



Central America Diabetes Initiative (CAMDI)

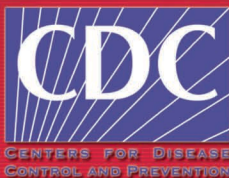
Survey of Diabetes, Hypertension and Chronic Disease Risk Factors

Belize



**Pan American
Health
Organization**

Regional Office of the
World Health Organization



The Central America Diabetes Initiative (CAMDI)

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PAHO HQ Library Cataloguing-in-Publication

Pan American Health Organization

The Central America Diabetes Initiative (CAMDI): Survey of Diabetes, Hypertension and Chronic Disease Risk Factors, Belize

ISBN: 978-92-75-13286-9

I. Title

1. DIABETES MELLITUS

2. HYPERTENSION

3. CHRONIC DISEASE

4. RISK FACTORS

5. DATA COLLECTION

6. CENTRAL AMERICA

NLM WK 810

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List of Annexes

Annex 1	Training
Annex 2	Household Census – Identifying Data, Household Sociodemographic Information
Annex 3	Informed Consent – Monitoring of Risk Factors – Belize
Annex 4	Questionnaire – Multinational Survey of Risk Factors for Non-Communicable Diseases
Annex 5	Organizational Structure
Annex 6	Field Evaluation Checklist
Annex 7	Diagnostic Criteria (Diabetes Mellitus)
Annex 8	Diagnostic Criteria (Hypertension)
Annex 9	Variables and Indicators Measured
Annex 10	Tables

List of Tables.

Tabla 1a.	Sample Demographics by Sex in Men and Women
Table 1b.	Sample Demographics by Age Group
Table 1c.	Demographics by Age Group in Men
Table 1d.	Sample Demographics by Age Group in Women
Table 2a.	Risk Characteristics by Age Group
Table 2b.	Risk Characteristics by Age Group in Men
Table 2c.	Risk Characteristics by Age Group in Women
Table 3.	Smoking Habits and Health Knowledge among Current Smokers (n=14,679)
Table 4.	Alcohol Consumption and Health Knowledge among Alcohol Users (n=47,755)
Table 5a.	Diabetes Mellitus, Impaired Glucose Tolerance, Impaired Fasting Glucose, Hypertension, High Cholesterol and Overweight Prevalence by Age (Total)
Table 5b.	Diabetes Mellitus, Impaired Glucose Tolerance, Impaired Fasting Glucose, Hypertension, High Cholesterol and Overweight Prevalence by Age (Men)
Table 5c.	Diabetes Mellitus, Impaired Glucose Tolerance, Impaired Fasting Glucose, Hypertension, High Cholesterol and Overweight Prevalence by Age (Women)
Table 6a.	Bivariate Associations between Demographic and Risk Characteristics and Diabetes Mellitus (Total)
Table 6b.	Bivariate Associations between Demographic and Risk Characteristics and Diabetes Mellitus (Men)
Table 6c.	Bivariate Associations between Demographic and Risk Characteristics and Diabetes Mellitus (Women)
Table 7.	Health Practices among persons with Diabetes (n=10,622)
Table 8a.	Bivariate Associations between Demographic and Risk Characteristics and Hypertension (Total)
Table 8b.	Bivariate Associations between Demographic and Risk Characteristics and Hypertension (Men)
Table 8c.	Bivariate Associations between Demographic and Risk Characteristics and Hypertension (Women)
Table 9.	Health Practices among Persons with Hypertension (n=20,324)
Table 10a.	Bivariate Associations between Demographic and Risk Characteristics and High Cholesterol (Total)
Table 10b.	Bivariate Associations between Demographic and Risk Characteristics and High Cholesterol (Men)
Table 10c.	Bivariate Associations between Demographic and Risk Characteristics and High Cholesterol (Women)
Table 11.	Health Practices among Persons with High Cholesterol (n=12,768)
Table 12a.	Bivariate Associations between Demographic and Risk Characteristics and Overweight/Obesity (Total)
Table 12b.	Bivariate Associations between Demographic and Risk Characteristics and Overweight/Obesity (Men)
Table 12c.	Bivariate Associations between Demographic and Risk Characteristics and Overweight/Obesity (Women)

Table 13. Demographic and Risk Characteristics Associated with Complete Specimen Collection and Laboratory Data, Unweighted (n=1,679)

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Publisher:

Pan American Health Organization (PAHO)
Survey of Diabetes, Hypertension and Chronic Disease Risk Factors, Belize
#4792 Coney Drive, Coney Drive Business Plaza, 3rd Floor, Belize City,
Belize, Central America.
ISBN: 978-92-75-13286-9

Acknowledgements

The Ministry of Health, Belize and PAHO/WHO would like to thank Lorraine Thompson (PAHO Focal Point), Valerie Jenkins (MOH Focal Point), Ethan Gough (Project Coordinator), Englebert Emmanuel (Biostatistician), Dr. Alberto Barcelo and Dr. Enrique Perez of PAHO Washington and Dr. Manuel Ramirez and Blanca Sulecio of INCAP, also Dr. Edward Gregg and Dr. Robert Gerzoff of The Centers for Disease Control and Prevention for their valuable technical contributions to the design and implementation of this project. We would like to thank the Office of the Director of Health Services, Dr. Kathleen Israel and Dr. Beverley Barnett for their leadership and support.

In addition, we are grateful to PAHO/WHO, Washington and the International Development Bank for their financial support, without which this project could not have been completed.

Regional and Deputy Regional Health Managers provided logistical support and resources. Ministry of Health Headquarters provided technical support with the financial management of the project. Dorla McKenzie and Mavis Moody provided support to the coordination of the project, and Ronald Crawford provided support with the management of supplies. We would also like to acknowledge, Dr. Khalid Ghazi and clinicians country-wide for the follow-up, referrals and medical attention provided to study participants, and Dr. Michael Pitts for his input on this report.

Other acknowledgments go to the Belize Diabetes Association and Rotary Club, San Ignacio.

In addition, we would like to thank the following persons for their commitment to the successful implementation of this survey.

Field Supervisors

Paula Cabb - Corozal and Orange Walk Districts

Nelson Onowanlali – Belize District

Marta Sosa - Cayo District

Denise Johnston – Stann Creek

Elizabeth Enriquez – Toledo District

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Interviewers and

Anthropometry

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TABLE OF CONTENTS

LIST OF ANNEXES	1
LIST OF TABLES	4
ACKNOWLEDGEMENTS.....	7
TABLE OF CONTENTS	6
1. EXECUTIVE SUMMARY	7
2. BACKGROUND.....	11
3. GOALS AND OBJECTIVES.....	13
4. METHODOLOGY	13
4.1. STUDY DESIGN.....	13
4.2. SIZE CALCULATION	13
4.3. SAMPLE SELECTION	13
4.4. PREPARATORY STAGES	15
4.5. DATA COLLECTION AND MANAGEMENT	15
4.6. DATA ENTRY AND ANALYSIS	18
5. RESULTS	19
5.1 DEMOGRAPHICS	19
5.2 RISK CHARACTERISTICS	19
5.3 SMOKING HABITS AND HEALTH KNOWLEDGE AMONG CURRENT SMOKERS	20
5.4 ALCOHOL CONSUMPTION AND HEALTH KNOWLEDGE AMONG ALCOHOL USERS	20
5.5 DIABETES MELLITUS	21
5.6 HYPERTENSION.....	22
5.7 HIGH CHOLESTEROL	23
5.8 OVERWEIGHT AND OBESITY	24
5.9 CHARACTERISTICS OF THE STUDY POPULATION WITHOUT COMPLETE BLOOD SAMPLES AND LABORATORY RESULTS	25
6. DISCUSSION	25
6.1 STUDY LIMITATIONS	28
7. CONCLUSIONS AND RECOMMENDATIONS	28
8. REFERENCES.....	29
9. ANNEXES.....	30

1. EXECUTIVE SUMMARY

There is some evidence that non-communicable diseases such as diabetes and hypertension are increasingly becoming major public health concerns in Belize, in particular as reflected in the country's mortality and hospitalization statistics over the past several years. However, there is a lack of adequate information on the prevalence of non-communicable diseases in Belize and the populations affected. Such information is important for securing and allocating financial resources for the development and implementation of prevention and control programs.

In November, 2005 through July, 2006, the Ministry of Health (MOH), Belize and the Pan American Health Organization/World Health Organization (PAHO/WHO), implemented a national, cross-sectional, household survey to measure the prevalence of diabetes mellitus and hypertension, and their associated risk factors. A sample size of 2,635 persons 20 years of age and older was determined. A total of 2,439 persons were interviewed, and blood samples were taken and laboratory analysis performed on 1,629. Variables measured were socio-demographics, family history of non-communicable diseases, smoking, alcohol consumption, lipid profile, physical activity, fruit, vegetable and oil consumption, and health seeking behavior.

The overall prevalence of diabetes mellitus was found to be 13.1% – 5.6% newly diagnosed and 7.7% known – while the overall prevalence of hypertension was 28.7% – 12.1% newly diagnosed and 16.6% known. Obesity, overweight and high cholesterol, major risk factors, showed a prevalence of 32.5%, 33.2% and 5.1% respectively. A high Body Mass Index, Triglyceride level, age, and a large waist circumference were the most consistent predictors of disease.

The majority of study participants were non-smokers (81.2%). Of those who were current smokers, the majority were in the 20-39 age group (50.6%), and former smokers tended to be 20-39 (41.8%) or 40-64 years old (38.3%). The prevalence of current tobacco use was 10.2% - 17.7% among men and 1.4% among women. However, women who smoke reported smoking more cigarettes in the last 30 days than did men (11.3 cigarettes/day vs. 8.8 cigarettes/day). It appears that men and women began smoking at early as age 13 (19.1 +/- 6.3 years).

One third of respondents (31.7%) consumed alcohol; however alcohol consumption was less common with increased age in both sexes. Men generally ingested alcohol more often than women (2.6 days/week vs. 1.6 days/week) and ingested larger quantities (8.5 drinks vs. 3.6 drinks).

The majority of respondents reported less than 60 minutes of physical activity per week (77.7%). Among those who reported 150 minutes of physical activity or more per week, the majority were more in the 20-39 year age group (73.1%).

In conclusion, although there were some notable socio-demographic differences in the occurrence of these non-communicable health conditions, the results indicated that diabetes, hypertension and their risk factors are serious public health concerns country-wide, and all populations are affected.

2. BACKGROUND

Diabetes and hypertension are two closely related chronic diseases that have been recognized as significant threats to the health and economic well being of socio-economically developed countries such as those of North America and Europe. However, it is increasingly becoming evident that these diseases are also having a significant impact on developing countries such as those in Central and South America. Migration from rural to urban centers may bring a significant reduction in infant and child mortality, and a reduction in communicable disease morbidity, but at the same time an increase in non-communicable disease morbidity and mortality is observed.

Non-communicable diseases (NCDs) are considered to be closely related to risk factors that are known to be prevalent in developed countries such as the availability and consumption of high fat, high calorie diets and the adoption of sedentary life styles. Although genetic predisposition is also recognized, modifiable risk factors such as diet, and physical activity are increasingly becoming very important public health concerns in developed nations, where Diabetes and Hypertension are significant contributors to heart disease, the principal cause of death. Heightened attention to the lifestyle and behavioural factors that contribute to heart disease is increasingly becoming a priority in developed nations.¹

However, there is a lack of suitable data about the prevalence of diabetes and other chronic non-communicable diseases in Central America. The majority of Central American countries are in an epidemiologic transition from communicable to non-communicable diseases such as diabetes mellitus, cardiovascular diseases, and the associated risk factors such as obesity, sedentary life styles, hypercholesterolemia, and others.

Small studies and information gathered from clinical providers in Central America suggests that there is an increase in the number of persons affected by chronic conditions such as diabetes and cardiovascular diseases. It is estimated that there are 19 million individuals with diabetes in Latin America and the Caribbean Region. In Central America alone, population estimates show an expected increase in the number of people living with diabetes of over 2 million by 2025.²

An analysis of the causes of death in Belize shows that the chronic and degenerative diseases account for more than a third of all deaths. Hypertensive diseases and diabetes

¹ PAHO/WHO. The Central American Diabetes Initiative (Belice, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama). Project Proposal, April 2002.

² PAHO/WHO. The Central American Diabetes Initiative (Belice, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua and Panama). Project Proposal, April 2002.

were the third and fourth leading causes of death in 1999 and were the first and second leading cause of death among women. By 2005, hypertensive diseases and diabetes mellitus had become the first and second leading cause of death in the country, and remain the top two leading causes of death among women. Chronic and degenerative diseases are also the leading causes of death among those over the age of fifty years.³

This trend is also evidenced by the growing numbers of people being diagnosed, hospitalized and attending clinics due to these conditions. In 1999, diabetes mellitus and hypertensive diseases were the tenth and twelfth leading cause of hospitalization, while in 2005 they had climbed to the seventh and ninth leading causes.⁴ Also, the leading causes of hospitalization for persons within those over fifty years were cardiovascular diseases, malignant tumors and diabetes.⁵

Belize is home to a population of cultures at high risk of developing diabetes. The country has also seen an increase in the number of hospitalizations. Over 50% of the population of approximately 300,000 people is Hispanic, and the remaining percentage includes people of African, East Indian and native Indian descent [Maya and Kekchi] as well as Garinagu and Mennonites. There is an alarming increase in the numbers of persons with obesity. A Diet, Exercise and Lifestyle Study done by the Caribbean Food and Nutrition Institute (CFNI), in collaboration with the University of Belize, showed that 36% of the population between 18 and 64 were overweight and 27% suffered obesity. Obesity was more prevalent among women than among men and persons living in the urban areas are more affected. This study also shows that 15% of this same age group is at risk of developing one or more of the chronic diseases.⁶

Currently, there is no national program to address NCDs in the country. However, the National Health Agenda 2007-2011 and the National Plan of Action for Food and Nutrition Security 2005-2010 identify NCDs as priorities.

This study was conducted as a part of the *Central American Diabetes Initiative (CAMDI)* which started in 2000 in order to determine the prevalence of diabetes, hypertension and their risk factors; to assess the levels of diabetes care; and to develop intervention programs. Surveys have been conducted in capital cities in Guatemala, Honduras, El Salvador, Costa Rica and Nicaragua. In Belize, the survey was conducted country-wide during the period November, 2005 to August, 2006. It looked to demonstrate needs for non-communicable disease prevention and control programs at the national and sub-national levels. The information generated is important for mobilizing financial support and for the allocation of resources for such programs.

³ Epidemiology Unit, Ministry of Health, Belize, 2006

⁴ Epidemiology Unit, Ministry of Health, Belize, 2006

⁵ Ministry of Health, Medical Statistics Office, 1998

⁶ Young, R. Comparative Gender Analysis of Dietary and Exercise Behaviour in the Caribbean – A Framework for Action: Belize Report, the Quantitative Section, 2003

3. Goals and Objectives

To reduce the burden of diabetes, hypertension and their associated risk factors in Belize

Objective(s):

- i. To determine the prevalence of diabetes mellitus, hypertension and risk factors for non-communicable diseases among persons 20 years of age and older
- ii. To provide a profile of medical care and self care practices of persons affected

4. Methodology

4.1. Study Design

The study utilized a cross-sectional, household-survey design, with multistage stratified random cluster sampling. It included three main components: the administration of a questionnaire, anthropometric measurements and biochemical analyses.

4.2. Size Calculation

The target sample size was 2,400 persons 20 years of age and older. Sample size was calculated based on the estimated prevalence of diabetes mellitus per age group (*Table A*) and a confidence level of 95%. To account for an estimated non-participation rate of 10%, the final sample size was 2,635.

Table A. Estimated Prevalence by Age group

Age group	Estimated prevalence	Desired confidence interval
20 – 39	1%	1%
40 – 64	10%	3%
65 and older	15%	4%

4.3. Sample Selection

The study used a national representative sample of the adult population (20 years of age and older) in the six districts of the country. Districts are divided into smaller units called enumeration districts (EDs). The primary sample unit for survey was the ED.

District sample sizes were determined proportionate to the size of the district population in relation to the national population (*Table B*). From each district a random 10% of EDs were selected from which to select households (*Table B*). Within each ED, household clusters were randomly selected utilizing a grid developed by the Central Statistical Office.

A household was defined as one or more persons living together i.e. sleeping at least four nights per week AND sharing at least one daily meal with the household. All household members meeting the following selection criteria were sampled:

Inclusion Criteria:

1. Men or women 20 years or older

Exclusion Criteria:

1. Pregnant women
2. Women three months postpartum
3. Persons with a disability (physical or mental)

The sample had representation of the country's ethnic groups. For example, since it is known that the Stann Creek District is mainly populated with Garifunas, information on this ethnic group was obtained through the ED sampling of the Stann Creek district. The same method was applied with the other ethnic groups.

Table B. District and ED Sample Totals

Districts	Population 20+	%	Total EDs	Sample persons per district	10% Sample E.D per District
Corozal	16,932	13	42	342	4
Orange Walk	20,287	15	51	395	5
Belize	42,903	33	106	869	11
Cayo	27,948	21	77	554	8
Stann Creek	13,262	10	40	264	4
Toledo	10,516	8	34	211	3
Total	131,848	100	350	2635	35

The sample was stratified by district, age and sex as follows:

Table C. Sample distribution by district, age and sex

District	20-39			40-64			65+		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Corozal	61	61	122	61	61	122	49	49	98
Orange Walk	71	71	142	71	71	142	57	57	114
Belize	155	155	310	155	155	310	125	125	250
Cayo	99	99	198	99	99	198	79	79	158
Stann Creek	47	47	94	47	47	94	38	38	76
Toledo	38	38	76	38	38	76	30	30	60
Total	471	471	942	471	471	942	378	378	756

4.4. Preparatory Stages

Two training workshops were conducted in preparation for the survey. For further explanation refer to *Annex 1*.

4.5. Data Collection and Management

a. Household Census (*Annex 2*.)

A census was conducted for each household visited. The census documented all members of the household their date of birth, age, relationship to the head of the household, and reason for exclusion from the study, regardless of eligibility.

b. Informed Consent and Human Subject Considerations (*Annex 3*.)

Approval was obtained from an ethical committee of the Ministry of Health, Belize. Consent forms were read to each participant. Written consent was obtained before the administration of questionnaires, anthropometry, blood pressure measurement, and taking of blood samples. All participant information was kept confidential.

c. Questionnaire (*Annex 4*.)

Socio-demographic and risk behaviour data were collected using a structured interviewer administered questionnaire in homes utilizing standard interviewing techniques. The questionnaire included modules on socio-demographics, family history of chronic non-communicable diseases, tobacco use, alcohol consumption, diabetes, hypertension, cholesterol, diet, physical activity and health seeking behaviour. The questionnaire utilized in the CAMDI project was adapted for Belize. Changes were made to sections such as administrative unit for sampling, ethnicity, family history and physical activity.

d. Anthropometry and Blood Pressure Measurement

1. Blood Pressure

Anthropometry and blood pressure measurements were taken in homes using standardized methods. Blood pressure was measured using a digital sphygmomanometer (*Omron Digital Blood Pressure Monitor HEM-712C*), with participants seated in a quiet location in a chair with back support. Three readings were taken with a 5 minute interval between each. If the difference between the 2nd and 3rd readings was more than 10mmHg, a fourth reading was taken. The mean value between the two closer measurements was used as the final value.

2. Height

To measure height, a tape measure was secured to a smooth surface at a 90^o angle to the floor, using a plumb line to ensure the tape was exactly vertical. A drafting triangle was used to identify 90^o surfaces. Study participants were asked to remove their shoes and ensure their hair was flat. They were then measured standing with their back against the tape measure, their knees touching with heels together and feet a 60^o angle apart, their palms in, and their chin slightly up. Measurements were taken twice. If the difference between readings was more than 0.5 cm a third measurement was taken. The mean value between the two closer measurements was used as the final value. All measurements were taken in participants' homes.

3. Hip and Waist

To measure hip circumference, participants were asked to remove their shoes and stand with their arms at the sides, palms facing inward, their feet together with heels touching and the external third of the feet at a 60^o angle. The hip measurement was taken around the most prominent lateral part of the hip, which was identified by asking the subject to flex the hip joint. To measure waist circumference, subjects were asked to stand in the same position with arms held out. Waist measurements were taken around the most prominent part of the abdominal wall (usually, at the level of the navel). Both measurements were taken twice. If the difference between the readings was more than 0.5cm, a third measurement was taken. The mean value between the two closer measurements was used as the final value. All measurements were taken in participants' homes.

4. Weight

Weight was measured in kilograms using a digital scale (*Healthometer 849KL*) with a maximum capacity of 150 kg. The scale was placed on the floor on a smooth horizontal surface, and subjects were asked to remove their shoes before stepping on the scale. Two readings were taken. If there was greater than a 0.5kg difference between the two, a third reading was taken. The mean value between the two closer measurements was used as the final value. All measurements were taken in participants' homes.

6. Body Mass Index

Body Mass Index was calculated using the formula:

Weight in Kilograms ÷ Height in meters²

7. Maintenance of Equipment

Digital Scales were checked weekly to ensure they were still operational, and digital sphygmomanometers were re-calibrated every 270 readings.

e. Phlebotomy and Biochemical Analysis

After questionnaire administration, anthropometry and blood pressure measurement, appointments were made to obtain blood samples within 7 days of the interview. Participants were instructed not to consume any food or drink (with the exception of water) for 14 hours prior to their appointment, with the exception of anti-diabetic or anti-hypertensive medication. Home visits, clinic visits, and community centers were used to meet appointments for specimen collection.

Venous blood samples were taken using red top tubes for Cholesterol, and grey top tubes for fasting glucose and 2 hour post prandial. Participants were given a 75g glucose drink (Trutol) after the fasting sample was taken, and were asked to consume the drink in 5 minutes. Only cholesterol and fasting glucose samples were taken from persons known to be living with diabetes and no Trutol drink was given.

All laboratory analyses were conducted at the Central Medical Laboratory in Belize City by one appointed Laboratory Technician. Laboratory tests included: fasting glucose, 2 hour post prandial glucose, total cholesterol, triglyceride, LDL and HDL.

f. Monitoring of Field Operations

All field operations were guided by the “Field Operations Manual” and “Phlebotomy Manual” for the purpose of standardization. Supervision and monitoring were conducted through direct observation by the Project Coordinator during field visits, and through discussion with district supervisors to verify proper implementation where observation was not possible. (*See Annex 5. for the Evaluation Checklist*) To ensure the integrity, comparability and veracity of the data, data collection forms were checked in the field by field supervisors. Questionnaires were checked by both field supervisors and the Project Coordinator before data entry. (*See Annex 6. for the Organizational Structure of the Project*) If additional errors were found during data entry, questionnaires were returned to the field for correction.

g. Distribution of Results and Referrals

Results of anthropometry and blood pressure measurements were returned immediately to study participants. Laboratory results were returned to study participants within three weeks by field supervisors. Persons with abnormal results were counseled and

referred to the physicians identified to receive referrals at the district level. There was also a mechanism established to address the health needs of persons with extremely abnormal results.

4.6. Data Entry and Analysis

a. Data Entry and Data Cleaning

Data entry commenced two months after the start of field work and was completed one week after the field work ended. Data were entered using *CSPro v3.1*. The database was designed with check codes and skip patterns to minimize data entry errors. Checks were performed on a randomly selected 10% of data entries every 400 questionnaires.

After data entry, the database was imported into *SPSS v11.01* for cleaning, tabulation, and *SPSSv 13.01* for analysis. The database was checked to ensure that the frequency of responses to individual questions matched skip patterns; the range of expected blood pressure, anthropometry, and laboratory values were checked for discrepancies; and a random 160 questionnaires were checked for data entry errors. By this last method, the total rate of data entry errors was found to be 0.2%.

b. Data Analysis

1. Weighting

The total sample interviewed was 2,441 persons. Blood samples were taken and laboratory analysis performed on 1,629. The data were weighted to reflect the total population giving a total estimate of 138,707 persons. The data were also weighted to represent those who gave blood samples for analysis, giving a total estimate of 114,932 persons. The standard error was adjusted for cluster sampling design. This report presents an analysis of the weighted data.

2. Descriptive Statistics

Frequencies were determined for socio-demographics and family history, stratified by sex, and for diet and risk behaviour (tobacco and alcohol use), stratified by sex and age. For continuous data, means and standard deviations were tabulated. The prevalence of Diabetes Mellitus, Impaired Glucose Tolerance, Impaired Fasting Glycaemia, Hypertension, Obesity, and High Cholesterol were also determined, stratified by age and sex. The health practices of persons known to have Diabetes Mellitus, Hypertension, and High Cholesterol levels were also assessed descriptively, stratified by sex. (*See Annex 7-9. for criteria used to diagnose each health condition.*)

3. Bivariate Analysis

Bivariate associations between socio-demographics and risk behaviors and Diabetes Mellitus, Hypertension, High Cholesterol, and Overweight/Obesity were determined by Chi-squared test. P-value <0.05 was considered statistically significant.

5. Results

5.1 Demographics

The majority of participants were from the Cayo (24.7%), Orange Walk (20.8%) and Belize districts (17.0%) districts. Half of them were women (50.0%), and the majority were from rural areas (58.8%). Most were in the 20-39 (61.1%) or 40-64 (30.0%) age groups. In terms of education, the majority were literate (86.7%), but most had only some or no primary school education (66.2%). The largest ethnic groups were the Mestizo (43.1%) and the Creole (19.0%). Approximately half (47.0%) were married, and almost a quarter (26.6%) were single. The majority of women were homemakers (48.4%), while most men reported full-time employment (51.8%) and more men than women were retired (5.5% vs. 1.7%). The greater majority of respondents owned their homes (81.3%) and on average 1.6 persons per household earned an income. In terms of family medical history, diabetes (32.2%) and hypertension (27.5%) were most common among the relatives of study participants, followed by cancer (13.9%). (*Table 1a.*)

5.2 Risk Characteristics

The prevalence of current tobacco use was 10.2% - 17.7% among men and 1.4% among women. Of those who were current smokers, the majority were 20-39 years (50.6%), while former smokers were either 20-39 (41.8%) or 40-64 years old (38.3%) (*Table 2a.*). The same was true among men, current smokers were most frequently in the 20-39 age group (51.0%), while former smokers were more likely to be 20-39 (43.2%) or 40-64 (38.2%) (*Table 2b.*). While among women, 96.1% were non-smokers. Of those who were current smokers among women, the majority were in the age groups 20-39 (44.7%) and 40-64 (42.0%), likewise among former smokers, the majority were in the age groups 20-39 (32.9%) and 40-64 (38.9%) (*Table 2c.*).

One third of respondents (31.7%) reported having at least one alcoholic beverage in the last month (*Table 2a.*). A significant percentage of men in all age groups reported the same practice. It was noted however, that alcohol consumption was less common with increased age (52.7% among men 20-29 years vs. 21.6% among men 65+ years) (*Table 2b.*). While in women, more than 60.0% reported no alcohol consumption in the last month in all age groups. A similar trend was noted in women, where alcohol consumption in the last month was most common in the 20-39 age group (18.6%) and decreased with age (5.7% among women 65 years and older) (*Table 2c.*).

Most participants (77.7%) reported less than 60 minutes of moderate or vigorous physical activity on average per week (*Table 2a.*). Men who reported moderate or vigorous physical activity for 150 minutes or more per week were predominantly in the age group 20-39 years (75.4%). However, 75.1% of all men averaged less than 60 minutes of weekly physical activity (*Table 2b.*). Similarly, most women also reported low levels of physical activity per week (80.4% of women reported an average of less than 60 minutes per week). Likewise, women who reported 150 minutes or more per week were more frequently 20-39 years (69.7%) (*Table 2c.*).

The majority of respondents reported using vegetable oil to bake or cook with (83.2%). Respondents reported consuming a mean 1.5 fruits and 1.5 vegetables per day.

5.3 Smoking Habits and Health Knowledge among Current Smokers

Respondents who reported that they had smoked at least 100 cigarettes in their lifetime began smoking at a mean age of 19.1 years. On average men and women reported that they began smoking at about the same age (19.0 +/- 6.1 vs. 20.3 +/- 7.3 years).

The majority of current smokers reported smoking in the last month (78.8%). Women reported smoking more cigarettes on average per day than did men (11.3 vs. 8.8), but only men reported smoking cigars. No respondents reported smoking pipes in the last 30 days. (*Table 3.*)

The majority of both sexes reported that they have thought about quitting smoking (75.9%), and on average both sexes reported that they had attempted to quit smoking about 3 to 4 times in the last year. (*Table 3.*)

5.4 Alcohol Consumption and Health Knowledge among Alcohol Users

Respondents who ingest alcohol every week reported having a drink 2.4 days per week on average. However, men generally reported more alcohol consumption than women. Men reported ingesting alcohol more days per week (2.6 days vs. 1.6 days). Men also reported ingesting more drinks on days when they drank (8.5 drinks vs. 3.6 drinks). Within the last month, men also reported ingesting more than 5 drinks on more occasions than women (1.6 days vs. 0.6 days). Half the respondents reported that they have felt the need to stop or reduce their alcohol consumption, however more women (59.7%) reported that have never felt like quitting than men (38.6%). (*Table 4.*)

5.5 Diabetes Mellitus

a. Prevalence

The overall prevalence of Diabetes Mellitus was 13.1%, 95%CI (11.0-15.6). Among men it was 8.3%, 95%CI (8.4-6.5) and was 17.6%, 95%CI (14.7-21.5) in women. However, 58.8% of these already knew they were People living with diabetes. The prevalence of diagnosed (during the study) Diabetes Mellitus was 5.6% – 3.8% in men and 7.3% in women. Diabetes Mellitus, both known and new cases, increased with age. The prevalence of diagnosed cases was more than two times higher in the 40-64 (8.7%) and 65 years and older (7.5%) age groups than in those 20-39 years. Also, women generally showed a higher prevalence of both diagnosed and known cases than men in all ages. The prevalence of known cases was twice as high among women 20-39 and 40-64 years as among men of the same age group. (*Table 5a, 5b 5c.*)

b. Demographic and Risk Factors Associated with Diabetes Mellitus

Statistically significant associations were found between diabetes mellitus and age, hypertension, BMI, total cholesterol, LDL, HDL, triglyceride, and waist circumference. The prevalence of diabetes mellitus was 3 to 5 times higher among older age groups, 40-64 (21.5%) and 65 years and older (33.1%). Prevalence of Diabetes Mellitus was also higher among respondents who were overweight (12.7%) or obese (20.2%). Persons with hypertension (24.7%), and persons with elevated cholesterol, LDL, and triglyceride levels also showed a higher diabetic prevalence, as did persons with a waist circumference indicative of risk (21.4%). (*Table 6a.*)

Among men, statistically significant associations were found between Diabetes Mellitus and age, hypertension, total cholesterol level, LDL, triglyceride level and waist circumference. A higher prevalence of diabetes mellitus was found among men 40-64 (13.6%) and 65 years and older (25.7%), those with hypertension (17.3%), those with a waist circumference ≥ 102 cm (17.2%) and those with elevated cholesterol levels. (*Table 6b.*)

Among women, there were statistically significant associations between diabetes mellitus and age, ethnicity, hypertension, total cholesterol, LDL, triglyceride, and waist circumference. A higher prevalence was found in women 40-64 (30.1%) and 65 years and older (40.2%), women of East Asian (35.8%), mixed (38.9%), and Garifuna (31.5%) ethnicity, women with hypertension (32.7%), those with elevated cholesterol, LDL and triglyceride levels, and women with a waist circumference ≥ 88 cm (23.0%) compared to women without these characteristics. (*Table 6c.*)

c. Health Practices among Persons Known to be Living with diabetes

Among respondents who knew they were Diabetic, only 3.5% reported that they never get their blood sugar tested. The majority (61.9%) reported that they were following a treatment program prescribed by a health professional to help control their blood sugar.

However, more women (40.5%) than men (31.9%) reported that they were not following such a program. Most respondents reported that their program included medication (95.9%), a special diet plan (75.2%), regular physical activity (59.7%), and reduced alcohol consumption (46.1%). Of those taking medication, 86.7% reported that they did not generally have the money to purchase medication *or* that they did but with much difficulty. (*Table 7*)

5.6 Hypertension

a. Prevalence

The prevalence of Hypertension was 28.7%, 95%CI (25.4-33.5). Among men it was 28.6%, 95%CI (24.6-36.3) and was 24.4%, 95%CI (67.2-75.6) among women. However 42.8% and 50.0% of men and women respectively already knew they were hypertensive. The prevalence of diagnosed hypertension was 12.1% – 12.2% among men and 12.2% among women. The prevalence of hypertension increased with age for both diagnosed and known cases, and both were generally more prevalent among women. (*Table 5a, 5b, 5c*)

b. Demographic and Risk Factors Associated with Hypertension

There was a statistically significant association between hypertension and district of residence, ethnicity, total cholesterol, triglyceride, and waist circumference. Although very high in all districts

($\geq 20.0\%$), the prevalence of hypertension was highest in Stann Creek (35.1%), Belize (34.1%), and Orange Walk (30.7%). The prevalence among persons 40-64 (42.8%) and 65 years and older (35.1%) was 2 to 3 times higher than among persons 20-39 years. Respondents of white (42.0%), mixed (37.2%), East Asian (37.1%), Garifuna (36.2%), and Creole ethnicity (32.4%) had a higher prevalence, as did persons who were obese (37.4%) and overweight (32.1%), those who had elevated cholesterol and triglyceride levels, and who had a waist circumference indicative of risk (38.8%). (*Table 8a*.)

Among men, there was a statistically significant association between hypertension and age, BMI, triglyceride, and waist circumference. Men 40-64 (43.2%) and 65 years and older (55.7%), men who were obese (39.9%) and overweight (34.4%), men with triglyceride ≥ 150 mg/dl, and men with a waist circumference ≥ 102 cm (48.6%) had a higher prevalence than men without these characteristics. (*Table 8b*.)

While among women, there were statistically significant associations between hypertension and district of residence, age, ethnicity, smoking, BMI, total cholesterol, triglycerides, and waist circumference. Women in Stann Creek (35.3%), Belize (34.6%), and Orange Walk (33.1%) had the highest prevalence of hypertension, although the prevalence among women was notably high in all six districts. Women 40-64 (42.3%) and 65 years and older (64.2%), women of East Asian (39.4%), Garifuna (42.3%), mixed (36.5%), white (39.8%) and Creole (34.0%) ethnicity, obese (36.0%) and women who were

overweight (29.5%), women with elevated cholesterol levels, and women with waist circumference ≥ 88 cm (35.2%) had a higher prevalence than women without these characteristics. (*Table 8c.*)

c. Health Practices among Persons Known to have Hypertension

Among respondents who knew they had hypertension little more than a third reported that they were following a treatment or program prescribed by a health professional to control their blood pressure (39.7%). These respondents reported medication (94.6%) and eating less salty food (87.5%), followed by regular physical activity (54.6%) and losing weight (48.6%) as part of the treatment prescribed. Of those taking medication, almost 87.5% reported that they did not generally have the money to purchase medication *or* that they did but with much difficulty. (*Table 9.*)

5.7 High Cholesterol

a. Prevalence

The prevalence of High Cholesterol was 5.1%, 95%CI (3.2-7.4). Among men it was 4.1%, 95%CI (2.3-6.6) and was 6.0%, 95%CI (3.8-8.7) among women. The prevalence of High cholesterol increased with age (3.1% in 20-39 vs. 11.1% in 65+). (*Table 5a, 5b 5c.*)

b. Demographic and Risk Factors Associated with High Cholesterol

There was a statistically significant association between High Cholesterol and age, ethnicity, LDL, triglyceride levels, and waist circumference. Persons 40-64 (6.6%) and 65 years and older (11.1%) had a higher prevalence than persons 20-39 years. Respondents who reported themselves as Mullaatto (12.6%), Mennonite (12.5%), East Asians (11.6%), the Garifuna (8.5%) had the highest prevalence. Persons with elevated LDL and triglyceride levels, and those with a waist circumference indicative of risk (6.0%) also had a higher prevalence than persons without these characteristics. (*Table 10a.*)

Among men, statistically significant associations were found between High Cholesterol and age and LDL levels. Men 40-64 (6.1%) and 65 years and older (7.5%) had a prevalence 2 to 3 times higher than men 20-39 years. Men with LDL ≥ 160 mg/dl (62.0%) had a higher prevalence of High Cholesterol than men without these characteristics. (*Table 10b.*)

Among women, there was a statistically significant association between High Cholesterol and age, ethnicity, LDL and triglyceride levels, and waist circumference. The prevalence was higher among women 40-64 years (7.2%) and 65 years and older (14.6%), and among East Asian (12.4%), Mennonite (13.2%), Garifuna (10.6%) and Creole (10.2%) women. Those with high LDL (86.5%) and triglyceride (11.1%) levels also had a higher prevalence than women without these characteristics. Women with a waist circumference ≥ 88 cm (7.2%) had a higher prevalence of High Cholesterol than women with smaller waist circumference. (*Table 10c.*)

c. Health Practices among Persons Known to have High Cholesterol

Among respondents who knew they had high cholesterol, 25.9% were presently following a program prescribed by a health professional to control their cholesterol level. The majority of these study participants reported eating less fat or no fat (86.7%), eating more vegetables, fruit and fibres (92.4%), and taking medication (75.6%), followed by losing weight (56.0%) and regular physical activity (47.3%) as the treatment prescribed. Of respondents who were currently taking medication, 95.6% reported that they did not generally have the money to purchase medication *or* that they did but with much difficulty. (*Table 11.*)

5.8 Overweight and Obesity

a. Prevalence

Thirty-two percent of study participants were obese:- 23.1% of men and 41.9% of women, while 33.2% were overweight:- 35.8% of men and 30.5% of women. The prevalence of overweight and obesity combined was 65.2%, 95%CI (61.7-71.5). There was more obesity among women than among men in all age groups, with those 40-64 years (49.3%) showing the highest prevalence of obesity. (*Table 5a, 5b, 5c.*)

b. Demographic and Risk Factors Associated with Overweight and Obesity

There was a statistically significant association between BMI ≥ 25.0 and district, age, ethnicity, HDL, triglyceride levels, and waist circumference. All districts had a high prevalence of overweight and obesity ($>50.0\%$), but the prevalence was highest in Corozal (77.6%) and was lowest in Toledo (52.3%). Persons 20-39 (62.5%) and 40-64 years (74.7%) had a higher prevalence as well. All Ethnic groups also had a very high prevalence of overweight and obesity ($> 40.0\%$), but the mixed (67.0%), and Mestizo (69.5%) ethnic groups and persons who reported themselves as other (91.3%) showed the highest. While Mulatto (43.1%), East Asian (53.8) and Mennonite respondents (56.2%) had the lowest prevalence. Persons with high triglyceride level (82.3%) and a waist circumference indicative of risk (93.7%) also had a higher prevalence than persons without these characteristics. (*Table 12a.*)

Among men, overweight and obesity were significantly associated with district, age, HDL and triglyceride levels, and waist circumference. The prevalence of overweight and obesity amongst men from all districts with the exception of Toledo was greater than 50.0%, with the Corozal district showing the highest prevalence (71.0%). Men age 20-39 (56.1%) and age 40-64 (67.4%) had a higher prevalence of overweight and obesity than older men (65+). Men with lower levels of HDL, higher levels of triglycerides, and a waist circumference ≥ 102 cm (97.7%) also had a high prevalence. (*Table 12b.*)

Among women, there were statistically significant associations between BMI ≥ 25.0 and age, triglyceride level and waist circumference. Women with high triglyceride levels

(81.6%), and a waist circumference ≥ 88 cm (92.3%) had a higher prevalence than women without these characteristics. (*Table 12c.*)

5.9 Characteristics of the Study Population without complete Blood Samples and Laboratory Results

Complete blood samples were taken from 1,629 (66.7%) of study participants. Of the total participants (2,441), women most frequently had complete blood samples (71.7%). Participants from the Toledo (84.7%), Orange Walk (72.9%) and Cayo (71.1%) districts and from rural communities (71.7%) also more frequently had complete blood samples. Participants in the 40-64 age group (73.4%) and the 65 and older age group (71.9%) were more likely to have complete blood samples as well. The Mennonite (90.3%), East Asian (81.3%), Mayan (75.2%) and Mestizo (69.1%) more frequently had complete blood samples. Participants who were former smokers (70.2%) and non-smokers (68.1%), those who did not have hypertension (72.1%) and who had a waist circumference indicative of risk (71.9%) more frequently had complete blood samples. However, the data were weighted to adjust for disparities in blood specimen collection. As such, the effect of such disparities on the overall conclusions of the study is minimized.

6. Discussion

This study was designed to investigate the prevalence of diabetes mellitus, hypertension and their associated risk factors in Belize. The findings are a national representation of ethnicity, and population age and sex distribution. It presents strong evidence of a high prevalence of these health conditions country-wide.

The overall prevalence of diabetes mellitus was higher (13.1%) than that found by the CFNI study (5.7%)⁷, and by comparison the prevalence was higher in Belize than in the Villa Nueva study in Guatemala (8.4%)⁸. It should be noted however, that the Villa Nueva study was conducted in a single barrio, while this study was conducted nationally. The CFNI study methodology was based on self reported status, while in this study diabetes status was based on both self reporting and laboratory diagnosis. Those who reported that they knew they had diabetes in the CFNI study were 5.7% as compared to 7.7% in this study. Both total and study diagnosed cases of diabetes were found to be more prevalent among women. Diabetes generally increased with age in both sexes and particularly affected the East Asian, Mixed and Garifuna communities. There was also a strong association between hypertension and diabetes in both sexes. Diabetes prevalence

⁷ Young, R. Comparative Gender Analysis of Dietary and Exercise Behaviour in the Caribbean – A Framework for Action: Belize Report, the Quantitative Section, 2003

⁸ Pontaza OP, Ramirez-Zea M, Barcelo A, Gil E, Gregg E, Meiners M, Valdez R, Flores EP. Encuesta de Diabetes, Hipertensión y Factores de Riesgo de Enfermedades Crónicas: Villa Nueva, Guatemala, 2005

was 3.5 times as high in women with hypertension and 2.5 times as high in men with hypertension, compared to those without hypertension in either sex.

The high prevalence of hypertension (28.7%) supports the pattern of Belize's morbidity and mortality data. Similar to diabetes, the prevalence of hypertension was found to be higher in this study than in the CFNI survey (13.0%)⁹ or compared to the Villa Nueva study in Guatemala (13.0%). In terms of *newly diagnosed* cases, the prevalence in Belize (12.1%) was 2 times higher than that found in the Villa Nueva survey (5.7%)¹⁰. In contrast to previous findings by the CFNI, the prevalence of hypertension was found to be higher among men (28.6%) than women (24.4%) in this study. In the CFNI survey, the prevalence of hypertension among men was 6.0% and was 27.0% in women. In this study, hypertension generally increased with age in both sexes.

It must be emphasized that in the methodology utilized in the CFNI study, both diabetes and hypertension were self-reported, and the Villa Nueva study was limited to a single urban community. The CFNI study was also limited to the age group 18 to 64 years.

As with diabetes, there was an association between ethnicity and hypertension. The Garifuna, Creole, East Asian, Mixed and Mennonite populations were more likely to have hypertension, as were residents of the Stann Creek and Belize districts, where the Garifuna and Creole are predominant.

The prevalence of high cholesterol in this survey was 5.1%, similar to the CFNI findings (5.0%)¹¹, but was much lower compared to Villa Nueva (9.9%). High cholesterol generally increased with age, particularly among women. The East Asian, Mennonite, Mulatto and Garifuna populations were most likely to have high cholesterol levels.

Obesity was also more prevalent (32.5%) in this survey compared with the CFNI Diet and Exercise study (27.3%) and compared with Villa Nueva (23.3%). However, overweight (33.2%) was less in this study as compared to the CFNI findings (36.3%). The shift toward obesity between the 2001 CFNI survey and this present study is suggestive of an increasing sedentary lifestyle and increased caloric intake. Overweight and obesity generally increased with age in both sexes, and all ethnic groups had a high prevalence ($\geq 43.1\%$). The lowest prevalence was found among the Mulatto (43.1%) and the East Asian (53.8%) ethnic groups. Comparing the findings of this study to the CFNI, a similar prevalence was found among the Creole (65.0% vs. 65.8% in the CFNI), and the Mestizo (69.5% vs. 67.1% in the CFNI). However, this study found a higher prevalence of

⁹ Young, R. Comparative Gender Analysis of Dietary and Exercise Behaviour in the Caribbean – A Framework for Action: Belize Report, the Quantitative Section, 2003

¹⁰ Pontaza OP, Ramirez-Zea M, Barcelo A, Gil E, Gregg E, Meiners M, Valdez R, Flores EP. Encuesta de Diabetes, Hipertensión y Factores de Riesgo de Enfermedades Crónicas: Villa Nueva, Guatemala, 2005

¹¹ Young, R. Comparative Gender Analysis of Dietary and Exercise Behaviour in the Caribbean – A Framework for Action: Belize Report, the Quantitative Section, 2003

overweight/obesity among the Garifuna (69.5% vs. 48.9%) and the Maya (63.5% vs. 52.3%).

All districts showed a high prevalence of overweight and obesity (65.7%), but the Corozal district showed a notably higher overweight/obese prevalence (77.6%) than the other districts, in particular among women (84.2%).

A family medical history of both diabetes (32.2%) and hypertension (27.5%) were prevalent in both sexes, suggesting an underlying genetic predisposition in the population that possibly contributes to the high prevalence of these conditions. The East Asian ethnic group included both East Indian and Asian respondents, but was predominantly East Indian. Genetic predisposition possibly contributes to the high prevalence of diabetes, hypertension, and high cholesterol in this ethnic group. Similarly, dietary factors likely contribute to the high prevalence of these health conditions among the Garifuna who are known to consume high quantities of cassava and other starchy staples, and the Creole who are known to consume large quantities of rice and fried foods.

The cultural preference for meat preparation is stewed or fried.¹² However, it should be noted that the majority of respondents cooked with vegetable oil as previously found in the CFNI study. There was no significant pattern in the consumption of fruits or vegetables by either sex. Smoking was most common in the 20-39 age group, and former smokers were most frequently in the 20-39 and 40-64 age groups. Women reported smoking more cigarettes per day than men. However, more men (17.7%) were found to be current smokers than women (1.4%). In both sexes, alcohol consumption was less common in older age groups. However, men reported both more frequent and larger quantities of alcohol consumption. Although physical activity was highest in the 20-39 age group, both sexes reported very low levels of physical activity.

Among persons known to be living with diabetes, more than half (61.9%) were following a treatment program prescribed by a health professional to control their blood sugar levels. Conversely, among persons who knew they had hypertension or high cholesterol, fewer reported that they were following a program to control their blood pressure (39.7%) or cholesterol levels (25.9%). Medication and dietary changes were reported as the most frequently prescribed treatments for diabetes and hypertension. Dietary changes were the most frequently prescribed treatment to control cholesterol levels.

¹² Young, R. Comparative Gender Analysis of Dietary and Exercise Behaviour in the Caribbean – A Framework for Action: Belize Report, the Quantitative Section, 2003

6.1 Study Limitations

- a. A third (33.3%) of respondents did not provide complete blood samples for laboratory analysis.
- b. Due to non-participation and difficulties obtaining the appropriate sample size from rural communities in the Belize district, secondary sampling was done in Hattieville and Ladyville.
- c. Some interviewers discontinued working with the survey after the initial training. Consequently, additional interviewers were identified and trained.
- d. The survey was initiated in November, 2005 prior to the Christmas Holiday season. Although there was a hiatus of two weeks from 18th December to 6th January, customary increased consumption of alcohol and food during this time period might have influenced study results.
- e. Only bivariate associations were investigated in this analysis, therefore the effect of potential confounders was not examined. However, data were stratified by sex and age, so differences between these groups were examined.

7. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, there is a high prevalence of diabetes mellitus, hypertension, and their major associated risk factors (obesity and hypercholesterolemia) in Belize. The increase in prevalence is consistent with the increasing trends seen in Belize's morbidity and mortality data, and suggests that an integral part of any prevention and control program must include active surveillance. These findings provide significant justification for the development of national policies and programs to address these public health issues.

There is a need to effect changes in the model of care to place emphasis on primary health care and prevention. Such programs must include widespread health education to address key lifestyle factors such as physical activity, nutrition, and tobacco use, which is sensitive to sex, age group, ethnicity, and geographic location. These should be complemented with norms, protocols and guidelines to improve quality of care and to ensure prevention of secondary and tertiary outcomes in persons with NCDs. Alongside changes in the model of care, the development of human resources must be addressed.

An increase in physical activity must be promoted and supported through the provision of organized programs, parks, playgrounds, and the encouragement of more physical

activity in schools. Food based dietary guidelines for the Belizean population is an urgent necessity.

A high Body Mass Index (≥ 25.0), age, triglycerides and large waist circumference (≥ 102 cm in men and ≥ 88 cm in women) were the most consistent predictors of diabetes, hypertension and high cholesterol in both sexes. Total cholesterol was a strong predictor of diabetes and hypertension, while HDL was a consistent predictor of high cholesterol. LDL and triglyceride levels were the most consistent laboratory markers of diabetes, hypertension, high cholesterol and overweight/obesity.

Future research should focus on characterizing the quality of care provided to patients with diabetes and hypertension, and the incidence of secondary and tertiary care outcomes.

8. REFERENCES

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9. ANNEXES

Annex 1. Training

Annex 2. Household Census

Annex 3. Informed Consent

Annex 4. Questionnaire

Annex 5. Organizational Structure

Annex 6. Field Evaluation Form

Annex 7. Diagnostic Criteria (Diabetes Mellitus)

Annex 8. Diagnostic Criteria (Hypertension)

Annex 9. Variables and Indicators Measured

Annex 1. Training

The first workshop was conducted during the period August 22-26, 2005. The objective was to sensitize interviewers about the survey. An overview of the survey was given and participants were trained in conducting the interviews and a considerable amount of time was spent on anthropometry training. Interviewers were also taught how to take blood pressure. The questionnaire was field tested and adjustments were made based on the findings of this exercise.

The second workshop was held on November 4th through November 6th, 2005. The objectives of the workshop were:

- a. To review sampling methodology, including geographic location of the project, target population, eligibility and exclusion criteria, sample size, and sample distribution stratified by geographic district, enumeration district (ED), age and sex.
- b. To ensure that field workers have uniform knowledge on blood pressure and anthropometric measurement.
- c. To instruct field workers in the use of the Research Questionnaire and other Forms to be utilized in the field for standardized implementation and data collection.

In attendance for the entire three day workshop were 21 participants from Belize's six districts. These participants included experienced Community Nurses Aids (CNAs) selected to perform anthropometry, interviewers with prior experience working with the Central Statistical Office on demographic surveys of similar design, and district supervisors. The training was facilitated by Nurse Valeria Jenkins, the MOH Focal Point, Lorraine Thompson, PAHO/WHO Project Officer, and Ethan Gough, Project Coordinator. Also in attendance was Blanca Sulecio from INCAP who facilitated anthropometry training, Dr. Enrique Perez, Regional Operations Coordinator for CAMDI, and Nurses Dorla McKenzie and Mavis Moody, support staff from the MOH.

Day 1

On the first day of the workshop, the entire group participated in the same training activities. In the morning, two presentations were given by the Project Coordinator to review project methodology. The presentations were as follows:

- *Sampling Methodology*: This presentation reviewed sampling methodology. It defined the target population, described the multistage development of the sample, and discussed sample size, sample distribution by geographic district, enumeration district (ED), age and sex, and the rationale for the methodology used.
- *Overview of Survey Methodology*: This presentation described the organizational structure of the project and responsible agencies, the methodology to be used in the field (with instruction on the purpose of the Forms to be utilized, and how they were to be completed), informed consent, sample coverage, the interview process, and common errors in conducting interviews. The presentation also emphasized the importance of the 14 hour fasting period prior to having blood samples taken, the role of supervisors in the field, and the distribution of

laboratory, anthropometric and blood pressure results with recommendations and referral if necessary.

In the afternoon, a training session in anthropometry was conducted for the entire group. The Belize Defense Force (BDF) supplied volunteer soldiers as subjects for practice sessions. The use of all pertinent equipment was demonstrated, including:

- The tape measure for measuring hip and waist circumference and height
- The scale for measuring weight

Day 2 and 3

The group was divided into 1) Interviewers and 2) Anthropometry for the remainder of the workshop. The training activities conducted with each group were as follows:

- *Interviewers:* The Informed Consent form and Research Questionnaire were reviewed. Participants were instructed on the importance of the informed consent as an integral part of the research process and the consent form as a legal document. The Research Questionnaire was reviewed question by question to familiarize participants with the type of information each question aimed to collect and skip patterns. In particular “Section XI Physical Activity” was reviewed and discussed. Also, a few recommendations for minor changes to the questionnaire were agreed upon by the group to improve skip instructions and to facilitate recording information on the questionnaire.

Practice sessions were conducted that included exercises in questionnaire administration and in approaching households to obtain permission for conducting the survey. Practice sessions in blood pressure measurement using the digital sphygmomanometer were conducted as well.

- *Anthropometry:* Community Nurses Aides were designated to perform anthropometry in the field. Training and practice sessions in anthropometry were conducted by Blanca Sulecio. Exercises in calculating Body Mass Index (BMI) were also conducted with CNAs. However, at the close of the three day workshop the decision was made to have district supervisors calculate BMI. Practice sessions in blood pressure measurement using the digital sphygmomanometer were conducted as with interviewers.

Annex 3. Informed Consent



**MONITORING OF RISK FACTORS – BELIZE
FORM 5. INFORMED CONSENT**

- Day |__|__| Month |__|__| Year |__|__| |__|__|
- Identification No.: |_|_|/|_|_|_|_|/|_|_|_|_|_|

The MINISTRY OF HEALTH, with the assistance of the Pan American Health Organization (PAHO), is conducting a survey whose objective is to learn about the health status of the Belizean population specifically with respect to diabetes (sugar in the blood), high blood pressure, and their risk factors. This study will provide information to guide non-communicable disease programs and improve health in the country. The study requires the participation of people over the age of 20, for this reason, we are requesting your valuable cooperation.

If you agree to participate in the study, you will first be asked a series of questions about your health. During the interview, your blood pressure will be taken, and at the end, your height, weight, waist and hips will be measured. All this will be done in your home and the results of the measurements will be given to you. If you are found to have high blood pressure, you will be referred to the health center for follow-up. Once the measurements have been taken, the interviewer will give you a note indicating the date and time for the following blood tests: Blood glucose (sugar in the blood to detect diabetes) and lipid profile (total cholesterol, triglycerides, HDL cholesterol, and LDL cholesterol, to detect the risk of cardiovascular disease). The results of the blood glucose and total cholesterol tests, will be available in three weeks at your nearest health center.

I hereby certify that, I, _____, identification card No. _____, understand the explanations above and voluntarily agree to participate in this study, and that I am willing to answer all the questions in the survey, and to have my blood pressure, height, weight, and the size of my waist and hips measured and to have blood tests. I understand that there is no risk to me from the questions and measurements that will be taken. I understand that the blood test will require at least two punctures of a vein in my arm, which can cause a little pain when the blood is drawn. The survey and measurements that will be done in my home will last approximately one hour. On the day in which my blood tests will be taken I will not leave the Health Center/ testing site for at least two and a half hours in the morning. All procedures will be done by personnel with a great deal of experience in these activities, and for my safety, only disposable needles and syringes will be used.

The benefit that I will derive from this study is; knowing my health status in terms of my blood pressure, weight, cholesterol, and blood sugar. Furthermore, as a result of my cooperation, the extent of these health problems in my community will be better understood. I understand that I will receive no monetary compensation for my participation in this study; however, the examinations will be free of charge, and I will receive a copy of the results.



All the information that I provide will be confidential and can be given only to the people working in this study. If the results of the study are published, my identity cannot be revealed. I also understand that I have the right to refuse to participate and to withdraw from the study whenever I choose without jeopardizing my job or my current or future health care.

I was given the opportunity to ask questions about the study, and all of them were answered to my satisfaction. If another question or problem arises, I know that I can contact **Valerie Jenkins** at the following phone number 822-2325/601-8275. I have read this letter or have had it read to me and I understand it. By signing this document, I give my consent to participate in this study as a volunteer.

Signature of volunteer: _____

Signature of interviewer: _____

Annex 4. Questionnaire

  PAHO / WHO	MULTINATIONAL SURVEY OF RISK FACTORS FOR NON-COMMUNICABLE DISEASES																																
ID <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> District ED HH Member																																	
I. AFFILIATION																																	
1.01 Country <input style="width: 100%;" type="text"/> 1.03 District <input style="width: 100%;" type="text"/> 1.05 Home address <input style="width: 100%;" type="text"/> 1.07 Telephone number <input style="width: 100%;" type="text"/> 1.09 Interviewer Code <input style="width: 100%;" type="text"/> 1.11 Surname (s) <input style="width: 100%;" type="text"/> 1.13 ID number <input style="width: 100%;" type="text"/> 1.15 Age (years) <input style="width: 100%;" type="text"/> 1.17 Birthdate <input style="width: 100%;" type="text"/> Day <input style="width: 100%;" type="text"/> Month <input style="width: 100%;" type="text"/> Year	1.02 City <input style="width: 100%;" type="text"/> 1.04 ED <input style="width: 100%;" type="text"/> 1.06 House number <input style="width: 100%;" type="text"/> 1.08 Number of clinical record, if applicable <input style="width: 100%;" type="text"/> 1.10 Date of interview <input style="width: 100%;" type="text"/> Day <input style="width: 100%;" type="text"/> Month <input style="width: 100%;" type="text"/> Year 1.12 Name (s) <input style="width: 100%;" type="text"/> 1.14 Sex Male <input type="radio"/> Female <input type="radio"/> 1.16 Consent: Read the Consent Statement Consent has been obtained Yes <input type="radio"/> No <input type="radio"/>																																
II. SOCIO-DEMOGRAPHIC CHARACTERISTICS																																	
2.01 Marital status: Single <input type="radio"/> Married <input type="radio"/> Divorced <input type="radio"/> Widow/er <input type="radio"/> Common law/ living together <input type="radio"/> Separated <input type="radio"/> 2.02 Do you know how to read and write? YES <input type="radio"/> NO <input type="radio"/> 2.03 Highest level of schooling completed? None <input type="radio"/> Primary <input type="radio"/> Secondary <input type="radio"/> University <input type="radio"/> Postgraduate <input type="radio"/> 2.04 Number of years completed? 1 <input type="radio"/> 2 <input type="radio"/> 3 <input type="radio"/> 4 <input type="radio"/> 5 <input type="radio"/> 6 <input type="radio"/> 7 <input type="radio"/> 8 <input type="radio"/> 2.05 Ethnicity: White <input type="radio"/> Creole/ Afro-caribbean <input type="radio"/> East Asian/ Indo-caribbean <input type="radio"/> Mayan/ Native <input type="radio"/> Garifuna <input type="radio"/> Mestizo <input type="radio"/> Mulatto <input type="radio"/> Menonite <input type="radio"/> Mixed racial background <input type="radio"/> Other <input type="radio"/> 2.06 Current job situation: Full-time <input type="radio"/> Part-time <input type="radio"/> Unemployed, able to work <input type="radio"/> Unemployed, not able to work <input type="radio"/> Homemaker <input type="radio"/> Student <input type="radio"/> Retired <input type="radio"/> Volunteer <input type="radio"/> Other <input type="radio"/> 2.07 The house that you live in is: Your own <input type="radio"/> Rented <input type="radio"/> Lent <input type="radio"/> Other <input type="radio"/> Specify: <input style="width: 100%;" type="text"/> 2.08 In the house in which you currently live.... 2.08.01 How many people live? <input style="width: 100%;" type="text"/> 2.08.02 How many rooms (excluding the bathroom and kitchen)? <input style="width: 100%;" type="text"/> 2.08.03 How many people sleep in the house on a regular basis? <input style="width: 100%;" type="text"/> 2.08.04 How many people in this house receive a salary or pay of some kind? <input style="width: 100%;" type="text"/>																																	
III. FAMILY HISTORY																																	
3.01 Indicate any relative with or who has died due to: (Complete all positive or pertinent options)																																	
	Hypertension Diabetes Stroke/ Cerebral Hemorrhage Cancer or Malignant Tumor High Cholesterol Osteoporosis, lack of calcium in the bones or hip fracture Heart Attack before 45 years old (father or brother) Heart Attack before 55 years old (mother or sister)																																
a Father b Mother c Brother / Sister d Son / Daughter	<table style="width: 100%; border: none;"> <tr> <td style="width: 10%;"><input type="radio"/></td> <td style="width: 10%;"><input type="radio"/></td> <td style="width: 10%;"><input type="radio"/></td> <td style="width: 10%;"><input type="radio"/></td> <td style="width: 10%;"><input type="radio"/></td> <td style="width: 10%;"><input type="radio"/></td> <td style="width: 10%;"><input type="radio"/></td> <td style="width: 10%;"><input type="radio"/></td> </tr> <tr> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> <tr> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> <td><input type="radio"/></td> </tr> </table>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																										
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>																										

IV. TOBACCO

- 4.01 Have you smoked at least 100 cigarettes in your life? Yes No No I have never smoked Not sure/ No response
If no, skip to 4.11
- 4.02 Do you currently smoke cigarettes? Yes (1 or more cigarettes/ day) Occasionally (less than 1 cigarette/ day) No (I have stopped smoking)
If no, skip to 4.11
- FOR SMOKERS ONLY
- 4.03 At what age did you begin to smoke? years
- 4.04 As an average, how many cigarettes/cigars or pipes did you smoke daily during the last thirty days? Cigarettes/ day Cigars/ day Pipes/ day Other. Specify:
- 4.05 When was the last time that you smoked? How long has it been that you have not smoked at least 1 cigarette/ day? Less than 1 month Between 1 and 6 months 1 year or more I don't remember/ not sure
- 4.06 How long after waking up do you smoke your first cigarette? In the first 5 minutes Between 6 and 30 minutes Between 31 and 60 minutes After 60 minutes
- 4.07 Do you think about quitting smoking? Yes No Not sure/ No response
If no or not sure, skip to 4.10
- 4.08 In how much time do you hope to accomplish this? (How many months from now?) Months
- 4.09 In the last 12 months, how many times have you quit smoking for at least 24 hours? Times
- 4.10 In the last 12 months, has a health professional advised you to quit smoking? Yes No Not sure
- 4.11 Do you know if smoking rules (bans, designated areas, etc) exist for public places such as the office, school, other work places, public transport, health centers, restaurants, and how these rules are followed?
 Yes, they exist and they are never violated. Yes they exist but they are frequently violated. Yes they exist but I don't know if they are violated They do not exist. I am not sure if they exist or not.
- 4.12 Do you believe that smoking can damage your health? Yes No Not sure
- 4.13 Do you believe that smoking in enclosed areas or close to other people can damage the health of those who are around you? Yes No Not sure

V. ALCOHOL USE

- 5.01 During the last month, have you ingested at least one of the following alcoholic drinks: Beer, wine, whisky, liquor? Yes No I don't drink Don't recall/ Not sure Refused
Skip to 6.01
- 5.02 During the last month, how many days per week or per month on average did you drink alcoholic beverages?
 Days per week Days per month Not sure Refused
- 5.03 We are going to consider for the purposes of this questionnaire that one drink is equivalent to one can or bottle of beer, one glass of wine, one shot of liquor. Approximately, how many drinks do you ingest, on average, on the days when you drink alcohol?
 Number of drinks Not sure Refused
- 5.04 Taking into consideration all types of alcoholic beverages, how many times during the last month have you ingested more than 5 drinks on one occasion?
 Days Not sure I deny/ don't want to answer.
- 5.05 Have you felt the need to decrease or stop drinking alcoholic drinks? Yes No Not sure Refused
- 5.06 Are there people who criticize the way you drink? Yes No Not sure Refused
- 5.07 Have you felt bad or guilty for the way you drink? Yes No Not sure Refused
- 5.08 Have you had to have a drink first thing in the morning to calm your nerves or to relieve a hangover from the day before? Yes No Not sure Refused

VI. DIABETES MELLITUS

6.01 Have you ever had a blood glucose or blood sugar test done? When?
 YES, less than 6 months YES, about 6-12 months YES, but more than 12 months ago NO Does not know / Not sure

6.02 Has a doctor, nurse or any other healthcare worker ever told you that you have diabetes or high blood sugar levels?
 YES YES, during pregnancy NO Does not know / Not sure Skip to **7.01**

6.03 How often do you have your blood tested?
 Number of times Per day Per week Per month Per year Never Does not know / Not sure

6.04 Have you ever heard about glycosilated hemoglobin or A1c?
 YES Number of times that you performed the test in the last 12 months. NO Does not know / Not sure

6.05 Are you at present participating in any diabetes program or treatment prescribed by a professional ?
 YES NO Does not know / Not sure Skip to **7.01**

6.06 What kind of treatment have you been prescribed to control your diabetes or blood sugar? (Complete all positive or pertinent options)
 YES NO YES NO
 a Medication b Special diet plan
 c Regular physical activity d Lose weight
 e Avoid excess alcohol intake f Home remedy. Which?
 g Other. Which?

6.07 Are you taking medications? YES NO DON'T KNOW/ NO ANSWER If no medication has been prescribed, skip to **7.01**

6.08 What medication are you taking?

Generic name	Trade name
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>

6.09 In general, where do you find the medications that the doctor has prescribed for diabetes?
 Public Pharmacy Private Pharmacy Social Security Foundations Others

6.10 In general, do you have the money or means to obtain the medications that the doctors prescribes for diabetes?
 YES, always YES, but with much difficulty NO

VII. BLOOD PRESSURE

- 7.01 Have you ever had your blood pressure taken? YES NO Does not know / Not sure Skip to **7.03**
- 7.02 Has a doctor, nurse or any other healthcare worker ever told you that you have or have had high blood pressure? YES NO DOESN'T KNOW/ NO ANSWER
- 7.03 Are you presently following a treatment to control your blood pressure? YES NO Does not know / Not sure Skip to **8.01**
- 7.04 What kind of treatment have you been prescribed to control your high blood pressure? (Complete all positive or pertinent options)
- | | | | |
|--------|--|--------|--|
| YES NO | | YES NO | |
| a | Medication <input type="radio"/> <input type="radio"/> | b | Eat less salty food <input type="radio"/> <input type="radio"/> |
| c | Do not drink alcohol in excess <input type="radio"/> <input type="radio"/> | d | Regular physical activity <input type="radio"/> <input type="radio"/> |
| e | Lose weight <input type="radio"/> <input type="radio"/> | f | Home Remedy. Which? <input type="radio"/> <input type="radio"/> <input type="text"/> |
| g | Stop smoking <input type="radio"/> <input type="radio"/> | h | Other. Which? <input type="radio"/> <input type="radio"/> <input type="text"/> |
- 7.05 Are you taking medication? YES NO NOT SURE/ NO ANSWER If no medication has been prescribed, skip to **8.01**
- 7.06 What medication are you taking?
- | Generic name | Trade name |
|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> |
| <input type="text"/> | <input type="text"/> |
| <input type="text"/> | <input type="text"/> |
- 7.07 In general, where do you find the medications that the doctor has prescribed for hypertension? Public Pharmacy Private Pharmacy Social Security Foundations Others
- 7.08 In general, do you have the money or means to obtain the medications that the doctors prescribes for hypertension? Yes, always Yes, but with much difficulty No

VIII. CHOLESTEROL

- 8.01 Have you ever measured your blood cholesterol? YES NO Does not know / Not sure Skip to **8.03**
- 8.02 When was the last time that you took a cholesterol test? In the last year In the last 2 years In the last 5 years More than 5 years ago Does not know / Not sure
- 8.03 Has a doctor, nurse or any other healthcare worker ever told you that you have high blood cholesterol? YES NO Does not know / Not sure Skip to **9.01**
- 8.04 Are you presently following a treatment or program to control your cholesterol? YES NO Does not know / Not sure Skip to **9.01**
- 8.05 What kind of treatment or medication have you been prescribed to lower your cholesterol? (Complete all positive or pertinent options)
- | | | | |
|--------|--|--------|--|
| YES NO | | YES NO | |
| a | Medication <input type="radio"/> <input type="radio"/> | b | Eat more vegetables, fruits and fibres <input type="radio"/> <input type="radio"/> |
| c | Eat less fat or no fat at all <input type="radio"/> <input type="radio"/> | d | Home remedy. Which? <input type="radio"/> <input type="radio"/> <input type="text"/> |
| e | Lose weight or control your weight <input type="radio"/> <input type="radio"/> | f | Regular physical activity <input type="radio"/> <input type="radio"/> |
- 8.06 Are you taking medications? Yes No Doesn't know/ No Answer If no medication has been prescribed, skip to **9.01**
- 8.07 What medication are you taking?
- | Generic name | Trade name |
|----------------------|----------------------|
| <input type="text"/> | <input type="text"/> |
| <input type="text"/> | <input type="text"/> |
| <input type="text"/> | <input type="text"/> |
- 8.08 In general, where do you find the medications that the doctor has prescribed for cholesterol? Public Pharmacy Private Pharmacy Social Security Foundations Others
- 8.09 In general, do you have the money or means to obtain the medications that the doctors prescribes for cholesterol? Yes, always Yes, but with much difficulty No

IX. HEART ATTACK AND CEREBRO-VASCULAR ACCIDENTS

9.01 Has a doctor or other healthcare professional ever told you that one time you had/ suffered from:

- | | YES | NO | DOESN'T KNOW/
NO ANSWER |
|---|-----------------------|-----------------------|----------------------------|
| 1. Heart Attack | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 2. Angina (chest) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 3. Cerebral Thrombosis, Hemorrhage, also called cerebro-vascular accident | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

If NO was answered for the last 3 questions, go to Section 10.

9.02 For having suffered from one or various of the aforementioned illnesses, are you taking medications? Yes No Doesn't know/ No Answer

9.03 In general, where do you find the medications that you are prescribed?
Public Pharmacy Private Pharmacy Social Security Foundations Others

9.04 In general, do you have the money or means to obtain these medications?
Yes, always Yes, but with much difficulty No

X. FRUITS AND VEGETABLES

The following questions are about foods and drinks that you eat or drink normally. Please tell me how frequently you eat them. Remember, I am interested in both the foods that you eat in the home as well as the foods that you eat outside the home normally.

10.01 How frequently do you eat fruit?
1. _____ per day
2. _____ per week
3. _____ per month
4. _____ per year
5. _____ never
6. _____ Don't know

10.02 How frequently do you eat vegetables?
1. _____ per day
2. _____ per week
3. _____ per month
4. _____ per year
5. _____ never
6. _____ Don't know

10.03 In general, what type of oil or fat do you use in your house to cook, fry, or bake?
Vegetable Oil Lard, Fat, Bacon Butter Margarine Cook without any fat or oil Whichever None

10.04 Do you generally have the money to buy the following foods?

	YES	NO
a Vegetables	<input type="radio"/>	<input type="radio"/>
b Fruits	<input type="radio"/>	<input type="radio"/>
c Vegetable Oil	<input type="radio"/>	<input type="radio"/>

XI. PHYSICAL ACTIVITY

11.01 In a normal week, do you do any activity on any day that makes you breathe heavier than normal?
 YES NO (Go to question 11.03) NOT SURE/ NO ANSWER

11.02 This section contains a series of questions that the interviewer should ask to complete the following table.

Activities in the last 7 days	Intensity: 1- Vigorous 2- Moderate	Times during the last 7 days	Average duration in minutes
A. Transport: walk, ride bicycles	<input type="text"/>	<input type="text"/>	<input type="text"/>
B. Sport or recreation: football, baseball, basketball, running, lifting weights, swimming, biking, dancing, etc.	<input type="text"/>	<input type="text"/>	<input type="text"/>
C. Paid work: walk, carry heavy boxes and objects, hammering, climb stairs, etc.	<input type="text"/>	<input type="text"/>	<input type="text"/>
D. Domestic Work: Clean, dust, climb stairs, garden work, etc.	<input type="text"/>	<input type="text"/>	<input type="text"/>

In order to fill in the column INTENSITY take into account that:

Vigorous activity: is activity that makes you breathe much heavier than normal

Moderate activity: is not as heavy as "vigorous activity" but it still makes you breathe a little heavier than normal.

11.03 During the last month, have you spent the majority of your weekdays seated? (80% or more)
 YES NO Don't remember/ not sure

XII. HEALTH CONDITION AND HEALTHCARE ACCESSIBILITY

12.01 In general, how would you say your health condition is?
 Excelent Very good Good Regular Bad Does not know / Not sure

12.02 During the last year, did you have any health coverage plan? (public, private, combined, any other)
 YES, always YES, but not always NO

12.03 Have you visited any healthcare team member in the last 12 months?
 YES NO Does not know / Not sure **If no, skip to 12.06**

12.04 In the last year, has there been a time that you needed to go to the doctor but couldn't because of lack of money?
 YES NO Don't remember/ not sure

12.05 Which professional did you visit last? Do NOT include emergencies.
 Physician Nurse Does not remember Other. Which?

12.06 How long ago did you last visit the doctor for a check-up?
 Within the last year Within the last 2 years 2-5 years ago 5 years or more Don't remember/ not sure Never

XIII. CLINICAL AND LABORATORY RESULTS

13.01	How many hours has it been since your last meal?	<input type="text"/>	13.10	Cholesterol	<input type="text"/>	[mg/dl]	
13.02	Systolic blood pressure	<input type="text"/>	[mm Hg]	13.11	Fasting glucose	<input type="text"/>	[mg/dl]
13.03	Diastolic blood pressure	<input type="text"/>	[mm Hg]	13.12	Triglycerides	<input type="text"/>	[mg/dl]
13.04	Weight	<input type="text"/>	[Kg]	13.13	LDL- Cholesterol	<input type="text"/>	[mg/dl]
13.05	Height	<input type="text"/>	[cm]	13.14	HDL- Cholesterol	<input type="text"/>	[mg/dl]
13.06	BMI	<input type="text"/>		13.15	2-hr blood glucose	<input type="text"/>	[mg/dl]
13.07	Waist	<input type="text"/>	[cm]				
13.08	Hip	<input type="text"/>	[cm]				
13.09	Waist-to-hip ratio	<input type="text"/>					

XIV. OPTIONAL MODULES

1. Women's Health

14.01.01 Have you ever had a clinical breast exam done? When was the last time?

YES, a year ago or less YES, about 1-2 years ago YES, but more than 2 years ago NO Does not know / Not sure

14.01.02 A mammography is an X-ray of each breast to screen for breast cancer. Have you ever had one done? When was the last time?

YES, a year ago or less YES, about 1-2 years ago YES, but more than 2 years ago NO Does not know / Not sure

14.01.03 Mammographies are done as routine exams, but sometimes they are done because a doctor or health care professional has found a lump or other kind of abnormality in the breasts. Was your last mammography done for this reason?

No Yes Does not know / Not sure

14.01.04 A Pap smear or cytological test is an exam to screen for cervical cancer. Have you ever had one done? When was the last time?

YES, a year ago or less YES, about 1-2 years ago YES, but more than 2 years ago NO Does not know / Not sure

2. Men's Health

14.02.01 A medical exam of the rectum (DRE- Digital Rectal Exam) is a test in which a doctor or healthcare professional inserts a gloved finger into the rectum to explore the prostate of the patient for size, shape, or hardness. Have you ever had this type of exam?

No Yes Does not know / Not sure

14.02.02 Has a doctor or other health care professional ever told you that you have prostate cancer?

No Yes Does not know / Not sure

3. Both Genders: Colorectal Cancer

14.03.01 A Fecal Occult Blood Test (FOBT) is an exam that checks for blood in the stool. Have you ever done this test?

No Yes Does not know / Not sure

14.03.02 A colonoscopy is a medical exam in which a tube is inserted through the rectum to be able to see the intestine to know if there are abnormalities or problems. Have you ever had this type of exam done?

No Yes Does not know / Not sure

14.03.03 Has a doctor or other health care professional ever told you that you have colon cancer?

No Yes Does not know / Not sure

4. Both Genders: Risk of Angina, Heart Attack, and Cerebro-Vascular Disease

14.04.01 Have you ever felt pressure and heaviness in your chest?
No Yes Does not know /
Not sure **If no, go to question 14.04.08**

14.04.02 Do you feel the pain in the center of your chest radiate out to the left side and left arm?
No Yes Does not know /
Not sure

14.04.03 Does the pain appear when you walk at a normal pace? Is the pain present when you are walking on a flat surface as well as an incline?
No Yes Does not know /
Not sure

14.04.04 Do you decrease your pace if the pain appears when you are walking?
No Yes Does not know /
Not sure

14.04.05 Does the pain disappear if you stop walking or if you insert a pill under your tongue?
No Yes Does not know /
Not sure

14.04.06 Does the pain disappear in less than 10 minutes?
No Yes Does not know /
Not sure

14.04.07 Have you ever had a pain in the front part of your chest that lasted 30 or more minutes?
No Yes Does not know /
Not sure

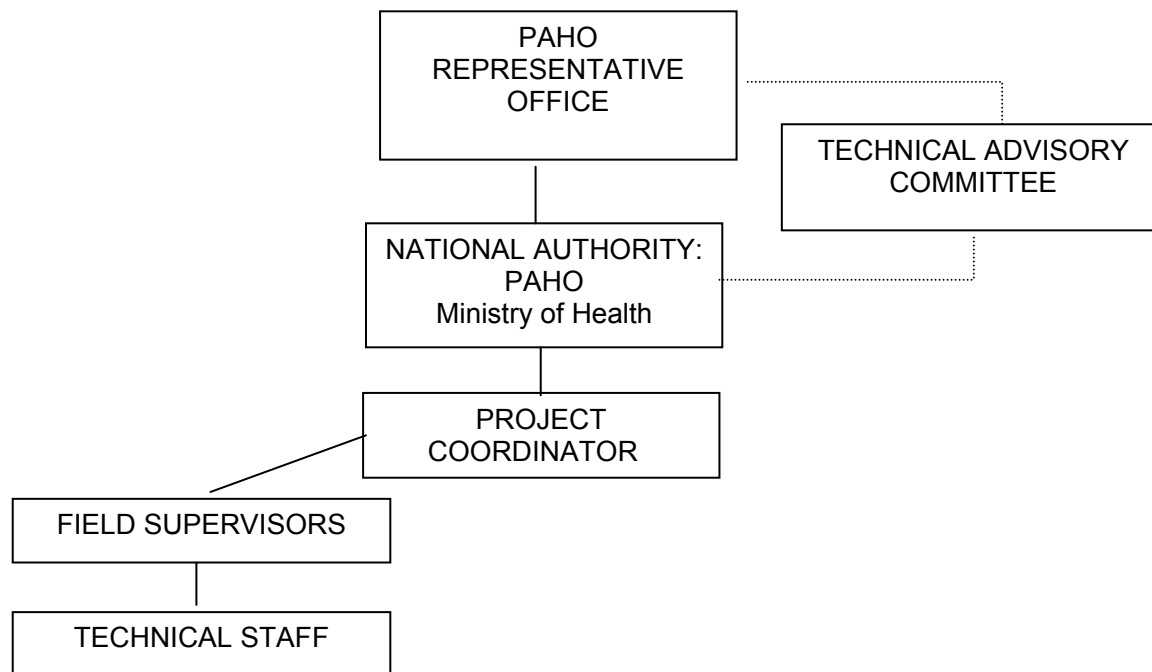
14.04.08 Have you ever had any of the following symptoms: difficulty speaking, weakness in the arms or legs on one side of the body, extremities that fall asleep on one side of the body?
No Yes Does not know /
Not sure

Annex 5. Organizational Structure

The organizational structure of the project is outlined in *Figure 2*. The PAHO/WHO country office was responsible for the organization of field work and the technical supervision of the project. The National Project Authority, comprised of the PAHO/WHO country office and the Ministry of Health, was responsible for the implementation of the study, evaluation of implementation, financial management, data analysis and publication.

The project coordinator was responsible for the day-to-day management and supervision of field implementation, and preparation of a Technical Report.

Figure 1. Organizational Structure



Field supervisors were directly responsible for organizing and controlling field work, coordinating staff to ensure quality, goals and deadlines. The field supervisors accompanied interviewers in the field, guided staff in field work and data collection, reviewed Questionnaires and Forms in the field for completeness and errors, and arranged and monitored appointments for blood samples.

Technical staff included interviewers, phlebotomists and field staff for taking anthropometric measurements. These field workers were responsible for questionnaire administration, anthropometry, blood pressure, revisiting homes to obtain missing data or to correct discrepancies in the questionnaire, and taking and shipping blood samples to the Central Medical Laboratory in Belize City for biochemical analysis.

A referral system was also established. A physician was identified in each district to receive referrals from the study at the local level, and a physician was identified at the national level to receive referrals with complications.

Annex 6. Field Evaluation Checklist

Key Activity	District					
	01	02	03	04	05	06
<i>FORMS AND QUESTIONNAIRES</i>						
Forms 1-4 completed in the right order						
Sample Coverage and Blood Draw Appointments being carefully monitored (Form 4A)						
Informed Consent properly obtained and consent form signed by both interviewer/ee						
Proper explanation of 14 hour fasting and the blood draw procedure (i.e. pre and post prandial draws, with a 2 hour wait and Trutol)						
Supervisor reviews forms for completion after each visit						
<i>BLOOD PRESSURE MEASUREMENT</i>						
Checklist for taking blood pressure completed before BP measurement and appropriate measures taken if necessary						
Proper body position/posture, cuff placement, relaxation, etc during BP measurement						
5 minute period of relaxation before the 1 st and between each subsequent measurement						
<i>ANTHROPOMETRY</i>						
Tape measure properly set up for height measurement (90 ^o surface, plume line used to position tape, etc)						
Height measurements taken using appropriate technique (posture, no shoes, etc.)						
Hip and waist measurements taken using appropriate technique (removal of thick clothing, etc)						
Participant comfort and privacy respected during anthropometry						
Weight measurements taken using appropriate techniques (no shoes, posture, etc.)						
<i>FASTING GLUCOSE AND CHOLESTEROL BLOOD SAMPLES</i>						
Verify no food or drink (except water) for at least 14 hours at time of blood draw						
2 hour time period for postprandial draw starts at first sip						
Trutol consumed in less than 5 minutes						
Grey tops for Fasting Glucose						
Red tops for Cholesterol						
Shipment of samples to the laboratory on ice and centrifugation 2 to 4 hours after extraction						
<i>EQUIPMENT</i>						
Proper equipment storage, maintenance and recalibration						
<i>LABORATORY TESTS (CML ONLY)</i>						
Proper Storage of serum samples (-20 ^o C before biochemical tests, (-70 ^o C after biochemical tests)						

Sample non-acceptance criteria used (<0.2ml, dense hemolysis)					
<i>DISTRIBUTION OF RESULTS WITH REFERRAL AND RECOMMENDATIONS WHEN NEEDED</i>					

Annex 7. Diagnostic Criteria (Diabetes Mellitus)

Values for diagnosis of diabetes mellitus and other categories of hyperglycemia.				
	Glucose concentration, mmol/litre (mg/dl)			
	Whole blood		Plasma	
	Venous	Capillary	Venous	Capillary
Diabetes Mellitus: Fasting or 2 h after glucose load ^a	≥6.1 (≥110) ≥10.0 (≥180)	≥6.1 (≥110) ≥11.1 (≥200)	≥7.0 (≥126) ≥11.1 (≥200)	≥ 7.0 (≥126) ≥12.2 (≥220)
Impaired Glucose Tolerance (IGT): Fasting value (if measured) And 2 h after glucose load ^a	<6.1 (<110) and ≥6.7 (≥120)	<6.1 (<110) And ≥7.8 (≥140)	<7.0 (<126) and ≥7.8 (≥140)	< 7.0 (<126) and ≥ 8.9 (≥160)
Impaired Fasting Glycaemia (IFG): Fasting And (if measured) 2 h post glucose load	≥5.6 (≥100) and <6.1 (<110) <6.7 (<120)	≥5.6 (≥100) and 6.1 (<110) <7.8 (<140)	≥5.6 (≥100) and <7.0 (<126) <7.8 (<140)	≥ 6.1 (≥110) and <7.0 (<126) <8.9 (<160)
<p>^aFor epidemiological or population screening purposes, the 2-hour value after 75g oral glucose may be used alone. For clinical purposes the diagnosis of diabetes should always be confirmed by repeating the test on another day unless there is unequivocal hyperglycemia with acute metabolic decompensation or obvious symptoms.</p> <p>Glucose concentration should not be determined on serum unless red cells are immediately removed, otherwise glycolysis will result in an unpredictable under-estimation of the true concentration. It should be stressed that glucose preservatives do not totally prevent glycolysis. If whole blood is used, the sample should be kept at 0-4°C or centrifuged immediately, or assayed immediately.</p>				
Reproduce from ¹³				

¹³ World Health Organization, . *Definition, Diagnosis and Classification of Diabetes Mellitus and its Complications*, Report of a WHO Consultation. Geneva, 1999. WHO/NCD/NCS 99.2

Annex 8. Diagnostic Criteria (Hypertension)*

Category	Systolic (mm Hg)		Diastolic (mm Hg)
Optimal	<120	and	<80
Normal	<130	and	<85
High-Normal	130-139	or	85-89
Hypertension			
Stage 1	140-159	or	90-99
Stage 2	160-179	or	100-109
Stage 3	≥ 180	or	≥ 110

* reproduced from ¹⁴

¹⁴ Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure., The sixth report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VI). Arch Intern Med 1997, 157:2413-2446.

Annex 9. Variables and Indicators Measured

VARIABLES	INDICATORS
Weight ¹⁵ : Normal Overweight Obese	18.50-24.99 kg/m ² 25.00-29.99 kg/m ² ≥30.00
Waist ¹⁵ <i>Risk</i> Waist-to-Hip Ratio <i>Risk</i>	Men ≥102 cm. Women ≥88 cm. Men >1.0; Women >0.85
Physical Activity: <i>Sedentary</i> <i>Moderate</i> <i>Active</i>	<60 min/week 60-149 min/week ≥ 150 min/week
Total Cholesterol ¹⁶ : <i>Optimal</i> <i>Borderline High</i> <i>High</i> LDL Cholesterol <i>Optimal</i> <i>Borderline High</i> <i>High</i> HDL Cholesterol <i>Optimal</i> <i>Borderline High</i> <i>High</i> Triglycerides <i>Optimal</i> <i>Borderline High</i> <i>High</i>	<200 mg/dl 200-239 mg/dl ≥240 mg/dl <130 mg/dl 130-159 mg/dl ≥160 mg/dl ≥60 mg/dl 40-59 mg/dl <40 mg/dl (MENOR DE 40) <150 mg/dl 150-199 mg/dl ≥ 200 mg/dl

¹⁵ WHO, Obesity: Preventing and Managing The Global Epidemic; Geneva 2000; ISBN 92 4 120894 5

¹⁶ Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Final Report. Circulation 2002; 106:3143-3421

Annex 10. Tables 1-12

Table 1a. Sample Demographics by Sex

	Men		Women		Total	
	n	%	n	%	n	%
Sex (%)	69,299	50.0	69,408	50.0	138,707	100.0
District						
Corozal	7,800	11.3	7,789	11.2	15,589	11.2
Orange Walk	14,556	21.0	14,352	20.7	28,908	20.8
Belize	11,782	17.0	11,754	16.9	23,536	17.0
Cayo	17,190	24.8	17,079	24.6	34,269	24.7
Stann Creek	10,898	15.7	10,992	15.8	21,890	15.8
Toledo	7,074	10.2	7,441	10.7	14,515	10.5
Urban/Rural						
Urban	28,611	41.3	28,583	41.2	57,194	41.2
Rural	40,688	58.7	40,824	58.8	81,512	58.8
Age						
20 - 39	41,563	60.0	43,200	62.2	84,763	61.1
40 - 64	21,650	31.2	19,971	28.8	41,621	30.0
≥65	6,086	8.8	6,236	9.0	12,322	8.9
Marital Status						
Single	20,663	29.8	16,209	23.4	36,872	26.6
Married	33,489	48.3	31,688	45.7	65,177	47.0
Divorced	489	0.7	965	1.4	1,454	1.0
Widow/er	1,665	2.4	3,550	5.1	5,215	3.8
Common Law	11,630	16.8	15,584	22.5	27,214	19.6
Separated	1,363	2.0	1,412	2.0	2,775	2.0
Literacy						
Literate	61,099	88.2	59,161	85.2	120,261	86.7
Illiterate	8,200	11.8	10,247	14.8	18,446	13.3
Highest Education Completed						
None	2,762	4.0	3,418	4.9	6,180	4.5
Primary	41,382	59.7	44,208	63.7	85,590	61.7
Secondary	18,336	26.5	17,462	25.2	35,798	25.8
University	6,495	9.4	3,984	5.7	10,479	7.6
Postgraduate	324	0.5	329	0.5	653	0.5
DK/NS	0	0.0	7	0.0	7	0.0
Ethnicity						
White	189	0.3	182	0.3	371	0.3
Creole/Afro-caribbean	14,094	20.3	12,321	17.8	26,415	19.0
East Asian/Indo-caribbean	2,248	3.2	3,229	4.7	5,477	3.9
Mayan/Native	9,104	13.1	7,792	11.2	16,896	12.2
Garifuna	8,291	12.0	8,374	12.1	16,665	12.0
Mestizo	28,942	41.8	30,829	44.4	59,771	43.1
Mulatto	407	0.6	402	0.6	809	0.6
Menonite	2,679	3.9	2,595	3.7	5,274	3.8
Mixed	3,039	4.4	3,074	4.4	6,113	4.4
Other	306	0.4	610	0.9	916	0.7
Employment						
Full-time	35,865	51.8	12,173	17.5	48,038	34.6
Part-time	11,007	15.9	6,307	9.1	17,314	12.5
Unemployed, able to work	7,154	10.3	9,815	14.1	16,969	12.2
Unemployed, unable to work	2,530	3.7	3,267	4.7	5,797	4.2
Homemaker	795	1.1	33,577	48.4	34,372	24.8
Student	1,339	1.9	891	1.3	2,230	1.6
Retired	3,841	5.5	1,163	1.7	5,004	3.6
Volunteer	93	0.1	173	0.2	266	0.2
Other	6,599	9.5	2,019	2.9	8,618	6.2
Home						
Own	56,212	81.1	56,532	81.4	112,744	81.3
Rented	8,160	11.8	7,963	11.5	16,123	11.6
Lent	2,957	4.3	2,992	4.3	5,949	4.3
Other	1,890	2.7	1,902	2.7	3,792	2.7
DK/NS	80	0.1	19	0.0	99	0.1
Persons with income (avg +/- std)	1.7+/- 1.17		1.6+/- 1.11		1.6+/- 1.14	
Family History (Family member had one of the following or more)						
Hypertension	15,343	27.9	17,893	27.1	33,236	27.5
Diabetes	17,884	32.5	21,115	32.0	38,999	32.2
Stroke	4,481	8.1	5,673	8.6	10,154	8.4
Cancer	7,338	13.3	9,479	14.4	16,817	13.9
High Cholesterol	3,945	7.2	5,405	8.2	9,350	7.7
Osteoporosis	829	1.5	1,506	2.3	2,335	1.9
Heart Attack	5,226	9.5	4,847	7.4	10,073	8.3

Table 1b. Sample Demographics by Age Group

	Total					
	20-39		40-64		≥65	
	n	%	n	%	n	%
District						
Corozal	9,564	11.3	4,635	11.1	1,391	11.3
Orange Walk	17,681	20.9	8,693	20.9	2,534	20.6
Belize	14,401	17.0	7,107	17.1	2,028	16.5
Cayo	20,929	24.7	10,344	24.9	2,994	24.3
Stann Creek	13,378	15.8	6,458	15.5	2,054	16.7
Toledo	8,810	10.4	4,384	10.5	1,321	10.7
Urban/Rural						
Urban	35,076	41.4	17,137	41.2	4,980	40.4
Rural	49,687	58.6	24,484	58.8	7,343	59.6
Marital Status						
Single	29,628	35.0	5,678	13.6	1,566	12.7
Married	33,383	39.4	25,696	61.7	6,099	49.5
Divorced	246	0.3	803	1.9	404	3.3
Widow/er	440	0.5	1,695	4.1	3,080	25.0
Common Law	19,737	23.3	6,535	15.7	942	7.6
Separated	1,329	1.6	1,215	2.9	230	1.9
Literacy						
Literate	76,987	90.8	35,094	84.3	8,181	66.4
Illiterate	7,776	9.2	6,527	15.7	4,142	33.6
Highest Education Completed						
None	1,014	1.2	2,825	6.8	2,341	19.0
Primary	46,104	54.4	30,252	72.7	9,234	74.9
Secondary	28,810	34.0	6,437	15.5	552	4.5
University	8,465	10.0	1,846	4.4	167	1.4
Postgraduate	370	0.4	254	0.6	29	0.2
DK/NS	0	0.0	7	0.0	0	0.0
Ethnicity						
White	181	0.2	157	0.4	33	0.3
Creole/Afro-caribbean	17,244	20.3	7,115	17.1	2,056	16.7
East Asian/Indo-caribbean	2,965	3.5	1,893	4.5	619	5.0
Mayan/Native	9,459	11.2	5,645	13.6	1,793	14.6
Garifuna	9,971	11.8	4,914	11.8	1,780	14.4
Mestizo	37,416	44.1	17,811	42.8	4,544	36.9
Mulatto	491	0.6	217	0.5	101	0.8
Menonite	3,198	3.8	1,628	3.9	448	3.6
Mixed	3,149	3.7	2,095	5.0	870	7.1
Other	690	0.8	147	0.4	79	0.6
Employment						
Full-time	33,338	39.3	13,475	32.4	1,225	10.0
Part-time	11,509	13.6	5,055	12.2	750	6.1
Unemployed, able to work	12,375	14.6	3,531	8.5	1,063	8.6
Unemployed, unable to work	2,138	2.5	1,712	4.1	1,947	15.8
Homemaker	18,543	21.9	11,990	28.9	3,838	31.2
Student	2,194	2.6	0	0.0	36	0.3
Retired	289	0.3	2,000	4.8	2,714	22.1
Volunteer	34	0.0	157	0.4	75	0.6
Other	4,342	5.1	3,622	8.7	653	5.3
Home						
Own	64,827	76.5	36,835	88.5	11,082	89.9
Rented	12,770	15.1	2,759	6.6	593	4.8
Lent	4,317	5.1	1,358	3.3	274	2.2
Other	2,849	3.4	622	1.5	320	2.6
DK/NS	0	0.0	46	0.1	53	0.4
Persons with income (avg +/- std)	1.7+/- 1.15		1.6+/- 1.11		1.0+/- 0.97	
No Paid occupation	68,990	62.9	32,834	29.9	7,830	7.1
Family History (Family member had one of the following or more)						
Hypertension	19,492	29.7	11,474	25.3	2,276	22.5
Diabetes	22,288	34.0	13,892	30.7	2,821	27.9
Stroke	4,684	7.1	4,377	9.7	1,092	10.8
Cancer	7,002	10.7	7,608	16.8	2,204	21.8
High Cholesterol	6,869	10.5	1,993	4.4	488	4.8
Osteoporosis	1,108	1.7	1,011	2.2	216	2.1
Heart Attack	4,133	6.3	4,969	11.0	1,006	10.0

**Table 1c. Demographics by Age Group
Men**

	20-39		40-64		≥65	
	n	%	n	%	n	%
District						
Corozal	4,717	11.3	2,406	11.1	678	11.1
Orange Walk	8,733	21.0	4,563	21.1	1,260	20.7
Belize	7,065	17.0	3,731	17.2	986	16.2
Cayo	10,281	24.7	5,430	25.1	1,478	24.3
Stann Creek	6,536	15.7	3,282	15.2	1,080	17.7
Toledo	4,231	10.2	2,238	10.3	605	9.9
Urban/Rural						
Urban	17,281	41.6	8,903	41.1	2,426	39.9
Rural	24,282	58.4	12,747	58.9	3,660	60.1
Marital Status						
Single	17,094	41.1	3,041	14.0	528	8.7
Married	16,090	38.7	13,623	62.9	3,777	62.1
Divorced	0	0.0	417	1.9	72	1.2
Widow/er	146	0.4	652	3.0	867	14.2
Common Law	7,577	18.2	3,405	15.7	649	10.7
Separated	656	1.6	513	2.4	193	3.2
Literacy						
Literate	38,181	91.9	18,783	86.8	4,137	68.0
Illiterate	3,381	8.1	2,868	13.2	1,951	32.0
Highest Education Completed						
None	435	1.0	1,233	5.7	1,094	18.0
Primary	21,853	52.6	14,959	69.1	4,571	75.1
Secondary	14,022	33.7	4,049	18.7	266	4.4
University	5,119	12.3	1,236	5.7	140	2.3
Postgraduate	133	0.3	174	0.8	17	0.3
Ethnicity						
White	89	0.2	68	0.3	33	0.5
Creole/Afro-caribbean	9,194	22.1	3,778	17.4	1,122	18.4
East Asian/Indo-caribbean	1,079	2.6	831	3.8	338	5.6
Mayan/Native	5,224	12.6	3,046	14.1	834	13.7
Garifuna	4,979	12.0	2,408	11.1	904	14.9
Mestizo	17,588	42.3	9,268	42.8	2,086	34.3
Mulatto	167	0.4	139	0.6	101	1.7
Menonite	1,573	3.8	883	4.1	223	3.7
Mixed	1,442	3.5	1,191	5.5	406	6.7
Other	228	0.5	39	0.2	39	0.6
Employment						
Full-time	24,101	58.0	10,656	49.4	1,108	18.2
Part-time	6,489	15.6	3,967	18.4	551	9.1
Unemployed, able to work	4,959	11.9	1,594	7.4	601	9.9
Unemployed, unable to work	796	1.9	642	3.0	1,092	17.9
Homemaker	544	1.3	165	0.8	86	1.4
Student	1,315	3.2	0	0.0	24	0.4
Retired	289	0.7	1,512	7.0	2,039	33.5
Volunteer	0	0.0	76	0.4	17	0.3
Other	3,069	7.4	2,961	13.7	568	9.3
Home						
Own	31,782	76.5	18,885	87.2	5,545	91.1
Rented	6,262	15.1	1,597	7.4	301	4.9
Lent	2,031	4.9	812	3.8	114	1.9
Other	1,488	3.6	310	1.4	92	1.5
DK/NS	0	0.0	46	0.2	34	0.6
Persons with income (avg +/- std)	1.8+/- 1.24		1.6+/- 1.00		1.0+/- 0.96	
No Paid occupation	32,962	62.3	15,982	30.2	3,958	7.5
Family History (Family member had one of the following or more)						
Hypertension	8,661	30.5	5,801	25.3	881	23.3
Diabetes	9,870	34.8	6,902	30.1	1,113	29.4
Stroke	2,175	7.7	1,942	8.5	365	9.6
Cancer	2,521	8.9	4,029	17.6	786	20.7
High Cholesterol	2,521	8.9	1,244	5.4	180	4.8
Osteoporosis	591	2.1	170	0.7	68	1.8
Heart Attack	2,041	7.2	2,820	12.3	396	10.5

**Table 1d. Sample Demographics by Age Group
Women**

	<u>20-39</u>		<u>40-64</u>		<u>≥65</u>	
	n	%	n	%	n	%
District						
Corozal	4,847	19.1	2,229	11.2	713	11.4
Orange Walk	8,948	35.2	4,130	20.7	1,274	20.4
Belize	7,336	28.9	3,376	16.9	1,042	16.7
Cayo	10,648	41.9	4,914	24.6	1,516	24.3
Stann Creek	6,842	26.9	3,176	15.9	974	15.6
Toledo	4,579	18.0	2,146	10.7	716	11.5
Urban/Rural						
Urban	17,795	41.2	8,234	41.2	2,554	40.9
Rural	25,405	58.8	11,737	58.8	3,683	59.1
Marital Status						
Single	12,534	29.0	2,637	13.2	1,038	16.6
Married	17,293	40.0	12,073	60.5	2,322	37.2
Divorced	246	0.6	386	1.9	332	5.3
Widow/er	294	0.7	1,043	5.2	2,213	35.5
Common Law	12,160	28.1	3,130	15.7	293	4.7
Separated	673	1.6	702	3.5	37	0.6
Literacy						
Literate	38,806	89.8	16,311	81.7	4,044	64.9
Illiterate	4,395	10.2	3,659	18.3	2,191	35.1
Highest Education Completed						
None	579	1.3	1,592	8.0	1,247	20.0
Primary	24,251	56.1	15,293	76.6	4,663	74.8
Secondary	14,788	34.2	2,388	12.0	286	4.6
University	3,346	7.7	610	3.1	27	0.4
Postgraduate	237	0.5	80	0.4	12	0.2
DK/NS	0	0.0	7	0.0	0	0.0
Ethnicity						
White	92	0.2	89	0.4	0	0.0
Creole/Afro-caribbean	8,050	18.6	3,337	16.7	934	15.0
East Asian/Indo-caribbean	1,886	4.4	1,062	5.3	281	4.5
Mayan/Native	4,235	9.8	2,599	13.0	959	15.4
Garifuna	4,992	11.6	2,506	12.5	876	14.0
Mestizo	19,828	45.9	8,543	42.8	2,458	39.4
Mulatto	324	0.7	78	0.4	0	0.0
Menonite	1,625	3.8	745	3.7	225	3.6
Mixed	1,707	4.0	904	4.5	464	7.4
Other	462	1.1	108	0.5	40	0.6
Employment						
Full-time	9,237	21.4	2,819	14.1	117	1.9
Part-time	5,020	11.6	1,088	5.4	199	3.2
Unemployed, able to work	7,416	17.2	1,937	9.7	462	7.4
Unemployed, unable to work	1,342	3.1	1,070	5.4	855	13.8
Homemaker	17,999	41.7	11,825	59.2	3,752	60.4
Student	879	2.0	0	0.0	12	0.2
Retired	0	0.0	488	2.4	675	10.9
Volunteer	34	0.1	81	0.4	58	0.9
Other	1,273	2.9	661	3.3	85	1.4
Home						
Own	33,045	76.5	17,950	89.9	5,537	88.8
Rented	6,508	15.1	1,162	5.8	292	4.7
Lent	2,286	5.3	546	2.7	160	2.6
Other	1,361	3.2	312	1.6	228	3.7
DK/NS	0	0.0	0	0.0	19	0.3
Persons with income (avg +/- std)	1.7+/- 1.05		1.7+/- 1.22		1.0+/- 0.97	
No Paid occupation	36,028	63.5	16,852	29.7	3,872	6.8
Family History (Family member had one of the following or more)						
Hypertension	10,831	29.1	5,673	25.3	1,395	22.1
Diabetes	12,418	33.4	6,990	31.2	1,708	27.1
Stroke	2,509	6.7	2,435	10.9	727	11.5
Cancer	4,481	12.0	3,579	16.0	1,418	22.5
High Cholesterol	4,348	11.7	749	3.3	308	4.9
Osteoporosis	517	1.4	841	3.8	148	2.3
Heart Attack	2,092	5.6	2,149	9.6	610	9.7

Table 2a. Risk Characteristics by Age Group

	Total											
	20 - 39			40 - 64			≥65			Total		
	n	%	(95%CI)	n	%	(95%CI)	n	%	(95%CI)	n	%	(95%CI)
Tobacco Use												
Non-smoker ^a	59393	85.6	(80.5-89.6)	26434	75.2	(67.6-81.5)	6689	71.1	(62.4-78.6)	92516	81.2	(76.7-85.1)
Former Smoker ^b	4081	5.9	(3.5-9.8)	3738	10.6	(6.9-16.1)	1940	20.6	(14.4-28.7)	9759	8.6	(6.2-11.8)
Current Smoker ^c	5872	8.5	(5.7-12.4)	4965	14.1	(10.3-19.0)	772	8.2	(4.2-15.4)	11610	10.2	(7.5-13.7)
Alcohol use in the last month												
Yes	29965	35.3	(27.4-44.1)	12407	29.8	(23.3-37.2)	1512	12.4	(8.3-18.0)	43884	31.7	(24.9-39.3)
No	41123	48.5	(39.3-57.8)	21965	52.8	(44.1-61.3)	7855	64.4	(53.8-73.7)	70943	51.2	(42.4-59.8)
Daily number of Fruit Eaten												
Average +/- std		1.4+/- 0.9			1.45,+/- 0.82			1.55,+/- 1.45			1.44+/-0.9	
Daily number of Vegetables Eaten												
Average +/- std		1.4+/- 1.0			1.4+/- 0.7			1.3+/- 0.7			1.4+/-0.9	
Type of oil or fat used at home												
Vegetable Oil	32350	82.8	(70.9-90.5)	16716	84.7	(75.6-90.8)	4539	81.0	(69.1-89.1)	53605	83.2	(74.1-89.6)
Lard, fat, bacon	2361	6.0	(2.9-12.1)	1365	6.9	(3.3-14.0)	604	10.8	(5.2-21.0)	4330	6.7	(3.4-12.7)
Butter	439	1.1	(0.3-4.4)	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	439	0.7	(0.2-2.7)
Margarine	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)
Whichever	3385	8.7	(3.4-20.2)	1352	6.8	(3.1-14.3)	433	7.7	(3.5-16.4)	5170	8.0	(3.9-15.8)
None	220	0.6	(0.1-3.9)	113	0.6	(0.1-4.5)	26.8	0.5	(0.1-3.4)	360	0.6	(0.1-2.1)
Cook without oil or fat	322	0.8	(0.3-2.4)	193	1.0	(0.3-3.4)	0	0.0	(0.0-0.0)	515.8	0.8	(0.4-1.8)
Have money to buy vegetables												
Yes	75750	89.3	(82.0-93.9)	35453	85.1	(79.4-89.4)	10100	82.7	(74.9-88.5)	121302	87.5	(81.5-91.7)
No	9072	10.7	(6.1-18.0)	6226	14.9	(10.6-20.6)	2106	17.3	(11.5-25.1)	17405	12.5	(8.3-18.5)
Have money to buy fruits												
Yes	75354	88.8	(81.0-93.7)	35393	84.9	(78.0-89.9)	10003	82.0	(74.6-87.6)	120750	87.1	(80.5-91.6)
No	9468	11.2	(6.3-19.0)	6286	15.1	(10.1-22.0)	2203	18.0	(12.4-25.4)	17957	12.9	(8.4-19.5)
Have money to buy vegetable oil												
Yes	78235	92.2	(88.3-94.9)	36885	88.5	(83.6-92.0)	10183	83.4	(75.4-89.2)	125303	90.3	(86.5-93.2)
No	6587	7.8	(5.1-11.7)	4794	11.5	(8.0-16.4)	2023	16.6	(10.8-24.6)	13404	9.7	(6.8-13.5)
Physical Activity												
Sedentary (avg. <60 min/week)	63161	74.7	(67.1-87.0)	33957	81.5	(77.0-85.3)	10504	86.1	(78.8-91.1)	107622	77.7	(71.8-82.7)
Moderate (avg. = 60-149 min/week)	4155	4.9	(3.3-7.3)	2625	6.3	(4.4-9.0)	436	3.6	(1.8-7.1)	7217	5.2	(3.8-7.1)
Active (avg. >= 150 min/week)	17251	20.4	(14.0-28.8)	5097	12.2	(8.7-16.9)	1266	10.4	(6.3-16.5)	23613	17.1	(12.2-23.4)
Waist Circumference												
Average (cm) +/- std		90.73+/- 14.33			97.04+/- 15.08			94.44+/- 12.56			92.9+/-14.7	
Hip Circumference												
Average (cm) +/- std		102.37+/- 13.41			104.37+/- 13.23			99.50+/- 11.52			102.7+/-13.2	
Waist-to-hip												
Average +/- std		0.89+/- 0.08			0.93+/- 0.09			0.95+/- 0.08			0.9+/-0.08	
Systolic Blood Pressure												
Average (mm Hg) +/- std		110.65+/- 16.35			125.14+/- 21.84			138.43+/- 26.96			116.96+/-21.03	
Diastolic Blood Pressure												
Average (mm Hg) +/- std		70.74+/- 11.61			77.48+/- 12.50			76.75+/- 12.93			73.39+/-12.70	

^aSmoked < 100 cigarettes in lifetime; ^bSmoked > 100 cigarettes in lifetime but do not currently smoke;

^cSmoked > 100 cigarettes in lifetime and currently smoke

**Table 2b. Risk Characteristics by Age Group
Men**

	20 - 39			40 - 64			≥65			Total		
	n	%	(95%CI)	n	%	(95%CI)	n	%	(95%CI)	n	%	(95%CI)
Tobacco Use												
Non-smoker ^a	27223	74.8	(65.8-82.0)	11846	60.1	(49.0-70.2)	2782	55.3	(43.6-66.4)	41851	68.4	(60.9-75.1)
Former Smoker ^b	3656	10.0	(5.7-17.0)	3235	16.4	(11.0-23.7)	1575	31.3	(22.9-41.2)	8467	13.8	(9.8-19.1)
Current Smoker ^c	5532	15.2	(9.7-22.9)	4645	23.5	(16.9-31.8)	672	13.4	(6.3-26.0)	10849	17.7	(12.8-24.0)
Alcohol use in the last month												
Yes	21927	52.7	(41.9-63.3)	9714	44.7	(34.0-55.8)	1275	21.6	(13.9-31.8)	32916	47.5	(37.7-57.5)
No	14824	35.6	(27.0-45.3)	9198	42.3	(31.2-54.2)	3700	62.6	(50.8-73.1)	27722	40.0	(31.0-49.8)
Eat Fruit												
Average Per day +/- std		1.4 +/- 0.9			1.5 +/- 0.9			1.7 +/- 1.8		1.44 +/- 0.9		
Eat Vegetables												
Average Per day +/- std		1.4 +/- 0.8			1.4 +/- 0.8			1.4 +/- 0.7		1.4 +/- 0.8		
Type of oil or fat used at home												
Vegetable Oil	13842	78.7	(64.5-88.2)	8660	85.5	(74.3-92.3)	2278	79.4	(64.8-89.0)	24780	81.0	(70.3-88.5)
Lard, fat, bacon	1328	7.6	(3.6-15.3)	564	5.6	(2.7-11.2)	319	11.1	(4.8-23.8)	2212	7.2	(3.7-13.8)
Butter	439	2.5	(0.6-9.5)	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	439	1.4	(0.4-5.5)
Margarine	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)
Whichever	1765	10.0	(4.1-22.6)	695	6.9	(2.4-17.9)	271	9.5	(3.1-25.7)	2731	8.9	(4.2-18.0)
None	220	1.3	(0.2-8.9)	113	1.1	(0.1-8.5)	0	0.0	(0.0-0.0)	333	1.1	(0.3-4.6)
Cook without oil or fat	0	0.0	(0.0-0.0)	93	0.9	(0.2-4.6)	0	0.0	(0.0-0.0)	92.6	0.3	(0.1-1.6)
Have money to buy vegetables												
Yes	37818	90.9	(77.9-96.6)	18903	86.9	(79.7-91.8)	5075	85.8	(74.3-92.7)	61796	89.2	(80.8-94.2)
No	3778	9.1	(3.4-22.1)	2847	13.1	(8.2-20.3)	837	14.2	(7.3-25.7)	7461	10.8	(5.8-19.2)
Have money to buy fruits												
Yes	37818	90.9	(77.9-96.6)	18801	86.4	(77.5-92.2)	4967	84.0	(72.8-91.2)	61586	88.9	(79.9-94.2)
No	3778	9.1	(3.4-22.1)	2949	13.6	(7.8-22.5)	945	16.0	(8.8-27.2)	7672	11.1	(5.8-20.1)
Have money to buy vegetable oil												
Yes	38597	92.8	(86.3-96.3)	19487	89.6	(81.4-94.4)	5064	85.7	(74.1-92.6)	63148	91.2	(85.5-94.8)
No	2998	7.2	(3.7-13.7)	2263	10.4	(5.6-18.6)	848	14.3	(7.4-25.9)	6109	8.8	(5.2-14.5)
Physical Activity												
Sedentary (avg. <60 min/week)	29016	70.2	(59.7-78.9)	17809	81.9	(74.4-87.5)	4965	84.0	(74.7-90.3)	51791	75.1	(67.0-81.7)
Moderate (avg. = 60-149 min/week)	1835	4.4	(2.5-7.8)	1279	5.9	(3.3-10.4)	180	3.0	(1.3-7.1)	3294	4.8	(3.1-7.3)
Active (avg. >= 150 min/week)	10489	25.4	(16.5-37.0)	2662	12.2	(7.3-19.9)	766	13.0	(7.8-20.8)	13917	20.2	(13.8-28.4)
Waist Circumference												
Average (cm) +/- std		89.33 +/- 13.24			96.46 +/- 14.70			93.27 +/- 12.30		91.9 +/- 14.0		
Hip Circumference												
Average (cm) +/- std		98.85 +/- 11.08			100.71 +/- 10.92			97.12 +/- 9.67		99.2 +/- 10.9		
Waist-to-hip												
Average +/- std		0.90 +/- 0.08			0.96 +/- 0.07			0.96 +/- 0.07		0.92 +/- 0.08		
Systolic Blood Pressure												
Average (mm Hg) +/- std		116.52 +/- 15.34			127.45 +/- 20.68			139.36 +/- 27.49		121.27 +/- 18.88		
Diastolic Blood Pressure												
Average (mm Hg) +/- std		72.0 +/- 11.3			78.42 +/- 12.32			77.59 +/- 13.51		74.56 +/- 12.57		

^aSmoked < 100 cigarettes in lifetime; ^bSmoked > 100 cigarettes in lifetime but do not currently smoke;

^cSmoked > 100 cigarettes in lifetime and currently smoke

Table 2c. Risk Characteristics by Age Group
Women

	20 - 39			40 - 64			≥65			Total		
	n	%	(95%CI)	n	%	(95%CI)	n	%	(95%CI)	n	%	(95%CI)
Tobacco Use												
Non-smoker ^a	32170	97.7	(94.6-99.0)	14588	94.7	(89.0-97.5)	3907	89.4	(80.5-94.5)	50665	96.1	(92.9-97.9)
Former Smoker ^b	425	1.3	(0.4-4.6)	503	3.3	(0.9-10.7)	365	8.3	(3.9-17.1)	1292	2.5	(1.1-5.2)
Current Smoker ^c	340	1.0	(0.4-3.0)	320	2.1	(1.0-4.2)	101	2.3	(0.7-7.2)	761	1.4	(0.8-2.5)
Alcohol use in the last month												
Yes	8038	18.6	(11.6-28.5)	2693	13.6	(8.6-20.7)	237	5.7	(1.7-8.3)	10967	15.8	(10.4-23.3)
No	26299	60.8	(48.5-71.9)	12767	64.3	(54.7-72.9)	4155	66.0	(53.8-76.4)	43221	62.3	(51.7-71.9)
Eat Fruit												
Average Per day +/- std		1.5 +/- 0.8			1.4 +/- 0.7			1.4 +/- 0.9			1.45 +/- 0.8	
Eat Vegetables												
Average Per day +/- std		1.5 +/- 1.2			1.3 +/- 0.6			1.3 +/- 0.6			1.39 +/- 1.0	
Type of oil or fat used at home												
Vegetable Oil	18508	86.1	(71.1-94.0)	8056	83.8	(73.7-90.5)	2261	82.7	(69.5-90.9)	28825	85.2	(74.0-92.1)
Lard, fat, bacon	1032	4.8	(1.8-12.5)	800	8.3	(3.4-19.0)	285	10.4	(4.9-20.8)	2117	6.3	(2.8-13.6)
Butter	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)
Margarine	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)
Whichever	1621	7.5	(2.1-23.3)	657	6.8	(3.4-13.1)	161	5.9	(2.2-14.9)	2439	7.2	(2.8-17.5)
None	0	0.0	(0.0-0.0)	0	0.0	(0.0-0.0)	26.8	1.0	(0.1-7.0)	27	0.1	(0.0-0.6)
Cook without oil or fat	322	1.5	(0.5-4.2)	101	1.0	(0.2-4.3)	0	0.0	(0.0-0.0)	423.2	1.3	(0.5-2.9)
Have money to buy vegetables												
Yes	37932	87.8	(82.6-91.6)	16549	83.0	(75.0-88.9)	5025	79.8	(71.8-86.0)	59506	85.7	(80.7-89.6)
No	5295	12.2	(8.4-17.4)	3380	17.0	(11.1-25.0)	1269	20.2	(14.0-28.2)	9943	14.3	(10.4-19.3)
Have money to buy fruits												
Yes	37536	86.8	(80.8-91.2)	16592	83.3	(75.3-89.0)	5036	80.0	(72.3-86.0)	59164	85.2	(79.9-89.9)
No	5690	13.2	(8.8-19.2)	3337	16.7	(11.0-24.7)	1258	20.0	(14.0-27.7)	10286	14.8	(10.5-20.5)
Have money to buy vegetable oil												
Yes	39638	91.7	(88.1-94.3)	17398	87.3	(81.3-91.6)	5119	81.3	(73.1-87.5)	62155	89.5	(86.0-92.2)
No	3588	8.3	(5.7-11.9)	2531	12.7	(8.4-18.7)	1175	18.7	(12.5-26.9)	7295	10.5	(7.8-14.0)
Physical Activity												
Sedentary (avg. <60 min/week)	34144	79.0	(71.9-84.7)	16148	81.0	(75.9-85.3)	5539	88.0	(80.9-92.7)	55831	80.4	(74.8-85.0)
Moderate (avg. = 60-149 min/week)	2320	5.4	(3.3-8.7)	1346	6.8	(4.4-10.3)	255.8	4.1	(1.9-8.4)	3923	5.6	(3.7-8.4)
Active (avg. >= 150 min/week)	6762	15.6	(10.3-23.0)	2435	12.2	(8.5-17.3)	499.6	7.9	(4.1-15.0)	9696	14.0	(9.7-19.7)
Waist Circumference												
Average (cm) +/- std		92.06 +/- 15.18			97.67 +/- 15.45			95.58 +/- 12.70			93.9 +/- 15.2	
Hip Circumference												
Average (cm) +/- std		105.77 +/- 14.52			105.77 +/- 14.52			101.82 +/- 12.65			106.1 +/- 14.4	
Waist-to-hip												
Average +/- std		0.87 +/- 0.08			0.90 +/- 0.09			0.94 +/- 0.09			0.88 +/- 0.09	
Systolic Blood Pressure												
Average (mm Hg) +/- std		10.50 +/- 15.26			122.63 +/- 22.76			137.52 +/- 26.40			112.66 +/- 22.16	
Diastolic Blood Pressure												
Average (mm Hg) +/- std		69.53 +/- 11.77			76.46 +/- 12.62			75.92 +/- 12.28			72.23 +/- 12.73	

^aSmoked < 100 cigarettes in lifetime; ^bSmoked > 100 cigarettes in lifetime but do not currently smoke;

^cSmoked > 100 cigarettes in lifetime and currently smoke

Table 3. Smoking Habits and Health Knowledge among Current Smokers (n=14,679)

	<u>Men</u>		<u>Women</u>		<u>Total</u>	
	n	%	n	%	n	%
Age began to smoke (avg +/- std)	19.0+/- 6.1		20.3+/- 7.3		19.1+/- 6.3	
Cigarettes/day (avg +/- std)	8.8+/- 13.2		11.3+/- 19.7		9.1+/-13.9	
Cigars/day (avg +/- std)	0.2+/- 0.4		0.0,+/- 0.0		0.2+/- 0.4	
Pipes/day (avg +/- std)	0.0+/- 0.0		0.0+/- 0.0		0.0 +/- 0.0	
Last time smoked						
< 1 month	10,737	79.7	836	69.7	11,573	78.8
Between 1 and 6 months	994	7.4	154	12.8	1,148	7.8
1 year or more	296	2.2	34	2.8	330	2.2
Don't know	1,453	10.8	176	14.7	1,629	11.1
How long after waking up do you smoke						
< 5 minutes	1,477	11.0	182	15.2	1,659	11.4
Between 6 and 30 minutes	2,198	16.4	141	11.8	2,339	16.0
Between 31 and 60 minutes	1,903	14.2	226	18.8	2,129	14.6
> 60 minutes	7,808	58.3	650	54.2	8,458	58.0
Ever think about quitting smoking						
Yes	10,270	76.2	869	72.5	11,139	75.9
No	2,683	19.9	275	22.9	2,958	20.2
Not sure/No response	527	3.9	55	4.6	582	4.0
In how many months do you wish to quit smoking (avg +/- std) ^a	3.6+/- 3.5		3.0+/- 3.4		3.6,+/- 3.5	
How many times quit smoking in the last 12 months (avg +/- std) ^a	3.7+/-7.0		3.7+/-7.8		3.7+/- 7.1	
Has a health professional advised you to stop smoking in the last 12 months						
Yes	4,712	35.0	364	30.4	5,076	34.6
No	8,545	63.4	835	69.6	9,380	63.9
Not sure/No response	222	1.6	0	0.0	222	1.5
Do smoking rules exist						
Yes, and never violated	3,784	28.1	298	24.9	4,082	27.8
Yes, frequently violated	8,433	62.6	781	65.1	9,214	62.8
Yes, don't know if they are violated	616	4.6	48	4.0	664	4.5
No	297	2.2	0	0.0	297	2.0
Not sure	349	2.6	73	6.1	422	2.9
Can smoking damage your health						
Yes	13,064	96.9	1,150	95.9	14,214	96.8
No	338	2.5	49	4.1	387	2.6
Not sure/No response	78	0.6	0	0.0	78	0.5
Can smoking in an enclosed area damage the health of other people					14,679	
Yes	12,546	93.1	1,149	95.8	13,713	93.4
No	363	2.7	19	1.6	382	2.6
Not sure/No response	552	4.1	31	2.6	583	4.0

^aAmong persons who have ever thought about quitting smoking

Table 4. Alcohol Consumption and Health Knowledge among Alcohol Users (n=47,755)

	<u>Men</u>		<u>Women</u>		<u>Total</u>	
	n	%	n	%	n	%
Days/week had at least one drink (avg +/- std)	2.6 +/- 2.2		1.6 +/- 1.3		2.4 +/- 2.1	
Drinks ingested on days when you drink (avg +/- std)	8.5 +/- 11.5		3.6 +/- 2.9		7.2 +/- 10.2	
Days in the last month ingest at least 5 drinks (avg +/- std)	1.6 +/- 2.8		0.6 +/- 1.5		1.4 +/- 2.5	
Ever felt the need to stop or decrease drinking						
Yes	20,562	58.1	4,254	34.3	24,816	52.0
No	13,639	38.6	7,393	59.7	21,032	44.0
Not sure/No response	1,035	2.9	722	5.8	1,757	3.7
Refused	129	0.4	21	0.2	150	0.3
Do people criticize the way you drink						
Yes	12,452	35.2	2,386	19.3	14,838	31.1
No	21,924	62.0	9,458	76.3	31,382	65.7
Not sure/No response	990	2.8	525	4.2	1,515	3.2
Refused	0	0.0	21	0.2	21	0.0
Ever felt bad or guilty for the way you drink						
Yes	12,651	35.8	2,093	16.9	14,744	30.9
No	22,288	63.0	10,276	82.9	32,564	68.2
Not sure/No response	426	1.2	0	0.0	426	0.9
Refused	0	0.0	21	0.2	21	0.0
Ever had to have a drink first thing in the morning to calm your nerves or to relieve a hangover						
Yes	3,335	9.4	389	3.1	3,724	7.8
No	31,576	89.3	11,980	96.7	43,556	91.2
Not sure/No response	454	1.3	0	0.0	454	1.0
Refused	0	0.0	21	0.2	21	0.0

Table 5a. Diabetes Mellitus, Impaired Glucose Tolerance, Impaired Fasting Glucose, Hypertension, High Cholesterol, and Overweight Prevalence by Age (Total)

	20 - 39			40 - 64			≥65			Total		
	n	%	(95%CI)	n	%	(95%CI)	n	%	(95%CI)	n	%	(95%CI)
BMI												
Low (<18.5)	2,566	2.3	(0.8-6.8)	842	2.0	(0.7-4.1)	597	4.8	(2.2-6.7)	4,005	2.9	(0.9-5.5)
Normal (18.5 - 24.9)	29,219	34.5	(28.1-38.6)	9,678	23.3	(19.2-28.7)	4,782	38.8	(33.6-48.4)	43,679	31.0	(26.8-35.4)
Overweight (25.0 - 29.9)	26,628	31.4	(27.5-36.6)	14,881	35.8	(32.9-41.7)	4,476	36.3	(28.2-42.0)	45,985	33.8	(30.4-37.3)
Obese (≥30.0)	26,349	31.1	(27.6-38.2)	16,219	39.0	(32.7-42.3)	2,467	20.0	(15.4-26.9)	45,035	33.0	(28.6-37.7)
Known Diabetes Mellitus	2,633	3.1	(1.9-5.1)	5,060	12.2	(9.5-15.7)	2,929	23.8	(19.3-30.4)	10,622	7.7	(6.2-9.7)
New Diabetes Mellitus ^a	2,913	3.4	(1.9-6.3)	3,607	8.7	(6.6-11.3)	913	7.5	(5.1-10.9)	7,433	5.4	(4.0-7.1)
Impaired Glucose Tolerance ^b	5,972	7.1	(4.9-9.9)	5,195	12.5	(9.2-16.7)	2,373	19.4	(14.7-25.3)	13,540	9.8	(7.8-12.2)
Impaired Fasting Glycaemia ^c	5,648	6.7	(4.2-10.3)	3,946	9.5	(6.4-13.8)	914	7.5	(3.9-13.7)	10,508	7.6	(5.4-10.6)
Known Hypertension	8,284	9.8	(8.5-13.8)	10,176	24.4	(19.5-28.4)	4,564	37.0	(31.9-43.9)	23,024	16.6	(14.7-19.9)
New Hypertension ^d	6,337	7.5	(4.9-11.4)	7,631	18.3	(13.3-25.1)	2,826	22.9	(18.4-27.5)	16,794	12.1	(9.4-15.6)
High Cholesterol (>240 ml/dg)	2,624	3.1	(1.6-5.9)	2,754	6.6	(4.5-9.6)	1,348	11.1	(6.5-18.6)	6,726	4.9	(3.2-7.4)

^aFasting Glucose ≥ 126 mg/dl venous plasma or 2 hour post prandial ≥ 200 mg/dl venous plasma

^bFasting Glucose < 126 mg/dl venous plasma and 2 hour post prandial ≥ 140 mg/dl venous plasma

^cFasting Glucose = 100 to 125 mg/dl venous plasma and 2 hour post prandial < 140 mg/dl venous plasma

^dSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

Table 5b. Diabetes Mellitus, Impaired Glucose Tolerance, Impaired Fasting Glucose, Hypertension, High Cholesterol, and Overweight Prevalence by Age (Men)

	20 - 39			40 - 64			Total			Total		
	n	%	(95%CI)	n	%	(95%CI)	n	%	(95%CI)	n	%	(95%CI)
BMI												
Low (<18.5)	1,150	2.8	(0.2-8.5)	696	3.2	(1.2-6.3)	403	6.6	(2.2-10.4)	2,249	3.2	(0.7-5.6)
Normal (18.5 - 24.9)	17,106	41.2	(32.4-48.6)	6,361	29.4	(27.3-38.3)	2,802	46.0	(38.3-55.2)	26,269	37.9	(31.6-44.3)
Overweight (25.0 - 29.9)	14,645	35.2	(30.4-44.3)	8,218	38.0	(33.6-45.9)	1,936	31.8	(23.5-44.0)	24,799	35.8	(32.6-42.7)
Obese (≥30.0)	8,661	20.8	(15.9-28.4)	6,374	29.4	(20.1-35.5)	945	15.5	(9.9-23.5)	15,980	23.1	(17.5-29.0)
Known Diabetes Mellitus	639	1.5	(0.6-4.1)	1,597	7.4	(4.2-12.5)	1,075	17.7	(13.3-24.3)	3,311	4.8	(3.4-6.6)
New Diabetes Mellitus ^a	852	2.0	(0.7-5.8)	1,279	5.9	(3.6-9.5)	403	6.8	(3.2-13.8)	2,534	3.7	(2.3-5.9)
Impaired Glucose Tolerance ^b	1,091	2.6	(0.9-7.7)	2,362	10.9	(6.6-17.5)	1,225	20.7	(13.8-29.9)	4,678	6.8	(4.2-10.7)
Impaired Fasting Glycaemia ^c	3,546	8.5	(4.8-14.6)	2,246	10.3	(6.5-15.9)	562	9.5	(5.3-16.3)	6,354	9.2	(6.1-13.6)
Known Hypertension	2,451	8.4	(4.8-14.2)	4,237	19.6	(12.7-24.4)	1,791	29.4	(23.5-37.5)	8,479	12.2	(10.0-17.2)
New Hypertension ^d	4,613	11.1	(6.9-17.6)	5,120	23.6	(16.4-36.8)	1,598	26.3	(20.3-34.8)	11,331	16.4	(12.2-22.9)
High Cholesterol (>240 ml/dg)	953	2.3	(0.9-5.4)	1,316	6.1	(3.5-10.3)	443	7.5	(4.1-13.4)	2,712	3.9	(2.3-6.6)

^aFasting Glucose ≥ 126 mg/dl venous plasma or 2 hour post prandial ≥ 200 mg/dl venous plasma

^bFasting Glucose < 126 mg/dl venous plasma and 2 hour post prandial ≥ 140 mg/dl venous plasma

^cFasting Glucose = 100 to 125 mg/dl venous plasma and 2 hour post prandial < 140 mg/dl venous plasma

^dSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

Table 5c. Diabetes Mellitus, Impaired Glucose Tolerance, Impaired Fasting Glucose, Hypertension, High Cholesterol, and Overweight Prevalence by Age (Women)

	Total											
	n	20 - 39 %	(95%CI)	n	40 - 64 %	(95%CI)	n	≥65 %	(95%CI)	n	Total %	(95%CI)
BMI												
Low (<18.5)	1,416	3.3	(1.4-8.1)	146	0.7	(0.1-2.6)	194	3.1	(1.1-8.1)	1,756	2.5	(1.1-5.8)
Normal (18.5 - 24.9)	12,113	28.0	(21.2-32.1)	3,317	16.6	(11.8-21.7)	1,980	31.8	(26.5-45.2)	17,410	24.2	(20.2-28.7)
Overweight (25.0 - 29.9)	11,983	27.7	(22.2-31.2)	6,663	33.4	(29.7-40.2)	2,540	40.7	(28.6-45.1)	21,186	30.0	(26.1-34.2)
Obese (≥30.0)	17,688	43.4	(36.6-50.5)	9,845	49.3	(42.4-54.7)	1,522	24.4	(18.4-33.5)	29,055	43.2	(37.9-48.7)
Known Diabetes Mellitus	1,995	4.6	(2.6-8.4)	3,463	17.3	(13.8-22.1)	1,854	29.7	(22.0-40.3)	7,312	10.5	(8.3-13.9)
New Diabetes Mellitus ^a	2,061	4.8	(2.4-9.2)	2,328	11.7	(8.7-15.5)	510	8.1	(4.2-15.1)	4,899	7.1	(5.1-9.7)
Impaired Glucose Tolerance ^b	4,882	11.3	(7.9-16.0)	2,833	14.2	(10.3-19.3)	1,148	18.2	(13.2-24.6)	8,863	12.8	(10.2-15.9)
Impaired Fasting Glycaemia ^c	2,102	4.9	(2.8-8.5)	1,700	8.5	(5.6-12.8)	352	5.6	(1.6-17.8)	4,154	6.0	(3.9-8.9)
Known Hypertension	5,833	13.5	(10.6-16.5)	5,939	29.7	(23.7-37.4)	2,773	44.5	(36.2-54.3)	14,545	21.0	(17.8-24.6)
New Hypertension ^d	1,724	4.0	(2.3-7.2)	2,511	12.6	(7.8-15.4)	1,228	19.7	(13.8-24.8)	5,463	7.9	(5.6-9.7)
High Cholesterol (>240 ml/dg)	1,671	3.9	(1.9-7.6)	1,438	7.2	(4.7-11.0)	904	14.6	(8.0-25.2)	4,013	5.8	(3.8-8.7)

^aFasting Glucose ≥ 126 mg/dl venous plasma or 2 hour post prandial ≥ 200 mg/dl venous plasma

^bFasting Glucose < 126 mg/dl venous plasma and 2 hour post prandial ≥ 140 mg/dl venous plasma

^cFasting Glucose = 100 to 125 mg/dl venous plasma and 2 hour post prandial < 140 mg/dl venous plasma

^dSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

Table 6a. Bivariate Associations between Demographic and Risk Characteristics and Diabetes Mellitus (Total)

	Total		Prevalence(%)	(95% CI)	p-value ^b
	Without Diabetes	With Diabetes ^a			
Total	114,932	18,221	13.1	(11.0-15.6)	-
District					
Corozal	11,133	1,545	12.2	(9.8-14.4)	
Orange Walk	26,351	4,185	13.7	(10.4-16.3)	
Belize	17,701	3,089	14.9	(11.7-17.0)	
Cayo	32,330	3,826	10.6	(7.8-12.9)	
Stann Creek	10,954	3,458	24.0	(16.0-30.8)	
Toledo	16,463	2,118	11.4	(4.8-24.8)	0.11
Urban/Rural					
Urban	42,555	6,457	13.2	(10.4-14.9)	
Rural	72,377	11,764	14.0	(10.4-17.4)	0.42
Age					
20 - 39	75,242	5,611	6.9	(4.3-9.9)	
40 - 64	31,806	8,710	21.5	(18.1-24.0)	
≥65	7,885	3,900	33.1	(26.4-38.1)	0.00
Ethnicity					
White	348	0	0.0	(0.0-0.0)	
Creole/Afro-caribbean	19,502	3,211	14.1	(8.7-20.6)	
East Asian/Indo-caribbean	4,748	1,719	26.6	(22.4-31.0)	
Mayan/Native	17,984	1,622	8.3	(4.2-15.1)	
Garifuna	10,420	2,765	21.0	(14.1-26.9)	
Mestizo	51,038	7,386	12.6	(9.9-14.7)	
Mulatto	473	51	9.7	(1.3-38.9)	
Menonite	6,756	468	6.1	(5.6-6.7)	
Mixed	2,578	921	26.3	(15.7-33.1)	
Other	1,085	78	6.7	(1.6-22.8)	0.05
Tobacco Use					
Non-smoker ^c	96,134	15,940	14.2	(11.2-16.4)	
Former smoker ^d	10,411	959	8.4	(6.6-25.6)	
Current smoker ^e	8,387	1,322	13.6	(4.0-16.3)	0.13
Physical Activity					
Sedentary (avg. <60 min/week)	88,072	14,910	14.5	(11.5-16.6)	
Moderate (avg. = 60-149 min/week)	5,848	843	12.6	(6.5-20.2)	
Active (avg. ≥ 150 min/week)	20,757	2,468	10.6	(6.8-15.8)	0.29
Hypertension ^f					
Yes	29,692	9,733	24.7	(20.2-28.2)	
No	85,241	8,488	9.1	(6.8-11.0)	0.00
BMI					
Low (<18.5)	2,973	134	4.3	(1.2-13.6)	
Normal (18.5 - 24.9)	37,758	3,533	8.6	(5.6-11.9)	
Overweight (25.0 - 29.9)	39,178	5,679	12.7	(9.4-15.5)	
Obese (≥30.0)	35,024	8,875	20.2	(14.9-24.9)	0.00
Total Cholesterol					
Optimal (<200mg/dl)	96,860	12,065	11.1	(8.8-12.7)	
Borderline High (200 -239 mg/dl)	13,845	3,474	20.1	(14.2-25.5)	
High (≥240 mg/dl)	4,058	2,570	38.8	(28.7-48.7)	0.00
LDL					
Optimal (<130mg/dl)	101,886	13,847	12.0	(9.6-13.6)	
Borderline High (130 -159 mg/dl)	9,496	2,260	19.2	(12.7-27.3)	
High (≥160 mg/dl)	3,380	2,002	37.2	(27.2-47.1)	0.00
HDL					
Optimal (≥60 mg/dl)	18,579	3,497	15.8	(10.5-21.1)	
Borderline Low (40 -59 mg/dl)	59,701	7,967	11.8	(8.9-14.1)	
Low (<40 mg/dl)	36,483	6,646	15.4	(11.8-18.8)	0.43
Triglycerides					
High (≥150 mg/dl)	37,351	8,451	18.1	(15.0-21.6)	
Normal (<150 mg/dl)	77,411	9,659	10.5	(7.9-13.8)	0.00
Waist Circumference					
Risk ^g	47,885	13,023	21.4	(16.9-24.8)	
No Risk	67,048	5,198	7.2	(5.3-9.0)	0.00

^aFasting Glucose ≥ 126 mg/dl venous plasma or 2 hour post prandial ≥ 200 mg/dl venous plasma

^bChi-squared test

^cSmoked < 100 cigarettes in lifetime; ^dSmoked > 100 cigarettes in lifetime but do not currently smoke;

^eSmoked > 100 cigarettes in lifetime and currently smoke

^fSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

^gMen ≥ 102 cm; Women ≥88 cm

Table 6b. Bivariate Associations between Demographic and Risk Characteristics and Diabetes Mellitus (Men)

	Men		Prevalence(%)	(95% CI)	p-value ^b
	Without Diabetes	With Diabetes ^a			
Total	60,139	5,845	8.3	(8.4-6.5)	-
District					
Corozal	4,988	474	8.7	(4.0-16.1)	
Orange Walk	13,947	1,444	9.4	(5.5-13.3)	
Belize	9,637	1,315	12.0	(7.8-16.5)	
Cayo	17,406	1,495	7.9	(4.2-13.3)	
Stann Creek	4,914	671	12.0	(4.9-23.0)	
Toledo	9,247	446	4.6	(3.4-6.2)	0.67
Urban/Rural					
Urban	21,714	2,271	9.5	(6.2-12.6)	
Rural	38,426	3,575	8.5	(5.8-11.5)	0.56
Age					
20 - 39	37,584	1,491	3.8	(1.7-7.3)	
40 - 64	18,280	2,876	13.6	(9.7-17.8)	
≥65	4,276	1,478	25.7	(19.2-31.8)	0.00
Ethnicity					
White	127	0	0.0	(0.0-0.0)	
Creole/Afro-caribbean	11,337	1,232	9.8	(5.3-16.5)	
East Asian/Indo-caribbean	2,244	323	12.6	(6.2-23.9)	
Mayan/Native	10,508	516	4.7	(2.7-7.7)	
Garifuna	5,336	428	7.4	(3.5-12.9)	
Mestizo	24,577	3,048	11.0	(7.2-14.6)	
Mulatto	188	41	17.9	(1.4-61.8)	
Menonite	4,088	133	3.2	(2.8-3.4)	
Mixed	1,284	95	6.9	(1.1-25.6)	
Other	451	30	6.2	(1.5-22.4)	0.00
Tobacco Use					
Non-smoker ^c	42,913	4,032	8.6	(5.8-11.1)	
Former smoker ^d	9,866	758	7.1	(5.1-27.2)	
Current smoker ^e	7,361	1,056	12.5	(2.9-15.7)	0.77
Physical Activity					
Sedentary (avg. <60 min/week)	44,189	5,086	10.3	(7.5-12.8)	
Moderate (avg. = 60-149 min/week)	2,729	112	3.9	(0.9-11.4)	
Active (avg. ≥ 150 min/week)	12,966	648	4.8	(2.4-8.7)	0.47
Hypertension ^f					
Yes	16,969	3,549	17.3	(12.5-22.7)	
No	43,170	2,296	5.0	(3.0-7.4)	0.00
BMI					
Low (<18.5)	74	1,332	5.3	(0.9-26.3)	
Normal (18.5 - 24.9)	1,009	23,723	4.1	(2.0-7.2)	
Overweight (25.0 - 29.9)	2,047	22,683	8.3	(5.1-12.1)	
Obese (≥30.0)	2,715	12,402	18.0	(10.3-27.3)	0.13
Total Cholesterol					
Optimal (<200mg/dl)	50,882	4,024	7.3	(5.1-9.4)	
Borderline High (200 -239 mg/dl)	7,236	1,166	13.9	(7.4-23.8)	
High (≥240 mg/dl)	2,021	655	24.5	(12.7,41.1)	0.00
LDL					
Optimal (<130mg/dl)	53,703	4,802	8.2	(5.9-10.3)	
Borderline High (130 -159 mg/dl)	4,703	572	10.8	(6.2-17.4)	
High (≥160 mg/dl)	1,733	470	21.3	(10.9-36.9)	0.00
HDL					
Optimal (≥60 mg/dl)	9,528	791	7.7	(3.8-13.8)	
Borderline Low (40 -59 mg/dl)	29,063	2,302	7.3	(4.6-10.1)	
Low (<40 mg/dl)	21,548	2,752	11.3	(7.2-16.4)	0.08
Triglycerides					
High (≥150 mg/dl)	21,361	3,025	12.4	(8.1-18.7)	
Normal (<150 mg/dl)	38,779	2,820	6.8	(4.1-9.7)	0.00
Waist Circumference					
Risk ^g	13,885	2,885	17.2	(10.9-24.3)	
No Risk	46,254	2,960	6.0	(4.2-7.8)	0.00

^aFasting Glucose ≥ 126 mg/dl venous plasma or 2 hour post prandial ≥ 200 mg/dl venous plasma

^bChi-squared test

^cSmoked < 100 cigarettes in lifetime; ^dSmoked > 100 cigarettes in lifetime but do not currently smoke;

^eSmoked > 100 cigarettes in lifetime and currently smoke

^fSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

^gMen ≥ 102 cm; Women ≥88 cm

Table 6c. Bivariate Associations between Demographic and Risk Characteristics and Diabetes Mellitus (Women)

	Women		Prevalence(%)	(95% CI)	p-value ^b
	Without Diabetes	With Diabetes ^a			
Total	54,794	12,376	17.6	(14.7-21.5)	-
District					
Corozal	6,146	1,071	14.8	(9.2-23.1)	
Orange Walk	12,404	2,741	18.1	(16.1-19.7)	
Belize	8,064	1,774	18.0	(13.9-20.9)	
Cayo	14,924	2,331	13.5	(10.9-14.3)	
Stann Creek	6,040	2,787	31.6	(21.9-39.7)	
Toledo	7,216	1,672	18.8	(7.1-41.0)	0.13
Urban/Rural					
Urban	20,841	4,187	16.7	(12.4-20.5)	0.56
Rural	33,952	8,189	19.4	(14.5-24.2)	
Age					
20 - 39	37,658	4,120	9.9	(6.2-14.2)	
40 - 64	13,526	5,834	30.1	(25.1-33.8)	0.00
≥65	3,609	2,422	40.2	(30.2-47.4)	
Ethnicity					
White	221	0	0.0	(0.0-0.0)	
Creole/Afro-caribbean	8,164	1,979	19.5	(11.7-28.3)	
East Asian/Indo-caribbean	2,504	1,396	35.8	(29.5-42.3)	
Mayan/Native	7,476	1,107	12.9	(5.5-26.2)	
Garifuna	5,085	2,337	31.5	(20.9-40.9)	
Mestizo	26,461	4,338	14.1	(11.0-17.2)	0.00
Mulatto	285	10	3.4	(0.4-24.4)	
Menonite	2,668	335	10.0	(9.3-10.7)	
Mixed	1,295	826	38.9	(23.0-49.6)	
Other	634	48	7.0	(1.2-30.5)	
Tobacco Use					
Non-smoker ^c	53,222	11,909	18.3	(14.5-21.3)	
Former smoker ^d	545	201	26.9	(8.8-41.2)	0.77
Current smoker ^e	1,026	266	20.6	(9.0-56.5)	
Physical Activity					
Sedentary (avg. <60 min/week)	43,883	9,824	18.3	(14.7-20.9)	
Moderate (avg. = 60-149 min/week)	3,119	731	19.0	(8.8-35.2)	0.47
Active (avg. ≥ 150 min/week)	7,791	1,820	18.9	(11.2-29.8)	
Hypertension ^f					
Yes	12,723	6,184	31.3	(26.9-30.1)	0.00
No	42,070	6,191	12.8	(9.3-16.4)	
BMI					
Low (<18.5)	1,642	60	3.5	(0.7-14.6)	
Normal (18.5 - 24.9)	14,034	2,524	15.2	(9.4-23.2)	
Overweight (25.0 - 29.9)	16,495	3,632	18.0	(13.3-22.5)	0.13
Obese (≥30.0)	22,622	6,159	21.4	(16.1-25.8)	
Total Cholesterol					
Optimal (<200mg/dl)	45,978	8,041	14.9	(11.7-17.7)	
Borderline High (200 -239 mg/dl)	6,608	2,308	25.9	(18.7-30.8)	0.00
High (≥240 mg/dl)	2,037	1,915	48.5	(32.9-62.9)	
LDL					
Optimal (<130mg/dl)	48,183	9,045	15.8	(12.6-18.3)	
Borderline High (130 -159 mg/dl)	4,793	1,688	26.0	(17.5-36.3)	0.00
High (≥160 mg/dl)	1,647	1,532	48.2	(32.8-62.2)	
HDL					
Optimal (≥60 mg/dl)	9,051	2,705	23.0	(14.9-30.4)	
Borderline Low (40 -59 mg/dl)	30,637	5,665	15.6	(12.5-18.4)	0.08
Low (<40 mg/dl)	14,935	3,894	20.7	(14.1-27.7)	
Triglycerides					
High (≥150 mg/dl)	15,990	5,425	25.3	(19.7-30.8)	0.00
Normal (<150 mg/dl)	38,633	6,839	15.0	(10.7-19.2)	
Waist Circumference					
Risk ^g	33,999	10,138	23.0	(17.8-27.0)	0.00
No Risk	20,794	2,237	9.7	(6.6-13.5)	

^aFasting Glucose ≥ 126 mg/dl venous plasma or 2 hour post prandial ≥ 200 mg/dl venous plasma

^bChi-squared test

^cSmoked < 100 cigarettes in lifetime; ^dSmoked > 100 cigarettes in lifetime but do not currently smoke;

^eSmoked > 100 cigarettes in lifetime and currently smoke

^fSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

^gMen ≥ 102 cm; Women ≥88 cm

Table 7. Health Practices among persons with Diabetes (n=10,622)

	Men		Women		Total	
	n	%	n	%	n	%
Get Blood Sugar Tested						
At least once/day	831	25.1	1,684	23.0	2,515	23.7
At least once/week	325	9.8	723	9.9	1,048	9.9
At least once/month	1,417	42.8	2,564	35.1	3,981	37.5
At least once/year	439	13.3	1,515	20.7	1,954	18.4
Never	16	0.5	355	4.9	371	3.5
Does not know/ not sure	282	8.5	470	6.4	752	7.1
Ever heard of Glycosilated Hemoglobin A1c						
Yes	300	9.1	672	9.2	972	9.2
No	2,828	85.4	6,222	85.1	9,050	85.2
Does not know/ not sure	183	5.5	417	5.7	600	5.6
Number of Glycosilated Hemoglobin A1c Test in past 12 months Average +/- STD ^a	2.8+/- 3.5		1.5+/- 2.4		1.7+/- 2.6	
Presently following a program to control blood glucose						
Yes	2,254	68.1	4,322	59.1	6,576	61.9
No	1,057	31.9	2,960	40.5	4,017	37.8
Treatment Prescribed ^b						
Medication	2,254	100.0	4,050	93.7	6,304	95.9
Regular physical activity	1,189	52.8	2,735	63.3	3,924	59.7
Avoid excess alcohol intake	1,284	57.0	1,746	40.4	3,030	46.1
Special diet plan	1,537	68.2	3,410	78.9	4,947	75.2
Lose weight	1,159	51.4	2,152	49.8	3,311	50.4
Home remedy	229	10.2	672	15.5	901	13.7
Currently taking Medication ^b						
Yes	2,110	93.7	4,032	93.3	6,142	93.4
No	143	6.3	289	6.7	432	6.6
Source of Medication ^c						
Public Pharmacy	931	44.1	2,511	62.3	3,442	56.0
Private Pharmacy	886	42.0	1,336	33.1	2,222	36.2
Social Security	0	0.0	12	0.3	12	0.2
Foundations	197	9.3	173	4.3	370	6.0
Other	96	4.5	0	0.0	96	1.6
Have the money to obtain medications ^c						
Yes, always	949	45.0	1,928	47.8	2,877	46.8
Yes, but with much difficulty	868	41.1	1,585	39.3	2,453	39.9
No	293	13.9	519	12.9	812	13.2

^aAmong person who have ever heard of Glycosilated Hemoglobin A1c

^bAmong person who are presently following a program or treatment to control their blood glucose (n=6576)

^cAmong person who are currently taking medication (n=6142)

Table 8a. Bivariate Associations between Demographic and Risk Characteristics and Hypertension (Total)

	Total		Prevalence(%)	(95% CI)	p-value ^b
	Without-Hypertension	With Hypertension ^a			
Total	98,887	39,818	28.7	(25.4-33.5)	-
District					
Corozal	11,081	4,507	28.9	(26.9-29.5)	
Orange Walk	20,024	8,883	30.7	(21.0-39.8)	
Belize	15,508	8,028	34.1	(31.2-39.7)	
Cayo	27,298	6,971	20.3	(17.1-29.8)	
Stann Creek	14,217	7,673	41.5	(35.1-48.2)	
Toledo	10,759	3,756	25.9	(18.8-33.9)	0.01
Urban/Rural					
Urban	39,470	17,724	31.0	(24.5-40.2)	
Rural	59,418	22,094	27.1	(23.9-32.0)	0.35
Age					
20 - 39	70,142	14,621	17.2	(15.1-22.4)	
40 - 64	23,815	17,807	42.8	(34.6-50.0)	
≥65	4,932	7,390	60.0	(53.7-66.9)	0.00
Ethnicity					
White	215	156	42.0	(15.2-90.5)	
Creole/Afro-caribbean	17,861	8,554	32.4	(24.5-43.7)	
East Asian/Indo-caribbean	3,443	2,033	37.1	(28.3-43.9)	
Mayan/Native	13,381	3,515	20.8	(14.9-23.5)	
Garifuna	10,638	6,027	36.2	(32.1-49.4)	
Mestizo	44,539	15,232	25.5	(21.9-30.9)	
Mulatto	647	162	20.0	(18.4-63.5)	
Menonite	3,638	1,635	31.0	(30.5-36.2)	
Mixed	3,840	2,274	37.2	(26.9-61.3)	
Other	686	230	25.1	(8.0-70.2)	0.00
Tobacco Use					
Non-smoker ^c	83,769	31,637	27.4	(24.0-32.1)	
Former smoker ^d	10,050	4,629	31.5	(27.6-50.9)	
Current smoker ^e	5,069	3,551	41.2	(24.9-47.6)	0.10
Physical Activity					
Sedentary (avg. <60 min/week)	76,128	31,252	29.1	(25.7-34.7)	
Moderate (avg. = 60-149 min/week)	5,653	1,702	23.1	(16.4-32.7)	
Active (avg. ≥ 150 min/week)	17,108	6,736	28.3	(21.6-33.3)	0.30
BMI					
Low (<18.5)	3,461	544	13.6	(8.3-21.6)	
Normal (18.5 - 24.9)	36,035	7,645	17.5	(14.2-22.5)	
Overweight (25.0 - 29.9)	31,202	14,784	32.1	(25.2-38.4)	
Obese (≥30.0)	28,193	16,844	37.4	(30.8-47.4)	0.00
Total Cholesterol					
Optimal (<200mg/dl)	82,541	31,091	27.4	(23.6-31.5)	
Borderline High (200 -239 mg/dl)	11,347	6,719	37.2	(28.5-46.8)	
High (≥240 mg/dl)	4,032	2,694	40.1	(29.5-51.6)	0.01
LDL					
Optimal (<130mg/dl)	86,956	34,073	28.2	(24.0-32.7)	
Borderline High (130 -159 mg/dl)	7,618	4,310	36.1	(27.9-45.8)	
High (≥160 mg/dl)	3,347	2,122	38.8	(27.8-51.1)	0.06
HDL					
Optimal (≥60 mg/dl)	15,162	8,055	34.7	(27.6-42.5)	
Borderline Low (40 -59 mg/dl)	51,873	18,876	26.7	(22.9-30.7)	
Low (<40 mg/dl)	30,885	13,573	30.5	(22.8-39.5)	0.21
Triglycerides					
High (≥150 mg/dl)	29,863	16,926	36.2	(29.8-43.0)	
Normal (<150 mg/dl)	68,057	23,579	25.7	(21.5-30.5)	0.00
Waist Circumference					
Risk ^f	37,573	23,822	38.8	(32.5-45.3)	
No Risk	61,316	15,996	20.7	(17.8-25.4)	0.00

^aSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

^bChi-squared test

^cSmoked < 100 cigarettes in lifetime; ^dSmoked > 100 cigarettes in lifetime but do not currently smoke;

^eSmoked > 100 cigarettes in lifetime and currently smoke

^fMen ≥ 102 cm; Women ≥88 cm

Table 8b. Bivariate Associations between Demographic and Risk Characteristics and Hypertension (Men)

	Men		Prevalence(%)	(95%CI)	p-value ^b
	Without-Hypertension	With Hypertension ^a			
Total	49,488	19,810	28.6	(24.6-36.3)	-
District					
Corozal	5,366	2,433	31.2	(26.4-37.0)	
Orange Walk	10,426	4,129	28.4	(14.8-45.2)	
Belize	7,816	3,966	33.7	(28.6-43.9)	
Cayo	13,455	3,735	21.7	(15.8-42.3)	
Stann Creek	7,105	3,793	34.8	(31.9-54.3)	
Toledo	5,320	1,754	30.2	(27.6-30.1)	0.36
Urban/Rural					
Urban	19,588	9,023	31.5	(24.7-44.8)	
Rural	29,901	10,787	26.5	(21.6-35.1)	0.30
Age					
20 - 39	34,499	7,064	17.0	(13.9-26.9)	
40 - 64	12,294	9,357	43.2	(33.6-52.9)	
≥65	2,697	3,389	55.7	(48.3-65.2)	0.00
Ethnicity					
White	106	84	44.2	(0.0-0.0)	
Creole/Afro-caribbean	9,728	4,366	31.0	(21.2-49.7)	
East Asian/Indo-caribbean	1,487	760	33.8	(24.2-44.5)	
Mayan/Native	7,153	1,951	21.4	(12.1-28.7)	
Garifuna	5,809	2,482	29.9	(22.0-39.2)	
Mestizo	21,434	7,508	25.9	(20.4-36.5)	
Mulatto	291	116	28.5	(12.8-90.8)	
Menonite	1,460	1,218	45.5	(43.5-53.6)	
Mixed	1,888	1,152	37.9	(20.3-77.6)	
Other	134	172	56.2	(11.6-94.9)	0.05
Tobacco Use					
Non-smoker ^c	35,449	12,863	26.6	(22.4-35.3)	
Former smoker ^d	9,378	4,102	30.4	(23.8-47.6)	
Current smoker ^e	4,662	2,845	37.9	(23.3-47.9)	0.41
Physical Activity					
Sedentary (avg. <60 min/week)	35,666	15,309	30.0	(26.2-39.5)	
Moderate (avg. = 60-149 min/week)	2,747	799	22.5	(10.5-39.8)	
Active (avg. ≥ 150 min/week)	11,076	3,574	24.4	(14.9-31.3)	0.07
BMI					
Low (<18.5)	1,908	341	15.2	(10.3-39.3)	
Normal (18.5 - 24.9)	21,716	4,554	17.3	(13.2-25.0)	
Overweight (25.0 - 29.9)	16,259	8,541	34.4	(24.9-45.0)	
Obese (≥30.0)	9,607	6,374	39.9	(29.7-58.8)	0.00
Total Cholesterol					
Optimal (<200mg/dl)	41,482	16,525	28.5	(23.5-34.1)	
Borderline High (200 -239 mg/dl)	5,541	2,995	35.1	(22.9-49.5)	
High (≥240 mg/dl)	1,352	1,361	50.2	(23.1-77.1)	0.15
LDL					
Optimal (<130mg/dl)	43,872	17,757	28.8	(23.2-35.2)	
Borderline High (130 -159 mg/dl)	3,347	2,052	38.0	(24.5-53.6)	
High (≥160 mg/dl)	1,157	1,072	48.1	(24.1-72.9)	0.15
HDL					
Optimal (≥60 mg/dl)	6,594	4,142	38.6	(27.7-50.7)	
Borderline Low (40 -59 mg/dl)	24,737	8,766	26.2	(20.3-33.0)	
Low (<40 mg/dl)	17,044	7,974	31.9	(22.5-42.9)	0.16
Triglycerides					
High (≥150 mg/dl)	15,408	9,538	38.2	(28.6-48.9)	
Normal (<150 mg/dl)	32,967	11,344	25.6	(20.1-31.9)	0.02
Waist Circumference					
Risk ^f	8,414	7,966	48.6	(33.8-63.8)	
No Risk	41,075	11,844	22.4	(19.6-28.9)	0.00

^aSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

^bChi-squared test

^cSmoked < 100 cigarettes in lifetime; ^dSmoked > 100 cigarettes in lifetime but do not currently smoke;

^eSmoked > 100 cigarettes in lifetime and currently smoke

^fMen ≥ 102 cm; Women ≥88 cm

Table 8c. Bivariate Associations between Demographic and Risk Characteristics and Hypertension (Women)

	Women		Prevalence(%)	(95% CI)	p-value ^b
	Without-Hypertension	With Hypertension ^a			
Total	49,399	20,008	24.4	(67.2-75.6)	-
District					
Corozal	5,715	2,074	26.6	(20.3-31.6)	
Orange Walk	9,598	4,754	33.1	(28.4-35.6)	
Belize	7,692	4,062	34.6	(30.3-39.2)	
Cayo	13,843	3,236	18.9	(16.1-20.8)	
Stann Creek	7,112	3,880	35.3	(31.0-51.1)	
Toledo	5,439	2,002	26.9	(13.4-43.6)	0.01
Urban/Rural					
Urban	19,882	8,701	30.4	(23.1-37.2)	
Rural	29,517	11,307	27.7	(22.9-33.0)	0.64
Age					
20 - 39	35,643	7,557	17.5	(14.2-21.1)	
40 - 64	11,521	8,450	42.3	(33.4-49.4)	0.00
≥65	2,235	4,001	64.2	(53.5-72.9)	
Ethnicity					
White	109	72	39.8	(3.5-85.5)	
Creole/Afro-caribbean	8,133	4,188	34.0	(25.5-40.8)	
East Asian/Indo-caribbean	1,956	1,273	39.4	(27.2-48.2)	
Mayan/Native	6,228	1,564	20.1	(11.8-28.1)	
Garifuna	4,829	3,545	42.3	(36.6-61.4)	0.00
Mestizo	23,105	7,724	25.1	(21.2-28.5)	
Mulatto	356	46	11.4	(3.2-69.9)	
Menonite	2,178	417	13.9	(12.9-14.9)	
Mixed	1,952	1,122	36.5	(24.7-57.1)	
Other	552	58	9.5	(3.9-27.4)	
Tobacco Use					
Non-smoker ^c	48,320	18,774	28.0	(23.6-31.9)	
Former smoker ^d	672	527	44.0	(40.1-82.6)	0.00
Current smoker ^e	407	706	63.4	(18.6-76.6)	
Physical Activity					
Sedentary (avg. <60 min/week)	40,462	15,943	28.3	(23.9-31.6)	
Moderate (avg. = 60-149 min/week)	2,906	903	23.7	(15.5-38.1)	0.31
Active (avg. ≥ 150 min/week)	6,032	3,162	34.4	(23.5-46.8)	
BMI					
Low (<18.5)	1,553	203	11.6	(3.2-16.0)	
Normal (18.5 - 24.9)	14,319	3,091	17.8	(11.9-24.4)	
Overweight (25.0 - 29.9)	14,943	6,243	29.5	(22.9-33.6)	0.00
Obese (≥30.0)	18,586	10,470	36.0	(29.5-43.5)	
Total Cholesterol					
Optimal (<200mg/dl)	41,059	14,566	26.2	(21.8-31.1)	
Borderline High (200 -239 mg/dl)	5,806	3,724	39.1	(30.2-48.7)	0.01
High (≥240 mg/dl)	2,680	1,333	33.2	(22.1-46.6)	
LDL					
Optimal (<130mg/dl)	43,084	16,316	27.5	(23.0-32.4)	
Borderline High (130 -159 mg/dl)	4,271	2,258	34.6	(26.0-44.3)	0.23
High (≥160 mg/dl)	2,190	1,050	32.4	(23.5-42.8)	
HDL					
Optimal (≥60 mg/dl)	8,568	3,913	31.4	(22.8-41.4)	
Borderline Low (40 -59 mg/dl)	27,136	10,110	27.1	(22.8-31.9)	0.68
Low (<40 mg/dl)	13,841	5,599	28.8	(21.4-37.5)	
Triglycerides					
High (≥150 mg/dl)	14,455	7,388	33.8	(27.3-40.9)	0.04
Normal (<150 mg/dl)	35,090	12,235	25.9	(21.2-31.2)	
Waist Circumference					
Risk ^f	29,159	15,856	35.2	(29.9-40.2)	0.00
No Risk	20,241	4,152	17.0	(11.1-21.9)	

^aSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

^bChi-squared test

^cSmoked < 100 cigarettes in lifetime; ^dSmoked > 100 cigarettes in lifetime but do not currently smoke;

^eSmoked > 100 cigarettes in lifetime and currently smoke

^fMen ≥ 102 cm; Women ≥88 cm

Table 9. Health Practices among Persons with Hypertension (n=20,324)

	Men		Women		Total	
	n	%	n	%	n	%
Presently following a program to control Blood Pressure						
Yes	3,146	37.1	5,999	41.2	9,145	39.7
No	5,199	61.3	8,514	58.5	13,713	59.6
Does not know/ not sure	134	1.6	31	0.2	165	0.7
Treatment Prescribed ^a						
Medication	2,864	91.0	5,791	96.5	8,655	94.6
Avoid excess alcohol intake	987	31.4	1,726	28.8	2,713	29.7
Lose weight	1,390	44.2	3,052	50.9	4,442	48.6
Stop smoking	849	27.0	1,292	21.5	2,141	23.4
Eat less salty food	2,584	82.1	5,421	90.4	8,005	87.5
Regular physical activity	1,861	59.2	3,134	52.2	4,995	54.6
Home Remedy	605	19.2	711	11.9	1,316	14.4
Currently taking Medication ^a						
Yes	2,709	86.1	5,499	91.7	8,208	89.8
No	437	13.9	500	8.3	937	10.2
Source of Medication ^b						
Public Pharmacy	1,377	50.8	3,104	56.4	4,481	54.6
Private Pharmacy	537	19.8	1,393	25.3	1,930	23.5
Social Security	0	0.0	0	0.0	0	0.0
Foundations	96	3.5	229	4.2	325	4.0
Other	698	25.8	774	14.1	1,472	17.9
Have the money to obtain medications ^b						
Yes, always	1,635	60.4	2,536	46.1	4,171	50.8
Yes, but with much difficulty	758	28.0	2,253	41.0	3,011	36.7
No	316	11.7	710	12.9	1,026	12.5

^aAmong person who are presently following a program or treatment to control their blood pressure (n=9,145)

^bAmong person who are currently taking medication (n=8,208)

Table 10a. Bivariate Associations between Demographic and Risk Characteristics and High Cholesterol (Total)

	Total		Prevalence(%)	(95% CI)	p-value ^b
	Without High Chol	With High Chol ^a			
Total	131,700	6,726	5.1	(3.2-7.4)	-
District					
Corozal	12,387	359	2.8	(2.1-3.8)	
Orange Walk	31,093	929	2.9	(0.9-8.9)	
Belize	20,174	1,652	7.6	(4.6-12.1)	
Cayo	36,549	1,444	3.8	(1.4-9.9)	
Stann Creek	14,144	1,195	7.8	(3.7-15.7)	
Toledo	17,353	1,147	6.2	(1.7-20.0)	0.39
Urban/Rural					
Urban	49,950	1,655	3.2	(1.7-5.9)	
Rural	81,750	5,071	5.8	(3.5-9.6)	0.13
Age					
20 - 39	82,072	2,624	3.1	(1.6-5.9)	
40 - 64	38,881	2,754	6.6	(4.5-9.6)	
≥65	10,746	1,347	11.1	(6.5-18.6)	0.00
Ethnicity					
White	348	0	0.0	(0.0-100.0)	
Creole/Afro-caribbean	22,214	1,330	5.6	(2.9-10.6)	
East Asian/Indo-caribbean	5,634	739	11.6	(6.6-19.7)	
Mayan/Native	19,936	115	0.6	(0.1-2.3)	
Garifuna	12,849	1,196	8.5	(3.8-17.8)	
Mestizo	58,547	2,135	3.5	(1.9-6.3)	
Mulatto	527	76	12.6	(2.4-46.4)	
Menonite	6,678	951	12.5	(9.3-16.4)	
Mixed	3,800	157	4.0	(1.4-10.7)	
Other	1,166	27	2.3	(0.2-17.9)	0.00
Tobacco Use					
Non-smoker ^c	111,057	6,000	5.1	(3.3-7.9)	
Former smoker ^d	11,111	499	4.3	(2.1-8.8)	
Current smoker ^e	9,533	227	2.3	(0.9-6.1)	0.25
Physical Activity					
Sedentary (avg. <60 min/week)	102,378	4,963	4.6	(2.9-7.1)	
Moderate (avg. = 60-149 min/week)	6,981	237	3.3	(1.2-8.4)	
Active (avg. ≥ 150 min/week)	22,342	1,272	5.4	(3.0-9.3)	0.63
BMI					
Low (<18.5)	3,029	139	4.4	(1.7-10.6)	
Normal (18.5 - 24.9)	41,042	1,851	4.3	(2.1-8.8)	
Overweight (25.0 - 29.9)	44,531	2,185	4.7	(2.7-7.9)	
Obese (≥30.0)	43,097	2,551	5.6	(3.7-8.4)	0.71
LDL					
Optimal (<130mg/dl)	119,977	1,052	0.9	(0.5-1.7)	
Borderline High (130 -159 mg/dl)	10,437	1,491	12.5	(7.6-19.9)	
High (≥160 mg/dl)	1,286	4,184	76.5	(64.4-85.4)	0.00
HDL					
Optimal (≥60 mg/dl)	21,940	1,278	5.5	(3.0-9.9)	
Borderline Low (40 -59 mg/dl)	66,943	3,807	5.4	(3.4-8.3)	
Low (<40 mg/dl)	42,817	1,642	3.7	(1.9-6.8)	0.34
Triglycerides					
High (≥150 mg/dl)	43,016	3,773	8.1	(4.7-13.5)	
Normal (<150 mg/dl)	88,683	2,953	3.2	(1.8-5.6)	0.00
Waist Circumference					
Risk ^f	59,326	3,790	6.0	(3.9-9.1)	
No Risk	72,374	2,936	3.9	(2.4-6.4)	0.02

^aTotal Cholesterol ≥ 240 mg/dl venous plasma

^bChi-squared test

^cSmoked < 100 cigarettes in lifetime; ^dSmoked > 100 cigarettes in lifetime but do not currently smoke;

^eSmoked > 100 cigarettes in lifetime and currently smoke

^fMen ≥ 102 cm; Women ≥88 cm

Table 10b. Bivariate Associations between Demographic and Risk Characteristics and High Cholesterol (Men)

	Men		Prevalence(%)	(95% CI)	p-value ^b
	Without High Chol	With High Chol ^a			
Total	66,544	2,713	4.1	(2.3-6.6)	-
District					
Corozal	5,607	92	1.6	(0.6-4.4)	
Orange Walk	16,165	501	3.0	(0.6-14.2)	
Belize	10,629	828	7.2	(4.3-12.0)	
Cayo	19,087	584	3.0	(0.9-9.2)	
Stann Creek	5,832	238	3.9	(0.9-14.3)	
Toledo	9,224	470	4.8	(1.2-17.4)	0.59
Urban/Rural					
Urban	25,064	594	2.3	(0.6-8.8)	
Rural	41,480	2,119	4.9	(2.8-8.3)	0.30
Age					
20 - 39	40,642	953	2.3	(0.9-5.4)	
40 - 64	20,434	1,316	6.1	(3.5-10.3)	
≥65	5,468	443	7.5	(4.1-13.4)	0.01
Ethnicity					
White	127	0	0.0	(0.0-0.0)	
Creole/Afro-caribbean	12,663	251	1.9	(0.8-4.8)	
East Asian/Indo-caribbean	2,301	266	10.4	(4.3-22.9)	
Mayan/Native	11,156	88	0.8	(0.2-3.0)	
Garifuna	5,877	372	6.0	(2.2-14.9)	
Mestizo	28,328	1,151	3.9	(1.5-9.6)	
Mulatto	232	76	24.7	(4.4-70.3)	
Menonite	3,771	509	11.9	(6.7-20.2)	
Mixed	1,609	0	0.0	(0.0-0.0)	
Other	480	0	0.0	(0.0-0.0)	0.06
Tobacco Use					
Non-smoker ^c	47,897	2,045	4.1	(2.3-7.3)	
Former smoker ^d	10,381	468	4.3	(0.8-6.9)	
Current smoker ^e	8,267	200	2.4	(1.9-9.2)	0.58
Physical Activity					
Sedentary (avg. <60 min/week)	50,062	1,729	3.3	(1.8-6.2)	
Moderate (avg. = 60-149 min/week)	3,231	64	1.9	(0.3-13.0)	
Active (avg. ≥ 150 min/week)	13,252	665	4.8	(2.0-10.9)	0.59
BMI					
Low (<18.5)	1,267	139	9.9	(4.7-19.6)	
Normal (18.5 - 24.9)	25,496	623	2.4	(1.0-5.5)	
Overweight (25.0 - 29.9)	24,969	1,012	3.9	(1.6-9.2)	
Obese (≥30.0)	14,812	939	6.0	(2.9-12.0)	0.18
LDL					
Optimal (<130mg/dl)	60,917	712	1.2	(0.5-2.8)	
Borderline High (130 -159 mg/dl)	4,780	619	11.5	(4.3-27.0)	
High (≥160 mg/dl)	847	1,382	62.0	(38.1-81.2)	0.00
HDL					
Optimal (≥60 mg/dl)	10,327	409	3.8	(1.4-10.2)	
Borderline Low (40 -59 mg/dl)	32,084	1,419	4.2	(1.9-9.1)	
Low (<40 mg/dl)	24,133	885	3.5	(1.6-7.6)	0.92
Triglycerides					
High (≥150 mg/dl)	23,588	1,358	5.4	(2.7-10.7)	
Normal (<150 mg/dl)	42,956	1,355	3.1	(1.7-5.5)	0.09
Waist Circumference					
Risk ^f	16,879	518	3.0	(1.1-7.6)	
No Risk	49,666	2,195	4.2	(2.4-7.5)	0.49

^aTotal Cholesterol ≥ 240 mg/dl venous plasma

^bChi-squared test

^cSmoked < 100 cigarettes in lifetime; ^dSmoked > 100 cigarettes in lifetime but do not currently smoke;

^eSmoked > 100 cigarettes in lifetime and currently smoke

^fMen ≥ 102 cm; Women ≥88 cm

Table 10c. Bivariate Associations between Demographic and Risk Characteristics and High Cholesterol (Women)

	Women		Prevalence(%)	(95% CI)	p-value ^b
	Without High Chol	With High Chol ^a			
Total	65,156	4,013	6.0	(3.8-8.7)	-
District					
Corozal	6,780	267	3.8	(1.8-7.7)	
Orange Walk	14,928	428	2.8	(1.1-7.1)	
Belize	9,545	824	7.9	(3.8-15.8)	
Cayo	17,462	860	4.7	(1.8-11.6)	
Stann Creek	8,312	957	10.3	(5.7-18.1)	
Toledo	8,129	677	7.7	(2.3-22.6)	0.26
Urban/Rural					
Urban	24,886	1,061	4.1	(2.8-5.9)	
Rural	40,270	2,952	6.8	(3.9-11.5)	0.11
Age					
20 - 39	41,430	1,671	3.9	(1.9-7.6)	
40 - 64	18,447	1,438	7.2	(4.7-11.0)	
≥65	5,278	904	14.6	(8.0-25.2)	0.00
Ethnicity					
White	221	0	0.0	(0.0-0.0)	
Creole/Afro-caribbean	9,551	1,079	10.2	(5.5-17.9)	
East Asian/Indo-caribbean	3,333	473	12.4	(5.6-25.3)	
Mayan/Native	8,780	27	0.3	(0.0-1.3)	
Garifuna	6,972	824	10.6	(4.8-21.6)	
Mestizo	30,219	984	3.2	(1.8-5.4)	
Mulatto	295	0	0.0	(0.0-0.0)	
Menonite	2,907	442	13.2	(12.3-14.2)	
Mixed	2,191	157	6.7	(2.4-17.4)	
Other	686	27	3.8	(0.4-29.1)	0.00
Tobacco Use					
Non-smoker ^c	63,160	3,955	5.9	(3.9-8.8)	
Former smoker ^d	730	31	4.1	(0.4-11.2)	
Current smoker ^e	1,266	27	2.1	(0.5-27.4)	0.50
Physical Activity					
Sedentary (avg. <60 min/week)	52,316	3,234	5.8	(3.6-9.3)	
Moderate (avg. = 60-149 min/week)	3,750	173	4.4	(1.3-13.7)	
Active (avg. ≥ 150 min/week)	9,090	607	6.3	(2.7-13.6)	0.90
BMI					
Low (<18.5)	1,762	0	0.0	(0.0-0.0)	
Normal (18.5 - 24.9)	15,546	1,228	7.3	(3.4-15.2)	
Overweight (25.0 - 29.9)	19,562	1,173	5.7	(3.5-9.1)	
Obese (≥30.0)	28,285	1,612	5.4	(3.2-8.9)	0.70
LDL					
Optimal (<130mg/dl)	59,060	340	0.6	(0.2-1.4)	
Borderline High (130 -159 mg/dl)	5,657	872	13.4	(7.3-23.1)	
High (≥160 mg/dl)	439	2,802	86.5	(76.5-92.6)	0.00
HDL					
Optimal (≥60 mg/dl)	11,613	869	7.0	(3.3-13.9)	
Borderline Low (40 -59 mg/dl)	34,859	2,388	6.4	(4.2-9.6)	
Low (<40 mg/dl)	18,684	757	3.9	(1.7-8.9)	0.39
Triglycerides					
High (≥150 mg/dl)	19,428	2,415	11.1	(6.6-17.9)	
Normal (<150 mg/dl)	45,727	1,598	3.4	(1.8-6.4)	0.00
Waist Circumference					
Risk ^f	42,447	3,272	7.2	(4.5-11.2)	
No Risk	22,708	741	3.2	(1.7-5.7)	0.01

^aTotal Cholesterol ≥ 240 mg/dl venous plasma

^bChi-squared test

^cSmoked < 100 cigarettes in lifetime; ^dSmoked > 100 cigarettes in lifetime but do not currently smoke;

^eSmoked > 100 cigarettes in lifetime and currently smoke

^fMen ≥ 102 cm; Women ≥88 cm

Table 11. Health Practices among Persons with High Cholesterol (n=12,768)

	Men		Women		Total	
	n	%	n	%	n	%
Presently following a program to control Cholesterol						
Yes	1,627	30.0	1,682	22.9	3,309	25.9
No	3,797	70.0	5,605	76.3	9,402	73.6
Does not know/ not sure	0	0.0	57	0.8	57	0.4
Treatment Prescribed ^a						
Medication	1,458	89.6	1,042	62.0	2,500	75.6
Eat less fat or nor fat at all	1,333	81.9	1,536	91.3	2,869	86.7
Lose weight or control your weight	769	47.3	1,083	64.4	1,852	56.0
Eat more vegetables, fruits and fibres	1,502	92.3	1,554	92.4	3,056	92.4
Home Remedy	275	16.9	95	5.6	370	11.2
Regular physical activity	953	58.6	611	36.3	1,564	47.3
Currently taking Medication ^a						
Yes	1,270	78.1	911	54.2	2,181	65.9
No	356	21.9	771	45.8	1,127	34.1
Source of Medication ^b						
Public Pharmacy	358	28.2	242	26.6	600	27.5
Private Pharmacy	905	71.3	495	54.3	1,400	64.2
Social Security	0	0.0	0	0.0	0	0.0
Fondations	0	0.0	157	17.2	157	7.2
Other	7	0.6	18	2.0	25	1.1
Have the money to obtain medications ^b						
Yes, always	775	61.0	245	31.7	1,020	49.9
Yes, but with much difficulty	495	39.0	443	57.3	938	45.9
No	0	0.0	85	11.0	85	4.2

^aAmong person who are presently following a program or treatment to control their Cholesterol (n=3,309)

^bAmong person who are currently taking medication (n=2,181)

Table 12a. Bivariate Associations between Demographic and Risk Characteristics and Overweight/Obesity (Total)

	Total		Prevalence(%)	(95% CI)	p-value ^a
	BMI < 25.0	BMI ≥ 25.0			
Total	47,684	91,020	65.2	(61.7-71.5)	-
District					
Corozal	3,490	12,098	77.6	(73.2-85.2)	
Orange Walk	8,721	20,186	69.8	(67.2-78.7)	
Belize	7,486	16,050	68.2	(61.8-75.1)	
Cayo	12,948	21,320	62.2	(56.6-70.3)	
Stann Creek	8,118	13,771	62.9	(41.4-81.6)	
Toledo	6,921	7,595	52.3	(48.4-56.6)	0.03
Urban/Rural					
Urban	18,298	38,895	68.0	(62.1-75.5)	
Rural	29,386	52,126	63.9	(58.6-71.5)	0.40
Age					
20 - 39	31,786	52,977	62.5	(58.0-70.6)	
40 - 64	10,520	31,101	74.7	(69.8-78.9)	
≥65	5,379	6,944	56.3	(47.9-62.5)	0.00
Ethnicity					
White	125	245	66.2	(11.8-87.4)	
Creole/Afro-caribbean	9,235	17,181	65.0	(60.5-76.2)	
East Asian/Indo-caribbean	2,530	2,948	53.8	(41.3-69.5)	
Mayan/Native	6,172	10,724	63.5	(54.0-70.6)	
Garifuna	6,523	10,142	60.9	(39.4-74.3)	
Mestizo	18,234	41,537	69.5	(66.5-76.1)	
Mulatto	460	349	43.1	(15.9-85.9)	
Menonite	2,310	2,963	53.0	(51.2-54.9)	
Mixed	2,016	4,097	67.0	(56.2-86.0)	
Other	80	836	91.3	(71.8-97.3)	0.04
Tobacco Use					
Non-smoker ^b	38,264	77,141	66.8	(61.6-71.7)	
Former smoker ^c	7,337	7,343	78.4	(66.0-87.1)	
Current smoker ^d	2,084	6,538	56.3	(39.8-71.6)	0.09
Physical Activity					
Sedentary (avg. <60 min/week)	36,094	71,284	66.4	(63.0-72.7)	
Moderate (avg. = 60-149 min/week)	2,370	4,986	67.8	(50.4-84.2)	
Active (avg. ≥ 150 min/week)	9,221	14,623	61.3	(48.5-69.8)	0.26
LDL					
Optimal (<130mg/dl)	41,069	79,961	66.1	(60.7-71.0)	
Borderline High (130 -159 mg/dl)	3,206	8,722	73.1	(61.5-82.3)	
High (≥160 mg/dl)	1,786	3,683	67.3	(44.2-84.3)	0.53
HDL					
Optimal (≥60 mg/dl)	10,010	13,208	56.9	(44.6-68.4)	
Borderline Low (40 -59 mg/dl)	24,795	45,955	65.0	(58.9-70.5)	
Low (<40 mg/dl)	11,257	33,202	74.7	(66.6-81.4)	0.02
Triglycerides					
High (≥150 mg/dl)	8,294	38,496	82.3	(77.2-86.4)	
Normal (<150 mg/dl)	37,767	53,870	58.8	(53.2-64.1)	0.00
Waist Circumference					
Risk ^f	3,846	57,549	93.7	(89.3-95.9)	
No Risk	43,838	33,474	43.3	(38.1-51.0)	0.00

^aChi-squared test

^bSmoked < 100 cigarettes in lifetime; ^cSmoked > 100 cigarettes in lifetime but do not currently smoke

^dSmoked > 100 cigarettes in lifetime and currently smoke

^eSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

^fMen ≥ 102 cm; Women ≥88 cm

Table 12b. Bivariate Associations between Demographic and Risk Characteristics and Overweight/Obesity (Men)

	Men		Prevalence(%)	(95% CI)	p-value ^a
	BMI < 25.0	BMI ≥ 25.0			
Total	28,518	40,778	58.6	(58.3-59.0)	-
District					
Corozal	2,258	5,541	71.0	(71.9-75.9)	
Orange Walk	5,554	9,001	61.8	(50.2-79.9)	
Belize	4,897	6,885	58.4	(53.1-69.6)	
Cayo	6,800	10,389	60.4	(53.7-66.9)	
Stann Creek	4,756	6,141	56.4	(36.8-75.3)	
Toledo	4,253	2,821	39.9	(36.7-44.9)	0.03
Urban/Rural					
Urban	11,002	17,608	61.5	(51.1-74.9)	
Rural	17,516	23,172	57.0	(51.3-64.7)	0.42
Age					
20 - 39	18,257	23,306	56.1	(50.2-66.4)	
40 - 64	7,057	14,593	67.4	(58.9-73.6)	
≥65	3,205	2,881	47.3	(38.9-58.3)	0.02
Ethnicity					
White	16	173	91.5	(17.3-98.6)	
Creole/Afro-caribbean	5,996	8,098	57.5	(55.4-72.0)	
East Asian/Indo-caribbean	1,310	938	41.7	(32.3-56.2)	
Mayan/Native	4,055	5,049	55.5	(39.5-64.4)	
Garifuna	4,050	4,241	51.2	(35.9-59.7)	
Mestizo	10,685	18,257	63.1	(55.2-73.8)	
Mulatto	261	146	35.9	(12.8-90.8)	
Menonite	968	1,710	63.9	(54.3-62.9)	
Mixed	1,139	1,900	62.5	(39.8-87.8)	
Other	39	267	87.3	(59.4-97.4)	0.06
Tobacco Use					
Non-smoker ^b	19,422	28,889	59.8	(52.2-64.8)	
Former smoker ^c	7,219	6,261	46.4	(64.6-87.7)	
Current smoker ^d	1,878	5,630	53.8	(36.6-70.1)	0.05
Physical Activity					
Sedentary (avg. <60 min/week)	19,797	31,177	61.2	(55.8-70.1)	
Moderate (avg. = 60-149 min/week)	1,234	2,312	65.2	(39.7-86.0)	
Active (avg. ≥ 150 min/week)	7,488	7,162	48.9	(36.2-57.8)	0.05
LDL					
Optimal (<130mg/dl)	25,685	35,945	58.3	(50.6-65.7)	
Borderline High (130 -159 mg/dl)	1,119	4,280	79.3	(62.2-89.9)	
High (≥160 mg/dl)	721	1,508	67.7	(35.4-88.9)	0.10
HDL					
Optimal (≥60 mg/dl)	6,310	4,426	41.2	(25.4-59.1)	
Borderline Low (40 -59 mg/dl)	14,201	19,302	57.6	(50.7-64.2)	
Low (<40 mg/dl)	7,015	18,004	72.0	(62.0-80.1)	0.00
Triglycerides					
High (≥150 mg/dl)	4,272	20,675	82.9	(76.5-87.8)	
Normal (<150 mg/dl)	23,253	21,058	47.5	(41.0-54.1)	0.00
Waist Circumference					
Risk ^f	384	15,996	97.7	(91.6-98.9)	
No Risk	28,135	24,785	46.8	(41.2-54.8)	0.00

^aChi-squared test

^bSmoked < 100 cigarettes in lifetime; ^cSmoked > 100 cigarettes in lifetime but do not currently smoke

^dSmoked > 100 cigarettes in lifetime and currently smoke

^eSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

^fMen ≥ 102 cm; Women ≥88 cm

Table 13. Demographic and risk Characteristics Associated with Complete Specimen Collection and Laboratory Data, Unweighted (n=1,679)

	Complete Interview and Laboratory Test	
	n	%
Sex		
Male	596	59.6
Female	1033	71.7
District		
Corozal	190	61.3
Orange Walk	264	72.9
Belize	491	63.2
Cayo	382	71.1
Stann Creek	131	51.8
Toledo	171	84.7
Urban/Rural		
Urban	602	60.4
Rural	1027	71.7
Age		
20 - 39	570	57.7
40 - 64	691	73.4
≥65	368	71.9
Ethnicity		
White	6	75.0
Creole/Afro-caribbean	410	59.8
East Asian/Indo-caribbean	74	81.3
Mayan/Native	194	75.2
Garifuna	133	59.6
Mestizo	646	69.1
Mulatto	10	55.6
Menonite	65	90.3
Mixed	77	58.8
Other	14	73.7
Tobacco Use		
Non-smoker ^a	1394	68.1
Former smoker ^b	118	70.2
Current smoker ^c	117	52.0
Physical Activity		
Sedentary (avg. <60 min/week)	1316	67.0
Moderate (avg. = 60-149 min/week)	79	65.8
Active (avg. ≥ 150 min/week)	233	65.3
Hypertension ^d		
Yes	973	63.6
No	656	72.1
BMI		
Low (<18.5)	37	54.4
Normal (18.5 - 24.9)	445	64.0
Overweight (25.0 - 29.9)	550	67.7
Obese (≥30.0)	597	69.0
Waist Circumference		
Risk ^e	889	71.9
No Risk	740	61.5

^aSmoked < 100 cigarettes in lifetime; ^bSmoked > 100 cigarettes in lifetime but do not currently smoke

^cSmoked > 100 cigarettes in lifetime and currently smoke

^dSystolic ≥ 140 mm Hg or Diastolic ≥ 90 mm Hg

^eMen ≥ 102 cm; Women ≥88 cm

