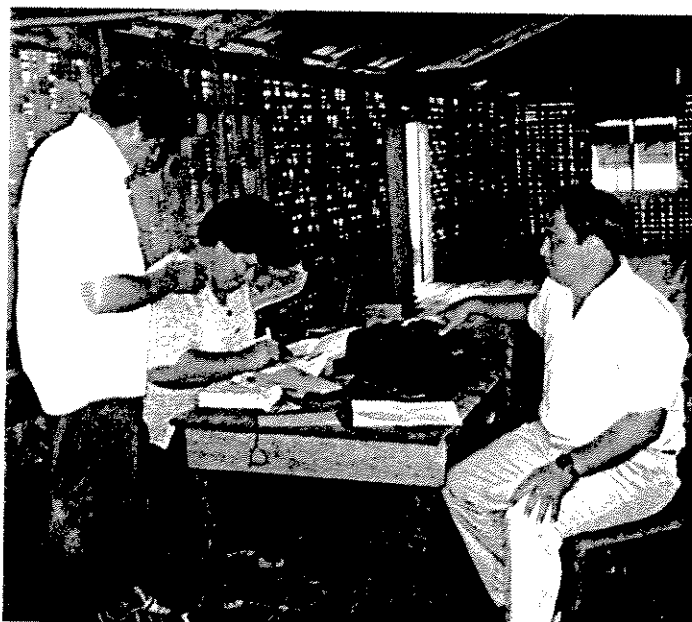


Table 6.32: Prevalence of Diabetes with Status of Diagnosis by Gender, Agegroup, Ethnicity and Area

Group		Diabetes (Among all)			Newly Diagnosed (Among diabetics)			Previously Diagnosed but uncontrolled		
Gender	N	%	95%CI	n	%	95%CI	n	%	95%CI	n
Male	862	14.6	± 3.8	153	60.3	± 9.0	85	69.2	±13.3	48
Female	1415	17.6	± 3.6	282	46.9	± 8.7	130	68.6	±11.4	103
Agegroup	N	%	95%CI	n	%	95%CI	n	%	95%CI	n
25-34	561	4.8	± 3.1	36	61.4	±22.5	22	49.7	±25.8	5
35-44	698	12.0	± 3.4	90	59.9	±14.9	56	56.0	±27.2	19
45-54	631	26.5	± 6.6	168	55.4	±14.9	84	74.1	±12.7	62
55-64	387	33.0	± 7.4	141	42.3	± 9.8	53	74.8	±10.9	65
Ethnicity	N	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1247	11.5	± 3.1	170	49.2	± 9.4	87	54.5	±13.2	49
Indian	979	21.2	± 3.4	250	53.6	± 7.3	118	80.2	± 8.1	99
Other	51	27.9	±15.2	15	79.5	±22.8	10	75.4	±17.6	3
Area	N	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	1280	12.8	± 2.9	181	51.5	± 9.8	87	65.0	±15.7	60
Urban	997	24.7	± 1.9	254	55.5	± 6.2	128	74.8	±10.4	9
Total	N	%	95%CI	n	%	95%CI	n	%	95%CI	n
	2277	16.0	± 3.1	435	53.2	± 6.6	215	68.8	±10.6	151

\* "uncontrolled" means fasting blood tasting glucose  $\geq 6.1$ mmol

There is also a difference in the overall prevalence of diabetes by locality with a prevalence of 24.7% (n=254) in the urban area and 12.8% (n=181) in the rural area. However, the rates of newly and previously diagnosed cases by locality are the same.

### 6.4.3.3 Treatment for diabetes

As noted in Table 6.33, among those with a previous diagnosis of diabetes, approximately two-thirds were on oral hypoglycemic medication and also on a special diet prescribed by a health worker. This table also indicates that smaller proportions were receiving other treatments for diabetes (e.g. insulin, advice to lose weight or stop smoking, herbal or traditional remedies). Of all treatments, only advice to stop smoking showed a statistically significant difference by gender, likely due to the fact that males are more likely to smoke tobacco.

It is notable that approximately one-fifth of all those with a previous diagnosis of diabetes reported current use of herbal or traditional remedies. This observation is consistent with the reported frequent use of traditional health practices by many of Fiji's ethnic populations.

Table 6. 33: Type of treatment among those with a previous diagnosis of diabetes by gender

Treatment	Males			Females		
	%	N	95%CI	%	N	95%CI
Insulin	3.8	5	± 3.8	7.8	18	± 3.9
Drugs	62.3	84	±11.0	66.5	161	± 8.7
Diet	66.7	85	±10.2	70.0	174	± 8.0
Weight	43.2	54	±14.1	39.6	100	± 6.4
Smoking	29.8	39	±10.3	8.7	18	± 4.0
Herbal	19.3	26	± 9.9	18.6	37	± 7.5

### 6.4.3.4 Conclusion

The prevalence of Diabetes Mellitus in the 25-64 years age group in Fiji is 16.0% (±3.1) with the rate in Indo-Fijians (21.2% ± 1.9) almost doubling that in Fijians (11.5% ± 3.1) and 53.2% were previously unknown.

Unlike hypertension, there was significantly higher proportion of diabetes amongst urban dwellers (24.7%±1.9) as compared to rural (12.8% ± 2.9).

There were slightly higher rates in females than males and as expected the prevalence of diabetes was increasing with age.

## 7 Limitations

The WHO STEPWISE approach employed in this survey has been the gold standard for NCD prevalence surveys in Fiji and the Pacific since its inception. The population sample taken was quite representative of the 15-64yrs in Fiji given the sampling technique and the sampling frame used.

However the imbalance between gender in the sample (Table 6.1) is partly due to the timing of the survey as it was mostly conducted during working hours where men are at work either in offices in urban areas or at the plantation for those in the rural hence the greater proportion of women than men. Given that the weighted proportion is

comparable to the population and in most category of variables (except obesity) the men are at higher risk than women, the bias should if anything strengthen the gender associations.

There is also some apparent imbalance in locality between the sample and the population (Table 6.1) and this is mainly because the weighting formula did not account for locality.

Attempts were made to collect information on response rate, but this was not feasible on the ground as there was logistical difficulty tracking the responses due to lack of documentation.

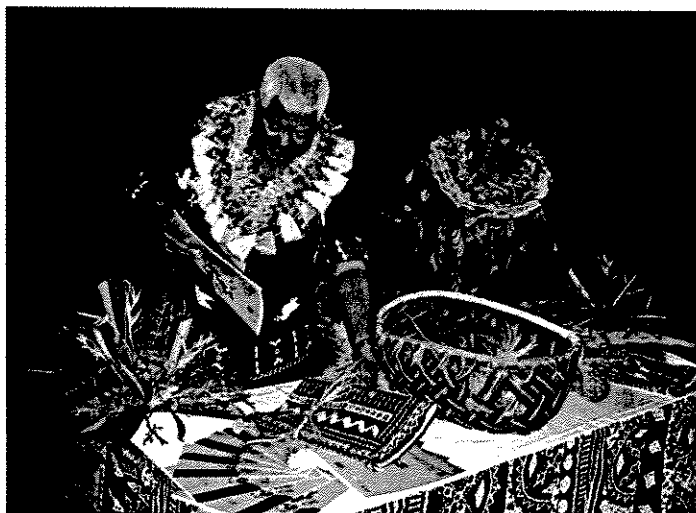
## 8 Conclusions

- The Fiji NCD-STEPS survey revealed that the point prevalence of non-communicable diseases mainly hypertension, diabetes and obesity are still relatively high and there has not been any decline since the last surveys in the '80s.
- NCD risk factors are highly prevalent in the Fiji population. Given that these risk factors could become non-communicable diseases (e.g. hypertension, diabetes, heart disease, stroke, cancer) of the future, it is essential that the Ministry of Health and partners work together aggressively to lower the proportion of these NCD risk factors in Fiji.
- Many of the NCD risk factors are linked and many individuals in Fiji are exposed to multiple NCD risk factors and there is a need to develop and implement integrated and comprehensive national strategies with multi-sectoral approach to combat these.

## 9 Recommendations

- Take more aggressive measures in decreasing tobacco use particularly targeting the younger age groups, males, Fijians and rural residents.
- Because of the association between kava use and other NCD risk factors (e.g alcohol and tobacco use), undertake health promotion activities to encourage more moderate kava consumption again targeting the younger age groups and males.
- Take more aggressive measures in reducing alcohol consumption particularly targeting the younger age groups, males, and Fijian females.
- Greatly increase health promotion efforts to highlight the benefits of fruit and vegetable consumption across all population sectors.
- Increase awareness among everyone regarding the adverse effects of excessive consumption of high-fat, high-salt, and high-sugar foods.
- Develop specific programs and improved environments to encourage increased physical activity in everyone, especially targeting females and adolescents.
- Increase the capacity of the healthcare system to identify, monitor and treat individuals with hypertension, particularly targeting Fijians.

- Increase the capacity of the healthcare system to identify, monitor and treat individuals with diabetes.
- Compare these findings with previous surveys and with other Pacific island countries as data become available.
- Maintain ongoing NCD risk factor surveillance to monitor and assess the effectiveness of health promotion and disease prevention strategies targeting NCDs and their risk factors.



# 10 Appendix 1: Detailed results

## 10.1 Demographic Information

Table 1. 1 Years spent in school: Males and Females

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
15-24	688	10.5	+ 0.3	950	10.8	+ 0.4
25-34	560	10.0	+ 0.4	927	10.2	+ 0.4
35-44	626	9.2	+ 0.4	920	9.4	+ 0.4
45-54	481	8.5	+ 0.4	658	7.9	+ 0.4
55-64	342	7.2	+ 0.5	350	7.1	+ 0.4
TOTAL	2697	9.6	+ 0.3	3805	9.7	+ 0.3

Table 1. 2 Ethnicity: Males and Females

Age	N	Males								
		Fijian			Indian			Other		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	691	56.0	+20.1	424	32.6	+20.4	244	3.3	+ 4.0	23
25-34	565	57.6	+20.9	348	37.5	+21.5	200	4.8	+ 4.1	17
35-44	633	55.3	+20.9	377	40.3	+20.9	244	4.5	+ 4.0	12
45-54	499	55.5	+19.9	289	41.4	+19.7	203	3.1	+ 3.5	7
55-64	364	63.3	+20.2	214	32.2	+19.2	143	4.5	+ 2.9	7
Total	2752	56.8	+19.1	1652	39.1	+19.3	1034	4.0	+ 2.9	66
Age	N	Females								
		Fijian			Indian			Other		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	956	57.3	+18.4	520	39.1	+18.6	404	3.6	+ 2.4	32
25-34	940	58.7	+17.4	549	36.8	+18.3	364	4.5	+ 3.1	27
35-44	947	55.4	+18.8	514	41.3	+18.7	404	3.2	+ 3.0	28
45-54	742	57.8	+19.1	345	39.1	+18.8	372	3.1	+ 3.4	25
55-64	426	61.8	+20.0	225	35.5	+19.5	190	2.8	+ 3.8	11
Total	4011	57.7	+18.3	2153	38.7	+18.3	1734	3.1	+ 2.6	124

Table 1. 3 Highest level of education: Males

Age	N	Never Attended		Some Primary		Primary		Secondary		High school		University		Post grad	
		%	n	%	n	%	n	%	n	%	n	%	n	%	n
15-24	689	0.1	1	0.3	3	20.3	126	43.6	300	22.9	152	7.3	57	5.4	50
25-34	564	0.3	2	1.3	7	33	163	36.6	212	15.4	90	9.1	57	4.5	33
35-44	633	1.1	6	2.6	14	37.7	219	45.7	295	6.3	46	4.2	30	2.4	23
45-54	497	3.3	15	3.1	19	53.2	253	29.2	146	3.9	19	4.4	27	3	18
55-64	364	5.5	21	9.6	41	63.9	218	12.5	47	1.9	9	4	15	2.7	13
Total	2747	1.2	45	2.1	84	35.2	979	37.7	1000	13.2	316	6.5	186	4	137



Table 1. 4 Highest level of education: Females

Age	N	Never Attended		Some Primary		Primary		Secondary		High school		University		Post grad	
		%	n	%	n	%	n	%	n	%	n	%	n	%	n
15-24	956	0.4	3	0.8	6	14.1	115	42	387	27.4	276	9.7	97	5.7	6
25-34	940	0.8	9	0.7	7	25.2	213	45	413	18.7	194	5.8	6	3.7	43
35-44	942	2.2	22	1.3	18	33.2	289	50.3	482	7.6	76	3.5	34	1.8	21
45-54	741	8.6	83	5.5	48	55.7	383	24.7	179	1.7	17	1.7	16	2	15
55-64	425	12.7	74	6	35	65.1	248	14.2	58	-	0	0.3	2	1.6	8
Total	4004	3.2	191	2	114	31.4	1248	39.4	1519	14.9	563	5.5	210	3.5	159

## 10.2 Tobacco Use

Table 2. 1 Current smoking status: Males

AGE	N	Daily smokers			Non-daily Smokers			Non-smokers		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	690	18.7	± 8.2	137	19.9	± 6.5	140	61.4	±10.9	413
25-34	565	31.5	± 7.5	167	29.1	± 5.8	180	39.4	± 7.5	218
35-44	633	27.1	± 4.9	171	30.4	± 5.2	187	42.5	± 6.2	275
45-54	498	29.6	± 7.3	145	28.8	± 8.5	154	41.7	± 6.5	199
55-64	364	27.8	± 6.3	95	35.9	± 4.9	127	36.3	±10.0	142
TOTAL	2750	26.0	± 4.5	715	27.0	± 4.8	788	47.0	± 6.5	1247

Table 2. 2 Current smoking status: Females

AGE	N	Daily smokers			Non-daily Smokers			Non-smokers		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	954	2.3	± 0.9	24	12.2	± 3.9	106	85.6	± 4.6	824
25-34	940	4.6	± 2.0	48	17.0	± 5.4	153	79.0	± 6.2	739
35-44	946	3.8	± 2.3	37	15.5	± 6.3	136	80.7	± 7.0	773
45-54	741	5.2	± 3.1	44	13.2	± 6.3	79	81.6	± 7.5	618
55-64	424	5.0	± 2.5	22	13.2	± 5.7	48	81.9	± 6.6	354
TOTAL	4005	3.9	± 1.4	175	14.2	± 4.6	522	82.0	± 5.3	3308

Table 2. 3 Current smoking status by area: Males

Area	N	Daily Smokers			Non-daily Smokers			Non-smokers		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	1716	28	±5.6	491	28.9	±6.0	541	43.1	±7.5	684
Urban	1034	19.5	±3.8	224	21.1	±2.6	247	59.4	±6.0	563
TOTAL	2750	26.0	±4.5	715	27.0	±4.8	788	47.0	±6.5	1247

Table 2. 4 Current smoking by area: Females

Area	N	Daily Smokers			Non-daily Smokers			Non-smokers		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	2071	3.9	±1.8	90	16.7	±5.8	357	79.4	±6.6	1624
Urban	1934	3.9	±2.2	85	8.3	±4.4	165	87.9	±6.5	1684
TOTAL	4005	3.9	±1.4	175	14.2	±4.6	522	82.0	±5.3	3308



Table 2. 5 Current smoking status by ethnicity: Males

Ethnic Group	N	Daily Smokers			Non-daily Smokers			Non-smokers		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1651	26.4	± 6.0	410	34.7	± 3.1	573	38.9	± 5.0	668
Indian	1033	25.4	± 5.5	289	17.1	± 3.4	203	57.6	± 6.2	541
Others	66	26.3	±11.1	16	15.3	±11.9	12	58.4	±19.7	38
<b>TOTAL</b>	<b>2750</b>	<b>26.0</b>	<b>± 4.5</b>	<b>715</b>	<b>27.0</b>	<b>± 4.8</b>	<b>788</b>	<b>47.0</b>	<b>± 6.5</b>	<b>1247</b>

Table 2. 6 Current smoking status by ethnicity: Females

Ethnic Group	N	Daily Smokers			Non-daily Smokers			Non-smokers		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	2149	5	± 2.0	126	22.2	± 3.3	470	72.8	± 3.9	1553
Indian	1733	1.4	± 0.6	35	1.6	± 0.5	32	97	± 0.9	1666
Others	123	10.5	± 5.5	14	21.1	±14.6	20	68.4	±10.4	89
<b>TOTAL</b>	<b>4005</b>	<b>3.9</b>	<b>± 1.4</b>	<b>175</b>	<b>14.2</b>	<b>± 4.6</b>	<b>522</b>	<b>82.0</b>	<b>± 5.3</b>	<b>3308</b>

Table 2. 7 Age started smoking, for current smokers: Males and Females

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
15-24	135	18.3	±0.5	24	18.9	±1.3
25-34	165	20.0	±0.9	47	21.2	±2.0
35-44	170	21.3	±0.8	37	24.1	±4.1
45-54	144	23.2	±1.2	44	30.6	±3.9
55-64	95	23.6	±1.8	22	36.4	±9.6
<b>TOTAL</b>	<b>709</b>	<b>20.7</b>	<b>±0.6</b>	<b>174</b>	<b>25.0</b>	<b>±2.1</b>

Table 2. 8 Years of smoking, for current smokers: Males and Females

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
15-24	135	3.5	±0.5	24	3.2	± 1.2
25-34	165	9.7	±1.1	47	9.2	± 2.2
35-44	170	18.6	±0.9	37	17.0	± 4.1
45-54	144	26.1	±1.2	44	19.1	± 4.0
55-64	95	35.9	±1.8	22	24.1	±10.4
<b>TOTAL</b>	<b>709</b>	<b>15.1</b>	<b>±1.6</b>	<b>174</b>	<b>13.5</b>	<b>± 2.4</b>

Table 2. 9 Percentage smoking various types of Cigarettes, for current smokers: Males

Age	Manufactured Cigarettes			Hand-rolled Cigarettes			Pipes full of tobacco			Cigars and cheroots			Other		
	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	89.1	±13.2	123	17.0	± 6.4	22	-	-	0	4.2	± 5.0	7	19.1	±17.2	22
25-34	82.0	±14.5	142	22.6	± 9.1	34	-	-	0	9.2	± 9.2	10	17.4	±12.8	26
35-44	71.6	±15.8	127	28.5	±10.6	44	1.2	±1.9	2	17.1	± 9.3	23	12.5	±12.1	20
45-54	71.7	±11.4	111	37.7	±14.5	42	-	-	0	19.8	± 8.1	18	11.8	±12.0	15
55-64	76.1	± 9.0	72	40.3	±14.3	32	-	-	0	22.5	±13.9	18	9.6	± 9.4	11
<b>Total</b>	<b>79.8</b>	<b>±12.4</b>	<b>575</b>	<b>26.5</b>	<b>± 7.5</b>	<b>174</b>	<b>0.3</b>	<b>±0.5</b>	<b>2</b>	<b>11.0</b>	<b>± 5.8</b>	<b>76</b>	<b>15.1</b>	<b>±12.0</b>	<b>94</b>

Table 2. 10 Percentage smoking various types of Cigarettes, for current smokers: Females

Age	Manufactured Cigarettes			Hand-rolled Cigarettes			Cigars and cheroots			Other		
	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	100	0	24	10.0	±15.6	3	-	-	0	-	-	0
25-34	80.9	±13.9	42	21.2	±16.9	6	10.4	±12.6	3	1.5	± 3.2	1
35-44	76.4	±27.1	30	29.8	±20.8	10	8.4	±12.5	2	18.0	±23.8	4
45-54	65.0	±29.3	32	26.9	±17.6	10	8.2	± 8.4	4	24.9	±30.1	6
55-64	40.0	±26.7	10	41.0	±21.9	7	18.9	±18.2	4	7.8	±12.5	2
Total	75.5	±16.9	138	24.4	±14.0	36	8.6	± 6.4	13	9.8	±12.2	13

Table 2. 11 Consumption of manufactured Cigarettes/day, for current smokers of manufactured Cigarettes: Males and Females

Age	Males			Females		
	Mean	95%CI	N	Mean	95%CI	N
15-24	6.3	±1.4	123	4.2	±3.3	24
25-34	7.1	±1.3	142	5.7	±1.2	42
35-44	7.9	±0.9	127	6.5	±1.4	30
45-54	8.2	±1.3	111	5.6	±1.6	32
55-64	8.0	±2.1	72	3.5	±2.4	10
TOTAL	7.3	±0.8	575	5.4	±1.3	138

Table 2.12 Consumption of hand-rolled Cigarettes/day, for current smokers of hand-rolled Cigarettes: Males and Females

Age	Males			Females		
	Mean	95%CI	N	Mean	95%CI	N
15-24	4.3	±1.4	22	3.0	-	3
25-34	5.4	±1.9	34	4.5	±1.6	6
35-44	7.6	±1.0	44	7.5	±6.4	10
45-54	7.5	±1.9	42	2.5	±1.4	10
55-64	7.7	±1.9	32	3.7	±1.2	7
TOTAL	6.5	±1.4	174	4.6	±2.0	36

### 10.3 Kava/Yaqona Consumption

Table 3. 1 Ever Kava consumption status: Males and Females

Age	Total population				Men				Women			
	N	Ever Consumed			N	Ever Consumed			N	Ever Consumed		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
15-24	1646	52.2	±11.2	851	690	62.2	±11.2	453	956	40.3	±12.1	398
25-34	1505	70.9	± 7.0	1004	565	84.8	± 6.9	485	940	54.9	±10.5	519
35-44	1580	70.9	± 8.3	1061	633	86.7	± 5.7	562	947	53.1	±12.9	499
45-54	1240	71.0	± 7.2	791	499	89.7	± 5.0	451	741	50.3	±12.2	340
55-64	789	68.8	± 8.2	512	363	87.1	± 7.1	314	426	50.6	± 9.8	198
Total	6760	65.0	± 8.2	4219	2750	78.9	± 6.1	2265	4010	49.1	±11.1	1954

Table 3. 2 Ever Kava consumption status by area: Males and Females

Area	Total population				Men				Women			
	N	Ever Consumed			N	Ever Consumed			N	Ever Consumed		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Rural	3791	69.3	± 9.4	2631	1716	81.8	±7.3	1474	2075	54.0	±13.2	1157
Urban	2969	53.1	±11.8	1588	1034	70.0	±6.9	791	1935	37.8	±16.9	797
Total	6760	65.0	± 8.2	4219	2750	78.9	±6.1	2265	4010	49.1	±11.1	1954

Table 3. 3 Ever Kava consumption status by ethnicity

Ethnic Group	Total population				Men				Women			
	N	Ever Consumed			N	Ever Consumed			N	Ever Consumed		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Fijian	3804	77.7	± 5.4	2931	1651	86.4	± 4.6	1439	2153	67.9	± 6.9	1492
Indian	2766	46.6	± 8.0	1167	1033	69.6	± 9.2	780	1733	20.1	± 7.5	387
Others	190	62.1	±11.8	121	66	64.5	±14.9	46	124	59	±14.4	75
Total	6760	65.0	± 8.2	4219	2750	78.9	± 6.1	2265	4010	49.1	±11.1	1954

Table 3. 4 Consumers of kava during the past 30 days

Age	Total population				Men				Women			
	N	Current Consumers			N	Current Consumers			N	Current Consumers		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
15-24	1645	38.2	±9.2	553	690	49.9	±10.1	345	955	24.3	± 9.2	208
25-34	1502	58.0	±5.6	748	565	78.3	± 6.6	440	937	34.3	± 7.3	308
35-44	1578	56.4	±6.9	787	631	77.8	± 7.3	496	947	32.5	± 9.0	291
45-54	1240	59.9	±6.8	630	499	82.3	± 6.1	415	741	35.0	±10.7	215
55-64	788	56.5	±8.8	410	363	80.0	± 9.2	282	425	33.1	± 8.3	128
Total	6753	51.7	±6.6	3128	2748	69.9	± 5.9	1978	4005	30.9	± 8.0	1150

Table 3. 5 Consumers of kava during the past 30 days by area

Area	Total population				Men				Women			
	N	Current Consumers			N	Current Consumers			N	Current Consumers		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Rural	3786	56.7	±7.2	2076	1715	73.7	±6.7	1326	2071	35.6	±9.6	750
Urban	2967	38.0	±5.1	1052	1033	57.9	±5.3	1033	1934	20.0	±6.9	400
Total	6753	51.7	±6.6	3128	2748	69.9	±5.9	2748	4005	30.9	±8.0	1150

Table 3. 6 Consumers of kava during the past 30 days by ethnicity

Age	Total population				Men				Women			
	N	Current Consumers			N	Current Consumers			N	Current Consumers		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Fijian	3799	61.7	± 5.5	2217	1650	76.3	± 5.5	1251	2149	45.3	± 6.0	966
Indian	2764	38.1	± 6.0	848	1032	63.2	± 7.8	698	1732	9.1	± 3.5	150
Others	190	40.4	±15.3	63	66	46.0	±21.5	29	124	33.3	±12.8	34
Total	6753	51.7	± 6.6	3128	2748	69.9	± 5.9	1978	4005	30.9	± 8.0	1150

Table 3. 7 Frequency of kava consumption in the last month among current users by Gender

Age	Males						
	N	1-19 days			20+ days		
		%	95%CI	n	%	95%CI	n
15-24	348	84.2	±9.7	294	15.8	±9.7	54
25-34	441	73.4	±5.7	330	26.6	±5.7	111
35-44	496	75.6	±5.6	375	24.4	±5.6	121
45-54	415	73.5	±6.0	296	26.5	±6.0	119
55-64	282	73.4	±7.0	202	26.6	±7.0	80
Total	1982	76.3	±4.5	1497	23.7	±4.5	485
Age	Females						
	N	1-19 days			20+ days		
		%	95%CI	n	%	95%CI	n
15-24	208	93.9	±5.7	196	6.1	±5.7	12
25-34	309	94.9	±3.2	295	5.1	±3.2	14
35-44	291	94.7	±2.6	273	5.3	±2.6	18
45-54	217	94.8	±3.6	203	5.2	±3.6	14
55-64	128	96.7	±3.4	124	3.3	±3.4	4
Total	1153	94.8	±1.9	1091	5.2	±1.9	62

Table 3. 8 Frequency of kava consumption in the last month among current users by Ethnicity

Ethnic Group	Males						
	N	1-19 days			20+ days		
		%	95%CI	n	%	95%CI	n
Fijian	1254	78.8	±6.2	984	21.2	± 6.2	270
Indian	699	71.4	±4.7	488	28.6	± 4.7	211
Others	29	84.6	±11.6	25	15.4	±11.6	4
TOTAL	1982	76.3	±4.5	1497	23.7	± 4.5	485
Ethnic Group	Females						
	N	1-19 days			20+ days		
		%	95%CI	n	%	95%CI	n
Fijian	968	94.4	±2.2	914	5.6	±2.2	54
Indian	151	95.8	±2.5	144	4.2	±2.5	7
Others	34	99.0	±1.9	33	1.0	±1.9	1
TOTAL	1153	94.8	±1.9	1091	5.2	±1.9	62

Table 3. 9 Frequency of kava consumption in the last month among current users by Area

Area	Males						
	N	1-19 days			20+ days		
		%	95%CI	n	%	95%CI	n
Rural	1329	76.8	±5.4	1012	23.2	±5.4	317
Urban	653	74.6	±5.5	485	25.4	±5.5	168
TOTAL	1982	76.3	±4.5	1497	23.7	±4.5	485
Area	Females						
	N	1-19 days			20+ days		
		%	95%CI	n	%	95%CI	n
Rural	753	94.3	±2.3	710	5.7	±2.3	43
Urban	400	96.7	±1.5	381	3.4	±1.5	19
TOTAL	1153	94.8	±1.9	1091	5.2	±1.9	62

Table 3. 10 Proportion likely to smoke tobacco or drink alcohol during or after yaqona consumption by gender

Age	Males						Females					
	Smoke tobacco			Drink alcohol			Smoke tobacco			Drink alcohol		
	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	49.4	±10.6	217	37.1	±5.5	177	26.6	±6.1	92	9.7	±5.4	39
25-34	63.7	± 6.8	304	37.8	±6.9	195	30.5	±5.9	157	5.9	±3.4	40
35-44	57.2	± 5.5	316	21.5	±3.4	127	28.9	±6.7	142	5.0	±2.6	29
45-54	59.7	± 5.7	268	17.3	±4.1	81	24.6	±6.8	86	0.6	±0.8	5
55-64	58.9	± 8.4	174	7.8	±3.8	26	21.3	±6.7	40	0.6	±1.0	2
Total	57.6	± 5.3	1279	28.1	±3.9	606	27.4	±3.8	517	5.4	±2.2	115

Table 3. 11 Type of food consumed during kava sessions: Males and Females

Type of food	Males			Females		
	%	95%CI	N	%	95%CI	N
Lollies	33.6	±5.3	740	52.1	±8.3	943
Biscuits	8.6	±2.7	193	7.6	±2.5	138
Bread	5.3	±2.0	122	2.7	±1.1	52
Soft drinks	8.6	±2.5	213	5.9	±2.1	133
Sweet snacks	12.8	±2.5	286	16.1	±3.5	296
Cooked food	52.1	±8.7	1122	43.7	±9.4	792

## 10.4 Alcohol Consumption

Table 4. 1 Alcohol consumption status: Males and Females

Age	Total population				Men				Women			
	N	Ever Consumed			N	Ever Consumed			N	Ever Consumed		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
15-24	1645	38.8	±6.9	601	690	57.6	±8.3	413	955	16.5	±6.3	188
25-34	1505	51.6	±5.7	695	565	77.4	±7.4	444	940	21.7	±7.4	251
35-44	1579	48.3	±6.3	678	632	76.4	±6.5	491	947	16.9	±7.1	187
45-54	1240	44.8	±5.0	478	499	74.1	±5.8	375	741	12.1	±6.1	103
55-64	788	39.2	±5.9	289	362	70.9	±7.4	251	426	7.6	±5.7	38
Total	6757	45.0	±5.0	2741	2748	70.0	±5.9	1974	4009	16.5	±5.9	767

Table 4. 2 Ever alcohol by area: Males and Females

Area	Total population				Men				Women			
	N	Ever Consumed			N	Ever Consumed			N	Ever Consumed		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Rural	3788	46.2	± 5.8	1590	1715	72.1	±7.4	1291	2073	14.1	± 5.3	299
Urban	2969	41.6	±10.1	1151	1033	63.2	±6.5	683	1936	22.2	±13.7	468
Total	6757	45.0	± 5.0	2741	2748	70.0	±5.9	1974	4009	16.5	± 5.9	767



Table 4. 3 Ever alcohol by ethnicity: Males and Females

Ethnic Group	Total population				Men				Women			
	N	Ever Consumed			N	Ever Consumed			N	Ever Consumed		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Fijian	3802	50.0	± 4.8	1778	1650	75.8	± 5.1	1242	2152	21	± 6.7	536
Indian	2765	37.1	± 6.6	863	1032	62.7	±10.4	689	1733	7.6	± 4.3	174
Others	190	50.4	±12.9	100	66	59.2	±19.7	43	124	39.3	±12.1	57
Total	6757	45.0	± 5.0	2741	2748	70.0	± 5.9	1974	4009	16.5	± 5.9	767

Table 4. 4 Consumers of alcohol during the past 12 months: Males and Females

Age	Total population				Men				Women			
	N	Current Consumers			N	Current Consumers			N	Current Consumers		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
15-24	1645	26.4	±5.5	406	690	42.0	± 7.8	305	955	7.8	±3.8	101
25-34	1505	29.3	±3.9	382	565	49.4	± 6.4	296	940	6.1	±3.9	86
35-44	1579	22.8	±4.6	312	632	39.2	± 7.2	248	947	4.4	±3.7	64
45-54	1240	16.6	±6.6	177	499	28.0	±10.5	142	741	3.9	±2.6	35
55-64	788	11.7	±3.9	86	362	22.1	± 8.1	79	426	1.2	±1.1	7
Total	6757	23.8	±3.0	1363	2748	39.9	± 4.3	1070	4009	5.5	±3.0	293

Table 4. 5 Consumers of alcohol during the past 12 month by area: Males and Females

Area	Total population				Men				Women			
	N	Current Consumers			N	Current Consumers			N	Current Consumers		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Rural	3788	23.1	±3.3	708	1715	38.9	±5.3	634	2073	3.5	±1.7	74
Urban	2969	25.6	±6.4	655	1033	42.9	±6.1	436	1936	10.0	±7.2	219
Total	6757	23.8	±3.0	1353	2748	39.9	±4.3	1070	4009	5.5	±3.0	293

Table 4. 6 Consumers of alcohol during the past 12 months by ethnicity: Males and Females

Ethnic Group	Total population				Men				Women			
	N	Current Consumers			N	Current Consumers			N	Current Consumers		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Fijian	3802	22.7	±3.1	753	1650	37.7	±4.5	573	2152	5.9	±3.4	180
Indian	2765	25.0	±4.4	553	1032	43.5	±7.4	469	1733	3.7	±2.4	84
Others	190	27.2	±8.5	57	66	34.6	±14.2	28	124	17.8	±7.6	29
Total	6757	23.8	±3.0	1363	2748	39.9	±4.3	1070	4009	5.5	±3.0	293

Table 4. 7 Alcohol consumption per drinking day during the past 12 months, for current consumers of Alcohol: Males

Total population																			
Age	Standard Drinks per Drinking Day																		
	N	1-2			3-4			5-8			9-12			13-20			>20		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	405	8.4	± 3.3	45	9.2	±3.8	42	22.4	± 5.5	94	23.7	±6.2	86	18.1	± 5.9	68	18.2	±4.9	70
25-34	377	8.2	± 3.6	42	9.2	±4.1	39	21.8	± 6.7	78	18.3	±5.5	64	18.7	± 3.2	66	23.8	±7.5	88
35-44	307	12.3	± 5.7	46	20.2	±6.3	60	22.9	± 7.8	67	17.6	±4.8	55	9.4	± 3.5	27	17.6	±8.1	52
45-54	171	11.6	± 6.8	25	22.0	±5.1	36	38.2	± 8.5	59	14.6	±4.8	25	6.7	± 3.8	12	7.0	±5.0	14
55-64	85	31.8	±11.4	27	27.6	±9.4	27	17.7	±10.8	14	8.3	±7.0	7	10.3	±10.0	7	4.3	±6.8	3
Total	1345	10.4	± 3.2	185	13.4	±3.5	204	23.6	± 4.5	312	19.3	±3.0	237	15.2	± 3.1	180	18.2	±6.1	227

Men																			
15-24	305	5.8	± 2.9	17	8.0	± 3.7	27	20.9	± 6.5	63	25.0	± 7.5	70	20.7	± 6.4	66	19.6	± 5.4	62
25-34	293	6.2	± 3.3	16	7.5	± 4.7	19	22.0	± 7.4	64	18.9	± 5.8	56	19.6	± 3.5	58	25.7	± 8.2	80
35-44	245	9.1	± 6.2	22	20.9	± 6.7	51	23.2	± 8.7	55	18.2	± 5.3	46	10.1	± 3.7	25	18.5	± 9.0	46
45-54	139	7.4	± 6.9	11	21.7	± 4.9	29	40.5	± 9.4	53	15.6	± 5.7	22	7.1	± 4.2	10	7.8	± 5.6	14
55-64	78	30.5	± 12.9	23	28.4	± 9.4	25	16.9	± 11.6	13	8.8	± 7.4	7	10.9	± 10.6	7	4.5	± 7.3	3
Total	1060	7.9	± 2.9	89	12.7	± 4.1	151	23.4	± 5.2	248	20.0	± 3.4	201	16.5	± 3.3	166	19.6	± 6.8	205
Women																			
15-24	100	25.0	± 11.2	28	17.0	± 8.2	15	31.7	± 14.6	31	15.7	± 8.6	16	1.6	± 2.5	2	9.0	± 6.1	8
25-34	84	26.7	± 15.3	26	25.7	± 12.8	20	19.9	± 14.9	14	12.6	± 12.0	8	10.3	± 6.8	8	4.8	± 4.7	8
35-44	62	46.0	± 24.4	24	13.1	± 8.1	9	19.6	± 8.7	12	11.1	± 9.7	9	1.7	± 2.2	2	8.5	± 6.5	6
45-54	32	48.3	± 25.8	14	24.3	± 20.0	7	18.2	± 16.6	6	5.9	± 12.0	3	3.3	± 3.4	2	-	-	0
55-64	7	54.9	± 50.7	4	12.5	± 19.0	2	32.6	± 54.6	1	-	-	0	-	-	0	-	-	0
Total	285	31.7	± 8.7	96	19.4	± 6.1	53	25.1	± 9.1	64	12.8	± 4.6	36	4.2	± 2.7	14	6.7	± 3.6	22

Table 4. 8 Alcohol consumption per drinking day during the past 12 months, for current consumers of alcohol:  
Females

Total population																			
Area	N	Standard Drinks per Drinking Day																	
		1-2			3-4			5-8			9-12			13-20			>20		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	700	8.8	± 3.7	74	11.9	± 4.6	94	22.8	± 6.0	159	20.8	± 3.6	136	15.9	± 4.1	106	19.8	± 8.1	131
Urban	645	14.4	± 2.8	111	16.9	± 3.2	110	25.4	± 4.1	153	15.6	± 2.1	101	13.3	± 2.1	74	14.5	± 3.4	96
Total	1345	10.4	± 3.2	185	13.4	± 3.5	204	23.6	± 4.5	312	19.3	± 3.0	237	15.2	± 3.1	180	18.2	± 6.1	227
Men																			
Rural	630	7.4	± 3.5	53	11.5	± 5.0	81	22.1	± 6.4	136	21.4	± 4.1	129	16.8	± 4.3	102	20.9	± 8.7	129
Urban	430	9.2	± 3.5	36	16.1	± 4.6	70	27.1	± 5.4	112	16.2	± 3.5	72	15.6	± 2.5	64	15.8	± 4.7	76
Total	1060	7.9	± 2.9	89	12.7	± 4.1	151	23.4	± 5.2	248	20.0	± 3.4	201	16.5	± 3.3	166	19.6	± 6.8	205
Women																			
Rural	70	28.2	± 13.7	21	18.8	± 9.8	13	33.4	± 14.6	23	12.1	± 8.7	7	4.1	± 4.5	4	3.4	± 4.7	2
Urban	215	34.4	± 8.7	75	19.9	± 8.0	40	18.6	± 7.3	41	13.5	± 5.1	29	4.4	± 3.3	10	9.3	± 2.7	2
Total	285	31.7	± 8.7	96	19.4	± 6.1	53	25.1	± 9.1	64	12.8	± 4.6	36	4.2	± 2.7	14	6.7	± 3.6	22

Table 4. 9 Alcohol consumption per drinking day during the past 12 months, for current consumers of Alcohol by ethnicity

Total population																			
Ethnic Group	N	Standard Drinks per Drinking Day																	
		1-2			3-4			5-8			9-12			13-20			>20		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijians	746	5.2	± 2.0	53	7.5	± 2.3	72	18.2	± 3.1	146	23.3	± 3.6	161	18.4	± 4.0	126	27.6	± 5.6	188
Indians	542	17.4	± 4.0	124	21.7	± 2.9	124	31.2	± 5.7	153	14.0	± 3.2	64	10.3	± 3.7	47	5.3	± 3.9	30
Others	57	10.3	± 7.3	8	9.7	± 5.2	8	20.2	± 16.6	13	18.4	± 8.8	12	20.0	± 16.4	7	21.4	± 16.3	9
Total	1345	10.4	± 3.2	185	13.4	± 3.5	204	23.6	± 4.5	312	19.3	± 3.0	237	15.2	± 3.1	180	18.2	± 6.1	227
Men																			
Fijians	568	3.5	± 1.9	21	5.6	± 2.1	35	16.1	± 3.5	97	24.4	± 4.3	131	20.3	± 4.2	115	30.2	± 6.0	169
Indians	464	13.6	± 2.6	67	22.3	± 2.9	114	32.8	± 5.6	145	15.0	± 3.4	64	10.8	± 3.8	45	5.6	± 4.2	29
Others	28	6.2	± 12.2	1	4.1	± 6.1	2	20.8	± 21.4	6	14.9	± 12.5	6	26.9	± 21.7	6	27.2	± 23.0	7
Total	1060	7.9	± 2.9	89	12.7	± 4.1	151	23.4	± 5.2	248	20.0	± 3.4	201	16.5	± 3.3	166	19.6	± 6.8	205
Women																			
Fijians	178	17.3	± 5.8	32	21.1	± 6.9	37	33.0	± 12.0	49	15.2	± 7.0	30	4.6	± 3.2	11	8.9	± 5.7	19
Indians	78	73.5	± 13.6	57	13.2	± 12.4	10	8.4	± 4.1	8	-	-	0	3.9	± 6.9	2	1.0	± 1.7	1
Others	29	20.6	± 10.4	7	23.6	± 18.4	6	18.4	± 11.8	7	27.2	± 22.8	6	3.0	± 5.0	1	7.2	± 8.2	2
Total	285	31.7	± 8.7	96	19.4	± 6.1	53	25.1	± 9.1	64	12.8	± 4.6	36	4.2	± 2.7	14	6.7	± 3.6	22

Table 4. 10 Average number of standard drinks per drinking day by agegroup

Age	Total population			Men			Women		
	Mean	95%CI	N	Mean	95%CI	N	Mean	95%CI	N
15-24	13.9	± 2.0	405	14.8	± 2.1	305	7.6	± 1.6	100
25-34	16.0	± 2.9	377	16.9	± 3.1	293	7.5	± 1.7	84
35-44	13.2	± 3.9	307	13.8	± 4.4	245	7.0	± 2.7	62
45-54	8.8	± 1.5	171	9.3	± 1.5	139	3.7	± 1.5	32
55-64	6.9	± 2.6	85	7.1	± 2.9	78	3.0	± 2.5	7
Total	13.6	± 2.5	1345	14.4	± 2.7	1060	7.0	± 1.1	285

Table 4. 11 Average number of standard drinks per drinking day by area

Area	Total population			Men			Women		
	Mean	95%CI	N	Mean	95%CI	N	Mean	95%CI	N
Rural	14.5	±3.2	700	15.1	±3.5	630	5.9	±1.1	70
Urban	11.5	±0.8	645	12.5	±1.3	430	7.9	±0.9	215
Total	13.6	±2.5	1345	14.4	±2.7	1060	7.0	±1.1	285

Table 4. 12 Average number of standard drinks per drinking day by ethnicity

Ethnic Group	Total population			Men			Women		
	Mean	95%CI	N	Mean	95%CI	N	Mean	95%CI	N
Fijians	17.4	±2.0	746	18.7	±2.0	568	8.3	±1.9	178
Indians	8.4	±1.7	542	8.8	±1.8	464	3.1	±1.3	78
Others	15.3	±5.7	57	18.1	±8.2	28	8.2	±1.9	29
Total	13.6	±2.5	1345	14.4	±2.7	1060	7.0	±1.1	285

Table 4. 13 Proportion of current drinkers who binge drink on drinking days by agegroup

Age	Total population				Men				Women			
	N	Binge drink*			N	Binge drink*			N	Binge drink*		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
15-24	405	83.5	± 5.7	325	305	86.2	± 5.0	261	100	65.4	±10.5	64
25-34	377	84.0	± 6.3	308	293	86.3	± 6.5	258	84	62.3	±16.0	50
35-44	307	68.1	±10.6	206	245	70.0	±11.9	172	62	48.4	±21.4	34
45-54	171	67.4	± 7.9	113	139	70.9	± 9.0	99	32	36.9	±22.0	14
55-64	85	40.9	±15.5	32	78	41.0	±16.4	30	7	39.0	±51.2	2
Total	1345	77.3	± 6.3	984	1060	79.5	± 6.8	820	285	58.6	± 8.0	164

\* 5 or more drinks for men and 4 or more drinks for women

Table 4. 14 Proportion of current drinkers who binge drink on drinking days by area

AGE	Total population				Men				Women			
	N	Binge drink*			N	Binge drink*			N	Binge drink*		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Rural	700	79.6	±8.0	536	630	81.1	±8.3	496	70	58.3	±13.8	40
Urban	645	71.4	±3.7	448	430	74.7	±7.2	324	215	58.8	± 8.2	124
Total	1345	77.3	±6.3	984	1060	79.5	±6.8	820	285	58.6	± 8.0	164

\* 5 or more drinks for men and 4 or more drinks for women

Table 4. 15 Proportion of current drinkers who binge drink on drinking days by ethnicity

Ethnic Group	Total population				Men				Women			
	N	Binge drink*			N	Binge drink*			N	Binge drink*		
		%	95%CI	n		%	95%CI	n		%	95%CI	n
Fijians	746	88.5	±3.6	643	568	90.9	± 3.5	512	178	71.3	±11.0	131
Indians	542	61.3	±4.7	297	464	64.2	± 4.6	283	78	19.9	±11.0	14
Others	57	84.6	±7.5	44	28	89.8	±10.5	25	29	71.7	±12.7	19
Total	1345	77.3	±6.3	984	1060	79.5	± 6.8	820	285	58.6	± 8.0	164

Table 4. 16. Number of standard drinks consumed during past 7 days, for current consumers of alcohol: Males and Females

Age	Males			Females		
	Mean	95%CI	N	Mean	95%CI	N
15-24	2.1	±0.5	116	2.3	±0.8	24
25-34	2.5	±0.8	111	0.9	±0.5	17
35-44	3.1	±1.2	103	1.5	±0.8	19
45-54	1.2	±0.3	79	0.4	±0.1	8
55-64	2.4	±2.6	36	-	-	-
TOTAL	2.3	±0.4	445	1.5	±0.4	68

Table 4. 17 Alcohol risk levels by agegroup

Total population													
Age	N	Non-drinkers			No risk			Low risk			High risk		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	1642	73.8	±5.4	1239	7.8	±1.6	105	8.0	±2.7	142	10.3	±3.4	156
25-34	1499	70.9	±3.8	1123	9.4	±3.3	98	6.9	±2.1	113	12.9	±3.2	165
35-44	1574	77.4	±4.6	1267	10.8	±4.5	125	5.4	±1.6	92	6.4	±1.7	90
45-54	1233	84.1	±6.3	1063	9.6	±4.6	88	3.9	±2.1	51	2.4	±1.1	31
55-64	786	88.6	±3.8	702	8.1	±3.9	59	1.6	±0.9	15	1.7	±1.2	10
Total	6734	76.5	±2.9	5394	9.1	±2.7	475	6.1	±1.4	413	8.3	±2.1	452
Men													
15-24	689	58.1	± 7.7	385	14.4	±2.7	105	10.1	±3.5	69	17.4	±5.8	130
25-34	561	50.8	± 6.3	269	17.5	±6.3	98	9.1	±2.9	54	22.6	±5.8	140
35-44	629	60.9	± 7.2	384	20.4	±8.3	125	7.3	±1.8	47	11.3	±3.1	73
45-54	495	72.8	±10.3	357	18.2	±8.2	88	4.7	±2.4	24	4.3	±2.0	26
55-64	360	78.3	± 8.0	283	16.3	±8.0	59	2.0	±1.6	8	3.4	±2.4	10
Total	2734	60.4	± 4.3	1678	17.1	±5.0	475	7.9	±1.3	202	14.6	±3.8	379
Women													
15-24	953	92.4	±3.8	854				5.6	±3.0	73	2.0	±1.2	26
25-34	938	94.0	±3.7	854				4.3	±2.5	59	1.7	±1.5	25
35-44	945	95.9	±3.7	883				3.3	±2.5	45	0.9	±1.2	17
45-54	738	96.6	±2.3	706				3.1	±2.1	27	0.3	±0.5	5
55-64	426	98.8	±1.1	419				1.2	±1.1	7	-	-	0
Total	4000	94.7	±2.9	3716				4.0	±2.2	211	1.3	±0.8	73

Table 4. 18 Alcohol risk levels by area

Total population													
Age	N	Non-drinkers			No risk			Low risk			High risk		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	3776	77.2	±3.3	3080	8.6	±3.4	262	5.7	±1.2	186	8.5	±2.7	248
Urban	2958	74.6	±6.4	2314	10.5	±3.0	213	7.1	±3.8	227	7.9	±2.4	204
Total	6734	76.5	±2.9	5394	9.1	±2.7	475	6.1	±1.4	413	8.3	±2.1	452
Men													
Rural	1707	61.4	±5.3	1081	15.6	±6.1	262	8.2	±1.5	129	14.9	±4.8	235
Urban	1027	57.3	±6.2	597	22.1	±4.1	213	7.0	±2.4	73	13.6	±3.1	144
Total	2734	60.4	±4.3	1678	17.1	±5.0	475	7.9	±1.3	202	14.6	±3.8	379
Women													
Rural	2069	96.7	±1.7	1999				2.7	±1.4	57	0.7	±0.4	13
Urban	1931	90.2	±7.1	1717				7.1	±5.3	154	2.7	±1.9	60
Total	4000	94.7	±2.9	3716				4.0	±2.2	211	1.3	±0.8	73

Table 4. 19 Alcohol risk levels by area

Total population													
Age	N	Non-drinkers			No risk			Low risk			High risk		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijians	3792	77.5	±3.1	3049	4.9	±1.0	148	6.7	±1.6	246	10.9	±2.3	349
Indo-Fijians	2752	75.4	±4.4	2212	15.6	±4.0	318	5.0	±1.4	141	4.0	±1.7	81
Others	190	72.8	±8.5	133	6.0	±5.5	9	7.8	±5.7	26	13.4	±6.4	22
Total	6734	76.5	±2.9	5394	9.1	±2.7	475	6.1	±1.4	413	8.3	±2.1	452
Men													
Fijians	1643	62.5	± 4.6	1077	9.3	± 1.9	148	9.0	±1.9	130	19.2	±3.9	288
Indo-Fijians	1025	56.9	± 7.4	563	29.2	± 7.1	318	6.5	±1.4	66	7.4	±3.1	78
Others	66	65.4	±14.2	38	10.7	±10.9	9	5.1	±5.1	6	18.7	±9.4	13
Total	2734	60.4	± 4.3	1678	17.1	± 5.0	475	7.9	±1.3	202	14.6	±3.8	379
Women													
Fijians	2149	94.2	±3.4	1972				4.1	±2.3	116	1.7	±1.3	61
Indo-Fijians	1727	96.6	±2.3	1649				3.2	±2.3	75	0.2	±0.2	3
Others	124	82.2	±7.6	95				11.1	±6.3	20	6.6	±4.4	9
Total	4000	94.7	±2.9	3716				4.0	±2.2	211	1.3	±0.8	73

Table 4. 20 Number of days of binge drinking\* during past 12 months, for current consumers of alcohol: Males and Females

Age	Males			Females		
	Mean	95%CI	N	Mean	95%CI	N
15-24	10.1	±3.1	246	5.6	±2.1	63
25-34	10.2	±2.4	234	7.2	±6.2	49
35-44	11.0	±5.0	199	10.0	±5.6	40
45-54	9.9	±5.7	113	2.9	±2.3	21
55-64	9.4	±5.9	48	1.0	-	1
TOTAL	10.3	±2.4	840	6.5	±3.7	174

Table 4.21: Risk categories for alcohol consumption among current drinkers by agegroup and gender

Total										
Age	N	No Risk			Low Risk			High Risk		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	403	29.8	± 5.8	105	30.7	±7.3	142	39.4	± 8.1	156
25-34	376	32.2	±11.0	98	23.6	±6.0	113	44.3	± 9.3	165
35-44	307	47.7	±13.5	125	24.0	±6.4	92	28.4	± 8.9	90
45-54	170	60.2	± 9.9	88	24.7	±9.9	51	15.1	± 6.7	31
55-64	84	71.0	±15.4	59	14.2	±8.6	15	14.8	±11.5	10
TOTAL	1340	38.7	±10.1	475	25.8	±4.6	413	35.5	± 8.5	452
Male										
Age	N	No Risk			Low Risk			High Risk		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	304	34.4	± 6.8	105	24.1	±7.0	69	41.4	± 8.9	130
25-34	292	35.5	±11.8	98	18.5	±5.8	54	45.9	±10.0	140
35-44	245	52.2	±13.9	125	18.8	±5.1	47	29.0	±10.0	73
45-54	138	67.0	± 8.2	88	17.2	±7.3	24	15.8	± 6.9	26
55-64	77	75.0	±13.9	59	9.3	±7.5	8	15.7	±12.6	10
TOTAL	1056	43.3	±10.6	475	19.9	±3.2	202	36.8	± 9.4	379



Female										
Age	N	No Risk			Low Risk			High Risk		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	99				73.5	±10.8	73	26.5	±10.8	26
25-34	84				71.6	±13.3	69	28.4	±13.3	25
35-44	62				78.8	±13.6	45	21.2	±13.6	17
45-54	32				90.8	±14.5	27	9.2	±14.5	5
55-64	7				100	± 0.0	7	0	± 0.0	0
TOTAL	284				76.0	± 6.0	211	24.0	± 6.0	73

Table 4. 22 Largest number of drinks consumed on single occasion, for current consumers of alcohol: Males and Females

Age	Males			Females		
	Mean	95%CI	N	Mean	95%CI	N
15-24	17.3	±3.1	288	11.3	±2.8	92
25-34	19.0	±3.6	273	8.5	±3.1	75
35-44	16.1	±3.2	234	7.2	±2.0	49
45-54	11.1	±1.8	132	5.7	±2.2	28
55-64	9.7	±3.0	73	2.9	±2.6	7
TOTAL	16.7	±2.6	251	9.2	±1.7	251

## 10.5 Diet

Table 5. 1 Servings of fruit consumed per day: Males

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	689	60.8	±6.1	448	20.7	±4.1	132	17.6	±5.9	102	1	±0.7	7
25-34	565	66.7	±6.7	382	20.1	±6.3	106	11.5	±3.6	67	1.7	±1.2	10
35-44	633	70.6	±5.4	458	16.4	±3.1	98	11.8	±4.2	69	1.2	±1.4	8
45-54	499	63.1	±9.3	334	22	±6.1	91	14	±5.8	69	1	±1.0	5
55-64	364	71	±7.9	261	18.8	±6.1	63	9.5	±4.0	37	0.7	±1.1	3
Total	2750	65.5	±5.3	1883	19.7	±3.4	490	13.6	±3.5	344	1.2	±0.7	33

\* Includes "Don't eat fruit at all"

Table 5. 2 Servings of fruit consumed per day by area: Males

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	1716	68.2	± 5.3	1166	19.3	±4.0	306	13.2	±3.9	219	1.3	±0.9	25
Urban	1034	63.3	±13.5	717	20.9	±6.0	184	14.9	±7.9	125	0.8	±0.7	8
Total	2750	65.5	± 5.3	1883	19.7	±3.4	490	13.6	±3.5	344	1.2	±0.7	33

\*Includes "Don't eat fruit at all"

Table 5. 3 Servings of fruit consumed per day by ethnicity: Males

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1651	67.4	± 6.6	1137	16.4	±4.7	263	14.3	± 4.2	222	1.9	±1.1	29
Indian	1033	63.4	± 8.6	703	24.5	±4.8	217	11.9	± 5.3	111	0.2	±0.2	2
Others	66	59	±12.5	43	18.5	±7.8	10	20.9	±11.4	11	1.6	±1.9	2
Total	2750	65.5	± 5.3	1883	19.7	±3.4	490	13.6	± 3.5	344	1.2	±0.7	33

\*Includes "Don't eat fruit at all"

Table 5. 4 Servings of fruit consumed per day: Females

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	955	63.2	±7.1	641	21.2	±3.7	190	14.7	±4.5	118	1	±1.4	6
25-34	937	65.2	±5.1	639	20.3	±4.0	180	14.2	±3.8	116	0.3	±0.4	2
35-44	946	68.5	±6.7	671	18.4	±3.5	165	12.5	±4.6	103	0.6	±0.5	7
45-54	741	68.9	±7.2	511	18.4	±4.3	145	12.7	±4.4	84	0.1	±0.1	1
55-64	425	71.8	±5.1	307	16.9	±3.8	72	10.6	±3.5	43	0.7	±0.9	3
Total	4004	66.4	±5.5	2769	19.6	±2.9	752	13.4	±3.5	464	0.6	±0.4	19

\* Includes "Don't eat fruit at all"

Table 5. 5 Servings of fruit consumed per day by area Females

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	2071	66.9	±6.7	1435	19.5	±4.1	379	13	±3.3	246	0.6	±0.6	11
Urban	1933	65.3	±9.2	1334	19.7	±1.0	373	14.6	±8.6	218	0.4	±0.3	8
Total	4004	66.4	±5.5	2769	19.6	±2.9	752	13.4	±3.5	464	0.6	±0.4	19

\*Includes "Don't eat fruit at all"

Table 5. 6 Servings of fruit consumed per day by ethnicity: Females

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	2152	70.9	± 5.6	1556	15.7	±3.3	327	12.8	± 2.7	257	0.6	±0.6	12
Indian	1730	60	± 8.3	1133	25.5	±3.3	402	13.9	± 6.8	188	0.5	±0.6	7
Others	122	62.2	±12.3	80	18.5	±6.3	23	19.3	±12.9	19	-	-	0
Total	4004	66.4	± 5.5	2769	19.6	±2.9	752	13.4	± 3.5	464	0.6	±0.4	19

\*Includes "Don't eat fruit at all"

Table 5. 7 Servings of vegetables consumed per day: Males

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	690	26.1	±8.7	210	23.6	±5.9	165	48.3	± 9.7	298	2	±1.2	17
25-34	565	29.2	±7.9	176	23.2	±7.4	126	44	±10.0	245	3.6	±2.4	18
35-44	633	25.1	±6.8	171	19.8	±4.2	137	52.4	± 8.8	308	2.6	±1.8	17
45-54	499	21.2	±8.3	118	22.9	±6.6	106	52.4	± 8.3	258	3.4	±2.2	17
55-64	364	29.2	±9.1	113	19.1	±7.9	68	47.6	± 6.7	171	4.1	±3.6	12
Total	2751	26.3	±6.7	788	22.3	±4.7	602	48.5	± 7.4	1280	2.9	±1.3	81

\* Includes "Don't eat vegetables at all"

Table 5. 8 Servings of vegetables consumed per day by area Males

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	1717	27.2	± 7.9	496	21.4	±5.4	337	48.4	± 7.2	829	3.1	±1.6	55
Urban	1034	23.4	±12.1	292	25	±8.5	265	49.1	±19.9	451	2.3	±1.9	26
Total	2751	26.3	± 6.7	788	22.3	±4.7	602	48.5	± 7.4	1280	2.9	±1.3	81

\*Includes "Don't eat vegetables at all"

Table 5. 9 Servings of vegetables consumed per day by ethnicity: Males

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1651	32.4	±10.3	570	18.2	±3.4	303	46.2	±10.2	723	3.3	± 1.4	55
Indian	1034	16.2	± 6.2	189	28	±7.6	285	53.7	±13.0	536	2.1	± 1.4	24
Others	66	38.5	±12.1	29	23.7	±9.0	14	31.6	±12.4	21	6.2	±13.2	2
Total	2751	26.3	± 6.7	788	22.3	±4.7	602	48.5	± 7.4	1280	2.9	± 1.3	81

\*Includes "Don't eat vegetables at all"

Table 5. 10 Servings of vegetables consumed per day: Females

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	955	31.2	±7.3	328	24.5	±4.6	236	41.7	±5.9	374	2.6	±2.5	17
25-34	940	23.7	±6.1	247	23.3	±6.0	233	50.6	±6.7	441	2.3	±1.2	19
35-44	945	22.1	±5.3	233	21.4	±4.9	214	50.4	±8.2	479	2	±1.3	19
45-54	741	26.5	±8.2	184	21.1	±5.7	184	51.1	±7.1	364	1.3	±1.0	9
55-64	426	29.1	±8.3	131	15.9	±5.0	78	52.4	±9.3	206	2.5	±1.8	11
Total	4007	26.5	±6.2	1123	22.3	±3.8	945	50	±6.1	1864	2.2	±1.2	75

\*Includes "Don't eat vegetables at all"

Table 5. 11 Servings of vegetables consumed per day by area Females

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	2073	26.7	±8.3	580	20.7	±4.2	423	50.2	± 7.0	1022	2.5	±1.5	48
Urban	1934	26.2	±6.9	543	26	±6.1	522	46.2	±10.8	842	1.6	±1.4	27
Total	4007	26.5	±6.2	1123	22.3	±3.8	945	50	± 6.1	1864	2.2	±1.2	75

\*Includes "Don't eat vegetables at all"

Table 5. 12 Servings of vegetables consumed per day by ethnicity: Females

Age	N	< 1 serving per day*			1 serving per day			2-4 servings per day			5 or more servings per day		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	2151	34.1	± 9.8	783	18.6	± 2.4	427	44.9	± 9.1	95	2.4	± 1.6	46
Indian	1732	15.3	± 5.5	297	27.6	± 5.9	489	55.5	±10.0	920	1.5	± 0.7	26
Others	124	25.1	±14.0	43	24	±11.8	29	44.3	±17.5	49	6.6	±14.5	3
Total	4007	26.5	± 6.2	1123	22.3	± 3.8	945	50	± 6.1	1864	2.2	± 1.2	75

\*Includes "Don't eat vegetables at all"

Table 5. 13 Type of oil or fat used, if subject prepares meals: Males

Age	N	1		2		3		4		5		6		7	
		% (95%CI)	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)	n
15-24	545	95.3 (±4.2)	519	0		0.4 (±0.6)	2	0.2 (±0.2)	3	2.4 (±2.9)	11	0.2 (±0.5)	1	1.6 (±1.3)	9
25-34	469	94.7 (±5.0)	445	0		0.1 (±0.1)	1	0.1 (±0.3)	2	3.0 (±3.6)	12	0.3 (±0.5)	2	1.9 (±1.9)	7
35-44	537	96.5 (±3.1)	520	0.1 (±0.2)	1	0		0.1 (±0.1)	1	1.1 (±1.2)	5	0		2.2 (±2.2)	10
45-54	409	92.3 (±5.7)	381	0.1 (±0.3)	1	0.3 (±0.7)	1	0.3 (±0.4)	2	3.2 (±3.8)	11	0.3 (±0.6)	1	3.5 (±2.2)	12
55-64	284	93.9 (±4.4)	266	0.2 (±0.5)	1	0		0.1 (±0.2)	1	0.8 (±1.2)	2	0.1 (±0.2)	1	4.9 (±4.3)	13
Total	2244	94.9 (±3.8)	2131	0.1 (±0.1)	3	0.2 (±0.2)	4	0.1 (±0.2)	9	2.3 (±2.3)	41	0.2 (±0.3)	5	2.3 (±1.5)	51

1=vegetable oil, 2=lard or suet, 3=butter or ghee, 4=margarine, 5=other, 6=none in particular, 7=none used

Table 5. 14 Type of oil or fat used, if subject prepares meals: Females

Age	N	1		2		3		4		5		6		7	
		% (95%CI)	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)	n	% (95%CI)	n
15-24	931	98.4 (±1.8)	912	0.1 (±0.2)	3	0.1 (±0.2)	2	0.1 (±0.1)	2	1.1 (±1.4)	10	0		2 (±0.3)	200
25-34	924	98.3 (±1.9)	908	0.1 (±0.2)	3	0		0.04 (±0.1)	1	1.1 (±1.2)	8	0		0.4 (±0.7)	4
35-44	931	96.4 (±2.2)	900	0.4 (±0.6)	5	0 (±0.1)	1	0.1 (±0.2)	3	1.1 (±1.5)	12	0.1 (±0.3)	11	1.1 (±0.9)	9
45-54	725	95.6 (±2.8)	694	0.2 (±0.3)	3	0.3 (±0.4)	5	0.4 (±0.5)	3	1.1 (±1.5)	7	0.3 (±0.5)	2	2.0 (±1.9)	11
55-64	417	96.6 (±2.4)	401	0		0		0.2 (±0.4)	3	1.8 (±1.8)	8	0		1.4 (±1.7)	5
Total	3928	97.4 (±1.6)	3815	0.2 (±0.2)	14	0.1 (±0.1)	8	0.1 (±0.1)	12	1.3 (±1.0)	45	0.1 (±0.1)	3	0.8 (±0.7)	31

1=vegetable oil, 2=lard or suet, 3=butter or ghee, 4=margarine, 5=other, 6=none in particular, 7= none used

## 10.6 Physical Activity

Table 6. 1: Work activity, stratified by age and gender

Total Population																
Age	N	Not Working			Nil			Low			Moderate			High		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	1600	13.0	±3.7	212	4.4	±1.7	98	41.0	±6.7	722	35.0	±4.8	499	6.6	±2.8	69
25-34	1485	7.3	±2.7	110	4.4	±1.8	80	34.5	±4.8	619	41.3	±4.3	571	12.6	±6.7	105
35-44	1552	5.4	±2.2	89	3.2	±2.0	62	36.1	±4.8	644	45.6	±5.2	658	9.8	±3.6	99
45-54	1218	7.3	±2.5	88	2.8	±1.4	45	37.3	±5.1	510	44.9	±5.0	508	7.8	±3.3	67
55-64	777	14.0	±4.5	115	4.2	±1.6	41	37.0	±3.4	304	40.1	±5.6	291	4.8	±3.8	26
Total	6632	9.2	±2.6	614	3.9	±1.4	326	37.4	±4.0	2799	40.7	±4.0	2527	8.8	±3.7	366
Male																
15-24	678	13.9	±4.8	102	1.9	±1.5	20	30.4	±8.5	219	42.5	±7.0	276	11.2	± 4.6	61
25-34	563	7.8	±3.5	45	3.5	±2.2	26	19.8	±6.1	129	47.0	±7.3	270	21.7	±10.4	93
35-44	624	5.7	±2.7	36	3.3	±2.4	25	23.1	±4.9	162	50.5	±5.7	311	17.4	± 6.1	90
45-54	493	7.4	±3.5	32	2.4	±1.5	14	26.4	±6.8	141	51.0	±6.8	250	12.8	± 4.8	56
55-64	360	16.7	±4.6	68	2.9	±2.4	13	21.4	±4.9	87	50.1	±7.4	167	8.9	± 6.8	25
Total	2718	9.9	±2.9	283	2.8	±1.4	98	24.9	±4.6	738	47.1	±5.4	1274	15.3	± 5.8	325
Female																
15-24	922	11.9	±4.1	110	7.3	±2.5	78	53.7	±5.1	503	26.1	±4.7	223	1.0	±1.1	8
25-34	922	6.6	±2.4	65	5.3	±1.9	54	51.7	±4.1	490	34.6	±4.1	301	1.8	±1.6	12
35-44	928	5.1	±2.7	53	3.0	±1.9	37	50.7	±5.4	482	40.0	±5.2	347	1.2	±1.2	9
45-54	725	7.2	±3.3	56	3.1	±1.7	31	49.4	±5.9	369	38.1	±6.2	258	2.2	±1.9	11
55-64	417	11.3	±6.0	47	5.7	±2.2	28	52.8	±6.0	217	29.8	±6.4	124	0.5	±1.0	1
Total	3914	8.4	±2.8	331	5.1	±1.6	228	51.9	±3.2	2061	33.2	±3.4	1253	1.4	±1.0	41

Table 6. 2: Work activity, stratified by ethnicity and gender

Total Population																
Age	N	Not Working			Nil			Low			Moderate			High		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijians	3732	11.5	±2.9	387	3.0	1.0	141	35.1	4.6	1471	43.2	5.1	1532	7.2	± 4.0	201
Indo-Fijians	2719	6.2	±3.0	217	4.8	2.3	168	40.8	5.8	1257	37.6	4.5	923	10.6	± 5.5	154
Others	181	4.8	±4.1	10	8.0	8.3	17	37.8	8.7	71	34.6	16.5	72	14.8	±16.6	11
Total	6632	9.2	±2.6	614	3.9	1.4	326	37.4	4.0	2799	40.7	4.0	2527	8.8	± 3.7	366

Male																
Fijians	1637	13.6	±3.4	206	1.7	0.9	33	20.4	4.5	378	51.6	5.7	839	12.6	± 6.6	181
Indo-Fijians	1016	5.3	±2.3	74	4.0	2.6	59	31.0	5.6	341	41.6	5.6	408	18.1	± 7.8	134
Others	65	2.4	±3.0	3	6.5	11.2	6	28.2	12.4	19	37.3	25.3	27	25.5	±26.5	10
Total	2718	9.9	±2.9	283	2.8	1.4	98	24.9	4.6	738	47.1	5.4	1274	15.3	± 5.8	325
Female																
Fijians	2095	9.2	±3.1	181	4.4	1.6	108	51.8	4.1	1093	33.6	4.7	693	1.0	±1.1	20
Indo-Fijians	1703	7.2	±4.3	143	5.8	2.2	109	52.1	5.3	916	32.9	5.5	515	1.9	±1.9	20
Others	116	7.9	±8.8	7	10.0	5.9	11	50.5	17.3	52	31.0	12.9	45	0.5	±1.1	1
Total	3914	8.4	±2.8	331	5.1	1.6	228	51.9	3.2	2061	33.2	3.4	1253	1.4	±1.0	41

Table 6. 3: Work activity stratified by area and gender

Total Population																
Age	N	Not Working			Nil			Low			Moderate			High		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	3743	9.7	±3.2	366	2.6	±0.7	105	34.2	±3.5	1398	43.4	±4.4	1599	10.1	±4.4	275
Urban	2889	7.8	±2.9	248	7.5	±2.7	221	46.3	±5.7	1401	33.1	±4.2	928	5.3	±4.1	91
Total	6632	9.2	±2.6	614	3.9	±1.4	326	37.4	±4.0	2799	40.7	±4.0	2527	8.8	±3.7	366
Male																
Rural	1707	10.6	±3.5	190	1.5	±0.7	29	20.9	±4.0	356	50.2	±6.2	886	16.9	±7.0	246
Urban	1011	7.8	±4.3	93	7.1	±2.9	69	37.9	±4.7	382	37.2	±4.7	388	10.0	±6.1	79
Total	2718	9.9	±2.9	283	2.8	±1.4	98	24.9	±4.6	738	47.1	±5.4	1274	15.3	±5.8	325
Female																
Rural	2036	8.6	±3.6	176	4.0	±1.3	76	51.0	±3.5	1042	34.9	±3.6	713	1.5	±1.3	29
Urban	1878	7.8	±2.9	155	7.8	±2.6	152	53.9	±6.6	1019	29.4	±6.0	540	1.0	±1.5	12
Total	3914	8.4	±2.8	331	5.1	±1.6	228	51.9	±3.2	2061	33.2	±3.4	1253	1.4	±1.0	41

Table 6. 4: Physical activity participation during transportation, stratified by age and gender

Total Population													
Age	N	Nil			Low			Moderate			High		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	1627	0.9	±0.7	22	9.1	±3.2	181	24.2	±5.7	432	65.8	±5.8	992
25-34	1484	2.5	±1.7	40	13.6	±4.6	227	21.6	±5.3	378	62.3	±7.3	839
35-44	1552	2.2	±1.2	38	14.0	±4.3	247	25.7	±5.0	432	58.1	±7.1	835
45-54	1220	2.6	±1.2	37	16.4	±5.5	236	24.1	±4.8	316	57.0	±8.1	631
55-64	778	1.9	±1.3	19	16.4	±6.1	143	23.4	±5.7	197	58.4	±9.2	419
Total	6661	1.9	±0.9	156	12.9	±3.9	1034	23.7	±4.6	1755	61.4	±6.4	3716
Male													
15-24	683	0.6	±0.7	6	5.3	±2.2	45	24.0	±6.9	174	70.1	±7.3	458
25-34	560	2.3	±1.7	15	12.7	±4.5	71	19.6	±6.0	134	65.3	±7.5	340
35-44	621	2.2	±1.4	18	12.5	±4.8	88	21.9	±5.7	145	63.3	±8.0	370
45-54	492	2.6	±1.5	15	13.7	±7.1	73	26.3	±4.9	140	57.4	±8.4	264
55-64	360	1.6	±1.6	7	14.5	±6.0	62	25.1	±6.8	93	58.8	±9.3	198
Total	2716	1.7	±0.9	61	10.6	±3.3	339	22.8	±4.8	686	64.8	±6.1	1630
Female													
15-24	944	1.3	±0.9	16	13.5	±5.5	136	24.4	±5.8	258	60.8	±7.5	534
25-34	924	2.7	±2.0	25	14.7	±5.4	156	23.9	±5.4	244	58.7	±7.9	499
35-44	931	2.2	±1.5	20	15.5	±4.4	159	29.9	±5.4	287	52.3	±6.4	465
45-54	728	2.5	±1.2	22	19.3	±5.4	163	21.7	±5.7	176	56.5	±9.3	367
55-64	418	2.1	±1.8	12	18.4	±7.1	81	21.6	±5.5	104	57.9	±10.4	221
Total	3945	2.1	±1.1	95	15.5	±4.7	695	24.8	±4.8	1069	57.6	±7.1	2086



Table 6. 5: Physical activity participation during transportation, stratified by ethnicity and gender

Total Population													
Age	N	Nil			Low			Moderate			High		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijians	3747	0.8	±0.8	40	7.0	± 3.0	352	26.6	± 4.9	1075	65.7	± 7.4	2280
Indo-Fijians	2726	3.7	±1.4	113	21.0	± 3.6	643	20.4	± 6.6	642	55.0	± 8.1	1328
Others	188	1.4	±1.6	3	18.6	±14.7	39	16.0	±11.4	38	64.0	±24.4	108
<b>Total</b>	<b>6661</b>	<b>1.9</b>	<b>±0.9</b>	<b>156</b>	<b>12.9</b>	<b>± 3.9</b>	<b>1034</b>	<b>23.7</b>	<b>± 4.6</b>	<b>1755</b>	<b>61.5</b>	<b>± 6.4</b>	<b>3716</b>
Male													
Fijians	1629	0.7	±0.8	17	5.3	± 2.6	109	25.7	± 5.3	442	68.3	± 7.2	1061
Indo-Fijians	1022	3.4	±1.8	44	18.0	± 3.8	222	19.6	± 7.2	231	59.0	±10.2	525
Others	65	----	±0.0	0	14.0	±14.3	8	14.1	±15.4	13	71.8	±24.9	44
<b>Total</b>	<b>2716</b>	<b>1.7</b>	<b>±0.9</b>	<b>61</b>	<b>10.6</b>	<b>± 3.3</b>	<b>339</b>	<b>22.8</b>	<b>± 4.8</b>	<b>686</b>	<b>64.8</b>	<b>± 6.1</b>	<b>1630</b>
Female													
Fijians	2118	0.8	±0.8	23	8.9	± 3.5	243	27.5	± 5.2	633	62.7	± 7.9	1219
Indo-Fijians	1704	4.0	±1.6	69	24.5	± 5.0	421	21.3	± 6.2	411	50.2	± 7.1	803
Others	123	3.2	±3.3	3	24.4	±16.8	31	18.3	±11.2	25	54.2	±23.0	64
<b>Total</b>	<b>3945</b>	<b>2.1</b>	<b>±1.1</b>	<b>95</b>	<b>15.5</b>	<b>± 4.7</b>	<b>695</b>	<b>24.8</b>	<b>± 4.8</b>	<b>1069</b>	<b>57.6</b>	<b>± 7.1</b>	<b>2086</b>

Table 6. 6: Physical activity participation during transportation, stratified by area and gender

Total Population													
Age	N	Nil			Low			Moderate			High		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	3729	1.3	±1.0	53	10.3	±4.2	410	23.0	±5.7	929	65.4	±6.7	2337
Urban	2932	3.7	±1.0	103	20.0	±5.0	624	25.8	±6.9	826	50.6	±9.7	1379
<b>Total</b>	<b>6661</b>	<b>1.9</b>	<b>±0.9</b>	<b>156</b>	<b>12.9</b>	<b>±3.9</b>	<b>1034</b>	<b>23.7</b>	<b>±4.6</b>	<b>1755</b>	<b>61.4</b>	<b>±6.4</b>	<b>3716</b>
Male													
Rural	1694	10.0	±0.8	19	8.5	±3.3	150	22.5	±5.9	415	68.0	± 6.3	1110
Urban	1022	4.1	±1.5	42	17.4	±5.6	189	23.9	±7.5	271	54.5	±11.4	520
<b>Total</b>	<b>2716</b>	<b>1.7</b>	<b>±0.9</b>	<b>61</b>	<b>10.6</b>	<b>±3.3</b>	<b>339</b>	<b>22.8</b>	<b>±4.8</b>	<b>686</b>	<b>64.8</b>	<b>± 6.1</b>	<b>1630</b>
Female													
Rural	2035	1.6	±1.4	34	12.6	±5.7	260	23.7	±6.0	514	62.2	±8.1	1227
Urban	1910	3.3	±1.1	61	22.3	±4.4	435	27.4	±6.4	555	47.0	±7.7	859
<b>Total</b>	<b>3945</b>	<b>2.1</b>	<b>±1.1</b>	<b>95</b>	<b>15.5</b>	<b>±4.7</b>	<b>695</b>	<b>24.8</b>	<b>±4.8</b>	<b>1069</b>	<b>57.6</b>	<b>±7.1</b>	<b>2086</b>

Table 6. 7: Leisure activity participation, stratified by age and gender

Total Population													
Age	N	Nil			Low			Moderate			High		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	1627	10.9	±3.2	213	58.4	±3.4	968	10.0	±1.6	170	20.7	±3.3	276
25-34	1482	11.2	±3.2	198	63.0	±4.4	963	10.3	±2.7	138	15.5	±3.3	183
35-44	1552	10.8	±2.8	190	69.7	±3.2	1063	10.4	±2.0	174	9.2	±1.9	125
45-54	1220	13.2	±3.1	175	66.9	±3.8	826	12.3	±2.7	140	7.6	±2.2	79
55-64	785	18.9	±4.1	161	69.4	±5.4	533	6.7	±1.7	56	5.0	±2.1	35
<b>Total</b>	<b>6666</b>	<b>12.0</b>	<b>±2.3</b>	<b>937</b>	<b>64.1</b>	<b>±2.8</b>	<b>4353</b>	<b>10.2</b>	<b>±1.3</b>	<b>678</b>	<b>13.8</b>	<b>±1.9</b>	<b>698</b>

Male													
15-24	682	6.1	±2.9	48	49.0	±5.6	329	12.2	±2.4	90	32.8	±4.9	215
25-34	558	6.6	±3.1	44	56.9	±5.6	315	11.2	±3.7	55	25.4	±5.5	144
35-44	619	8.1	±2.6	55	68.5	±4.0	405	10.0	±2.5	73	13.4	±3.5	86
45-54	491	11.2	±3.3	55	62.8	±4.5	309	15.0	±4.3	74	10.9	±4.0	53
55-64	363	14.5	±5.8	56	70.4	±6.7	250	7.4	±2.3	29	7.7	±3.1	28
Total	2713	6.1	±2.1	258	49.0	±3.4	1608	12.2	±1.3	321	32.8	±2.9	526
Female													
15-24	945	16.5	±4.6	165	69.6	±4.7	639	7.5	±1.5	80	7.5	±2.2	61
25-34	924	16.5	±4.9	154	70.2	±4.6	648	9.3	±3.3	83	9.3	±1.7	39
35-44	933	13.8	±3.6	135	71.0	±3.8	658	10.7	±2.5	101	10.7	±1.8	39
45-54	729	15.4	±4.3	120	71.5	±5.0	517	9.3	±4.0	66	9.3	±1.8	26
55-64	422	23.5	±4.1	105	68.4	±5.1	283	5.9	±1.8	27	5.9	±2.0	7
Total	3953	16.4	±2.9	679	70.2	±2.7	2745	8.8	±1.6	357	8.8	±1.1	172

Table 6. 8: Leisure activity participation, stratified by ethnicity and gender

Total Population													
Age	N	Nil			Low			Moderate			High		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijians	3760	12.3	±2.8	523	62.3	±3.4	2386	9.4	±1.3	365	16.0	±2.0	486
Indo-Fijians	2721	11.1	±3.4	381	66.9	±3.3	1860	11.2	±2.2	290	10.8	±3.6	190
Others	185	15.2	±5.3	33	62.4	±8.4	107	11.8	±4.1	23	10.6	±7.7	22
Total	6666	12.0	±2.3	937	64.1	±2.8	4353	10.2	±1.3	678	13.8	±1.9	698
Male													
Fijians	1635	7.7	±2.5	146	55.8	±3.8	920	11.3	±1.8	198	25.1	±2.7	371
Indo-Fijians	1012	7.7	±3.0	100	63.1	±5.7	654	11.5	±2.2	116	17.7	±5.9	142
Others	66	15.3	±6.5	12	57.2	±8.0	34	12.9	±7.0	7	14.6	±12.8	13
Total	2713	8.0	±2.1	258	58.7	±3.4	1608	11.5	±1.3	321	21.8	±2.9	526
Female													
Fijians	2125	17.4	±3.9	377	69.6	±3.9	1466	7.3	±1.3	167	5.7	±1.9	115
Indo-Fijians	1709	15.1	±3.8	281	71.1	±2.0	1206	10.8	±2.8	174	3.0	±0.7	48
Others	119	15.0	±8.8	21	69.2	±15.8	73	10.4	±7.5	16	5.4	±4.8	9
Total	3953	16.4	±2.9	679	70.2	±2.7	2745	8.8	±1.6	357	4.6	±1.1	172

Table 6. 9: Leisure activity participation, stratified by area and gender

Total Population													
Age	N	Nil			Low			Moderate			High		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	3735	11.4	±2.8	502	64.3	±3.5	2463	9.9	±1.6	360	14.4	±2.3	410
Urban	2931	13.5	±1.9	435	63.4	±3.0	1890	10.9	±1.3	318	12.1	±2.0	288
Total	6666	12.0	±2.3	937	64.1	±2.8	4353	10.2	±1.3	678	13.8	±1.9	698
Male													
Rural	1694	7.3	±2.4	148	59.0	±4.2	1032	11.3	±1.5	186	22.4	±3.6	328
Urban	1019	10.2	±1.8	110	57.7	±4.4	576	12.1	±1.9	135	20.0	±1.8	198
Total	2713	8.0	±2.1	258	58.7	±3.4	1608	11.5	±1.3	321	21.8	±2.9	526
Female													
Rural	2041	16.4	±3.9	354	70.8	±3.5	1431	8.3	±2.1	174	4.4	±1.4	82
Urban	1912	16.6	±2.5	325	68.6	±2.9	1314	9.8	±1.4	183	5.1	±2.2	90
Total	3953	16.4	±2.9	679	70.2	±2.7	2745	8.8	±1.6	357	4.6	±1.1	172

## 10.7 Medical History:- High Blood Pressure

Table 7. 1 Time elapsed since most recent blood pressure measurement: Males and Females

Age	N	Males								
		<12 Months			1-5 Years Ago			> 5 Years Ago*		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	204	63.1	±10.5	128	33.1	±11.0	67	3.8	± 2.6	9
25-34	327	56.4	± 7.1	185	35.4	± 6.0	113	8.2	± 3.8	29
35-44	447	52.3	± 8.3	250	35	± 7.4	153	9.7	± 3.8	44
45-54	425	68	± 6.1	286	24.7	± 6.0	108	7.3	± 3.5	31
55-64	336	75.1	± 6.4	250	20.8	± 6.2	69	4.1	± 2.3	17
<b>Total</b>	<b>1739</b>	<b>62</b>	<b>± 4.3</b>	<b>1099</b>	<b>30.8</b>	<b>± 3.9</b>	<b>510</b>	<b>7.2</b>	<b>± 1.9</b>	<b>130</b>
Age	N	Females								
		<12 Months			1-5 Years Ago			> 5 Years Ago*		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	435	58.9	± 7.0	263	38.1	± 6.3	159	3	± 1.5	13
25-34	797	51.2	± 6.7	426	37.5	± 3.9	289	11.3	± 4.1	82
35-44	840	54.7	± 5.5	458	32.8	± 5.3	284	12.5	± 3.0	98
45-54	683	72.5	± 5.8	496	19.3	± 4.1	134	8.2	± 3.6	53
55-64	409	77	± 6.0	316	18.6	± 5.4	74	4.5	± 2.4	19
<b>Total</b>	<b>3164</b>	<b>60.1</b>	<b>± 4.5</b>	<b>1959</b>	<b>31.1</b>	<b>± 2.9</b>	<b>940</b>	<b>8.8</b>	<b>± 2.1</b>	<b>265</b>

Table 7. 2 Time elapsed since most recent blood pressure measurement by area: Males and Females

Age	N	Males								
		<12 Months			1-5 Years Ago			> 5 Years Ago*		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	1061	62.1	±5.3	671	31.3	±5.1	319	6.6	±2.1	71
Urban	678	61.8	±4.8	428	29.4	±3.9	191	8.8	±2.5	59
<b>Total</b>	<b>1739</b>	<b>62</b>	<b>±4.3</b>	<b>1099</b>	<b>30.8</b>	<b>±3.9</b>	<b>510</b>	<b>7.2</b>	<b>±1.9</b>	<b>130</b>
Age	N	Females								
		<12 Months			1-5 Years Ago			> 5 Years Ago*		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	1646	59.7	±5.8	1014	31.5	±3.5	495	8.7	±2.8	137
Urban	1518	61	±5.4	945	30.2	±3.2	445	8.9	±2.6	128
<b>Total</b>	<b>3164</b>	<b>60.1</b>	<b>±4.4</b>	<b>1959</b>	<b>31.1</b>	<b>±2.9</b>	<b>940</b>	<b>8.8</b>	<b>±2.1</b>	<b>265</b>

Table 7.3 Time elapsed since most recent blood pressure measurement by ethnicity: Males and Females

Age	N	Males								
		<12 Months			1-5 Years Ago			> 5 Years Ago*		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1038	59.5	± 5.1	616	32	± 5.3	332	8.5	±2.3	90
Indian	653	68.6	± 6.7	460	26	± 6.2	157	5.1	±2.7	36
Fijian	48	44.9	±14.1	23	48.8	±15.9	21	6.3	±6.2	4
<b>Total</b>	<b>1739</b>	<b>62</b>	<b>± 4.3</b>	<b>1099</b>	<b>30.8</b>	<b>± 3.9</b>	<b>510</b>	<b>7.2</b>	<b>±1.9</b>	<b>130</b>
Age	N	Females								
		<12 Months			1-5 Years Ago			> 5 Years Ago*		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1673	59.2	± 5.6	973	32.3	± 4.0	553	8.5	±2.5	147
Indian	1397	61.5	± 7.1	928	29.5	± 4.6	359	9	±2.9	110
Fijian	94	58.2	±15.1	58	30.9	±11.7	28	11	±9.2	8
<b>Total</b>	<b>3164</b>	<b>60.1</b>	<b>± 2.5</b>	<b>1959</b>	<b>31.1</b>	<b>± 2.9</b>	<b>940</b>	<b>8.8</b>	<b>±2.1</b>	<b>265</b>

Table 7. 4 Diagnosis of hypertension by health worker: Males and Females

Age	Male				Females			
	N	HTN*			N	HTN*		
		%	95%CI	n		%	95%CI	n
15-24	688	1.1	±0.7	9	952	3.0	±1.2	26
25-34	563	3.2	±1.8	21	940	8.4	±2.6	83
35-44	633	7.9	±2.6	51	943	12.2	±2.3	119
45-54	499	13.4	±4.7	73	740	24.1	±4.1	185
55-64	364	23.0	±4.6	85	426	37.6	±7.1	156
Total	2747	6.5	±1.3	239	4001	12.4	±1.7	569

\* HTN = Hypertension or high blood pressure

Table 7. 5 Diagnosis of hypertension by health worker by area: Males and Females

Area	Males				Females			
	N	HTN*			N	HTN*		
		%	95%CI	n		%	95%CI	n
Rural	1715	6.2	±1.5	139	2070	12.8	±2.1	304
Urban	1032	7.5	±2.1	100	1931	11.5	±2.5	265
Total	2747	6.5	±1.3	239	4001	12.4	±1.7	569

\* HTN = Hypertension or high blood pressure

Table 7. 6 Diagnosis of hypertension by health worker by ethnicity: Males and Females

Ethnic Group	Males				Females			
	N	HTN*			N	HTN*		
		%	95%CI	n		%	95%CI	n
Fijian	1649	6.1	± 1.7	137	2147	12.6	± 2.4	293
Indian	1032	6.8	± 1.6	97	1731	11.7	± 1.9	252
Other	66	10.9	±10.2	5	123	17.2	±11.2	24
Total	2747	6.5	± 1.3	239	4001	12.4	± 1.7	569

\* HTN = Hypertension or high blood pressure

Table 7. 7 Type of blood pressure treatment for hypertension: Males & Females

Treatment	Males			Females		
	%	95%CI	N	%	95%CI	N
Drugs	47.3	±10.8	110	47.1	±8.6	282
Diet	46.8	± 9.2	112	48.6	±7.3	292
Weight	33.9	± 9.2	80	34.0	±6.3	206
Smoking	28.8	± 7.4	69	11.6	±5.0	67
Herbal	25.9	± 8.7	62	21.0	±6.2	115

Table 7. 8 Prevalence of hypertension by age group: Males and Females

Age	Males				Females			
	N	%	95%CI	n	N	%	95%CI	n
15-24	671	12.6	±3.7	81	927	4.9	±2.0	39
25-34	546	14.7	±4.6	78	924	9.1	±2.2	86
35-44	616	19.3	±3.7	114	928	17.1	±2.8	161
45-54	489	33.0	±5.6	165	728	36.7	±5.2	268
55-64	359	42.1	±7.2	152	422	62.2	±6.7	258
Total	2681	19.8	±2.4	590	3929	18.3	±1.9	812

\* HTN = Hypertension or high blood pressure



Table 7. 9 Prevalence of hypertension by area: Males and Females

Area	Males				Females			
	N	%	95%CI	n	N	%	95%CI	n
Rural	1676	20.3	±3.0	379	2039	18.9	±2.5	448
Urban	1005	18.2	±2.4	211	1890	16.7	±2.2	364
Total	2681	19.8	±2.4	590	3929	18.3	±1.9	812

\* HTN = Hypertension or high blood pressure

Table 7. 10 Prevalence of hypertension by ethnicity: Males and Females

Ethnic Group	Males				Females			
	N	%	95%CI	n	N	%	95%CI	n
Fijian	1628	21.8	± 3.7	376	2132	19.4	± 2.6	452
Indian	988	15.8	± 2.6	199	1677	16.8	± 2.0	341
Others	65	29.5	±12.2	15	120	16.1	±10.0	19
Total	2681	19.8	± 2.4	590	3929	18.3	± 1.9	812

\* HTN = Hypertension or high blood pressure

## 10.8 Medical History:- Diabetes

Table 8. 1 Blood sugar measured in the last 12 months: Males and Females

Age	Males				Females			
	N	Yes			N	Yes		
		%	95%CI	n		%	95%CI	n
15-24	690	8.8	±2.9	62	956	14.7	±2.9	150
25-34	564	17.5	±5.2	105	939	30.6	±3.5	294
35-44	632	28.4	±3.5	183	946	37.2	±3.9	352
45-54	498	44.7	±5.9	234	740	49.9	±7.1	398
55-64	364	52.4	±6.9	204	426	64.1	±6.2	267
TOTAL	2748	23.6	±2.8	788	4007	33.0	±3.1	1461

Table 8. 2 Blood sugar measured in the last 12 months by area: Males and Females

Area	Males				Females			
	N	Yes			N	Yes		
		%	95%CI	n		%	95%CI	n
Rural	1715	22.1	±3.2	439	2073	32.5	±3.8	733
Urban	1033	28.4	±4.0	349	1934	34.0	±4.3	728
TOTAL	2748	23.6	±2.8	788	4007	33.0	±3.1	1461

Table 8. 3 Blood sugar measured in the last 12 months by ethnicity: Males and Females

Ethnic Group	Males				Females			
	N	Yes			N	Yes		
		%	95%CI	n		%	95%CI	n
Fijian	1648	21.2	± 3.1	403	2151	30.9	±4.8	683
Indian	1034	26.9	± 5.4	370	1732	36.0	±4.9	740
Others	66	24.3	±11.1	15	124	33.4	±8.9	38
TOTAL	2748	23.6	± 2.8	788	4007	33.0	±3.1	1461



Table 8. 4 Self reported diabetes: Males and Females

Age	Males				Females			
	N	Diabetes			N	Diabetes		
		%	95%CI	n		%	95%CI	n
15-24	688	0.3	±0.7	2	954	-	-	0
25-34	564	1.0	±1.0	9	939	1.4	±1.0	15
35-44	633	3.1	±1.5	22	945	2.6	±1.4	32
45-54	497	7.7	±3.6	43	741	13.1	±3.1	108
55-64	364	13.5	±3.6	56	425	19.2	±3.9	87
Total	2746	3.2	±0.9	132	4004	4.5	±0.9	242

Table 8. 5 Self reported diabetes by area: Males and Females

Area	Males				Females			
	N	Diabetes			N	Diabetes		
		%	95%CI	n		%	95%CI	n
Rural	1713	2.5	±0.9	60	2070	4	±1.0	106
Urban	1033	5.2	±0.9	72	1934	5.7	±1.1	136
Total	2746	3.2	±0.9	132	4004	4.5	±0.9	242

Table 8. 6 Self reported diabetes by ethnicity: Males and Females

Ethnic Group	Males				Females			
	N	Diabetes			N	Diabetes		
		%	95%CI	n		%	95%CI	n
Fijian	1647	2.3	±0.9	51	2150	3.5	±1.2	86
Indian	1033	4.8	±1.3	81	1730	5.9	±1.6	147
Others	66	-	-	0	124	6.3	±3.8	9
Total	2746	3.2	±0.9	132	4004	4.5	±0.9	242

Table 8. 7 Type of blood glucose treatment for diabetics: Males & Females

Treatment	Males			Females		
	%	N	95%CI	%	N	95%CI
Insulin	3.8	5	± 4.1	7.8	18	±4.2
Drugs	62.3	84	±11.8	66.5	161	±9.4
Diet	66.7	85	±10.9	70.0	174	±8.6
Weight	43.2	54	±15.1	39.6	100	±6.9
Smoking	29.8	39	±11.0	8.7	18	±4.3
Herbal	19.3	26	±10.6	18.6	37	±8.0

Table 8. 8 Prevalence of Diabetes by age group: Males and Females

Age	Males				Females			
	N	%	95%CI	n	N	%	95%CI	n
25-34	207	3.3	±2.6	11	354	6.7	±4.4	25
35-44	260	12.6	±4.9	36	438	11.3	±3.4	54
45-54	227	26.9	±9.9	54	404	26.2	±6.1	114
55-64	168	26.8	±8.7	52	219	38.7	±9.2	89
Total	862	14.6	±3.8	153	1415	17.6	±3.6	282

Table 8. 9 Prevalence of Diabetes by area: Males and Females

Area	Males				Females			
	N	%	95%CI	n	N	%	95%CI	n
Rural	569	11.4	±3.8	70	711	14.6	±3.3	111
Urban	293	25.6	±5.4	83	704	24.0	±5.8	171
Total	862	14.6	±3.8	153	1415	17.6	±3.6	282

Table 8. 10 Prevalence of Diabetes by ethnicity: Males and Females

Ethnic Group	Males				Females			
	N	%	95%CI	n	N	%	95%CI	n
Fijian	508	8.3	± 2.6	54	739	14.8	± 4.3	116
Indian	338	22.1	± 5.0	97	641	20.2	± 3.3	153
Others	16	20.8	±24.8	2	35	37.4	±30.8	13
Total	862	14.6	± 3.8	153	1415	17.6	± 3.6	282

## 10.9 Physical Measures

Table 9. 1 Height (m): Males and Females

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
15-24	674	173.2	±1.5	930	161.6	±1.5
25-34	548	174.0	±1.3	924	162.1	±2.0
35-44	616	174.0	±1.4	933	161.2	±1.9
45-54	489	172.5	±1.4	732	160.1	±1.9
55-64	359	171.7	±1.3	422	158.6	±1.9
TOTAL	2686	173.4	±1.2	3941	161.2	±1.7

Table 9. 2 Weight (kg): Males and Females

Age	Males			Females*		
	N	Mean	95%CI	N	Mean	95%CI
15-24	674	66.7	±2.9	680	61.6	±3.4
25-34	548	74.2	±3.5	643	71.5	±4.6
35-44	615	76.9	±3.5	680	72.3	±4.0
45-54	489	77.9	±4.3	527	75.4	±4.6
55-64	359	77.3	±2.7	329	75.9	±4.0
TOTAL	2685	73.2	±3.1	2859	69.6	±3.8

\* Pregnant females excluded

Table 9. 3 Body mass index (kg/m2) by age group: Males and Females

Age	Males			Females*		
	N	Mean	95%CI	N	Mean	95%CI
15-24	674	22.1	±0.7	680	23.5	±1.0
25-34	548	24.4	±0.9	643	27.1	±1.1
35-44	615	25.3	±0.9	680	27.7	±0.9
45-54	489	26.0	±1.1	527	29.4	±1.1
55-64	359	26.1	±0.8	329	30.0	±1.0
TOTAL	2685	24.2	±0.7	2859	26.7	±0.9

\* Pregnant females excluded

Table 9. 4 Body mass index (kg/m2) by area: Males and Females

Area	Males			Females*		
	N	Mean	95%CI	N	Mean	95%CI
Rural	1679	24.3	±0.8	1537	26.8	±1.0
Urban	1006	24.2	±1.3	1322	26.4	±1.4
TOTAL	2685	24.2	±0.7	2859	26.7	±0.8

\* Pregnant females excluded

Table 9. 5 Body mass index (kg/m2) by ethnic group: Males and Females

Ethnic Group	Males			Females*		
	N	Mean	95%CI	N	Mean	95%CI
Fijian	1631	25.3	±0.5	1566	28.0	±0.7
Indian	990	22.5	±0.6	1206	24.4	±0.4
Others	64	26.7	±1.1	87	29.3	±2.4
TOTAL	2685	24.2	±0.7	2859	26.7	±0.9

\* Pregnant females excluded

Table 9. 6 Risk categories for body mass index (kg/m<sup>2</sup>): Males

Age	N	Non Obese			Overweight			Obese		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	674	82.8	±4.5	548	14.9	±4.2	106	2.3	±1.5	20
25-34	548	63.3	±7.7	332	27.5	±5.1	160	9.2	±4.9	56
35-44	615	50.3	±8.3	290	36.4	±7.1	232	13.2	±5.2	93
45-54	489	45.2	±9.3	209	37.4	±6.2	189	17.3	±7.2	91
55-64	359	45.2	±7.3	160	35.9	±6.5	130	18.9	±6.1	69
<b>TOTAL</b>	<b>2685</b>	<b>62.7</b>	<b>±5.5</b>	<b>1539</b>	<b>27.5</b>	<b>±3.3</b>	<b>817</b>	<b>9.8</b>	<b>±3.2</b>	<b>329</b>

Table 9. 7 Risk categories for body mass index (kg/m<sup>2</sup>): Females\*

Age	N	Non Obese			Overweight			Obese		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	680	66.9	±7.3	457	24.2	±6.9	156	8.9	±2.5	67
25-34	643	39.0	±7.8	241	31.8	±5.9	210	29.2	±6.8	192
35-44	680	32.2	±7.0	206	39.3	±3.8	261	28.5	±6.5	213
45-54	527	23.6	±8.1	125	32.7	±5.5	174	43.6	±9.5	228
55-64	329	20.0	±5.9	66	35.2	±5.7	115	44.8	±7.4	148
<b>TOTAL</b>	<b>2859</b>	<b>42.2</b>	<b>±6.6</b>	<b>1095</b>	<b>31.5</b>	<b>±3.4</b>	<b>916</b>	<b>26.4</b>	<b>±4.6</b>	<b>848</b>

\* Pregnant females excluded

Table 9. 8 Risk categories for body mass index (kg/m<sup>2</sup>) by Area: Males

Area	N	Non Obese			Overweight			Obese		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	1679	63.2	±6.5	985	28.4	±4.2	526	8.4	±2.9	168
Urban	1006	61.3	±8.4	554	24.6	±2.8	291	14.1	±7.7	161
<b>TOTAL</b>	<b>2685</b>	<b>62.7</b>	<b>±5.5</b>	<b>1539</b>	<b>27.5</b>	<b>±3.3</b>	<b>817</b>	<b>9.8</b>	<b>±3.2</b>	<b>329</b>

Table 9. 9 Risk categories for body mass index (kg/m<sup>2</sup>) by Area: Females\*

Area	N	Non Obese			Overweight			Obese		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	1537	40.8	±8.3	569	32.9	±4.4	526	26.3	±5.3	442
Urban	1322	45.4	±7.5	526	28.1	±3.7	390	26.5	±7.0	406
<b>TOTAL</b>	<b>2859</b>	<b>42.2</b>	<b>±6.6</b>	<b>1095</b>	<b>31.5</b>	<b>±3.4</b>	<b>916</b>	<b>26.4</b>	<b>±4.6</b>	<b>848</b>

\* Pregnant females excluded

Table 9. 10 Risk categories for body mass index (kg/m<sup>2</sup>) by ethnic group: Males

Ethnic Group	N	Non Obese			Overweight			Obese		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1631	57.4	± 5.1	819	31.1	±2.7	563	11.3	±3.8	249
Indian	990	72.7	± 5.3	691	21.4	±3.9	237	5.9	±2.1	62
Others	64	41.6	±19.3	29	32.0	±9.7	17	26.4	±9.5	18
<b>TOTAL</b>	<b>2685</b>	<b>62.7</b>	<b>± 5.5</b>	<b>1539</b>	<b>27.5</b>	<b>±3.3</b>	<b>817</b>	<b>9.8</b>	<b>±3.2</b>	<b>329</b>

Table 9. 11 Risk categories for body mass index (kg/m2) by ethnic group: Females\*

Ethnic Group	N	Non Obese			Overweight			Obese		
		%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1566	32.8	± 5.8	444	35.2	± 3.7	539	32.0	± 5.0	583
Indian	1206	57.9	± 4.2	627	26.3	± 3.1	357	15.8	± 2.7	222
Others	87	37.9	±19.8	24	22.4	±11.9	20	39.7	±18.6	43
<b>TOTAL</b>	<b>2859</b>	<b>42.2</b>	<b>± 6.6</b>	<b>1095</b>	<b>31.5</b>	<b>± 3.4</b>	<b>916</b>	<b>26.4</b>	<b>± 4.6</b>	<b>848</b>

\* Pregnant females excluded

Table 9. 12 Waist Circumference (cm): Males and Females

Age	Males			Females*		
	N	Mean	95%CI	N	Mean	95%CI
15-24	674	74.3	±1.8	871	74.3	±2.3
25-34	548	81.6	±2.2	876	83.7	±2.2
35-44	616	86.0	±1.5	920	86.8	±1.8
45-54	489	89.5	±2.3	732	90.9	±2.1
55-64	359	90.8	±1.8	422	93.4	±2.4
<b>TOTAL</b>	<b>2686</b>	<b>82.6</b>	<b>±1.6</b>	<b>3821</b>	<b>83.6</b>	<b>±2.0</b>

\* Pregnant females excluded

Table 9. 13: Substantially increased risk\* category for waist measurement by gender, agegroup and ethnicity

Age	Males				Females†			
	N	Substantially increased risk			N	Substantially increased risk		
		%	95%CI	n		%	95%CI	n
15-24	674	1.0	±1.0	9	680	12.3	± 3.4	85
25-34	548	4.2	±3.0	27	644	37.5	± 7.4	243
35-44	616	6.0	±2.2	43	680	45.4	± 7.3	321
45-54	489	15.3	±6.0	82	527	60.0	± 8.8	315
55-64	359	16.4	±6.2	68	329	66.5	± 6.1	217
Ethnic	N	%	95%CI	n	N	%	95%CI	n
Fijian	1631	6.2	±2.4	154	1568	44.5	± 5.6	783
Indo-Fijian	990	5.2	±2.2	68	1205	25.4	± 5.5	355
Others	65	12.5	±9.6	7	87	40.6	±20.7	43
<b>TOTAL</b>	<b>2686</b>	<b>6.1</b>	<b>±2.1</b>	<b>229</b>	<b>2860</b>	<b>37.4</b>	<b>± 5.4</b>	<b>1181</b>

† Pregnant females excluded

\*\* Substantially increased risk : males ≥ 102cm; females ≥ 88cm

**Table 9. 14 Currently on anti-hypertensive treatment with drugs prescribed by a health professional: Males and Females**

Age	Males				Females			
	N	Yes			N	Yes		
		%	95%CI	n		%	95%CI	n
15-24	49	-	-	0	90	-	-	0
25-34	66	-	-	0	125	2.7	±3.4	4
35-44	96	10.7	±9.3	9	179	11.9	±5.0	22
45-54	97	20.3	±8.0	20	207	35	±9.9	71
55-64	101	28.7	±9.2	32	147	42.3	±9.2	67
<b>TOTAL</b>	<b>409</b>	<b>10.9</b>	<b>±3.1</b>	<b>61</b>	<b>748</b>	<b>18.7</b>	<b>±3.5</b>	<b>164</b>

**Table 9. 15 Resting blood pressure (mmHg): Males†**

Age	Systolic			Diastolic		
	N	Mean	95%CI	N	Mean	95%CI
15-24	657	124.5	±2.0	657	66.6	±1.2
25-34	527	125.9	±1.9	527	71.0	±2.0
35-44	572	126.0	±2.1	572	74.0	±1.8
45-54	421	128.5	±1.9	421	75.3	±1.7
55-64	287	131.5	±2.4	287	74.3	±1.9
<b>TOTAL</b>	<b>2464</b>	<b>126.2</b>	<b>±1.4</b>	<b>2464</b>	<b>71.0</b>	<b>±1.3</b>

† Excludes persons taking medication for high blood pressure

**Table 9. 16 Resting blood pressure (mmHg): Females†**

Age	Systolic			Diastolic		
	N	Mean	95%CI	N	Mean	95%CI
15-24	897	115.3	±2.2	897	66.9	±1.5
25-34	875	118.3	±1.9	875	71.4	±1.5
35-44	834	121.2	±1.6	834	73.6	±1.5
45-54	589	129.4	±2.6	589	77.5	±1.3
55-64	291	139.6	±3.1	291	79.6	±2.0
<b>TOTAL</b>	<b>3486</b>	<b>120.8</b>	<b>±1.8</b>	<b>3486</b>	<b>71.8</b>	<b>±1.3</b>

† Excludes persons taking medication for high blood pressure

**Table 9. 17 Blood pressure risk categories: Males†**

Age	N	Optimal			Normal			High-Normal			Grade 1 HTN			Grade 2 HTN			Grade 3 HTN		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	665	39.5	±6.6	262	24.9	±3.8	176	23.6	±4.2	151	11.4	±3.4	72	0.6	±0.7	4	-	-	0
25-34	528	32.5	±5.2	174	30.2	±3.4	156	23.2	±4.4	127	12.8	±4.4	65	1.3	±1.2	6	-	-	0
35-44	563	35.6	±4.4	209	28.3	±3.6	158	21.8	±3.4	116	11.5	±2.8	63	2.5	±1.1	15	0.3	±0.5	2
45-54	409	32.5	±4.6	133	26.5	±3.9	105	18.1	±2.9	75	17.5	±3.8	73	3.2	±2.3	15	2.3	±1.9	8
55-64	269	29.3	±6.3	80	20.5	±4.3	59	21.3	±7.3	55	22.1	±9.0	57	6.8	±2.6	18	-	-	0
<b>Total</b>	<b>2434</b>	<b>35.2</b>	<b>±4.0</b>	<b>858</b>	<b>26.9</b>	<b>±2.2</b>	<b>654</b>	<b>22.3</b>	<b>±2.2</b>	<b>524</b>	<b>13.3</b>	<b>±2.3</b>	<b>330</b>	<b>1.9</b>	<b>±0.7</b>	<b>58</b>	<b>0.4</b>	<b>±0.2</b>	<b>10</b>

† Excludes persons taking medication for high blood pressure

†† HTN=Hypertension

Optimal: <120/<80; Normal:120-129/80-84; High-normal: 130-139/85-89; Hypertension: Grade 1=140-159/90-99,Grade2=160-179/100-109, Grade 3 is ≥180/≥110.



Table 9. 18 Blood pressure risk categories by area: Malest

Area	N	Optimal			Normal			High-Normal			Grade 1 HTN			Grade 2 HTN			Grade 3 HTN		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	1534	33.4	±4.6	489	26.8	±2.5	415	23.5	±2.4	359	13.8	±2.8	224	2.1	±0.9	41	0.3	±0.3	6
Urban	900	41.3	±5.8	369	27.3	±4.1	239	18.2	±3.6	165	11.4	±2.6	106	1.3	±0.5	17	0.4	±0.3	4
Total	2434	35.2	±3.7	858	26.9	±2.0	654	22.3	±2.1	524	13.3	±2.2	330	1.9	±0.7	58	0.4	±0.2	10

† Excludes persons taking medication for high blood pressure

†† HTN=Hypertension

Optimal: <120/<80; Normal:120-129/80-84; High-normal: 130-139/85-89; Hypertension: Grade 1=140-159/90-99, Grade2=160-179/100-109, Grade 3 is ≥180/≥110.

Table 9. 19 Blood pressure risk categories by ethnicity Malest

Ethnic group	N	Optimal			Normal			High-Normal			Grade 1 HTN			Grade 2 HTN			Grade 3 HTN		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1492	28	± 4.2	435	27.8	± 2.2	413	25.2	± 2.5	361	16	± 3.0	233	2.7	±0.9	45	0.2	±0.2	5
Indian	882	46.9	± 6.7	405	24.8	± 4.3	221	18.3	± 2.8	152	8.6	± 2.8	88	0.8	±0.5	11	0.6	±0.3	5
Others	60	26.1	±10.6	18	34	±10.3	20	18.5	±11.3	11	19.5	±11.8	9	1.9	±2.4	2	-	-	0
Total	2434	35.2	± 3.7	858	26.9	± 2.0	654	22.3	± 2.1	524	13.3	± 2.2	330	1.9	±0.7	58	0.4	±0.2	10

† Excludes persons taking medication for high blood pressure

†† HTN=Hypertension

Optimal: <120/<80; Normal:120-129/80-84; High-normal: 130-139/85-89; Hypertension: Grade 1=140-159/90-99, Grade 2=160-179/100-109, Grade 3 is ≥180/≥110.

Table 9. 20 Blood pressure risk categories: Femalest

Age	N	Optimal			Normal			High-Normal			Grade 1 HTN			Grade 2 HTN			Grade 3 HTN		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
15-24	904	66.9	±7.5	633	20.2	±5.0	174	86	±3.2	65	4	±1.9	30	0.2	±0.4	2	-	-	0
25-34	840	59.1	±5.6	522	22.6	±4.1	172	11.5	±4.0	93	5.9	±2.0	44	0.72	±0.8	7	0.1	±0.2	2
35-44	811	50	±5.9	418	23.9	±3.9	184	15.6	±3.1	120	8.4	±2.3	70	1.8	±1.2	14	0.4	±0.4	5
45-54	542	36	±6.8	213	22.9	±3.6	116	18.9	±4.3	96	15.3	±2.1	83	5.6	±2.3	27	1.3	±1.1	7
55-64	260	21.3	±7.6	59	17.1	±6.2	49	19.2	±6.1	47	29	±8.9	65	11	±3.7	32	2.3	±1.9	8
Total	3357	54.6	±5.0	1845	21.8	±2.7	695	12.8	±2.4	421	8.4	±1.3	292	2.1	±0.6	82	0.4	±0.2	22

† Excludes persons taking medication for high blood pressure

†† HTN=Hypertension

Optimal: <120/<80; Normal:120-129/80-84; High-normal: 130-139/85-89; Hypertension: Grade 1=140-159/90-99, Grade 2=160-179/100-109, Grade 3 is ≥180/≥110.

Table 9. 21 Blood pressure risk categories by area: Femalest

Area	N	Optimal			Normal			High-Normal			Grade 1 HTN			Grade 2 HTN			Grade 3 HTN		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Rural	1737	51.1	±5.6	859	23.3	±3.3	404	14	±3.0	243	9.2	±1.5	174	2.1	±0.7	49	0.1	±0.2	8
Urban	1620	62.7	±4.5	986	18.1	±1.9	291	10.1	±2.3	178	6.6	±1.1	118	1.8	±0.9	33	0.7	±0.3	14
Total	3357	54.6	±5.0	1845	21.8	±2.7	695	12.8	±2.4	421	8.4	±1.3	292	2.1	±0.6	82	0.4	±0.2	22

† Excludes persons taking medication for high blood pressure

†† HTN=Hypertension

Optimal: <120/<80; Normal:120-129/80-84; High-normal: 130-139/85-89; Hypertension: Grade 1=140-159/90-99, Grade 2=160-179/100-109, Grade 3 is ≥180/≥110.

Table 9. 22 Blood pressure risk categories by ethnicity Femalest

Ethnic group	N	Optimal			Normal			High-Normal			Grade 1 HTN			Grade 2 HTN			Grade 3 HTN		
		%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n	%	95%CI	n
Fijian	1842	47.4	± 4.5	886	24.2	± 3.2	423	15.5	±2.3	275	9.6	±1.7	185	2.6	±0.7	56	0.6	±0.3	17
Indian	1419	65.6	± 2.5	904	17.5	± 1.6	250	8.4	±0.9	132	6.9	±1.6	103	1.3	±0.5	25	0.2	±0.2	5
Others	96	51.1	±11.5	55	27.7	±11.4	22	15.9	±12.8	14	4.5	±4.0	4	0.7	±1.3	1	0.6	±0.3	17
Total	3357	54.6	± 5.0	1845	21.8	± 2.7	695	12.8	±2.4	421	8.4	±1.3	292	2.1	±0.6	82	0.4	±0.2	22

† Excludes persons taking medication for high blood pressure

†† HTN=Hypertension

Optimal: <120/<80; Normal:120-129/80-84; High-normal: 130-139/85-89; Hypertension: Grade 1=140-159/90-99, Grade 2=160-179/100-109, Grade 3 is ≥180/≥110.

Table 9. 23 Hip Circumference (cm): Males and Females

Age	Males			Females†		
	N	Mean	95%CI	N	Mean	95%CI
15-24	674	90.4	±1.8	680	93.3	±2.1
25-34	548	94.4	±1.9	644	99.6	±2.2
35-44	616	95.8	±1.5	680	99.9	±2.1
45-54	489	96.4	±2.1	527	104.2	±4.5
55-64	359	95.6	±1.4	329	103.4	±2.3
TOTAL	2686	93.9	±1.6	2689	98.8	±2.1

† Pregnant females excluded

Table 9. 24 Waist-hip Circumference ratio: Males and Females

Age	Males			Females†		
	N	Mean	95%CI	N	Mean	95%CI
15-24	674	0.8	±0.01	678	0.8	±0.01
25-34	548	0.9	±0.01	643	0.8	±0.01
35-44	615	0.9	±0.01	679	0.9	±0.01
45-54	489	0.9	±0.01	527	0.9	±0.01
55-64	357	0.9	±0.01	329	0.9	±0.03
TOTAL	2683	0.9	±0.01	2856	0.8	±0.01

† Pregnant females excluded

Table 9. 25 Risk categories for waist-hip ratio: Males and Females

Age	Males				Females			
	N	High-risk WHRT† (>1.0)			N	High-risk WHR (>0.85)		
		%	95%CI	n		%	95%CI	n
15-24	674	-	-	0	678	18.1	±5.4	107
25-34	548	1.1	±1.0	8	643	43.3	±8.2	260
35-44	614	4.4	±2.2	31	679	57.6	±7.7	381
45-54	488	11.1	±3.2	57	527	65.5	±6.7	350
55-64	357	14.1	±5.5	64	329	73.2	±7.1	236
TOTAL	2681	3.9	±1.1	160	2856	44.6	±5.5	1334

† Pregnant females excluded

†† WHR=waist-to-hip ratio



## 10.10 Biochemical Measures

Table 10. 1 Fasting status: Males and Females†

Age	Males				Females			
	N	Fasted			N	Fasted		
		%	95%CI	n		%	95%CI	n
25-34	216	96.7	±5.1	207	370	97	±3.4	355
35-44	275	95.6	±5.3	261	453	97.7	±2.3	439
45-54	241	94.5	±5.8	228	422	97.9	±3.2	407
55-64	179	94.1	±8.3	168	225	98.8	±1.8	221
TOTAL	911	95.5	±5.5	86.4	1470	97.7	±2.5	1470

Table 10. 2 Fasting blood glucose (mmol/L): Males and Females

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
25-34	207	5.1	±0.4	354	5.1	±0.2
35-44	260	5.5	±0.2	439	5.4	±0.2
45-54	227	5.9	±0.3	405	6.3	±0.3
55-64	168	6.2	±0.6	220	6.6	±0.5
TOTAL	862	5.5	±0.2	1418	5.7	±0.2

Table 10. 3 Fasting blood glucose risk categories: Males and Females

Age	Males				Females			
	N	≥6.1 mmol/L			N	≥6.1 mmol/L		
		%	95%CI	n		%	95%CI	n
25-34	207	3.0	±2.6	10	354	5.2	±3.6	18
35-44	260	11.3	±5.4	33	439	9.0	±3.6	45
45-54	227	23.9	±9.6	48	405	23.8	±5.8	102
55-64	168	23.6	±9.4	45	220	34.5	±8.0	78
Total	862	12.9	±3.8	136	1418	15.2	±3.2	243

Table 10. 4 Fasting Blood Glucose risk categories: By ethnicity

Ethnic group	Males				Females			
	N	≥6.1 mmol/L			N	≥6.1 mmol/L		
		%	95%CI	n		%	95%CI	n
Fijian	508	6.4	± 2.2	44	742	12.2	± 3.7	99
Indian	338	20.9	± 4.5	90	641	18.3	± 2.3	133
Others	16	20.8	±24.8	2	35	34.1	±30.1	11
Total	862	12.9	± 3.8	136	1418	15.2	± 3.2	243

Table 10. 5 Fasting Blood Glucose risk categories: Rural and Urban

Area	Males				Females			
	N	≥6.1 mmol/L			N	≥6.1 mmol/L		
		%	95%CI	n		%	95%CI	n
Rural	569	9.8	±3.8	58	714	12.4	±2.8	95
Urban	293	24.1	±4.8	78	704	21.3	±5.1	148
Total	862	12.9	±3.8	136	1418	15.2	±3.2	243

Table 10. 6 Total cholesterol (mmol/L): Males and Females

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
25-34	205	5.04	±0.36	350	4.68	±0.17
35-44	255	5.54	±0.27	436	4.86	±0.20
45-54	222	5.62	±0.33	401	5.39	±0.27
55-64	166	5.53	±0.28	216	5.43	±0.23
TOTAL	848	5.39	±0.24	1403	5.02	±0.17

Table 10. 7 Total mean cholesterol by gender and ethnicity

Ethnic Group	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
Fijian	499	5.22	±0.31	732	5.04	±0.18
Indian	333	5.51	±0.39	636	4.99	±0.27
Others	16	6.40	±1.0	35	4.94	±0.67
TOTAL	848	5.39	±0.24	1403	5.02	±0.17

Table 10. 8 Fasting total cholesterol (mmol/L) by area: Males and Females

Area	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
Rural	556	5.31	±0.27	701	4.95	±0.17
Urban	292	5.64	±0.44	702	5.15	±0.33
TOTAL	848	5.39	±0.24	1403	5.02	±0.17

Table 10. 9 Fasting total cholesterol risk categories: Males and Females

Age	Males				Females			
	N	Elevated(≥5.2 mmol/L)			N	Elevated(≥5.2 mmol/L)		
		%	95%CI	n		%	95%CI	n
25-34	205	39.9	±12.4	85	350	29.7	±6.8	108
35-44	255	50.5	± 9.3	124	436	28.7	±7.6	128
45-54	222	55.4	± 9.3	129	401	49.8	±8.7	206
55-64	166	58.8	± 7.1	95	216	54.0	±7.4	116
Total	848	49.1	± 6.2	433	1403	37.8	±6.0	558

Table 10. 10 Total cholesterol risk categories by area: Males and Females

Area	Males				Females			
	N	≥5.2 mmol/L			N	≥5.2 mmol/L		
		%	95%CI	n		%	95%CI	n
Rural	566	47.5	±7.5	269	701	36.7	±7.5	267
Urban	292	54.7	±8.2	164	702	40.0	±9.3	291
Total	848	49.1	±6.2	433	1403	37.8	±6.0	558

Table 10. 11 Total cholesterol risk categories by ethnicity: Males and Females

Ethnic group	N	Males Elevated (≥5.2 mmol/L)				Females Elevated (≥5.2 mmol/L)			
		%	95%CI	n		%	95%CI	n	
Fijian	499	45.3	± 8.9	232	732	39.9	± 6.72	94	
Indian	333	52.6	± 9.1	191	636	34.6	± 8.22	49	
Others	16	66.6	±30.2	10	35	40.5	±30.7	15	
<b>Total</b>	<b>848</b>	<b>49.1</b>	<b>± 6.2</b>	<b>433</b>	<b>1403</b>	<b>37.8</b>	<b>± 6.0</b>	<b>558</b>	

Table 10. 12 Fasting triglycerides (mmol/L) by age group: Males and Females

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
25-34	205	1.36	±0.28	349	1.22	±0.19
35-44	255	1.53	±0.16	436	1.20	±0.11
45-54	223	1.66	±0.26	400	1.50	±0.20
55-64	167	1.32	±0.19	215	1.45	±0.16
<b>TOTAL</b>	<b>850</b>	<b>1.47</b>	<b>±0.17</b>	<b>1400</b>	<b>1.31</b>	<b>±0.12</b>

Table 10. 13 Fasting triglycerides (mmol/L) by ethnicity: Males and Females

Ethnicity	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
Fijians	499	1.33	±0.21	730	1.33	±0.16
Indo-Fijians	335	1.64	±0.32	635	1.26	±0.15
Others	16	1.70	±0.31	35	1.69	±0.70
<b>TOTAL</b>	<b>850</b>	<b>1.47</b>	<b>±0.17</b>	<b>1400</b>	<b>1.31</b>	<b>±0.12</b>

Table 10. 14 Fasting triglycerides (mmol/L) by area: Males and Females

Area	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
Rural	557	1.36	±0.17	700	1.25	±0.15
Urban	293	1.85	±0.26	700	1.45	±0.14
<b>TOTAL</b>	<b>850</b>	<b>1.47</b>	<b>±0.17</b>	<b>1400</b>	<b>1.31</b>	<b>±0.11</b>

Table 10. 15 Fasting triglycerides (mmol/L) risk categories by agegroup: Males and Females

Age	Males				Females			
	N	High (e1.7 mmol/L)			N	High (e1.7 mmol/L)		
		%	95%CI	n		%	95%CI	n
25-34	205	24.9	±10.5	58	349	19.7	±6.5	69
35-44	255	31.2	± 7.9	84	436	18.4	±4.8	86
45-54	223	40.1	±11.1	92	400	29.1	±9.3	121
55-64	167	20.6	±10.1	43	215	31.2	±8.2	68
<b>Total</b>	<b>850</b>	<b>29.6</b>	<b>± 7.6</b>	<b>277</b>	<b>1400</b>	<b>23.3</b>	<b>±5.5</b>	<b>344</b>

Table 10. 16 Fasting triglycerides (mmol/L) risk categories by ethnicity: Males and Females

Ethnicity	Males				Females			
	N	High(e1.7 mmol/L)			N	High(e1.7 mmol/L)		
		%	95%CI	n		%	95%CI	n
Fijians	499	22.5	± 9.9	126	730	24.5	± 7.8	184
Indo-Fijians	335	37.6	±11.3	144	635	21.4	± 5.3	152
Others	16	43.4	±20.2	73	5	24.1	±19.5	8
<b>Total</b>	<b>850</b>	<b>29.6</b>	<b>± 7.6</b>	<b>277</b>	<b>1400</b>	<b>23.3</b>	<b>± 5.5</b>	<b>344</b>

Table 10. 17 Fasting triglycerides (mmol/L) risk categories by area: Males and Females

Area	Males				Females			
	N	High(e1.7 mmol/L)			N	High(e1.7 mmol/L)		
		%	95%CI	n		%	95%CI	n
Rural	557	24.0	±7.3	136	700	21.0	±7.2	151
Urban	293	48.8	±8.5	141	700	27.9	±5.3	193
<b>Total</b>	<b>850</b>	<b>29.6</b>	<b>±7.1</b>	<b>277</b>	<b>1400</b>	<b>23.3</b>	<b>±5.5</b>	<b>344</b>

Table 10. 18 Fasting HDL cholesterol (mmol/L) by agegroup: Males and Females

Age	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
25-34	205	1.11	±0.08	351	1.03	±0.05
35-44	256	1.08	±0.08	436	1.06	±0.06
45-54	223	1.14	±0.07	400	1.05	±0.05
55-64	167	1.16	±0.07	215	1.05	±0.07
<b>TOTAL</b>	<b>851</b>	<b>1.11</b>	<b>±0.06</b>	<b>1402</b>	<b>1.05</b>	<b>±0.04</b>

Table 10. 19 Fasting HDL cholesterol (mmol/L) by ethnicity: Males and Females

Ethnicity	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
Fijians	500	1.16	±0.09	730	1.04	±0.06
Indo-Fijians	335	1.06	±0.05	637	1.06	±0.07
Others	16	1.07	±0.10	35	1.08	±0.11
<b>TOTAL</b>	<b>851</b>	<b>1.11</b>	<b>±0.06</b>	<b>1402</b>	<b>1.05</b>	<b>±0.04</b>

Table 10. 20 Fasting HDL cholesterol (mmol/L) by area: Males and Females

Area	Males			Females		
	N	Mean	95%CI	N	Mean	95%CI
Rural	558	1.14	±0.07	701	1.04	±0.05
Urban	293	1.04	±0.03	701	1.06	±0.05
<b>TOTAL</b>	<b>851</b>	<b>1.11</b>	<b>±0.05</b>	<b>1402</b>	<b>1.05</b>	<b>±0.04</b>



Table 10. 21 Fasting HDL cholesterol risk categories: Males and Females

Age	Males				Females			
	N	Low( $\leq 0.9$ mmol/L)			N	Low( $\leq 0.9$ mmol/L)		
		%	95%CI	n		%	95%CI	n
25-34	205	29.3	$\pm 6.3$	64	351	35.4	$\pm 7.0$	125
35-44	256	29.2	$\pm 7.9$	67	436	35.3	$\pm 7.1$	148
45-54	223	29.2	$\pm 8.5$	67	400	33.9	$\pm 5.6$	138
55-64	167	24.9	$\pm 7.3$	74	215	37.7	$\pm 11.8$	78
Total	851	30.9	$\pm 5.1$	272	1402	35.4	$\pm 4.6$	489

Table 10. 22 Fasting HDL cholesterol risk categories by ethnicity: Males and Females

Ethnic group	Males				Females			
	N	Low( $\leq 0.9$ mmol/L)			N	Low( $\leq 0.9$ mmol/L)		
		%	95%CI	n		%	95%CI	n
Fijian	500	27.9	$\pm 7.8$	152	730	36.5	$\pm 7.4$	276
Indian	335	34.9	$\pm 6.1$	115	637	34.1	$\pm 7.3$	201
Others	16	31.8	$\pm 22.8$	5	35	29.7	$\pm 19.3$	12
Total	851	30.9	$\pm 5.1$	272	1402	35.3	$\pm 4.6$	489

Table 10. 23 Fasting HDL cholesterol risk categories by area: Males and Females

Area	Males				Females			
	N	Low( $\leq 0.9$ mmol/L)			N	Low( $\leq 0.9$ mmol/L)		
		%	95%CI	n		%	95%CI	n
Rural	558	29.1	$\pm 6.1$	160	701	35.3	$\pm 6.5$	249
Urban	293	37.4	$\pm 1.9$	112	701	35.5	$\pm 4.4$	240
Total	851	30.9	$\pm 5.1$	272	1402	35.3	$\pm 4.6$	489

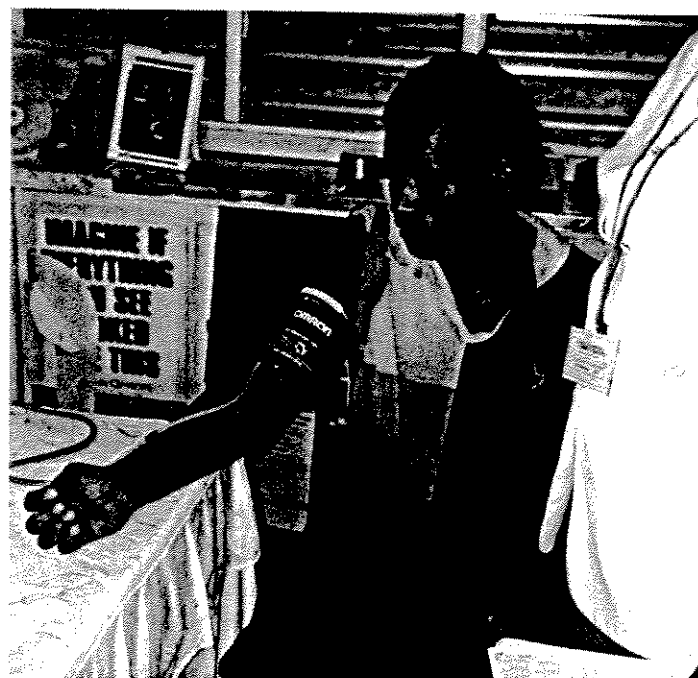
## 10.11 Data quality indices

Table 11. 1 Number of pregnant females

Age	N	Pregnant	
		%	n
15-24	739	7.9	59
25-34	694	6.7	49
35-44	693	1.9	11
45-54	527	-	0
55-64	329	-	0
TOTAL	2982	4.6	119

Table 11. 2 Number of blood pressure and heart rate measurements taken

	One			Two			Three		
	%	95%CI	n	%	95%CI	n	%	95%CI	n
Systolic	0.02	$\pm 0.03$	2	77.5	$\pm 4.6$	5238	20.4	$\pm 3.8$	1387
Diastolic	0.02	$\pm 0.03$	1	77.5	$\pm 4.6$	5239	20.4	$\pm 3.8$	1387
Heart rate	0.2	$\pm 0.11$	12	77.4	$\pm 4.6$	5230	20.3	$\pm 3.8$	1379





## 11 APPENDIX 2 WEIGHTING FORMULAS

- W1 = "Tikina factor" =  $(1 / \# \text{ of Tikinas chosen}) * (\text{Fiji population} / \text{Tikina population})$   
 =  $(1 / 19) * (775,077 / \text{Tikina population})$   
**Note:** This factor will increase the weight of participants from smaller Tikinas, which have a lesser probability of being chosen.
- W2(PPS) = "Cluster factor" for those clusters with more than 1 EA per cluster  
 =  $(1 / \# \text{ EAs selected from Tikina}) * (\text{Tikina population} / \text{EA population})$   
 W2(SRS) = "Cluster factor" for those clusters with only 1 EA per cluster  
 = Total # of EAs in that Tikina  
**Note:** EA = enumeration area = cluster.
- W3 = "Selection from EA factor"  
 =  $\text{EA population} / \# \text{ of potential participants in households approached}$   
**Note:** This will increase the weight of participants from clusters where a smaller proportion of potential participants were identified.
- W4 = "Weight to the sum of the EA population factor"  
 = 
$$\frac{\text{EA population}}{\# \text{ of S1 part.} * (\# \text{ HH approached} / \# \text{ HH with someone home}) * (\# \text{ of pot. part.} / \# \text{ of S1 part.})}$$
  
 = 
$$\frac{\text{EA population} * \# \text{ of households with someone home}}{\# \text{ of households approached} * \# \text{ of potential participants in households approached}}$$
  
**Note:** This is an intermediate step used to more accurately calculate a post-stratification re-weighting in conjunction with the use of the next weighting factor, W5.
- W5 = "Population proportion factor"  
 = 
$$\frac{(\text{Proportion of ethnicity/sex/age group in population})}{(\text{Proportion of ethnicity/sex/age group in sample})}$$
  
**Note:** Each participant can be classified within 1 of 30 ethnicity/sex/age groups. This factor will increase the weight of participants in ethnicity/sex/age groups with a smaller proportion of the total sample than the proportion of that group within the total 15-64 year-old population.
- W6 = "Step 2 response rate factor"  
 =  $\# \text{ participants for Step 1} / \# \text{ participants for Step 2}$   
**Note:** This will increase the weight of participants from clusters with a lower response rate for Step 2.
- W7 = "Step 3 response rate factor"  
 =  $\# \text{ scheduled for Step 3} / \# \text{ with Step 3 measures}$   
**Note:** This will increase the weight of participants from clusters with a lower response rate for Step 3, and it will decrease the weight of participants from clusters where more participants showed up for Step 3 than were scheduled. This weighting factor can be < 1 since most of the "extra" (i.e. non-scheduled) Step 3 participants had not been initially chosen for Step 3. Also, this weighting factor will not be calculated for the few 15-24 year-olds with Step 3 measures (n=44), as they will be excluded from the analysis of the Step 3 variables.
- S1WT = Total Weighting Formula for Step 1 variables  
 =  $W1 * W2 * W3 * W4 * W5$   
 S2WT = Total Weighting Formula for Step 2 variables  
 =  $S1WT * W6 = W1 * W2 * W3 * W4 * W5 * W6$   
 S3WT = Total Weighting Formula for Step 3 variables  
 =  $S1WT * W7 = W1 * W2 * W3 * W4 * W5 * W7$