SAMOA

NCD Risk Factors

STEPS Report

June 2008

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FOREWORD

It is common knowledge that Non communicable diseases (NCDs) are highly prevalent in Samoa's population, a trend that is being reflected globally. The social and economic related impacts on our livelihoods have made it paramount that we address this health burden in an effective and sustainable manner.

The STEPwise approach to chronic risk factor surveillance has been an invaluable exercise for us to understand the NCD situation in Samoa, and towards developing health strategies and activities that are based on solid research based evidence.

It must be mentioned that the journey taken in completing this exercise has been a great learning curve for Samoa's Health Sector. Other than the fact that the STEPwise approach is still relatively new and continues to be improved, the demands on costs, human and resource materials, and especially time have been tolling. The importance of having such data and the constraints just mentioned, need to be seriously addressed when next Samoa carries out a STEPS process.

Samoa is grateful to the World Health Organisation for its continued support. Those both locally and overseas who contributed to the question finalisation and data collection have been credited in this document. Technical officers and experts who contributed to the finalisation of the data analysis and report write-up are also greatly appreciated and acknowledged.

It is a great achievement that Samoa not only has this publication to share, but also a vast set of raw data that the health sector and key regional partners can further use to highlight the NCD burden both and the national and regional level.

I trust that all who read this document will realise the enormity of the NCD problem in Samoa and realise the greater achievement, which is to put in place the appropriate strategies and activities based on the evidence provided.

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Gatoloaifaana Amataga Alesana-Gidlow
Hon. Minister of Health

Dr. Kevin Palmer's picture

WHO message to go here.

Dr. Kevin Palmer
WHO Representative, APIA

Executive Summary

Overview

The Samoa Non-Communicable Diseases Prevalence and Risk Factor Survey (Samoa-STEPS) is part of a global effort to address major non-communicable diseases (NCD) risk factors in developing countries. The survey is part of series planned to obtain evidence to assist the effective delivery of national and regional prevention and control programs.

The Samoa-STEPS survey was a population based nation-wide cross-sectional assessment of key chronic diseases and their risk factors in adults aged 25-64 years. It was implemented from August to October 2002. The main objectives were:

- To investigate the prevalence of key NCDs in Samoa;
- To determine the prevalence of the major risk factors for NCDs in Samoa

Data was obtained from 2804 individuals using stratified cluster sampling.

Key Results

Tobacco Use

- Two in every five adults between 25-64 years in Samoa smoke. (40.3%)
- The majority of smokers are male. 56.9% of men smoke compared to 21.8% of women
- Approximately half the men (49.4%) smoke on a daily basis whereas 18.0% of women smoke on a daily basis.
- Once a smoker, the likelihood of being a daily smoker does not differ between the sexes.
- Smoking prevalence and average age started smoking are not significantly different across Urban Apia, Rural Upolu and Savaii.
- Whilst the average starting age for male daily smokers has not changed significantly, women are starting to smoke at a younger age than before.
- Daily smokers in the study population have smoked for an average of 18.4 years and smoke an average of 12 cigarettes a day.
- Manufactured cigarettes is increasingly the tobacco of choice amongst daily smokers. 9 in 10 daily smokers (90.2%) in the age group 25-34 years smoke manufactured cigarettes compared to 56.7% in the 55-64 years age group.

Alcohol Use

- The overall prevalence of current drinkers (those who have consumed alcohol within the past 12 months) was 29.4%
- Alcohol consumption is much higher in men. 50.8% of men were current drinkers compared to 5.8% of women

- Men were not only more likely to drink than women they were also more likely to drink more frequently, drink more heavily on a typical drinking day, and to indulge in binge drinking.
- Younger men are more likely to drink than older men, whilst women in the 35-44 year age group are more likely to drink than women in other age groups.
- The majority of current drinkers spend at least one day a week drinking alcohol. 44.7% spend 1-4 days a week drinking alcohol with a further 11.0% who spend between 5-7 days a week drinking alcohol.
- Among current drinkers, the average number of standard drinks on a drinking day was 7.6 Men drank on average 7.8 standard drinks whilst women drank 5.5 standard drinks on average.
- Two thirds of the current drinkers drink 6 or more drinks on a drinking day: 66.2% of men and 38.7% of women.
- When binge drinking is defined as 5 or more standard drinks for a man or 4 or more standard drinks for a woman consumed on at least one day of the previous 7 days, the binge drinking prevalence was 44.7% for men and 15.6% for women.
- There were no significant differences across regions of residence for prevalence of drinking, frequency of drinking or amount of drinking (including binge drinking).

Diet

- One in three people eat less than the recommended 5 servings of fruits and vegetables per day; 33.3% of men and 31.9% of women. (starchy vegetables included)
- Women are slightly more likely to eat fruits than men
- Of the three food items fresh fish, tinned fish and mutton flaps, consumption of tinned fish was highest (an average of 3.3 times a week). Fresh fish was consumed an average of 2.3 times a week whilst mutton flaps was eaten an average 1.1 times a week.

Physical Activity

- One in two of the study population is physically inactive. (50.3%)
- Physical inactivity is much higher in women with about two thirds (64.4%) inactive compared to 37.6% or slightly over a third of the men.
- Levels of physical activity are no different across the ten year age groups of the study population
- Physical activity for men is primarily attained while at work (mean of 102 MET minutes) compared to physical activity gained during travel or recreation. (means of 25.8 and 19.4 MET minutes respectively)
- Physical activity for women is low (median of 12.8 MET minutes per day, mean of 45.1 MET minutes per day) and there are no differences in the levels gained from any of the work, travel and recreation settings.

Overweight & Obesity

- A significant proportion of the study population is overweight or obese (85.2%) Women show a slightly higher proportion suffering from overweight or obesity (89.8%) than men. (81.1%)

- The obesity problem is more advanced in women than in men. Two in every three women between 25-64 years of age is obese, while almost half (44.9%) of men in the same age range are obese.
- The study population's mean BMI was 31.4 kg/m^2 : the women's mean BMI was marginally higher at 33.2 kg/m^2 compared to the men's mean BMI of 30.0 kg/m^2

Blood Pressure & Hypertension

- 1 in 5 adults aged 25-64 years (21.2%) suffers from high blood pressure (hypertension). The overall prevalence rates in men and women are not significantly different.
- Of those found to have high blood pressure, a significant 85.3% had not previously been diagnosed.
- In the age group 25-34 years, the prevalence rate in men was 15.3% which was more than double the rate in women of 6.3%.
- Hypertension levels increase with age.

Blood Glucose and Diabetes

- 1 in 5 adults aged 25-64 years, (21.5%) suffer from diabetes. Diabetes prevalence in men and women are not statistically different.
- Of those found with diabetes, the vast majority (84.5%) had not been diagnosed before. The rate of undiagnosed diabetes is higher the younger the age group.
- Diabetes prevalence increases with age. 43.6% of the 55-64 year olds suffer from diabetes, which is four times the prevalence in the 25-34 year age group of 10.8%.
- A further 16.7% of the study population had impaired fasting glycaemia, so that the overall prevalence in 25-64 year olds of diabetes or impaired fasting glycaemia was 38.2%.

Blood Cholesterol

- 13.7% of adults aged 25-64 years have a high risk level of cholesterol (≥5.2mmol/L). There was no significant difference between the rates in men and women.
- The mean cholesterol level was 4.2 mmol/L, with both genders having the same mean values.
- Mean cholesterol levels and prevalence with high risk cholesterol levels increased with age.

Combined Risk Factors for NCDs

- 1 in 3 adults aged 25-64 years (33.8%) are at high risk of developing an NCD. (at least 3 of 5 risk factors present)
- Only 3.0% of the study population are at low risk of developing an NCD. (i.e. none of the 5 risk factors present), with a marginally higher proportion of men in this risk category (4.4%) compared to women (1.2%)

1. Introduction

1.1 Background to the STEPS Survey in Samoa

Non-communicable diseases (NCD) are the major cause of death and disability globally and are of great concern to the World Health Organization (WHO) and countries alike. Recent data show that NCDs are responsible for almost 60% of deaths and 43% of disease burden globally and that by 2020, it is predicted that they will be responsible for 73% deaths and 60% of the global burden of disease by 2020.

A recent WHO Western Pacific Regional Office analysis of NCDs in the Western Pacific Region highlighted the very high mortality in the Pacific Islands. WHO decided to assist countries by implementing a surveillance programme which could help control and prevent the growing NCD problem.

Surveillance is essential for guiding policy development; for effective allocation of health care resources; to improve capability of countries to respond to emerging disease trends; and to underpin the development of intervention programs and evaluating prevention programs.

WHO has recommended the WHO STEPwise approach to surveillance as the NCD surveillance tool. The STEPS framework has three levels of assessment into: health risk behaviours; physical measurements; and blood samples.

Key Premises for Implementing STEPS are: to establish STEPS-basic surveillance sites; to utilise STEPS methodology focusing on core essential information with country modifications as appropriate to their needs; to analyse with enough statistical power to detect risk factor trends; and to contribute data to a comparable global database.

1.2 Samoa in Context

1.2.1 Geography & People

Samoa is an Independent State in the Pacific, consisting of two main islands, Upolu and Savaii; two smaller islands Apolima and Manono, and 5 other uninhabited islets. The total land area of 2,934 square kilometers is of volcanic origin with mountainous interiors and narrow coastal plains. Samoa is approximately halfway between Hawaii and New Zealand, with American Samoa its nearest neighbour at one hundred kilometers to the east. The main island Upolu is home to the capital Apia, and nearly three quarters of the population. The climate is tropical with a rainy season from November to April.

Samoans are a Polynesian people, and remain strong and proud of their *faa-Samoa* or Samoan traditional way of life despite centuries of European contact. Much of the traditions and culture have been retained, including social systems and language.

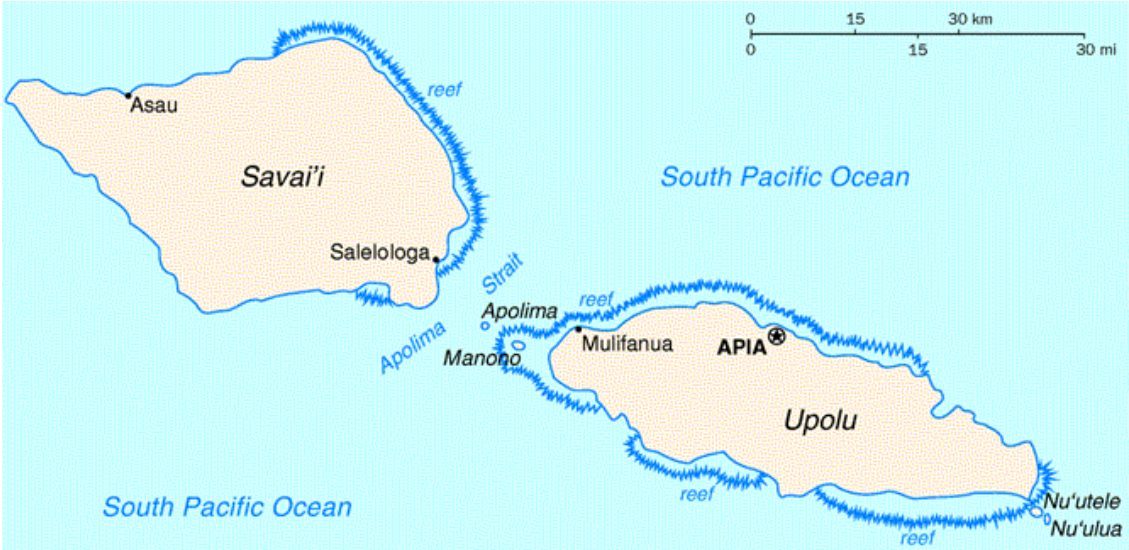


Fig 1.2.1 Map of Samoa

1.2.2 Governance & Economy

Samoa gained independence in 1962 and was the first Pacific Island country to do so. It was formerly administered by New Zealand as a trusteeship of the United Nations. Samoa has a Westminster type parliamentary system with 49 members of parliament elected for a 5-year term, by the population aged 21 years and above. Governance is complemented at the village and district level by the *matai*-system, which is a traditional system of governance by chiefs.

Samoa is a least developed country with a GDP in 2002 of SAT$885 million (approximately US$295 million) and a per capita GDP of SAT$5,010 approximately USD$1,700.[1] The small open economy is reliant on a narrow resource base - tourism, fisheries, small-scale manufacturing and agricultural exports. It is also heavily dependent on overseas development assistance and remittances as a source of foreign exchange. In the 1990s the economy suffered major setbacks due to natural disasters such as cyclones, and the taro leaf blight disease which wiped out a major agricultural export. Economic reforms have since combined with political stability to earn Samoa a reputation in the Pacific as one of the fastest growing and stable economies.

1.2.3 Population

The 2001 Census showed a population of 176,710 people. Almost half the population are dependent, with 41% below 15 years of age and 4% aged 65 years and over. The median age was 19.7 years. Three quarters of the population live on the main island of Upolu, and 22% live in the urban area around the capital Apia.

Migration plays a major role in the population dynamics of Samoa. A high natural growth rate of 2.4% is tempered by net outwards migration, mainly towards New Zealand and Australia resulting in an annual growth rate of 1%. Increasing internal migration towards the urban Apia area presents challenges to the health, social services and infrastructure which are addressed by the Government's development strategy for the 2002-2004 period.

1.2.4 Social and Human Development Indicators

Though Samoa is a least developed country, the standard of living is relatively high and uniform, and reflects the commitment to community and social institutions. Samoans enjoy a high literacy rate at almost 100% according to the 2001 Census with school enrolment levels at 98.1%. Access to safe water is reported at 88.6%. Electricity supply is almost universal and the majority of the roads are tar sealed.

Life expectancy at birth stands at 71.8 years for men and 73.8 years for women according to the 2001 Census. The crude birth and deaths rates were 29 and 5.5 respectively per 1000 of the population. Total Fertility Rate was 4.4 for women of childbearing age (15-49 years).

Table 1.2.4 Samoa Demographic and socio-economic Profile

Indicator	Value	Source
Total population (2001)	176,710	1
0-14 yrs	41%	1
15-64 yrs	55%	1
65+ yrs	4%	1
Natural Growth Rate (2001)	2.4%	1
Annual population growth (2001)	1%	1
Median age (2001)	19.7 years	1
Sex ratio (2001)	109 males per 100 females	1
Urban population (2001)	22%	1
Crude birth rate (2001)	29 births per 1000 population	1
Crude death rate (2001)	5.5 deaths per 1000 population	1
Total fertility rate (2001 Census)	4.4	1
Teenage fertility rate (2001)	45.5	1
Infant mortality rate (2001)	19 infant deaths per 1000 live births	1
Child (<5 yrs) Mortality Rate (2002)	25 deaths per 1000 live births	2
Maternal Mortality Rate (2002)		3
Average life expectancy at birth (2001)	71.8 years for males, 73.8 years for females	1
Proportion Infants immunized against measles	99% of children under 1 year	3
TB incidence rate per 100,000 population (2002)	18.29	4
Number of households (2001)	23,059	1
Average household size (2001)	8	1
GDP per capita (2002)	SAT $5,010 (USD$1700)	5
Proportion of households with access to improved sanitation facilities (2001)	99.9% of households	5
Proportion of households with sustainable access to an improved water source (2001)	88.6% of households	5

1. National Census of Population and Housing, 2001
2. UN Human Development Report, 2003
3. Ministry of Health
4. Secretariat of the Pacific Community
5. Department of Statistics

1.2.5 Health System, Health Status and NCDs

Health System

The health system in Samoa is dominated by the public health sector which at the time of the survey was under the auspices of one entity the Department of Health.[2] A network of health facilities consisting of a 210 bed hospital in Apia, a 21 bed hospital in Savaii, 4 district hospitals, 8 health centres and 16 health sub-centres provides primary, secondary and some tertiary health care services to the community. Health prevention and promotion programmes target primordial prevention and key target areas including child and maternal health, communicable and non-communicable diseases. A referral scheme exists for the referral of patients to overseas hospitals for tertiary services not available in country.

Health resources are limited with a chronic shortage of doctors and nurses. In 2002 there were 3 doctors and 21 nurses for every 10,000 of the population. With the exception of the two main hospitals, the rest of the public sector health facilities are almost exclusively staffed by nurses. Health services provided by the public sector are predominantly government funded through taxes, supplemented by external donor aid and limited user fees. In 2002, the total health expenditure was SAT$36.6m (US$12.2m) comprising 4.2% of the annual GDP. Per capita health expenditure was ST$206 (US$69).

There is a small but significant private sector consisting of one 21 bed hospital, 10 private medical clinics, 2 pharmacies, 2 dentistries and a home for the elderly. All are located in the Apia urban area with the exception of one private medical clinic based in Savaii. A collection of NGOs also provide services and programmes focusing on HIV/AIDS, reproductive health, suicide and mental health.

Traditional healers of which there are an estimated 2,000 and some 130 traditional birth attendants (TBAs), are significantly utilised by the community. In the decade to the year 2000, approximately 1 in 5 births were delivered by a traditional birth attendant. Links with the TBAs are strong however more work is expected to go into defining and forging the relationship with traditional healers to ensure safe practices.

Health Status & NCDs

Health status overall has improved for Samoans over the past decades. In the decade to 2001 life expectancy improved by 8.3 years to 71.8 and 73.8 years for men and women respectively.[3] Immunisation coverage was well over 90% in most target groups. Fertility and mortality rates were also reported on the decline and infectious diseases under control with some such as filariasis at a possibility of elimination.

Despite these positive health indicators morbidity and mortality patterns show a population undergoing the epidemiological transition of rising non-communicable diseases whilst still dealing with high rates of ill health and death caused by infectious and parasitic diseases.

NCDs such as diabetes and its complications, cardiovascular disease and hypertension now feature prominently in the leading causes of both morbidity and mortality. Prior research reveals these NCDs are on the increase and if left unchecked will present an untenable burden to the community and health resources in the not so distant future. Current data shows this burden of NCDs in comparison to others include more frequent presentations for medical care, longer hospital stays, higher rates of re-admission and followup, high utilisation of operating theatre, high drugs and diagnostic facilities use, and by far the significant majority of the limited resources for tertiary treatment overseas.

Where tuberculosis, leprosy and filariasis were the infectious diseases of prominence in prior decades, control programmes have now brought their incidence rates down to elimination levels and instead, respiratory infections and intestinal infectious diseases are examples of the infectious disease types now requiring daily medical intervention. Yearly outbreaks of dengue and typhoid fever show vector control, water quality and sanitation still require much work and with increased ease of international travel, border control has gained prominence in the fight to contain and control existing infectious diseases as well as prohibit the introduction of newly emerging infectious diseases.

Child and maternal health also remain areas of high priority. Protein malnutrition has been shown to be affecting significant numbers of young children. Adult and adolescent fertility rates, maternal and infant mortality rates are still relatively high. Motor accidents are also on the rise and suicide has remained a social concern with Samoa registering high rates compared to the rest of the world.

2. STEPS Survey Methods & Operations

2.1 Survey Rationale & Objectives

The overall objective of the survey was to investigate the prevalence of key NCDs and their associated risk factors, which include smoking, alcohol consumption, physical inactivity, obesity, hypertension, raised blood glucose and lipids in Samoa.
Specifically the survey aims to assist in:

1. Keeping track of the duration and magnitude of trends of NCDS and their risk factors.
2. Planning and evaluating a health promotion preventative campaign.
3. Predicting likely future demands for health services.

2.2 Sampling Methodology

The total population of Samoa was divided into villages according to the Statistical boundaries and classifications from the 2001 National Census on Population and Housing.

Out of a total 330 villages, 38 villages were excluded for having a population size of less than 100 and 7 villages were excluded for having population sizes of more than 2000 for logistical reasons. Thus, the sampling frame consisted of 285 villages only.

The 285 villages were stratified into 3 regions based on the Ministry of Health boundaries: Urban Apia, Rural Upolu and Savaii. Villages were randomly selected from each stratum using Probability Proportionate to Size (PPS) methods until the target population for each stratum was reached. This required 6 villages in Apia, 5 in Rural Upolu and 5 in Savaii.

For selected villages with a population less than 1000, a village based survey was conducted, where everyone in the selected village between the ages of 25-64 was surveyed.

For selected villages with populations greater than 1000, a household based survey was conducted based on the following rule. Simple random sampling was used to select one enumeration area within the village and adjacent enumeration areas were continued to be sampled until a target sample of about 200 was reached.

2.2.1 Sample Size

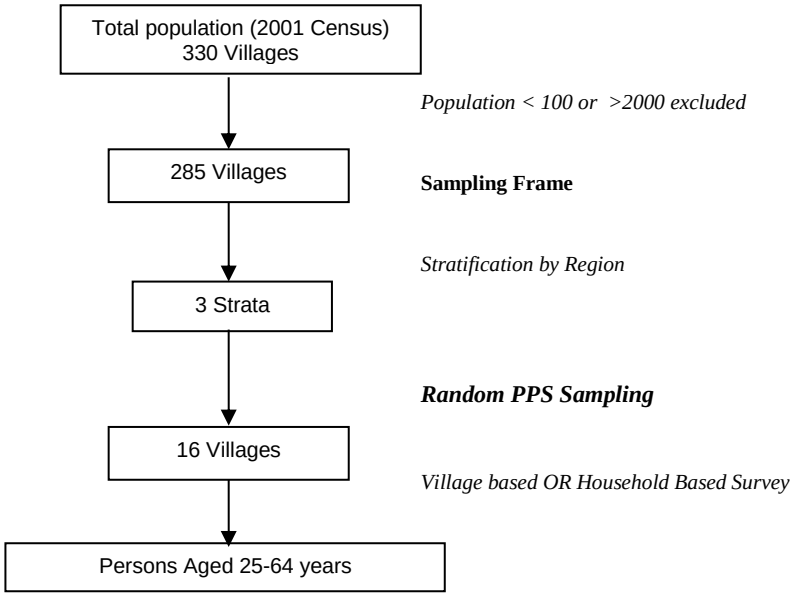
Based on the premise that diabetes is likely to be the least prevalent item in the survey, the survey sample size was determined based on the need to detect differences in the prevalence of diabetes by region. In order to be able to detect 5% differences in the prevalence of diabetes between the three strata, a total sample size of **2276** was required. Assuming an 80% participation rate, the target population was **2845**. A list of the 16 villages selected and the respondent numbers from each are in Table 2.2.1b – Appendix 1.

Table 2.2.1a Sample Size by Strata

	Sampling Frame		Study Sample		
	N	%	Target No.	Minimum No.	Actual No.*
Region					
Apia Urban	28179	44.8%	1274	1019	1274
Upolu Rural	20154	32.0%	911	729	734
Savaii	14592	23.2%	660	528	796
Total (25-64 yrs)	**62925**	100.0%	2845	2276	**2804**

** Actual sample size after data cleaning*

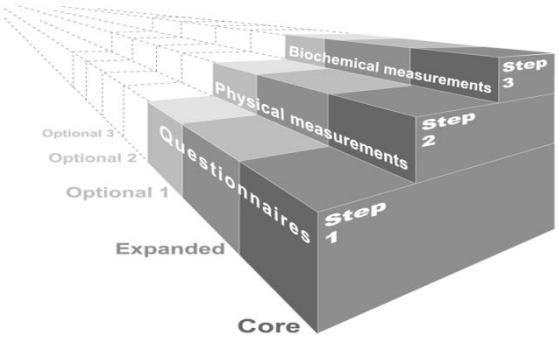
Fig. 2.2a. Survey sampling methodology.



2.2.2 Survey Structure

The STEPS approach moves along a sequential three-step process. The key premise is that, by using the same standardized questions, all countries can use the information not only for information within-country trends, but also for between-country comparisons. The questionnaires therefore will be relatively simple.

Fig 2.2.b The WHO STEPs approach to surveillance of NCDs.



The *STEPS* approach is based on levels of surveillance of risk factors:

STEP 1:	A simple questionnaire-based survey on selected major health risk behaviours (smoking, alcohol consumption, physical inactivity) plus additional issues deemed to be of importance in the individual country.
STEP 2:	A basic field survey including additional basic physiological measures of health risks (blood pressure, height, weight, waist circumference).
STEP 3:	A comprehensive field survey adding analysis of blood samples (total cholesterol, lipids, glucose).

All three levels of the survey template were implemented in the Samoa Survey.

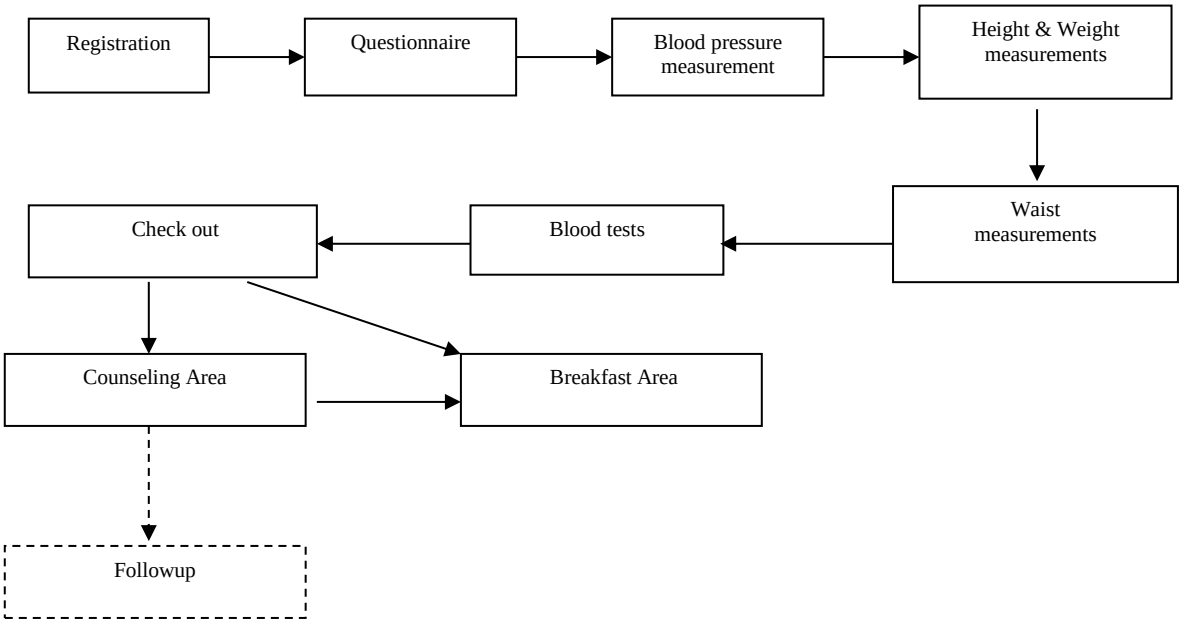
2.3 Survey Administration

The survey commenced in October and was conducted over a period of 8 weeks. The planning phase commenced much earlier in the year with attendance by the two members of the survey management team, of a one week training specific to management and administration of the STEPS survey series conducted by the Fiji School of Medicine, in February. A pilot survey preceded the actual survey to iron out any unforeseen problems with the questionnaire design and survey logistics.

All equipment used for physical and biochemical measurements were of WHO recommended standards and sourced using the WHO office, Apia. Details of this equipment can be found in Appendix 4.

A team of over 30 personnel trained in interviewing and taking the survey measurements and blood tests required in the survey carried out the work required at the different villages selected. The following diagram illustrates a typical survey setup which allowed for free flow of survey participants and counselling to be provided to those found in the survey with previously undiagnosed NCDs and risk factors. Breakfast was provided at the completion of the process as participants had been fasting.

Data entry was done in country using the EpiInfo™ software[4] for Windows, and sent to the WHO office Geneva for cleaning and databook / tables generation. .



2.4 Data Analysis

Data analysis was conducted using EpiInfo™ for Windows[4]. Data cleaning was conducted by the WHO Geneva office who also assisted together with the Menzies Institute and WHO Suva Office in preliminary analysis. Two officers from the Ministry of Health attended a one week training in Suva Fiji on Epi Info and STEPS survey analysis.

Final data analysis and table checking and re-generation in some instances were done in country due to the extended period of time since the actual survey and compilation of this final report. Weighted percentages, means and 95% confidence intervals for the percentages and means were computed using statistics appropriate to the study's cluster sampling design.

3. Results

3.1 SAMPLE PROFILE

Out of a targeted sample size of 2845, data was obtained from 2804 individuals. The sample distribution by age-group, gender and region are given below, in relation to the respective distributions in the sampling frame.

Table 3.1.1a

		Sampling Frame		Study Sample		
		Number	Proportion	Number	Unweighted Proportion	Weighted Proportion
Total		62,925	100%	2804	100%	100%
Region	Apia Urban	28179	44.8%	1274	45.4%	44.8%
	Upolu Rural	20154	32.0%	734	26.2%	32.0%
	Savaii	14592	23.2%	796	28.4%	23.2%
Sex	Male	33244	52.8%	1291	46.0%	52.8%
	Female	29681	47.2%	1513	54.0%	47.2%
Age Group (years)	25-34	25052	39.8%	1001	35.7%	39.8%
	35-44	18919	30.1%	724	25.8%	30.1%
	45-54	11732	18.6%	585	20.9%	18.6%
	55-64	7222	11.5%	494	17.6%	11.5%

3.1.1 Response Proportions

As all the survey respondents for the survey took part in Step 1 (behavioural measurements by questionnaire), this total of 2804 was used as the denominator to calculate the participation rates for Step 2 - Physical measurements, and Step 3 - Biochemical measurements.

There was a 99.6% response rate for Step 2, with equal response rates from the genders. The participation rate dropped slightly for Step 3 to 96.8% consisting of 96.7% for males and 96.9% for females.

3.1.2 Age-Group and Sex of Respondents

Table 3.1.2a shows the age and gender breakdown of the sample. Weighting was applied to balance sample distributions of age/sex in relation to the actual population, as well as to account for the different probabilities of selection .

Table 3.1.2a Age group and sex of the respondents.

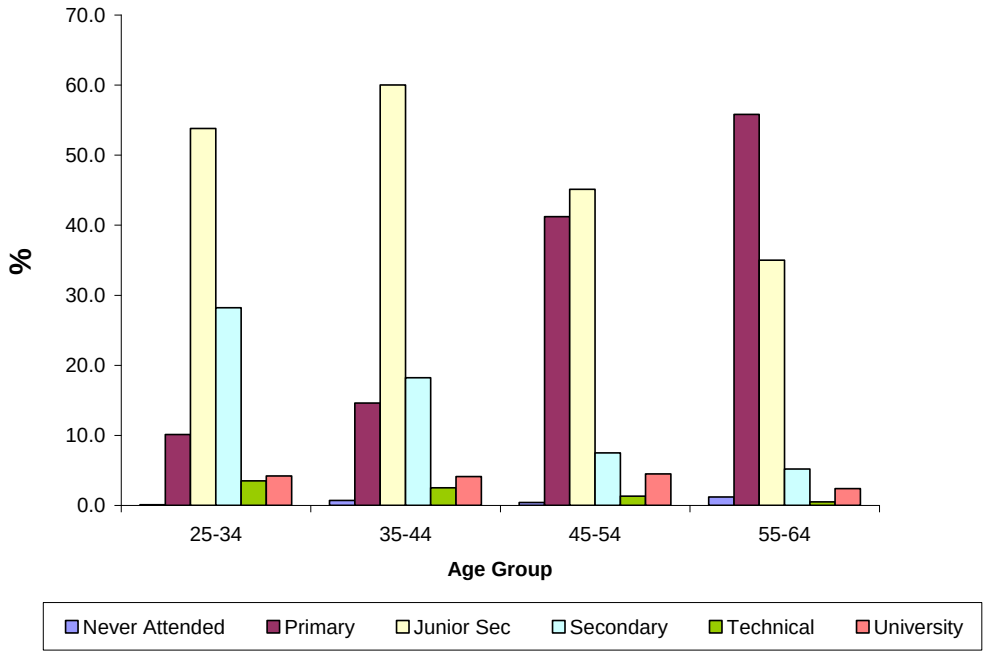
Age group and sex of respondents						
Age Group (years)	Men		Women		Both Sexes	
	n	%	n	%	n	%
25-34	485	48.5	516	51.5	1001	35.7
35-44	313	43.2	411	56.8	724	25.8
45-54	271	46.3	314	53.7	585	20.9
55-64	222	44.9	272	55.1	494	17.6
25-64	**1291**	**46.0**	**1513**	**54.0**	**2804**	**100**

3.1.3 Level of Education

The level of education of respondents was assessed through two questions on the questionnaire. Participants were asked the highest level of education they had completed, and how many years in total they spent at school or in full-time study.
Results indicate a reasonably high educational level of the study population. (Table 3.1.3b Appendix 1) 99.5% had at least finished Primary/Pastors' school level, 75.1% had reached some secondary/junior secondary school; 23.9% had at least finished Secondary school and 6.1% had completed some technical or tertiary level education. The average number of years spent in full-time study was 10.8 years or Form 4 in the old educational system.(Table 3.1.3b)

There was no gender difference as observed in the proportions completing each educational level, except as expected in the technical training area which showed a slightly higher proportion of the men 3.7% (±1.6) compared to women at 1% (±0.7). This was also affirmed when assessed through the number of years spent in full time study. Fig 3.1.3 shows the expected progressive trend in education levels, with younger age-groups generally leaving school at a higher level of education than their older counterparts. Whilst this may be so from primary level to secondary, there is no significant difference between age groups in proportions completing university level education.

Fig 3.1.3: Proportional Distribution of Sample Population according to Highest Educational Level Achieved

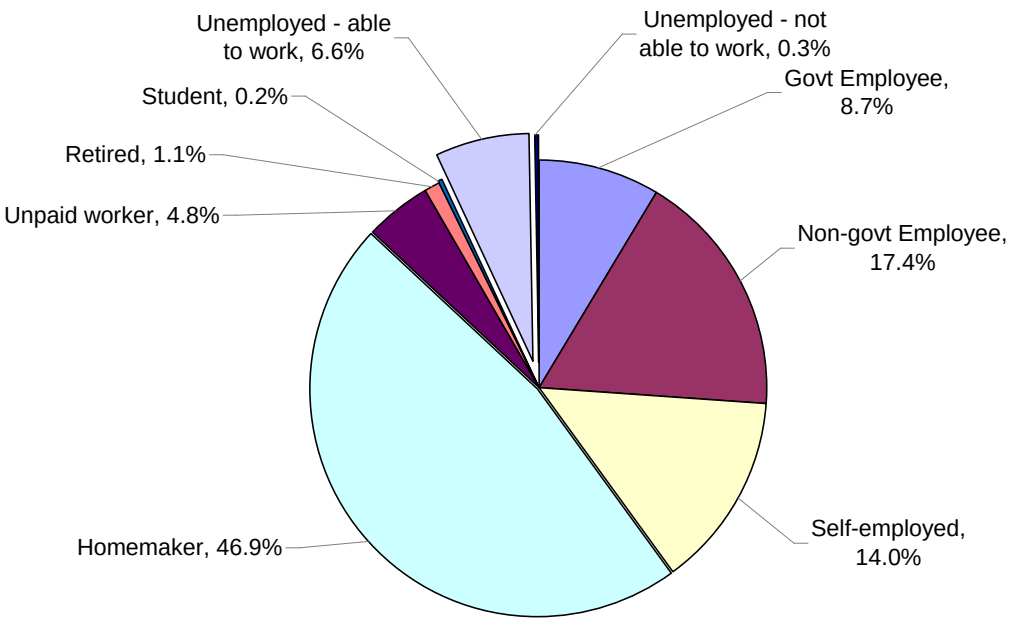


3.1.4 Employment Status

Overall, 40.3% of the study population were in paid employment. The government employed 8.7%, self-employment accounted for 14% whilst 17.4% were in paid employment elsewhere. The 59.7% who were not in paid employment were made of up Homemakers at 46.9%, students, retirees and unpaid workers at 6.1% while the remaining 6.3% were unemployed. (Fig 3.1.4) A higher proportion of men were in paid employment at 58.6%, compared to only 25% of the women. (Table 3.1.4a Appendix 1)

When those not in paid employment are assessed separately, the majority as mentioned above were homemakers at 78.3%, 8.0% were in unpaid occupations including volunteer work and subsistence farming, 1.8% had retired, 0.4% were students, and 11.5% were unemployed. (Table 3.1.4b Appendix 1) Of those who were unemployed, a high 95.3% reported being able to work.

Fig 3.1.4: Employment Status of Respondents



3.2 STEP 1: BEHAVIOURAL MEASURES

3.2.1 Tobacco Use

The questionnaire asked various questions regarding history of tobacco use, types of tobacco used and amounts of tobacco consumed.

The definitions of smoking status used in the survey are as follows:

Current Smoker:	A survey respondent who has smoked any tobacco product in the previous 12 months.
Non Smoker:	A survey respondent who has not smoked a tobacco product in the previous 12 months.
Daily Smoker:	A current smoker who smokes a tobacco product on a daily basis.
Non-daily Smoker:	A current smoker but does not smoke on a daily basis.

Results Description

Smoking Status

The survey indicated 40.3.% (±2.9) of the study population were current smokers and 59.7% do not smoke. Those who smoked on a daily basis accounted for 34.6% of the study population. (Table 3.2.1a Appendix 1)

A significant gender difference was observed with 56.9% (±4.2) of the men being current smokers, compared to 21.8% (±3.2) of the women. No significant differences in smoking status were observed across age groups or across regions of residence. (Table 3.2.1b Appendix 1) The gender difference also translated to the daily smokers when assessed against the total study population, where only 18% (±2.5) of all women in the study were daily smokers, compared to 49.4% (± 4.2) of the men.

When daily smokers are assessed against all current smokers however, no gender difference was observed. (Table 3.2.1c Appendix 1) The proportion of current smokers who smoked on a daily basis was 86.9% (±4.8) for the men, compared to 82.7(±5.8) for the women and 85.8(±4.4) overall. This illustrated that once a smoker, gender makes no difference as to the probability of being a daily smoker or not. No significant differences could be seen by region.

Age started Smoking

The average age at which the daily smokers amongst the study population started smoking was 21.4 yrs. (Table 3.2.1d Appendix 1) Though there was a gender difference in the average starting age, the women were not far behind the men. Women on average started smoking at 24.4 years (±1.7) compared with men who started earlier at an average age of 20.4 years (±0.8). There was no significant difference across age groups amongst the men. The women however show a distinct difference where the youngest age-group (25-34 yrs) started smoking at a much younger average age of 21.6 years (±1.4) compared to 29.2 years (±3.5) for the women in the 55-64 years age group. The average starting age for smoking for the younger women (25-34 years and 35-44 years) fall within the average starting age range for the men. No significant differences could be seen across the regions for the average starting age of daily smokers. (Table 3.2.1e Appendix 1)

Duration of Smoking

The average number of years of smoking for the daily smokers was 18.4 years (± 1.6). Men showed a slightly higher average duration of smoking than the women, at 19.4 (±1.7) years and 15.6 (±1.7) years respectively. (Table 3.2.1f Appendix 1) Though a gender difference was observed in the two older age groups, where the average duration of smoking is higher in the males, this difference disappears for the younger age groups, so that women daily smokers in the 25-34 years and 35-44years age-groups have been smoking for the same average number of years as their male counterparts. Smoking duration did not vary significantly between regions (Table 3.2.1g – Appendix 1)

Manufactured Cigarette Smoking

Manufactured cigarettes were smoked by 80.1% (±7.3) of the daily smokers. (Table 3.2.1h Appendix 1) No significant gender difference was observed. By age group, a general trend can be seen towards smoking manufactured cigarettes by the younger population. A significant difference was seen between the youngest and oldest age groups, where a very high 91.4% (±5.2) of the 25-34 years age group, were smoking manufactured cigarettes, compared to only 56.7% (±11.0) of the 55-64 year age group.

Amount of Tobacco Smoking

The amount of smoking for all daily smokers was quite high. Those who smoked manufactured cigarettes did so at an average of 12 cigarettes per day. (Table 3.2.1i Appendix 1)Smokers of hand-rolled cigarettes were not far behind at 9.4 cigarettes per day. Piped tobacco smokers averaged at 3.9 pipes per day, whilst those who smoked other types which included Samoan rolled tobacco, cigars and cheroots, smoked at an average of 7.4 units per day. No real differences were evident between genders or across age groups, in the average amounts smoked per day of each tobacco type.

Comparison with previous data

Table 3.2.1 lists previous studies on smoking in Samoa. Though direct comparisons are difficult due to differing methodologies, differing target age groups and uncertainty as to definitions of smoking to include in the prevalence estimates, a general observation is that in almost two decades, the STEPS survey results indicate that smoking prevalence for males and females has undergone a slight decrease.

Table 3.2.1: Smoking Prevalence in Samoa

Survey Year	Publication	Region	Age Group	Smoking Prevalence (%)		
				Male	*Female*	*Both Sexes*
1987	Zimmet et al [5]	Overall	35-59 yrs	75	27	
1991	Zimmet et al [6]	Urban (Apia)	25-74 yrs	50	19	
		Upolu Rural (Poutasi)		66.7	20.4	
		Rural Savaii (Tuasivi)		52.8	18.1	
1995	McGarvey et al [7]	Urban/Rural	29+ yrs	60	24	
2000	National Health Survey [8]	Overall	14+ yrs	29.9	8	19.4
		- Apia				16.3
		- North West Upolu				18.5
		- Rest of Upolu				21.0
		- Savaii				21.2
2002	STEPS Survey	Overall	25-64 yrs	56.9	21.8	40.3
		- Apia Urban				38.5
		- Upolu Rural				45.6
		- Savaii				36.8

3.2.2 Alcohol Consumption

Alcohol consumption amongst the study population was gauged by asking questions which addressed frequency and quantity of alcohol consumption.

The definitions used in the survey were:

Current Drinker: a survey respondent who has consumed alcohol within the last 12 months.

Abstainer: has not consumed alcohol in the last 12 months

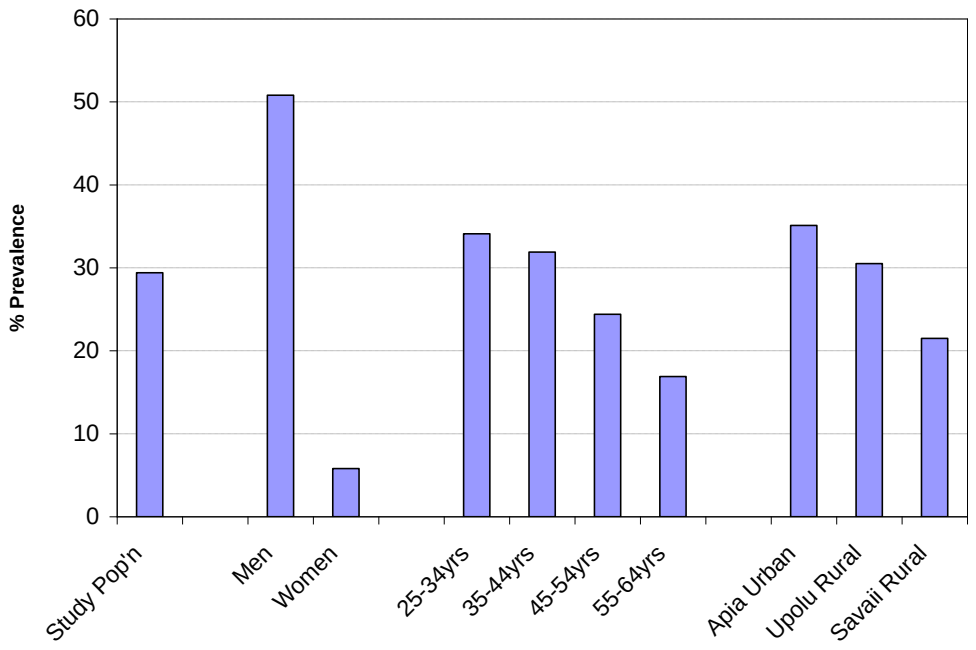
Binge Drinker: for males, a current drinker who consumes 5 or more standard drinks per drinking day; and for females, 4 or more standard drinks per drinking day, over the previous 7 days.

Results Description

As Table 3.2.2a shows, results indicate 29.4% (±4.1) of the study population were "current drinkers" or had consumed alcohol within the previous 12 months. Alcohol consumption was almost nine times higher in men than in women, with 50.8% (±5.6) of the men having consumed alcohol in the last 12 months compared to 5.8% (±1.8) of the women.

This notable difference by gender was seen in all the age groups. Fig 3.2.2 indicates drinking generally appears higher the younger the age group. However the difference was significant only between the youngest and the oldest of the four age groups overall, repeating the pattern exhibited in men due to their much higher representation in the drinking population. In women, drinking was highest in the 35-44 years age group, mirroring a pattern exhibited in women living in Apia Urban and Upolu Rural.

Fig 3.2.2: Alcohol Consumers over the Previous 12 Months



By region, though Fig 3.2.2a indicates higher drinking prevalence in residents of the Apia Urban region (35.1%±7.6), followed by those in Upolu Rural (30.5%±7.1) and lastly in Savaii (21.5%±7.0), at the 95% CI levels the study was not able to detect any significant differences

between the three regions overall. This pattern is again a reflection of the pattern in men. For women, the study showed significantly lower prevalence of drinking for those living in Savaii, (1.3%±2.3) than their counterparts in the Apia Urban area (9.8%±3.3).

Table 3.2.2a

Alcohol consumption status over the previous 12 months

Men

Age Group (years)	Apia Urban (N=551)			Upolu Rural (N=367)			Savaii (N=351)			All Regions (N=1269)		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	135	63.8	17.6	72	59.0	11.4	66	48.9	13.2	273	58.2	8.4
35-44	73	62.2	12.6	51	53.9	11.8	43	46	8.6	167	54.5	5.6
45-54	52	49.5	21.3	43	47.7	12.0	21	27.5	26.4	116	41.9	10.3
55-64	46	41.4	10.3	19	31.8	24.8	12	24.8	16.1	77	32	9.0
25-64	306	**58.5**	9.2	185	**52.0**	9.6	142	**40.1**	12	633	**50.8**	5.6

Women

Age Group (years)	Apia Urban (N=710)			Upolu Rural (N=421)			Savaii (N=373)			All Regions (N=1504)		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	28	11.4	6.4	6	4.6	3.4	3	2.3	4.3	37	6.6	2.7
35-44	21	12.7	2.4	11	8.3	4.9	1	0.8	2.6	33	7.7	2.2
45-54	8	6.0	7.3	5	5.9	13.9	0	-	-	13	3.8	2.9
55-64	4	3.0	2.8	1	1.4	3.5	1	1.6	4.6	6	2.0	1.8
25-64	61	**9.8**	3.3	23	**5.5**	2.4	5	**1.3**	2.3	89	**5.8**	1.8

Both Sexes

Age Group (years)	Apia Urban (N=1261)			Upolu Rural (N=788)			Savaii (N=724)			Alll Regions (N=2773)		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	163	39.6	14.9	78	33.4	11.7	69	26.8	7.0	310	34.1	6.7
35-44	94	38.1	6.9	62	31.9	9.8	44	24.5	8.1	200	31.9	4.3
45-54	60	27.9	7.2	48	31.9	11.6	21	14.1	12.6	129	24.4	5.9
55-64	50	21.7	5.9	20	16.5	11.3	13	13.4	10.0	83	16.9	4.5
25-64	367	**35.1**	7.6	208	**30.5**	7.1	147	**21.5**	7.0	722	**29.4**	4.1

Quantity of Alcohol Consumption

Current drinkers were asked the question "*In the past 12 months, how frequently have you had at least one alcoholic drink?"* Table 3.2.2b shows the distribution of responses to four categories.

Overall, a high 44.7% (±9.9) of current drinkers reported spending 1-4 days a week drinking alcohol; 46.7% (±10.6) of men and 25.3% (±7.5) of women. A further 11.0% (±3.9) of current drinkers had a higher drinking frequency of 5-7 days a week, which showed the majority of current drinkers in the study population consumed alcohol on at least one day in a week. For men the most common drinking frequency was 1-4 days per week, whilst for women the most common drinking frequency was not as high at less than one day a month (42.5%±14.9).

Current drinkers were also asked "*When you drink alcohol, on average, how many drinks do you have during one day?"* A high proportion (66.7%±4.0) of the current drinkers reported drinking 6 or more standard drinks on average in a drinking day; 66.2% (±4.4) of men and 38.7% (±8.2) of women (Table 3.2.2c). The proportion of those consuming six or more drinks in a drinking day was highest in the youngest age group and decreased with age, a reflection of the pattern in men who as mentioned previously are the vast majority of current drinkers.

The average number of standard drinks consumed per day by current drinkers was quite high. (Table 3.2.2d) Men consumed on average, 7.8 (±0.3) standard drinks per drinking day, whilst the equivalent for women was 5.5 (±1.2).

Binge Drinking

Binge drinking among current drinkers was defined as those who consumed 5 or more drinks for men and 4 or more drinks for women on a drinking day *within the previous 7 days*. Current drinkers were asked how many drinks they'd consumed on each day of the week preceding the survey and the proportion of binge drinkers was quantified as those who had consumed the binge drinking limit, on one or more days of the preceding week.

Table 3.2.2e indicates that among current drinkers, binge drinking was much higher amongst men (44.7%±6.3) compared to women (15.6±15.2). For men binge drinking was highest in the youngest age group 25-34 years, (56.1%±7.7) and decreased with age, whilst for women it was highest in the oldest age group. Among regions, Apia Urban had the highest proportion of binge drinkers, followed by Upolu Rural then Savaii, though the differences were not statistically significant.

Of note is that had the definition of binge drinking not been restricted to consumption within the past 7 days, the prevalence of binge drinking would be much higher as indicated in the results of both Tables 3.2.2c and 3.2.2d.

When current drinkers were asked the number of days they had indulged in binge drinking over the past 12 months, men reported having indulged in binge drinking on an average of 29.4 days (±10.6) over the past 12 months, (2-3 times in a month) whilst women had indulged in binge drinking on 14.5 days (±12.5) over the past 12 months, or about once a month. (Table 3.2.2f – Appendix 1)

Table 3.2.2b

Frequency of drinking days in the past 12 months among current drinkers

Men (N = 627)

Age Group (years)	5-7 days/week			1-4 days/week			1-3 days/month			< once a month		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	28	9.7	5.1	151	57.2	14.0	64	22.2	8.6	30	10.9	4.9
35-44	25	15.1	7.8	63	38.1	8.7	43	25.8	7.6	35	21.0	8.9
45-54	13	10.8	8.5	50	43.4	9.2	27	24.1	10.7	24	21.7	4.9
55-64	9	10.6	7.7	18	25.3	18.2	25	31.2	17.3	22	32.8	10.8
25-64	75	11.7	4.1	282	46.7	10.6	159	24.3	7.4	111	17.4	4.9

Women (N = 88)

Age Group (years)	5-7 days/week			1-4 days/week			1-3 days/month			< once a month		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	1	2.2	5.1	14	36.1	12.0	11	30.7	19.1	11	31.0	23.4
35-44	2	6.0	9.9	4	6	11.4	10	32	11.9	16	48.3	15
45-54	0	0.0	0	3	21.6	23.2	2	16.2	16.3	8	62.3	23.3
55-64	1	16.2	36	1	29.2	50.6	0	0	0	4	54.5	53.8
25-64	4	4.2	5.3	22	25.3	7.5	23	28.1	10.9	39	42.5	14.9

Both Sexes (N= 715)

Age Group (years)	5-7 days/week			1-4 days/week			1-3 days/month			< once a month		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	29	9.0	4.8	165	55.3	13.3	75	22.9	7.2	41	12.7	5.5
35-44	27	14.1	7.3	67	35.3	8.1	53	26.5	6.2	51	24.1	8.6
45-54	13	10.0	8	53	41.8	8.3	29	23.5	9.8	32	24.6	5.6
55-64	10	11.0	8.4	19	25.6	16.0	25	29.3	16.4	26	34.1	11.1
25-64	79	11.0	3.9	304	44.7	9.9	182	24.6	6	150	19.7	5.0

Region	5-7 days/week			1-4 days/week			1-3 days/month			< once a month		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
Apia Urban	43	12.0	4.5	170	50.6	14.8	88	22.5	7.2	64	14.9	6.8
Upolu Rural	22	10.4	6.8	95	49.2	15.8	42	20.2	6.4	45	20.2	9.8
Savaii	14	9.6	11.5	39	26.3	7.4	52	35.3	18.2	41	28.8	5.0
All Regions	79	11.0	3.9	304	44.7	9.9	182	24.6	6.0	150	19.7	5.0

Table 3.2.2c

Frequency of drinks per drinking day in the past 12 months among current drinkers

Men (N) = 627

Age Group (years)	1 drink			2-3 drinks			4-5 drinks			6+ drinks		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	1	0.3	0.7	15	5.6	2.5	58	21.3	5.0	196	72.8	5.2
35-44	0	0	0.0	12	7.8	6.3	41	24.8	7.0	111	67.4	10.7
45-54	1	0.9	2.1	12	10	5.4	41	35	8.7	62	54.1	10.7
55-64	3	4.9	5.9	12	17	10.2	23	31	17.6	39	47.1	13.4
25-64	5	0.7	0.6	51	7.8	2.1	163	25.3	3.9	408	66.2	4.4

Women (N) = 87

Age Group (years)	1 drink			2-3 drinks			4-5 drinks			6+ drinks		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	4	8.7	12.4	10	24.3	9.5	9	22.8	12.2	14	44.2	21.3
35-44	3	9.7	14.7	11	33.6	22.8	6	20.8	18.2	12	35.9	21
45-54	2	14.3	26.8	6	42.9	32.7	3	25.8	26.5	2	17	17.3
55-64	0	0	0	2	28.5	56.5	0	0	0	3	71.5	56.5
25-64	9	9.4	8.7	29	30.3	12.9	18	21.5	6.7	31	38.7	8.2

Both Sexes (N) = 714

Age Group (years)	1 drink			2-3 drinks			4-5 drinks			6+ drinks		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	5	1.1	1.3	25	7.3	2.2	67	21.4	5.0	210	70.2	5.0
35-44	3	1.1	1.9	23	10.7	6.3	47	24.3	5.9	123	63.8	9.6
45-54	3	1.9	3.4	18	12.3	5.6	44	34.3	7.8	64	51.4	10.5
55-64	3	4.7	5.7	14	17.5	10.1	23	29.7	17.0	42	48.1	14.2
25-64	14	1.5	1.0	80	9.9	2.0	181	24.9	3.4	439	63.7	4.0

Table 3.2.2d

Average number of standard drinks consumed during one day

Age Group (years)	Men			Women			Both Sexes		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	270	8.2	0.7	37	5.9	1.8	307	8.0	0.5
35-44	164	8.2	0.8	32	5.6	2.3	196	8.0	0.9
45-54	116	6.7	0.6	13	3.9	2.2	129	6.5	0.5
55-64	77	6.0	0.9	5	5.5	2.8	82	5.6	0.9
25-64	627	7.8	0.3	87	5.5	1.2	714	7.6	0.4

Table 3.2.2e

Proportion of binge drinkers* among current drinkers in the past week

		Men (N=633) 5 or more drinks			Women (N=89) 4 or more drinks		
		n	%	CI (±)	n	%	CI (±)
Age Group	25-34	153	56.1	7.7	9	24.3	24.4
	35-44	66	39.4	8.3	2	6.8	9.0
	45-54	36	31.2	9.2	0	0.0	0.0
	55-64	23	26.2	10.2	2	45.4	53.8
Total		278	**44.7**	6.3	13	**15.6**	15.2
Region	Apia Urban	153	52.3	10.1	12	22.3	20.3
	Upolu Rural	72	41.3	3.7	0	-	-
	Savaii	53	36.2	12.0	1	20.2	25.1
Total		278	**44.7**	6.3	13	**15.6**	15.2

* for men: 5 or more standard drinks; for women: 4 or more standard drinks

3.2.3 Diet

Fruit and Vegetables

Fruit and vegetable consumption amongst the population was gauged by asking the study participants the frequency and quantity of fruit and vegetables consumed. Starchy fruit and vegetables were included in the definition of vegetables. A serving of fruit was defined as half a cup and a serving of vegetable as half a cup or one cup of vegetable salad.

Results Description

Fruit Consumption

Frequency of fruit consumption

Results from the survey indicate that people did not eat fruit every day as recommended. On average most people ate fruit only 2.8 days per week. (Table 3.2.3a) Women were slightly more likely to consume fruit, with an average of 3.0 days per week, compared to the men's average of 2.6 days. For both men and women, frequency of fruit consumption did not vary significantly with age or by region of residence. (Table 3.2.3b Appendix 1)

Amount of fruit consumed

Findings indicate a fair portion (11.4%) of the study population ate virtually no fruit i.e. no fruit or less than one serving a day (Table 3.2.3c) Men were more likely than women to consume no fruit or have very low intakes i.e. 15.1% of men reported eating virtually no fruit compared to 7.1% of women. Low intakes appeared highest in the oldest age group for both men and women though the differences among age groups were not significant. The amount of fruit consumed did not vary significantly with region of residence. (Table 3.2.3d Appendix 1)

On days that fruit are consumed, the mean number of servings consumed by the survey respondents was 2.8. (Table 3.2.3e) This indicator of consumption per day did not vary significantly by sex nor age-group. By region of residence, though Savaii showed slightly higher mean servings of fruits consumed per day in which fruit is consumed, followed by the Apia Urban area then Upolu Rural, the differences were not statistically significant. (Table 3.2.3h)

*Comparison with previous data-**

Though survey methodologies and study populations differ, a study on urban youth in 1997[9] found that 46% of males and 37% of females reported eating no fruit on the day before the survey. These proportions are much higher than the current survey's findings of 15.3% of males and 7.1% of females who eat virtually no fruit.

Both surveys showed that women were more likely to eat fruit than men.

Table 3.2.3a

Mean days in a week where fruit and/or vegetables are eaten.

Days eating Fruit in a typical week

Age Group (years)	Men (N=1283)			Women (N=1508)			Both Sexes (N=2791)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	481	2.7	0.2	515	3.0	0.3	996	2.8	0.2
35-44	313	2.5	0.3	411	3.0	0.4	724	2.8	0.3
45-54	269	2.5	0.4	310	3.2	0.5	579	2.8	0.3
55-64	220	2.5	0.3	272	3.0	0.4	492	2.8	0.3
25-64	1283	**2.6**	0.2	1508	**3.0**	0.2	2791	**2.8**	0.2

Days eating Vegetables in a typical week

Age Group (years)	Men (N=1220)			Women (N=1461)			Both Sexes (N=2681)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	457	6.3	0.3	494	6.5	0.2	951	6.4	0.2
35-44	294	6.2	0.2	394	6.5	0.1	688	6.4	0.1
45-54	261	6.4	0.2	307	6.7	0.1	568	6.5	0.2
55-64	208	6.5	0.3	266	6.6	0.2	474	6.5	0.2
25-64	1220	**6.3**	0.2	1461	**6.5**	0.1	2681	**6.4**	0.1

Table 3.2.3c

Servings of fruit consumed per day (by age group and sex)

Men (N=1283)

Age Group (years)	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	57	11.8	3.9	90	19.4	7.8	221	46.6	5.6	113	22.2	9.0
35-44	53	16.9	5.6	61	19.9	6.3	120	39.2	6.2	79	24.0	8.6
45-54	47	17.6	4.4	45	16.8	6.5	114	42.8	7.7	63	22.8	7.2
55-64	39	19.6	4.1	29	14.6	6.6	101	42.6	6.3	51	23.3	7.8
25-64	196	**15.3**	3.7	225	**18.5**	5.8	556	**43.2**	4.1	306	**22.9**	7.5

Women (N=1508)

Age Group (years)	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	36	6.3	3.0	122	24.8	5.0	253	48.8	4.9	104	20.1	6.1
35-44	31	7.6	2.9	71	17.9	5.9	220	54.0	5.9	89	20.5	10.2
45-54	23	7.2	3.8	67	21.3	8.5	153	49.5	6.5	67	22.0	8.3
55-64	20	8.3	3.8	43	15.1	7.5	139	50.5	10.8	70	26.1	9.6
25-64	110	**7.1**	1.9	303	**20.8**	5.1	765	**50.7**	4.2	330	**21.4**	6.6

Both Sexes (N=2791)

Age Group (years)	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	93	9.2	2.8	212	21.9	5.9	474	47.7	3.3	217	21.2	7
35-44	84	12.5	4.0	132	19.0	5.5	340	46.3	5.4	168	22.3	8.9
45-54	70	12.8	3.6	112	18.9	5.8	267	45.9	5.5	130	22.4	6.5
55-64	59	13.9	3.1	72	14.9	6.0	240	46.5	7.8	121	24.7	7.6
25-64	306	**11.4**	2.7	528	**19.6**	5.2	1321	**46.8**	3.6	636	**22.2**	6.8

Table 3.2.3e

Mean number of servings per day where fruits or vegetables are eaten
(By Age group and Sex)

Fruits

Age Group (years)	Men (N=1283)			Women (N=1508)			Both Sexes (N=2791)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	481	2.9	0.5	515	2.7	0.2	996	2.8	0.4
35-44	313	2.7	0.5	411	2.9	0.6	724	2.8	0.5
45-54	269	2.8	0.4	310	3.0	0.3	579	2.9	0.3
55-64	220	2.8	0.5	272	3.2	0.6	492	3.0	0.5
25-64	1283	**2.8**	0.4	1508	**2.9**	0.3	2791	**2.8**	0.4

Vegetables

Age Group (years)	Men (N=1220)			Women (N=1461)			Both Sexes (N=2681)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	457	5.9	0.8	494	5.6	0.7	951	5.8	0.8
35-44	294	5.7	0.9	394	5.5	0.8	688	5.6	0.8
45-54	261	5.6	0.7	307	5.5	0.8	568	5.5	0.7
55-64	208	5.7	0.8	266	5.6	0.6	474	5.7	0.6
25-64	1220	**5.8**	0.7	1461	**5.6**	0.6	2681	**5.7**	0.7

Fruits and Vegetables

Age Group (years)	Men (N=1220)			Women (N=1461)			Both Sexes (N=2681)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	482	8.5	1.3	515	8.1	0.9	997	8.3	1.1
35-44	313	8.0	1.2	411	8.2	1.3	724	8.1	1.2
45-54	270	8.1	1.0	313	8.3	1.0	583	8.2	1.0
55-64	222	8.1	1.3	272	8.8	1.0	494	8.5	1.0
25-64	1287	**8.2**	1.1	1511	**8.3**	1.0	2798	**8.2**	1.1

Vegetable Consumption

Frequency of vegetable consumption

As Table 3.2.3a shows, survey participants reported eating vegetables practically every day of the week. (6.4 days). Men ate vegetables on average 6.3 days of the week and women 6.5 days. This consumption pattern was very similar in all age groups for both men and women. The frequency of vegetable consumption was highest in Savaii, followed by Rural Upolu then Apia, however the differences were minimal as shown in Table 3.2.3b Appendix 1.

The frequent consumption of vegetables is almost certainly due to the fact that starchy vegetables e.g. taro were included in the definition of vegetables. General observation of the Samoan diet suggests that Samoans eat more starchy vegetables than other types of vegetables. If the starchy foods had not been included the consumption of vegetables would most likely have been much lower.

Amount of vegetables consumed

On days that vegetables are consumed, 54.7% of the survey participants reported eating 5 or more servings of vegetables. (Table 3.2.3f) As mentioned previously, had starchy vegetables been excluded from the definition of vegetables in this survey, this proportion would have been much lower. Amount of vegetable servings eaten per day did not vary significantly between sexes, age group or region of residence. (Table 3.2.3g Appendix 1)

The mean number of servings consumed by the survey respondents on days in which vegetables are consumed was 2.8. (Table 3.2.3e) As for fruit consumption, this indicator of amount of vegetable consumption did not vary significantly by sex nor age-group. By region of residence, though residents of Savaii showed slightly higher mean servings of vegetables consumed, followed by residents of Apia Urban area then Upolu Rural, the differences were not statistically significant. (Table 3.2.3h – Appendix 1)

Table 3.2.3f

Servings of vegetables consumed per day (by age group and sex)

Men (N=1220)												
Age Group (years)	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	3	0.8	0.8	37	8.9	5.2	149	33.9	10.8	268	56.5	15.8
35-44	0	-	-	11	4.2	3.1	113	39.2	11.8	170	56.6	14.2
45-54	1	0.4	0.8	18	7.2	3.9	97	38.9	12.3	145	53.6	15.0
55-64	0	-	-	8	3.8	3.6	84	39.7	14.5	116	56.5	16.3
25-64	4	**0.4**	0.4	74	**6.6**	3.8	443	**37.1**	10.6	699	**56.0**	14.2

Women (N=1461)												
Age Group (years)	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	0	-	-	30	6.8	4.1	185	38.9	13.5	279	54.3	16.0
35-44	0	-	-	23	6.3	3.8	162	42.0	11.8	209	51.7	14.9
45-54	0	-	-	10	3.3	2.7	133	43.5	12.0	164	53.2	14.0
55-64	0	-	-	15	5.1	3.6	107	40.3	12.0	144	54.6	13.7
25-64	0	**-**	-	78	**5.8**	3.0	587	**40.8**	11.5	796	**53.4**	13.9

Both Sexes (N=2681)												
Age Group (years)	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	3	0.4	0.4	67	7.9	4.6	334	36.2	11.5	547	55.5	15.6
35-44	0	-	-	34	5.2	3.1	275	40.6	11.2	379	54.2	14.1
45-54	1	0.2	0.4	28	5.4	3.0	230	41	11.3	309	53.4	13.8
55-64	0	-	-	23	4.5	2.9	191	40	11.8	260	55.5	13.9
25-64	4	**0.2**	0.2	152	**6.2**	3.3	1030	**38.9**	10.7	1495	**54.7**	13.8

Fruit and vegetables

Amount of fruits and vegetables consumed

As indicated in Table 3.2.3i, a high 32.7% of the study population eat less than the recommended 5 servings of fruits and vegetables per day. The results were similar between the sexes and across the age groups and regions of residence. That a third of the study population is indicated as eating less than the recommended 5 servings of fruits and vegetables a day, is of interest. The finding has worrying implications since scientific evidence shows that fruit and vegetables are protective against non-communicable diseases.

Fresh fish, Tinned Fish and Mutton Flaps

Survey respondents were asked how many times they had consumed fresh fish, tinned fish and mutton flaps in the preceding week.

Of the three food items, consumption of tinned fish was highest, followed by fresh fish then mutton flaps. Tinned fish was eaten an average of 3.3 times in the week, followed by fresh fish at 2.3 times and mutton flaps at an average 1.1 times in the week. (Table 3.2.3j)

Men in the youngest age group 25-34 years showed a lower consumption rate per week (1.9) of fresh fish, than men in the older age groups. Men in the oldest age group 55-64 years similarly showed a lower consumption rate for mutton flaps than their younger counterparts. Other than these there were generally no significant differences by age group for each of the three food items. These findings overall are not surprising given the communal nature of living including food preparation and consumption, within Samoan families.

By region of residence, consumption of tinned fish was higher for respondents living in Savaii than the rest of Samoa. Residents of Apia Urban registered higher consumption of mutton flaps - slightly higher than residents of Upolu Rural and significantly higher than residents of Savaii. For fresh fish, Upolu rural residents showed higher consumption rates of fresh fish – slightly higher than for residents of Savaii and significantly higher than consumption by residents of Apia Urban.

Table 3.2.3i

Proportion consuming <5 servings of combined fruits and vegetables per day (by age group, region and sex)

Age Group (years)	Men (N=1287)			Women (N=1511)			Both Sexes (N=2798)		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	143	32.1	13.7	162	32.9	11.3	305	32.4	12.1
35-44	107	35.2	12.1	130	33.2	12.6	237	34.2	11.7
45-54	87	33.8	14.7	90	29.1	12.5	177	31.6	13.2
55-64	69	32.4	13.2	83	30.1	12.0	152	31.2	11.3
25-64	406	**33.3**	12.3	465	**31.9**	11.3	871	**32.7**	11.7

Region	Men (N=1220)			Women (N=1461)			Both Sexes (N=2681)		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
Apia Urban	162	31.7	20.9	212	31.8	17.9	374	31.8	19.3
Upolu Rural	149	40.9	16.6	151	36.7	17.4	300	39.0	16.5
Savaii	95	27.2	22.9	102	27.4	22.4	197	27.3	22.5
All Regions	406	**33.3**	12.3	465	**31.9**	11.3	871	**32.7**	11.7

Comparison with previous data

In 1991 the frequency of fresh fish consumption was reported to be 1.8 days per week in urban areas and 2.6 in rural areas.[10] Comparable STEPS data show Apia residents eating fresh fish 2.0 times a week and people in Rural Upolu 2.8. A direct comparison of the data suggests that the frequency of fresh fish consumption in 2002 was similar to that of 1991. However there are differences in study methodologies and reporting methods, making it difficult to interpret the information.

A 1999 study showed that, at the time, mutton flaps contributed most of the protein in the Samoan diet followed by fresh fish, then tinned fish.[11] Although the methodology and the data reported in the STEPS survey are quite different from the 1999 study it does appear that tinned fish may have become a more significant source of protein in the diet than fresh fish and that mutton flaps are no longer the important source of protein they once were.

Table 3.2.3i

Mean number of times fresh fish, tinned fish and mutton flaps consumed in a week (by age group and sex)

Fresh Fish

Age Group (years)	Men (N=1287)			Women (N=1512)			Both Sexes (N=2799)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	483	1.9	0.3	515	2.1	0.4	998	2.0	0.3
35-44	311	2.6	0.4	411	2.1	0.3	722	2.4	0.3
45-54	271	2.6	0.4	314	2.5	0.5	585	2.5	0.4
55-64	222	2.9	0.4	272	2.7	0.3	494	2.8	0.3
25-64	1287	**2.4**	0.3	1512	**2.3**	0.3	2799	**2.3**	0.3

Tinned Fish

Age Group (years)	Men (N=1289)			Women (N=1512)			Both Sexes (N=2801)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	483	2.9	0.3	515	3.3	0.4	998	3.1	0.3
35-44	313	3.1	0.4	411	3.7	0.4	724	3.4	0.4
45-54	271	3.1	0.5	314	3.7	0.2	585	3.4	0.3
55-64	222	3.2	0.7	272	3.7	0.4	494	3.4	0.5
25-64	1289	**3.0**	0.3	1512	**3.5**	0.3	2801	**3.3**	0.3

Mutton Flaps

Age Group (years)	Men (N=1289)			Women (N=1512)			Both Sexes (N=2801)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	483	1.6	0.3	515	1.2	0.3	998	1.4	0.3
35-44	313	1.1	0.3	411	0.9	0.2	724	1.0	0.2
45-54	271	1.1	0.3	314	0.7	0.2	585	0.9	0.2
55-64	222	0.7	0.2	272	0.7	0.3	494	0.7	0.2
25-64	1289	**1.3**	0.2	1512	**1.0**	0.2	2801	**1.1**	0.2

Table 3.2.3j

Mean number of times fresh fish, tinned fish and mutton flaps consumed in a week (by region)

Fresh Fish

Region	Men (N=1287)			Women (N=1512)			Both Sexes (N=2799)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
Apia Urban	558	1.9	0.1	712	2.1	0.4	1270	2.0	0.2
Upolu Rural	374	3.0	0.5	422	2.6	0.7	796	2.8	0.6
Savaii	355	2.3	0.7	378	2.1	0.5	733	2.2	0.6
All Regions	1287	**2.4**	0.3	1512	**2.3**	0.3	2799	**2.3**	0.3

Tinned Fish

Region	Men (N=1289)			Women (N=1512)			Both Sexes (N=2801)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
Apia Urban	560	2.9	0.3	712	3.2	0.4	1272	3.0	0.3
Upolu Rural	374	2.6	0.5	422	3.2	0.4	796	2.9	0.4
Savaii	355	3.8	0.5	378	4.2	0.5	733	4.0	0.5
All Regions	1289	**3.0**	0.3	1512	**3.5**	0.3	2801	**3.3**	0.3

Mutton Flaps

Region	Men (N=1289)			Women (N=1512)			Both Sexes (N=2801)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
Apia Urban	560	1.7	0.2	712	1.3	0.3	1272	1.5	0.2
Upolu Rural	374	1.2	0.5	422	0.9	0.3	796	1.1	0.4
Savaii	355	0.8	0.3	378	0.5	0.4	733	0.6	0.3
All Regions	1289	**1.3**	0.2	1512	**1.0**	0.2	2801	**1.1**	0.2

3.2.4 Physical Activity

Questions asked in this section related to three domains or areas in people's lives where physical activity is expected to take place. These being;

1. Physical Activity at ***Work***;
2. Physical activity during ***Travel*** to and from places ; and
3. ***Recreational*** physical activity.

Definitions used in the survey are as follows:

Moderate Activity:
More than 10 minutes at a time doing any of the following:
- painting
- gardening
- cleaning
- plastering
- swimming
- climbing stairs
- cycling
- farming

Vigorous Activity:
More than 10 minutes at a time doing any of the following:
- Heavy construction
- Carrying heavy loads
- Digging
- Running
- Strenuous sport
- Sawing wood
- shovelling

To quantify and measure physical activity for this report, activities done by participants were converted and measured in MET minutes. MET is an abbreviation for metabolic equivalent and its calculation reflects the intensity of a specific physical activity. A MET is defined as the ratio of the associated metabolic rate for a specific activity divided by the resting metabolic rate. The resting metabolic rate is approximately 1 MET and reflects the energy cost of sitting quietly. The MET values weighting for the three Physical Activity domains are as follows:

- Moderate Physical Activity (Work and Recreation Domains) = 4.0 METS
- Vigorous Physical Activity (Work and Recreation Domains) = 8.0 METS
- Transport Related walking/cycling = 4.0 METS

Levels of Activity were defined as below in terms of MET minutes:

- Inactive (Low) (<600 MET minutes per week)
- Moderately Active (Moderate) (600-1500 MET minutes per week)
- Vigorously Active (High) (>1500 MET minutes per week)

Results Description

In terms of total physical activity, the study population averaged 99.4 MET minutes per day. (±12.1) Women again featured poorly at 45.1 (±12.8) MET minutes per day compared to men with more than three times as much at 145.3 (±13.9) MET minutes per day. (Table 3.2.4a)

Whilst the average MET minutes per day may seem relatively high, the medians give a better indication of where the study population is at. In contrast to the average of 99.4 MET minutes per day for the study population, the median was only 30.0 MET minutes per day. The median for women was 12.8 MET minutes per day and for men was 68.6 MET minutes per day. This reflects that the majority of the study participants reported low levels of physical activity, especially women.

The above findings are further corroborated when the study population is classed into the three categories of Inactive (Low), Moderately Active (Moderate), and Vigorously Active (High). Results indicate about half the study population at 50.3% (±5.7) were inactive. (Table 3.2.4b)

There is a significant gender difference in that men have significantly higher proportions compared to women in the Moderate and Vigorously Active groups, whilst women have higher proportions classified in the Inactive group. As Table 3.2.4b shows, 64.4% (±7.5) of women were inactive, compared to 37.6% (±5.7) of the men. A further 33.1% (±7.0) of women were moderately active, compared to 47.6% (±5.5) of the men, whilst only 2.5% (±0.9) of the women were classified vigorously active compared to 14.8% (±3.7) of the men. There were no age-group differences within each of the classifications for the study population.

In terms of physical activity in the three domains of work, travel and recreation, findings indicate that the majority of the study population's physical activity is undertaken at work, with a mean of 62.5 (±7.1) MET minutes per day. (Table 3.2.4b) This was due mainly to the men, where their average amount of physical activity time undertaken at work of 102.0 (±11.0) MET minutes per day was significant higher than that spent in the other two domains of travel and recreation. In contrast, women on average only spent 15.1(±6.2) MET minutes per day in the work domain. There was no significant difference in the mean amounts of physical activity time spent by women in work, travel or recreation. For men, whilst work is by far the domain where they get the most physical activity, there is no significant difference in the amounts of physical activity time spent in travel or recreation, and this held true for the study population as a whole. Within each domain, work is the only area where there is a significant difference in mean physical activity times by gender. Though men exhibit slightly higher mean times than women in both the travel and recreation areas, the differences were not statistically significant. Within each of the three domains, no significant differences in levels of physical activity could be seen across age groups, for males or females.

Table 3.2.4b

Levels of Total Physical Activity by Age-Grp & Sex

Men (N=1277)

Age Group (years)	High			Moderate			Low		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	63	13.1	4.4	258	54.1	7.3	161	32.8	5.8
35-44	49	15.4	6.4	139	45.4	8.1	120	39.2	9.7
45-54	45	16.9	6.5	115	42.7	8.9	110	40.4	7.7
55-64	35	15.6	8.1	86	39.2	10.6	96	45.2	9.9
25-64	192	**14.8**	3.7	598	**47.6**	5.5	487	**37.6**	5.7

Women (N=1500)

Age Group (years)	High			Moderate			Low		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	12	2.2	1.5	154	31.9	7.3	342	65.9	7.3
35-44	8	1.9	1.2	150	36.5	9.4	251	61.5	9.9
45-54	7	2.2	1.5	106	34.4	7.2	199	63.4	8.0
55-64	15	4.9	3.6	70	27.2	10.5	186	67.9	11.0
25-64	42	**2.5**	0.9	480	**33.1**	7.0	978	**64.4**	7.5

Study Population (N=2777)

Age Group (years)	High			Moderate			Low		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	75	8.1	2.1	412	43.9	5.5	503	48.1	4.6
35-44	57	8.9	3.7	289	41.1	7.4	371	49.9	9.2
45-54	52	10.2	3.6	221	38.9	6.8	309	50.9	6.6
55-64	50	10.2	5.0	156	33.2	10.1	282	56.6	9.6
25-64	234	**9.0**	2.0	1078	**40.8**	5.4	1465	**50.3**	5.7

Table 3.2.4a

Mean Physical Activity By Age Group & Sex in MET minutes per day

Age Group (years)	Men (N=1277)			Women (N=1500)			Both Sexes (N=2777)		
	n	Mean	CI (±)	N	Mean	CI (±)	n	Mean	CI (±)
25-34	423	152.9	21.4	409	51.2	19.8	832	108.2	17.4
35-44	269	159.1	26.9	344	46.3	14.8	613	106.0	19.5
45-54	240	120.7	28.4	273	41.2	13.5	513	84.8	20.6
55-64	198	125.7	22.8	236	31.5	9.7	434	79.8	15.9
25-64	1130	**145.3**	13.9	1262	**45.1**	12.8	2392	**99.4**	12.1

Table 3.2.4 c

Levels of physical activity during work, travel and recreation time by age group and sex

Physical Activity - Work

Age Group (years)	Men (N=1277)			Women (N=1500)			Study Population (N=2777)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	438	106.1	20.5	421	17.6	12.7	859	67.2	13.0
35-44	285	116.1	23.6	352	15.1	7.6	637	69.4	16.8
45-54	244	82.4	21.6	279	12.6	9.0	523	50.9	13.9
55-64	203	83.6	23.5	238	11.1	7.1	441	48.5	13.1
25-64	1170	**102.0**	11.0	1290	**15.1**	6.2	2460	**62.5**	7.1

Physical Activity - Travel

Age Group (years)	Men (N=1277)			Women (N=1500)			Study Population (N=2777)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	469	27.1	8.9	493	19.2	6.8	962	23.5	6.3
35-44	297	24.8	8.9	399	21.3	6.8	696	23.1	7.4
45-54	266	23.9	5.7	306	21.9	6.3	572	23.0	5.3
55-64	211	26.5	4.8	270	12.6	3.1	481	19.4	3.3
25-64	1243	**25.8**	5.8	1468	**19.3**	5.6	2711	**22.7**	5.2

Physical Activity - Recreational

Age Group (years)	Men (N=1277)			Women (N=1500)			Study Population (N=2777)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	480	24.0	6.1	504	13.9	7.0	984	19.3	5.7
35-44	303	19.2	6.9	406	9.3	5.2	709	14.4	5.5
45-54	269	14.4	9.5	311	7.1	4.4	580	11.1	6.8
55-64	217	12.4	8.0	270	8.6	6.5	487	10.5	6.1
25-64	1269	**19.4**	5.9	1491	**10.6**	5.3	2760	**15.2**	5.3

3.3 STEP 2: PHYSICAL MEASURES

3.3.1 Overweight and Obesity

To gauge obesity and body fat levels within the study population, their height, weight and waist circumferences were physically measured by trained staff for the second step of the survey. Results are presented as metric units.

Body Mass Index is an approximate measure of obesity and is calculated for each participant as their weight in kilograms divided by the square of their height in meters. Each participant's BMI is then classified into the risk categories as outlined below.

Calculating BMI:

$$BMI = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}$$

Risk Factor Categories for BMI :

Underweight	BMI < 18.5
Normal	18.5 ≤ BMI < 25.0
Overweight	25.0 ≤ BMI < 30.0
Obese	BMI ≥ 30.0

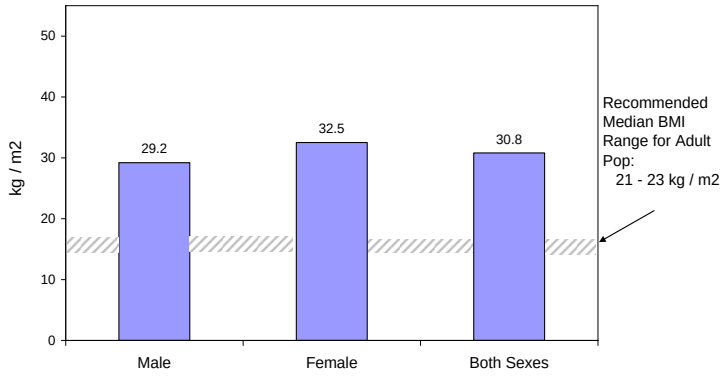
Waist circumference is an approximate index of intra-abdominal fat mass and total body fat. It is measured at the mid point between the inferior margin of the last rib and the crest of the ilium in the mid-axillary plane. There is an increased risk of metabolic complications for men with a waist circumference ≥102 cm, and women with a waist circumference ≥88 cm[1].

Results Description

Body Mass Index (BMI)

The study population's mean BMI was 31.4 (±0.6) kg/m^2. (Table 3.3.1b) The mean BMI for women was significantly higher at 33.2 kg/m^2 compared to the men at a mean of 30.0 (±0.6) kg/m^2. This gender difference was also observed in all the age-groups except the oldest age-group. Fig 3.3.1a shows the median BMI by gender and clearly illustrates how Samoa's median BMI values fall a fair way outside of the targeted adult population median for optimal health.[1]

Fig 3.3.1a: Median BMI values by Gender

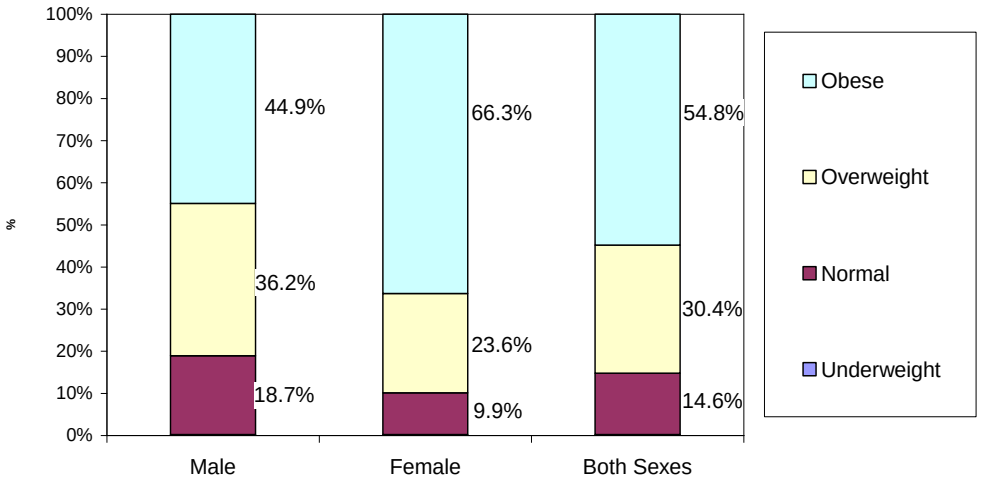


When individual BMI results are grouped into risk categories, an overwhelming 85.2% (±2.0) are either Overweight or Obese. (Fig 3.3.1c) The obese alone account for more than half the total study population, at 54.8% (±5.4). Except for the Underweight category where the proportions are the same, a significant gender difference was observed across all risk categories

[1] http://www.who.int/nutrition/topics/5_population_nutrient/en/index5.html

A higher proportion of men were in the Normal range, whilst women's proportions were higher in the Overweight and Obese categories. 66.3% (±6.0) of the women were obese, compared to 44.9% (±4.7) of the men.

Fig 3.3.1b: Proportions per BMI Risk Category



Comparison with previous data

Tables ?? and ?? list previous studies on BMI and obesity in Samoa. Though direct comparisons are difficult due to differing methodologies and samples it does appear that since the late 1970s adiposity has increased in the Samoan population.

Table ???: Mean BMI in Samoa

Survey Year	Publication	Region	Age Group	Mean BMI		
				Male	*Female*	*Both Sexes*
1981	Jackson et al[2]	Rural	20+ yrs	26.2	27.9	
		Urban		28.1	30.9	
1991	McGarvey[3]	Rural	20-74 yrs	26.2	27.7	
2002	STEPS Survey	Overall	25-64 yrs	30.0	33.2	31.4

Table ???: Obesity Prevalence in Samoa

Survey Year	Publication	Region	Age Group	Obesity Prevalence (%)		
				Male	*Female*	*Both Sexes*
1978	Zimmet et al [12]	Urban (Apia)	20+ yrs	37.7	58.2	
		Upolu Rural (Poutasi)		22.7	45.6	
		Rural Savaii (Tuasivi)		11.2	27.5	
1991	Zimmet et al [13]	Urban (Apia)	25-74 yrs	56.9	75.0	
		Upolu Rural (Poutasi)		43.3	61.2	

[2] Jackson L.R., Taylor S., Faaiuso S., Ainuu S.P., Whitehouse S., Zimmet P. Hyperuricemia and gout in Western samoa. J Chronic Disorders, 1981; 34:65-75

[3] McGarvey, S. T. Obesity in Samoans and a perspective on its etiology in Polynesians, Am J Clin Nutr 1991:53:1586S-1594S

		Rural Savaii (Tuasivi)		36.0	53.8	
2002	STEPS Survey	Overall	25-64 yrs	44.9	66.3	54.8

Waist Circumference

The mean waist circumference for the study group was 96.3cm (±1.4). (Table 3.3.1a) Though no significant gender differences were evident overall and for the three older age groups, women in the study's youngest age group 25-34 years had a significantly higher mean waist circumference than men in their age group.

Table 3.3.1a

Mean Waist Circumference By Age Group & Sex

Waist Circumference

Age Group (years)	Men (N=1274)			Women (N=1432)			Both Sexes (N=2706)		
	n	Mean (cm)	CI (±)	n	Mean (cm)	CI (±)	n	Mean (cm)	CI (±)
25-34	476	89.0	2.0	460	93.7	2.4	936	91.1	1.8
35-44	309	97.8	2.6	391	98.2	1.5	700	98.0	1.6
45-54	269	100.5	1.8	311	101.9	2.4	580	101.2	1.7
55-64	220	100.6	3.9	270	101.0	1.8	490	100.8	2.3
25-64	1274	**95.2**	1.7	1432	**97.6**	1.5	2706	**96.3**	1.4

Table 3.3.1b

Mean results for Height, Weight and BMI

Height, Weight and BMI

Body Mass Index (BMI)

Age Group (years)	Men (N=1267)			Women (N=1427)			Both Sexes (N=2695)		
	n	Mean (kg/m^2)	CI (±)	n	Mean (kg/m^2)	CI (±)	n	Mean (kg/m^2)	CI (±)
25-34	471	28.2	0.7	456	32.1	1.0	927	29.9	0.7
35-44	309	31.1	1.0	394	33.6	0.7	703	32.3	0.7
45-54	268	31.4	0.7	310	34.5	1.5	578	32.8	1.0
55-64	220	30.8	1.4	267	33.1	1.0	487	31.9	0.9
25-64	1268	**30.0**	0.6	1427	**33.2**	0.8	2695	**31.4**	0.6

Height

Age Group (years)	Men (N=1281)			Women (N=1502)			Both Sexes (N=2784)		
	n	Mean (cm)	CI (±)	n	Mean (cm)	CI (±)	n	Mean (cm)	CI (±)
25-34	480	172.3	1.2	510	162.0	1.1	990	167.5	0.9
35-44	310	172.6	1.0	407	161.3	0.9	717	167.2	0.9
45-54	270	170.1	1.3	314	160.0	0.8	584	165.4	1.0
55-64	221	169.4	1.0	271	158.3	1.3	492	163.8	1.0
25-64	1281	**171.6**	0.7	1502	**160.9**	0.6	2783	**166.5**	0.6

Weight

Age Group (years)	Men (N=1282)			Women (N=1502)			Both Sexes (N=2695)		
	n	Mean (kg)	CI (±)	n	Mean (kg)	CI (±)	n	Mean (kg)	CI (±)
25-34	480	86.2	2.8	510	84.9	3.0	990	85.6	2.4
35-44	311	93.4	3.1	407	88.1	2.0	718	90.9	2.2
45-54	270	91.8	3.1	314	89.6	3.8	584	90.8	3.1
55-64	221	88.9	4.7	271	84.0	3.5	492	86.4	2.8
25-64	1282	**89.7**	2.2	1502	**86.5**	2.4	2784	**88.2**	2.2

Table 3.3.1c
Percentage in each BMI risk category, by age-group and sex

BMI Risk Categories

Men (N=1268)

Age Group (years)	n	%	Underweight %	Underweight CI (±)	Normal	Normal CI (±)	Overweight & Obese	Overweight & Obese CI (±)	Overweight	Overweight CI (±)	Obese	Obese CI (±)
25-34	471	39.3	0	-	28.1	4.9	71.9	4.9	42.1	3.9	29.8	6.4
35-44	309	29.8	0	-	11.1	4.5	88.9	4.5	35.4	9.0	53.5	9.7
45-54	268	18.0	0.6	1.2	12.7	4.3	86.7	4.7	28.0	6.1	58.7	7.1
55-64	220	12.9	0.5	1.0	15.9	3.8	83.6	4.2	31.9	8.8	51.7	11.3
25-64	1268	100	0.2	0.3	18.7	2.7	81.1	2.6	36.2	4.1	44.9	5.7

Women (N=1427)

Age Group (years)	n	%	Underweight %	Underweight CI (±)	Normal	Normal CI (±)	Overweight & Obese	Overweight & Obese CI (±)	Overweight	Overweight CI (±)	Obese	Obese CI (±)
25-34	456	36.5	0.3	0.5	13.5	4.0	86.3	4.1	28.1	6.8	58.2	9.0
35-44	394	30.8	0	-	7.8	3.8	92.2	3.8	23.4	4.5	68.8	3.9
45-54	310	17.8	0.4	0.8	6.1	4.5	93.5	4.9	19.0	6.4	74.5	10.3
55-64	267	14.8	0.4	0.9	10.3	4.9	89.3	4.9	18.4	3.7	70.9	7.6
25-64	1427	100	0.2	0.3	9.9	2.3	89.8	2.3	23.6	4.2	66.3	6.0

Study Population (N=2695)

Age Group (years)	n	%	Underweight %	Underweight CI (±)	Normal	Normal CI (±)	Overweight & Obese	Overweight & Obese CI (±)	Overweight	Overweight CI (±)	Obese	Obese CI (±)
25-34	927	38.0	0.1	0.2	21.6	3.7	78.3	3.8	35.9	3.8	42.4	5.9
35-44	703	30.3	0	-	9.5	3.1	90.5	3.1	29.8	6.0	60.7	6.0
45-54	578	17.9	0.5	0.7	9.7	3.2	89.8	3.4	23.9	5.5	65.9	7.6
55-64	487	13.8	0.5	1.0	13.1	2.6	86.4	2.9	25.2	4.8	61.3	6.1
25-64	2695	100	0.2	0.2	14.6	2.1	85.2	2.0	30.4	3.8	54.8	5.4

3.3.2 Blood Pressure and Hypertension

The prevalence of hypertension in the study population was measured through a combination of questions asked during interview, and the physical measurements of systolic and diastolic blood pressure during the second step of the survey.

Through the questionnaire, study participants were asked whether they had ever been diagnosed with elevated blood pressure or hypertension by a doctor or other health worker, and if so, whether they were on oral medication for it. (taken within the last 2 weeks).

Next during the physical measurement stage, two readings were taken for each participant for both systolic and diastolic blood pressure. A third reading for each participant was taken if the difference between the first two was 10mm Hg or more. The mean of the valid two measurements was then taken to calculate each participant's systolic and diastolic blood pressure reading.

For the purposes of this report, the definition of a participant with Hypertension or Raised Blood Pressure was taken as anyone in the study population who satisfies one or more of the following criteria.

- the systolic blood pressure is greater than or equal to 140 mmHg;
- the diastolic blood pressure is greater than or equal to 90 mmHg ;
- the participant is receiving oral medication for high blood pressure

Results Description

Systolic and Diastolic Blood Pressure

The results showed a mean systolic blood pressure for the study population of 125.1 (±1.4) mmHg whilst the mean diastolic blood pressure was 74.5 (±1.3) mmHg. (Table 3.3.2a Appendix 1) The men had a higher calculated mean systolic blood pressure of 129.3 (±1.4) mmHg compared to the women's calculated mean systolic blood pressure of 120.3 (±1.9) mmHg. For diastolic blood pressure, there was no significant difference between the genders, with the men having a mean of 75.3 (±1.4) mmHg and the women a mean of 73.5 (±1.4) mmHg.

There was an overall trend seen with systolic and diastolic blood pressure increasing with age. In terms of statistical significance between age groups, the commonality between the genders and for the study population as a whole was the significant statistical difference between the oldest and the youngest age groups, for both systolic and diastolic blood pressure, where the younger age group had significantly lower mean readings than the older age group.

No significant difference by region could be seen in the mean systolic and diastolic blood pressures, as verified in Table 3.3.2b Appendix 1.

Hypertension

In accordance with this report's definition of a survey participant with hypertension, the survey results indicated a 21.2% (±3.2) prevalence of hypertension in the study population. (Table 3.3.2c) Of those with hypertension, a very high 85.3% had not been diagnosed before. This high rate of undiagnosed hypertension existed in both genders, where 89.5% of the men and 79.5% of the women had not previously been diagnosed.

The prevalence of hypertension amongst men was 23.1% (±4.2) and for women it was 18.8 % (±3.2). Though the men's rate was slightly higher this difference was not statistically significant. A gender difference was seen in the youngest age group however – the prevalence of hypertension in men aged 25-34 years was 15.3% (±4.4) which was more than twice the prevalence in women of the same age group at 6.3% (±2.1). For each of the other age groups, there was no significant difference in the prevalence rates by gender.

Fig 3.3.2a illustrates the general trend seen in the results for hypertension prevalence rates to increase with age. The overall prevalence rates for the study population statistically increased in each successive 10 year age group except between the age groups of 45-54years and 55-64 years. The same pattern was seen for women. For men, whilst the overall pattern of increase with age was there, statistical differences existed only between non-consecutive age groups.

There were no significant differences across the three regions as evident in Table 3.3.2d Appendix 1.

Fig 3.3.2a: Prevalence of Hypertension by Age Group and Sex

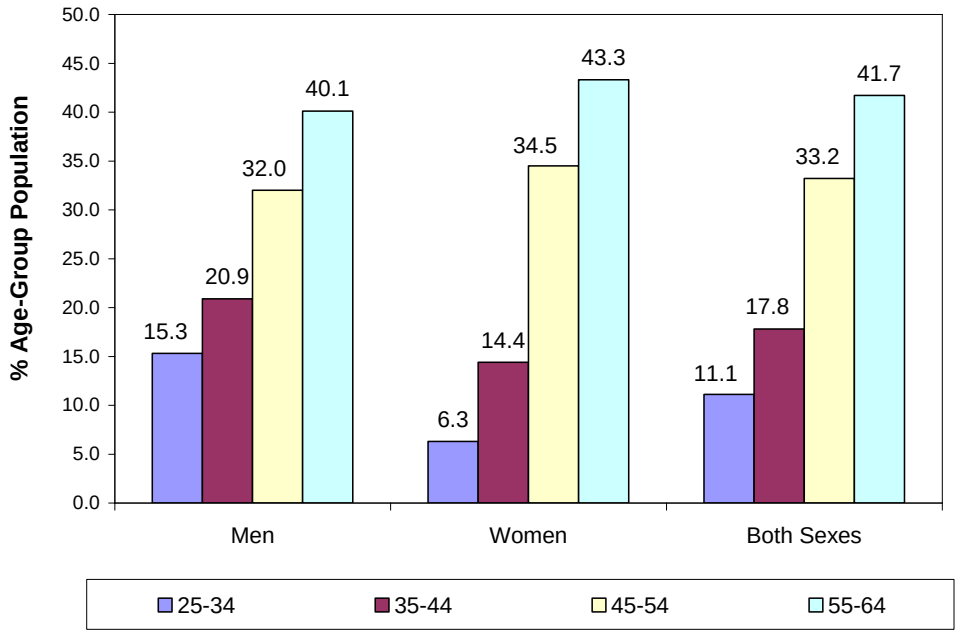


Table 3.3.2c
Prevalence of Hypertension and percentage undiagnosed. (By age group and sex)

Men (N=1286)

Age Group (years)	Not Hypertensive			Hypertensive*			Hypertensive* (N=323)					
							Newly diagnosed & NOT on medication**			Previously diagnosed (on medication)***		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	408	84.7	4.4	75	15.3	4.4	75	100.0	0.0	0	-	-
35-44	244	79.1	6.6	68	20.9	6.6	66	97.1	4.4	2	2.9	4.4
45-54	184	68.0	6.0	86	32.0	6.0	72	82.9	9.6	14	17.1	9.6
55-64	127	59.9	9.5	94	40.1	9.5	70	75.4	9.4	24	24.6	9.4
25-64	963	76.9	4.2	323	**23.1**	4.2	283	**89.5**	3.7	40	**10.4**	3.7

Women (N=1505)

Age Group (years)	Not Hypertensive			Hypertensive*			Hypertensive* (N=318)					
							Newly diagnosed & NOT on medication**			Previously diagnosed (on medication)***		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	477	93.7	2.1	35	6.3	2.1	33	95.9	8.2	2	4.1	8.2
35-44	349	85.6	3.0	58	14.4	3.0	46	79.6	15.6	12	20.0	15.6
45-54	208	65.5	7.9	106	34.5	7.9	85	80.0	7.7	21	20.0	7.7
55-64	153	56.7	7.8	119	43.3	7.8	87	72.5	16.2	32	27.5	16.2
25-64	1187	81.2	3.2	318	**18.8**	3.2	251	**79.5**	8.5	67	**20.5**	8.5

Study Population (N=2791)

Age Group (years)	Not Hypertensive			Hypertensive*			Hypertensive* (N=641)					
							Newly diagnosed & NOT on medication**			Previously diagnosed (on medication)***		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	885	88.9	2.6	110	11.1	2.6	108	98.9	2.3	2	1.1	2.3
35-44	593	82.2	3.4	126	17.8	3.4	112	90.4	5.6	14	9.6	5.6
45-54	392	66.8	5.5	192	33.2	5.5	157	81.5	7.6	35	18.5	7.6
55-64	280	58.3	6.1	213	41.7	6.1	157	73.9	10.4	56	26.1	10.4
25-64	2150	78.9	3.2	641	**21.1**	3.2	534	**85.3**	4.9	107	**14.7**	4.9

3.4 STEP 3: BIOCHEMICAL MEASURES

3.4.1 Blood Glucose and Diabetes

The measurement of impaired fasting glycaemia (iFG) and elevated fasting glucose levels (diabetes) within the study population was done through a combination of questions asked during interview and the measurement of fasting whole blood capillary glucose levels during the third stage of the survey. An Accutrend meter and glucose testing strips from Advanced Diagnostics was used for the blood measurements.

Through the questionnaire, study participants were asked whether they had ever been told by a doctor or health worker that they had diabetes, and if so, whether they were on insulin or oral medication for it. (taken within the last 2 weeks). Those who had been diagnosed and taking insulin or medication were included in the count of those with diabetes.

For the purposes of this report the following definitions apply:

Impaired Fasting Glucose: Where the glucose level was between 5.6 and 6.1 mmol/L
Ie: (5.6 mmol/L ≤ fasting glucose < 6.1 mmol/L)

Elevated Fasting Glucose (Diabetes): Where <u>one or both</u> of the following conditions are met.

- the fasting glucose level is greater than or equal to 6.1 mmol/L (110mg/dl)
- the person has previously been diagnosed with diabetes and is on insulin or medication for it.

These cutoff rates for IFG and Diabetes are based on the WHO definitions [14]simplified in the following table.

Fig 3.4.1a: Values for diagnosis of diabetes mellitus and other categories of hyperglycaemia

	Glucose concentration, mmol l^{-1} (mg dl^{-1})		
	Whole blood		Plasma*
	Venous	*Capillary*	*Venous*
Diabetes Mellitus:			
Fasting or	≥ 6.1 (≥ 110)	≥ 6.1 (≥ 110)	≥ 7.0 (≥ 126)
2–h post glucose load	≥ 10.0 (≥ 180)	≥ 11.1 (≥ 200)	≥ 11.1 (≥ 200)
Impaired Glucose Tolerance (IGT):			
Fasting (if measured) and	< 6.1 (< 110) and	< 6.1 (< 110) and	< 7.0 (< 126) and
2–h post glucose load	≥ 6.7 (≥ 120)	≥ 7.8 (≥ 140)	≥ 7.8 (≥ 140)
Impaired Fasting Glycaemia (IFG):			
Fasting	≥ 5.6 (≥ 100) and	≥ 5.6 (≥ 100) and	≥ 6.1 (≥ 110) and
and (if measured)	< 6.1 (< 110)	< 6.1 (< 110)	< 7.0 (< 126)
2-h post glucose load	< 6.7 (< 120)	< 7.8 (< 140)	< 7.8 (< 140)

* Corresponding values for capillary plasma are: for Diabetes Mellitus, fasting ≥ 7.0 (≥ 126), 2–h ≥ 12.2 (≥ 220); for Impaired Glucose Tolerance, fasting < 7.0 (< 126) and 2–h ≥ 8.9 (≥ 160) and < 12.2 (< 220); and for Impaired Fasting Glycaemia ≥ 6.1 (≥ 110) and < 7.0 (< 126) and if measured, 2–h < 8.9 (< 160). For epidemiological or population screening purposes, the fasting or 2–h value after 75 g oral glucose may be used alone. For clinical purposes, the diagnosis of diabetes should always be confirmed by repeating the test on another day unless there is unequivocal hyperglycaemia with acute metabolic decompensation or obvious symptoms.

Results Description

Fasting Blood Glucose Levels

As Table 3.4.1a shows, the mean fasting blood glucose levels for the study population was 5.6 mmol/L (±0.1) The mean fasting glucose levels for women at 5.6 (±0.1) mmol/L was not far behind the men's mean fasting glucose level of 5.7 (±0.1) mmol/L, but of no significant difference. Mean fasting glucose levels also did not vary significantly between genders for each ten year age group.

An overall increase in mean fasting blood glucose levels with age was observed. The first three consecutive 10 year age groups showed progressively significant increases. The 45-54 years and 55-64 years age groups are the only consecutive age groups where the mean fasting glucose levels were not significantly different.

Table 3.4.1a
Mean Fasting Blood Glucose (By age group and sex)
(Excludes participants on medication for diabetes or high blood glucose)

Age Group (years)	Men (N=1178)			Women (N=1365)			Both Sexes (N=2543)		
	n	Mean	CI (±)	N	Mean	CI (±)	n	Mean	CI (±)
25-34	448	5.3	0.1	489	5.1	0.1	937	5.2	0.1
35-44	292	5.6	0.2	369	5.5	0.2	661	5.6	0.1
45-54	248	6.1	0.3	277	6.2	0.4	525	6.1	0.2
55-64	190	6.3	0.3	230	6.5	0.4	420	6.4	0.2
25-64	1178	**5.7**	0.1	1365	**5.6**	0.1	2543	**5.6**	0.1

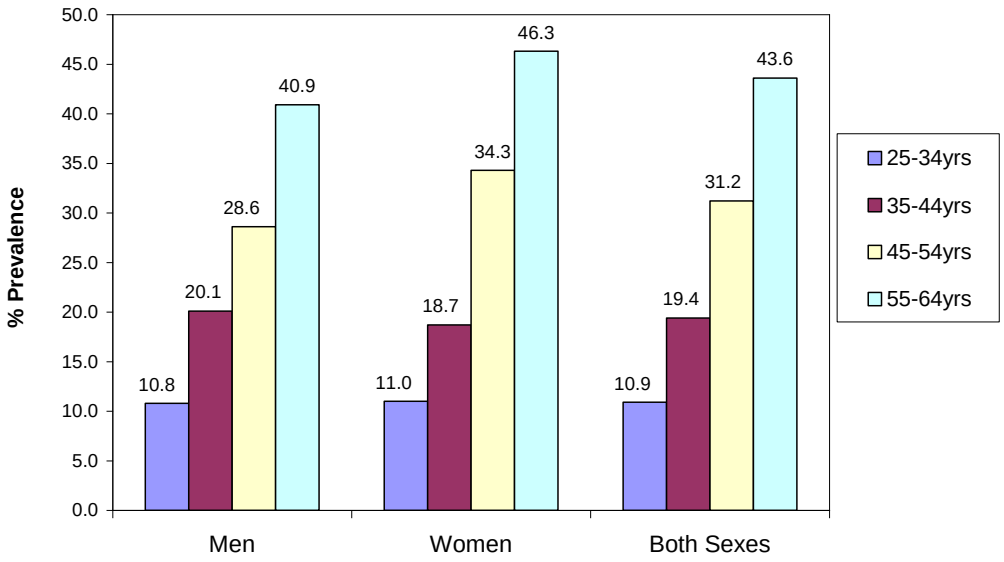
Diabetes Prevalence

The study results show the prevalence of diabetes in the study population was 21.5% (±2.5). (Table 3.4.1b) Though women show a slightly higher prevalence rate of 22.4% (±2.5) compared to the prevalence rate in men of 20.7% (±3.4), the difference was not statistically significant. Within each 10 year age group, though slight differences can also be seen in the prevalence rates by gender, the differences were not statistically significant.

In general, the prevalence of diabetes increased with age as illustrated in Fig 3.4.1b The prevalence rate of diabetes was highest in the oldest age group (55-64 yrs) at 43.6% (±5.3), which was four times the prevalence rate in the youngest age-group 25-34 yrs of 10.8% (±2.2). Each successive 10 year age group in between showed significantly increasing prevalence rates. This pattern existed for women, whilst for men, though the general trend towards increasing prevalence rates with age existed, the prevalence rates were statistically different only for 10 year age groups that were non consecutive.

Of those with diabetes, a very high 84.5% (±4.3) had not been diagnosed before. (Table 3.4.1b) This high rate of undiagnosed diabetes did not differ significantly between genders, with 87.1% (±6.3) of diabetic men and 82.0% (±5.2) of diabetic women, having not been diagnosed previously. The prevalence by age groups show a general trend towards higher proportions of undiagnosed diabetes the younger the age group.

Fig 3.4.1b: Prevalence of Diabetes by Age Group and Sex



Impaired Fasting Glycaemia

The results show that 16.7% (±1.8) of the study population had Impaired Fasting Glycaemia. A significantly higher proportion of men had impaired fasting glycaemia at 20.4% (±1.7) compared to 12.7% (±2.6) of women.

Fig 3.4.1c shows an overall trend by age group and sex with increasing proportions of diabetic and impaired glucose patients with age, and for each group, the prevalence rates in females closely following the males.

Fig 3.4.1c: Prevalence of Diabetes and IFG By Age group and Sex

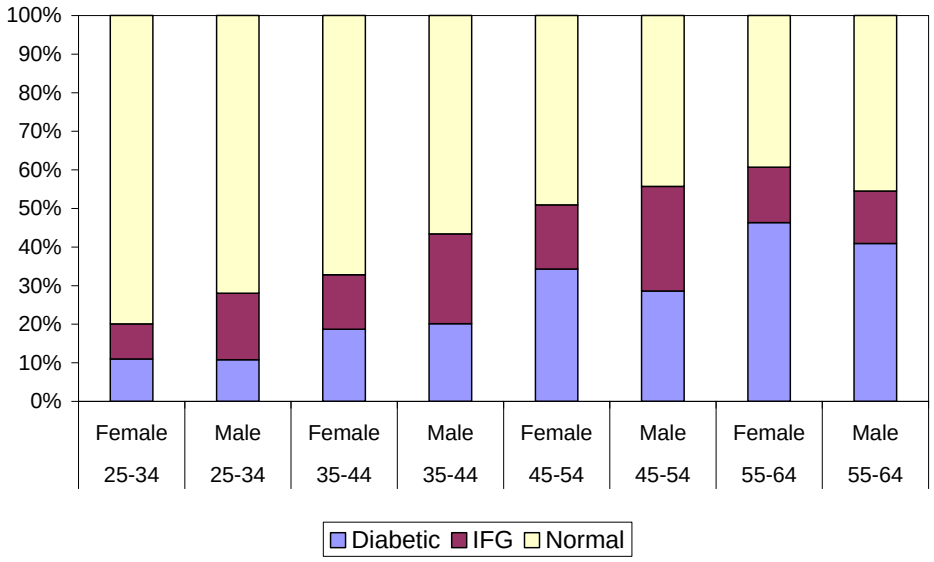


Table 3.4.1b

Diabetes Prevalence and Impaired Fasting Glycaemia (By age group and sex)

Men (N=1221)										**Diabetic* (N=274)**					
Age Group (years)	Diabetic*			Impaired Fasting Glucose**			Normal			Newly diagnosed & NOT on medication***			Previously diagnosed (on medication)***		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	48	10.8	3.5	77	17.3	4.4	324	72.0	6.4	47	97.5	5.4	1	2.5	5.4
35-44	61	20.1	5.7	70	23.3	5.7	165	56.6	5.2	57	94.2	4.0	4	5.8	6.8
45-54	74	28.6	5.7	71	27.1	8.8	112	44.3	6.2	65	87.8	6.9	9	12.2	6.9
55-64	91	40.9	8.6	32	13.6	4.6	96	45.5	7.5	62	70.5	15.1	29	29.5	15.1
25-64	274	**20.7**	3.4	250	20.4	1.7	697	58.9	3.5	231	**87.1**	6.3	43	**12.9**	6.3

Women (N=1439)										**Diabetic* (N=361)**					
Age Group (years)	Diabetic*			Impaired Fasting Glucose**			Normal			Newly diagnosed & NOT on medication***			Previously diagnosed (on medication)***		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	60	11.0	2.8	49	9.1	3.0	381	80.0	5.1	59	98.6	3.0	1	1.4	3.0
35-44	74	18.7	4.4	53	14.1	5.3	255	67.2	6.0	61	83.7	12.4	13	16.3	12.4
45-54	105	34.3	5.3	54	16.6	3.9	145	49.1	5.7	78	75.5	13.2	27	24.5	13.2
55-64	122	46.3	6.0	42	14.4	4.2	99	39.3	6.6	89	75.7	7.1	33	24.3	7.1
25-64	361	**22.4**	2.5	198	12.7	2.6	880	65.0	4.2	287	**82.0**	5.2	74	**18.0**	5.2

Study Population (N=2660)										**Diabetic* (N=635)**					
Age Group (years)	Diabetic*			Impaired Fasting Glucose**			Normal			Newly diagnosed & NOT on medication***			Previously diagnosed (on medication)***		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	108	10.9	2.2	126	13.4	2.8	705	75.8	4.4	106	98.0	3.2	2	2.0	3.2
35-44	135	19.4	4.5	123	19.0	4.6	420	61.6	4.0	118	89.4	8.1	17	10.6	8.1
45-54	179	31.2	3.8	125	22.3	5.3	257	46.5	4.2	143	81.5	7.4	36	18.5	7.4
55-64	213	43.6	5.3	74	14.0	2.5	195	42.4	4.7	151	73.2	9.3	62	26.8	9.3
25-64	635	21.5	2.5	448	16.7	1.8	1577	**61.8**	3.4	518	**84.5**	4.3	117	**15.5**	4.3

Diabetic* : *Fasting Glucose* >= 6.1mmol/L

Impaired Fasting Glucose: 5.6mmol/L ≤ *Fasting Glucose* < 6.1mmol/L

Normal : *Fasting Glucose* < 5.6 mmol/L

3.4.2 Blood Cholesterol

Elevated blood cholesterol is recognised as an important risk factor for coronary heart disease. To gauge blood cholesterol levels for the study population, the total blood cholesterol was measured for each participant using an Accutrend GCT cholesterol meter. Elevated or high risk cholesterol levels were classified as being equal to or exceeding 5.2mmol/L [15]

Results Description

Table 3.4.2a shows the mean total blood cholesterol level for the respondents was 4.2 (±0.1) and this mean was the same for both genders. This similarity between genders also extended to the comparisons of the age groups within. For both men and women, there was a general trend towards increasing mean total cholesterol with age. Analysis by region showed practically no difference in mean total cholesterol among residents of the three different regions.

The mean total cholesterol level for each participant was also used to determine the proportion of individuals at high risk of developing coronary artery disease. (determined by levels of total cholesterol >= 5.2mmol/L) Table 3.4.2b shows that 13.7% (±3.3) of the respondents were in the high risk category; 13.8% (±5.) for men and 13.6 (±2.7) for women, indicating no statistical difference between the genders. As for the mean total cholesterol levels, the proportion of participants in the high risk category generally increased with increasing age.

Table 3.4.2a

Mean total cholesterol (mmol/L) by age group, region and gender

Age Group (years)	Men (N=1228)			Women (N=1456)			Both Sexes (N=2684)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	459	3.9	0.1	491	4.0	0.1	950	3.9	0.1
35-44	293	4.3	0.1	393	4.2	0.1	686	4.3	0.1
45-54	257	4.5	0.2	306	4.5	0.1	563	4.5	0.2
55-64	219	4.5	0.3	266	4.6	0.3	485	4.6	0.2
25-64	1228	**4.2**	0.1	1456	**4.2**	0.1	2684	**4.2**	0.1

Region	Men (N=1228)			Women (N=1456)			Both Sexes (N=2684)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
Apia Urban	527	4.1	0.2	676	4.2	0.2	1203	4.2	0.2
Upolu Rural	355	4.2	0.2	413	4.2	0.1	768	4.2	0.1
Savaii	346	4.4	0.3	367	4.3	0.2	713	4.3	0.2
All Regions	1228	**4.2**	0.1	1456	**4.2**	0.1	2684	**4.2**	0.1

Table 3.4.2b

Proportion with elevated fasting total cholesterol*, by age group, region and gender

Age Group (years)	Men (N=1228)			Women (N=1456)			Both Sexes (N=2684)		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	27	5.7	3.1	36	7.3	2.0	63	6.5	2.2
35-44	43	14.3	5.2	41	10.7	2.9	84	12.5	2.8
45-54	59	24.1	9.8	63	20.0	5.8	122	22.2	5.8
55-64	47	23.0	9.0	77	28.5	9.9	124	25.8	8.2
25-64	176	**13.8**	5.0	217	**13.6**	2.7	393	**13.7**	3.3

Region	Men (N=1228)			Women (N=1456)			Both Sexes (N=2684)		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
Apia Urban	63	11.4	5.5	103	13.2	5.1	166	12.3	5.0
Upolu Rural	51	12.6	10.1	63	13.9	3.8	114	13.2	5.8
Savaii	62	17.8	8.8	51	13.8	4.2	113	15.9	5.6
All Regions	176	**13.8**	5.0	217	**13.6**	2.7	393	**13.7**	3.3

* total fasting glucose >= 5.2mmol/L

3.5 COMBINED RISK FACTORS

Consistent with the standardised measure of raised risk for NCDs amongst countries implementing the STEPS survey, five common and critical risk factors were selected and combined to indicate the overall risk for NCDs in Samoa.

The five common and critical risk factors were:

1. current daily smoking;
2. overweight or obese (i.e. BMI ≥ 25 kg/m^2);
3. raised blood pressure (SBP ≥ 140 and/or DBP ≥ 90mmHg or currently on medication);
4. consumed less than 5 combined servings of fruit and vegetables per day; and
5. low level of activity (<600 MET minutes per week).

The risk categories were then identified as:

Low Risk: 0 of 5 risk factors present
Moderate Risk: 1-2 out of 5 risk factors present
High Risk: from 3 to all 5 of the risk factors are present

Results Description

The results in Table 3.5a indicate that only 3.0% of the study population were classified as having low risk for NCDs. (i.e. none of the 5 risk factors present). A third or 33.8%(±6.6) of the study population are at high risk for NCDs having at least 3 of the five identified risk factors for NCDs.

Among those aged 25-44 years, the proportion of those in the high risk category was 30.2% (±5.4), and amongst the older 45-64 year olds the proportion in this high risk category was 41.1 (±11.1%).

Between the sexes, though the difference is not much, a higher proportion of men are within the low risk category (4.4%±2.6) than women (1.2%±1.1).

Table 3.5a

Distribution of raised risk for NCDs by gender and age group

Men

Age Group (years)	Low Risk			Moderate Risk			High Risk		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-44	11	5.2	3.8	138	61.6	8.2	71	33.2	7.5
45-64	4	2.5	3.7	71	54.9	13.0	52	42.6	13.8
25-64	15	**4.4**	2.6	209	**59.7**	8.5	123	**35.9**	7.8

Women

Age Group (years)	Low Risk			Moderate Risk			High Risk		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-44	3	1.5	1.7	157	72.4	10.1	54	26.1	9.7
45-64	1	0.8	1.7	105	58.9	11.2	73	40.3	10.7
25-64	4	**1.2**	1.1	262	**67.3**	8.9	127	**31.5**	8.5

Study Population

Age Group (years)	Low Risk			Moderate Risk			High Risk		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-44	14	3.7	2.6	295	66.1	6.5	125	30.2	5.4
45-64	5	1.6	2.1	176	57.1	10.7	125	41.1	11.1
25-64	19	**3.0**	1.5	471	**63.2**	7.3	250	**33.8**	6.6

4. Discussion & Conclusions

The Samoa STEPS survey has provided clear evidence that NCDs and related major risk factors studied present a major threat to the health and well-being of the people of Samoa. Its findings show significant proportions of the population are already under the burden of NCDs and that a large proportion of them are undiagnosed and in need of treatment and disease management interventions. Furthermore, the study has also highlighted that a significant proportion of the population are at risk of developing NCDs. The significant prevalence of major risk factors in the population point to a future burden of disease that need immediate addressing with prevention and health promotion strategies which target sustainable long term improvements in health.

Tobacco Smoking

Globally, tobacco is the fourth most common risk factor for disease and the second major cause of death. It is responsible for the death of one in ten adults each year worldwide.[16] Smokers have markedly increased risk of multiple cancers, particularly lung cancer, and are at far greater risk of NCDs such as heart disease, stroke, diabetes, chronic obstructive pulmonary disease (COPD) and other fatal and non-fatal diseases. Intra uterine growth retardation, spontaneous miscarriages and low birth weight babies are known outcomes of smoking during pregnancy.[17] It has also been shown that non-smokers exposed to second hand smoke have a 25 to 35% increased risk of suffering acute coronary diseases, and increased frequency of chronic respiratory conditions. [18] Small children whose parents smoke at home have an increased risk of suffering lower tract respiratory infections, middle ear infection and Sudden Infant Death Syndrome (SIDS).[19]

In light of these critical facts the STEPS survey findings on the prevalence of tobacco smoking is of much concern. Of the adult population studied, the majority of males smoke, with half of them smoking on a daily basis. One in five women smoke, but once a smoker, the probability of their being a daily smoker was the same as that for men. In addition, women are starting to smoke at a younger age than before. Manufactured cigarettes are by far the tobacco of choice with preference rates increasing to almost an exclusive choice for the younger age groups. Daily smokers smoked an average of 12 cigarettes per day, and the high average durations of smoking indicates smoking cessation programs need to be emphasised.

Alcohol Consumption

In 2000, alcohol use caused 3.2% of deaths (1.8 million) worldwide, and 4% of the global disease burden.[20] Alcohol consumption is the leading risk factor for disease burden in low mortality developing countries and the third largest risk factor in developed countries.[21] The proportion of disease burden attributable to alcohol use in the developing world is between 2.6% to 9.8% of the total burden for males and 0.5% to 2.0% of the total burden for females.[22] Besides the direct toxic effects of intoxication and addiction, alcohol use causes about 20% to 30% of each of esophageal cancer, liver disease, homicide, epileptic seizures, and motor vehicle accidents worldwide.[23] Heavy alcohol use increases the risk of cardiovascular disease[24 25 26 27 28] and stroke.[29 30 31 32 33] Alcohol consumption during pregnancy is related to various risks to the fetus, which include Fetal Alcohol Spectrum Disorders. Alcohol consumption during pregnancy can also lead to spontaneous abortion, low birth weight and prematurity, and intra-uterine growth retardation. [34 35] Higher volume of alcohol consumption is also associated with depression and can severely impair an individual's functioning in social roles such as parent, spouse or partner.[36]

The Samoa STEPS Survey has found ????

Diet

It is recognised that nutrition is central to the concept of Healthy Lifestyles. WHO has reported that "nutrition is coming to the fore as a major modifiable determinant of chronic disease, with scientific evidence increasingly supporting the view that alterations in diet have strong effects, both positive and negative on health throughout life. Most importantly, dietary adjustments may not only influence present health, but may determine whether or not an individual will develop such diseases as cancer, cardiovascular disease and diabetes much later in life.[37]

Fruit and Vegetables

Fruit and vegetables are important components of a healthy diet. Low fruit and vegetable intake is ranked twelfth amongst the twenty leading selected risk factors for burden of disease globally.[38]

A lack of fruit and vegetables in the diet is associated with major health problems such as cardiovascular diseases and some cancers. According to *The World Health Report 2002* low fruit and vegetables intake is estimated to cause about 19% of gastrointestinal cancer, about 31% of ischemic heart disease and 11% of stroke world wide.

As a group fruit and vegetables are major contributors of essential nutrients to the diet. They provide dietary fibre and micronutrients such as flavonoids, carotenoids, vitamin C, potassium and folic acid. They have a low energy density due to their high water content.

The 2003 Joint FAO/WHO Expert Consultation on diet, nutrition and the prevention of chronic diseases recommended the intake of a minimum of 400g of fruit and vegetables per day (excluding potatoes and other starchy tubers) for the prevention of chronic diseases such as heart disease, cancer, diabetes and obesity as well as the for the prevention and alleviation of several micronutrient deficiencies, especially in less developed countries.[39] Based on a typical serving size of 80g, the recommendation that adults eat at least 400g of fruit and vegetables per day, is often interpreted as eat "at least 5 servings per day".

The STEPS survey findings indicate that a significant number of adults in Samoa are not eating sufficient fruit and vegetables. A high 32.7% of the study population ate less than the minimum recommended 5 servings of fruit and vegetables per day. Indeed this figure is likely to be an underestimate since starchy fruit and vegetables were included in the STEPS definition of fruit and vegetables. If starchy fruit and vegetables had been excluded it is likely that the percentage of adults eating insufficient fruit and vegetables would have been much higher. These findings have worrying implications since those eating insufficient intakes are at greater risk of diseases such as ischaemic heart disease, stroke and some cancers.

For a population living in a tropical environment, conducive to the production of fruit and vegetables, the fact that the study population had a very low fruit and vegetables intake is indicative of a need for strong promotion of fruit and vegetables as a necessary part of keeping healthy. It is also an indication that there is a need for cross linkages between health and agriculture to encourage production and consumption of fruit and vegetables.

Fresh fish, tinned fish and mutton flaps

Mutton flaps are a fatty, low cost meat, high in saturated fatty acids, which are linked to an increased risk of heart disease. Fish, on the other hand, is low in fat, high in protein and an excellent source of omega 3 fatty acids. Research suggests that regular consumption of fish

may reduce the risk of various diseases such as heat disease, stroke and depression. Tinned fish, while it provides many of the health benefits of fresh fish, is generally higher in salt than fresh fish and if canned in oil is higher in fat.

The STEPS survey shows that the study population was consuming more fish and tinned fish than mutton flaps. This appears to be a change from previous years where mutton flaps provided more protein in the diet than either fish or tinned fish. Data from the STEPS survey do not indicate why this change may have taken place but it is possible that turkey tails, another high fat meat, may simply have taken the place of mutton flaps as a cheaper alternative. Tinned fish is now more common than fresh fish in the diet. While tinned fish is recommended for consumption in a healthy diet it is a less desirable option than fresh fish because of its higher fat content, if canned in oil, and higher salt content.

Of particular importance to strategy development is the fact that men in the youngest age group 25-34 years showed a lower consumption rate per week (1.9) of fresh fish, than men in the older age groups. Men in the oldest age group 55-64 years similarly showed a lower consumption rate for mutton flaps than their younger counterparts. This is an indication of a rapid change (within one generation) of eating habits that needs to be addressed through active promotion and information programs.

Physical Activity

Worldwide more than 60% of adults do not engage in sufficient levels of physical activity, which are beneficial to health. More from both developed and developing countries, lead sedentary lifestyles, making it one of the more serious yet insufficiently addressed public health problem at present

The impact of sedentary lifestyles indicates an increase in all causes of mortality, double the risk of cardiovascular diseases, diabetes, and obesity, and increases in the risks of colon cancer, high blood pressure, osteoporosis, lipid disorders, depression and anxiety. Research in the Pacific noted a significant change in lifestyles patterns by shifts towards higher intakes of fats and sugars (WHO 2002 & WHO 2003). Contributing to this is urbanization for occupational opportunities, which further adds to reduced physical activity. Physical activity has been identified as a key determinant of energy expenditure leading to tremendous effect on energy balance, weight control and its numerous beneficial impact on reducing risks of certain chronic diseases, improved mental health and well being (WHO 2004).

Samoa is no exception as prevalence of physical inactivity is escalating in higher rates. The study shows an increased percentage of surveyed population (50.3) who were physically inactive, in particular, women (64.4%) compared to men (37.6%). Women have low levels of physical activity as indicated in 12.8 (MET) minutes per day compared to men at 68.6 (MET) minutes per day. There is no difference in the levels of physical activity gained from any of the work, travel and recreation settings for women. These results demonstrate the need for well-planned, appropriate physical activity interventions for Samoa. This includes creating supportive environments such as developing healthy public policies, modification to environmental structures and review of existing programs to infuse new ideas and fresh approaches to make physical activity compelling and socially acceptable. Physical activity needs not to be strenuous to bring health benefits. What is important is to include activity as part of a regular routine.

Obesity

BMI

Overweight and obesity are important determinants of health. They lead to adverse metabolic effects on blood pressure, cholesterol, triglycerides and insulin resistance. Risks of coronary heart disease, ischaemic stroke and type 2 diabetes mellitus increase steadily with increasing BMI[40], and mortality rates have also been shown to increase with increasing degrees of overweight, as measured by BMI.[41] Globally overweight and obesity are the tenth leading risk factor for burden of disease.[42]

Studies have shown that to achieve optimum health, the median BMI for an adult population should be in the range of 21 – 23 kg/m^2, while the goal for individuals should be to maintain BMI in the range 18.5 – 24.9 kg/m$^{2.}$ Individuals with BMI that fall within the overweight category run a slightly increased risk of co morbidities, and those in the obese range a moderate to severe risk of co morbidities. [43] The STEPS survey population's mean BMI was 31.4 (±0.6) kg/m^{2,} well over the recommended 21-23kg/m^2. This indicates extremely high levels of overweight and obesity in the Samoan population. In fact, when individual BMI results are grouped into risk categories, an overwhelming 85.2% (±2.0) are either overweight or obese. These high rates of obesity place a significant proportion of the population at risk of developing co-morbidities and vulnerable to increased mortality rates, thus making overweight and obesity significant public health problems in Samoa. Overweight and obesity rates in the younger age groups, although lower than the older groups, are never-the-less high and indicate continued problems with NCDs in the future.

Comparison with previous data show that BMI levels and prevalence of obesity have increased since the 1970s. Also as with previous studies a greater proportion of women are overweight or obese than men. This gender difference has persisted since the 1970s. More women were inactive than men and this could account for some of the reason why more women are more obese than men.

Obesity is related to high dietary energy intakes and inadequate physical activity levels. The STEPS survey was unable to measure dietary energy intakes, however high total energy intakes have been reported previously (Galanis) and these are consistent with current observations of the Samoan diet. STEPS data do indicate that the adult Samoan population is not doing enough physical activity, with half the study population classified as inactive.

Although the study shows that women are more vulnerable to obesity than men, the fact that rates of obesity in the study population are high for both men and women make it crucial that any strategies to reduce levels of obesity must target both men and women in all age groups.
A modest weight reduction could reduce blood pressure and lower the risk of type 2 diabetes.

The findings of the survey in terms of obesity give further credence to the survey findings in regard to diet and physical activity.

Waist circumference

Changes in waist circumference reflect changes in risk factors for cardiovascular disease and other forms of chronic diseases. Waist circumference is a more powerful determinant of subsequent risk of type 2 diabetes than BMI. [44 45 46 47 48]

The waist circumference measurements, reported in the STEPS survey are high, supporting the BMI data and indicating that the Samoan population is very vulnerable to cardiovascular diseases and diabetes.

Blood Pressure & Hypertension

In 2003 hypertension was estimated to cause 4.5% of the global disease burden and was as prevalent in many developing countries, as in the developed world. Furthermore it was acknowledged that blood pressure-induced cardiovascular risk rises continuously across the whole blood pressure range.[49]

From the Survey findings, of particular concern to Samoa is the high prevalence of hypertension in the study population (21.2%) with a very high percentage of these having never been diagnosed previously. This indicates that people are not used to the concept of having a blood pressure check on a regular basis especially among young males. Of the 21.2%, 85.3% were newly diagnosed hypertensive patients during the study period and majority of whom aged between 25-45 years of age. The McGarvey study of blood pressure and cardiovascular diseases carried out in Samoa from 1990-1995 among those age 29 years and older showed a higher prevalence among the older age group of 45 years and older especially among males (50.5%) then females (47%) respectively. Also it was interesting to note that from the McGarvey 1990-1995 study the total prevalence among males from 29years upwards was 13.3% compared to this study of 23.1% among males 25years and older. Comparison among the female population also showed a dramatic increase in the prevalence of hypertension from 8.1% during the McGarvey study 1990-1995 to 18.8% (2002). Even though the McGarvey study from 1990 to 1995 is a poor representation of the actual prevalence rate of hypertension in the total population never the less it provided a bench mark for comparison with the steps survey and thus clearly shows an urgent need to address the increasing number of people with hypertension. Health promotion and preventive activities needs to catered to capture the young population between 25 to 45 year olds especially among the young males which represents the highest risk.

Blood Glucose & Diabetes

The WHO has reported that diabetes causes about 5% of all deaths globally each year from complications of diabetes. It is recognized that 80% of people with diabetes live in low and middle income countries and most people with diabetes are middle-aged (45-64), not elderly (65+). The WHO further stresses that unless urgent action is taken diabetes deaths are likely to increase by more than 50% in the next 10 years.

As already sated the study shows that for Samoa diabetes prevalence increases with age indicating the changes of the impact of lifestyle practises over the years, which has a direct impact on the high prevalence of diabetes in not just the older population but in particular the younger age group with impaired fasting glycaemia. It was also noted from the study that a very high proportion of diabetic patients were diagnosed during the study period and it was cleared from the study that out of every diabetic patient diagnose 5 more are yet to be identified. The risk of having and impaired fasting glucose and diagnosed with diabetes is much higher among the younger population as compared to the older population. If this trend continues it can be estimated, by the year 2010 the prevalence of diabetes will properly increase from the current 21.5% to as high as 33.5% of the same age groups if preventive measures are not in place compact the increasing number of people diagnosed with diabetes. Studies by Braun,[50] Collins[51] and Zimmet[52] all reported diabetes as a growing problem in the pacific, Samoa in particular with the prevalence of diabetes ranging from 9.1% to 10.1% from the four different studies with a dramatic increase in the prevalence rate among those living in the urban areas of Apia. These studies also looked at other contributing factors to diabetes including obesity, physical activities, stress and cholesterol, contributed to the increasing number of diabetes and complications arising from poorly controlled diabetes. Also it is important to note that even though these studies are independent of each other and samples sizes are does not represent the population as a whole. It does provide a clear indication of the extent of the problem 10 to 15

years ago and is continuing to worsen as is evident by the STEPS survey. It was also evident from these studies and all of which stresses the importance of maintaining and expanding health preventive and promotion programs to address the ever rising number of people diagnosed with diabetes.

Blood Cholesterol

The WHO has reported that diabetes causes about 5% of all deaths globally each year from complications of diabetes. It is recognized that 80% of people with diabetes live in low and middle income countries and most people with diabetes are middle-aged (45-64), not elderly (65+). The WHO further stresses that unless urgent action is taken diabetes deaths are likely to increase by more than 50% in the next 10 years.

As already sated the study shows that for Samoa diabetes prevalence increases with age indicating the changes of the impact of lifestyle practises over the years, which has a direct impact on the high prevalence of diabetes in not just the older population but in particular the younger age group with impaired fasting glycaemia. It was also noted from the study that a very high proportion of diabetic patients were diagnosed during the study period and it was cleared from the study that out of every diabetic patient diagnose 5 more are yet to be identified. The risk of having and impaired fasting glucose and diagnosed with diabetes is much higher among the younger population as compared to the older population. If this trend continues it can be estimated, by the year 2010 the prevalence of diabetes will properly increase from the current 21.5% to as high as 33.5% of the same age groups if preventive measures are not in place compact the increasing number of people diagnosed with diabetes.

The studies by Braun, Collins and Zimmet all reported diabetes as a growing problem in the pacific, Samoa in particular with the prevalence of diabetes ranging from 9.1% to 10.1% from the four different studies with a dramatic increase in the prevalence rate among those living in the urban areas of Apia. These studies also looked at other contributing factors to diabetes including obesity, physical activities, stress and cholesterol, contributed to the increasing number of diabetes and complications arising from poorly controlled diabetes. Also it is important to note that even though these studies are independent of each other and samples sizes do not represent the population as a whole. It does provide a clear indication of the extent of the problem 10 to 15 years ago and is continuing to worsen as is evident by the STEPS survey. It was also evident from these studies and all of which stresses the importance of maintaining and expanding health preventive and promotion programs to address the ever rising number of people diagnosed with diabetes.

Combined Risk for NCDs

It is evident that a risk factor is a condition that increases peoples chances of getting a disease. The risk factors targeted in this survey indicate that diet, weight and physical activity are all things that people can do to lessen the onset of non communicable diseases which are increasing in Samoa.

Also important is that effective screening of all risk factors targeted in this survey is important for detection and early management.

It is not enough that promotion and primary health care target one known set of risk factors but that all these need to be addressed at the same time if the trends of increasing levels of Non Communicable Diseases are to have a positive impact on reducing and reversing trends.

It is also important from the findings that people must be encouraged to do what they can do to change their lifestyles as well as using primary health clinics for early detection.

Diet, nutrition, physical activity and tobacco and alcohol use are risk factors that need to be addressed as multiple risk factors if heart disease, cancers and other lifestyle diseases are to be prevented or delayed.

It is evident that 33.8% of the study population are at high risk of non communicable disease and 63.2% are at moderate risk. It is also evident from the literature that socioeconomic and environmental factors, education and job status also influences our risk of developing NCDs. It is also clear from the STEPS, the risk for NCD increases with age especially among males as compared to females. Now the question here is why? Attempting to answer this question will not be easy but it is well understood and clearly anticipated from the literature since the early 80's that NCD will be a major concern for Samoa in the future. With a fast growing population and economy, carp with limited health resources over the years has bear witness to its present state with NCD. No concern for ones health and physical well being is also clearly portrayed here from the findings with high percentages of the surveyed population being obese with high fat diets with the fast growing number of fast food outlets and limited physical activity as well as those newly diagnosed with hypertension and type 2 diabetes millitis (NIDDM) (or both) or diagnosed with borderline diabetes or hypertension. Easy accessibility and availability of tobacco and alcohol with no proper legislation or policing of existing legislation further increases risks for NCD. This is evident from the STEPS survey based on the prevalence rates of current smokers (40.3%) and drinkers (29.4%) across the study population.

The STEPS and literature suggest that any interventions on non communicable diseases (NCD) must be "devised based on the level of economic development, the socio-economic context of risk factor exposures, and individual characteristics such as age, sex and education level.[53]" It also stresses the need to carry out proper screening and training programs for health staff and the community.

Primordial and primary prevention and promotion programs to be more community focused with community participation and community driven with a strong emphasis on the young and high risk populations especially the male population, and the community and individuals to be more accountable for their own health status and well being.

5. Recommendations

1. Update and implement the National NCD Strategy and Plan of Action
2. Ensure National Guidelines which address NCD prevention, detection, management and care are kept updated, effectively disseminated to key players, and monitored
3. Update and implement the National Food and Nutrition Policy and the National Plan of Action for Nutrition
4. Promote and implement the WHO Framework on Tobacco Control (FCTC)
5. Consider an effective and appropriate screening programme that addresses obesity, blood pressure and hypertension, blood glucose and blood cholesterol.
6. Advocate national legislation, policies and regulations that promote healthy living, such as:
    - prohibition or control of marketing and sale of unhealthy foods, goods and other substances;
    - price control measures targeting reduction of access to unhealthy foods and substances, and conversely, easier access to foods, goods and services that promote healthier living
7. Enhance and capitalise on partnerships with the private and NGO sector, government ministries, corporations and community groups to augment resources towards promotion, prevention and management of NCDs and risk factors
8. Advocate for the allocation of more resources (funding, positions and training opportunities) towards Health prevention and promotion, in particular towards addressing NCDs and risk factors.
9. Ensure a sustainable funding mechanism is in place to support implementation of activities under the National NCD Strategy and Plan of Action.
10. Develop and/or implement and/or upscale intensity of interventions to:
    a. Prevent initiation of smoking – the young age group and both sexes to be targeted, with women in particular to prevent their rates from matching those of the men.
    b. Promote smoking cessation – all age groups and genders to be targeted.
    c. Support moderate consumption of alcohol and reduce harmful drinking – men in particular should be targeted
    d. Promote physical activity – women in particular especially in the urban areas to be targeted as well as the promotion of physical activity during leisure time.
    e. Promote increased consumption of fruits and vegetables including programs that that support increased access to and availability of fruits and vegetables
    f. Promote informed self management and care for those with NCDs

Surveillance

1. Secure commitment and funding to implement the Samoa NCD STEPS survey at least 5-10 years after this initial survey to ensure to allow systematic monitoring of progress
2. Future Samoa NCD Steps surveys to incorporate these recommendations at a minimum:
    a. Employment categories to be “activity” oriented rather than employer oriented as in the current format.
    b. Definition of vegetables to exclude “starchy” vegetables

c. Data cleaning and analysis to be completed within at least one year since completion of survey so that the information is more timely and relevant and key players, knowledge and information is more readily available.

Appendix 1. Additional Result Tables

Table 2.1.1a:
Regional Strata showing villages selected

Sample Size

Region	Village	No. Respondents
Apia	Fagalii	187
	Vaimea	126
	Lepea	168
	Tulaele	141
	Vaigaga	268
	Tuanai	384
Upolu Rural	Faleseela	213
	Utulaelae	60
	Lufilufi	230
	Falefa	214
	Eva	79
Savaii	Fogapoa	71
	Patamea	198
	Lelepa	61
	Samata-i-uta	190
	Salailua	214
Total		**2804**

Table 3.1.3a:
Highest Level of Education achieved by the Survey Participants

Educational Level

				Never attended school		Primary / Pastor's School		Junior Secondary		Secondary School		Technical Training		University	
		N	Col. %	%	CI (±)	%	CI (±)	%	CI (±)	%	CI (±)	%	CI (±)	%	CI (±)
All Respondents		2753	100%	0.5	0.3	23.0	3.8	51.7	2.3	18.5	2.2	2.4	1.2	4.0	1.1
Age-Group	25-34	979	36%	0.1	0.3	10.1	3.7	53.8	3.6	28.2	2.1	3.5	1.4	4.2	1.6
	35-44	714	26%	0.7	0.7	14.6	3.7	60.0	2.7	18.2	3.1	2.5	1.9	4.1	2.0
	45-54	575	21%	0.4	0.6	41.2	3.9	45.1	4.5	7.5	2.9	1.3	1.2	4.5	1.9
	55-64	485	18%	1.2	1.5	55.8	7.0	35.0	4.7	5.2	3.1	0.5	0.7	2.4	1.2
Sex	Males	1259	46%	0.5	0.6	25.6	5.2	48.2	4.2	17.6	2.5	3.7	1.6	4.4	1.4
	Females	1494	54%	0.4	0.4	20.2	2.9	55.4	3.1	19.5	3.1	1.0	0.7	3.5	1.1

Employment Status

Table 3.1.4a:
Proportion of respondents in paid employment and those who are unpaid.
Unpaid includes persons who are working without pay, students, homemakers, retired, and unemployed.

Age-Group (years)	Men				
	n	% Paid Work			% Unpaid
		% Govt Employee	% Non-Govt Employee	% Self-employed	
25-34	483	11.2	33.1	19.9	35.8
35-44	313	8.3	27.5	28.1	36.1
45-54	271	10.7	16.6	25.8	46.9
55-64	222	11.3	11.7	17.1	59.9
25-64	**1289**	10.4	24.6	22.7	42.4

Age-Group (years)	Women				
	n	% Paid Work			% Unpaid
		% Govt Employee	% Non-Govt Employee	% Self-employed	
25-34	516	9.1	15.3	3.5	72.1
35-44	411	7.8	9	7.5	75.7
45-54	314	6.1	11.1	10.2	72.6
55-64	271	4.1	6.6	7	82.3
25-64	**1512**	7.2	11.2	6.6	75

Age-Group (years)	Study Population				
	n	% Paid Work			% Unpaid
		% Govt Employee	% Non-Govt Employee	% Self-employed	
25-34	999	10.1	23.9	11.4	54.6
35-44	724	8	17	16.4	58.6
45-54	585	8.2	13.7	17.4	60.7
55-64	493	7.3	8.9	11.6	72.2
25-64	**2801**	8.7	17.4	14	60

Unpaid Work & Unemployed

Table 3.1.4b:
Proportion of respondents in Unpaid activities including Unemployed

Employment Type	Employment category	n	% Employment Categories	% Employment Type
Unemployed	Unemployed - able to work	184	11.0%	95.3%
	Unemployed - not able to work	9	0.5%	4.7%
Unemployed Total		193	11.5%	100.0%
Unpaid Occupation	Homemaker	1315	78.3%	88.4%
	Retired	31	1.8%	2.1%
	Student	7	0.4%	0.5%
	Unpaid worker	134	8.0%	9.0%
Unpaid Occupation Total		1487	88.5%	100.0%
Total		1680	100.0%	

Table 3.2.1a
Smoking status among total population (by Age-Grp & Sex

Men (N=1278)

Age Group (years)	Current Smokers			Non-Smokers			Current Smokers					
							Daily Smokers			Non-Daily Smokers		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	264	56.3	8.5	216	43.7	8.5	225	48.2	8.5	39	8.1	8.9
35-44	176	57.2	4.3	135	42.8	4.3	154	50.1	4.3	22	7.0	5.3
45-54	158	58.3	7.5	110	41.7	7.5	146	54.1	7.5	12	4.2	7.8
55-64	118	56.1	8.9	101	43.9	8.9	94	45.2	9.0	24	11.0	8.9
25-64	**716**	**56.9**	4.2	562	43.1	4.2	**619**	**49.4**	4.2	97	7.4	4.7

Women (N=1504)

Age Group (years)	Current Smokers			Non-Smokers			Current Smokers					
							Daily Smokers			Non-Daily Smokers		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	95	18.3	6.1	419	81.7	6.1	77	15.0	5.7	18	3.3	2.1
35-44	123	29.3	4.4	287	70.7	4.4	105	25.1	4.6	18	4.2	2.5
45-54	63	19.1	6.7	246	80.9	6.7	52	15.8	6.6	11	3.3	2.2
55-64	47	18.4	5.1	224	81.6	5.1	34	13.7	4.7	13	4.7	3.5
25-64	**328**	**21.8**	3.2	1176	78.2	3.2	**268**	**18.0**	2.5	60	3.8	1.6

Both Sexes (N=2782)

Age Group (years)	Current Smokers			Non-Smokers			Current Smokers					
							Daily Smokers			Non-Daily Smokers		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	359	38.5	6.6	635	61.5	6.6	302	32.7	6.6	57	5.9	2.7
35-44	299	43.8	3.7	422	56.2	3.7	259	38.1	3.8	40	5.7	1.9
45-54	221	40.4	5.4	356	59.7	5.4	198	36.6	5.6	23	3.8	1.6
55-64	165	37.2	7.4	325	62.8	7.4	128	29.4	7.0	37	7.8	3.0
25-64	**1044**	**40.3**	2.9	1738	59.7	2.9	**887**	**34.6**	3.0	157	5.7	1.8

Smoking Status

Table 3.2.1b :
Smoking status among total population (by Age Group and Region)

Apia Urban (N=1266)

Age Group (years)	Current Smokers			Non-Smokers			Current Smokers					
							Daily Smokers			Non-Daily Smokers		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	167	38.0	10.1	310	62.0	10.1	140	32.2	10.0	27	5.9	3.3
35-44	121	43.5	5.4	167	56.5	5.4	104	37.5	5.5	17	6.0	1.7
45-54	86	36.3	11.8	168	63.7	11.8	76	32.4	10.2	10	3.9	3.0
55-64	73	30.1	6.4	174	69.9	6.4	56	23.8	3.1	17	6.3	7.3
25-64	**447**	**38.5**	3.3	819	61.5	3.3	**376**	**32.9**	3.7	71	5.6	2.5

Upolu Rural (N=792)

Age Group (years)	Current Smokers			Non-Smokers			Current Smokers					
							Daily Smokers			Non-Daily Smokers		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	109	44.9	18.8	145	55.1	18.8	92	38.2	19.0	17	6.7	8.7
35-44	99	46.1	9.0	132	53.9	9.0	85	39.9	11.2	14	6.2	5.2
45-54	85	52.0	6.6	91	48.0	6.6	75	46.3	7.9	10	5.7	3.0
55-64	49	39.0	9.1	82	61.0	9.1	39	30.8	6.1	10	8.2	6.7
25-64	**342**	**45.6**	9.1	450	54.4	9.1	**291**	**39.0**	9.8	51	6.6	5.7

Savaii (N=724)

Age Group (years)	Current Smokers			Non-Smokers			Current Smokers					
							Daily Smokers			Non-Daily Smokers		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	83	31.8	6.8	180	68.2	6.8	70	26.9	9.2	13	4.9	4.9
35-44	79	41.7	10.8	123	58.3	10.8	70	37.1	8.1	9	4.7	5.3
45-54	50	34.7	9.7	97	65.3	9.7	47	32.7	13.4	3	2.0	3.8
55-64	43	41.5	20.5	69	58.5	20.5	33	32.8	20.8	10	8.7	6.0
25-64	**255**	**36.8**	5.7	469	63.2	5.7	**220**	**31.2**	4.8	35	4.9	3.6

Table 3.2.1c :
Proportion of Daily Smokers among Current Smokers (Age Group and Sex)

Men (N=1278)

Age Group (years)	Daily Smokers			Non-Daily Smokers		
	n	%	CI (±)	n	%	CI (±)
25-34	225	85.6	7.3	39	14.4	7.3
35-44	154	87.7	5.1	22	12.3	5.1
45-54	146	92.8	4.7	12	7.2	4.7
55-64	94	80.4	8.2	24	19.6	8.2
25-64	619	**86.9**	4.8	97	13.1	4.8

Women (N=1504)

Age Group (years)	Daily Smokers			Non-Daily Smokers		
	n	%	CI (±)	n	%	CI (±)
25-34	77	82.0	10.9	18	18.0	10.9
35-44	105	85.6	8.5	18	14.4	8.5
45-54	52	82.6	11.8	11	17.4	11.8
55-64	34	74.6	17.2	13	25.4	17.2
25-64	268	**82.7**	5.8	60	17.3	5.8

Both Sexes (N=2782)

Age Group (years)	Daily Smokers			Non-Daily Smokers		
	n	%	CI (±)	n	%	CI (±)
25-34	302	84.8	7.0	57	15.2	7.0
35-44	259	87.0	4.2	40	13.0	4.2
45-54	198	90.6	4.0	23	9.4	4.0
55-64	128	79.0	7.8	37	21.0	7.8
25-64	887	**85.8**	4.4	157	14.2	4.4

Initiation of smoking

Table 3.2.1d :
Average age started smoking (by Age Group and Sex)

Age Group (years)	Men (N=619)			Women (N=268)			Both Sexes (N=887)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	222	19.8	0.8	77	21.6	1.4	299	20.2	0.7
35-44	154	20.9	1.3	104	23.9	1.8	258	21.9	1.2
45-54	141	20.2	1.2	51	28.7	2.0	192	21.9	0.9
55-64	91	21.5	1.9	33	29.2	3.5	124	23.3	1.4
25-64	608	**20.4**	0.8	265	**24.4**	1.7	873	**21.4**	0.8

Table 3.2.1e
Average age started smoking (by Age Group and Region) :

Age Group (years)	Apia Urban (N=)			Upolu Rural (N=)			Savaii (N=)			All Regions (N=)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	139	20.4	1.2	92	19.6	0.6	68	20.8	3.1	299	20.2	0.7
35-44	103	22.0	2.9	85	20.8	1.8	70	22.9	2.6	258	21.9	1.2
45-54	74	22.4	0.9	73	20.6	2.4	45	23.1	2.1	192	21.9	0.9
55-64	55	20.5	2.0	38	24.6	4.0	31	24.0	3.2	124	23.3	1.4
25-64	371	**21.3**	1.7	288	**20.7**	1.1	214	**22.5**	1.7	873	**21.4**	0.8

Duration of smoking

Table 3.2.1f :
Average duration of smoking (Age Group and Sex)

Age Group (years)	Men (N=619)			Women (N=268)			Both Sexes (N=887)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	222	9.9	1.0	77	8.4	1.2	299	9.6	0.7
35-44	154	18.4	0.8	104	15.7	2.1	258	17.6	1.0
45-54	141	28.9	1.4	51	20.6	1.8	192	27.2	1.1
55-64	91	38.1	1.8	33	30.8	3.6	124	36.4	1.8
25-64	608	**19.4**	1.7	265	**15.6**	1.7	873	**18.4**	1.6

Table 3.2.1g :
Average duration of smoking (Age Group and Region)

Age Group (years)	Apia Urban (N=)			Upolu Rural (N=)			Savaii (N=)			All Regions (N=)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	139	9.6	0.8	92	10.2	1.0	68	8.6	2.5	299	9.6	0.7
35-44	103	17.2	2.6	85	18.5	1.1	70	16.9	2.2	258	17.6	1.0
45-54	74	27.3	1.2	73	28.4	3.2	45	25.7	2.4	192	27.2	1.1
55-64	55	38.5	2.3	38	35.9	5.3	31	35.6	3.8	124	36.4	1.8
25-64	371	**17.5**	1.7	288	**18.8**	3.3	214	**19.1**	4.7	873	**18.4**	1.6

Manufactured Cigarette Smokers

Table 3.2.1h
Proportion of Manufactured Cigarette Smokers among Daily Smokers

Men (N=619)

Age Group (years)	Manufactured Cig Smokers			Other Tobacco Prod Smokers		
	n	%	CI (±)	n	%	CI (±)
25-34	202	90.2	6.5	23	9.8	6.5
35-44	123	79.9	9.3	31	20.1	9.3
45-54	97	65.1	8.8	49	34.9	8.8
55-64	58	55.4	13.2	36	44.6	13.2
25-64	480	**78.2**	8.5	139	21.8	8.5

Women (N=268)

Age Group (years)	Manufactured Cig Smokers			Other Tobacco Prod Smokers		
	n	%	CI (±)	n	%	CI (±)
25-34	74	95.7	4.2	3	4.3	4.2
35-44	92	86.7	6.0	13	13.3	6.0
45-54	42	79.9	13.2	10	20.1	13.2
55-64	24	61.2	18.5	10	38.8	18.5
25-64	232	**85.9**	4.5	36	14.1	4.5

Both Sexes (N=887)

Age Group (years)	Manufactured Cig Smokers			Other Tobacco Prod Smokers		
	n	%	CI (±)	n	%	CI (±)
25-34	276	91.4	5.2	26	8.6	5.2
35-44	215	82.0	7.6	44	18.0	7.6
45-54	139	68.0	7.4	59	32.0	7.4
55-64	82	56.7	11.0	46	43.3	11.0
25-64	712	**80.1**	7.3	175	19.9	7.3

Rate of Smoking

Table 3.2.1i
Average number of tobacco products smoked per day by daily smokers

Men (N=619)

Age Group (years)	Manufactured Cigarettes			Hand-rolled Cigarettes			Pipes of Tobacco			Other *		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	202	10.3	1.8	62	6.8	2.2	0	-	-	5	3.3	3.0
35-44	123	14.9	2.0	70	11.9	2.6	1	2.0	-	9	6.7	5.4
45-54	97	13.5	2.6	65	10.3	2.1	2	1.0	-	25	9.4	4.8
55-64	58	14.9	3.1	35	10.0	2.3	2	8.3	6.0	16	8.5	5.1
25-64	480	**12.6**	1.0	232	**9.9**	1.3	5	**3.9**	9.6	55	**7.9**	3.2

Women (N=268)

Age Group (years)	Manufactured Cigarettes			Hand-rolled Cigarettes			Pipes of Tobacco			Other *		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	74	8.0	1.6	6	8.4	5.6	0	-	-	0	-	-
35-44	92	11.6	2.5	19	5.6	2.4	0	-	-	2	2.5	1.5
45-54	42	11.1	4.9	11	7.6	3.0	0	-	-	2	6.1	15.6
55-64	24	10.9	3.6	10	5.1	2.8	0	-	-	6	3.4	3.8
25-64	232	**10.2**	1.5	46	**6.3**	2.3	0	**-**	-	10	**3.7**	1.2

Both Sexes (N=887)

Age Group (years)	Manufactured Cigarettes			Hand-rolled Cigarettes			Pipes of Tobacco			Other *		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	276	9.8	1.5	68	6.9	2.0	0	-	-	5	3.3	3.0
35-44	215	13.8	1.5	89	10.8	2.3	1	2.0	-	11	6.1	4.5
45-54	139	12.9	2.0	76	10.0	1.9	2	1.0	-	27	9.2	5.1
55-64	82	13.9	2.9	45	9.0	1.9	2	8.3	6.0	22	7.2	3.1
25-64	712	**12.0**	0.8	278	**9.4**	1.2	5	**3.9**	9.6	65	**7.4**	3.0

Other * : Other tobacco forms including cigars, cheroots, Samoan rolled tobacco or other as specified by respondent.

Table 3.2.2f

Mean number of days of binge drinking in the past 12 months

Alcohol - Binge Drinking

		Men (N=633) 5 or more drinks			Women (N=87) 4 or more drinks		
		n	Mean	CI (±)	n	Mean	CI (±)
Age Group	25-34	273	29.1	8.1	35	9.8	8.7
	35-44	167	34.6	21.7	33	11.1	13.4
	45-54	116	28.3	14.9	13	4.7	5.6
	55-64	77	13.0	7.1	6	105.6	133.7
Total		633	**29.4**	10.6	87	**14.5**	12.5
Region	Apia Urban	306	37.4	20.1	59	15.5	17.2
	Upolu Rural	185	28.8	10.2	23	8.0	12.6
	Savaii	142	16.1	8.0	5	32.9	39.6
Total		633	**29.4**	10.6	87	**14.5**	12.5

Table 3.2.3b

Diet

Mean number of days in a typical week, when fruits and vegetables are eaten

(By Region and Sex)

Days eating Fruit in a typical week

Region	Men (N=1283)			Women (N=1508)			Both Sexes (N=2791)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
Apia Urban	555	2.7	0.3	709	3.1	0.4	1264	2.9	0.3
Upolu Rural	374	2.6	0.4	421	3.0	0.4	795	2.8	0.3
Savaii	354	2.4	0.5	378	3.0	0.5	732	2.7	0.5
All Regions	1283	**2.6**	0.2	1508	**3.0**	0.2	2791	**2.8**	0.2

Days eating Vegetables in a typical week

Region	Men (N=1220)			Women (N=1461)			Both Sexes (N=2681)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
Apia Urban	537	6.0	0.3	685	6.3	0.2	1222	6.2	0.3
Upolu Rural	352	6.3	0.2	412	6.5	0.2	764	6.4	0.2
Savaii	331	6.7	0.3	364	6.8	0.1	695	6.8	0.2
All Regions	1220	**6.3**	0.2	1461	**6.5**	0.1	2681	**6.4**	0.1

Table 3.2.3d

Servings of fruit consumed per day (By Region and Sex)

Men (N=1283)

Region	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
Apia Urban	86	16.2	4.2	103	20.6	11.8	234	40.7	4.0	132	22.5	15.9
Upolu Rural	56	14.2	4.0	74	20.3	8.1	168	46.0	3.5	76	19.5	9.7
Savaii	54	15.5	10.1	48	14.0	8.1	154	43.3	11.5	98	27.2	10.4
All Regions	196	**15.3**	3.7	225	**18.5**	5.8	556	**43.2**	4.1	306	**22.9**	7.5

Women (N=1508)

Region	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
Apia Urban	56	8.1	2.6	134	19.5	8.1	367	52.3	4.4	152	20.1	10.5
Upolu Rural	31	7.0	3.0	110	27.3	6.3	204	47.9	9.0	76	17.9	11.2
Savaii	23	6.1	4.3	59	15.7	9.9	194	51.7	7.8	102	26.5	13.3
All Regions	110	**7.1**	1.9	303	**20.8**	5.1	765	**50.7**	4.2	330	**21.4**	6.6

Both Sexes (N=2791)

Region	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
Apia Urban	142	12.3	2.7	237	20.1	9.9	601	46.2	4	284	21.4	13.3
Upolu Rural	87	10.9	3.5	184	23.5	5.7	372	46.8	5.1	152	18.7	9.8
Savaii	77	11.0	7.2	107	14.8	8.9	348	47.4	9.0	200	26.9	11.5
All Regions	306	**11.4**	2.7	528	**19.6**	5.2	1321	**46.8**	3.6	636	**22.2**	6.8

** includes no fruits*

Diet

Table 3.2.3g
Servings of vegetables consumed per day (By Region and Sex)

Men (N=1220)

Region	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
Apia Urban	1	0.2	0.4	29	6.2	6.7	202	39.0	16.4	305	54.6	22.8
Upolu Rural	3	0.9	1.0	30	8.8	6.2	135	39.3	13.4	184	51.0	19.3
Savaii	0	-	-	15	4.5	5.3	106	32.4	24.1	210	63.1	29.3
All Regions	4	**0.4**	0.4	74	**6.6**	3.8	443	**37.1**	10.6	699	**56.0**	14.2

Women (N=1461)

Region	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
Apia Urban	0	-	-	36	5.8	5.9	272	41.0	15.3	377	53.2	20.5
Upolu Rural	0	-	-	29	7.8	3.9	178	43.3	21.8	205	48.8	24.5
Savaii	0	-	-	13	3.7	4.8	38	29.0	22.7	214	58.3	27.0
All Regions	0	**-**	-	78	**5.8**	3.0	587	**40.8**	11.5	796	**53.4**	13.9

Both Sexes (N=2791)

Region	<1 serving*			1 serving			2-4 servings			5+ servings		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
Apia Urban	1	0.2	0.2	65	6.0	6.3	474	39.9	15.5	682	53.9	21.4
Upolu Rural	3	0.5	0.5	59	8.3	4.8	313	41.2	16.1	389	49.9	21.1
Savaii	0	-	-	28	4.1	5.0	243	35.1	23.4	424	60.8	28.0
All Regions	4	**0.2**	0.2	152	**6.2**	3.3	1030	**38.9**	10.7	1495	**54.7**	13.8

Table 3.2.3h
Mean number of servings per day where fruits or vegetables are eaten
(By Region and Sex)

Fruits

Region	Men (N=1283)			Women (N=1508)			Both Sexes (N=2791)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
Apia Urban	555	2.8	0.9	709	2.9	0.5	1264	2.8	0.7
Upolu Rural	374	2.7	0.7	421	2.6	0.7	795	2.6	0.6
Savaii	354	3.0	0.5	378	3.2	0.6	732	3.1	0.5
All Regions	1283	**2.8**	0.4	1508	**2.9**	0.3	2791	**2.8**	0.4

Vegetables

Region	Men (N=1220)			Women (N=1461)			Both Sexes (N=2681)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
Apia Urban	537	5.6	1.2	685	5.3	1.1	1222	5.5	1.1
Upolu Rural	352	5.5	1.1	412	5.5	1.3	764	5.5	1.2
Savaii	331	6.1	1.3	364	5.9	1.1	695	6.0	1.2
All Regions	1220	**5.8**	0.7	1461	**5.6**	0.6	2681	**5.7**	0.7

Fruits and Vegetables

Region	Men (N=1220)			Women (N=1461)			Both Sexes (N=2681)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
Apia Urban	559	8.2	2.2	711	8.0	1.6	1270	8.1	1.9
Upolu Rural	374	7.9	1.7	422	8.0	1.8	796	7.9	1.7
Savaii	354	8.7	1.8	378	8.9	1.8	732	8.8	1.8
All Regions	1287	**8.2**	1.1	1511	**8.3**	1.0	2798	**8.2**	1.1

Table 3.2.4d
Levels of Total Physical Activity (by Age-Group and Region)

Physical Activity – All Settings

Apia (N=1259)

Age Group (years)	High			Moderate			Low		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	25	5.6	1.4	158	34.8	4.1	292	59.6	4.3
35-44	18	7.0	6.1	90	31.4	11.0	176	61.6	13.5
45-54	15	6.8	3.1	80	30.9	13.6	161	62.3	14.2
55-64	27	10.2	15.8	74	30.8	17.4	143	59.0	20.1
25-64	85	**6.7**	2.7	402	**32.7**	8.5	772	**60.6**	9.3

Upolu Rural (N=789)

Age Group (years)	High			Moderate			Low		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	21	8.6	7.2	120	48.6	12.7	111	42.7	5.6
35-44	20	9.9	3.1	99	43.7	13.4	111	46.4	14.4
45-54	21	13.7	13.9	80	47.1	6.6	75	39.2	6.6
55-64	12	9.7	9.9	43	32.9	18.7	76	57.4	14.8
25-64	74	**9.9**	5.4	342	**44.8**	11.0	373	**45.3**	5.8

Savaii (N=729)

Age Group (years)	High			Moderate			Low		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	29	10.9	6.1	134	51.2	8.5	100	37.8	9.2
35-44	19	10.3	13.0	100	50.2	16.6	84	39.5	24.0
45-54	16	10.9	5.0	61	40.7	11.6	73	48.3	10.7
55-64	11	10.7	5.4	39	35.3	25.2	63	54.0	22.9
25-64	75	**10.7**	5.4	334	**46.3**	9.2	320	**43.0**	13.0

Table 3.2.4e
Levels of work-related physical activity by Age-Group and Sex (MET minutes per day)

Physical Activity – Work Related

Vigorous Physical Activity during Work

Age Group (years)	Men (N=1277)			Women (N=1500)			Study Population (N=2777)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	439	80.9	11.2	422	13.9	11.5	861	51.5	8.6
35-44	286	90.9	22.8	354	8.7	3.9	640	52.9	15.2
45-54	245	73.3	17.1	279	8.9	7.0	524	44.3	11.1
55-64	203	64.7	14.0	238	8.9	5.8	441	37.7	9.7
25-64	1173	**80.5**	8.0	1293	**10.7**	4.9	2466	**48.8**	5.6

Moderate Physical Activity during Work

Age Group (years)	Men (N=1277)			Women (N=1500)			Study Population (N=2777)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	479	29.8	9.8	501	18.9	12.4	980	24.8	7.6
35-44	306	32.2	8.9	403	18.1	11.9	709	25.5	8.1
45-54	268	17.2	6.2	311	17.4	19.0	579	17.3	10.1
55-64	216	27.6	15.1	270	21.8	27.2	486	24.7	18.7
25-64	1269	**28.0**	6.1	1485	**18.8**	14.2	2754	**23.7**	8.3

Physical Activity – Recreation Related

Table 3.2.4f
Levels of recreation-related physical activity by Age-Group and Sex (MET minutes per day)

Vigorous Physical Activity during Recreation

Age Group (years)	Men (N=1277)			Women (N=1500)			Study Population (N=2777)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	482	11.2	3.4	505	4.6	4.0	987	8.2	3.1
35-44	304	9.7	3.7	407	3.0	2.2	711	6.4	2.6
45-54	269	6.8	4.9	312	0.9	0.8	581	4.1	2.8
55-64	217	7.6	6.7	270	2.9	2.4	487	5.2	3.7
25-64	1272	**9.5**	2.8	1494	**3.2**	2.1	2766	**6.5**	2.3

Moderate Physical Activity during Recreation

Age Group (years)	Men (N=1277)			Women (N=1500)			Study Population (N=2777)		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
25-34	480	12.8	4.1	506	9.5	5.6	986	11.3	3.7
35-44	304	9.8	4.0	408	6.4	3.4	712	8.2	3.3
45-54	269	7.6	5.4	311	6.2	3.9	580	7.0	4.5
55-64	217	4.9	2.7	271	5.8	4.5	488	5.4	3.3
25-64	1270	**10.0**	3.5	1496	**7.5**	3.9	2766	**8.8**	3.4

Blood Pressure

Table 3.3.2a
Mean Systolic and Diastolic Blood Pressure readings (by Age-Group and Sex)

Men (N=1246)

Age Group (years)	Systolic BP			Diastolic BP		
	n	Mean	CI (±)	n	Mean	CI (±)
25-34	483	127.3	1.3	483	71.2	1.8
35-44	310	128.9	2.0	310	77.2	1.8
45-54	256	130.5	2.1	256	78.8	1.8
55-64	197	135.4	3.0	197	79.8	2.0
25-64	1246	**129.3**	1.4	1246	**75.3**	1.4

Women (N=1439)

Age Group (years)	Systolic BP			Diastolic BP		
	n	Mean	CI (±)	n	Mean	CI (±)
25-34	510	113.3	1.5	510	69.3	1.4
35-44	396	119.0	1.6	395	73.7	1.4
45-54	293	129.4	3.6	293	79.4	2.0
55-64	240	133.4	4.2	240	78.3	2.9
25-64	1439	**120.3**	1.9	1438	**73.5**	1.4

Study Population (N=2685)

Age Group (years)	Systolic BP			Diastolic BP		
	n	Mean	CI (±)	n	Mean	CI (±)
25-34	993	120.8	1.2	993	70.3	1.2
35-44	706	124.3	1.4	705	75.5	1.2
45-54	549	130.0	2.4	549	79.1	1.6
55-64	437	134.4	2.7	437	79.1	2.2
25-64	2685	**125.1**	1.4	2684	**74.5**	1.3

Table 3.3.2b
Mean Resting Systolic and Diastolic Blood Pressure readings (by Region)

Age Group (years)	Systolic BP			Diastolic BP			Hypertensives Only: Systolic BP			Hypertensives Only: Diastolic BP		
	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)	n	Mean	CI (±)
Apia	1269	126.0	1.6	1269	75.8	0.7	320	148.9	2.2	320	91.0	2.0
Savaii	734	126.4	4.4	734	74.4	3.9	155	149.0	3.4	155	90.6	3.3
Upolu Rural	788	124.9	1.1	788	74.4	1.2	166	149.1	6.9	166	91.0	2.4

Table 3.3.2d
Hypertension Prevalence and percentage newly diagnosed (by Age Group and Region)

Apia (N=1269)

Age Group (years)	Not Hypertensive			Hypertensive*			Hypertensive* (N=323)					
							Newly diagnosed & NOT on medication**			Previously diagnosed (on medication)***		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	412	85.4	3.1	65	14.6	3.1	63	97.9	5.3	2	2.1	5.3
35-44	232	80.7	8.6	55	19.3	8.6	50	92.6	8.3	5	7.4	8.3
45-54	174	67.2	6.6	82	32.8	6.6	73	90.6	8.3	9	9.4	8.3
55-64	131	51.8	8.8	118	48.2	8.8	88	74.0	6.8	30	26.0	6.8
25-64	949	**77.1**	4.8	320	**22.9**	4.8	274	**89.1**	2.6	46	**10.9**	2.6

Upolu (N=788)

Age Group (years)	Not Hypertensive			Hypertensive*			Hypertensive* (N=318)					
							Newly diagnosed & NOT on medication**			Previously diagnosed (on medication)***		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	231	91.3	3.2	21	8.7	3.2	21	100.0	0.0	0	-	-
35-44	191	82.8	2.3	37	17.2	2.3	31	86.1	11.4	6	13.9	11.4
45-54	120	68.6	9.2	57	31.4	9.2	43	74.1	26.1	14	25.9	26.1
55-64	80	61.2	14.7	51	38.8	14.7	35	67.7	28.7	16	32.3	28.7
25-64	622	81.0	1.6	166	**19.0**	1.6	130	**80.5**	13.0	36	**19.5**	13.0

Savaii (N=734)

Age Group (years)	Not Hypertensive			Hypertensive*			Hypertensive* (N=641)					
							Newly diagnosed & NOT on medication**			Previously diagnosed (on medication)***		
	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)	n	%	CI (±)
25-34	242	90.9	9.6	24	9.1	9.6	24	100.0	0.0	0	-	-
35-44	170	83.5	9.2	34	16.5	9.2	31	91.9	16.2	3	8.1	16.2
45-54	98	64.8	17.4	53	35.2	17.4	41	77.7	14.1	12	22.3	14.1
55-64	69	61.1	15.0	44	38.9	15.0	34	78.9	24.6	10	21.1	24.6
25-64	579	78.9	12.3	155	**21.1**	12.3	130	**84.7**	14.6	25	**15.3**	14.6

** Systolic BP ≥ 140 mmHg AND/OR Diastolic BP ≥ 90 mmHg AND/OR previously diagnosed and on medication*

*** Systolic BP ≥ 140 mmHg AND/OR Diastolic BP ≥ 90 mmHg AND not previously diagnosed and on medication*

**** previously diagnosed by a doctor or health worker for hypertension AND on medication for it.*

Appendix 2a: Questionnaire – English Version

Participant ID [ ][ ] [ ][ ][ ]
village *participant*

GOVERNMENT OF SAMOA

DEPARTMENT OF HEALTH
&
World Health Organization

WHO STEPwise approach to NCD Risk Factor Surveillance

Village: _____

Interviewer code and initials [ ][ ] [ ][ ][ ]
code *initials*

Date of completion of the questionnaire [ ][ ] / [ ][ ] / [ ][ ][ ][ ]
day *month* *year*

Interview language
Samoan ○[1]
English ○[2]

Check if the following are completed:

	Yes	No
Consent form:	○	○
Fasting status:	○	○
Checkout:	○	○
Data entry:	○	○
Data entry irregularities:	○	○

I. Identification Information

I1 Family Name [ ]

I2 First Name [ ]

I3a Phone [ ][ ][ ][ ][ ]

I3b. Specify whose phone:

work ○[1]
home ○[2]
neighbour ○[3]
committee house ○[4]
no phone ○[5]

I4 Household name of the family that you live with

[ ]

D. Demographic Information

D1 Sex

Male ○[1]
Female ○[2]

D2 What is your date of birth? ☐☐ / ☐☐ / ☐☐☐☐
day *month* *year*

D3 How old are you? ☐☐ *years*

D4 What is the highest level of education you have completed?

1. Never attended school ○[1]
2. Primary school/Pastor's school ○[2]
3. Some secondary school (junior high school) ○[3]
4. Secondary school (Form 6 or equivalent, e.g. high school) ○[4]
5. Technical training (or equivalent) ○[5]
6. University or tertiary qualification ○[6]

D5 In total, how many years have you spent at school or in full-time study (excluding pre-school)? ☐☐ *years*

D6 Which of the following best describes your main work status over the last 12 months?

1. Government employee ○[1]
2. Non-government employee ○[2]
3. Self-employed ○[3]
4. Non-paid (or volunteer, includes subsistence farming) ○[4]
5. Student ○[5]
6. Homemaker (household chores) ○[6]
7. Retired ○[7]
8. Unemployed (able to work) ○[8]
9. Unemployed (unable to work) ○[9]

S. Smoking

S1a Do you currently smoke any tobacco products such as cigarettes, cigars, or pipes?

Yes	○[1]	(If **No**, skip to S4a)
No	○[2]	

S1b *If **Yes**:* Do you currently smoke tobacco products daily?

Yes	○[1]	(If **No**, skip to S4a)
No	○[2]	

S2a How old were you when you first started smoking daily? ☐☐ *years* (If **can't recall** age, go to S2b)

S2b If you don't know how old you were, do you remember how long ago it was?

i) Either ☐☐ *weeks ago*

ii) or ☐☐ *months ago*

iii) or ☐☐ *years ago*

S3 On average, how many of the following items do you smoke each day?

a) Manufactured cigarettes ☐☐ *per day*

b) Hand-rolled cigarettes ☐☐ *per day*

c) Pipes full of tobacco (Samoan or palagi) ☐☐ *per day*

d) Cigars/cheroots/Samoan rolled tobacco ☐☐ *per day*

e) Specify other:_____ ☐☐ *per day*

S4 Are you exposed to other people smoking in your presence…

a) At work?	○[1]	○[2]	○[3]
b) At home?	○[1]	○[2]	○[3]
c) On public transport?	○[1]	○[2]	○[3]

A. Alcohol Consumption

A1a Have you ever consumed a drink that contains alcohol (such as beer, wine, spirits or home brew?)

Yes ○1
No ○2

(If **No**, skip to N1a)

A1b *If **Yes**:* Was this within the past 12 months?

Yes ○1
No ○2

(If **No**, skip to N1a)

A2 In the past 12 months, how frequently have you had at least one alcoholic drink?

1. 5 or more days a week ○1
2. 1-4 days per week ○2
3. 1-3 days a month ○3
4. Less than once a month ○4

A3 When you drink alcohol, on average, how many drinks do you have during one day?

☐☐☐ *drinks*

A4 During the past 7 days, how many standard drinks of any alcoholic beverage did you have each day? *(For a definition of standard drink, show demonstration kits)*

	Number of		**Number of**
a) Monday	☐☐	e) Friday	☐☐
b) Tuesday	☐☐	f) Saturday	☐☐
c) Wednesday	☐☐	g) Sunday	☐☐
d) Thursday	☐☐		

A5a **For Men only:** In the past 12 months, on how many days did you have five or more alcoholic drinks in a single day?

☐☐☐ *days*

A5b **For Women only:** In the past 12 months, on how many days did you have four or more alcoholic drinks in a single day?

☐☐☐ *days*

A6 **For everyone:** In the past 12 months, what was the largest number of drinks you had on a single occasion, counting all types of alcoholic beverages combined?

☐☐☐ *drinks*

N. Nutrition

Think of what you usually eat for breakfast, lunch, dinner and snacks for the following questions.
(Show demonstration cups for serving sizes and for definitions of fruits, vegetables, starchy vegetables)

N1a On how many days do you eat fruit in a typical week?

☐ *days* (If "**0**", skip to N2a)

N1b How many servings of fruit do you eat on one of these days?

☐☐ *servings*

N2a On how many days do you eat vegetables in a typical week (includes starchy vegetables and fruits)? *(Show pictures: Examples are greens plus taro, taamu, green banana, breadfruit, yam, potato, sweet potato. This does NOT include rice or bread.)*

☐ *days* (If "**0**", skip to N3)

N2b How many servings of vegetables (including starchy) do you eat on one of these days?

☐☐ *servings*

N3 In the last 7 days, how many times did you eat fresh fish?

☐☐ *times*

N4 In the last 7 days, how many times did you eat tinned fish?

☐☐ *times*

N5 In the last 7 days, how many times did you eat mutton flaps?

☐☐ *times*

Physical Activity

Occupation-related Physical Activity (paid or unpaid)

Reply to the following questions thinking about a typical week during the past 12 months.

O1 How long is your typical workday? ☐☐
hours

O2 Does your work involve mostly sitting or standing still?
(e.g. walking for less than 10 minutes at a time)

Yes ○[1] No ○[2] *(If **Yes**, skip to T1)*

O3 a) Does your work involve vigorous activities like heavy lifting, digging, or heavy construction work for at least 10 minutes at a time?

Yes ○[1] No ○[2] *(If **No**, skip to O4)*

b) If "Yes," on how many days in a typical week? ☐ *days*

c) How much time do you spend doing this on a typical day? ☐☐ : ☐☐
hours *minutes*

O4 a) Does your work involve moderate-intensity activities like brisk walking or carrying light loads for at least 10 minutes at a time?

Yes ○[1] No ○[2] *(If **No**, skip to T1)*

b) If "Yes," on how many days in a typical week? ☐ *days*

c) How much time do you spend doing this on a typical day? ☐☐ : ☐☐
hours *minutes*

Travel-related Physical Activity

T1 a) Do you walk or cycle to and from places (to work, to the market, to church, etc.) for at least 10 minutes at a time?

Yes ○[1] No ○[2] *(If **No**, skip to L1)*

b) If "yes," on how many days in a typical week? ☐ *days*

c) How much time do you spend travelling this way on a typical day?

☐☐ : ☐☐
hours *minutes*

Other Physical Activity ***(Recreation / Sport / Leisure)***

This set of questions is about activities you do in your leisure time for recreation, such as sport (that is, activities aside from your work or travel, and not the activities already mentioned). These are activities that you choose to do voluntarily, not including necessary plantation work or household chores (Tafao).

L1 Does your **recreation, sport and leisure (RSL) time** involve mostly sitting, reclining, or standing with walking for less than 10 minutes at a time, e.g. watching TV?

Yes ○[1] No ○[2]

L2 a) Do you do vigorous activities like weight lifting, running, or strenuous sports in your **leisure** time for at least 10 minutes at a time?

Yes ○[1] No ○[2] *(If **No**, skip to L3a)*

b) If "Yes," on how many days in a typical week? ☐ *days*

c) How much time do you spend doing this on a typical day? ☐☐ : ☐☐ *hours* *minutes*

L3 a) Do you do moderate-intensity activities like brisk walking, cycling or swimming in your **RSL**-time for at least 10 minutes at a time?

Yes ○[1] No ○[2] *(If **No**, skip to R1)*

b) If "Yes," on how many days in a typical week? ☐ *days*

c) How much time do you spend doing this on a typical day? ☐☐ : ☐☐ *hours* *minutes*

Sitting/Reclining Activity

This question is about sitting or reclining. Think back over the past 7 days to time spent at work, at home, during recreation time, including time spent sitting at a desk, visiting friends, reading, or watching television – but not counting time spent sleeping.

R1 How much time do you spend sitting or reclining on a typical day?

☐☐ : ☐☐ *hours* *minutes*

Types of Activities

P1 What physical activities did you do in the last 4 weeks?
(read the list and/or show a list and mark as many as apply)

	Yes	No
a) Walking	O[1]	O[2]
b) Running (tamoe or koleni)	O[1]	O[2]
c) Team sports	O[1]	O[2]
d) Swimming	O[1]	O[2]
e) Dancing	O[1]	O[2]
f) Chores/ fai feau	O[1]	O[2]
g) Jazzercize	O[1]	O[2]
h) Lifting weights/ push-ups/ sit-ups	O[1]	O[2]

NCD Knowledge and Attitude

These questions are about diseases such as diabetes, high blood pressure, coronary heart disease and stroke.

K1 Do you think that any of the following are contributing factors for these diseases?

	Yes	No	Uncertain
a) Doing little physical activity	O[1]	O[2]	O[3]
b) Stress, anxiety, anger	O[1]	O[2]	O[3]
c) Overweight	O[1]	O[2]	O[3]
d) Smoking	O[1]	O[2]	O[3]
e) Alcohol	O[1]	O[2]	O[3]
f) High fat intake	O[1]	O[2]	O[3]
g) Eating large quantities (Ai tele)	O[1]	O[2]	O[3]
h) Eating few vegetables	O[1]	O[2]	O[3]
i) Older age	O[1]	O[2]	O[3]
j) Genetics/ family inheritance	O[1]	O[2]	O[3]
k) Pregnancy	O[1]	O[2]	O[3]
l) Ethnicity (e.g. Pacific Islanders, Samoans)	O[1]	O[2]	O[3]

K2 In the last 12 months, have you received information about these diseases from a personal consultation with…?

	Yes	No	Uncertain
a) Doctors	O[1]	O[2]	O[3]
b) Nurses	O[1]	O[2]	O[3]

c) Other health care workers	O[1]	O[2]	O[3]
d) Traditional healers	O[1]	O[2]	O[3]
e) Pastor or clergy	O[1]	O[2]	O[3]

K3 In the last 12 months, did you receive information about these diseases from any of the following sources?

	Yes	No
a) TV	O[1]	O[2]
b) Radio	O[1]	O[2]
c) Pamphlets	O[1]	O[2]
d) Posters	O[1]	O[2]
e) Group talks by a HCW	O[1]	O[2]
f) Internet	O[1]	O[2]
g) Newspapers/ magazines	O[1]	O[2]
h) Books	O[1]	O[2]

K4 In the last 12 months, did you receive any information about these diseases in any of the following places?

	Yes	No
a) Health clinic/ hospital	O[1]	O[2]
b) Work place	O[1]	O[2]
c) Church	O[1]	O[2]
d) Village-based community centre	O[1]	O[2]
e) Market	O[1]	O[2]

K5 How many servings of fruits and vegetables a day should we eat?
(show demonstration cards for serving sizes)

[ ][ ] *Servings per day*

K6 Do you think you are at risk for developing a disease such as diabetes, high blood pressure, heart disease or stroke?

Yes O[1] No O[2] Uncertain O[3]

History and Knowledge of Blood Pressure

M1 Does anyone in your family have high blood pressure, for example…?

	Yes	No	Uncertain
a) Mother	O[1]	O[2]	O[3]
b) Father	O[1]	O[2]	O[3]
c) Siblings	O[1]	O[2]	O[3]
d) Other family member	O[1]	O[2]	O[3]

M2 Which parts of the body can be affected by high blood pressure?

	Yes	No	Uncertain
a) Eyes	○[1]	○[2]	○[3]
b) Kidneys	○[1]	○[2]	○[3]
c) Heart	○[1]	○[2]	○[3]
d) Brain/ Stroke	○[1]	○[2]	○[3]
e) Blood vessels	○[1]	○[2]	○[3]
f) Pregnancy	○[1]	○[2]	○[3]

M3 When was your blood pressure last measured by a health professional?

1. within the past 12 months ○[1]
2. 1-5 years ago ○[2]
3. not within the past 5 years ○[3]
4. never ○[4]
5. uncertain ○[5]

M4 During the past 12 months have you been told by a doctor or other health worker that you have elevated blood pressure or hypertension?

Yes ○[1] No ○[2] Uncertain ○[3] *(If **No**, skip to B1)*

M5 Have you seen a traditional healer for high blood pressure in the last 12 months?

Yes ○[1] No ○[2]

M6 Are you taking* an herbal or traditional medicine for your high blood pressure?

Yes ○[1] No ○[2]

M7 Are you currently receiving any of the following treatments for high blood pressure prescribed by a doctor or other health worker?

	Yes	No	Uncertain
a) Medication**	○[1]	○[2]	○[3]
b) Special prescribed diet	○[1]	○[2]	○[3]
c) Advice or treatment to lose weight	○[1]	○[2]	○[3]
d) Advice or treatment to stop smoking	○[1]	○[2]	○[3]
e) Advice to exercise	○[1]	○[2]	○[3]

History and Knowledge of Diabetes:

B1 Does anyone you know have diabetes?

	Yes	No	Uncertain
a) Mother	○[1]	○[2]	○[3]
b) Father	○[1]	○[2]	○[3]
c) Siblings	○[1]	○[2]	○[3]
d) Other family member	○[1]	○[2]	○[3]

B2 Have you had your blood sugar measured in the last 12 months?

Yes ○[1] No ○[2] Uncertain ○[3]

B3 Have you ever been told by a doctor or other health worker that you have diabetes?

Yes ○[1] No ○[2] Uncertain ○[3]

*(If **No**, skip to B7)*

B4 Have you seen a traditional healer for diabetes in the last 12 months?

Yes ○[1] No ○[2]

B5 Are you taking* any herbal or traditional medicine for your diabetes?

Yes ○[1] No ○[2]

B6 Are you currently receiving any of the following treatment for diabetes from a doctor or other health worker?

		Yes	No	Uncertain
a) Insulin		○[1]	○[2]	○[3]
b) Oral medication**		○[1]	○[2]	○[3]
c) Special prescribed diet		○[1]	○[2]	○[3]
d) Advice or treatment to lose weight	○[1]	○[2]	○[3]	
e) Advice or treatment to stop smoking		○[1]	○[2]	○[3]
f) Advice to exercise	○[1]	○[2]	○[3]	

B7 What are some of the symptoms of diabetes?

		Yes	No	Uncertain
a) Urinary frequency	○[1]	○[2]	○[3]	
b) Excess thirst		○[1]	○[2]	○[3]
c) Blurry vision		○[1]	○[2]	○[3]
d) Itchiness		○[1]	○[2]	○[3]
e) General malaise/weakness	○[1]	○[2]	○[3]	
f) Irritability		○[1]	○[2]	○[3]
g) Poor wound healing		○[1]	○[2]	○[3]
h) Frequent infections	○[1]	○[2]	○[3]	

B8 Which parts of the body can be affected by diabetes?

		Yes	No	Uncertain
a) Eyes/ blindness		○[1]	○[2]	○[3]
b) Kidneys		○[1]	○[2]	○[3]
c) Heart		○[1]	○[2]	○[3]
d) Brain/ Stroke		○[1]	○[2]	○[3]
e) Feet/ ulcers/ amputations		○[1]	○[2]	○[3]
f) Blood vessels		○[1]	○[2]	○[3]
g) Nerves		○[1]	○[2]	○[3]
h) Penis/ erectile dysfunction	○[1]	○[2]	○[3]	
i) Pregnancy		○[1]	○[2]	○[3]

* *Not including massage or topical treatments*
** *Taken in the last two weeks*

STEP 2: PHYSICAL MEASURES

Blood Pressure
(Sit 5 minutes before 1st measurement, and 1 minute between measures)

		Reading 1	Reading 2	Reading 3
V1	Systolic Blood Pressure	☐☐☐ *mmHg*	☐☐☐ *mmHg*	☐☐☐ *mmHg*
V2	Diastolic Blood Pressure	☐☐☐ *mmHg*	☐☐☐ *mmHg*	☐☐☐ *mmHg*

V3 Cuff size: sm ○[1] med ○[2] lg ○[3] *V4* Technician ID ☐☐

V5 Device ID ☐☐

V6 Height ☐☐☐.☐ *cm* *V7* Tech ID ☐☐ *V8* Device ID ☐☐

V9 Weight ☐☐☐.☐ *kg* *V10* Tech ID ☐☐ *V11* Device ID ☐☐

V12 Participant currently pregnant?: Yes ○[1] No ○[2] Uncertain ○[3] *(If **Yes**, skip to Step 3)*

V13 Waist ☐☐☐.☐ *cm* *V14* Tech ID ☐☐ *V15* Device ID ☐☐

STEP 3: BIOCHEMICAL MEASURES

Fasting status

Y1 During the last 12 hours have you had anything to eat or drink, other than water?

Yes ○[1] No ○[2] Uncertain ○[3]

Blood glucose

Y2 Technician ID ☐☐ *Y3* Device ID ☐☐

Y4 Time of finger prick ☐☐ : ☐☐ *hours* *minutes*

Y5 Fasting blood glucose (capillary) ☐☐.☐ *mmol/L*

Blood Lipids

Y6 Technician ID ☐☐ *Y7* Device ID ☐☐

Y8 Fasting total cholesterol ☐.☐☐

Appendix 2b: Questionnaire – Samoan Version

Numera a le tagata o loo suesueina ☐☐ ☐☐☐
nuu

GOVERNMENT OF SAMOA

DEPARTMENT OF HEALTH
&
World Health Organization

Suesuega o Faama'i Le Pipisi ma Mafua'aga i Samoa

Nuu/Alalafaga: _____

Numera / Mataitusi amata igoa o le sui suesue
(ID) (Initials) ☐☐ *ID* ☐☐☐ *Initials*

Aso na mae'a ai le suesuega ☐☐ / ☐☐ / ☐☐☐☐
aso *masina* *tausaga*

Gagana faaaogaina

Gagana Samoa ○[1]
Gagana Peretania ○[2]

Siaki po ua ma'ea ona faatumuina vaega nei :

	1. loe	2. Leai
Pepa o maliega:	○	○
O e faaoge talu mai anapo (vagana ai le vaiauli):	○	○
Ua ma'ea ona suesueina:	○	○
Ua mae'a ona faamauina faamatalaga:	○	○
Faamatalaga le talafeagai:	○	○

I. Faamatalaga i le Tagata o lo o suesueina

I1 Faaiu ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

I2 Igoa Muamua ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

I3a Telefoni ☐☐☐☐☐

I3b Telefoni i le
fale faigaluega ○[1]
aiga ○[2]
tua'oi ○[3]
fale komiti ○[4]
leai se telefoni ○[5]

I4 O ai le suafa o le ulu o le aiga o loo e nofo ai?

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

D. Faamatalaga Faapitoa

D1 Ituaiga

ii ○[1]
Tamaitai ○[2]

D2 O le a lou aso fanau? ☐☐ / ☐☐ / ☐☐☐☐
aso *masina* *tausaga*

D3 Ua fia ou tausaga? ☐☐ *tausaga*

D4 O le a le maualuga o le vasega sa mae'a / gata ai lau aoga?

7. Ou te lei alu i se aoga ○[1]
8. Aoga Tulaga lua / Aoga a le Faifeau ○[2]
9. Se vaega o Aoga maualuga / faa-itumalo ○[3]
10. Aoga Maualuga (ua laasia le Vasega 6 maualuga) ○[4]
11. Aoga o tomai faapitoa (Matata Eseese) ○[5]
12. Iunivesite (e aofia ai Kolisi faafaiaoga/faafaifeau/aoga faatausima'i pasi, etc) ○[6]

D5 I le aotelega, e fia le aofai o tausaga sa e aoga ai (full time) e le aofia ai Aoga Faataitai? ☐☐ *tausaga*

D6 O fea o galuega o loo lisi i lalo na e faigaluega ai i le sefulu lua masina ua mavae atu?

10. Tagata faigaluega a le Malo ○[1]
11. Tagata faigaluega e ese mai galuega a le malo (non-government employee) ○[2]
12. Tagata faigaluega mo ia lava e aofia ai ma le au faifaatoaga e galulue mo se tupe maua ○[3]
13. Tagata faigaluega le totogia (volunteer) e aofia ai le aufaifaatoaga e galulue mo lo latou lava tausiga ○[4]
14. Tamaiti Aoga ○[5]
15. Tagata nofofale / faigaluega i le aiga (Domestic Duties) ○[6]
16. Tagata faigaluega ua ritaea ○[7]
17. Tagata e le faigaluega, ae mafai ona galue ○[8]
18. Tagata e le faigaluega ona e le mafai ona galue ○[9]

S. Taumafa Tapa'a / Sikareti

S1a O e taumafa tapa'a e pei o sikareti, sika po o tapa'a utu paipa i le taimi nei?

Ioe ○[1]
Leai ○[2]

(A" leai" alu i le fesili S4a)

S1b ***Afai e Ioe***: E te taumafa tapa'a i aso uma?

Ioe ○[1]
Leai ○[2]

(A"leai" alu i le fesili S4a)

S2a O le fia o ou tausaga na amata ai ona e taumafa tapa'a i aso uma?

☐☐ *tausaga*

(A le manatua tausaga, alu i le fesili S2b)

S2b Afai e te le manatua le matua o ou tausaga, o le a le umi talu ona e ulaula i aso uma?

☐☐ *Vaiaso talu ai*

po ☐☐ *Masina talu ai*

po ☐☐ *Tausaga talu ai*

S3 E fia le aofai o ituaiga tapa'a nei e masani ona e taumafaina/ulaina i le aso e tasi?

f) Sikareti ua maea ona gaosia ☐☐

g) Sikareti ta'ai ☐☐

h) Tapa'a utu paipa (Samoa/Palagi) ☐☐

i) Sika/Tapa'a Samoa (tipi) ☐☐

j) O nisi tapa'a:_____ ☐☐

S4 E masani ona e faatasi ma isi tagata a o ulaula….

a) I le galuega?	○[1]	○[2]	○[3]
b) I le aiga?	○[1]	○[2]	○[3]
c) I totonu o taavale lau pasese?	○[1]	○[2]	○[3]

A. Taumafa Ava Malosi

A1a Ua e taumafaina se ava malosi (e pei o le pia, uaina, fagu malosi po o le pulū)?

Ioe ○[1]
Leai ○[2] (A "leai" alu i le fesili N1a)

A1b ***Afai e Ioe :*** Sa e taumafaina i totonu ole 12 masina talu ai?

Ioe ○[1]
Leai ○[2] (A "leai" alu i le fesili N1a)

A2 I le 12 masina talu ai, e faafia ona e taumafaina se ipu ava malosi se tasi pe sili atu?

5. 5 aso pe sili atu i le vaiaso ○[1]
6. 1-4 aso o le vaiaso ○[2]
7. 1-3 aso i le masina ○[3]
8. Lalo ifo i le tasi i le masina ○[4]

A3 I taimi e te taumafaina ai le ava malosi, e fia ni ipu ava faapenei e masani ona e taumafaina i le aso?

☐☐☐ *Std drinks*

A4 I le 7 aso talu ai, e fia ni ipu ava faapenei sa e taumafaina i aso taitasi?

	Aofai o ipu ava (std drinks)		Aofai o ipu ava (std drinks)
a) Aso Gafua	☐☐	e) Aso Faraile	☐☐
b) Aso Lua	☐☐	f) Aso Toonai	☐☐
c) Aso Lulu	☐☐	g) Aso Sa	☐☐
d) Aso Tofi	☐☐		

A5a **Mo Alii :** I le 12 masina talu ai, e fia ni aso sa e taumafaina ai ni ipuava se **5 pe sili atu** foi le aofai, i le aso?

☐☐☐ *aso*

A5b **Mo Tamaitai :** I le 12 masina talu ai, e fia ni aso sa e taumafaina ai ni ipuava se **4 pe sili atu** foi le aofai i le aso?

☐☐☐ *aso*

A6 **Mo tagata uma :** I le 12 masina talu ai, o le a se **maualuga o le faitau aofai** o ipu ava malosi sa e taumafaina i le taimi e tasi? *(e aofia ai soo se ituaiga ava malosi)*

☐☐☐ *Ipu ava*

N. Taumafa Tatau

Mafaufau i au taumafa masani o le taeao, aoauli, afiafi ma vai'aiga mo fesili o loo i lalo.
(faaali fua o 'aiga ma ituaiga o fualaau 'aina).

N1a E fia ni aso o le vaiaso e te taumafa ai i se fualaau 'aina suamalie?
(Vaai i le ata A)

☐ *aso* (A"0" alu i le fesili N2a)

N1b E fia ni au 'aiga o fualaau 'aina suamalie e te taumafaina i se aso se tasi o ia aso?*(e aofia ai vaisalo, supoesi, suafai, kokoesi, salati fualaau 'aina suamalie, etc. Vaai i le ata A)*

☐☐ *Aofai o 'aiga*

N2a E fia ni aso e te taumafa ai i se fualaau 'aina faisua/meaai aano i le vaiaso?
(Vaai i le ata B & C : e aofia ai talo, taamu, fai, ulu, ufi, pateta, umala, kapisi, kukama, maukeni, salati fualaau 'aina taumafa mata, etc.; e le aofia ai araisa ma falaoa).

☐ *aso* (A "0" alu ile fesili N3)

N2b E fia ni au 'aiga o fualaau 'aina faisua / meaai aano sa e taumafaina i se aso se tasi o ia aso?

☐☐ *Aofai o 'aiga*

N3 I aso e 7 ua mavae, e faafia ona e taumafa i se ia fou?

☐☐ *Aofai*

N4 I aso e 7 ua mavae, e faafia ona e taumafa i se i'a tuuapa?
(e aofia ai apa tuna, wahoo, etc..)

☐☐ *Aofai*

N5 I aso e 7 ua mavae, e faafia ona e taumafa i se fasi mamoe?

☐☐ *Aofai*

Faagaioiga o le Tino

O. Faagaioiga o le tino i taimi o galuega (galuega totogi / le totogia)

Mafaufau i au galuega masani i le vaiaso, e tali mai ai fesili nei mo le 12 masina ua tea .

O1 O le a le umi e masani ona e faigaluega ai i aso taitasi? ☐☐ *itula*

O2 E tele ina e nofo pe ete tu e te le gaioi, pe a e galue i lau galuega?
(ie. laititi ifo ma le 10 minute e savali ai mo se taimi)

Ioe ○[1] Leai ○[2] *(A "Ioe" alu i le fesili T1a)*

O3 a) E aofia i lau galuega masani le faatinoina o galuega mamafa e pei o le siisii mea mamafa, eliina o lua po o galuega fau fale?
(ie: *Galuega e faatinoina i le 10 minute pe sili atu).*

Ioe ○[1] Leai ○[2] *(A "leai" alu i le fesili O4a)*

b) Afai e "Ioe" e fia ni **aso o le vaiaso** e masani ona e galue ai faapea? ☐ *aso*

c) O le a se **umi o le taimi** e masani ona e galue ai faapea i le aso? ☐☐ : ☐☐
itula *minute*

O4 a) E i ai ni vaega o lau galuega e manaomia ai le faanatinati o lau savali po o le siisii foi o ni mea e le mamafa tele i se 10 minute pe sili atu foi?

Ioe ○[1] Leai ○[2] *(A "leai" alu i le fesili T1a)*

b) Afai e "Ioe" e fia ni **aso o le vaiaso** e te faatinoina ai ia galuega? ☐ *aso*

c) O le a se **umi o le taimi** e masani ona e galue ai faapea i le aso? ☐☐ : ☐☐
itula *minute*

T. Faagaioiga o le tino i taimi o femalaga'iga.

T1 a) E te savali pe ete alu i se uila vili vae ma e toe foi mai i se taimi e sili atu i le 10 minute? *(ie: i le galuega, maketi, lotu etc)*

Ioe ○[1] Leai ○[2] *(A "leai" alu i le fesili L1)*

b) Afai e "Ioe" e fia ni **aso o le vaiaso** e masani ona e malaga ai faapea? ☐ *aso*

c) O le a se **umi o le taimi** e masani ona e malaga ai faapea i le aso? ☐☐ : ☐☐
itula *minute*

L. Isi Galuega e Faagaioi ai le Tino i taimi o tafaoga, taaloga ma taimi avanoa.

(O fesili nei e faasino tonu i galuega e faagaioi ai lou tino i ou taimi paganoa i tafaoga ma taaloga (e le aafia ai galuega e te faatinoina pe a e faigaluega pe faimalaga foi i se mea).

L1 I ou taimi paganoa/tafao/taalo etc., e tele ina e saofa'i, taotooto faalagolago, tu ma savali foi mo se umi e i lalo ifo o le 10 minute? (*eg. matamata TV*)

Ioe ○[1] Leai ○[2]

L2 a) I ou taimi paganoa, e te faatinoina ni galuega mamafa e pei o le siisii mea mamafa, tamo'e pe ete taalo malosi foi i ni taaloga i le 10 minute pe sili atu?

Ioe ○[1] Leai ○[2] *(A "leai" alu i le fesili L3a*

b) Afai e "Ioe" e fia ni **aso o le vaiaso** ete faatinoina ai ia galuega? ☐ *aso*

c) O le a le **umi o le taimi** e te faia ai ia galuega i se aso se tasi o le vaiaso? ☐☐ : ☐☐ *itula* *minute*

L3 a) I ou taimi paganoa e te faatinoina ni gaioiga e le mamafa tele e pei o le taalo, savali, vili se uila po o le aau, i le 10 minute pe sili atu?

Ioe ○[1] Leai ○[2] *(A "leai" alu i le fesili R1)*

b) Afai e "Ioe", e fia ni **aso o le vaiaso** e te faatinoina ai ia galuega? ☐ *aso*

c) O le a le **umi o le taimi** e te faatinoina ai ia galuega i le aso? ☐☐ : ☐☐ *itula* *minute*

.

R. Faagaioiga o le tino pe a nofonofo / taotooto

O le fesili lenei e faasino i au galuega e fai pe a e nofonofo pe ete taotooto i taimi e te ala ai. Mafaufau i le 7 aso ua tuana'i atu i le taimi lea o lo o e faigaluega i lou fale faigaluega po o lou lava fale, pe o le taimi o lo o e tafao pe nofonofo ai ma taimi e te alu ai e vaai au uo pe matamata le TV. Ae le o le taimi e te tofa ai.

R1 O le a le umi o se taimi e masani ona e nofonofo pe ete taotooto ai, i se aso se tasi? ☐☐ : ☐☐ *itula* *minute*

P. Ituaiga o galuega e faagaioi ai le tino

P1 O a ni galuega faamalositino sa e faia i le 4 vaiaso ua tuana'i atu?
(Tali uma mai i vaega ua fesiligia)

	Ioe	Leai
i) Savali	O[1]	O[2]
j) Tamoe pe koleni	O[1]	O[2]
k) Taalo i ni taaloga	O[1]	O[2]
l) Aau	O[1]	O[2]
m) Siva	O[1]	O[2]
n) Fai feau	O[1]	O[2]
o) Siva faamalositino	O[1]	O[2]
p) Siisii mea mamafa, faamalositino	O[1]	O[2]

K. O uiga faaalia ma le silafia i faama'i le pipisi

(O fesili nei e faatatau i faama'i le pipisi e pei o le ma'i suka, toto maualuga, ma'i o le fatu po o le pe o se itutino).

K1 E te manatu e ono maua oe i faama'i le pipisi ona o mafuaaga nei?

	Ioe	Leai	Le mautinoa
m) Le lava le faagaioi o le tino	O[1]	O[2]	O[3]
n) Popole, ita	O[1]	O[2]	O[3]
o) Mamafa/puta tele	O[1]	O[2]	O[3]
p) Taumafa tapa'a	O[1]	O[2]	O[3]
q) Taumafa ava malosi	O[1]	O[2]	O[3]
r) Taumafa i meaai e tele ai le ga'o	O[1]	O[2]	O[3]
s) Ai tele	O[1]	O[2]	O[3]
t) Itiiti le taumafa i fualaau 'aina faisua (vegetables)	O[1]	O[2]	O[3]
u) Matua le soifua	O[1]	O[2]	O[3]
v) Tupuaga / tuufaasolo i totonu o se aiga	O[1]	O[2]	O[3]
w) Tina maitaga	O[1]	O[2]	O[3]
x) Tagatanuu (ethnicity -e.g. tagata Pasefika, Samoa)	O[1]	O[2]	O[3]

K2 I le 12 masina ua tuana'i, sa e maua ni faamatalaga tuusa'o e uiga i faama'i le pipisi mai…?

	Ioe	Leai	Le Mautinoa
f) Alii/Tamaitai Fomai	○[1]	○[2]	○[3]
g) Alii/Tamaitai tausima'i	○[1]	○[2]	○[3]
h) Isi aufaigaluega a le Soifua Maloloina	○[1]	○[2]	○[3]
i) Taulasea / Fofo Samoa	○[1]	○[2]	○[3]
j) Faifeau / Vasega o faifeau	○[1]	○[2]	○[3]

K3 Sa e maua mai ni faamatalaga e uiga i faama'i le pipisi mai vaega o le a taua i le 12 masina ua tuana'i atu?

	Ioe	Leai
i) Televise	○[1]	○[2]
j) Leitio	○[1]	○[2]
k) Pepa o faamatalaga *(pamphlets)*	○[1]	○[2]
l) Ata *(Posters)*	○[1]	○[2]
m) Aoaoga mai se sui o le Soifua Maloloina	○[1]	○[2]
n) Fesootaiga i luga o komepiuta	○[1]	○[2]
o) Nusipepa / Tusiata *(Magazines)*	○[1]	○[2]
p) Tusi	○[1]	○[2]

K4 Sa e maua ni faamatalaga e uiga i faama'i le pipisi i nofoaga nei, i le 12 masina ua tuanai atu?

	Ioe	Leai
f) Falema'i (Hospital/Health clinic)	○[1]	○[2]
g) Fale faigaluega	○[1]	○[2]
h) Ekalesia / Lotu	○[1]	○[2]
i) Falekomiti (village based community centre)	○[1]	○[2]
j) Maketi	○[1]	○[2]

K5 E fia aiga o fualaau 'aina suamalie ma fualaau 'aina fai sua e tatau ona taumafa i le aso?
(Tasi le aiga = ½ iputi fualaau' aina fai sua)

[ ][ ] *Aofai o 'aiga i le aso*

K6 I sou manatu, e ono aafia oe i se faama'i le pipisi e pei o le ma'i suka, toto maualuga, ma'i o le fatu po o le pe o le isi itu o le tino?

Ioe ○[1] Leai ○[2] Le mautinoa ○[3]

M. Talaaga ma le silafia o le Toto Maualuga

M1 E i ai se tasi o lou aiga e maua i le toto maualuga e pei o …?

	Ioe	Leai	Le mautinoa
e) Tina	○[1]	○[2]	○[3]
f) Tama	○[1]	○[2]	○[3]
g) Uso/tuagane/tuafafine	○[1]	○[2]	○[3]
h) Isi tagata o le Aiga ○[1]	○[2]	○[3]	

M2 O a ni vaega o le tino e ono aafia i le toto maualuga?

	Ioe	Leai	Le mautinoa
g) Mata/fofoga	○[1]	○[2]	○[3]
h) Fatu gao	○[1]	○[2]	○[3]
i) fatu	○[1]	○[2]	○[3]
j) fai'ai / pe itu tino	○[1]	○[2]	○[3]
k) ala toto	○[1]	○[2]	○[3]
l) ma'itaga	○[1]	○[2]	○[3]

M3 O le a le taimi mulimuli na fua ai lou toto e se alii/tamaitai fomai/tausimai?

1) i totonu o le 12 masina ua tea ○[1]
2) 1-5 tausaga ua tuana'i ○[2]
3) sili atu ma le 5 tausaga ua tuana'i ○[3]
4) e lei fuaina muamua ○[4]
5) le mautinoa ○[5]

M4 I le 12 masina ua tuanai, na fautua atu se alii/tamaitai foma'i po o se tausima'i ua maualuga le fua o lou toto?

Ioe ○[1] Leai ○[2] Le mautinoa ○[3] *(A "leai" alu i le fesili B1)*

M5 Sa e alu e vaai se taulasea / fofo Samoa mo lou toto maualuga i le 12 masina ua tuana'i atu?

Ioe ○[1] Leai ○[2]

M6 O togafitia oe i ni vai Samoa mo lou toto maualuga *(e le aofia ai le fofo po o vai o le pau)*?

Ioe ○[1] Leai ○[2]

M7 O e faaaogaina ni togafitiga e pei ona taua i lalo *(e pei ona fautuaina e se fomai po o se tagata faigaluega o le Soifua Maloloina)* mo lou toto maualuga?

	Ioe	Leai	Le mautinoa
a) Fualaau faatonuina (sa inumia i le 2 vaiaso ua tea)	○[1]	○[2]	○[3]
b) Taumafa faapitoa	○[1]	○[2]	○[3]
c) Fautuaga/Togafitiga ina ia faaitiitia le mamafa ○[1]	○[2]	○[3]	
d) Fautuaga/Togafitiga ina ia taofi le taumafa tapaa	○[1]	○[2]	○[3]
e) Fautuaga ina ia faamalositino ○[1]	○[2]	○[3]	

B. Talaaga ma le silafia o le Ma'i Suka

B1 E te silafia se tasi e maua i le mai suka?

	Ioe	Leai	Le mautinoa
e) Tina	○[1]	○[2]	○[3]
f) Tama	○[1]	○[2]	○[3]
g) Uso/tuagane/tuafafine	○[1]	○[2]	○[3]
h) Isi tagata o le aiga	○[1]	○[2]	○[3]

B2 Na fua lou suka i totonu o le 12 masina ua tuana'i?

Ioe ○[1] Leai ○[2] Lemautinoa ○[3]

B3 Na fautuaina oe e se alii/tamaitai fomai/tausimai o lo o e maua i le mai suka? *(A "leai" alu i le fesili B7)*

Ioe ○[1] Leai ○[2] Le mautinoa ○[3]

B4 Ua e sailia se fofo Samoa mo lou mai suka i le 12 masina ua tuana'i atu?

Ioe ○[1] Leai ○[2]

B5 O togafitia oe i ni vai Samoa mo lou mai suka *(e le aofia ai le fofo po o le vai ole pa'u)*?

Ioe ○[1] Leai ○[2]

B6 O e faaaogaina ni togafitiga e pei ona taua i lalo *(e pei ona fautuaina e se fomai po o se tagata faigaluega o le Soifua Maloloina)* mo lou mai suka?

	Ioe	Leai	Le mautinoa
a) Insulini (tui o le suka)	○[1]	○[2]	○[3]
b) Fualaau faatonuina *(sa inumia ile 2 vaiaso ua tea)*	○[1]	○[2]	○[3]
c) Taumafa faapitoa faatonuina	○[1]	○[2]	○[3]
d) Fautuaga/Togafitiga ina ia faaitiitia le mamafa	○[1]	○[2]	○[3]
e) Fautuaga/Togafitiga ina ia taofi le taumafa tapaa	○[1]	○[2]	○[3]
f) Fautuaga ina ia faamalositino	○[1]	○[2]	○[3]

B7 O a ni auga e te silafia o le mai suka?

	Ioe	Leai	Le mautinoa
i) Tulai soo	○[1]	○[2]	○[3]
j) Fia inu soo	○[1]	○[2]	○[3]
k) Nenefu le vaai	○[1]	○[2]	○[3]
l) Mageso le tino	○[1]	○[2]	○[3]
m) Vaivai /gagase tino	○[1]	○[2]	○[3]
n) Itaita gofie	○[1]	○[2]	○[3]
o) Faigata ona pepe manu'a	○[1]	○[2]	○[3]
p) Maua gofie i siama o faama'i	○[1]	○[2]	○[3]

B8 O a ni vaega o le tino e ono aafia i le mai suka?

	Ioe	Leai	Le mautinoa
j) Mata/tauaso	○[1]	○[2]	○[3]
k) Fatugao	○[1]	○[2]	○[3]
l) Fatu	○[1]	○[2]	○[3]
m) Fai'ai/Pe le itu tino	○[1]	○[2]	○[3]
n) Papala o vae	○[1]	○[2]	○[3]
o) Ala toto	○[1]	○[2]	○[3]
p) Neura	○[1]	○[2]	○[3]
q) Pe le itu sa o alii	○[1]	○[2]	○[3]
r) Ma'itaga	○[1]	○[2]	○[3]

STEP 2: PHYSICAL MEASURES

Blood Pressure

(Relax for 5 minutes before 1st measurement, and 1 minute between measures)

		Reading 1	Reading 2	Reading 3
V1	Systolic Blood Pressure	☐☐☐ *mmHg*	☐☐☐ *mmHg*	☐☐☐ *mmHg*
V2	Diastolic Blood Pressure	☐☐☐ *mmHg*	☐☐☐ *mmHg*	☐☐☐ *mmHg*

V3 Cuff size: sm ○[1] med ○[2] lg ○[3] *V4* Technician ID ☐☐

V5 Device ID ☐☐

V6 Height ☐☐☐.☐ *cm* *V7* Tech ID ☐☐ *V8* Device ID ☐☐

V9 Weight ☐☐☐.☐ *kg* *V10* Tech ID ☐☐ *V11* Device ID ☐☐

V12 Participant currently pregnant?: Yes ○[1] No ○[2] Uncertain ○[3] *(If **Yes**, skip to Step 3)*

V13 Waist ☐☐☐.☐ *cm* *V14* Tech ID ☐☐ *V15* Device ID ☐☐

STEP 3: BIOCHEMICAL MEASURES

Fasting status

Y1 During the last 12 hours have you had anything to eat or drink, other than water?

Yes ○[1] No ○[2] Uncertain ○[3]

Blood glucose

Y2 Technician ID ☐☐ *Y3* Device ID ☐☐

Y4 Time of finger prick ☐☐ : ☐☐ *hours* *minutes*

Y5 Fasting blood glucose (capillary) ☐☐.☐ *mmol/L*

Blood Lipids

Y6 Technician ID ☐☐ *Y7* Device ID ☐☐

Y8 Fasting total cholesterol ☐.☐☐ *mmol/L*

Appendix 3. Fact Sheet

{ Lani Notes: Keep formatting and details included in original fact sheet except check all figures again against re-run tables }

Appendix 4. Equipment List

Weight:
Digital Scales (x5)
2.5 kg and 10 kg weights (for calibration of weight scales)

Height:
Leicester Height Measure (x3)
Solid Wall

Waist Circumference:
Constant tension tape (Figure Finder Tape Measure) (x6)
tape measure (x4)

Blood Pressure:
OMRON Digital Automatic Blood Pressure Monitor
3 cuff sizes – small, medium, large (4 each)
Sphygmomanometer (calibration and standby for OMRON)

Blood Glucose & Cholesterol:
Advanced Glucose Meter (x4)
Glucometer strips (x3000)
Accutrend GCT Cholesterol Meter (x4)
Cholesterol meter strips (x3000)
Cholesterol Meter Batteries (x16)
swabs
lancets (x3000)
sharps container

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