REPUBLIC OF RWANDA

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Rwanda Non-communicable Diseases Risk Factors Report

November 2015

Acknowledgements

The accomplishment of the Rwanda STEP survey is the results of the participation of a large number of individuals and organizations. We would like to express our gratitude to all of them.

In the first place, we are very thankful to men and women who generously agreed to respond to all questions they were asked.

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Foreword

Once considered to be Western diseases or diseases impacting only the wealthy among a population, a new reality is becoming apparent as non-communicable diseases (NCDs) become more and more predominant in developing countries, now competing with infectious diseases such as malaria and HIV-AIDS. This increase in non-communicable diseases is a result of industrialization, urbanization, globalization, economic development, and the aging population as public health improves. This epidemiological transition raises major concerns to developing countries as we strive to find the right balance in resource allocation across health programs, supporting the rising needs of non-communicable diseases while also maintaining traditionally heavily funded programs for infectious diseases such as HIV/AIDS.

Most of the risk factors associated with chronic non-communicable diseases are well characterized and many are preventable and/or amenable to mitigation. Such risk factors include environmental, behavioral, and biological influences. Given the opportunity to mitigate disease in the context of this increasing prevalence, now is the opportune time to develop strategies and tactics to prevent, support, and cope with this increasing burden of non-communicable diseases in our community.

In order to develop the most effective, efficient strategies, it is imperative that we document the population prevalence of modifiable risk factors and conditions associated with lifestyle risk factors for such diseases. The Rwanda Non-Communicable Disease Risk Factors Survey was conducted to gather information that will inform the development and implementation of the national strategic plan to prevent and control diseases throughout the country. The survey supplements existing data from hospitals and health centers at the health facility level, which solely respond to the needs of already affected individuals. Findings from this Non-Communicable Disease Risk Factors Survey will serve as a baseline and, combined with health facility level data, will pave the way for a comprehensive, proactive surveillance system for non-communicable diseases in Rwanda.

Dr. Agnes BINAGWAHO
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Table of Contents

Table of figures

List of tables

Abbreviations

BMI	Body Mass Index
BP	Blood Pressure
CDC	Centers for Disease control (U.S.A.)
CI	Confidence Interval
DBP	Diastolic Blood Pressure
EA	Enrolment Area
FCTC	Framework Convention on Tobacco Control
GDP	Gross Domestic Product
HDL	High-density lipoprotein
HMIS	Health Management Information System
HSSP-2	Rwandan Health Sector Strategic Plan (2009 – 2012)
MET	Metabolic equivalent
mmHg	Millimetres of mercury (unit of blood pressure measurement)
mmol/L	Millimoles per litre (unit for blood chemistry values)
MOH	Ministry of Health
NCD	Noncommunicable diseases
NISR	Rwandan National Institute of Statistics
NRL	National Reference Laboratory
PDA	Personal Digital Assistant
PEN	Package of Essential NCD Interventions
PHC	Primary Health Care
PPP	Purchasing Power Parity
RNEC	Rwanda National Ethics Committee
STEPs	WHO Stepwise approach to NCD surveillance
SBP	Systolic Blood Pressure
UN	United Nations
WHO	World Health Organization

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Executive Summary

Background

The Rwandan Ministry of Health recognizes the threat that Non-Communicable Diseases (NCDs) pose to health and development in Rwanda and in 2009 articulates strategies to respond to them in the Health Sector Strategic Plan 2012 - 2018 (HSSP-3). Among other things, the plan calls for a national prevalence survey on NCD risk factors.

This report responds to that call and summarizes the findings of the first NCD risk factor survey in Rwanda conducted from November 2012 to March 2013.

Objectives

The specific objectives of the survey were:

- To describe the prevalence of modifiable risk factors (physical inactivity, unhealthy diet, tobacco and alcohol use) and other risk factors which may be contributing to NCDs and injuries in Rwanda;
- To determine the prevalence of hypertension, diabetes, raised cholesterol, asthma, chronic renal diseases, injuries and HIV/AIDS amongst Rwandans aged 15-64 years;
- To provide reliable and up-to-date information on the health system response for planning and evaluating public health initiatives and for identifying future demands on health services for the management and treatment.

Results and Conclusions

The survey of a representative sample of 7,240 people (2,692 men and 4,548 women) aged 15-64 years revealed a number of important findings:

- 19.1% of men and 7.1% of women were current tobacco smokers;
- Alcohol consumption was common with more than half of men and almost one-third of women identified as current drinkers;
- 30.0% of men and 17.0% of women had binged on alcohol in the past 30 days;
- Low fruit and vegetable intake was pervasive with 99.1% of participants consumed less than five servings of fruit and/or vegetables per day;
- The frequency, duration and intensity of physical activity in Rwanda was high and this is likely to be protecting Rwandan's from NCDs;
- The majority of physical activity was work related;
- Blood pressure and diabetes were infrequently measured prior to the survey;
- 75.0% of participants were within a healthy weight range;
- 17.1% of participants were overweight (14.3%) or obese (2.8%) with a highest prevalence in women and in urban areas;
- Around 15.0% of participants had raised blood pressure and prevalence rose to 40% for those in the 55-64 year age group;

- 90.0% of participants reported not always wearing a seat belt and 75.0% reported not always wearing a helmet when riding a motorcycle or scooter;
- 5.0% reported being involved in a road traffic crash in the last 30 days and 34.0% of those who were reported a serious injury;
- Raised blood glucose was uncommon, affecting 3.1% of the population;
- Prevalence of raised total cholesterol levels was low at 2.6% overall;

The survey has demonstrated that while overweight and obesity or raised total cholesterol levels were uncommon, several of the more upstream risk factors such as low fruit and vegetable intake and harmful consumption of alcohol were common and need attention.

The STEPs NCD risk factor survey in Rwanda represents a significant step forward in the prevention and control of NCDs because it is the first time a population wide survey has been conducted on NCD risk factors. The findings point to the need for a national NCD strategy that focuses primarily on prevention (e.g. preventing increases in the number of people who smoke, or drink alcohol, promoting regular fruits and vegetable consumption) and address the upstream determinants of NCDs (e.g. the behavioral risk factors and their social determinants such as educational attainment). Alongside this prevention work, additional action is required at the primary care level to better diagnose and manage NCD risk factors in older Rwandans.

Recommendations

The following recommendations are presented as priority actions for NCD prevention and control in Rwanda based on the findings of this report:

Actions for preventing NCDs and addressing the upstream determinants

That the Government of Rwanda:

- Informs relevant government departments, non-government agencies, the private sector and development agencies of the findings and recommendations in this report;
- Provides high level leadership on NCD prevention and control and follow through on commitments made at the UN Political Declaration on NCDs;
- Develops national NCD targets based on the global voluntary NCD targets;
- Monitors the implementation of the NCD Action Plan;
- Accelerates the implementation the WHO Framework Convention on Tobacco Control and introduce or strengthen legislation promoting smoke free environments, health warnings on cigarette packages and taxes on all tobacco products;

- Introduces or strengthens legislation and social marketing to promote the responsible sale and consumption of alcohol, including taxes on products containing alcohol;
- Boosts the funding available for NCD prevention and control through a hypothecated tobacco and alcohol taxes;
- Develops or strengthens policies promoting local production, distribution and promotion of fruit and vegetables and supporting the importation of healthy foods;
- Investigates the potential to significantly scale-up the acquisition, distribution, marketing and availability of fruit and vegetables;
- Develops or strengthens injury prevention policies on seat belt use, helmet use and on reducing injuries due to falls and cuts.

That the Ministry of Health in partnership with NGOs and the wider community:

- Develop and implement a comprehensive and multi sectoral NCD Action Plan with timed targets and indicators in line with the Global NCD Action Plan;
- Provide comprehensive anti-smoking campaigns (targeting use of manufactured cigarettes by those aged 15-24 years, and use of hand-rolled cigarettes and pipe tobacco by women) to prevent smoking uptake) and quit programs for current smokers;
- Provide campaigns promoting responsible consumption of alcohol
- Promote fruit and vegetable consumption and provide programs to increase the availability of fruits and vegetables such as support for production, preservation and promotion of its consumption;
- Strengthen the health system for NCD prevention and control, particularly for older Rwandans and those with 3 or more NCD risk factors. This should include:
    - Improved measurement of blood pressure, total cholesterol and blood sugar levels;
    - Improved diagnosis of raised blood pressure, total cholesterol and glucose;
    - Programs to reduce blood pressure, particularly in men;
    - Screening for the absolute risk of cardiovascular disease and implementation of programs to treat those at high risk as per the WHO package for essential NCD interventions
- Implement social marketing campaigns promoting awareness of seat belts and helmets and how to reduce the risk of serious injuries from falls and cuts

Surveillance actions:

That the Ministry of Health:

- Conducts a further NCD risk factor survey in 5 years' time to determine changes in risk factor prevalence and consider including other important and emerging NCDs such as dental, eye and ear conditions. Repeating this STEPs survey in five years' time will allow for trends in NCD risk factors to be determined and for data to be collected on other risk factors (e.g. salt) that are considered national priorities.
- Improves the STEP survey questionnaire on nutrition:
    - Use a 24 hour recall instead of the day in a typical week.
    - Ask if vegetables are consumed cooked or raw.
    - Which oil and which use (estimated %age for deep frying , pan frying, not cooked)
    - Is the oil for deep frying reused
- Aligns the variables included in future surveys with national and global NCD targets and goals.

1.Introduction

1.1 Background and rationale

Non-communicable diseases (NCDs) such as cardiovascular disease, cancer, diabetes and chronic respiratory diseases are responsible for a high proportion of death and disability globally. Based on current trends, by the year 2020 these diseases are predicted to account globally for 73% of deaths and 60% of the disease burden. Most of these increases will reflect the epidemiological transition from communicable to non-communicable diseases in developing countries (WHO NCD Surveillance Strategy 2012). To counter these trends, a global set of NCD risk factor targets has been endorsed that aim to reduce premature deaths from NCDs by 25% by 2025. The starting point for achieving these targets in most countries is collecting baseline data on the prevalence of selected NCDs and their risk factors.

The Rwandan Ministry of Health has recognized the threat that NCDs pose to health and development in Rwanda and has articulated strategies for responding to NCDs in their Health Sector Strategic Plan for 2009 to 2012 (HSSP-2). Among other things, the plan called for a national prevalence survey on NCD risk factors (Government of Rwanda, 2009).

This first NCD risk factor survey in Rwanda serves multiple purposes. Firstly, it provides information on the size of selected NCD burden and risk factors in Rwanda. Secondly, it provides a baseline against which progress against national and global NCD targets can be measured. Thirdly, it provides a platform from which to strengthen Rwanda's health system response to NCDs by determining the effectiveness, or otherwise, of current prevention and control measures. Fourthly, it provides an opportunity for comparing NCD data with other African countries. Finally it provides evidence from which NCD prevention and control policy and programs can be developed and implemented.

1.2 Rwanda

1.2.1 Geography

Rwanda has a land area of 26,338 square kilometers; it is situated in central Africa approximately 117 km from the equator and is surrounded by the democratic republic of Congo (west), Uganda (north), Tanzania (east) and Burundi (south).[1] While Rwanda has no direct access to the sea, approximately 3% of Rwanda is water with 23 lakes, the main ones being Lake Kivu, Lake Muhazi, Lake Ihema, Lake Burera, Lake Ruhondo, and Lake Mugesera. Also known as 'the land of a thousand hills', Rwanda has five volcanoes and numerous rivers, some forming the source of the River Nile. Average temperatures range between 24.6 - 27.6ºc and the rainy seasons are from March to May and October to November.

[1]Rwanda Development Board (http://www.rdb.rw/about-rwanda/geography.html) [accessed 1 September 2014]

1.2.2 Population

In 2012 the total population of Rwanda was 10,515,973 with a population density of ~ 415 people per square kilometer making it one of the most densely populated countries in Africa.[2] 83% of the total population in Rwanda lives in rural areas and 17% in urban areas. The capital city is Kigali and the official languages are Kinyarwanda, French and English. Life expectancy at birth is 66.2 years for females and 62.6 years for males. Unemployment is low (3.4%) and 54% of households are in possession of cell phones.

1.2.3 Rwanda's vision and economy

Rwanda's vision and aspirations are outlined in Rwanda Vision 2020, a document that is the result of a national consultative process conducted between 1997 and 2000.[3] The discussions and debates involved Rwandans from all walks of life, including leadership of all levels in the business community, government, academia and civil society. The vision is built on the six pillars listed below interwoven with three crossing cutting themes of gender equality, protection of the environment and advancing science and technology.

Table 1: Rwanda vision 2020 pillars and cross-cutting areas

Pillars of the Vision 2020	Cross-cutting areas of Vision 2020
1. Good governance and a capable state	**1.** Gender equality
2. Human resource development and a knowledge based economy	**2.** Protection of environment and sustainable natural resource management
3. A private sector-led economy	**3.** Science and technology, including ICT
4. Infrastructure development	
5. Productive and market oriented agriculture	
6. Regional and International Economic integration.	

The major aspiration of Vision 2020 is to transform Rwanda's economy into a middle income country (per capita income of about 900 USD per year, from 220 USD in 2000), requiring an annual growth rate of at least 7%. And, it looks like this is an aspiration that will be achieved with gross domestic product almost doubling in Rwanda between 2007 and 2012 from USD 3.74 billion to $7.10 billion (using purchasing power parity) with the main sectors contributing to the economy being the Agriculture sector (33%), Industry (16%) and Services (45%). Rwanda's main export products are coffee and tea. On a per capita basis GDP was USD 644 in 2012 using PPP.

[2]National Institute of Statistics of Rwanda (http://www.statistics.gov.rw) [accessed 1 September 2014]
[3]Republic of Rwanda.Rwanda Vision 2020.

1.3 Existing information on NCDs in Rwanda

Population level NCD mortality data for Rwanda is based on estimates. According to the latest data from the World Health Organizations Global Health Observatory, non-communicable conditions account for 36 percent of deaths in Rwanda, of which cardiovascular diseases account for 13%, cancers account for 7%, diabetes accounts for 2%, chronic respiratory diseases account for 1%, and other NCDs account for 12%.[4]Mortality data are available from hospital registries in Rwanda demonstrate that NCDs are an important cause of death. Table 2 uses data from Rwanda Health Mamagement Information System (HMIS) and shows that cardiovascular diseases were the third most common cause of death in 2012 accounting for 8% of deaths. Cancer accounted for 4%. However hospital registries do not provide population level information or information on the risk factors, such as harmful use of alcohol, physical inactivity, unhealthy diet and tobacco use, which are the precursors of NCDs.

Table 2: Top 10 causes of death in district hospitals and public health centers (HMIS 2012)

Rank	Cause of Death	Total	% of Total
1	Neonatal illness	2,722	33
2	Pneumopathies	660	8
3	Cardiovascular disease	608	7
4	Malaria	603	7
5	Obstetrical problems	595	7
6	Physical trauma and fractures	550	7
7	HIV/AIDS opportunistic infections	432	5
8	Diarrhea	335	4
9	Cancer	321	4
10	Acute Respiratory Infections	283	3
	All other reported deaths	1,063	13
	Total	**8,143**	**100**

1.4 Risk factors for NCDs in Rwanda

The 2010 Rwanda DHS documented a relatively low prevalence of tobacco use (4.6 percent in women aged 15-49, and 21 percent in men aged 15-59). A population-based cancer registry from the Butare Prefecture operating between 1991 and 1994 found few (5%) tobacco-related tumors among incident cancer cases (Newton, 1996). The 2010 Rwanda DHS found that while only 10 percent of women aged 15-49 in rural areas had a body mass index (BMI) consistent with overweight (≥ 25 kg/m^2), 20 percent of this population had a BMI consistent with adult underweight or malnutrition (≤ 18.5 kg/m^2).

[4]WHO Global Health Observatory (http://www.who.int/countries/rwa/en/) [accessed 1 November 2014]

1.5 The 2012-13 NCD STEPs risk factor survey in Rwanda

The Rwanda 2012-2013 NCD Risk factor survey was led by the Ministry of Health (MOH) and supported by other stakeholders including the Rwanda National Institute of Statistics (NISR), the National Reference Laboratory, the World Health Organization (WHO) and the US Centers for Disease Control and Prevention (CDC). The role of each of these organizations is outlined below:

- **Ministry of Health (MOH):** The MOH led and managed the implementation of the survey through the Directorate of Clinical Services and the Division of Non-communicable Diseases at the Rwanda Biomedical Center Institute of HIV/AIDS & Disease Prevention and Control. The MOH recruited and trained the data collection teams and liaised with the administrative district to facilitate the data collection process in the field. Additionally, the MOH played a key role in the mobilization of both technical assistance and financial resources to carry out the survey. The MOH secured all required clearances from the NISR, the Rwanda National Ethics Committee (RNEC) and CDC. The MOH will also coordinate the dissemination of the findings this report.
- **National Institute of Statistics of Rwanda (NISR):** The NISR provided substantial technical support for the design and implementation of the survey including a review of the sampling process (sample frame, sample size, enumeration areas) and provision of national guidelines and training manuals for the fieldwork.
- **National Reference Laboratory (NRL):** The National Reference Laboratory provided support for the design and implementation of the biochemical assessment component of the survey. The NRL technical team performed the biomedical measurements.
- **World Health Organization (WHO):** The World health Organization provided the survey methodology, technical assistance and financial support for the implementation of the survey. A consultant provided support for the training of the data collectors and the data analysis. Additionally, WHO provided in-kind contribution including measurement instruments such as scales, CardioChek, reagents and Personal Digital Assistants (PDAs).

- **The United States Centers for Diseases Control and Prevention (CDC):** The CDC provided technical support to the Ministry of Health through a cooperative agreement that covers, among other things, the prevention of non-communicable diseases. For this specific activity, the CDC in-country team actively supported the Ministry of Health in the development of the survey protocol and requested institutional review board (IRB) clearance from CDC Atlanta. The technical support expanded to the supervision of data collection, data cleaning and analysis, and reporting. Additionally, financial resources were availed for this survey through a cooperative agreement to support the implementation of the survey as needed (i.e. data analysis, reporting, training, survey implementation).

1.6 Objectives

The overall objective of the survey was to assess the magnitude of selected Non-Communicable Diseases and their risk factors in the Rwandan population using the WHO STEPS wise approach to NCD risk factor surveillance. Specific objectives were:

- To describe the prevalence of modifiable risk factors (physical inactivity, unhealthy diet, tobacco and alcohol use) and other risk factors which may be contributing to NCDs and injuries in Rwanda;
- To determine the prevalence of hypertension, diabetes, raised cholesterol, asthma, chronic renal diseases, injuries and HIV/AIDS amongst Rwandans aged 15-64 years;
- To provide reliable and up-to-date information on the health system response for planning and evaluating public health initiatives and for identifying future demands on health services for the management and treatment;

2 Methodology

2.1 Approach

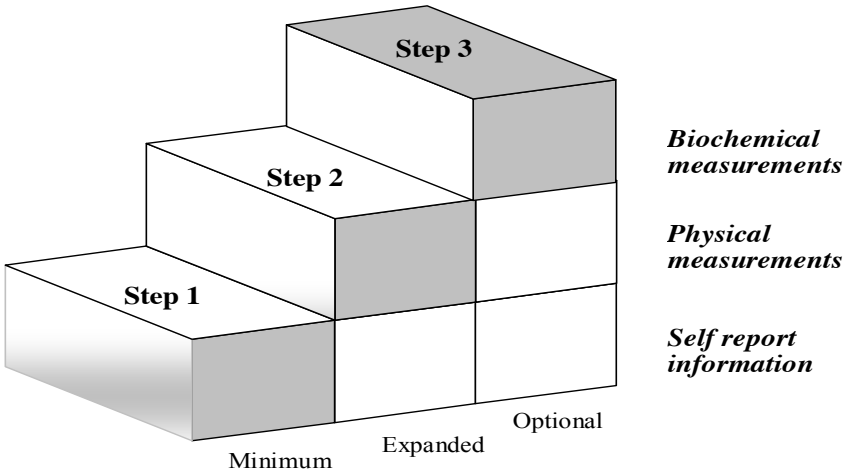
The Rwanda NCD risk factor survey used the WHO Stepwise approach as its methodology. As the name suggests, this approach follows a sequential three-step process as illustrated in Figure 1.

Step 1: Completion of an interviewer assisted questionnaire on tobacco use, alcohol consumption, fruits vegetable and oil consumptions, physical activity, history of blood pressure and diabetes and injuries. Data from the interview were recorded on Personal Digital Assistants.

Step 2: Physical measurement of blood pressure, height, weight, waist and hip circumference, heart rate.

Step 3: Biochemical measures of fasting blood glucose, total cholesterol, urine albumin.

Figure 1: Sequential three-step process



2.2 Ethics approval

Participants in the survey were provided with a plain language statement about the study and they provided written and oral consent. They were informed that they could withdraw themselves or their data from the study at any time. The survey protocol was reviewed by the Rwanda National Ethics Committee (RNEC) and the CDC Review Board (Office of Associate Director of Science, Atlanta). Approvals from both institutions are required prior to initiation and collection of any data on the field.

2.3 Participants and sampling

Participants were Rwandan residents aged 15-64 years. Because it was not feasible to conduct a census on the whole population, a representative random sample of participants was selected.

Sampling

To detect statistically significant differences between categories, the WHO STEPwise methodology suggests a minimum sample of 384 people for every age, sex rural/urban or province category the results will be stratified by. For the Rwandan survey the MOH was interested in looking at both males and females across five age groups (15-24 years, 25-34 years, 35-44 years, 45-54 years and 55-64 years), yielding a minimum required sample size of 3840. This was multiplied by 1.5 to account conservatively for the likelihood of a selected participant having the risk factor of interest and then divided by 0.80 assuming that only 80% of those invited to participate would actually participate. This yielded a required sample size of 7200 participants.

Multistage cluster sampling was used to select these participants from the population based on information from the last census. The three levels of clustering were:

1. Random selection of a statistical enumeration area (as defined by NISR)
2. Random selection of a household within the enumeration area
3. Random selection of an individual within the household

Selection of Enumeration Areas

Administratively, Rwanda is divided into thirty districts. In turn, each district is sub-divided into sectors. Each sector is sub-divided into cells and then into villages. Villages are synonymous with enumeration area's (EAs) in Rwanda and there are a total of 14,953 EAs in Rwanda. A total of 180 EA's (or 1.2%) were randomly selected from this total using a probability proportional to size method that gives those EA's with more people living in them a higher chance of being selected. In this way, the representativeness of the selected EAs is maximized.

Selection of households

Forty households were randomly selected from within each of the selected EAs from a list of households supplied by NISR based on the most recent census.

Selection of eligible participants

One eligible participant (an adult aged 15-64 years) was randomly selected from within each household using the Kish sampling method which is built into the PDAs used in the survey.

2.4 Data collection procedures

The data was collected from November 2012 to March 2013 throughout the country by 16 teams of 3 data collectors, one laboratory technician and one supervisor. Prior to the survey, data collection personnel obtained informed consent from survey participants and gave fasting instructions to those who consented to participate in step 3. The consent form was available in English and Kinyarwanda, the language that is mostly spoken in Rwanda. Steps 1 and 2 were completed at the participant's home and step 3 was completed at a gathering area identified by local community leaders.

2.4.1 Behavioral risk factors (Step 1)

All participants completed an interviewer-assisted questionnaire and answers were recorded on a PDA. Questions were asked on socio-demographic characteristics, tobacco use, alcohol consumption, fruit and vegetable consumption, cooking oil use, meals eaten away from home, physical activity, history of raised blood pressure, diabetes, injuries, asthma, HIV/AIDS, and urinary albumin. The questionnaire was translated from English to Kinyarwanda and back translated to from Kinyarwanda to English.

2.4.2 Physical measurements (Step 2)

Survey staff conducted the physical measurements following the recommended STEPwise protocols. The OMRON M4 Digital Automatic Blood Pressure Monitor was used to measure resting blood pressure. Blood pressure was measured three times; the first reading followed by two more measurements taken with 2-3 minute intervals. The three readings of the blood pressure were recorded, and the average of the second and third readings was used in the analysis. Heart rate was also recorded using the Omron monitor and, as with blood pressure, the average of the second and third readings was used for analysis.

Weight and height were measured once using Genesis growth scales with a laser for measuring height. Height was measured to the nearest whole centimeter and weight to the nearest 0.1 kg. Participants were measured without shoes and wearing only light clothing. Waist circumference was measured once using the Figure Finder constant tension tape and recorded to the nearest 0.1 cm at the mid-point between the lowest palpable rib and the top of the iliac crest. Waist circumference was not measure for pregnant women.

2.4.3 Biochemical measurements (Step 3)

Participants provided separate consent for participating in step 3. Participants fasted from 10:00pm in the evening until measurements were taken the following morning. Capillary blood samples were drawn using the finger prick method. Total cholesterol, HDL and fasting blood glucose were measured using CardioChek PA (Glucose, Cholesterol, HDL) as per STEPs protocol. For every tenth finger-prick test performed, a venous sample was taken for quality control at the National Reference Laboratory. These quality control samples were withdrawn from the database and thus fewer people (n=6651) completed this step compared to steps 2 and 3. Participants who were identified as being at high risk of developing, or with, advanced chronic conditions were referred for a follow-up clinical examination.

2.5 Data entry and quality control

The survey team reviewed responses to step 1 for completeness while participants were still present and any missing information was appropriately updated. This check was done first by the interviewer and then by the survey team supervisor. The data on the PDAs (from steps 1, 2 and 3) was backed up every Friday during the data collection period. This was completed by an assigned data manager who uploaded all data onto a computer at the MOH using e-STEPs and epi-data software. Data quality was reviewed weekly by a team comprised of the survey coordinator, the data manager and a technical assistant. Feedback was sent to the survey supervisors while they were still on the field to correct any discrepancy.

2.6 Data analysis and dissemination

The data were weighted and analyzed using epi-data. A five-day data analysis workshop was organized to generate the survey factsheets and the data book (appendix 2). These two documents serve as the basis for the survey report. The results of the survey will be shared with participants and stakeholders in Rwanda during a national workshop. The report will also be uploaded on the website of the Ministry of Health.

3 Results

3.1 Response rate and socio-demographic characteristics

Survey completion rate

A total of 7,225people (2,687 men and 4,538 women) aged 15-64 years participated in the Rwanda NCD risk factor survey with overall response rate of 99.8% for Step 1 and 98.8% for Steps 2 and 3.

Table 3: Survey Completion rate by age, sex and province

Background characteristics	n	Completion STEP 1		Completion STEP 2 and 3	
		Yes	No	Yes	No
		%	%	%	%
Overall	**7,225**	**99.8**	**0.2**	**98.8**	**1.2**
Age group					
15-24	1,512	99.6	0.4	98.7	1.3
25-34	2,390	99.8	0.2	98.5	1.5
35-44	1,550	100	0	99.4	0.6
45-54	1,060	99.9	0.1	99.2	0.8
55-64	713	99.8	0.2	99.3	0.7
Sex					
Men	2,687	99.8	0.2	98.9	1.1
Women	4,538	99.8	0.2	98.8	1.2
Province					
Eastern	1,707	99.5	0.5	98.6	1.4
Kigali City	824	99.7	0.3	97.8	2.2
Northern	1,214	99.9	0.1	98.9	1.1
Southern	1,560	99.6	0.4	99.4	0.6
Western	1,920	100	0	99.2	0.8

Socio-demographic characteristics

The table below shows the age and sex distribution of participants. Women were more likely than men to participate making up 62.8% of the overall sample (compared to 52% of women 15-64 years reported in the census 2012) and this higher proportion was reflected across all the age groups. This can be explained by the long duration and period of data collection that included the cultivation and schooling season (November 2012 to March 2013) when women were easier found at home than men.

A higher proportion of women than men in the sample was found in STEPS survey conducted in other countries (e.g. Zambia STEPS 2008, 33% of males). More than half of the participants were under 35 years of age with those aged 55-64 years approximately 10% of the sample. The majority of participants were from rural locations (78.3%) and when stratified by province, the largest proportions were from Kigali City and the Western Province (table 4). With respect to educational attainment, almost two-thirds of participants (65.4%) reported completing primary schooling. A similar proportion of participants (63.8%) reported being married. Over 80% of participants were self-employed and 15% reported being on unpaid employment.

Table 4: Socio Demographic Characteristics of Survey Participants

Background characteristics	n	%
Age		
15-24	1,513	20.92
25-34	2,394	33.10
35-44	1,551	21.45
45-54	1,061	14.67
55-64	713	9.86
Sex		
Male	2,692	37.18
Female	4,548	62.82
Residence		
Rural	5,668	78.29
Semi-Urban	599	8.27
Urban	973	13.44
Province		
Eastern	824	11.38
Kigali City	1,923	26.56
Northern	1,218	16.82
Southern	1,562	21.57
Western	1,713	23.66
Education Level		
No formal schooling	1,459	20.19
Primary completed	4,725	65.37
Secondary completed	929	12.85
High school and above	115	1.59
Marital Status		
Never married/Single	1,711	23.69
Currently in Union	4,608	63.81
Separated/Divorced	382	5.29
Widowed	520	7.2
Occupation		
Government employee	127	1.76
Non-government employee	98	1.36
Self-employed	5,909	81.88
Unpaid	1,083	15.01

3.2 Behavioral risk factors

3.2.1 Tobacco use

Information about tobacco use was obtained by asking participants if they currently smoke tobacco products. Participants were sorted into the following groups:

- **Current smokers** – those who had smoked any tobacco product (such as cigarettes, cigars or rolled tobacco) in the past 12 months. This category includes:
  - **Daily smokers** – those who smoke any tobacco product every day.
  - **Non-daily smokers** – those current smokers who do not smoke on a daily basis.
- **Non-smokers** – those who do not currently smoke. This category includes:
  - **Past smokers** – those who have smoked in the past.
  - **Never-smokers** – those who have never smoked.

Overall 12.8% (Table 5) of survey respondents declared themselves as “current smokers” defined as those individuals who smoked in the past 30 days before the survey day. Current smoking rate varies by background characteristics. Current smokers are recruited among adults aged 35 and above with a proportion ranging from 15.7% to 38%. Current smoking increases with age. Men smoked more compared to women (19.2% vs. 7.1%) as displayed on Table 5. Rural and semi-Urban survey respondents are more likely to be current smokers compared to urban (9.7%) with respectively 13.5% and 12.0 % of current smokers (Table 5). Kigali City and the Western province have the lower rates of current smokers respectively 8.52% and 9.65% (Table 5). Among current smokers, 68.8% are reported smoking daily. That includes 72.9% among men and 58.9% among females. Again, Kigali City and the Western Province have the highest proportion of daily smokers 73.2% and 75.8% respectively.

Table 5: Tobacco use status among survey participants disaggregated by background characteristics

Background characteristics	Current smokers			Daily smokers among current smokers	
	n*	%	95%CI	%	95CI%
Overall	**7,222**	**12.8**	**[11.85,13.81]**	**68.8**	**[65.1,72.3]**
Age					
15-24	1,510	3.8	[02.81, 05.03]	51.9	[37.8,65.7]
25-34	2,389	11.3	[9.79,12.98]	73.3	[67.2,78.6]
35-44	1,550	15.7	[13.74,17.81]	71.6	[65.0,77.4]
45-54	1,060	29.1	[26.05,32.29]	69.0	[63.0,74.4]
55-64	713	38.1	[34.1, 42.36]	69.6	[62.8,75.6]
Sex					
Male	2,684	19.1	[17.48,20.84]	72.9	[68.5,76.9]
Female	4,538	7.1	[06.33,07.97]	58.9	[53.2,64.5]
Residence					
Rural	5,653	13.5	[12.34,14.7]	69.2	[65.0,73.1]
Semi urban	598	12.0	[08.88,16.11]	68.4	[59.0,76.5]
Urban	971	9.7	[07.8,12.04]	66.2	[53.7,76.8]

*Due to missing data subgroup totals may not add up to n

It should be outlined that for non-smokers, there is a high proportion of participants that have never smoked (85.8% overall) while there are few past smokers that have quit smoking (1.3% overall).

Mean age at smoking debut

The mean age when respondents started first smoking is 18.6 year old among current smokers (Table 6). Smoking debuts earlier among men (18.4 years compared to women (19.3 years). The same trend is observed for rural (18.6 years) semi-urban (18.4) compared to urban where urban respondents started smoking at older age (19.3 years). In the Western province people start smoking at an advanced age (19.8 years) compared to the other provinces. Conversely, the Eastern province has the lowest age of smoking debut (18 years). As for marital status, single and never married start smoking earlier compared to widows at 21 years, currently in union (18.6 years), and separated or divorced (19 years).

Of potential concern was that the mean age of starting smoking among men (16.3 years) and women (17.2 years) in the 15-24 year age group was younger than for all other age groups. This suggests that the age of initiating smoking may be decreasing in Rwanda. While not significantly different from a statistical perspective due to small numbers of participants in these age groups, this is a trend that should be monitored further.

Table 6: Age at which survey participants started smoking

		Age at first start smoking		
	n*	Mean	SE	95% CI
Overall	**1,051**	**18.6**	**-0.2**	**[18.2,19.1]**
Age	N			
15-24	48	16.2	-0.5	[15.2,17.3]
25-34	232	18.1	-0.3	[17.5,18.7]
35-44	220	18.8	-0.5	[17.9,19.7]
45-54	293	19.1	-0.4	[18.3,20.0]
55-64	257	20.1	-0.6	[19.0,21.2]
Sex				
Male	624	18.4	-0.2	[17.9,18.9]
Female	427	19.3	-0.4	[18.4,20.1]
Residence				
Rural	865	18.6	-0.2	[18.1,19.1]
Semi-Urban	83	18.4	-0.6	[17.2,19.6]
Urban	103	19.3	-0.5	[18.3,20.2]

*Due to missing data subgroup totals may not add up to n

Consumption of tobacco products

The mean number of manufactured cigarettes is 2.6 cigarettes per day. The number of cigarettes consumed decreases as age group increase and male survey participant's daily consumption of manufactured cigarettes is higher (3.3) compared to females (.3). Urban survey participants have the highest mean of manufactured cigarettes consumed per day (6.5) and that mean is as twice as the overall mean.

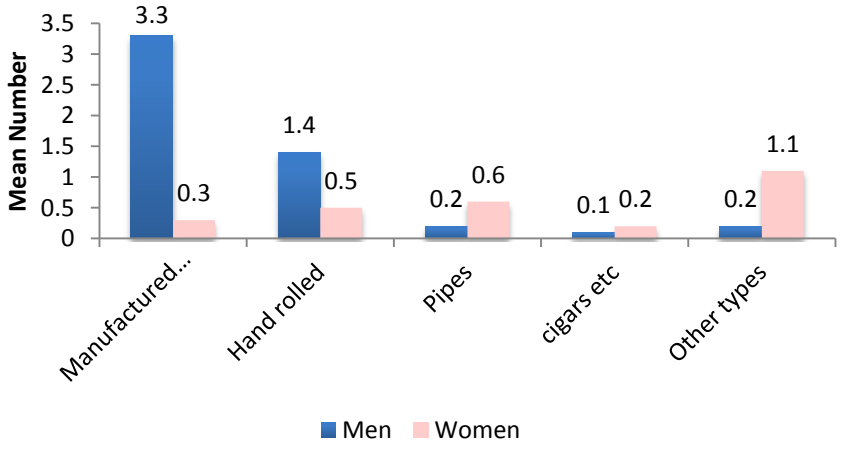
Table 7: Mean number of manufactured cigarettes smoked per day

Background characteristics	Mean number of cigarettes smoked			
	n*	Mean	SE	95%CI
Overall	**7,240**	**2.6**	**-0.2**	**[2.2,2.9]**
Age				
15-24	1,513	3.7	-0.6	[2.5,4.9]
25-34	2,394	3.8	-0.4	[3.1,4.5]
35-44	1,551	3.1	-0.4	[2.2,4.0]
45-54	1,061	1.4	-0.2	[1.0,1.7]
55-64	713	1.3	-0.3	[0.8,1.9]
Sex				
Male	2,692	3.3	-0.2	[2.9,3.8]
Female	4,548	0.3	-0.1	[0.2,0.4]
Residence				
Rural	5,668	2.1	-0.2	[1.8,2.4]
Semi-Urban	599	2	-0.5	[0.9,3.0]
Urban	973	6.5	-0.8	[5.0,8.0]

*Due to missing data subgroup totals may not add up to n

Among daily smokers, the mean number of manufactured cigarettes smoked per day was 3.3 (95%CI, 2.8- 3.8) for men and 0.3 (95% CI, 0.2 – 0.4) for women (see Figure 2).

Figure 2: Mean amount of tobacco used by daily smokers by type



3.2.2 Alcohol consumption

Alcohol consumption data was collected from survey respondents in the past 30 days and past 12 months. Consumption in the past 30 days is defined as current alcohol drinkers. The quantity of alcohol consumed was assessed and drinkers were categorized into heavy and non -heavy drinkers. Male heavy drinkers consumed more than 5 servings on a single occasion while for female it is 4 servings on a single occasion.

Overall 55.3% of survey respondents ever drank alcohol including 65% among males and 46.7% among females. Among them 41.2% consumed alcohol during the past 30 days preceding the survey and termed as current drinkers. Additionally 23.5% of survey respondents are classified as heavy drinkers.

The proportion of alcohol consumers among male respondents is higher compared to females. In fact male who ever consume alcohol, current drinkers and heavy drinkers is respectively 65.0%, 52.0% and 30.5% compared to 46.7%, 31.4% and 17.1% for females (Table 8).

Respondents from rural and semi-urban areas have higher proportion of alcohol consumption as compared to urban area. In fact the proportion of survey respondents that have ever consumed alcohol is 56.7% and 63.3% for rural and semi-urban respectively while in urban area it is 43.8% . Similarly, proportions of current drinkers among survey participants are 43.1% and 44.7% for rural and urban areas respectively compared to urban area 29% (Table 8). The same trend is observed within heavy drinkers group where rural and semi-urban proportions of heavy drinking are 24.3% 24.7% compared to 18.4% for urban residents (Table 8). The proportion of survey participants who ever drank alcohol in the southern and western provinces are respectively 65.2% and 57.1% are above the overall proportion of the survey population 55.3% (Table 8). Survey participant with no formal education tend to have ever drank alcohol (63.8%), are current drinkers (49.5%) with higher proportion of heavy drinkers (28%) (Table 8). More than 50% of widow reported ever drank alcohol (64.1%).

Table 8: Alcohol consumption: Current and Heavy Drinkers among Survey Total Population by background characteristics

Background characteristics		Ever consume alcohol		Current drinkers among total survey population		Heavy drinkers among survey total population	
	n*	**%**	**95%CI**	**%**	**95%CI**	%	95% CI
Overall	**7,222**	**55.3**	**[53.4,57.3]**	**41.2**	**[39.4,43.0]**	**23.5**	**[21.9,25.1]**
Age							
15-24	1,510	45.8	[42.5,49.1]	29.9	[27.2,32.8]	16.4	[14.4,18.6]
25-34	2,389	57.4	[54.9,60.0]	44.8	[42.3,47.3]	26	[23.8,28.3]
35-44	1,550	60	[57.0,62.9]	46.5	[43.6,49.4]	26.9	[24.3,29.6]
45-54	1,060	67.4	[64.3,70.4]	54.5	[51.1,57.8]	32	[28.9,35.4]
55-64	713	69.9	[66.0,73.6]	54.6	[50.5,58.7]	30.5	[26.6,34.8]
Sex							
Male	2,684	65	[62.4,67.4]	52	[49.5,54.5]	30.5	[28.3,32.8]
Female	4,538	46.7	[44.3,49.0]	31.4	[29.4,33.4]	17.1	[15.6,18.8]
Residence							
Rural	5,653	56.7	[54.4,59.0]	43.1	[41.0,45.3]	24.3	[22.4,26.3]
Semi-Urban	598	63.3	[56.4,69.8]	44.7	[39.0,50.6]	24.7	[18.7,31.9]
Urban	971	43.8	[39.2,48.5]	29	[25.9,32.4]	18.4	[16.0,21.1]

*Due to missing data subgroup totals may not add up to n

The Table 9 below displays current drinkers among survey participants who ever consumed alcohol and heavy drinkers among current drinkers. Among those who ever drank alcohol 88% of them drank alcohol during the last 30 days preceding the survey. Fifty seven percent (57%) of these current drinkers are considered as heavy drinkers (more than four or five drinks in a single drinking occasion depending on the sex).

Table 9: Alcohol Consumption: current drinkers and heavy drinkers by background characteristics

Background characteristics	Current Drinkers among those who ever consume alcohol			Heavy drinkers among current drinkers		
	n*	**%**	**95%CI**	n	%	95% CI
Overall	**3,427**	**88**	**[86.5,89.4]**	**3,057**	**57**	**[54.0,59.9]**
Age						
15-24	538	79.8	[75.7,83.2]	427	54.7	[49.6,59.7]
25-34	1,128	90.7	[88.7,92.3]	1,017	58	[54.1,61.8]
35-44	758	91.5	[89.3,93.3]	685	57.7	[53.2,62.1]
45-54	606	93	[90.7,94.8]	560	58.8	[53.8,63.7]
55-64	397	93.2	[90.5,95.2]	368	55.9	[50.0,61.7]
Sex						
Male	1,632	90.4	[88.3,92.2]	1,511	58.6	[55.3,61.9]
Female	1,795	84.7	[82.5,86.7]	1,546	54.6	[50.7,58.4]
Residence		88	[86.5,89.4]			
Rural	2,767	89.2	[87.5,90.7]	2,491	56.3	[52.8,59.8]
Semi-Urban	308	84.5	[78.2,89.2]	268	55.3	[43.4,66.7]
Urban	352	82.5	[78.0,86.3]	298	63.5	[56.4,70.1]

*Due to missing data subgroup totals may not add up to n

Survey participants who ever drank alcohol were asked if they have consumed alcohol during the past 12 months and 84.5% responded that they did consume alcohol during the past 12 months. Among them, 50.2% are heavy drinkers. More males drank in the past 12 months compared to females (88.7% vs. 79.4%. Survey participants currently in union and separated or divorced presented with more than 85% of individuals who drank in the past 12 months and at the same time higher proportion of heavy drinkers.

Table 10: Alcohol consumption in the past 12 months

Background characteristics	Consume alcohol in the past 12 Months			Heavy drinkers among those who consume alcohol in the past 12 months	
		Yes		Yes	
	n*	%	95%CI	%	95%CI
Overall	**4,077**	**84.5**	**[82.8,86.2]**	**50.2**	**[47.5,52.9]**
Age					
15-24	665	82.1	[78.8,84.9]	43.7	[39.2,48.2]
25-34	1,321	86.1	[83.5,88.3]	52.6	[48.9,56.2]
35-44	904	84.7	[82.0,87.1]	52.8	[48.6,57.0]
45-54	702	86.9	[83.9,89.5]	54.7	[50.0,59.4]
55-64	485	83.8	[79.7,87.2]	52.1	[46.4,57.9]
Sex					
Male	1,830	88.7	[86.6,90.4]	53	[49.8,56.2]
Female	2,247	79.4	[77.1,81.4]	46.2	[42.8,49.7]
Residence					
Rural	3,272	85.3	[83.3,87.1]	50.3	[47.1,53.5]
Semi-Urban	370	83.6	[76.9,88.6]	46.7	[37.3,56.5]
Urban	435	80.4	[75.1,84.7]	52.4	[45.9,58.8]

*Due to missing data subgroup totals may not add up to n

3.2.3 Diet and eating patterns

Survey participants provided information about their diet habits. They responded to questions related to consumption of vegetables and fruits and the types of oil mostly used for meal preparation. Additionally, the number of meals eaten per day was also assessed. In general the level of fruit and vegetables consumption is very low if we use the WHO cut off of at least 5 servings per day. Less than 1% of the survey respondents consumed more than 5 servings of fruit or vegetables per day (Table 11). The mean number of days fruit and vegetables are consumed per week is respectively 1.6 and 4 days per week.

Table 11: Distribution of Fruits and vegetables consumption by survey participants

Background characteristics	< 5 servings of fruits			< 5 servings of vegetables		
	n*	%	95%CI	n	%	95%CI
Overall	**4,627**	**99.6**	**[99.4,99.8]**	**6,890**	**99.3**	**[98.8,99.5]**
Age						
15-24	1,135	99.7	[98.9,99.9]	1,452	99.5	[98.7,99.8]
25-34	1,603	99.7	[99.1,99.9]	2,277	99.3	[98.8,99.6]
35-44	949	99.4	[98.6,99.7]	1,493	99.2	[98.6,99.6]
45-54	565	99.9	[98.9,100.0]	1,006	98.7	[97.4,99.4]
55-64	375	99.1	[97.7,99.7]	662	98.4	[97.0,99.2]
Sex						
Male	1,715	99.8	[99.3,99.9]	2,524	99.2	[98.8,99.5]
Female	2,912	99.5	[99.1,99.7]	4,366	99.3	[98.7,99.6]
Residence						
Rural	3,538	99.6	[99.3,99.8]	5,386	99.2	[98.6,99.5]
Semi urban	382	100.0		577	99.6	[98.7,99.9]
Urban	707	99.6	[98.3,99.9]	927	99.5	[98.9,99.8]

*Due to missing data subgroup totals may not add up to n

Table 12: Number of daily fruit servings and number of days fruit consumed per week

Background characteristics		Number of fruit servings per day			Number of day fruit consumed per week		
	n*	mean	SE	95% CI	mean	SE	95% CI
Overall	**7232**	**1.3**	**0**	**[1.2,1.3]**	**1.6**	**0**	**[1.6,1.7]**
Age							
15-24	1,513	1.3	0	[1.2,1.3]	1.9	-0.1	[1.8,2.0]
25-34	2,394	1.2	0	[1.2,1.3]	1.7	0	[1.6,1.8]
35-44	1,551	1.3	0	[1.2,1.3]	1.5	-0.1	[1.4,1.6]
45-54	1,061	1.2	0	[1.2,1.3]	1.2	-0.1	[1.1,1.3]
55-64	713	1.3	0	[1.2,1.3]	1.3	-0.1	[1.2,1.5]
Sex							
Male	2,692	1.2	0	[1.2,1.3]	1.6	0	[1.5,1.7]
Female	4,548	1.3	0	[1.2,1.3]	1.7	0	[1.6,1.7]
Residence							
Rural	5,668	1.3	0	[1.2,1.3]	1.6	0	[1.5,1.7]
Semi-Urban	599	1.3	0	[1.2,1.4]	1.6	-0.1	[1.4,1.8]
Urban	973	1.2	0	[1.2,1.3]	1.9	-0.1	[1.8,2.1]

*Due to missing data subgroup totals may not add up to n

Table 13: Mean number of daily servings and number of days vegetables consumed per week

Background characteristics		Number of serving vegetables per day			Number of Days vegetables consumed		
	n*	Mean	SE	95% CI	Mean	SE	95% CI
Overall	**7,232**	**1.6**	**0**	**[1.5,1.6]**	**4**	**0**	**[3.9,4.1]**
Age							
15-24	1,513	1.5	0	[1.5,1.6]	3.9	-0.1	[3.8,4.1]
25-34	2,394	1.5	0	[1.5,1.6]	3.9	-0.1	[3.8,4.0]
35-44	1,551	1.6	0	[1.5,1.6]	4.2	-0.1	[4.0,4.3]
45-54	1,061	1.6	0	[1.5,1.7]	4.2	-0.1	[4.0,4.3]
55-64	713	1.6	0	[1.6,1.7]	4.1	-0.1	[3.9,4.2]
Sex							
Male	2,692	1.5	0	[1.5,1.6]	3.7	-0.1	[3.6,3.8]
Female	4,548	1.6	0	[1.6,1.6]	4.2	0	[4.1,4.3]
Residence							
Rural	5,668	1.6	0	[1.5,1.6]	3.9	-0.1	[3.8,4.0]
Semi-Urban	599	1.5	0	[1.5,1.6]	4.1	-0.2	[3.8,4.5]
Urban	973	1.6	0	[1.5,1.6]	4.6	-0.1	[4.4,4.7]

*Due to missing data subgroup totals may not add up to n

Cooking Oil and meals outside home

The majority of households (95.8%) used vegetable oil most often for the preparation of household meals. Less than 1% of households used lard, butter or margarine. Eating meals outside of a home is uncommon in Rwanda with men reporting eating an average of 1.1 meals a week outside of the home and women reporting an average of less than one meal per week. Those in the younger age groups were slightly more likely to eat outside of the home than those in the oldest age group.

3.2.4 Physical activity

To measure the amount of physical activity, information on how often a person is physically active (**frequency**), how long (**duration**) he or she is active for and the level (**intensity**) of the activity is required. In the STEPs survey, participants were asked how often and how long they engaged in three domains of physical activity in a typical week: work-related, transport-related and recreation-related using questions from the Global Physical Activity Questionnaire (GPAQ). In the work and recreation domains, participants were asked on how many days per week and how many hours/minutes per day they participate in moderate and vigorous intensity activities.

In the transport domain, participants were asked how often and how long they either walk and/or cycle to and from places. The term MET (metabolic equivalent) is used to express the intensity of physical activity. A MET is the ratio of the associated metabolic rate for a specific activity divided by the resting metabolic rate. The energy cost of sitting quietly is 1 MET and is equivalent to a calorie consumption of 1kcal/kg/hour. It is estimated that, compared to sitting quietly, a person's caloric consumption is four times as high when being moderately active, and eight times as high when being vigorously active. The table below shows the MET values used to calculate participant's physical activity in each of the three physical activity domains mentioned above.

Table 14: MET values used to calculate participant's physical activity

Domain	MET value
Work	• Moderate MET value = 4.0 • Vigorous MET value = 8.0
Transport	• Cycling and walking MET value = 4.0
Recreation	• Moderate MET value = 4.0 • Vigorous MET value = 8.0

MET values allow the calculation of total physical activity (expressed as MET-minutes/week which combines frequency, duration and intensity) and once this was calculated, participants were classified into three levels:

- **High**

A person reaching any of the following criteria is classified in this category:

- Vigorous-intensity activity on at least 3 days achieving a minimum of at least 1,500 MET-minutes/week OR
- 5 or more days of any combination of walking, moderate- or vigorous-intensity activities achieving a minimum of at least 3,000 MET-minutes per week.

- **Moderate**

A person not meeting the criteria for the "high" category, but meeting any of the following criteria is classified in this category:

- 3 or more days of vigorous-intensity activity of at least 20 minutes per day OR
- 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day OR
- 5 or more days of any combination of walking, moderate- or vigorous-intensity activities achieving a minimum of at least 600 MET-minutes per week.

- **Low**

A person not meeting any of the above-mentioned criteria falls in this category.

The Table 15 shows that 61.5% of the overall sample had high levels of physical activity, 25.2% moderate levels and 13.3% low levels of physical activity. Younger people were more likely to report high levels of physical activity than older men

Table 15: Distribution of Physical activity level

		Low		Moderate		High	
	n*	%	95% CI	%	95% CI	%	95% CI
Overall	**7,225**	**13.3**	**[12.0,14.7]**	**25.2**	**[23.7,26.7]**	**61.5**	**[59.4,63.5]**
Age Group							
15-24	1,512	12.5	[10.7,14.7]	27.7	[25.4,30.2]	59.7	[56.8,62.6]
25-34	2,390	12.6	[11.0,14.4]	22.8	[20.8,25.0]	64.5	[61.8,67.2]
35-44	1,550	12.4	[10.5,14.7]	23.8	[21.2,26.6]	63.8	[60.8,66.7]
45-54	1,060	15	[12.6,17.8]	24.4	[21.7,27.3]	60.6	[57.0,64.1]
55-64	713	20.6	[17.3,24.3]	26.2	[22.9,29.8]	53.2	[49.0,57.4]
Sex							
Men	2,687	9.8	[8.4,11.5]	24.4	[22.4,26.6]	65.8	[63.2,68.3]
Women	4,538	16.5	[14.8,18.3]	25.9	[24.2,27.7]	57.6	[55.2,59.9]
Residence							
Rural	5,655	12.1	[10.6,13.8]	23.5	[21.8,25.2]	64.4	[62.1,66.7]
Semi urban	598	10.4	[7.3,14.6]	21.4	[16.4,27.4]	68.2	[60.8,74.8]
Urban	972	21	[18.2,24.1]	36.2	[32.5,40.1]	42.8	[38.9,46.8]
Province							
Eastern	1,707	12.3	[10.2,14.7]	23.4	[20.5,26.6]	64.3	[60.3,68.1]
Kigali	824	19	[16.4,22.0]	34.3	[29.7,39.2]	46.7	[40.9,52.5]
Northern	1,214	16.1	[11.5,22.1]	29.3	[25.4,33.4]	54.6	[47.9,61.2]
Southern	1,560	11.8	[9.3,14.8]	23.2	[20.6,26.1]	65	[61.1,68.7]
Western	1,920	10.8	[8.8,13.3]	21.4	[18.6,24.3]	67.8	[64.0,71.4]

*Due to missing data subgroup totals may not add up to n

3.3 Biological risk factors

3.3.1 Blood pressure

3.3.1.1 Blood pressure measurement and diagnosis

Blood pressure measurements were taken using a battery powered digital blood pressure machine. During day 2 encounter with survey participants, three readings were performed 3-5 minutes apart after 15min rest of the survey participant. The mean of the last two readings for both systolic and diastolic pressure was used as the final blood pressure reading. Rationale for these series of measurements is to increase precision and accuracy of the estimates of hypertension prevalence in Rwanda. Classification in the table below is used to categorize the different levels of blood pressure in the Rwanda population.

Hypertension is the term used to describe high blood pressure. It constitutes a well-known risk factor for cardiovascular diseases. Blood pressure-induced cardiovascular risk rises continuously across the blood pressure range. Survey participants with a systolic blood pressure above 139 mmHg and or diastolic blood pressure greater than 89 mmHg are considered having hypertension.

The Rwanda NCD survey revealed that 21.3% of the survey participants have had their blood pressure ever taken by a health care professional. This includes 29.9% of females and 11.8% of males (Table 16). Survey participants living in semi- urban and urban areas are more likely to have their blood pressure taken respectively 25.9% and 26.4% compared to 19.8% for rural residents (Table 16). Among those who ever had their blood pressure taken, 11.2% have been diagnosed with high blood pressure. Thirteen point four percent (13.4%) of urban residents were declared having hypertension which is higher than rural and semi-urban dwellers (Table 16).

Table 16: History of Blood pressure measurement, hypertension status

-	Blood pressure ever taken			Hypertension among participants whose blood pressure was ever taken	
	n	**%**	**95%CI**	**%**	**95%CI**
Overall	**7,222**	**21.3**	**[20.1,22.6]**	**11.2**	**[9.8,12.7]**
Age					
15-24	1,510	13.3	[11.7,15.1]	7.5	[4.7,11.9]
25-34	2,389	26.9	[24.8,29.2]	6.7	[5.0,9.0]
35-44	1,550	28.9	[26.3,31.5]	12.7	[9.7,16.3]
45-54	1,060	22.8	[20.1,25.9]	18.2	[14.1,23.3]
55-64	713	21.6	[18.7,24.9]	33.2	[26.7,40.5]
Sex					
Male	2,684	11.8	[10.5,13.3]	12.2	[9.1,16.0]
Female	4,538	29.9	[28.2,31.6]	10.9	[9.4,12.5]
Residence					
Rural	5,653	19.8	[18.4,21.3]	10.7	[9.1,12.5]
Semi urban	598	25.9	[21.8,30.6]	10.9	[7.6,15.4]
Urban	971	26.4	[23.1,30.0]	13.4	[9.9,17.9]
Province					
Eastern	1,706	17.6	[15.3,20.2]	11.2	[8.3,15.1]
Kigali City	823	24.8	[21.3,28.6]	11.1	[7.7,15.8]
Northern	1,214	20.8	[17.8,24.2]	13.7	[10.4,17.8]
Southern	1,559	22.3	[19.7,25.1]	11.7	[9.0,15.0]
Western	1,920	22.7	[20.4,25.2]	9.3	[7.0,12.4]

Measurement of blood pressure taken during the survey revealed that 15% of Rwandans have an elevated blood pressure (Table 17). Data shows that men have greater hypertension prevalence than women and the disaggregated data reported in the Table 65 indicate also that for men the hypertension appears to come at earlier age than women.

Table 17: Hypertension and medication distribution among survey participants

	BP measured and Have hypertension		
	n	%	95%CI
Overall	**7225**	**15.0**	**[13.8,16.3]**
Age			
15-24	1,512	7.7	[06.3,09.4]
25-34	2,390	12.8	[11.3,14.5]
35-44	1,550	18.8	[16.7,21.1]
45-54	1,060	26.7	[23.7,29.8]
55-64	713	39.3	[35.7,43.1]
Sex			
Male	2,687	16.1	[14.4,17.8]
Female	4,538	14.1	[12.8,15.4]
Residence			
Rural	5,655	14.7	[13.3,16.1]
Semi urban	598	18.1	[14.7,22.0]
Urban	972	15.1	[12.0,18.9]
Province			
Eastern	1,707	12.2	[10.0,14.8]
Kigali City	824	13.7	[10.7,17.5]
Northern	1,214	17.1	[13.9,20.8]
Southern	1,560	14.2	[11.9,16.9]
Western	1,920	17.7	[15.4,20.2]

3.3.2 Diabetes

3.3.2.1 Blood sugar measurement and diagnosis

During the Rwanda NCD survey participants were asked to fast overnight of the eve of survey day 2. (No food, except for clear water after taking supper/dinner). Finger prick was performed on fasting participants to draw capillary blood for blood glucose testing through a point-of care machine (CardioChek PA) provided by WHO AFRO.

Definition:
- Mean fasting blood glucose, including those currently on medication for raised blood glucose (mmol/L)
- Percentage with impaired fasting glycaemia (capillary whole blood value ≥5.6 mmol/L and <6.1 mmol/L)
- Percentage with raised fasting blood glucose as defined below or currently on medication for raised blood glucose (capillary whole blood value ≥ 6.1 mmol/L)

Over 97% of men (97.9%) and women (97.6%) reported that they had never had their blood sugar measured and only 0.4% of men (11 men) and 0.4% of women (19 women) reported having high blood sugar diagnosed (not shown). As reported in Table 18 the impaired fasting glycaemia is rare in Rwanda and raised blood glucose is uncommon, affecting just 3.06% of the population.

Most of those with raised blood glucose however do not know they have raised blood glucose. This finding highlights the need for improved diagnosis, particularly for those aged over 45 years for whom the condition is more prevalent.

Table 18: Fasting Blood glucose classification

Background characteristics		Impaired fasting blood glucose (>=5.6 AND <6.1"mmol)		Raised fasting blood glucose (>= 6.1 mmol)	
	n	%	95%CI	%	95%CI
Overall	**6,662**	**1.59**	**[1.2,2.0]**	**3.06**	**[2.4,3.8]**
Age					
15-24	1,363	1.1	[0.6,2.1]	2.6	[1.6,4.1]
25-34	2,190	1.8	[1.2,2.5]	2.8	[2.1,3.8]
35-44	1,447	1.5	[1.0,2.2]	3.3	[2.5,4.5]
45-54	980	2.2	[1.4,3.5]	4.3	[3.1,5.8]
55-64	682	2.6	[1.5,4.2]	4.3	[2.9,6.4]
Sex					
Male	2,470	1.8	[1.2,2.7]	3.3	[2.4,4.5]
Female	4,192	1.4	[1.0,1.8]	2.8	[2.3,3.6]
Residence					
Rural	5,238	1.6	[1.2,2.1]	2.5	[2.0,3.2]
Semi-Urban	564	0.6	[0.2,2.3]	1.9	[1.0,3.6]
Urban	860	2.2	[1.3,3.5]	6.6	[3.6,11.6]

Table 19: Mean fasting blood glucose levels

Background characteristics	Mean Glucose			
	n*	Mean	SE	95% CI
Overall	7240	3.9	0	[3.8,4.0]
Age				
15-24	1,513	3.9	-0.1	[3.8,4.0]
25-34	2,394	3.8	0	[3.8,3.9]
35-44	1,551	3.9	0	[3.8,4.0]
45-54	1,061	4	-0.1	[3.9,4.1]
55-64	713	4	-0.1	[3.9,4.1]
Sex				
Male	2,692	3.9	-0.1	[3.8,4.0]
Female	4,548	3.9	0	[3.8,4.0]
Residence				
Rural	5,668	3.8	0	[3.8,3.9]
Semi-Urban	599	3.8	-0.1	[3.6,3.9]
Urban	973	4.4	-0.2	[4.0,4.7]

*Due to missing data subgroup totals may not add up to n

3.3.3 Cholesterol

For raised total blood cholesterol, a cut-off point ≥5.0 mmol/L was used to distinguish participants at high-risk group for cardiovascular disease. Table 20 shows the proportion participants with raised blood cholesterol by gender and age group. Less than 2.6% of participants had raised blood cholesterol. Disaggregated data reported in the Table 81 shows that the raised blood cholesterol increased with age group and was highest in the 55-64 year age group for both men (5.6%) and women (7.4%). Women were slightly more likely to have raised blood cholesterol than men.

Table 20: Blood cholesterol levels

Background characteristics	Mean Cholesterol			Raised cholesterol ≥5.0 mmol/L		
	Mean	SE	95%CI	n	%	95%CI
Overall	3.2	-0.02	[3.16,3.25]	**7,004**	**2.6**	**[1.5,2.1]**
Age						
15-24	3.1	-0.04	[3.03,3.18]	1,463	1.5	[0.2,0.9]
25-34	3.17	-0.02	[3.14,3.21]	2,305	2.5	[1.6,2.8]
35-44	3.28	-0.03	[3.22,3.33]	1,515	2.9	[1.5,3.0]
45-54	3.34	-0.03	[3.29,3.40]	1,026	4.0	[2.0,4.2]
55-64	3.52	-0.04	[3.44,3.60]	695	6.6	[3.6,6.8]
Sex						
Male	3.1	-0.03	[3.04,3.17]	2,612	2.2	[0.8,1.7]
Female	3.29	-0.02	[3.26,3.33]	4,392	3.1	[1.8,2.8]
Residence						
Rural	3.14	-0.02	[3.11,3.18]	5,489	1.9	[1.0,1.6]
Semi-Urban	3.22	-0.07	[3.09,3.35]	586	3.0	[1.4,4.8]
Urban	3.51	-0.1	[3.31,3.71]	929	5.9	[2.5,5.2]

Table 21 shows the proportion of men and women with low and high HDL levels. 64.8% of men and 53.7% of women had low HDL levels with the lowest levels occurring for men and women in the youngest age group. Cardiovascular disease risk may be higher in the presence of low HDL cholesterol level (< 1 mmol/l or 40mg/dl in males, < 1.3 mmol/l or 50 mg/dl in females).

Table 21: Blood lipid (HDL)

Background characteristics		Mean HDL level			Low HDL level			High HDL Level	
		Mean	SE	95%CI	n	%	95%CI	%	95%CI
Overall	**7,035**	**1.03**	**-0.01**	**[1.01,1.04]**	**7,011**	**59**	**[57.2,60.7]**	**11.1**	**[10.2,12.2]**
Age									
15-24	1,465	0.92	-0.01	[0.90,0.95]	1,464	67.8	[64.9,70.6]	6.2	[5.0,7.7]
25-34	2,318	1.04	-0.01	[1.02,1.06]	2,308	57.3	[55.0,59.6]	11.9	[10.5,13.4]
35-44	1,521	1.1	-0.02	[1.07,1.13]	1,517	53.6	[50.5,56.6]	14.6	[12.7,16.8]
45-54	1,031	1.13	-0.02	[1.09,1.16]	1,024	49.8	[46.5,53.1]	16.5	[14.2,19.1]
55-64	700	1.19	-0.02	[1.15,1.23]	698	43.4	[39.8,47.1]	19.1	[16.0,22.7]
Sex									
Male	2,623	0.97	-0.01	[0.95,1.00]	2,610	64.8	[62.4,67.2]	8.9	[7.7,10.3]
Female	4,417	1.07	-0.01	[1.05,1.09]	4,401	53.7	[51.7,55.7]	13.2	[11.9,14.5]
Residence									
Rural	5,521	1.02	-0.01	[1.00,1.04]	5,500	59.5	[57.5,61.6]	11.3	[10.2,12.5]
Semi-Urban	587	1.05	-0.04	[0.98,1.12]	583	56.3	[49.4,62.9]	11.7	[8.6,15.8]
Urban	932	1.05	-0.03	[1.00,1.11]	928	57.6	[52.5,62.5]	10.3	[7.4,14.0]

*Due to missing data subgroup totals may not add up to n

3.3.3 Renal disorder/Albuminuria

Urine albumin was tested for all consenting survey participants to check for proteinuria using dipsticks. Albumin is a protein found in the blood. A healthy kidney does not let albumin pass into the urine. A damaged kidney lets some albumin pass into the urine. The presence of albumin in the urine requires further kidney functions investigation to assess the level of albumin alongside with the glomerular filtration rate. The results are displayed in the table below.

Overall 10.5% of the survey population presented with positive urine albumin. There is no difference between male and female. However, the prevalence of positive albumin is higher in rural area (12%) compared to semi urban and urban. Additionally the Eastern (13%) and Northern (14.9%) provinces have higher prevalence compared to the other provinces. These prevalence are above the overall prevalence and deserve special attention. Further investigation is needed. Kigali City presents with the lower prevalence (4%), below 50% of the overall prevalence.

Table 22: Urine albumin

	Positive Urine Albumin			Negative Urine Albumin	
	n	%	95%CI	%	95%CI
Overall	6,988	10.5	[8.9,12.3]	89.5	[87.7,91.1]
Age					
15-24	1,460	10.4	[8.2,13.2]	89.6	[86.8,91.8]
25-34	2,303	9.3	[7.6,11.3]	90.7	[88.7,92.4]
35-44	1,512	12.8	[10.6,15.4]	87.2	[84.6,89.4]
45-54	1,019	10.8	[8.6,13.5]	89.2	[86.5,91.4]
55-64	694	10.6	[7.9,14.1]	89.4	[85.9,92.1]
Sex					
Male	2,611	11	[9.2,13.2]	89	[86.8,90.8]
Female	4,377	10	[8.4,12.0]	90	[88.0,91.6]
Residence					
Rural	5,482	12	[10.0,14.3]	88	[85.7,90.0]
Semi-Urban	586	6.4	[2.0,18.6]	93.6	[81.4,98.0]
Urban	920	5.2	[3.5,7.7]	94.8	[92.3,96.5]
Province					
Eastern	1,624	13	[9.4,17.6]	87	[82.4,90.6]
Kigali City	777	4.2	[2.7,6.4]	95.8	[93.6,97.3]
Northern	1,194	14.9	[10.4,20.8]	85.1	[79.2,89.6]
Southern	1,513	8.6	[6.7,11.0]	91.4	[89.0,93.3]
Western	1,880	10	[6.8,14.4]	90	[85.6,93.2]

3.3.4 Asthma

Data on asthma history was collected from survey participants including treatment experience. Participants were asked about their breathing experience in the past 12 months and if they have ever been diagnosed by a health professional to have asthma as well as the treatment or advice prescribed. However given the poor quality of the treatment data, results for that component are not presented in this report. A total of 1.1% of the survey participants were diagnosed with asthma. More female reported having asthma (1.6%) compared to .6% for men. Additionally, urban and semi-urban residents present the highest percentage of asthma cases.

Table 23: Distribution of survey participants ever been diagnosed with asthma by a professional healthcare provider (Doctor or nurse)

Background characteristics		Diagnosed with asthma		
		n	%	95%CI
Overall		**7,222**	**1.1**	**[0.8,1.4]**
Age				
	15-24	1,510	0.6	[0.3,1.2]
	25-34	2,389	0.8	[0.5,1.3]
	35-44	1,550	1.2	[0.8,1.8]
	45-54	1,060	2.0	[1.3,3.1]
	55-64	713	3.0	[2.0,4.4]
Sex				
	Male	2,684	0.6	[0.4,1.0]
	Female	4,538	1.4	[1.1,1.9]
Residence				
	Rural	5,653	0.8	[0.6,1.1]
	Semi urban	598	1.1	[0.5,2.5]
	Urban	971	2.3	[1.3,3.9]

3.3.5 Overweight and obesity

Physical and biochemical measures were collected as parts two and three of the STEPs survey respectively. The height and weight of each participant was measured following the standardized STEPS protocol. The body mass index (BMI) of each participant was calculated by dividing the weight (kilograms) by the square of the height (metres^2). Note that pregnant women were excluded from average weight and BMI calculations.

Body mass index categories

- ✓ Underweight: BMI < 18.5
- ✓ Normal weight:18.5 ≤ BMI ≤ 24.9
- ✓ Overweight: BMI ≥ 25.0
- ✓ Obese : BMI ≥ 30.0

Overall the Rwanda NCD survey found that while 2.8% are obese, 14.3% are overweight and 7.8% underweight. Obesity is prevalent in the age group 35-54 and females (4.7%). Additionally the prevalence of obesity is more predominant in urban areas (10.2%) and Kigali city (7.7%). The Northern Province has the lower prevalence of obese (1.8%).

Seventy five percent (75%) of Rwandans are credited with normal weight with more males than females. All provinces except Kigali have a prevalence of normal weight above the national prevalence. Normal weight prevalence in Kigali is 66.1% (Table 24).The mean body max index for the overall survey participant is 22.3 (Table 24).

Table 24: Body mass index

		Underweight <18.5			Normal weight (18.5-24.9)		Overweight (25.0-29.9)		Obese (≥30)	
		n	%	95%CI	%	95%CI	%	95%CI	%	95%CI
Overall		**7,115**	**7.80**	**[7.0,8.7]**	**75.03**	**[73.9,76.2]**	**14.32**	**[13.4,15.3]**	**2.8**	**[2.4,3.3]**
Age										
	15-24	1,486	9.3	[7.7,11.0]	76.9	[74.8,78.8]	12.3	[10.8,14.1]	1.5	[1.0,2.3]
	25-34	2,348	4.0	[3.2,4.9]	76.6	[74.8,78.5]	16.4	[14.7,18.1]	3.0	[2.4,3.8]
	35-44	1,535	5.8	[4.7,7.2]	73.5	[71.0,75.9]	16.6	[14.7,18.5]	4.1	[3.2,5.4]
	45-54	1,041	12.5	[10.3,15.2]	67.9	[64.8,70.8]	15.2	[13.0,17.7]	4.4	[3.1,6.2]
	55-64	705	13.7	[11.0,16.8]	73.5	[69.9,76.8]	9.6	[7.5,12.2]	3.2	[2.2,4.6]
Sex										
	Male	2,649	10.0	[8.7,11.4]	80.2	[78.5,81.7]	9.1	[8.0,10.3]	0.8	[0.5,1.2]
	Female	4,466	5.9	[5.0,6.8]	70.4	[68.8,72.1]	19.0	[17.7,20.4]	4.7	[4.0,5.5]
Residence										
	Rural	5,574	7.7	[6.7,8.7]	77.6	[76.3,78.8]	13.3	[12.2,14.5]	1.5	[1.2,1.8]
	Semi urban	592	9.1	[6.5,12.6]	73.0	[69.8,76.0]	15.5	[13.0,18.3]	2.4	[1.5,3.9]
	Urban	949	7.8	[6.1,9.9]	63.1	[60.0,66.4]	18.9	[16.6,21.4]	10.2	[8.4,12.1]

3.4 Combined NCD risk factors

Some people may have more than one risk factor for NCDs and, generally, the more risk factors they have the higher their level of risk. The following tables summarize information on the percentage of participants who:

1. were current daily smokers;
2. were overweight (BMI ≥25 kg/m^2);
3. had raised blood pressure (SBP ≥140 and/or DBP≥90 mmHg or currently on medication for raised blood pressure);
4. consumed less than five combined servings of fruit and vegetables per day and
5. had low level of physical activity (<600 METminutes per week).

NCD risk factors accumulate with age so the tables focus on combinations of the oldest two age groups. Also, the total number of participants contributing data to the tables is lower because of missing data for one or more of the risk factors. The Table 25 shows that most men 84.6% were at moderate risk of NCDs with one or two risk factors. An additional 15%, mostly in the 45-64 year age group were at high risk with 3 or more risk factors.

Categorization of association risk factors for NCDs

- ✓ Low Risk:0 of 5 risk factors
- ✓ Moderate Risk:1 or 2 of 5 risk factors
- ✓ High Risk: 3 or more of 5 risk factors

Table 25: Percentage of NCD risk categories among men by age group

Summary of Combined Risk Factors							
				Men			
Age Group (years)	n	% with 0 risk factors	95% CI	% with 1-2 risk factors	95% CI	% with 3-5 risk factors	**95% CI**
25-44	1400	0.5	0.1-0.9	88.2	86.5-90.0	11.3	**9.5-13.1**
45-64	602	0.2	0.0-0.5	75.3	71.6-79.0	24.6	**20.9-28.3**
15-64	**2002**	**0.4**	**0.1-0.7**	**84.6**	**82.8-86.3**	**15.0**	13.3-16.7

Table 26 shows that, like men, most women (82.0%) were at moderate risk of NCDs with one or two risk factors. An additional 17.7%, mostly in the 45-64 year age group were at high risk with 3 or more risk factors.

Table 26: Percentage of NCD risk categories among women by age group

Summary of Combined Risk Factors							
				Women			
Age Group (years)	n	% with 0 risk factors	95% CI	% with 1-2 risk factors	95% CI	% with 3-5 risk factors	95% CI
25-44	2166	0.3	0.1-0.5	85.9	84.0-87.7	13.9	12.0-15.7
45-64	1053	0.5	0.1-0.9	72.9	69.8-76.1	26.6	23.4-29.7
15-64	3219	0.3	0.1-0.5	82.0	80.2-83.7	17.7	15.9-19.4

Table 54 shows that overall, less than 1% of participants had no risk factors, 83.2% were at moderate risk of NCDs and 16.4% were at high risk.

Table 27: Percentage of NCD risk categories among men and women by age group

Summary of Combined Risk Factors							
				Both Sexes			
Age Group (years)	n	% with 0 risk factors	95% CI	% with 1-2 risk factors	95% CI	% with 3-5 risk factors	95% CI
25-44	3566	0.4	0.2-0.6	87.0	85.6-88.4	12.6	11.2-14.0
45-64	1655	0.3	0.1-0.6	74.0	71.5-76.5	25.7	23.1-28.2
15-64	5221	0.4	0.2-0.6	83.2	81.9-84.6	16.4	15.0-17.8

3.5 Injuries

Table 28 and table 29 highlight seat belt use and helmet use as risk factors for traffic-related injuries. Overall 89.8% of participants reported not always using a seat belt during the 30 days prior to the survey. Women (92.9%) were significantly more likely to report not always using a seat belt than men (86.5%). Seat belt use did not vary significantly with age.

Table 28: Percentage of drivers or passengers not always using a seat belt

Percentage of drivers or passengers not always using a seat belt									
	Men			Women			Both Sexes		
Age Group (years)	n	% Not always using seat belt	95% CI	n	% Not always using seat belt	95% CI	n	% Not always using seat belt	*95% CI*
15-24	350	89.1	85.5-92.8	569	92.5	90.2-94.9	919	90.9	88.5-93.2
25-34	611	84.8	81.0-88.6	880	91.7	89.2-94.3	1491	88.3	85.6-91.0
35-44	358	83.4	78.6-88.2	588	93.5	90.0-96.9	946	88.7	85.4-92.0
45-54	247	85.6	80.7-90.6	378	94.7	91.9-97.4	625	90.3	87.2-93.4
55-64	137	89.0	82.9-95.0	276	96.3	93.7-99.0	413	93.1	90.0-96.2
15-64	**1703**	**86.5**	**83.8-89.2**	**2691**	**92.9**	**91.0-94.9**	**4394**	**89.8**	**87.8-91.9**

Table 29 shows that 74.0% of participants reported not always wearing a helmet during the 30 days prior to the survey. There were no significant differences between men and women in reporting of helmet use. However, older participants were more likely to report not always wearing a helmet during the 30 days prior to the survey than younger participants.

Table 29: Percentage of drivers or passengers of a motorcycle or scooter not always wearing a helmet

Percentage of drivers or passengers of a motorcycle or motor-scooter not always using a helmet									
	Men			Women			Both Sexes		
Age Group (years)	n	% Not always using helmet	95% CI	n	% Not always using helmet	95% CI	*n*	% Not always using helmet	*95% CI*
15-24	346	74.8	69.6-79.9	589	72.7	68.3-77.0	935	73.7	69.8-77.5
25-34	618	67.9	62.9-73.0	880	74.9	70.6-79.3	1498	71.4	67.6-75.3
35-44	361	66.9	61.0-72.8	582	78.3	73.7-82.9	943	72.8	68.5-77.1
45-54	244	77.3	71.9-82.7	378	79.4	74.1-84.7	622	78.4	74.1-82.7
55-64	143	80.9	74.0-87.9	268	87.2	82.4-92.0	411	84.3	80.1-88.6
15-64	**1712**	**72.1**	**68.5-75.6**	**2697**	**75.9**	**72.5-79.3**	**4409**	**74.0**	**70.9-77.1**

Overall, 5.3% of participants reported being involved in a road traffic crash in the 12 months prior to the survey (Table 89. Men (8.9%) were much more likely to report being involved in a road traffic crash than women (2.2%) and particularly men in the youngest two age groups.

Table 30: Percentage of participants involved in a road traffic crash during the past 12 months

Percentage of respondents involved in a road traffic crash during the past 12 months									
Age Group (years)	Men			Women			Both Sexes		
	n	% Involved in road traffic crashes	95% CI	n	% Involved in road traffic crashes	95% CI	*n*	% Involved in road traffic crashes	*95% CI*
15-24	564	12.2	9.4-15.0	938	2.7	1.6-3.7	1502	7.3	5.8-8.8
25-34	920	9.6	7.6-11.5	1447	2.2	1.3-3.1	2367	5.7	4.6-6.8
35-44	555	4.3	2.6-6.1	980	1.7	0.9-2.5	1535	2.9	2.0-3.8
45-54	388	4.7	2.6-6.7	662	1.8	0.8-2.8	1050	3.1	2.0-4.3
55-64	236	3.0	0.8-5.1	472	1.3	0.3-2.3	708	2.0	0.9-3.1
15-64	2663	8.9	7.4-10.3	4499	2.2	1.7-2.7	7162	5.3	4.6-6.1

Table 31 shows that more than a third (34.4%) of those involved in a road-traffic crash in the past 12 months sustained a serious injury. There was some variation with age group for men such that those in the 35-44 year age group appeared more likely to sustain a serious injury. However, numbers of participants were small and consequently, the confidence intervals were wide.

Table 31: Percentage of participants involved in a road traffic crash during the past 12 months who were seriously injured

Percentage of respondents seriously injured as a result of road traffic crash among those involved in a road traffic crash									
Age Group (years)	Men			Women			Both Sexes		
	n	% Seriously injured	95% CI	n	% Seriously injured	95% CI	*n*	% Seriously injured	*95% CI*
15-24	68	27.9	17.1-38.7	25	32.3	13.1-51.5	93	28.7	19.2-38.3
25-34	88	43.1	33.4-52.9	32	31.3	14.5-48.1	120	40.7	32.1-49.4
35-44	24	54.2	33.4-75.1	17	29.6	7.3-52.0	41	46.3	29.5-63.2
45-54	18	33.3	11.2-55.3	12	24.9	0.0-49.9	30	30.6	13.2-48.1
55-64	7	43.2	6.0-80.4	6	33.3	0.0-72.0	13	39.8	12.1-67.5
15-64	**205**	**35.4**	**28.2-42.6**	**92**	**31.0**	**20.2-41.8**	**297**	**34.4**	**28.3-40.6**

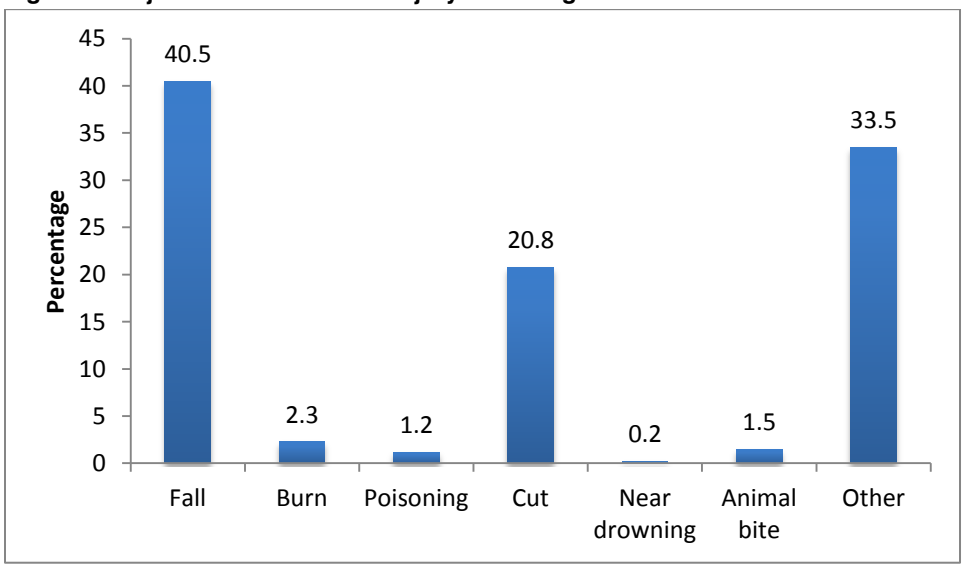
In addition to being asked questions about traffic-related injuries, participants were asked if, in the past 12 months, they were injured accidentally, other than in a road traffic crash, and required medical attention. Table 32 shows that 3.9% of participants reported being seriously injured and serious injuries were significantly higher for men (5.2%) than women (2.7%).

Table 32: Percentage of participants seriously injured other than in a road traffic crash

Percentage of respondents seriously injured in a non-road traffic accident									
Age Group (years)	Men			Women			Both Sexes		
	n	% Seriously injured	95% CI	n	% Seriously injured	95% CI	n	% Seriously injured	*95% CI*
15-24	567	6.2	4.1-8.2	941	2.8	1.8-3.8	1508	4.4	3.3-5.6
25-34	924	5.1	3.6-6.6	1456	2.8	1.9-3.7	2380	3.9	3.0-4.7
35-44	557	5.0	3.3-6.8	986	2.0	1.1-3.0	1543	3.4	2.4-4.4
45-54	392	3.6	1.8-5.3	665	3.0	1.7-4.3	1057	3.3	2.2-4.4
55-64	235	2.5	0.6-4.5	474	3.6	1.9-5.3	709	3.1	1.8-4.4
15-64	**2675**	**5.2**	**4.2-6.2**	**4522**	**2.7**	**2.2-3.2**	**7197**	**3.9**	**3.3-4.5**

The major causes of serious injury for participants (men and women) who were injured accidently other than by road traffic crash (n=247) are shown in the figure below. Falls, cuts and other unspecified causes were the major causes reported.

Figure 3: Major causes of serious injury excluding road traffic crashes



3.6 HIV/AIDS

Survey participants have been asked about their HIVAIDS status. Self-reported information HIV test, treatment and duration of treatment have been collected and the results show that 3.4% of the overall sample was HIV positive. The highest prevalence is in Kigali City (5.5%), followed by the western province (4.1%), the southern province (3.5%) and eastern and northern provinces (2.4%). Among the self-reported HIV positive 87.6% was currently on treatment, with a large difference between women (92%) and men (78.7%).

Overall 76% of the survey respondents have ever been tested. More women reported ever been tested (78.8%) compared to men (72.8%) (p=.000). The age-group 25- 34 and 35-44 have the highest percentage of testing: 92.2% and 90.8% respectively. The Southern and Western provinces have the lowest proportion of HIV testing history. 71.7% and 75.4% respectively.

Table 33: HIV testing and treatment status

Background characteristics	Ever been tested for HIV			Self-reported HIV Positive		Currently on treatment		
	n	%	95%CI	%	95%CI	n	%	95%CI
Overall	**7,212**	**76.0**	**[74.5,77.4]**	**3.4**	**[3.0,4.0]**	**237**	**87.6**	**[81.9,91.6]**
Age								
15-24	1,505	59.5	[56.3,62.5]	1.5	[0.9,2.6]	15	84.3	[52.6,96.3]
25-34	2,387	92.2	[91.0,93.3]	2	[1.5,2.7]	43	87	[73.6,94.1]
35-44	1,550	90.8	[89.1,92.2]	6.1	[5.0,7.5]	92	91.6	[81.6,96.4]
45-54	1,060	76.8	[74.0,79.3]	7.5	[5.7,9.7]	61	82.5	[69.7,90.6]
55-64	710	60.4	[56.5,64.1]	6.1	[4.2,9.0]	26	93.5	[76.6,98.4]
Sex								
Male	2,680	72.8	[70.6,74.9]	2.6	[2.0,3.3]	62	78.7	[65.0,88.1]
Female	4,532	78.8	[77.2,80.4]	4.2	[3.5,4.9]	175	92	[86.6,95.4]
Residence								
Rural	5,646	75.3	[73.5,77.0]	2.8	[2.4,3.4]	152	88.9	[81.1,93.7]
Semi urban	598	79.6	[75.2,83.4]	5.3	[3.6,7.6]	30	81	[60.8,92.1]
Urban	968	77.6	[73.8,81.0]	5.4	[4.0,7.4]	55	87.6	[76.8,93.8]
Province								
Eastern	1,701	76.6	[73.5,79.4]	2.4	[1.8,3.3]	42	91	[72.7,97.5]
Kigali City	821	78.2	[73.9,82.0]	5.5	[3.9,7.8]	46	82.3	[69.9,90.3]
Northern	1,212	79.7	[76.7,82.5]	2.4	[1.5,4.0]	26	87.3	[55.3,97.5]
Southern	1,559	71.7	[67.9,75.1]	3.5	[2.5,4.7]	48	84.7	[72.8,92.0]
Western	1,919	75.4	[72.2,78.4]	4.1	[3.2,5.1]	75	91	[80.2,96.2]

4 Discussion

This section discusses the results of the Rwanda NCD risk factor survey and presents a range of recommendations for the prevention and control of NCDs, including injuries, in Rwanda. When interpreting the results, it is important to note that the participants in this survey were a representative sample of the population of Rwanda aged 15 to 64 years. The response rate was high and the results obtained provide an accurate picture of NCD risk for the nation as a whole.

4.1 Behavioral risk factors

Tobacco use, physical inactivity, unhealthy diet and the harmful use of alcohol are risk factors for NCD that can be modified.

4.1.1 Tobacco use

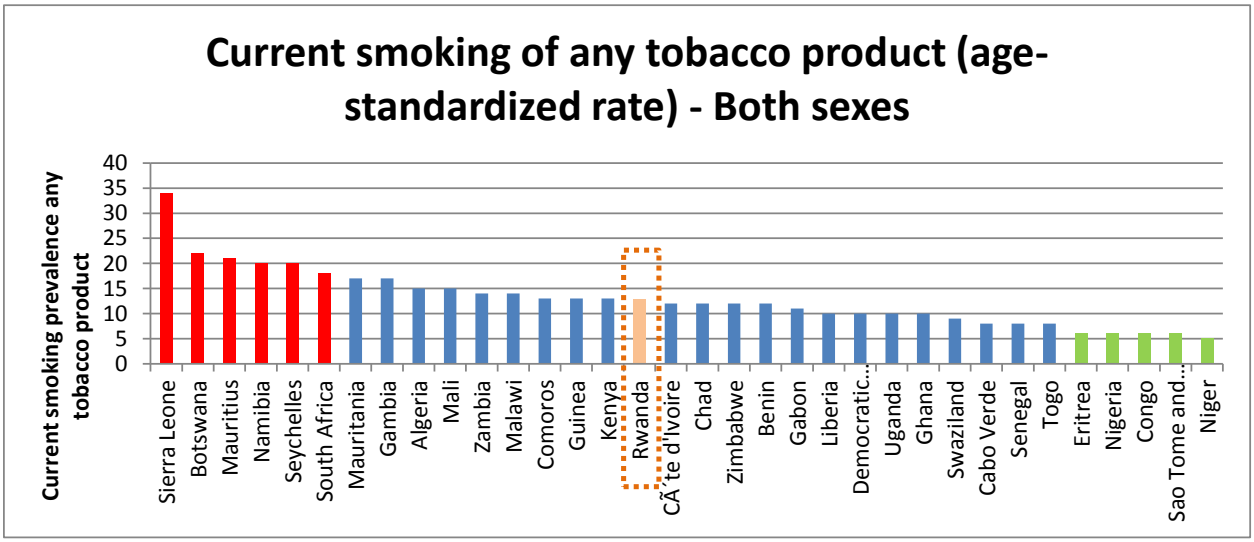
In Rwanda, most people, and especially women, have never smoked and were not exposed to the smoking of others. Thus, preventing people from starting smoking is likely the most effective tobacco control strategy.

However, almost 20% of men smoked and, perhaps reflective of the addictive nature of tobacco, most of these men smoked daily indicating that some support for quitting smoking is required. Of concern was that most people started smoking when they were in their teenage years and, based on reported duration of smoking, it was clear that once people started smoking they kept on smoking.

Participants reported using a variety of tobacco products and prevention strategies should target manufactured cigarette use by young men and women as well as hand-rolled cigarettes and pipe tobacco. While passive smoking (or second hand exposure to tobacco smoke) was not common (~10-15% of participants exposed either at home or at work), it was higher in homes for the youngest age groups suggesting that smoking at home may be increasing over time.

Figure 5 compares current tobacco smoking prevalence for African countries (where data is available). It shows that Rwanda has a prevalence of smokers in line with the average compared to other African countries.

Figure 4: Smoking prevalence in African Countries



Source1: WHO – Global Health Observatory (GHO) – Tobacco use 2010 and Rwandan STEP Survey 2012 - http://apps.who.int/gho/data/node.main.1250?lang=en

4.1.2 Harmful use of alcohol

Alcohol consumption was common with more than half of men and almost one-third of women identified as current drinkers. An additional five or six percent of participants reported consuming alcohol in the 12 months prior to the survey. There are evidences that the number of standard drinks per drinking occasion was high for men (3.1 standard drinks) and that some people (~ 30% of men and 17% of women) had binged on alcohol in the past 30 days. Moreover, 57% of participants reported rarely or never drinking alcohol with meals and this may be indicative of riskier drinking patterns.

4.1.3 Unhealthy diet

Daily consumption of fruit and vegetables has been shown to be protective against NCDs. The data shows that the consumption of fruits and vegetables was infrequent and the number of servings insufficient. Because good nutrition plays a critical role in protecting against cardiovascular disease, diabetes, cancer and chronic respiratory disease, identifying sustainable strategies for increasing fruit and vegetable consumption in Rwanda is critical for preventing NCDs but also for controlling these disease among those who already have them. Despite these recommendations, the suggested cut off of 5 servings per day by WHO doesn't fit into the Rwanda meal habits. In fact, at the best the maximum number of meals per day is 3 in Rwanda and that's the only occasion where consumption of vegetables and fruits can occur. Therefore, the cutoff of 5 meals consequently eliminates the vast majority of Rwandese. Upcoming NCD surveys should take that into account when designing the data collection tools (not denying the requirement of five servings of vegetable and fruits per day).

Saturated fat is a risk factor for coronary heart disease. In Rwanda however through this survey, the vast majority of respondents reported cooking with vegetable oils that contain unsaturated fats. Most meals in Rwanda are eaten at home identifying this setting as the main source of food and therefore the main focus of any health promotion initiatives to improve nutrition.

4.1.4 Physical inactivity

The frequency, duration and intensity of physical activity in Rwanda were high and this is likely to be protecting Rwandan's from NCDs. The majority of this physical activity was work related, although active forms of transport also made a substantial contribution. Very little physical activity came from the recreational domain except for men in the 15-24 year age group. Frequency of inactivity or sedentary behavior was correspondingly low. There were some sex and age differences such that women and younger age groups generally spent less time being physically active. For women, physical activity was also less intensive. Monitoring the physical activities of women, and possibly those in the younger age groups, may be important for ensuring current levels of activity are maintained.

4.2 Biological risk factors

4.2.1 Overweight / obesity

The mean body mass index of 22.3 kg/m^2 for participants is well within the normal or healthy weight range and consequently most participants (75.0%) fell within this healthy weight range. Low mean waist circumference values support the notion that overweight is not a problem for the majority of the population. However, 7.8% of participants, particularly those in the older age groups, were underweight. In addition, 23.7% of women, were either overweight (19%) or obese (4.7%). As countries develop they undergo an epidemiological transition and communicable diseases and underweight are replaced by non-communicable diseases and overweight as the major health problems. In the absence of trend data it is not possible to determine if this is the case in Rwanda. There are not many countries that have such a high percentage of the population falling within a healthy weight range and some thought should be given to how best to maintain this profile into the future and to bring both underweight and overweight individuals into the healthy weight range.

4.2.2 Raised blood pressure

Overall, around 15% of participants had raised blood pressure and this proportion rose to 40% for those in the 55-64 year age group making raised blood pressure the most common NCD risk factor for this age group. It is important to research on some of the causes of raised blood pressure in the country and consider putting in place programs (such as salt reduction programs if salt consumption is high) to reduce blood pressure at a population level. Most people with raised blood were undiagnosed and therefore were not on medication. However, for that the few who were, it was encouraging to see that their blood pressure was under control.

4.2.3 Raised blood glucose and total cholesterol

Impaired fasting glycaemia is rare in Rwanda and raised blood glucose is uncommon, affecting just 3.1% of the population. However, prevalence of raised total cholesterol reached 7.4% for women aged 55-64 years. Interestingly, prevalence of low HDL was highest for the youngest age group. Higher blood pressure, blood glucose and total cholesterol levels for the oldest age groups point to screening for absolute risk of cardiovascular disease so they can benefit from secondary prevention. Most of those with raised blood glucose however do not know they have raised blood glucose. This finding highlights the need for improved diagnosis, particularly for those aged 45 years for whom the condition is more prevalent.

4.2.4 Asthma

Asthma is prevalent in urban, semi-urban areas and among female population. Although the overall self-reported prevalence of asthma is low, it is still a public health concern that requires special attention from the government of Rwanda. In-depth investigation through a qualitative survey is advisable to have a better understanding of the underlying causes of the differences between men and women as well as providing appropriate recommendations to tackle this issue in both urban and semi-urban areas.

4.2.5 Renal disorder/Albuminuria

The survey analyzed the presence of albumin proteins in the urine of the participants. Results shows around 10% of the survey participants had signs of kidney lesion. Kigali city has lowest prevalence of 4.3%, followed by Southern province (8.6%) and Western province (10%). Rural areas have highest prevalence (12%) than urban (5.2%) and semi urban (6.4%). Together with raised blood pressure the renal disorders represent the highest prevalence of biological risk factors.

4.2.6 People with multiple NCD risk factors

The presence of multiple risk factors in individuals increases their overall risk of NCDs. Depending on the number of these risk factors, individuals can be classified as having low, medium or high risk of NCDs. This overall measure of NCD risk found that less than 1% of participants had no risk factors, 83.2% were at moderate risk of NCDs and 16.4% were at high risk. Not surprisingly, the proportion of 45-64 year old participants with a high NCD risk was double that of those aged 25-44 making people in this age group an important target for interventions to manage NCD risk factors. WHO's package of essential NCD interventions is one tool that may help manage the NCD burden in this older age group.

4.3 Other risk factors

4.3.1 HIV/AIDS

Self-reported cases of HIV accounted for 3.4% of the overall participants. Kigali city has the highest prevalence (5.5%) followed by western province (4.1%), Southern province (3.5%), eastern and northern (2.4%).Among the self-reported HIV positive 87.6% was currently on treatment, with a large difference between women (92%) and men (78.7%). 76% of the people have been tested at least 1 time. The southern province is the least (71.7), followed by Western (75.4%), Eastern (76.6%), Kigali city (78.2%), Northern (79.7%).

4.3.2 Injuries

Road traffic crashes were infrequent, with 5.3% of participants reporting that they had been involved in a road traffic crash in the past 12 months. However 34% of those who were involved in a road traffic crash sustained serious injuries. This may be due to poor use of seatbelts in cars and helmets when riding motorcycles or scooters. Ninety percent of participants reported not always wearing a seat belt and 75% reported not always wearing a helmet when riding a motorcycle or scooter. Strategies to encourage seat belt and helmet use for both men (who were more involved in road traffic crashes) and women (who were less likely to wear seat belts or helmets) would reduce the number of serious injuries.

Accidental injuries for reasons other than road traffic crashes were less common that injuries due to road traffic crashes. However 5% of men and 3% of women were still seriously injured by these other causes. Falls and cuts were the main specified causes of these injuries and should be the focus of any health promotion activities focused on injury prevention.

4.4 Health system response to blood pressure and diabetes

How the health system responds to NCDs is a critical part of their management. This survey found that both blood pressure and blood sugar are infrequently measured in Rwanda.

It also found that hypertension and diabetes are not commonly diagnosed. Most of those with elevated blood pressure and raised fasting blood glucose are undiagnosed. One explanation for this is that high blood pressure and diabetes are rare and the higher rates of diagnosis among older age groups support this possibility. However when blood pressure and fasting glucose of the survey participants were measured in part three of the survey, this revealed that 15% of the population have raised blood pressure and 3% have raised blood glucose implying that both were grossly under-diagnosed. There is therefore a need to strengthen the health system to improve early diagnosis and management of these conditions in the general population.

4.5 Association between particular risk factors

Multivariate analysis was performed to identify risk factors associated with high blood pressure and injuries. Table100, 101 and 102 in the appendix summarized the significance of these associations.

4.5.1 Risk factors associated with hypertension

Sex is strongly associated with hypertension. In fact the Rwanda NCD survey results show that males are 34% more likely to have hypertension compared to women. As observed in many other studies older generations tend to have high blood pressure compared to young generation. In the Rwanda NCD survey the adjusted odd ratio of the age group 45-64 is more than 4 folds the one of the age group 15-24 years. Alcohol consumption, body mass index, and urine albumin are associated with hypertension (Table 100.

4.5.2 Association between Alcohol drinking and injury

Association between injury and alcohol consumption multivariate analysis shows that males are more exposed to serious injuries compared to females. Additionally, current drinking men tend to have serious road injuries compared to current female current drinkers (Table 35). The same drinking pattern is true for heavy drinkers (Table 36). Heavy drinkers are times more likely to have serious injury in the last past 12 months compared to not heavy drinkers (Table 36). There is no significance difference between age groups in term of association between heavy drinkers and serious injury as well as current drinkers and serious injuries (Table 35 & 36).

Table 34:Association between current drinking and serious injury in the last 12 months in Rwanda

Factors	N	N Adjusted (%)	UOR (95% CI)	p-value	AOR (95% CI)	p-value
Alcohol consumption						
Not a current drinker	4154	116 (3.1)	1.0		1.0	
Current Drinker	3046	137 (5.1)	1.69 (1.24– 2.31)	0.001	1.50 (1.08 – 2.08)	0.015
Sex						
Women	4525	123 (2.7)	1.0		1.0	
Men	2675	130 (5.2)	1.95 (1.49 – 2.54)	<0.001	1.79 (1.35 – 2.37)	<0.001
Age						
15-24 years	1507	61 (4.5)	1.0		-	
25-34 years	2380	87 (3.9)	0.86 (0.61 – 1.23)	0.415	-	
35-44 years	1543	48 (3.4)	0.76 (0.51 – 1.12)	0.160	-	
45-54 years	1057	34 (3.3)	0.72 (0.46 – 1.14)	0.165	-	
55-64 years	709	23 (3.1)	0.69 (0.35 – 1.13)	0.143	-	

† "Current drinker" is a person who consumed alcohol in the past 30 days. "Not a current drinker" is a person who has never taken alcohol

Table 36:Association between heavy drinking and serious injury in the last 12 months in Rwanda

Factors	N	N Adjusted (%)	UOR (95% CI)	p-value	AOR (95% CI)	p-value
Alcohol consumption[φ]						
Not a heavy drinker	7003	244 (3.9)	1.0		1.0	
Heavy Drinker	144	8 (6.0)	1.60 (0.78 – 3.30)	0.202	1.34 (0.64 – 2.80)	0.431
Sex						
Women	4525	123 (2.7)	1.0		1.0	
Men	2692	501 (5.2)	1.95 (1.49 – 2.54)	<0.001	1.91 (1.46 – 2.51)	<0.001
Age						
15-24 years	1507	61 (4.5)	1.0			
25-34 years	2380	87 (3.9)	0.86 (0.61 – 1.23)	0.415	-	
35-44 years	1543	48 (3.4)	0.76 (0.51 – 1.12)	0.160	-	
45-54 years	1057	34 (3.3)	0.72 (0.46 – 1.14)	0.165	-	
55-64 years	709	23 (3.1)	0.69 (0.35 – 1.13)	0.143	-	

φ "Heavy drinking" is defined as 5+ Units of Alcohol in a single sitting for men and 4+ Units of Alcohol in a single sitting for women in the past 30 days

4.6 Conclusion and targets

The STEPs NCD risk factor survey in Rwanda represents a significant step forward in the prevention and control of NCDs because it is the first time a population wide survey has been conducted on NCD risk factors.

Data suggests that the risk factors of Rwanda lay in the harmful use of alcohol and the unhealthy diet, followed by the tobacco use. Physical inactivity and obesity are not an issue in Rwanda. The highest prevalence in Rwanda are due to hypertension and renal disorders.

There is a need for a national NCD strategy that focuses primarily on prevention (e.g. preventing increases in the number of people who smoke) and address the upstream determinants of NCDs (e.g. the behavioral risk factors and their social determinants such as educational attainment).

Alongside this prevention work, some additional action is required at the primary care level to better diagnose and manage NCD risk factors in older Rwandans.
The table below provides the global voluntary NCD targets for 2025. It includes details of the indicators that could be used to measure progress against these targets in Rwanda and potential data sources. Also in the table are baseline values for Rwanda obtained from this survey and goals if the targets are adopted.

Table 37: Global NCD risk factor and response targets and their application in Rwanda

Global NCD Target	Possible Indicator	Data Source	Rwanda Baseline	Rwanda goal if target adopted
Behavioral Risk Factors				
Reduce the prevalence of current smokers 30% from baseline	Age-standardized prevalence of daily smoking among persons aged 15+ years	2012-13 STEPs	12.8%	9.0%
Reduce harmful use of alcohol by 10%	Age-standardized prevalence of heavy episodic drinking among adolescents and adults.	2012-13 STEPs	23.5%	21.5%
Reduction of 10% in physical inactivity	Age-standardized prevalence of insufficiently physically active persons aged 15+ years	2012-13 STEPs	**	
Reduce salt/sodium intake by 30%	Age-standardized mean population intake of salt per day in grams in persons aged 15+ years.	Next STEPs survey	*	
Biological Risk Factors				
Halt rise in adolescent/adult obesity (0% increase from baseline)	Age-standardized prevalence of obesity among persons aged 15+ years (adults)	2012-2013 STEPs	3.0%	3.0%
Halt rise in diabetes (0% increase from baseline)	Age-standardized prevalence of diabetes among persons aged 15+ years	2012-2013 STEPS	3.1%	3.1%
Contain the prevalence of raised blood pressure	Age-standardized prevalence of raised blood pressure among persons aged 15+ years	2012-2013 STEPS	15.0%	15.0%
Health system response				
At least 50% of eligible people receive multidrug therapy and counseling to prevent heart attacks & stroke	Proportion of eligible persons receiving drug therapy and counseling (including glycemic control) to prevent heart attacks and strokes	MOH records	*	
Essential NCD medicines and basic technologies available to 80% of the population	Availability and affordability of quality, safe and efficacious essential non-communicable disease medicines, including generics, and basic technologies in both public and private facilities.	MOH records	*	

* Not currently available

** Can be calculated with secondary analysis of the 2012-13 STEPs data

The global obesity, diabetes and blood pressure targets are designed to halt the rise of these risk factors. For Rwanda this means maintaining the 3.0%, 3.1% and 15.0% baseline prevalence rates. Smoking and alcohol related targets could be achieved with relatively small reductions in current prevalence.

5 Recommendations

The following recommendations are presented as priority actions for Rwanda based on the results of this report:

Actions for preventing NCDs and addressing the upstream determinants

That the Government of Rwanda:

- Inform relevant government departments, non-government agencies, the private sector and development agencies of the findings and recommendations in this report;
- Provide high level leadership on NCD prevention and control and follow through on commitments made at the UN Political Declaration on NCDs;
- Develop national NCD targets based on the global voluntary NCD targets;
- Monitor the implementation of the NCD Action Plan:
- Accelerate the implementation the WHO Framework Convention on Tobacco Control and introduce or strengthen legislation promoting smoke free environments, health warnings on cigarette packages and taxes on all tobacco products;
- Introduce or strengthen legislation and social marketing to promote the responsible sale and consumption of alcohol, including taxes on products containing alcohol;
- Boost the funding available for NCD prevention and control through a hypothecated tobacco and alcohol taxes;
- Develop or strengthen policies promoting local production, distribution and promotion of fruit and vegetables and supporting the importation of healthy foods;
- Investigate the potential to significantly scale-up the acquisition, distribution, marketing and availability of fruit and vegetables;
- Develop or strengthen injury prevention policies on seat belt use, helmet use and on reducing injuries due to falls and cuts.

That the Ministry of Health in partnership with NGOs and the wider community:

- Develop and implement a comprehensive and multi sectoral NCD Action Plan with timed targets and indicators in line with the Global NCD Action Plan;
- Provide comprehensive anti-smoking campaigns (targeting use of manufactured cigarettes by those aged 15-24 years, and use of hand-rolled cigarettes and pipe tobacco by women) to prevent smoking uptake) and quit programs for current smokers;

- Provide campaigns promoting responsible consumption of alcohol
- Promote fruit and vegetable consumption and provide programs to increase the availability of fruits and vegetables such as support for production, preservation and promotion of its consumption;
- Strengthen the health system for NCD prevention and control, particularly for older Rwandans and those with 3 or more NCD risk factors. This should include:
    - Improved measurement of blood pressure, total cholesterol and blood sugar levels;
    - Improved diagnosis of raised blood pressure, total cholesterol and glucose;
    - Programs to reduce blood pressure, particularly in men;
    - Screening for the absolute risk of cardiovascular disease and implementation of programs to treat those at high risk as per the WHO package for essential NCD interventions

Implement social marketing campaigns promoting awareness of seat belts and helmets and how to reduce the risk of serious injuries from falls and cuts.

Surveillance actions:

That the Ministry of Health:

- Conduct a further NCD risk factor survey in 5 years' time to determine changes in risk factor prevalence and consider including other important and emerging NCDs such as dental, eye and ear conditions. Repeating this STEPs survey in five years' time will allow for trends in NCD risk factors to be determined and for data to be collected on other risk factors (e.g. salt) that are considered national priorities.
- Improve the STEP survey questionnaire on nutrition:
    - Use a 24 hour recall instead of the day in a typical week.
    - Ask if vegetables are consumed cooked or raw.
    - Which oil and which use (estimated %age for deep frying , pan frying, not cooked)
    - Is the oil for deep frying reused
- Align the variables included in future surveys with national and global NCD targets and goals.

References

1. Lopez AD, Disease Control Priorities Project. Global burden of disease and risk factors. New York, NY: Oxford University Press; 2006.
2. Government of Rwanda. Health Sector Strategic Plan. July 2009 - June 2012. Kigali: Ministry of Health; 2009.
3. Jamison DT, World Bank. Disease and mortality in Sub-Saharan Africa. 2nd ed. Washington, D.C.: World Bank; 2006.
4. Mathers C, Boerma T, Fat DM. The Global Burden of Disease: 2004 Update. Geneva: World Health Organization; 2008.
5. Simms V, Atijosan O, Kuper H, Nuhu A, Rischewski D, Lavy C. Prevalence of epilepsy in Rwanda: a national cross-sectional survey. Trop Med Int Health 2008;13:1047-53.
6. Atijosan O, Rischewski D, Simms V, et al. A national survey of musculoskeletal impairment in Rwanda: prevalence, causes and service implications. PLoS One 2008;3:e2851.
7. Mathenge W, Nkurikiye J, Limburg H, Kuper H. Rapid assessment of avoidable blindness in Western Rwanda: blindness in a postconflict setting. PLoS Med 2007;4:e217.
8. Munyandamutsa N& Mahoro P. (2009). Prévalence de l'Etat de Stress Post- Traumatique : Diversités des figures cliniques, abus de drogues et autres co-morbidités
9. MEASURE DHS OM. Interim Rwanda Demographic Health Survey. 2007-08: Rwanda INdlSd; 2009.
10. Pampel F. Tobacco use in sub-Sahara Africa: estimates from the demographic health surveys. Soc Sci Med 2008;66:1772-83.
11. MEASURE DHS OM. Rwanda Demographic Health Survey III. 2005: Rwanda INdlSd; 2005.
12. Newton R, Ngilimana PJ, Grulich A, et al. Cancer in Rwanda. Int J Cancer 1996;66:75-81.
13. Bukhman G, Kidder A, eds. The PIH Guide to Chronic Care Integration for Endemic Non-Communicable Diseases - Rwanda Edition. Boston: Partners In Health; 2011.
14. Parkin DM, Sitas F, Chirenje M, Stein L, Abratt R, Wabinga H. Part I: Cancer in Indigenous Africans--burden, distribution, and trends. Lancet Oncol 2008;9:683-92.
15. Bedu-Addo G, Bates I. Causes of massive tropical splenomegaly in Ghana. Lancet 2002;360:449-54.
16. Weatherall DJ, Clegg JB. Inherited haemoglobin disorders: an increasing global health problem. Bull World Health Organ 2001;79:704-12.
17. Patel V, Prince M. Global mental health: a new global health field comes of age. JAMA 2010;303:1976-7.

18. Birbeck GL, Molyneux ME, Kaplan PW, et al. Blantyre Malaria Project Epilepsy Study (BMPES) of neurological outcomes in retinopathy-positive paediatric cerebral malaria survivors: a prospective cohort study. Lancet Neurol 2010;9:1173-81.
19. Edwards T, Scott AG, Munyoki G, et al. Active convulsive epilepsy in a rural district of Kenya: a study of prevalence and possible risk factors. Lancet Neurol 2008;7:50-6.
20. Commerford P, Mayosi B. An appropriate research agenda for heart disease in Africa. Lancet 2006;367:1884-6.
21. Mocumbi AO, Ferreira MB. Neglected cardiovascular diseases in Africa: challenges and opportunities. J Am Coll Cardiol 2010;55:680-7.
22. Bukhman G, Ziegler JL, Parry EH. Endomyocardial Fibrosis: still a mystery after 60 years. In: PLoS Neglected Trop Dis; 2008:e97.
23. Salvi SS, Barnes PJ. Chronic obstructive pulmonary disease in non-smokers. Lancet 2009;374:733-43.
24. White SL, Chadban SJ, Jan S, Chapman JR, Cass A. How can we achieve global equity in provision of renal replacement therapy? Bull World Health Organ 2008;86:229-37.
25. Mbanya JC, Motala AA, Sobngwi E, Assah FK, Enoru ST. Diabetes in sub-Saharan Africa. Lancet 2010;375:2254-66.
26. Stanley CM, Rutherford GW, Morshed S, Coughlin RR, Beyeza T. Estimating the healthcare burden of osteomyelitis in Uganda. Trans R Soc Trop Med Hyg 2010;104:139-42.
27. Petersen PE, Bourgeois D, Ogawa H, Estupinan-Day S, Ndiaye C. The global burden of oral diseases and risks to oral health. Bull World Health Organ 2005;83:661-9.
28. Bonita, R, de Courten, M, Dwyer, T, Jamrozik, K, and Winkelmann, R. Surveillance of risk factors for noncommunicable disease: The WHO STEPwise approach. Geneva: World Health Organization. 2001.
29. WHO abbreviated report of consultation, 2011: http://www.who.int/diabetes/publications/report-hba1c_2011.pdf31. Ebrahim, S, and Davey Smith G. "Exporting Failure? Coronary Heart Disease and Stroke in Developing Countries" International Journal of Epidemiology 2001; 30: 201-205

30. Miranda JJ., Kinra S, Casas JP., Smith GD. and Ebrahim S.: "*Non-communicable diseases in low- and middle-income countries: context, determinants and health policy*", Trop Med Int Health 13 (2008), pp. 1225–1234

31. Kathleen S., Mathers C., Leeder S., and Beaglehole R.: *"Preventing chronic diseases: how many lives can we save?*",*Lancet* 366 (2005), pp. 1578–1582

32. . J Mufunda, G Mebrahtu, A Usman, P Nyarango, A Kosia, Y Ghebrat, A Ogbamariam,
33. M Masjuanand A Gebremichael:*The prevalence of hypertension and its relationship with obesity: results from a national blood pressure survey in Eritrea*. Journal of Human Hypertension (2006) 20, 59–65. doi:10.1038/ sj.jhh.1001924

34. Malawi Ministry of Health: *Malawi National STEPS Survey for Chronic Non-Communicable Diseases and their Risk Factors Final Report 2009*
35. Koning L et al, Eur Heart J. 2007 Apr: 28(7):850-6. Epub 2007 Apr 2; and Lean MEJ et al.
36. Yusuf S, Hawken S, Ounpuu S et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (The INTERHEART study): case-control study. Lancet. 2004; 364:937-952).

37. Parikh P, Mochari H, Mosca L. Clinical utility of a fingerstick technology to identify individuals with abnormal blood lipids and high-sensitivity C-reactive protein levels.Am J Health Promot. 2009 Mar-Apr; 23(4):279-82

Appendix 1: Additional tables

Response rate and socio-demographic characteristics

Table 358: Age group and sex of respondents

Age group and sex of respondents						
Age Group (years)	Men		Women		Both Sexes	
	n	%	n	%	n	%
15-24	571	21.2	943	20.8	1514	20.9
25-34	929	34.5	1462	32.2	2391	33.1
35-44	560	20.8	991	21.8	1551	21.5
45-54	393	14.6	667	14.7	1060	14.7
55-64	237	8.8	476	10.5	713	9.9
15-64	**2691**	**100.0**	**4542**	**100.0**	**7229**	**100.0**

Table 39: Mean number of years of education by sex and age group

Mean number of years of education						
Age Group (years)	Men		Women		Both Sexes	
	n	Mean	n	Mean	n	Mean
15-24	569	5.8	942	5.5	1511	5.7
25-34	928	4.8	1462	4.6	2390	4.7
35-44	559	5.7	989	4.8	1548	5.1
45-54	393	4.7	666	3.4	1059	3.9
55-64	236	3.1	474	1.9	710	2.4
15+	**2685**	**5.0**	**4533**	**4.4**	**7218**	**4.6**

Table 40: Percentage of current smokers by sex and age group

Percentage of current smokers									
Age Group (years)	Men			Women			Both Sexes		
	n	% Current smoker	95% CI	n	% Current smoker	95% CI	n	% Current smoker	95% CI
15-24	568	6.5	4.3-8.7	943	1.2	0.5-1.9	1511	3.8	2.7-4.9
25-34	927	20.5	17.4-23.6	1462	2.9	1.9-3.8	2389	11.2	9.5-13.0
35-44	559	23.3	19.4-27.2	991	9.1	7.0-11.1	1550	15.6	13.5-17.7
45-54	393	37.8	31.9-43.8	667	21.6	18.1-25.0	1060	29.0	25.6-32.5
55-64	237	49.7	42.8-56.7	476	29.2	24.4-34.0	713	38.3	34.0-42.5
15-64	**2684**	**19.2**	**17.4-21.1**	**4539**	**7.2**	**6.3-8.1**	**7223**	**12.9**	**11.8-14.0**

Table 41: Smoking status of men by age group

Age Group (years)	Smoking status								
	Men								
	n	Current smoker					Non-smokers		
		% Daily	95% CI	% Non-daily	95% CI	% Past smoker	95% CI	% Never smoker	95% CI
15-24	568	3.3	1.9-4.8	3.2	1.6-4.7	1.1	0.2-1.9	92.4	90.1-94.8
25-34	927	15.8	13.1-18.4	4.8	3.3-6.2	1.7	0.9-2.6	77.8	74.6-80.9
35-44	559	17.6	14.1-21.1	5.7	3.7-7.8	1.4	0.5-2.4	75.3	71.4-79.1
45-54	393	28.4	23.2-33.7	9.4	6.4-12.4	2.3	0.8-3.8	59.9	54.0-65.8
55-64	237	38.3	31.7-45.0	11.4	6.9-15.9	2.1	0.3-3.9	48.2	41.2-55.2
15-64	**2684**	**14.0**	**12.5-15.5**	**5.2**	**4.2-6.2**	**1.5**	**1.0-2.0**	**79.2**	**77.3-81.2**

Table 42: Smoking status of women by age group

Age Group (years)	Smoking status								
	Women								
	n	Current smoker					Non-smokers		
		% Daily	95% CI	% Non-daily	95% CI	% Past smoker	95% CI	% Never smoker	95% CI
15-24	943	0.6	0.1-1.2	0.5	0.1-1.0	0.3	0.0-0.7	98.5	97.8-99.3
25-34	1462	1.4	0.8-2.0	1.4	0.8-2.1	0.7	0.3-1.1	96.5	95.4-97.5
35-44	991	5.7	4.1-7.3	3.3	2.2-4.5	1.3	0.6-2.1	89.6	87.5-91.8
45-54	667	12.9	10.2-15.6	8.7	6.3-11.1	2.6	1.4-3.7	75.9	72.3-79.5
55-64	476	17.4	13.7-21.2	11.8	8.2-15.3	3.6	1.7-5.5	67.3	62.3-72.2
15-64	**4539**	**4.3**	**3.6-4.9**	**3.0**	**2.4-3.6**	**1.1**	**0.8-1.4**	**91.7**	**90.7-92.7**

Table 43: Smoking status of both sexes by age group

Age Group (years)	Smoking status								
	Both Sexes								
	n	Current smoker					Non-smokers		
		% Daily	95% CI	% Non-daily	95% CI	% Past smoker	95% CI	% Never smoker	95% CI
15-24	1511	2.0	1.2-2.7	1.8	1.0-2.6	0.7	0.2-1.1	95.5	94.3-96.7
25-34	2389	8.2	6.9-9.6	3.0	2.2-3.8	1.2	0.7-1.6	87.6	85.8-89.3
35-44	1550	11.2	9.3-13.0	4.4	3.3-5.5	1.4	0.7-2.0	83.1	80.9-85.2
45-54	1060	20.0	17.1-23.0	9.0	7.0-11.1	2.4	1.5-3.4	68.5	65.1-72.0
55-64	713	26.7	22.9-30.5	11.6	8.6-14.6	2.9	1.6-4.2	58.8	54.5-63.1
15-64	**7223**	**8.9**	**8.0-9.8**	**4.0**	**3.4-4.7**	**1.3**	**1.0-1.6**	**85.8**	**84.6-87.0**

Table 44: Mean age of starting smoking among daily smokers by sex and age group

Mean age started smoking									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean age	95% CI	n	Mean age	95% CI	n	Mean age	95% CI
15-24	19	16.3	14.5-18.0	5	17.2	15.0-19.5	24	16.4	14.9-17.9
25-34	144	18.6	17.9-19.4	19	15.6	13.5-17.7	163	18.4	17.6-19.1
35-44	93	19.6	18.3-20.9	55	19.1	16.9-21.3	148	19.5	18.4-20.6
45-54	109	19.3	18.0-20.7	84	19.7	18.0-21.3	193	19.4	18.4-20.5
55-64	86	19.2	17.6-20.7	80	22.0	19.7-24.3	166	20.2	18.9-21.5
15-64	**451**	**18.8**	**18.3-19.4**	**243**	**19.7**	**18.6-20.8**	**694**	**19.0**	**18.5-19.5**

Table 45: Mean duration of smoking among daily smokers by sex and age group

Mean duration of smoking									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean duration	95% CI	n	Mean duration	95% CI	n	Mean duration	95% CI
15-24	19	5.7	4.0-7.4	5	4.5	1.6-7.5	24	5.6	4.0-7.1
25-34	144	11.2	10.3-12.1	19	15.6	13.1-18.0	163	11.6	10.7-12.4
35-44	93	19.7	18.2-21.1	55	20.9	18.8-23.0	148	20.0	18.8-21.2
45-54	109	30.2	28.7-31.7	84	30.0	28.4-31.5	193	30.1	29.0-31.2
55-64	86	40.0	38.3-41.7	80	36.9	34.5-39.3	166	38.9	37.5-40.3
15-64	**451**	**21.1**	**19.9-22.3**	**243**	**27.4**	**25.8-29.0**	**694**	**22.7**	**21.6-23.8**

Table 46: Percentage of current daily smokers who smoke manufactured cigarettes

Manufactured cigarette smokers among daily smokers									
Age Group (years)	Men			Women			Both Sexes		
	n	% Manu-factured cigarette smoker	95% CI	n	% Manu-factured cigarette smoker	95% CI	n	% Manu-factured cigarette smoker	95% CI
15-24	19	100.0	100-100	6	51.0	10.5-91.5	25	91.8	82.6-100.0
25-34	144	89.6	83.8-95.5	21	4.8	0.0-14.0	165	81.8	74.9-88.8
35-44	96	79.3	71.5-87.2	56	5.4	0.0-11.0	152	58.7	50.3-67.1
45-54	111	52.3	42.6-62.1	85	17.7	9.8-25.6	196	40.3	33.0-47.6
55-64	88	47.8	36.6-59.0	83	6.1	0.8-11.4	171	32.2	24.3-40.2
15-64	**458**	**73.5**	**69.2-77.8**	**251**	**12.4**	**7.4-17.3**	**709**	**58.0**	**53.8-62.2**

Table 47: Participants exposure to second-hand smoke at home on 1 or more of the 7 days preceding the survey

Exposed to second-hand smoke in home on 1 or more of the past 7 days									
Age Group (years)	Men			Women			Both Sexes		
	n	% Exposed	95% CI	n	% Exposed	95% CI	n	% Exposed	95% CI
15-24	562	13.5	10.6-16.4	919	16.4	13.7-19.1	1481	15.0	12.8-17.2
25-34	912	8.7	6.6-10.7	1445	12.1	10.3-13.9	2357	10.5	9.0-11.9
35-44	549	4.6	2.4-6.8	985	14.6	12.0-17.1	1534	10.0	8.1-11.9
45-54	382	9.1	6.1-12.2	655	14.2	11.3-17.1	1037	11.9	9.8-14.0
55-64	230	11.3	7.2-15.4	469	11.7	8.8-14.7	699	11.5	9.0-14.1
15-64	**2635**	**10.1**	**8.5-11.7**	**4473**	**14.3**	**12.8-15.7**	**7108**	**12.3**	**11.0-13.6**

Table 48: Participants exposure to second-hand smoke in the workplace on 1 or more of the 7 days preceding the survey

Exposed to second-hand smoke in the workplace on 1 or more of the past 7 days									
Age Group (years)	**Men**			**Women**			**Both Sexes**		
	n	% Exposed	95% CI	n	% Exposed	95% CI	n	% Exposed	95% CI
15-24	531	11.6	8.8-14.5	857	11.0	8.7-13.3	1388	11.3	9.5-13.2
25-34	858	11.5	9.3-13.8	1357	9.1	7.4-10.8	2215	10.3	8.7-11.9
35-44	526	10.1	7.0-13.2	922	10.2	7.7-12.6	1448	10.1	8.0-12.3
45-54	365	13.4	9.6-17.2	615	12.4	9.6-15.1	980	12.8	10.5-15.1
55-64	208	12.5	8.2-16.8	441	11.1	8.3-13.9	649	11.7	9.2-14.2
15-64	**2488**	**11.6**	**9.9-13.3**	**4192**	**10.5**	**9.1-11.8**	**6680**	**11.0**	**9.7-12.3**

Table 49: Percentage of men who were current drinkers by age group

Alcohol consumption status									
	Men								
Age Group (years)	n	% Current drinker (past 30 days)	95% CI	% Drank in past 12 months, not current	95% CI	% Past 12 months abstainer	95% CI	% Lifetime abstainer	95% CI
15-24	568	38.3	33.7-42.9	8.8	6.2-11.4	7.2	5.1-9.3	45.7	41.1-50.3
25-34	927	58.4	54.7-62.1	4.4	3.0-5.8	7.5	5.6-9.5	29.6	26.0-33.2
35-44	559	58.7	54.0-63.3	2.1	1.0-3.3	7.9	5.6-10.2	31.3	26.6-36.0
45-54	393	64.6	59.3-69.9	2.5	1.0-4.1	7.4	4.8-10.0	25.5	20.5-30.5
55-64	237	71.2	64.8-77.6	3.4	1.2-5.6	5.9	2.5-9.4	19.5	14.0-25.0
15-64	**2684**	**52.2**	**49.3-55.1**	**5.5**	**4.4-6.6**	**7.4**	**6.0-8.7**	**34.9**	**32.1-37.8**

Table 50: Percentage of women who were current drinkers by age group

Alcohol consumption status									
	Women								
Age Group (years)	n	% Current drinker (past 30 days)	95% CI	% Drank in past 12 months, not current	95% CI	% Past 12 months abstainer	95% CI	% Lifetime abstainer	95% CI
15-24	943	22.1	19.0-25.2	6.5	4.7-8.3	9.1	7.2-11.1	62.3	58.1-66.5
25-34	1462	32.4	29.1-35.7	4.8	3.6-5.9	8.4	6.7-10.1	54.4	50.8-58.0
35-44	991	36.0	32.5-39.4	6.2	4.6-7.7	10.3	8.2-12.3	47.6	43.8-51.3
45-54	667	45.8	41.8-49.9	5.4	3.7-7.2	10.0	7.5-12.5	38.8	35.0-42.5
55-64	476	41.8	36.7-46.9	4.4	2.5-6.3	15.5	11.7-19.4	38.3	33.3-43.2
15-64	**4539**	**31.5**	**29.1-33.9**	**5.7**	**4.8-6.5**	**9.6**	**8.4-10.9**	**53.2**	**50.4-56.0**

Table 51: Percentage of participants who were current drinkers by age group

Alcohol consumption status									
	Both Sexes								
Age Group (years)	n	% Current drinker (past 30 days)	95% CI	% Drank in past 12 months, not current	95% CI	% Past 12 months abstainer	95% CI	% Lifetime abstainer	95% CI
15-24	1511	30.0	26.9-33.1	7.6	6.0-9.2	8.2	6.6-9.8	54.2	50.5-57.8
25-34	2389	44.8	42.0-47.5	4.6	3.7-5.6	8.0	6.6-9.5	42.6	39.7-45.6
35-44	1550	46.4	43.2-49.5	4.3	3.3-5.4	9.2	7.6-10.8	40.1	36.9-43.4
45-54	1060	54.4	50.9-58.0	4.1	2.9-5.3	8.8	6.8-10.8	32.7	29.4-35.9
55-64	713	54.8	50.4-59.1	4.0	2.6-5.3	11.3	8.5-14.1	30.0	26.0-34.0
15-64	**7223**	**41.3**	**39.1-43.5**	**5.6**	**4.8-6.3**	**8.6**	**7.5-9.7**	**44.6**	**42.1-47.0**

Table 52: Mean number of standard drinks per drinking occasion among current drinkers by sex and age group

Mean number of standard drinks per drinking occasion among current (past 30 days) drinkers									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	*n*	*Mean*	*95% CI*
15-24	213	2.3	1.8-2.7	202	1.6	1.2-2.1	415	2.0	1.7-2.4
25-34	523	3.6	3.0-4.1	458	1.9	1.6-2.2	981	2.9	2.6-3.3
35-44	319	2.9	2.5-3.3	349	1.6	1.4-1.9	668	2.4	2.1-2.6
45-54	240	4.3	3.4-5.3	299	1.6	1.4-1.8	539	3.1	2.5-3.6
55-64	157	2.6	1.9-3.2	191	1.8	1.3-2.4	348	2.3	1.8-2.7
15-64	**1452**	**3.1**	**2.8-3.4**	**1499**	**1.7**	**1.5-2.0**	**2951**	**2.6**	**2.3-2.8**

Table 53: Percentage of men who had five or more/women who had four or more drinks on any day in the past 30 days during a single occasion by age group

Five/four or more drinks on a single occasion at least once during the past 30 days among total population						
Age Group (years)	Men			Women		
	n	% ≥ 5 drinks	95% CI	n	% ≥ 4drinks	95% CI
15-24	568	20.9	17.1-24.6	943	12.2	9.8-14.5
25-34	927	34.9	31.1-38.6	1462	17.9	15.1-20.6
35-44	559	34.9	30.6-39.2	991	19.9	16.9-22.9
45-54	393	40.2	34.6-45.8	667	25.0	21.5-28.6
55-64	237	43.4	36.5-50.3	476	20.6	16.5-24.7
15-64	**2684**	**30.6**	**28.0-33.3**	**4539**	**17.2**	**15.3-19.1**

Table 36: Proportion of current drinkers who usually, sometimes, rarely or never consumed alcohol with meals

Drinking with meals among current drinker									
Age Group (years)	Both Sexes								
	n	% Usually with meals	95% CI	% Sometimes with meals	95% CI	% Rarely with meals	95% CI	% Never with meals	95% CI
15-24	427	8.8	6.1-11.6	31.9	26.5-37.3	8.8	5.8-11.7	50.5	44.7-56.3
25-34	1017	9.5	7.5-11.5	33.1	29.7-36.4	11.8	9.5-14.1	45.6	41.7-49.6
35-44	685	8.8	6.4-11.1	34.4	30.4-38.4	9.0	6.5-11.4	47.9	43.7-52.0
45-54	560	8.1	5.8-10.4	34.9	30.4-39.3	12.7	9.6-15.7	44.4	39.5-49.3
55-64	368	7.9	5.0-10.8	29.2	24.1-34.3	13.0	9.4-16.5	49.9	44.1-55.7
15-64	**3057**	**8.9**	**7.5-10.2**	**32.9**	**30.4-35.5**	**10.7**	**9.3-12.2**	**47.5**	**44.4-50.6**

Table 37: Mean number of days in a week fruits consumed by sex and age group

Mean number of days fruit consumed in a typical week									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of days	95% CI	n	Mean number of days	95% CI	*n*	*Mean number of days*	*95% CI*
15-24	544	1.8	1.7-2.0	920	1.9	1.8-2.1	1464	1.9	1.8-2.0
25-34	892	1.7	1.5-1.8	1410	1.7	1.6-1.8	2302	1.7	1.6-1.8
35-44	536	1.5	1.3-1.6	954	1.5	1.4-1.6	1490	1.5	1.4-1.6
45-54	374	1.3	1.1-1.4	640	1.2	1.1-1.3	1014	1.2	1.1-1.3
55-64	227	1.4	1.1-1.6	454	1.3	1.1-1.5	681	1.3	1.1-1.5
15-64	**2573**	**1.6**	**1.5-1.7**	**4378**	**1.7**	**1.6-1.7**	**6951**	**1.6**	**1.6-1.7**

Table 38: Mean number of days in a week vegetables consumed by sex and age group

Mean number of days vegetables consumed in a typical week									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of days	95% CI	n	Mean number of days	95% CI	*n*	*Mean number of days*	*95% CI*
15-24	558	3.7	3.5-3.9	941	4.2	4.0-4.3	1499	3.9	3.8-4.1
25-34	916	3.6	3.5-3.8	1452	4.2	4.1-4.3	2368	3.9	3.8-4.1
35-44	553	3.9	3.7-4.1	983	4.4	4.2-4.6	1536	4.2	4.0-4.3
45-54	390	4.0	3.7-4.2	664	4.3	4.1-4.5	1054	4.2	4.0-4.3
55-64	233	3.9	3.5-4.2	464	4.2	4.0-4.4	697	4.0	3.9-4.2
15-64	**2650**	**3.7**	**3.6-3.9**	**4504**	**4.2**	**4.1-4.4**	**7154**	**4.0**	**3.9-4.1**

Table 39: Mean number of combined servings of fruit and vegetables consumed per average day

Mean number of servings of fruit and/or vegetables on average per day									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean number of servings	95% CI	n	Mean number of servings	95% CI	*n*	*Mean number of servings*	*95% CI*
15-24	560	1.2	1.1-1.2	941	1.4	1.3-1.5	1501	1.3	1.2-1.3
25-34	921	1.1	1.0-1.2	1456	1.3	1.3-1.4	2377	1.2	1.2-1.3
35-44	555	1.2	1.1-1.3	986	1.3	1.3-1.4	1541	1.3	1.2-1.3
45-54	390	1.2	1.1-1.3	663	1.3	1.2-1.4	1053	1.2	1.2-1.3
55-64	236	1.2	1.1-1.4	471	1.2	1.1-1.4	707	1.2	1.1-1.3
15-64	**2662**	**1.2**	**1.1-1.2**	**4517**	**1.3**	**1.3-1.4**	**7179**	**1.3**	**1.2-1.3**

Table 40: Number of servings of fruit and/or vegetables on average per day for men

Number of servings of fruit and/or vegetables on average per day									
Age Group (years)	Men								
	n	% no fruit and/or vege's	95% CI	% 1-2 servings	95% CI	% 3-4 servings	95% CI	% ≥5 servings	95% CI
15-24	560	48.3	43.7-52.9	48.8	44.3-53.3	2.5	1.3-3.8	0.4	0.0-0.8
25-34	921	52.1	48.5-55.6	44.2	40.8-47.7	2.8	1.7-3.9	0.9	0.1-1.6
35-44	555	49.3	44.6-54.0	47.3	42.7-51.8	2.7	1.4-4.1	0.7	0.0-1.4
45-54	390	50.7	44.7-56.7	46.2	40.3-52.0	2.1	0.7-3.5	1.0	0.0-2.0
55-64	236	46.5	39.4-53.7	49.6	42.5-56.7	1.7	0.0-3.4	2.1	0.3-4.0
15-64	**2662**	**49.7**	**46.8-52.7**	**47.0**	**44.2-49.7**	**2.5**	**1.9-3.2**	**0.7**	**0.3-1.1**

Table 41: Number of servings of fruit and/or vegetables on average per day for women

Number of servings of fruit and/or vegetables on average per day

Age Group (years)	Women								
	n	% no fruit and/or vege's	95% CI	% 1-2 servings	95% CI	% 3-4 servings	95% CI	% ≥5 servings	95% CI
15-24	941	42.9	38.8-46.9	51.9	48.0-55.9	3.9	2.7-5.2	1.3	0.3-2.2
25-34	1456	41.0	37.8-44.1	54.6	51.6-57.6	3.7	2.7-4.6	0.8	0.3-1.2
35-44	986	41.1	37.5-44.7	54.6	51.2-58.0	3.5	2.3-4.6	0.8	0.2-1.4
45-54	663	44.7	40.7-48.7	50.9	47.0-54.8	3.0	1.7-4.3	1.4	0.4-2.3
55-64	471	45.8	40.6-51.0	50.6	45.6-55.6	2.7	1.3-4.2	0.9	0.0-1.7
15-64	**4517**	**42.4**	**39.8-45.1**	**52.9**	**50.5-55.4**	**3.6**	**3.0-4.2**	**1.0**	**0.5-1.5**

Table 42: Mean number of meals per week eaten outside a home in a typical week

Mean number of meals eaten outside a home									
Age Group (years)	Men			Women			Both Sexes		
	n	mean	95% CI	n	mean	95% CI	n	mean	95% CI
15-24	562	1.0	0.8-1.2	937	0.6	0.4-0.7	1499	0.8	0.7-0.9
25-34	916	1.3	1.1-1.5	1454	0.4	0.3-0.5	2370	0.8	0.7-1.0
35-44	549	1.0	0.8-1.3	988	0.5	0.3-0.6	1537	0.7	0.6-0.9
45-54	389	1.0	0.7-1.3	662	0.4	0.2-0.6	1051	0.7	0.5-0.9
55-64	236	0.6	0.3-0.9	474	0.3	0.2-0.5	710	0.4	0.3-0.6
15-64	**2652**	**1.1**	**0.9-1.2**	**4515**	**0.5**	**0.4-0.6**	**7167**	**0.8**	**0.6-0.9**

Table 43:Mean minutes of work-related physical activity

Mean minutes of work-related physical activity on average per day									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean minutes	95% CI	n	Mean minutes	95% CI	*n*	*Mean minutes*	*95% CI*
15-24	539	127.1	110.8-143.3	898	107.5	94.9-120.1	1437	117.1	105.5-128.6
25-34	894	202.5	185.6-219.5	1402	161.9	147.0-176.7	2296	181.2	168.0-194.5
35-44	539	189.4	168.5-210.3	963	177.7	159.6-195.8	1502	183.1	166.9-199.2
45-54	379	176.9	154.1-199.8	637	157.8	140.1-175.5	1016	166.6	151.1-182.2
55-64	232	130.3	104.9-155.7	449	146.6	129.2-164.1	681	139.3	122.8-155.8
15-64	**2583**	**164.7**	**152.6-176.9**	**4349**	**143.5**	**132.2-154.8**	**6932**	**153.6**	**143.1-164.1**

Table 44: Mean minutes of transport-related physical activity

Mean minutes of transport-related physical activity on average per day									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean minutes	95% CI	n	Mean minutes	95% CI	*n*	*Mean minutes*	*95% CI*
15-24	539	81.5	72.2-90.8	898	60.0	54.7-65.3	1437	70.5	64.8-76.1
25-34	894	96.1	87.5-104.7	1402	63.2	58.6-67.7	2296	78.9	73.6-84.1
35-44	539	97.8	87.8-107.8	963	68.4	62.8-74.1	1502	81.8	75.8-87.8
45-54	379	77.4	68.5-86.3	637	63.6	56.9-70.3	1016	70.0	64.2-75.8
55-64	232	64.7	54.9-74.4	449	51.7	44.9-58.4	681	57.5	51.3-63.7
15-64	**2583**	**86.8**	**81.3-92.3**	**4349**	**62.2**	**58.8-65.5**	**6932**	**73.9**	**70.2-77.5**

Table 45: Mean minutes of recreation-related physical activity

Mean minutes of recreation-related physical activity on average per day									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean minutes	95% CI	n	Mean minutes	95% CI	*n*	*Mean minutes*	*95% CI*
15-24	539	31.9	26.6-37.3	898	8.8	6.0-11.5	1437	20.1	16.9-23.3
25-34	894	12.5	9.7-15.4	1402	1.3	0.5-2.1	2296	6.7	5.0-8.3
35-44	539	6.7	4.1-9.2	963	1.0	0.3-1.8	1502	3.6	2.4-4.8
45-54	379	3.2	1.7-4.8	637	0.9	0.0-1.8	1016	1.9	1.0-2.8
55-64	232	4.2	0.0-9.2	449	1.2	0.0-3.0	681	2.6	0.1-5.0
15-64	**2583**	**17.4**	**15.0-19.9**	**4349**	**3.9**	**2.8-5.0**	**6932**	**10.3**	**8.9-11.7**

Table 46: Mean minutes of total physical activity

Mean minutes of total physical activity on average per day									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean minutes	95% CI	n	Mean minutes	95% CI	*n*	*Mean minutes*	*95% CI*
15-24	539	240.5	217.8-263.1	898	176.3	161.0-191.6	1437	207.6	192.1-223.2
25-34	894	311.2	288.6-333.7	1402	226.4	209.8-243.0	2296	266.8	250.6-282.9
35-44	539	293.9	269.2-318.5	963	247.2	227.3-267.0	1502	268.5	250.5-286.5
45-54	379	257.5	232.4-282.7	637	222.3	202.1-242.5	1016	238.6	221.3-255.9
55-64	232	199.2	168.7-229.7	449	199.5	178.8-220.2	681	199.4	179.6-219.2
15-64	**2583**	**269.0**	**253.4-284.5**	**4349**	**209.5**	**197.0-222.1**	**6932**	**237.7**	**225.3-250.1**

Table 47: Levels of total physical activity for men

Age Group (years)	Level of total physical activity						
	Men						
	n	% Low	95% CI	% Moderate	95% CI	% High	95% CI
15-24	539	11.4	8.6-14.1	21.6	18.0-25.2	67.1	62.8-71.3
25-34	894	15.9	12.6-19.2	14.8	12.2-17.4	69.3	65.2-73.4
35-44	539	19.3	15.2-23.4	19.5	15.7-23.2	61.2	56.1-66.4
45-54	379	21.9	17.3-26.5	22.5	18.0-27.0	55.6	49.6-61.6
55-64	232	33.2	26.6-39.9	20.3	15.3-25.3	46.5	39.6-53.4
15-64	**2583**	**16.4**	**14.1-18.7**	**19.3**	**17.3-21.3**	**64.3**	**61.3-67.3**

Table 48: Levels of total physical activity for women

Age Group (years)	Level of total physical activity						
	Women						
	n	% Low	95% CI	% Moderate	95% CI	% High	95% CI
15-24	898	25.1	21.5-28.7	23.6	21.0-26.3	51.3	47.4-55.2
25-34	1402	25.8	22.7-28.8	21.7	19.0-24.4	52.5	48.8-56.3
35-44	963	24.1	20.5-27.6	19.9	16.8-23.0	56.1	51.9-60.3
45-54	637	26.7	22.7-30.8	22.2	18.7-25.6	51.1	46.4-55.8
55-64	449	34.6	29.6-39.6	17.2	13.4-21.0	48.3	43.0-53.5
15-64	**4349**	**25.9**	**23.5-28.4**	**21.9**	**20.1-23.6**	**52.2**	**49.3-55.2**

Table 49: Levels of total physical activity for both sexes

Age Group (years)	Level of total physical activity						
	Both Sexes						
	n	% Low	95% CI	% Moderate	95% CI	% High	95% CI
15-24	1437	18.4	15.8-20.9	22.6	20.3-25.0	59.0	55.7-62.2
25-34	2296	21.1	18.5-23.6	18.4	16.4-20.4	60.5	57.3-63.8
35-44	1502	21.9	18.8-25.0	19.7	16.9-22.5	58.4	54.6-62.3
45-54	1016	24.5	21.2-27.8	22.3	19.3-25.3	53.2	49.2-57.2
55-64	681	34.0	29.6-38.3	18.6	15.3-21.9	47.5	43.0-52.0
15-64	**6932**	**21.4**	**19.4-23.5**	**20.6**	**19.1-22.2**	**58.0**	**55.3-60.6**

Table 50: Minutes spent in sedentary activities on average per day by men

Minutes spent in sedentary activities on average per day			
Age Group (years)	Men		
	n	Mean minutes	95% CI
15-24	568	147.7	134.8-160.6
25-34	927	122.5	113.9-131.1
35-44	559	125.7	116.0-135.5
45-54	393	142.6	128.7-156.4
55-64	237	142.0	124.0-160.0
15-64	**2684**	**136.0**	**129.0-143.0**

Table 51: Minutes spent in sedentary activities on average per day by women

Minutes spent in sedentary activities on average per day			
Age Group (years)	Women		
	n	Mean minutes	95% CI
15-24	943	160.8	150.6-170.9
25-34	1462	127.3	119.7-134.9
35-44	991	121.2	113.9-128.4
45-54	667	128.9	119.3-138.5
55-64	476	152.6	140.6-164.5
15-64	**4539**	**140.3**	**134.2-146.3**

Table 52: Minutes spent in sedentary activities on average per day by both sexes

Minutes spent in sedentary activities on average per day			
Age Group (years)	Both Sexes		
	n	Mean minutes	95% CI
15-24	1511	154.4	145.1-163.6
25-34	2389	125.0	119.0-131.0
35-44	1550	123.3	116.9-129.6
45-54	1060	135.2	126.6-143.7
55-64	713	147.9	136.4-159.4
15-64	**7223**	**138.3**	**132.8-143.7**

Table 53: Previous blood pressure measurement and diagnosis for men

Blood pressure measurement and diagnosis									
	Men								
Age Group (years)	n	% Never measured	95% CI	% measured. not diagnosed	95% CI	% diagnosed. but not within past 12 months	95% CI	% diagnosed within past 12 months	95% CI
15-24	568	92.6	90.5-94.7	6.7	4.7-8.7	0.2	0.0-0.5	0.5	0.0-1.1
25-34	927	86.7	84.3-89.0	12.5	10.2-14.7	0.2	0.0-0.5	0.7	0.1-1.2
35-44	559	83.7	80.4-86.9	14.5	11.5-17.6	0.9	0.1-1.7	0.9	0.1-1.7
45-54	393	84.1	80.4-87.9	12.3	9.0-15.6	1.3	0.2-2.4	2.3	0.7-4.0
55-64	237	86.0	81.3-90.7	9.8	6.0-13.5	1.7	0.1-3.3	2.6	0.6-4.5
15-64	**2684**	**88.2**	**86.7-89.7**	**10.4**	**9.0-11.7**	**0.5**	**0.3-0.8**	**0.9**	**0.6-1.3**

Table 54: Previous blood pressure measurement and diagnosis for women

Blood pressure measurement and diagnosis									
	Women								
Age Group (years)	n	% Never measured	95% CI	% measured. not diagnosed	95% CI	% diagnosed. but not within past 12 months	95% CI	% diagnosed within past 12 months	95% CI
15-24	943	81.0	78.4-83.6	17.7	15.2-20.3	0.5	0.1-1.0	0.7	0.2-1.3
25-34	1462	60.6	57.2-64.0	36.7	33.3-40.0	1.1	0.5-1.7	1.6	0.9-2.2
35-44	991	60.3	56.6-64.0	34.4	30.8-38.1	2.4	1.5-3.4	2.8	1.7-3.9
45-54	667	71.2	67.4-74.9	24.2	20.9-27.5	1.5	0.6-2.4	3.2	1.8-4.5
55-64	476	72.5	68.2-76.8	18.0	14.3-21.8	5.0	3.1-7.0	4.4	2.6-6.2
15-64	**4539**	**70.0**	**68.0-71.9**	**26.8**	**24.9-28.6**	**1.4**	**1.1-1.7**	**1.9**	**1.5-2.2**

Table 55: Mean height (cm) by sex and age group

Mean height (cm)						
Age Group (years)	Men			Women		
	n	Mean	95% CI	n	Mean	95% CI
15-24	561	162.0	161.2-162.7	926	154.7	154.2-155.2
25-34	911	165.0	164.3-165.6	1437	156.0	155.6-156.4
35-44	553	165.0	164.3-165.7	982	156.5	155.9-157.1
45-54	388	165.7	164.8-166.7	653	156.4	155.9-157.0
55-64	236	164.9	164.0-165.8	469	156.1	155.4-156.8
15-64	**2649**	**163.9**	**163.4-164.4**	**4467**	**155.7**	**155.4-156.0**

Table 56: Mean weight (kg) by sex and age group

Mean weight (kg)						
Age Group (years)	Men			Women		
	n	Mean	95% CI	n	Mean	95% CI
15-24	561	56.1	55.2-56.9	877	54.5	53.8-55.2
25-34	911	60.3	59.4-61.2	1322	57.4	56.6-58.1
35-44	553	60.2	58.9-61.4	928	57.1	56.2-58.0
45-54	388	59.1	57.9-60.3	649	56.1	55.0-57.2
55-64	236	57.7	56.4-59.0	467	53.8	52.8-54.8
15-64	**2649**	**58.4**	**57.8-59.0**	**4243**	**55.9**	**55.3-56.4**

Table 57: Mean body mass index (kg/m2) by sex and age group

Mean BMI (kg/m^2)									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	*n*	*Mean*	*95% CI*
15-24	559	21.3	21.0-21.5	876	22.8	22.5-23.1	1435	22.0	21.8-22.2
25-34	907	22.1	21.9-22.3	1322	23.5	23.3-23.8	2229	22.8	22.6-23.0
35-44	552	21.9	21.6-22.1	926	23.3	22.9-23.6	1478	22.6	22.4-22.8
45-54	388	21.5	21.1-21.9	647	22.9	22.5-23.3	1035	22.2	22.0-22.5
55-64	236	21.2	20.8-21.6	464	22.1	21.7-22.5	700	21.7	21.4-22.0
15-64	**2642**	**21.6**	**21.5-21.8**	**4235**	**23.0**	**22.8-23.2**	**6877**	**22.3**	**22.2-22.5**

Table 58: Body mass index (BMI) classifications among men by age group

BMI classifications									
Age Group (years)	Men								
	n	% Under-weight <18.5	95% CI	% Normal weight 18.5-24.9	95% CI	% Overweight 25.0-29.9	95% CI	% Obese ≥30.0	95% CI
15-24	559	7.0	4.9-9.1	86.2	83.4-89.0	6.7	4.6-8.8	0.2	**0.0-0.5**
25-34	907	5.0	3.5-6.5	85.6	83.3-88.0	9.0	7.0-11.0	0.3	0.0-0.7
35-44	552	5.8	3.6-8.0	81.4	78.2-84.7	11.4	8.7-14.1	1.3	0.4-2.2
45-54	388	15.9	11.7-20.2	71.6	66.5-76.7	10.3	7.1-13.6	2.1	0.2-4.0
55-64	236	14.0	9.2-18.7	78.3	72.6-84.0	6.4	3.2-9.6	1.3	0.0-2.8
15-64	**2642**	**7.7**	**6.4-8.9**	**83.2**	**81.6-84.8**	**8.5**	**7.3-9.7**	**0.7**	**0.4-1.0**

Table 59: Body mass index (BMI) classifications among women by age group

BMI classifications									
Age Group (years)	Women								
	n	% Under-weight <18.5	95% CI	% Normal weight 18.5-24.9	95% CI	% Overweight 25.0-29.9	95% CI	% Obese ≥30.0	95% CI
15-24	876	2.5	1.4-3.7	76.5	73.4-79.6	18.1	15.3-20.9	2.9	1.7-4.1
25-34	1322	3.2	2.2-4.1	71.6	68.7-74.4	20.1	17.8-22.4	5.2	3.6-6.7
35-44	926	5.9	4.4-7.4	69.7	66.3-73.1	18.4	15.9-21.0	5.9	4.1-7.7
45-54	647	9.4	6.9-11.9	65.9	61.8-69.9	18.4	15.4-21.4	6.3	4.1-8.5
55-64	464	13.1	9.7-16.6	72.1	68.1-76.1	10.4	7.5-13.3	4.4	2.6-6.2
15-64	**4235**	**4.9**	**4.1-5.6**	**72.4**	**70.6-74.2**	**18.2**	**16.8-19.7**	**4.6**	**3.6-5.5**

Table 60: Body mass index (BMI) classifications among both sexes by age group

BMI classifications									
Age Group (years)	Both Sexes								
	n	% Under-weight <18.5	95% CI	% Normal weight 18.5-24.9	95% CI	% Overweight 25.0-29.9	95% CI	% Obese ≥30.0	95% CI
15-24	1435	4.8	3.5-6.1	81.4	79.2-83.5	12.3	10.5-14.2	1.5	0.9-2.2
25-34	2229	4.1	3.2-5.0	78.5	76.6-80.5	14.6	13.0-16.3	2.8	2.0-3.6
35-44	1478	5.9	4.6-7.2	75.2	72.7-77.8	15.1	13.3-17.0	3.8	2.6-4.9
45-54	1035	12.4	9.9-15.0	68.5	65.3-71.7	14.7	12.4-17.0	4.4	2.8-5.9
55-64	700	13.5	10.6-16.4	74.9	71.4-78.4	8.6	6.4-10.9	3.0	1.8-4.2
15-64	**6877**	**6.2**	**5.4-7.0**	**77.7**	**76.3-79.0**	**13.5**	**12.4-14.5**	**2.7**	**2.1-3.2**

Table 61: Mean waist circumference (cm) by sex and age group

Waist circumference (cm)						
Age Group (years)	Men			Women		
	n	Mean	95% CI	n	Mean	95% CI
15-24	560	71.8	71.1-72.5	877	75.0	74.2-75.9
25-34	909	75.7	75.0-76.4	1321	77.8	77.0-78.6
35-44	553	76.6	75.8-77.4	927	78.4	77.4-79.3
45-54	387	77.7	76.4-79.0	650	77.9	76.7-79.0
55-64	236	77.7	76.5-79.0	467	76.7	75.5-78.0
15-64	**2645**	**74.7**	**74.2-75.2**	**4242**	**76.8**	**76.2-77.5**

Table 62: Mean systolic blood pressure (mmHg) by sex and age group

Mean systolic blood pressure (mmHg)									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	*n*	*Mean*	*95% CI*
15-24	560	118.3	117.1-119.4	925	115.0	114.2-115.8	1485	116.6	115.8-117.4
25-34	912	123.3	122.3-124.2	1437	115.9	115.2-116.6	2349	119.4	118.8-120.1
35-44	554	122.9	121.7-124.2	982	119.8	118.7-120.9	1536	121.2	120.4-122.1
45-54	388	125.6	123.8-127.3	653	127.0	125.3-128.7	1041	126.3	125.1-127.6
55-64	236	131.1	128.4-133.8	469	135.6	133.3-138.0	705	133.6	131.8-135.4
15-64	**2650**	**122.0**	**121.3-122.8**	**4466**	**118.9**	**118.2-119.5**	**7116**	**120.4**	**119.8-121.0**

Table 63: Mean diastolic blood pressure (mmHg) by sex and age group

Mean diastolic blood pressure (mmHg)									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	*n*	*Mean*	*95% CI*
15-24	560	73.0	72.1-73.9	925	76.2	75.4-76.9	1485	74.6	74.0-75.3
25-34	912	78.4	77.5-79.2	1437	77.5	76.9-78.1	2349	77.9	77.3-78.5
35-44	554	79.4	78.4-80.4	982	80.0	79.2-80.8	1536	79.7	79.1-80.4
45-54	388	80.4	79.2-81.5	653	82.4	81.5-83.4	1041	81.5	80.7-82.3
55-64	236	81.6	80.1-83.2	469	84.0	82.7-85.3	705	82.9	81.9-84.0
15-64	**2650**	**76.9**	**76.2-77.6**	**4466**	**78.4**	**77.9-79.0**	**7116**	**77.7**	**77.2-78.2**

Table 64: Percentage of participants with raised blood pressure excluding those on medication

SBP ≥140 and/or DBP ≥ 90 mmHg excluding those on medication for raised blood pressure									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	*n*	*%*	*95% CI*
15-24	556	8.3	6.1-10.5	922	7.4	5.6-9.2	1478	7.8	6.3-9.4
25-34	909	17.7	14.9-20.5	1425	8.7	7.1-10.3	2334	13.0	11.3-14.7
35-44	552	19.9	16.6-23.2	973	18.3	15.5-21.1	1525	19.1	16.9-21.3
45-54	386	24.1	19.5-28.7	647	29.7	26.0-33.5	1033	27.1	24.1-30.2
55-64	234	37.3	30.6-44.0	465	41.1	36.5-45.8	699	39.4	35.5-43.3
15-64	**2637**	**16.3**	**14.6-18.0**	**4432**	**14.4**	**13.1-15.8**	**7069**	**15.3**	**14.1-16.6**

Table 65: Percentage of participants with raised blood pressure or currently on medication

SBP ≥140 and/or DBP ≥ 90 mmHg or currently on medication for raised blood pressure									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	*n*	*%*	*95% CI*
15-24	560	8.9	6.7-11.2	925	7.7	5.9-9.5	1485	8.3	6.8-9.8
25-34	912	18.0	15.2-20.8	1437	9.5	7.9-11.0	2349	13.5	11.9-15.2
35-44	554	20.2	16.9-23.5	982	19.1	16.3-21.9	1536	19.6	17.4-21.8
45-54	388	24.5	19.9-29.1	653	30.4	26.7-34.1	1041	27.7	24.6-30.7
55-64	236	37.8	31.2-44.4	469	41.6	37.0-46.3	705	39.9	36.1-43.8
15-64	**2650**	**16.8**	**15.1-18.5**	**4466**	**15.0**	**13.7-16.4**	**7116**	**15.9**	**14.6-17.1**

Table 66: Percentage of participants with stage 2 hypertension or currently on medication

SBP ≥160 and/or DBP ≥ 100 mmHg or currently on medication for raised blood pressure									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
15-24	560	2.5	1.2-3.8	925	1.3	0.5-2.1	1485	1.9	1.1-2.7
25-34	912	4.2	2.8-5.5	1437	2.2	1.4-2.9	2349	3.1	2.3-3.9
35-44	554	3.6	2.1-5.1	982	5.3	3.8-6.8	1536	4.5	3.4-5.6
45-54	388	6.2	3.8-8.6	653	10.4	8.1-12.8	1041	8.5	6.8-10.2
55-64	236	12.3	8.1-16.6	469	17.1	13.5-20.7	705	15.0	12.2-17.8
15-64	**2650**	**4.2**	**3.3-5.0**	**4466**	**4.3**	**3.7-5.0**	**7116**	**4.3**	**3.7-4.8**

Table 67: Percentage of participants with treated and controlled blood pressure

Respondents with treated and/or controlled raised blood pressure							
	Both Sexes						
Age Group (years)	n	% On medication and SBP<140 and DBP<90	95% CI	% On medication and SBP≥140 and/orDBP≥90	95% CI	% Not on medication and SBP≥140 and/orDBP≥90	95% CI
15-24	121	5.1	1.0-9.3	1.0	0.0-3.1	93.8	89.2-98.4
25-34	300	3.9	1.6-6.2	0.6	0.0-1.3	95.6	93.2-98.0
35-44	299	3.1	1.0-5.2	0.3	0.0-0.8	96.6	94.5-98.8
45-54	293	1.9	0.4-3.5	0.8	0.0-1.8	97.3	95.5-99.2
55-64	284	0.6	0.0-1.4	1.6	0.0-3.1	97.8	96.1-99.6
15-64	**1297**	**3.1**	**1.8-4.3**	**0.8**	**0.2-1.4**	**96.1**	**94.8-97.5**

Table 68: Mean Diastolic and systolic blood pressure

		Systolic blood pressure			Diastolic blood pressure		
	n	Mean	SE	95% CI	Mean	SE	95% CI
Overall	**7,232**	**120.3**	**-0.3**	**[119.7,120.9]**	**77.7**	**-0.2**	**[77.3,78.2]**
Age							
15-24	**1,513**	**116.6**	**-0.4**	**[115.8,117.4]**	**74.6**	**-0.3**	**[74.0,75.2]**
25-34	**2,394**	**119.4**	**-0.3**	**[118.8,120.1]**	**77.9**	**-0.3**	**[77.4,78.5]**
35-44	**1,551**	**121.3**	**-0.4**	**[120.4,122.1]**	**79.7**	**-0.3**	**[79.1,80.4]**
45-54	1,061	126.3	-0.6	[125.1,127.6]	81.5	-0.4	[80.7,82.3]
55-64	713	133.6	-0.9	[131.9,135.4]	83	-0.5	[82.0,84.0]
Sex							
Male	2,692	122	-0.4	[121.3,122.7]	76.9	-0.3	[76.3,77.5]
Female	4,548	118.8	-0.3	[118.2,119.4]	78.5	-0.2	[78.0,78.9]
Residence							
Rural	5,668	120.3	-0.3	[119.6,121.0]	77.5	-0.3	[77.0,78.0]
Semi-Urban	599	121.3	-0.8	[119.7,122.8]	79.2	-0.9	[77.5,80.9]
Urban	973	119.7	-0.6	[118.5,121.0]	77.9	-0.6	[76.7,79.1]
Province							
Eastern	1,713	119.3	-0.6	[118.1,120.5]	75.9	-0.5	[75.0,76.9]
Kigali City	824	119.8	-0.7	[118.4,121.1]	77.9	-0.6	[76.7,79.0]
Northern	1,218	121.9	-0.7	[120.6,123.2]	77.6	-0.6	[76.5,78.7]
Southern	1,562	119.7	-0.7	[118.4,121.0]	78.1	-0.5	[77.1,79.1]
Western	1,923	121	-0.6	[119.8,122.1]	79.1	-0.5	[78.1,80.0]

Table 69: Percentage of NCD risk categories among men by age group

Summary of Combined Risk Factors							
Age Group (years)	Men						
	N	% with 0 risk factors	95% CI	% with 1-2 risk factors	95% CI	% with 3-5 risk factors	95% CI
25-44	1400	0.5	0.1-0.9	88.2	86.5-90.0	11.3	9.5-13.1
45-64	602	0.2	0.0-0.5	75.3	71.6-79.0	24.6	20.9-28.3
15-64	2002	0.4	0.1-0.7	84.6	82.8-86.3	15.0	13.3-16.7

Table 70: Percentage of NCD risk categories among women by age group

Summary of Combined Risk Factors

Age Group (years)	Women						
	N	% with 0 risk factors	95% CI	% with 1-2 risk factors	95% CI	% with 3-5 risk factors	95% CI
25-44	2166	0.3	0.1-0.5	85.9	84.0-87.7	13.9	12.0-15.7
45-64	1053	0.5	0.1-0.9	72.9	69.8-76.1	26.6	23.4-29.7
15-64	**3219**	**0.3**	**0.1-0.5**	**82.0**	**80.2-83.7**	**17.7**	**15.9-19.4**

Table 71: Percentage of NCD risk categories among men and women by age group

Summary of Combined Risk Factors							
Age Group (years)	Both Sexes						
	N	% with 0 risk factors	95% CI	% with 1-2 risk factors	95% CI	% with 3-5 risk factors	95% CI
25-44	3566	0.4	0.2-0.6	87.0	85.6-88.4	12.6	11.2-14.0
45-64	1655	0.3	0.1-0.6	74.0	71.5-76.5	25.7	23.1-28.2
15-64	**5221**	**0.4**	**0.2-0.6**	**83.2**	**81.9-84.6**	**16.4**	**15.0-17.8**

Table 72: Percentage of drivers or passengers not always using a seat belt

Percentage of drivers or passengers not always using a seat belt									
Age Group (years)	Men			Women			Both Sexes		
	n	% Not always using seat belt	95% CI	n	% Not always using seat belt	95% CI	*n*	% Not always using seat belt	*95% CI*
15-24	350	89.1	85.5-92.8	569	92.5	90.2-94.9	919	90.9	88.5-93.2
25-34	611	84.8	81.0-88.6	880	91.7	89.2-94.3	1491	88.3	85.6-91.0
35-44	358	83.4	78.6-88.2	588	93.5	90.0-96.9	946	88.7	85.4-92.0
45-54	247	85.6	80.7-90.6	378	94.7	91.9-97.4	625	90.3	87.2-93.4
55-64	137	89.0	82.9-95.0	276	96.3	93.7-99.0	413	93.1	90.0-96.2
15-64	**1703**	**86.5**	**83.8-89.2**	**2691**	**92.9**	**91.0-94.9**	**4394**	**89.8**	**87.8-91.9**

Table 73: Percentage of drivers or passengers of a motorcycle or scooter not always wearing a helmet

Percentage of drivers or passengers of a motorcycle or motor-scooter not always using a helmet									
Age Group (years)	Men			Women			Both Sexes		
	n	% Not always using helmet	95% CI	n	% Not always using helmet	95% CI	*n*	% Not always using helmet	*95% CI*
15-24	346	74.8	69.6-79.9	589	72.7	68.3-77.0	935	73.7	69.8-77.5
25-34	618	67.9	62.9-73.0	880	74.9	70.6-79.3	1498	71.4	67.6-75.3
35-44	361	66.9	61.0-72.8	582	78.3	73.7-82.9	943	72.8	68.5-77.1
45-54	244	77.3	71.9-82.7	378	79.4	74.1-84.7	622	78.4	74.1-82.7
55-64	143	80.9	74.0-87.9	268	87.2	82.4-92.0	411	84.3	80.1-88.6
15-64	**1712**	**72.1**	**68.5-75.6**	**2697**	**75.9**	**72.5-79.3**	**4409**	**74.0**	**70.9-77.1**

Table 74: Percentage of participants involved in a road traffic crash during the past 12 months

Percentage of respondents involved in a road traffic crash during the past 12 months									
Age Group (years)	Men			Women			Both Sexes		
	n	% Involved in road traffic crashes	95% CI	n	% Involved in road traffic crashes	95% CI	*n*	% Involved in road traffic crashes	*95% CI*
15-24	564	12.2	9.4-15.0	938	2.7	1.6-3.7	1502	7.3	5.8-8.8
25-34	920	9.6	7.6-11.5	1447	2.2	1.3-3.1	2367	5.7	4.6-6.8
35-44	555	4.3	2.6-6.1	980	1.7	0.9-2.5	1535	2.9	2.0-3.8
45-54	388	4.7	2.6-6.7	662	1.8	0.8-2.8	1050	3.1	2.0-4.3
55-64	236	3.0	0.8-5.1	472	1.3	0.3-2.3	708	2.0	0.9-3.1
15-64	**2663**	**8.9**	**7.4-10.3**	**4499**	**2.2**	**1.7-2.7**	**7162**	**5.3**	**4.6-6.1**

Table 75: Percentage of participants involved in a road traffic crash during the past 12 months who were seriously injured

Percentage of respondents seriously injured as a result of road traffic crash among those involved in a road traffic crash									
Age Group (years)	Men			Women			Both Sexes		
	n	% Seriously injured	95% CI	n	% Seriously injured	95% CI	*n*	% Seriously injured	*95% CI*
15-24	68	27.9	17.1-38.7	25	32.3	13.1-51.5	93	28.7	19.2-38.3
25-34	88	43.1	33.4-52.9	32	31.3	14.5-48.1	120	40.7	32.1-49.4
35-44	24	54.2	33.4-75.1	17	29.6	7.3-52.0	41	46.3	29.5-63.2
45-54	18	33.3	11.2-55.3	12	24.9	0.0-49.9	30	30.6	13.2-48.1
55-64	7	43.2	6.0-80.4	6	33.3	0.0-72.0	13	39.8	12.1-67.5
15-64	**205**	**35.4**	**28.2-42.6**	**92**	**31.0**	**20.2-41.8**	**297**	**34.4**	**28.3-40.6**

Table 76: Percentage of participants seriously injured other than in a road traffic crash

Percentage of respondents seriously injured in a non-road traffic accident									
Age Group (years)	Men			Women			Both Sexes		
	n	% Seriously injured	95% CI	n	% Seriously injured	95% CI	*n*	% Seriously injured	*95% CI*
15-24	567	6.2	4.1-8.2	941	2.8	1.8-3.8	1508	4.4	3.3-5.6
25-34	924	5.1	3.6-6.6	1456	2.8	1.9-3.7	2380	3.9	3.0-4.7
35-44	557	5.0	3.3-6.8	986	2.0	1.1-3.0	1543	3.4	2.4-4.4
45-54	392	3.6	1.8-5.3	665	3.0	1.7-4.3	1057	3.3	2.2-4.4
55-64	235	2.5	0.6-4.5	474	3.6	1.9-5.3	709	3.1	1.8-4.4
15-64	**2675**	**5.2**	**4.2-6.2**	**4522**	**2.7**	**2.2-3.2**	**7197**	**3.9**	**3.3-4.5**

Table 77: Mean fasting blood glucose

Mean fasting blood glucose (mmol/L)									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	*n*	*Mean*	*95% CI*
15-24	517	3.85	3.7-4.0	841	3.8	3.7-4.0	1358	3.8	3.7-4.0
25-34	845	3.85	3.7-4.0	1341	3.8	3.7-3.9	2186	3.8	3.8-3.9
35-44	513	3.89	3.8-4.0	933	3.9	3.8-4.0	1446	3.9	3.8-4.0
45-54	361	4.03	3.8-4.2	619	4.0	3.9-4.1	980	4.0	3.9-4.1
55-64	229	3.98	3.8-4.2	452	4.1	4.0-4.2	681	4.0	3.9-4.2
15-64	**2465**	**3.89**	**3.8-4.0**	**4186**	**3.9**	**3.8-4.0**	**6651**	**3.9**	**3.8-4.0**

Table 78: Impaired fasting glycaemia

Impaired Fasting Glycaemia*									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	*n*	*%*	*95% CI*
15-24	517	1.6	0.3-2.8	841	0.7	0.1-1.4	1358	1.1	0.4-1.8
25-34	845	1.5	0.6-2.4	1341	2.0	1.1-2.9	2186	1.8	1.1-2.4
35-44	513	1.4	0.4-2.4	933	1.6	0.8-2.4	1446	1.5	0.9-2.1
45-54	361	3.3	1.3-5.3	619	1.3	0.3-2.3	980	2.2	1.2-3.3
55-64	229	3.5	1.1-6.0	452	1.8	0.4-3.1	681	2.5	1.2-3.8
15-64	**2465**	**1.8**	**1.1-2.5**	**4186**	**1.4**	**0.9-1.8**	**6651**	**1.6**	**1.2-2.0**

Table 79: Raised blood glucose or currently on medication for diabetes

Raised blood glucose or currently on medication for diabetes **									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	*n*	*%*	*95% CI*
15-24	517	2.7	1.0-4.5	841	2.3	1.0-3.5	1358	2.5	1.2-3.8
25-34	845	3.3	1.9-4.7	1341	2.3	1.4-3.3	2186	2.8	1.9-3.7
35-44	513	3.3	1.6-5.1	933	3.4	2.1-4.6	1446	3.3	2.3-4.4
45-54	361	5.0	2.7-7.3	619	3.6	2.1-5.1	980	4.3	2.9-5.6
55-64	229	3.5	0.9-6.2	452	4.9	2.8-7.0	681	4.3	2.5-6.0
15-64	**2465**	**3.3**	**2.2-4.4**	**4186**	**2.8**	**2.1-3.5**	**6651**	**3.0**	**2.3-3.8**

Table 80: Mean total cholesterol by sex and age group

Mean total cholesterol (mmol/L)									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
15-24	558	3.0	2.9-3.1	906	3.2	3.1-3.3	1464	3.1	3.0-3.2
25-34	893	3.1	3.0-3.1	1413	3.3	3.2-3.3	2306	3.2	3.1-3.2
35-44	545	3.2	3.1-3.3	971	3.3	3.3-3.4	1516	3.3	3.2-3.3
45-54	381	3.3	3.2-3.3	645	3.4	3.3-3.5	1026	3.3	3.3-3.4
55-64	235	3.4	3.2-3.5	460	3.7	3.6-3.7	695	3.5	3.4-3.6
15-64	**2612**	**3.1**	**3.0-3.2**	**4395**	**3.3**	**3.3-3.3**	**7007**	**3.2**	**3.2-3.2**

Table 81: Percentage with raised blood cholesterol (≥ 5.0 mmol/L)

Total cholesterol ≥ 5.0 mmol/L or currently on medication for raised cholesterol									
Age Group (years)	Men			Women			Both Sexes		
	n	%	95% CI	n	%	95% CI	n	%	95% CI
15-24	548	1.8	0.4-3.2	890	1.8	0.8-2.7	1438	1.8	0.8-2.8
25-34	871	2.5	1.4-3.5	1367	3.3	2.3-4.2	2238	2.9	2.2-3.6
35-44	531	2.6	1.2-4.0	937	3.5	2.4-4.6	1468	3.1	2.1-4.0
45-54	372	2.4	0.9-3.9	610	5.5	3.7-7.3	982	4.0	2.8-5.3
55-64	222	5.6	2.5-8.7	426	7.4	5.1-9.8	648	6.6	4.6-8.6
15-64	**2544**	**2.4**	**1.5-3.3**	**4230**	**3.3**	**2.6-4.0**	**6774**	**2.9**	**2.2-3.5**

Table 82: Mean HDL cholesterol by sex and agegroup

Mean HDL (mmol/L)									
Age Group (years)	Men			Women			Both Sexes		
	n	Mean	95% CI	n	Mean	95% CI	n	Mean	95% CI
15-24	558	0.86	0.8-0.9	908	1.0	1.0-1.0	1466	0.9	0.9-1.0
25-34	896	0.98	1.0-1.0	1419	1.1	1.1-1.1	2315	1.0	1.0-1.1
35-44	546	1.08	1.0-1.1	974	1.1	1.1-1.2	1520	1.1	1.1-1.1
45-54	384	1.11	1.1-1.2	646	1.1	1.1-1.2	1030	1.1	1.1-1.2
55-64	236	1.16	1.1-1.2	464	1.2	1.2-1.3	700	1.2	1.2-1.2
15-64	**2620**	**0.97**	**0.9-1.0**	**4411**	**1.1**	**1.1-1.1**	**7031**	**1.0**	**1.0-1.0**

Table 83: Men with low HDL

Percentage of respondents with HDL <1.03mmol/L			
Age Group (years)	Men		
	n	%	95% CI
15-24	558	72.6	68.3-76.8
25-34	896	63.3	59.8-66.8
35-44	546	57.6	53.0-62.3
45-54	384	49.5	44.2-54.8
55-64	236	47.4	40.9-53.8
15-64	**2620**	**63.6**	**60.9-66.3**

Table 84: Women with low HDL

Percentage of respondents with HDL <1.29mmol/L			
Age Group (years)	Women		
	n	%	95% CI
15-24	908	81.5	78.4-84.6
25-34	1419	72.3	69.6-75.0
35-44	974	71.4	68.3-74.5
45-54	646	70.0	65.8-74.1
55-64	464	63.0	58.5-67.4
15-64	**4411**	**74.6**	**72.6-76.6**

Table 100: Factors associated with hypertension in Rwanda: Results from the 2013 WHO STEPS survey

Factors	N	n Adjusted (%)	UOR (95% CI)	p-value	AOR (95% CI)	p-value
Sex						
Women	4548	762 (14.2)	1.0		1.0	
Men	2692	501 (16.2)	1.16 (1.02 – 1.33)	0.027	1.34 (1.15 – 1.55)	<0.001
Age						
15-24 years	1513	115 (7.7))	1.0		1.0	
25-34 years	2394	287 (12.8)	1.75 (1.39 – 2.20)	<0.001	1.64 (1.29 – 2.08)	<0.001
35-44 years	1551	289 (18.8)	2.76 (2.18 – 3.51)	<0.001	2.55 (1.99 – 3.26)	<0.001
45-54 years	1061	287 (26.7)	4.34 (3.39 – 5.55)	<0.001	4.04 (3.12 – 5.21)	<0.001
55-64 years	713	282 (39.3)	7.73 (6.01 – 9.94)	<0.001	7.51 (5.75 – 9.81)	<0.001
Employment status						
Government	127	29 (22.1)	1.0		-	
Non-Government	98	24 (24.8)	1.16 (0.60 – 2.27)	0.655	-	
Self Employed	5909	1071 (16.5)	0.70 (0.48 – 1.03)	0.067	-	
Unpaid	1083	138 (9.3)	0.36 (0.23 – 0.56)	<0.001	-	
Education level						
No Formal Education	1459	330 (20.5)	1.0		-	
Primary School	4725	744 (13.9)	0.63 (0.53 – 0.74)	<0.001	-	
Secondary School	929	168 (14.7)	0.67 (0.52 – 0.85)	0.001	-	
High School or greater	115	21 (16.1)	0.74 (0.23 – 1.25)	0.265	-	
Level of Physical Activity						
Low and Moderate MET	2825	543 (16.3)	1.0		1.0	
High MET	4415	720 (14.4)	0.86 (0.75 – 0.99)	0.033	0.87 (0.75 – 1.00)	0.049
Alcohol consumption						
Not a current drinker	4182	641 (12.7)	1.0		1.0	
Current Drinker	3058	622 (18.5)	1.56 (1.36 – 1.79)	<0.001	1.30 (1.12 – 1.51)	<0.001
Tobacco use						
Daily Smoker	720	156 (20.7)	1.0		-	
Non-Daily Smoker	331	71 (19.3)	0.91 (0.67 – 1.24)	0.555	-	
Past Smoker	104	26 (21.9)	1.07 (0.63 – 1.83)	0.803	-	
Never Smoked	6071	1010 (14.3)	0.64 (0.52 – 0.78)	<0.001	-	
Urine Albumin**						
Negative	6257	1133 (15.7)	1.0		1.0	
Positive	741	108 (12.7)	1.27 (0.97 – 1.66)	0.076	1.32 (1.01 – 1.72)	0.043
Body Mass Index						
Normal weight	5239	861 (14.4)	1.0		1.0	
Under weight	523	75 (10.6)	0.70 (0.53 – 0.92)	0.012	0.57 (0.43 – 0.75)	<0.001
Over weight	1112	251 (20.6)	1.54 (1.31 – 1.82)	<0.001	1.67 (1.39 –2.01)	<0.001
Obese	251	76 (27.9)	2.31 (1.69 – 3.15)	<0.001	2.22 (1.61 – 3.07)	<0.001
Blood Lipids						
High Cholesterol						
HDL <1.29mmol/L	5280	881 (14.3)	1.0		-	
HDL >=1.29mmol/L	1960	382 (17.8)	1.31 (1.11 – 1.53)	0.01	-	
Total Cholesterol						
HDL <1.03mmol/L	3807	605 (13.5)	1.0		1.0	
HDL >=1.03mmol/L	3433	658 (17.3)	1.34 (1.16 – 1.56)	<0.001	1.18 (1.01 – 1.38)	0.39
Residence						
Rural	5668	964 (14.8)	1.0		-	
Semi-Urban	599	122 (18.2)	1.28 (0.98 – 1.68)	0.070	-	
Urban	973	177 (15.3)	1.04 (0.78 – 1.39)	0.784	-	
Residence *combined*						
Rural	5668	964 (14.8)	1.0			
Semi-Urban & Urban	1572	299 (16.3)	1.13 (0.90 – 1.40)	0.295		

** 242 participants did not provide a urine sample

Table 101: Association between current drinking and serious injury in the last 12 months in Rwanda: Results from the 2013 WHO STEPS survey

Factors	N	n Adjusted (%)	UOR (95% CI)	p-value	AOR (95% CI)	p-value
Alcohol consumption †						
Not a current drinker	4154	116 (3.1)	1.0		1.0	
Current Drinker	3046	137 (5.1)	1.69 (1.24 – 2.31)	0.001	1.50 (1.08 – 2.08)	0.015
Sex						
Women	4525	123 (2.7)	1.0		1.0	
Men	2675	130 (5.2)	1.95 (1.49 – 2.54)	<0.001	1.79 (1.35 – 2.37)	<0.001
Age						
15-24 years	1507	61 (4.5)	1.0		-	
25-34 years	2380	87 (3.9)	0.86 (0.61 – 1.23)	0.415	-	
35-44 years	1543	48 (3.4)	0.76 (0.51 – 1.12)	0.160	-	
45-54 years	1057	34 (3.3)	0.72 (0.46 – 1.14)	0.165	-	
55-64 years	709	23 (3.1)	0.69 (0.35 – 1.13)	0.143	-	

† current drinker is defined as a person who consumed alcohol in the past 30 days (current consumers) and not a current drinker includes those who have never taken alcohol

Table 102: Association between heavy drinking and serious injury in the last 12 months in Rwanda: Results from the 2013 WHO STEPS survey

Factors	N	n Adjusted (%)	UOR (95% CI)	p-value	AOR (95% CI)	p-value
Alcohol consumption[φ]						
Not a heavy drinker	7003	244 (3.9)	1.0		1.0	
Heavy Drinker	144	8 (6.0)	1.60 (0.78 – 3.30)	0.202	1.34 (0.64 – 2.80)	0.431
Sex						
Women	4525	123 (2.7)	1.0		1.0	
Men	2692	501 (5.2)	1.95 (1.49 – 2.54)	<0.001	1.91 (1.46 – 2.51)	<0.001
Age						
15-24 years	1507	61 (4.5)	1.0			
25-34 years	2380	87 (3.9)	0.86 (0.61 – 1.23)	0.415	-	
35-44 years	1543	48 (3.4)	0.76 (0.51 – 1.12)	0.160	-	
45-54 years	1057	34 (3.3)	0.72 (0.46 – 1.14)	0.165	-	
55-64 years	709	23 (3.1)	0.69 (0.35 – 1.13)	0.143	-	

φHeavy drinking is defined as 5+ Units of Alcohol in a single sitting for men and 4+ Units of Alcohol in a single sitting for women in the past 30 days

Appendix 2: Rwanda STEPS Survey Questionnaire

Participant Identification Number |_|_|_| |_|_|_| |_|_|_|

Survey Information

Location and Date		Response	Code
1.	**Cluster/Village ID***Nimero y'umudugudu*	|_|_|_|	I1
2.	**Cluster/Village name***Izina ry'umudugudu*		I2
3.	**Interviewer ID***Nimero y'ubaza*	|_|_|_|	I3
4.	**Date of completion of the instrument***Itariki yujurijwehoifishi*	|_|_| |_|_| |_|_|_|_| **ddmm year**	I4

Participant Id Number |_|_|_| |_|_|_| |_|_|_|

Consent, Interview Language and Name		Response	Code
5	Consent has been read and obtained *Yemeye ku bushake kubazwa*	Yes 1 No 2 **If NO, END**	I5
6	Interview Language *[Insert Language]* *Ururimi rukoreshwa m'ukubaza*	Kinyarwanda 1 English 2 French 3	I6

7	Time of interview *Igihe ibazwa rimara* (24 hour clock)	⌊_⌊_⌋ : ⌊_⌊_⌋ hrs mins	I7
8	Family name *Amazina lya kinyarwanda*		I8
9	First Name *Izina rya gikristo*		I9
Additional Information that may be helpful			
10	Contact phone number where possible *Nimero ya telefone abalizwaho(niba ihari)*		I10

Step 1 Demographic Information

CORE: Demographic Information			
Question		**Response**	**Code**
11	Sex (*Record Male / Female as observed)* *Igitsina (gabo/gore, uko ubibona)*	Male 1 Female 2	C1
12	What is your date of birth? *Itariki y'amavuko* *Don't Know 77 77 7777* *Ntabizi*	⌊_⌋⌊_⌋ ⌊_⌋⌊_⌋ ⌊_⌋⌊_⌋⌊_⌋⌊_⌋ *If known, Go to C4* dd mm year	C2
13	How old are you? *Mufite imyaka ingahe?* *Don't Know 00* *Ntabizi*	Years ⌊_⌋⌊_⌋	C3
14	In total, how many years have you spent at school or in full-time study (excluding pre-school)? *Waba warize amashuri angahe? Havuyemo ay'incuke*	Years ⌊_⌋⌊_⌋	C4

EXPANDED: Demographic Information				
15	What is the **highest level of education** you have completed? *Niyihe mpamyabumenyi isumba izindi ufite?*	No formal schooling Less than primary school Primary school completed Secondary school didn't complete College/University completed Post graduate degree Refused	Nta mashuri mwize Hasi y'amashuri abanza Yarangije amashuri abanza Hasi y'amashuri yisumbuye Yarangije amashuri yisumbuye Hasi yamashuri yakaminuza Yarangije Kaminuza Impamyabumenyi y'ikirenga 88Nta gisubizo	C5

17	What is your **marital status**? *Irangamimerere ryawe ni rihe?*	Never married Currently married Separated Divorced Widowed Cohabitating Refused	1Ntarashaka 2 Yarashatse 3 Ntabana n'uwo bashakanye 4 Yatandukanye n'uwo bashakanye byemewe n'amategeko 5 yarapfakaye 6 Babana mu buryo butemewe n'amategeko 88 Nta gisubizo	C7
18	Which of the following best describes your **mainwork** status over the past 12 months? *Mu milimo ikurikira, Ni uwuhe murimo w'ingenzi wari ufite mu mezi 12 ashize?* *[INSERT COUNTRY-SPECIFIC CATEGORIES]* (*USE SHOWCARD)*	Government employee Non-government employee Self-employed Non-paid Student Homemaker Retired Unemployed (able to work) Unemployed (unable to work) kkwork work) Refused	1 Akorera leta 2Akorera imiryango y'ijyenga 3.Yikorera ku giti cye 4 Umukozi udahembwa 5Umunyeshuri 6Umukozi wo mu rugo 7 Ari mu kiruhuko cy'izabukuru cy'izabukuru cy'izabukuru 8 Nta kazi 9 Ntashoboye gukora 88 Nta gisubizo	C8
19	How many people older than 18 years, including yourself, live in your household? *Muri uru rugo,ubana n'abantu bangahe barengeje imyaka 18(nawe urimo)?*	Number of people	⌊__⌋⌊__⌋	C9

EXPANDED: Demographic Information, Continued			
Question		**Response**	**Code**
20	Taking **the past year**, can you tell me what the average earnings of the household have been? *Duhereye mu mezi cumi n'abili ashize mushobora kumbwira mugereranyije amafaranga mwinjije?* *(RECORD ONLY ONE, NOT ALL 3)* *(ANDIKA KIMWE GUSA)*	Per week _____ *Go to T1*	C10a
		OR per month _____ *Go to T1*	C10b
		OR per year _____ *Go to T1*	C10c
		Refused 88	C10d
21	If you don't know the amount, can you give an **estimate** of the annual household income if I read some options to you? Is it *Niba utazi neza umubare, mushobora kugereranya umusaruro mwinjije ku mwaka, ndamutse mbasomeye ibi bikurikira* *[INSERT QUINTILE VALUES IN LOCAL CURRENCY]*	≤ Quintile (Q) 1 1 More than Q 1, ≤ Q 2 2 More than Q 2, ≤ Q 3 3 More than Q 3, ≤ Q 4 4 More than Q 4 5 Don't Know 77 Refused 88	C11
22	In which category do you fall according to Ubudehe categorization? *Uri muruhe rwego rw'ubudehe urimo?* *(READ OPTIONS)*	Category 1 Category 2 Category 3	C 12

Step 1 Behavioral Measurements

CORE: Tobacco Use			
Now I am going to ask you some questions about various health behaviours. This includes things like smoking, drinking alcohol, eating fruits and vegetables and physical activity. Let's start with tobacco. *Noneho ubu ngiye kukubaza ibijyanye ni myitwarire mu buzima. Harimo niba unkwa itabi, inzoga, niba urya imbuto, niba urya imboga, niba ukora imyitozo ngorora mubiri.*			
Question		**Response**	**Code**
22	Have you **ever smoked** any tobacco products such as cigarettes, cigars or pipes? *(USE SHOWCARD)*	Yes 1 No 2 *If No, go to T9a*	T1a
23	Do you currently smoke any **tobacco products**, such as cigarettes, cigars or pipes? *(USE SHOWCARD)* *Waba unywa itabi nk'isigara, itabi ryo mu nkono, ubugoro, ikigoma….?*	Yes 1 No 2 *If No, go to T6*	T1
24	Do you currently smoke tobacco products **daily**? *Waba unywa itabi nibiri komokaho buri munsi?*	Yes 1 No 2 *If No, go to T6*	T2

25	How old were you when you **first started** smoking daily? *Watangiye kunywa itabi cyangwa ibyavuzwe haruguru buri munsi ufite imyaka ingahe*?	Age (years) Don't know 77 └┴┘ *If Known, go to T5a*	T3
26	Do you remember how long ago it was? *Uribuka igihe umaze ubinywa buri munsi*? *(RECORD ONLY 1, NOT ALL 3)(Shyiraho kimwe gusa)* *Don't know 77 Ntabizi*	In Years └┴┘ *If Known, go to T5a*	T4a
		OR in Months └┴┘ *If Known, go to T5a*	T4b
		OR in Weeks └┴┘	T4c
27	On average, **how many** of the following do you smoke each day? *Ugereranyije mu bwoko bw'itabi bukurikira unywa imiti ingahe burimunsi ?* *(RECORD FOR EACH TYPE, USE SHOWCARD)* *Don't Know 77* *Ntabizi*	Manufactured cigarettes └┴┘	T5a
		Hand-rolled cigarettes └┴┘	T5b
		Pipes full of tobacco └┴┘	T5c
		Cigars, cheroots, cigarillos └┴┘	T5d
		Other └┴┘ *If Other, go to T5 other, else go to T9*	T5e
		Other (please specify): └┴┴┴┴┴┴┴┘ *Go to T9*	T5other
28	During the past 12 months, have you tried to **stop smoking**?	Yes 1	T6a
		No 2	
29	During any visit of a doctor or other health worker in the past 12 months, were you advised to quit smoking tobacco?	Yes 1 *If T2=Yes, go to T9a*	T6b
		No 2 *If T2=Yes, go to T9a*	
		No visit during the past 12 months 3 *If T2=Yes, go to T9a*	

EXPANDED: Tobacco Use			
Question		**Response**	**Code**
30	In the past, did you **ever** smoke **daily**? *Mu gihe gishize, waba warigeze unywa itabi buri munsi?*	Yes 1 No 2 *If No, go to T9*	T6
31	How old were you when you **stopped** smoking **daily**? *Wari ufite imyaka ingahe igihe wahagarikaga kunywa itabi buri munsi*?	Age (years) Don't Know 77 ⌊_⌋⌊_⌋ *If Known, go to T9*	T7
32	How **long ago** did you stop smoking daily? *Hashize igihe kingana iki uhagaritse kunywa itabi buri munsi*? *(RECORD ONLY 1, NOT ALL 3)* *Don't Know 77Ntabizi*	Years ago ⌊_⌋⌊_⌋ *If Known, go to T9*	T8a
		OR Months ago ⌊_⌋⌊_⌋ *If Known, go to T9*	T8b
		OR Weeks ago ⌊_⌋⌊_⌋	T8c
33	Have you **ever** used **smokeless** tobacco products such as [snuff, chewing tobacco, betel]? (USE SHOWCARD)	Yes 1	T19a
		No 2 If No, go to T13	
34	Do you **currently use** any **smokeless tobacco** such as *[snuff, chewing tobacco, betel]? (USE SHOWCARD)* *Ubu waba ukoresha itabi ridasohora umwotsi?(kwihumuriza, gukania itabi, n'ibindi)*	Yes 1 No 2 *If No, go to T12*	T9
35	Do you **currently usesmokeless tobacco** products **daily?** *Ese ibyo tuvuze haruguru waba ubikoresha buli munsi?*	Yes 1 No 2 *If No, go to T12*	T10
36	On average, how many **times a day** do you use …. *Ugereranyije waba ubikoresha nka kangahe ku munsi?* *(RECORD FOR EACH TYPE, USE SHOWCARD)* *Don't Know 77* *Ntabizi*	Snuff, by mouth ⌊_⌋⌊_⌋	T11a
		Snuff, by nose ⌊_⌋⌊_⌋	T11b
		Chewing tobacco ⌊_⌋⌊_⌋	T11c
		Betel, quid ⌊_⌋⌊_⌋	T11d
		Other *If Other, go to T11other,* ⌊_⌋⌊_⌋ *else go to T13*	T11e
		Other (specify) ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ *Go to T13*	T11other
37	In the past, did you ever use smokeless tobacco such as [snuff, chewing tobacco, or betel]daily? *Mu gihe cyashize, waba warigeze ukoresha itabi ritagira umwotsi nk'iryo kwihumuriza, kurikanja*	Yes 1 No 2	T12
38	During the past 7 days, on how many days did someone **in your home** smoke when you were present? *Mu minsi irindwi ishize umuntu mubana mu nzu*	Number of days ⌊_⌋⌊_⌋	T13

39	During the past 7 days, on how many days did someone smoke in closed areas **in your workplace** (in the building, in a work area or a specific office) when you were present? *Mu minsi irindwi ishize,ni iminsi ingahe umuntu yaba yaranywereye itabi aho ukorera hafunze (mu nzu ukoreramo, mu biro byawe) nawe uhari?*	Number of days Don't know or don't work in a closed area 77 ⌊_⌋⌊_⌋	T14

CORE: Alcohol Consumption			
The next questions ask about the consumption of alcohol.			
Question		**Response**	**Code**
40	Have you **ever** consumed an alcoholic drink such as beer, wine, spirits, and fermented local beer? *Waba warigeze kunywa inzoga nka ikigage, divayi, wiski,urwagwa,byeli……?* *(USE SHOWCARD OR SHOW EXAMPLES)*	Yes 1 No 2 *If No, go to D1*	A1a
41	Have you consumed an alcoholic drink within the **past 12 months**? *Waba warigeze kunywa inzoga mumezi cumi nabiri ashize?*	Yes 1 No 2 *If No, go to D1*	A1b
42	During the past 12 months, **how frequently** have you had at least one alcoholic drink? *Mumezi cumi nabiri ashize ni minsi ingahe wanyoye ni bura inzoga imwe ?* *(READ RESPONSES, USE SHOWCARD)*	Daily 1 5-6 days per week 2 1-4 days per week 3 1-3 days per month 4 Less than once a month 5	A2
43	Have you consumed an alcoholic drink within the **past 30 days**? *Mu minsi mirongo itatu ishize wanyweye inzoga?*	Yes 1 No 2 *If No, go to D1*	A3
44	During the past 30 days, on how many **occasions** did you have at least one alcoholic drink? *Mu minsi mirongo itatu ishize waba waranyweye inzoga imwe inshuro zingahe?*	Number Don't know 77 ⌊_⌋⌊_⌋	A4
45	During the past 30 days, when you drank alcohol, **on average**, how many **standardalcoholicdrinks** did you have during one drinking occasion? *Mu minsi mirongo itatu ishize, igihe wanyoye inzoga, waba waranyweye inzoga zingahe?* *(USE SHOWCARD)*	Number Don't know 77 ⌊_⌋⌊_⌋	A5
46	During the past 30 days, what was the **largest number** of standard alcoholic drinks you had on a single occasion, counting all types of alcoholic drinks together? *Mu minsi 30 ishize waba waranyweye inzoga nyinshi zingahe inshuroimwe ?*	Largest number Don't Know 77 ⌊_⌋⌊_⌋	A6
47	During the past 30 days, how many times did you have For **men**: **five or more** For **women**: **four or more** standard alcoholic drinks in a single drinking occasion? *Mu minsi 30 ishize, waba waranyweye inzoga zingahe inshuro imwe,Ku**bagabo**: **eshanu** cyangwa izirenzeKu **bagore: enye** cyangwa izirenze?*	Number of times Don't Know 77 ⌊_⌋⌊_⌋	A7

EXPANDED: Alcohol Consumption			
48	During the past 30 days, when you consumed an alcoholic drink, how often was it with meals? Please do not count snacks. *Mu minsi 30 ishize, igihe wanyweye inzoga , waba warazinyweye kangahe n' ibiryo?*	Usually with meals 1 Sometimes with meals 2 Rarely with meals 3 Never with meals 4	A8
49	During each of the **past 7 days**, how many standard alcoholic drinks did you have each day? *Mu minsi 7 ishize, waba waranyweye inzoga zingahe buri munsi?* *(USE SHOWCARD)* *Don't Know 77* *Ntabizi*	Monday ⌊_⌋⌊_⌋	A9a
		Tuesday ⌊_⌋⌊_⌋	A9b
		Wednesday ⌊_⌋⌊_⌋	A9c
		Thursday ⌊_⌋⌊_⌋	A9d
		Friday ⌊_⌋⌊_⌋	A9e
		Saturday ⌊_⌋⌊_⌋	A9f
		Sunday ⌊_⌋⌊_⌋	A9g

CORE: Diet			
The next questions ask about the fruits and vegetables that you usually eat. I have a nutrition card here that shows you some examples of local fruits and vegetables. Each picture represents the size of a serving. As you answer these questions please think of a typical week in the last year. *Ibibazo bikurikira bijyanye ni mirire y'imbuto n'imboga mu kunda kurya. Mfite ikarita igaragaza izo mbuto n'imboga zikunda kuribwa ino aha. Buri foto irerekana indyo uko ingana. Urimo gusubiza utekereze ku cyumweru mu mwaka washize*			
Question		**Response**	**Code**
50	In a typical week, on how many days do you **eat fruit**? *Waba urya imbuto inshuro zingahe mu cyumweru?* *(USE SHOWCARD)*	Number of days *5.1.1.1.1.1.1.1.1* ⌊_⌋⌊_⌋ Don't Know 77 *If Zero days, go to D3*	5.1.1.1.1.1.
51	How many **servings** of fruit do you eat on **one** of those days? *muri iyo minsi urya imboga, uzirya inshuro zingahe ku munsi?* (*USE SHOWCARD)*	Number of servings Don't Know 77 ⌊_⌋⌊_⌋	5.1.1.1.1.1.
52	In a typical week, on how many days do you **eat vegetables**? *Waba urya imboga mu minsi ingahe mu cyumweru?* *(USE SHOWCARD)*	Number of days *5.1.1.1.1.1.1.1.4* ⌊_⌋⌊_⌋ Don't Know 77 *If Zero days, go to D5*	D3

53	How many **servings** of vegetables do you eat on one of those days? *Muri iyo minsi*urya *imboga,uzirya inshuro zingahe ku munsi*? *(USE SHOWCARD)*	Number of servings Don't know 77 └┴┘	D4

EXPANDED: Diet			
54	What type of **oil or fat is most often** used for meal preparation in your household? *Mukunze gukoresha ayahe mavuta mu guteka?* *(USE SHOWCARD)* *(SELECT ONLY ONE)*	Vegetable oil 1 Lard or suet 2 Butter or ghee 3 Margarine 4 Other 5 *If Other, go to D5 other* None in particular 6 None used 7 Don't know 77	D5
		Other └┴┴┴┴┴┴┴┴┘	D5other
55	On average, how many meals per week do you eat that were not prepared at a home? By meal, I mean breakfast, lunch and dinner. *Ugereranyijye ni kangahe urya hanze ibitateguriwe murugo?*	Number Don't know 77 └┴┘	D6

CORE: Physical Activity			
Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person. Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment and fishing. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate. *Ubu ngiye kukubaza kugihe umara ukora ubugorora ingingo mu cyumweru. Usubize bino bibazo nubwo waba wumva udakora siporo.Tekereza kugihe umara ukora ubugorora ingingo. Tekereza ku bintu ukora m'ubuzima nkakazi cyangwa ibindi ukora m'ubuzima. Mugusubiza ubugorora ingingo ni bintu cyangwa akazi gatuma umutima utera cyane cyangwa ugahumeka vuba cyane*		
Question		**Response**	**Code**
Work			
56	Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like *[carrying or liftingheavy loads, digging or construction work]* for at least 10 minutes continuously? *Waba ukora akazi gatuma uhumeka cyangwa umutima umutima utera cyane bikamara nki minota cumi?*	Yes 1 No 2 *If No, go to P 4*	5.1.1.1.1.1.
57	In a typical week, on how many days do you do vigorous-intensity activities as part of your work?*Mu cyumweru, waba ukora akazi gasaba ingufu nyinshi mu minsi ingahe?*	Number of days └┘	5.1.1.1.1.1.
58	How much time do you spend doing vigorous-intensity activities at work on a typical day? *Waba umara igihe kingana gite ukora akazi gasaba ingufu nyinshi?*	Hours : minutes └┴┘ : └┴┘ hrs mins	P3 (a-b)

59	Does your work involve moderate-intensity activity, that causes small increases in breathing or heart rate such as brisk walking, climbing steps *[or carrying light loads]* for at least 10 minutes continuously? *Waba ukora akazi k'igufu bidakabije gatuma uhumeka cyangwa umutima utera cyane? ariko bidakabije bikamara iminota nki icumi? (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P 7*	P4
60	In a typical week, on how many days do you do moderate-intensity activities as part of your work? *Mu cyumweru, waba ukora akazi gasaba ingufu zigereranyijye iminsi ingahe?*	Number of days ⌊_⌋	P5
61	How much time do you spend doing moderate-intensity activities at work on a typical day?Umara igihe kingana gute ukora akazi gasaba ingufu k'umunsi?	Hours : minutes ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ hrs mins	P6 (a-b)
Travel to and from places			
The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship. *[Insert other examples if needed]*			
62	Do you walk or use a bicycle *(pedal cycle)* for at least 10 minutes continuously to get to and from places? *Waba ugenda ukoresheje amaguru cyangwa igare ni bura iminota 10 uja aho ngaho*?	Yes 1 No 2 *If No, go to P 10*	P7
63	In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places? *Mu cyumweru, waba ugenda ukoresheje amaguru cyangwa igare ni bura iminota 10 kangahe uja aho ngaho?*	Number of days ⌊_⌋	P8
64	How much time do you spend walking or bicycling for travel on a typical day? *Waba umara igihe kingana gute k'umunsi ugenda cyangwa atwara igare* uja aho ngaho?	Hours : minutes ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ hrs mins	P9 (a-b)

CORE: Physical Activity, Continued			
Question		**Response**	**Code**
Recreational activities			
The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure), *[Insert relevant terms].* *Ibibazo bikurikira ntaho bihuriye n'akazi na transport byavuzwe hejuru* *Ubu ndashaka ku kubaza ku myitozo ngorora mubiri*			
65	Do you do any vigorous-intensity sports, fitness or recreational *(leisure)* activities that cause large increases in breathing or heart rate like *[running or football]* for at least 10 minutes continuously? *Waba ukora imyitozo ngorora mubiri ituma habaho guhumeka cyangwa umutima utera cyane?* *[INSERT EXAMPLES] (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P 13*	P10
66	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational *(leisure)* activities? *Mu cyumweru, waba ukora imyitozo ngorora*	Number of days ⌊_⌋	P11

	mubiri mu minsi ingahe?		
67	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day? *Umara igihe kingana gute ukora imyitozo ngorora mubiri k'umunsi?*	Hours : minutes └┘└┘ : └┘└┘ hrs mins	P12 (a-b)
68	Do you do any moderate-intensity sports, fitness or recreational *(leisure)* activities that cause a small increase in breathing or heart rate such as brisk walking*, [cycling, swimming, volleyball]* for at least 10 minutes continuously? *Waba ukora imyitozo ngorora mubiri itera umutima gutera cyangwa guhumeka cyane?* *[INSERT EXAMPLES] (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P16*	P13
69	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational *(leisure)* activities? *Mu cyumweru, waba ukora imyitozo ngorora mubiri mu minsi ingahe?*	Number of days └┘	P14
70	How much time do you spend doing moderate-intensity sports, fitness or recreational *(leisure)* activities on a typical day? *Waba umara igihe kingana gute ukora imyitozo ngorora mubiri k'umunsi?*	Hours : minutes └┘└┘ : └┘└┘ hrs mins	P15 (a-b)

EXPANDED: Physical Activity			
Sedentary behaviour			
The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent sitting at a desk, sitting with friends, traveling in car, bus, train, reading, playing cards or watching television, but do not include time spent sleeping. *Ikibazo gikurikira, kireba ibyo ukora m' ubuzima ariko nuvuga igihe umara uryamye.* *[INSERT EXAMPLES] (USE SHOWCARD)*			
70	How much time do you usually spend sitting or reclining on a typical day? *Umara igihe kingana gute wicyaye?*	Hours : minutes └┘└┘ : └┘└┘ hrs mins	P16 (a-b)

CORE: History of Raised Blood Pressure			
Question		**Response**	**Code**
71	Have you ever had your blood pressure measured by a doctor or other health worker? *Wari wasuzumwa nu muganga umuvuduko wa maraso?*	Yes 1 No 2 *If No, go to H6*	H1
72	Have you ever been told by a doctor or other health worker that you have raised blood pressure or hypertension? *Hari ubwo muganga yakubwiye ko ufite umuvuduko w'amaraso uri hejuru?*	Yes 1 No 2 *If No, go to H6*	H2a
73	Have you been told in the past 12 months?	Yes 1	H2b

	Wabibwigiwe mu mezi 12 ashize?	No 2	

EXPANDED: History of Raised Blood Pressure			
74	Are you currently receiving any of the following treatments/advice for high blood pressure prescribed by a doctor or other health worker? *Waba uri kuvurwa cyangwa waragiriwe inama na muganga?*		
	Drugs (medication) that you have taken in the past two weeks. *Waba warafashe imiti mu byumweru 2 bishize ?*	Yes 1 No 2	H3a
	Advice to reduce salt intake *Wagiriwe inama yo kureka umunyu?*	Yes 1 No 2	H3b
	Advice or treatment to lose weight.*Wagiriwe inama yo kugabanya ibiro?*	Yes 1 No 2	H3c
	Advice or treatment to stop smoking	Yes 1 No 2	H3d
	Advice to start or do more exercise *Wagiriwe inama yo gukora imyitozo ngorora mubiri?*	Yes 1 No 2	H3e
75	Have you ever seen a traditional healer for raised blood pressure or hypertension?*Waba waravuwe na muganga w' agihanga?*	Yes 1 No 2	H4
76	Are you currently taking any herbal or traditional remedy for your raised blood pressure?*Waba urimo gukoresha imiti y'agihanga?*	Yes 1 No 2	H5

CORE: History of Diabetes			
Question		**Response**	**Code**
77	Have you ever had your blood sugar measured by a doctor or other health worker?*Wari wasuzumwa na muganga isukari mu maraso?*	Yes 1 No 2 *If No, go to M1*	H6
78	Have you ever been told by a doctor or other health worker that you have raised blood sugar or diabetes? *Hari ubwo muganga yakubwiye ko ufite isukari mu maraso iri hejuru?*	Yes 1 No 2 *If No, go to M1*	H7a
79	Have you been told in the past 12 months?*Wabibwigiwe mu mezi 12 ashize?*	Yes 1 No 2	H7b

EXPANDED: History of Diabetes			
80	Are you currently receiving any of the following treatments/advice for diabetes prescribed by a doctor or other health worker? *Waba uri kuvurwa cyangwa waragiriwe inama na muganga?*		
	Insulin. *Ufata insulin?*	Yes 1 No 2	H8a
	Drugs (medication) that you have taken in the past two weeks. *Urafata imiti mu byumweru 2 bishize?*	Yes 1 No 2	H8b
	Special prescribed diet. *Hari indyo wandikiwe na muganga?*	Yes 1 No 2	H8c
	Advice or treatment to lose weight. *Waba waragiriwe inama na muganga guta ibiro?*	Yes 1 No 2	H8d
	Advice or treatment to stop smoking. *Wagiriwe inama yo kureka itabi?*	Yes 1 No 2	H8e
	Advice to start or do more exercise. *Wagiriwe inama yo gukora imyitozo ngorora mubiri?*	Yes 1 No 2	H8f
81	Have you ever seen a traditional healer for diabetes or raised blood sugar? *Waba waravuwe na muganga w' agihanga?*	Yes 1 No 2	H9
82	Are you currently taking any herbal or traditional remedy for your diabetes? *Waba urimo gukoresha imiti y'agihanga?*	Yes 1 No 2	H10

EXPANDED: History of Asthma				
83	In the last 12months, have you ever lost your breath or suffocated? *Mumeze 12 ashize, wari waburaho umwuka?*	Yes 1 No 2		H11
84	Have you been told by a doctor or other health worker that you have asthma? *Wari wasuzumwa na muganga ku bwo kubura umwuka?*	Yes 1 No 2 *If no, go next section*		H12
85	Are you currently recieving treatment/advice for asthma prescribed by a doctor or other health worker? If NO, skip the next questions on the drugs used, if YES, list them below. *Waba uri kuvurwa cyangwa waragiriwe inama na muganga?*			
	Bronchodilatators	Yes /____/------	No /____/	X1
	Anti-inflammatory steroids	Yes /____/------	No /____/	X2
	Inhaling corticoids Injectable corticoids Corticoid tablets	Yes /____/------	No /____/	X3
	Anti-histamines	Yes /____/------	No /____/	X4

	Cromoglycates	Yes /____/------	No /____/	X5
86	Have you been advised on the life style measures by a doctor or other health workers e.g on avoiding allergens like dust, grains and living in well ventillated rooms etc. *Waba waragiriwe inama na muganga kubijyanye n'ibintu bya gutera gufungana?*	Yes1 No2		H14
87	Have you been advised to stop smoking or recieved treatment for the habit by a doctor or other health workers?*Waba wagiriwe inama yo kureka itabi?*	Yes 1 No2		H15
88	Have you been advised to start or do more exercise? *Waba waragiriwe inama yo gukora imyitozo ngorora mubiri?*	Yes 1 No2		H16
89	In the past 12 months, have you consulted a traditional healer for asthma? *Waba waravuwe na muganga w' agihanga mu mezi 12 ashize?*	Yes 1 No2		H17
90	Have you taken tradition medicine (herbs) for asthma? *Waba urimo gukoresha imiti y'agihanga?*	Yes 1 No 2		H18

Injury

CORE: Injury				
The next questions ask about different experiences and behaviours that are related to road traffic injuries.				
Question		**Response**		**Code**
91	In the past 30 days, how often did you use a seat belt when you were the driver or passenger of a motor vehicle?	All of the time Sometimes Never Have not been in a vehicle in past 30 days No seat belt in the car I usually am in Don't Know Refused	1 2 3 4 5 77 88	V1
92	In the past 30 days, how often did you wear a helmet when you drove or rode as a passenger on a motorcycle or motor-scooter?	All of the time Sometimes Never Have not been on a motorcycle or motor-scooter in past 30 days Do not have a helmet Don't Know Refused	1 2 3 4 5 77 88	V2
93	In the past 12 months, have you been involved in a road traffic crash as a driver, passenger, pedestrian, or cyclist?	Yes (as driver) Yes (as passenger) Yes (as pedestrian) Yes (as a cyclist) No Don't know	1 2 3 4 5 *If No, go to V5* 77 *If don't know, go to V5*	V3

		Refused	88	*If Refused, go to V5*	
94	Did you have any injuries in this road traffic crash which required medical attention?	Yes No Don't know Refused	1 2 77 88		V4
95	If yes, does this injury result in any disability?	Yes No Don't know Refused to respond	1 2 77 88		V5
96	What type of disability is it? (check all that applies)*Nubuhe bumuga impanuka yagusigiye?*	Unable to use hand or arm Difficulty using hand or arm Walk with a limp Loss of hearing Loss of vision Weakness or shortness of Inability to remember things; Inability to chew food Don't know Refused to respond	1 2 3 4 5 6 7 8 77 88		V6
The next questions ask about the most serious accidental injury you have had in the past 12 months.					
97	In the past 12 months, were you injured accidentally,other than the road traffic crashes which required medical attention?	Yes No Don't know Refused	1 2 77 88	*If No, go to V8* *If don't know, go to V8* *If Refused, go to V8*	V7
98	Please indicate which of the following was the cause of this injury.	Fall Burn Poisoning Cut Near-drowning Animal bite Other (specify) Don't know Refused	1 2 3 4 5 6 7 77 88		V8
		Other (please specify)	|__|__|__|__|__|__|__|__|__|		V8other
99	Does this injury (other than the traffic) result in any disability?	Yes No Don't know Refused to respond	1 2 77 88		V9
100	What type of disability is it? (check all that applies)*Nubuhe bumuga impanuka yagusigiye?*	Unable to use hand or arm Difficulty using hand or arm Walk with a limp	1 2 3		V10

		Loss of hearing	4	
		Loss of vision	5	
		Weakness or shortness of breath	6	
		Inability to remember things;	7	
		Inability to chew food	8	
		Don't know	77	
		Refused to respond	88	

HIV AIDS				
	Now, I would like to discuss with you about your HIV AIDS status. You have the right to refuse to respond and that won't negatively affect you			
101	Have you even been tested for HIV?	Yes	1	
		No	2	
		Don't know	77	
		Refused to respond	88	
102	If, Yes what was the result of the most recent test?	Negative	1	
		Positive	2	
		Don't know	77	
		Refused to respond	88	
103	Are you currently receiving care and treatment for your positivity to HIV (pre ART)?	Yes	1	
		No	2	
		Refused to respond	88	
104	Are you receiving anti-retroviral treatment currently?	Yes	1	
		No	2	
		Refused to respond	88	

Step 2 Physical Measurements

CORE: Height and Weight			
Question		**Response**	**Code**
105	Interviewer ID	⌊_⌊_⌊_⌊_⌋	M1
106	Device IDs for height and weight	Height ⌊_⌊_⌋	M2a
		Weight ⌊_⌊_⌋	M2b
107	Height	in Centimetres (cm) ⌊_⌊_⌊_⌊_⌋ . ⌊_⌋	M3
108	Weight *If too large for scale 666.6*	in Kilograms (kg) ⌊_⌊_⌊_⌊_⌋ . ⌊_⌋	M4
109	**For women:** Are you pregnant? *Uratwite?*	Yes 1 *If Yes, go to M 8*	M5

		No 2	
CORE: Waist			
110	Device ID for waist	⌊_⌊_⌋	M6
111	Waist circumference	in Centimetres (cm) ⌊_⌊_⌊_⌋.⌊_⌋	M7
CORE: Blood Pressure			
112	Interviewer ID	⌊_⌊_⌊_⌋	M8
113	Device ID for blood pressure	⌊_⌊_⌋	M9
114	Cuff size used	Small 1 Medium 2 Large 3	M10
115	Reading 1	Systolic (mmHg) ⌊_⌊_⌊_⌋	M11a
		Diastolic (mmHg) ⌊_⌊_⌊_⌋	M11b
116	Reading 2	Systolic (mmHg) ⌊_⌊_⌊_⌋	M12a
		Diastolic (mmHg) ⌊_⌊_⌊_⌋	M12b
117	Reading 3	Systolic (mmHg) ⌊_⌊_⌊_⌋	M13a
		Diastolic (mmHg) ⌊_⌊_⌊_⌋	M13b
118	During the past two weeks, have you been treated for raised blood pressure with drugs (medication) prescribed by a doctor or other health worker? *Mu byumweru 2 bishize , waba waravuwe umuvuduko wa maraso?*	Yes 1 No 2	M14

EXPANDED: Hip Circumference and Heart Rate			
119	Hip circumference	in Centimeters (cm) ⌊_⌊_⌊_⌋.⌊_⌋	M15
120	Heart Rate		
	Reading 1	Beats per minute ⌊_⌊_⌊_⌋	M16a
	Reading 2	Beats per minute ⌊_⌊_⌊_⌋	M16b
	Reading 3	Beats per minute ⌊_⌊_⌊_⌋	M16c

Step 3 Biochemical Measurements

CORE: Blood Glucose			
Question		**Response**	**Code**
1217	During the past 12 hours have you had anything to eat or drink, other than water? *Mu masaha 12 ashize, waba wariye cyangwa wanyoye ikinu uretse amazi?*	Yes 1 No 2	B1
1122	Technician ID	⌊_⌊_⌊_⌋	B2
123	Device ID	⌊_⌊_⌋	B3
124	Time of day blood specimen taken (24 hour clock)	Hours : minutes ⌊_⌊_⌋ : ⌊_⌊_⌋ hrs mins	B4
125	Fasting blood glucose *Choose accordingly: mmol/l or mg/dl*	mmol/l ⌊_⌊_⌋ . ⌊_⌊_⌋ mg/dl ⌊_⌊_⌊_⌋ . ⌊_⌋	B5
126	Today, have you taken insulin or other drugs (medication) that have been prescribed by a doctor or other health worker for raised blood glucose? *Uyu munsi, waba wafashe insulin cyangwa indi miti wandikiwe nu muganga?*	Yes 1 No 2	B6
CORE: Blood Lipids			
127	Device ID	⌊_⌊_⌋	B7
128	Total cholesterol *Choose accordingly: mmol/l or mg/dl*	mmol/l ⌊_⌊_⌋ . ⌊_⌊_⌋ mg/dl ⌊_⌊_⌊_⌋ . ⌊_⌋	B8
129	During the past two weeks, have you been treated for raised cholesterol with drugs (medication) prescribed by a doctor or other health worker? *Mu byumweru 2 bishize waba waravuwe kubera cholesterol ?*	Yes 1 No 2	B9

EXPANDED: Triglycerides			
130	Triglycerides *Choose accordingly: mmol/l or mg/dl*	mmol/l ⌊⌊⌋.⌊⌋⌋ mg/dl ⌊⌊⌊⌋.⌊⌋	B10
CORE: Urine albumin			
131	Device ID	⌊⌊⌋	B12
132	Urine Albumin *Choose accordingly: mmol/l or mg/dl*	mmol/l ⌊⌊⌋.⌊⌋⌋ mg/dl ⌊⌊⌊⌋.⌊⌋	B13
133	During the past two weeks, have you been treated for raised urine albumin with drugs (medication) prescribed by a doctor or other health worker?*Mu byumweru 2 bishize waba waravuwe kubera albumin izamutse?*	Yes 1 No 2	B14