# Third national STEPS Survey on the Prevalence of Noncommunicable Disease and Injury Risk Factors–2013

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## ABBREVIATIONS

| | |
|---|---|
| ABP | Arterial Blood Pressure |
| AH | Arterial Hypertension |
| BMI | Body Mass Index |
| CI | Confidence Interval |
| CVD | Cardiovascular Diseases |
| DBP | Diastolic Blood Pressure |
| DM | Diabetes Mellitus |
| FHPP | Foundation for Health Policy Promotion |
| HC | Hip Circumference |
| HDL | High Density Lipoprotein |
| HU | Health Unit |
| Int'l | International |
| LDL | Low Density Lipoprotein |
| MBA | Master of Business Administration |
| MC | Medical Science |
| MCA-M | Millennium Challenge Account, Mongolia |
| MET | Standard Metabolic Equivalent |
| mm Hg | Millimeters of Mercury |
| MNT | Mongolian Tugriks |
| MOH | Ministry of Health |
| NCC | National Cancer Center |
| NCD | Noncommunicable Diseases |
| NCMH | National Center for Mental Health |
| PHI | Public Health Institute |
| NIMS | National Institutes of Medical Sciences |
| NRC | Nutrition Research Center |
| NUMS | National University of Medical Sciences |
| PDA | Personal Digital Assistant |
| PRC | The People's Republic of China |
| RCDT | Regional Center for Diagnosis and Treatment |
| RF | Risk Factor |
| SBP | Systolic Blood Pressure |
| SC | Sport Center |
| Sc. | Science |
| TPA | Traffic Police Authority |
| WC | Waist Circumference |

## FOREWORD

The Ministry of Health and Sports the Public Health Institute organized the first and second NCD STEPS survey nationwide in 2005 and 2009 respectively, with technical and financial assistance from the World Health Organization. The findings and results of these national surveys provided the evidences for establishing the baseline indicators of the National Programme on NCDI, and the NCDI surveillance system in Mongolia, and utilized in monitoring and evaluation for the implementation of the National Programme on NCDI.

The second National NCDI STEPS survey conducted in 2009 additionally included the causes and prevalence of traffic injuries, as well as breast and cervical cancers. Compared to the previous two national surveys conducted in 2005 and 2009, the scope of the present survey was augmented with several important components including screening of cancer, oral health, salt intake among the population, and NCD health care and services.

The goal of the third national survey was to provide up-to-date information by assessing the prevalence, current situation and future tendencies of NCDI causes and risk factors among the Mongolian population compared by age groups, gender and locality, and also intended to furnish the necessary data for monitoring and evaluating the implementation of the National Program on NCDI, the end-line assessment for the MCA Mongolia Health Project, and to contribute to further development of the next stages of the Global Strategy for the prevention and control of non-communicable diseases.

The current Survey used WHO STEPS survey methodology adapted to the country specifics, utilizing the combined and up-to-date laboratory and statistical analytical methods. A total of 6013 randomly selected 15-64 year-old Mongolian residents of both sexes from 21 aimags and Ulaanbaatar city were involved in the survey. The findings and results of the survey helped to determine the prevalence of common modifiable NCDI risk factors, and provided scientifically sound evidence, data and information on NCDI.

The key importance of the current Survey on the Prevalence of Non-Communicable Diseases and Injury (NCDI) Risk Factors is to evaluate the implementation of the National Program on NCD Prevention and Control, and the outcomes and efficiencies of the Health Project funded by the Millennium Challenge Account (MCA) Mongolia.

The significance of the survey is to extend the NCD risk factor surveillance system in Mongolia and enable data to be incorporated with WHO NCD Global Info Base to obtain internationally comparable trends in NCD risk factors among the Mongolian population. This valuable information and related facts provide us with evidence to effectively implement public health policies, programs, and projects.

**OYUNBAATAR TS.,**

**MINISTER OF HEALTH AND SPORTS**

## ACKNOWLEDGEMENTS

Due to social and economic shifts in global civilizations, non-communicable diseases have increased rapidly not only in developing countries but in developed countries as well, accounts for 63% of total mortality and gained itself the title "silent epidemic of 21st century".

NCD and its risk factors are multiplying in our country because of population migration, urbanization and other factors. And that is causing burdens to social and economic development of individuals, communities and the country.

On behalf of the national research team, I would like to thank Leanne Reilly, team leader of Research coordination committee under the Ministry of Health and Sport and surveillance system of NCD at WHO in Geneva, specialist Melanie Cowen, Western Pacific Region specialist Dr.Cherian, WHO Representative in Mongolia Dr. Soe Nyunt-U, NCD specialist Dr.Tsogzolmaa B., MCA Mongolia Health project team and Public Health Department of MOHS for the help and cooperation for successfully organizing "The STEPS survey on the prevalence of Non-communicable disease and injury risk factors, Mongolia".

By determining the prevalence of NCD risk factors with this survey, evidence-based data will be provided that is necessary for planning the priorities and activities to engrain healthy attitudes of our people in the coming years. Furthermore, it shows that there is necessity to raise public awareness of healthy lifestyle and to engrain it, to develop and to activate integrated policy of urban planning and nutrition, to expand international co-operation in this field to implement best practices, to promote human resource development and to distribute the sectorial funding efficiently for non-communicable disease prevention and control.

I wish the readers best of success in your research and work in protecting and promoting population health.

Public Health Institute - For the health and well-being for all!

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Sport Center
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**Note:** Any comments and suggestions related to this survey will be invaluable in our work and be appreciated to be considered in the future surveys. Therefore, please feel free to send your comments and suggestions to the following address.

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## EXECUTIVE SUMMARY

The STEPS Survey on the Prevalence of Non-communicable Diseases and Injury (NCDI) Risk Factors was conducted nationwide in Ulaanbaatar and 21 provinces using the WHO Stepwise surveillance approach. The survey data was collected from May to June 2015 in selected sites. The goal of the survey was to determine the prevalence of common risk factors for NCDs and injuries, evaluate the impact of the Integrated National Program on NCD Prevention and Control, and the Health Project of the Millennium Challenge Account of Mongolia (MCAM).

The survey results and findings were estimated by analyzing data collected from 6013 (97.4 percent out of 6150 individuals recruited) randomly selected 15-64 year-old Mongolian residents of both sexes. The survey participants aged 25-64 years old were involved in the third step of the survey to determine the prevalence of biochemical risk factors.

The survey results showed that in Mongolia, 27.1% of the population smoke tobacco, from which 49.1% of men and 5.3% of women were current smokers. The vast majority of smokers (91.7%) smoke daily. Nearly one in two persons (42.9%) were exposed to second-hand smoke at home and one-in-three (35.6%) were exposed at work. Results of the comparative study (STEPS 2009 vs. 2013) indicate that the prevalence of smoking among the 15-64 year-old adult population did not increase, staying at about the same level.

The current drinking or consumption of alcohol in the past 30 days was reported by 38.3% of all respondents or 48.8% of men and 24.1% of women. On drinking occasions, the current drinkers consumed an average of 9.0 standard drinks; 10.8 for men and 5.2 women. The prevalence of binge drinking (more than 6 drinks on one occasion for men and women) was 37.5% in men and 9.7% in women, which is considered negative behavior.

The average daily serving of fruit was 0.4, and the average daily serving of vegetables was 1.0, which is 3.6 servings less than WHO recommendations. The majority of the population (96.4%) consumed less than 5 servings of fruit and vegetables daily. Fruit and vegetable consumption in rural areas was half that of urban areas.

Survey data indicate that 22.3% of the population was not meeting the minimum recommendation for physical activity and nearly 1 in 4 persons in urban areas were at increased risk for physical inactivity. Urban men were twice as likely to fall into the category of low physical activity as rural men, and urban women were twice as likely compared to their rural counterparts. The survey results revealed that nearly one-fifth (18.3%) of the population did not meet WHO physical activity recommendations for health, being engaged in moderate physical activity for less than 150 minutes per week, and 66.6 percent of the population were not engaged in vigorous physical activity.

On average, the median time spent in physical activity per day was 105.7 minutes, indicating the needs for improving community-based approach for health promotion and physical activities.

The mean BMI of the study population was 25.9 kg/m2 and it was 25.3 kg/m2 in men and 26.6 kg/m2 in women, respectively. According to BMI risk assessment, 54.4% of the population was overweight or obese, and 19.7% was obese. The prevalence of overweight and obesity tended to increase with age and the proportion of overweight or obese women in all age groups was higher compared to their male counterparts. The study results show that the mean waist circumference was 87.9 cm among men, and 87.2 cm among women. According to the waist circumference risk assessment, 56.8 percent of the population, 44.4 percent of men and 69.3 percent of women had central obesity.

Mean systolic blood pressure (SBP) was 130 mmHg in men and 124 mmHg in their female counterparts, and was significantly higher in men than in women. The prevalence of arterial

hypertension among the population was 27.5%. Men had a significantly higher prevalence (30.5%) of arterial hypertension compared to those of women (24.5%). There was no significant difference in the prevalence of arterial hypertension between urban and rural populations.

Prevalence of hypercholesterolemia or high risk hypercholesterolemia in the population was 61.9%. Mean blood cholesterol and the percentage with or at risk of increased total cholesterol increased significantly compared to the 2009 survey data. The prevalence of high risk triglyceride category and hypertriglyceridemia in the population was 19.6% with higher prevalence in men (22.4%) compared to women (17.1%).

Mean low density lipoprotein (LDL) among the study population was 2.9 mmol/L. It grasps our attention that the proportion of the population at risk and with increased blood LDL stayed high, at 42.5%. Mean high density lipoprotein (HDL) among the study population was 1.3 mmol/L and the proportion of women and men at risk or with decreased blood HDL was 36.2% and 30.9%, respectively.

Mean fasting blood glucose in the study population was 5.0 mmol/L and there was no difference between men and women. However, there was a statistically significant difference by locality, indicating that the urban population was more likely to have higher mean fasting glucose than the rural population.

The prevalence of hidden diabetes or high risk for elevated impaired fasting glucose (IFG 5.6-6.0 mmol/L) was 8.3% among the 25-64 year-old study population. The prevalence of raised blood glucose or respondents who are currently on medication for diabetes was 6.9% in the study population. When stratified by gender, the prevalence of diabetes was 7.6% in males, 6.3% in females. However, the difference between genders was not statistically significant.

Cervical cancer screening coverage was 53.5% among female respondents. Breast cancer screening and breast examinations by health workers was 33.1% in surveyed women aged 15-64 years old. Women who had breast examinations by health workers was statistically significantly higher in rural areas (41.0%) than those in urban settings (24.6 %) and the screening coverage improved since the last survey was conducted in 2009.

The prevalence of road traffic injuries during the past 12 months was 3.4% among the study population. One in three (32.6%) traffic injuries was due to speeding, and 8.4% was due to driving under the influence of alcohol, showing that those incidences were related to risky personal behavior. Roughly eight in ten drivers and passengers (75.4%) did not use a seatbelt regularly.

The prevalence of violent injury during the past 12 months was 6.0% in the study population, 6.5% in men and 5.8% in women. Compared with results of the 2009 survey, the proportion of the population injured in a violent incidence that re¬quired medical services increased. Men are more likely to fall victim to interpersonal violence which can be explained mainly because men tend to use physical force to resolve conflicts. Nevertheless, among females involved in violent incidents, 36.8 percent reported being abused by family members or intimate partners and 22.1 percent were abused by friends or acquaintances. The proportion of survey respondents who were abused as a child was 48.2 percent in the study population, showing a decline compared to those in the previous survey.

According to the WHO recommended methodology, combined exposure of 5 common risk factors such as current daily smoking, consumption of less than five servings of fruit and/or vegetables per day, physical inactivity not meeting WHO recommendations on physical activity for health (<150 minutes of moderate activity per week, or equivalent), overweight and obese, and raised blood pressure is utilized to determine the population's combined risk factors for NCDs. The proportion of population with none of the common risk factors for NCD was only 1 percent, whereas 36.9

percent of 15-64 year-old population had 3 or more common NCD risk factors; thus indicating high risks for developing NCDs. It is alarming that more than half (or 53.2 percent) of the population aged 45-65 years have a high risk for NCDs.

The summary of combined NCD risk factors demonstrates that the proportion of men who have 3-5 combined common modifiable NCDI risk factors (35.2%) in all age groups was statistically significantly higher compared to those in women. These results show that the current high prevalence of NCDI risk factors among men have negative impacts on life expectancy and the quality of life of Mongolian men.

## SUMMARY OF RESULTS AND FINDINGS

| Results for Mongolians aged 15–64 years (incl. 95% CI) | Both Sexes (N=6013) | Men (N=2719) | Women (N=3294) |
|---|---|---|---|
| **Step 1. Tobacco Use** | | | |
| Percentage who currently smoke tobacco | **27.1** (25.2-29.0) | **49.1** (46.5-51.8) | **5.3** (4.0-7.0) |
| Percentage of current daily smokers among smokers | **24.8** (23-26.8) | **45.4** (42.6-48.3) | **4.5** (3.3-6.0) |
| *Current daily smokers among smokers:* | | | |
| Mean age started smoking (in years) | **19.7** (19.2-20.3) | **19.1** (18.6-19.7) | **25.9** (23.6-28.2) |
| Mean duration of smoking (in years) | **20.5** (19.5-21.5) | **21.2** (20.2-22.1) | **14.4** (11.1-17.6) |
| Percentage of smokers who use manufactured cigarettes among daily smokers | **95.2** (90.5-97.6) | **94.8** (89.8-97.5) | **98.8** (91.3-99.9) |
| Mean number of manufactured cigarettes smoked per day | **10.0** (9.2-10.8) | **10.3** (9.5-11.2) | **6.4** (5.5-7.4) |
| Percentage of respondents exposed to second-hand smoke in the past 30 days. | **25.5** (22.7-28.5) | **31.9** (28.4-35.5) | **19.4** (16.4-22.8) |
| **Step 2. Alcohol Consumption** | | | |
| Proportion of population who consumed alcohol drinks in the past 12 months | **64.6** (60.3-68.6) | **74.5** (71.5-77.2) | **54.8** (47.7-61.7) |
| Proportion of population who consumed alcohol drinks 5-6 days per week in the past 12 months | **0.3** (0.1-0.9) | **0.6** (0.2-1.6) | **0.2** (0.0-0.5) |
| Proportion of population who consumed alcohol drinks less than once a month in the past 12 months | **58.0** (54.1-61.8) | **42.5** (38.4-46.6) | **0.0** |
| Proportion of population who consumed alcohol drinks in the past 30 days | **36.3** (33.3-39.3) | **48.8** (46.0-51.5) | **24.1** (20.2-27.9) |
| Mean number of drinking occasions in the past 30 days (frequency) | **3.6** (2.9-4.4) | **4.3** (3.3-5.2) | **2.4** (1.9-2.9) |
| Mean number of standard drinks consumed per drinking occasion in the past 30 days (1 standard drink=vodka 25 ml, beer 330 ml, wine 100 ml) | **9.0** (8.3-9.6) | **10.8** (9.9-11.8) | **5.2** (4.8-5.6) |
| Proportion of population who consumed ≥6 standard drinks per drinking occasion in the past 30 days | **23.5** (21.2-25.7) | **37.5** (34.4-40.6) | **9.7** (8.0-11.7) |
| **Step 1. Fruit and Vegetable Consumption (In a typical week: excluding holidays and celebrations)** | | | |
| Mean number of days fruit consumed in a typical week | **1.1** (1.0-1.2) | **0.9** (0.7-1.0) | **1.3** (1.2-1.5) |
| Mean number of servings of fruit on average per day (1 serving=80 g) | **0.4** (0.4-0.5) | **0.3** (0.3-0.4) | **0.5** (0.4-0.6) |
| Mean number of days vegetables consumed in a typical week | **4.5** (4.2-4.9) | **4.5** (4.1-4.9) | **4.6** (4.2-4.9) |
| Mean number of servings of vegetables on average per day | **1.0** (0.9-1.1) | **1.0** (0.9-1.1) | **1.1** (1.0-1.2) |
| Mean number of servings of fruit and vegetables on average per day | **1.5** (1.3-1.6) | **1.3** (1.2-2.5) | **1.6** (1.4-1.7) |

| Results for Mongolians aged 15-64 years (incl. 95% CI) | Both Sexes (N=6013) | Men (N=2719) | Women (N=3294) |
|---|---|---|---|
| Proportion of population who ate less than five servings of fruit and/or vegetables on average per day | **96.4** (95.3-97.2) | **97.1** (96.1-98.1) | **95.7** (94.5-96.8) |
| **Step 1. Physical Activity** | | | |
| Proportion of population with low level of physical activity (Less than 600 MET minutes per week) | **22.3** (18.4-26.7) | **21.3** (17.3-25.3) | **23.2** (18.3-28.2) |
| Proportion of population who not meeting WHO recommendations on physical activity for health | **18.3** (14.5-22.2) | **16.9** (13.3-20.4) | **19.7** (15.0-24.4) |
| Median time spent in physical activity on average per day, minutes | **105.7** (31.4-300.0) | **114.3** (36.4-317.1) | **95.7** (28.6-274.3) |
| Proportion of population not engaging in vigorous physical activity | **66.6** (63.4-69.8) | **57.6** (53.8-61.3) | **75.5** (72.3-78.6) |
| **Step 2. Physical Measurements** | | | |
| Mean Body Mass Index (BMI) (kg/м2) | **25.9** (25.7-26.2) | **25.3** (25-25.6) | **26.6** (26.3-26.9) |
| Proportion of population with overweight and/or obesity (BMI ≥ 25 kg/м2) | **54.4** (52.3-56.6) | **49.0** (45.8-52.2) | **59.9** (57.7-62.1) |
| a. Proportion of population who are overweight (BMI=25-29.9 kg/м2) | **34.8** (32.6-36.9) | **33.9** (31.0-36.7) | **35.7** (33.0-38.4) |
| b. Proportion of population who are obese (BMI≥ 30 kg/м2) | **19.7** (18.0-21.5) | **15.2** (13.3-17.0) | **24.2** (21.5-27.0) |
| Mean waist circumference among all respondents | - | **87.9** (86.9-88.8) | **87.2** (86.2-88.1) |
| Mean hip circumference among all respondents | - | **0.92** (0.91-0.93) | **0.89** (0.88-0.9) |
| Proportion of population classified as central obesity (waist circumference: for men≥90 см, for women≥80 см) | **56.8** (54.0-59.6) | **44.4** (40.8-47.9) | **69.3** (66.6-71.9) |
| Mean systolic blood pressure (mm HG) | **127** (125.9-128) | **130** (128.7-131.4) | **124.0** (122.7-125.3) |
| Mean diastolic blood pressure (mm HG) | **79.9** (79.3-80.4) | **80.6** (79.7-81.5) | **79.2** (78.5-79.9) |
| ***Prevalence of Arterial Hypertension:*** | | | |
| Proportion of population with raised blood pressure (SBP ≥140 and/or DBP ≥ 90 mm HG) who are currently on medication for hypertension | **27.5** (25.6-29.4) | **30.5** (27.4-33.7) | **24.5** (27.4-33.7) |
| Proportion of population with raised blood pressure (SBP ≥160 and/or DBP ≥ 90 mm HG) who are currently on medication for hypertension | **13.6** (12.2-15.2) | **13.5** (11.7-15.5) | **13.8** (12.1-15.6) |
| Proportion of population with raised blood pressure (SBP ≥140 and/or DBP ≥ 90 mm HG) who are not currently on medication for hypertension | **71.9** (66.7-76.5) | **77.0** (70.8-82.2) | **65.6** (58.7-71.9) |
| **Step 3. Biochemical Measurements (among 25-64 year-old population, 95% CI)** | | | |
| Mean fasting blood glucose (mmol/L) | | **5.0** (4.8-5.2) | **4.9** (4.8-5.0) |
| Proportion of population with risks for raised blood glucose (capillary whole blood value: 5.6-6.0 mmol/L) | | **10.0** (6.0-14.0) | **6.8** (4.3-9.3) |

| | | | |
|---|---|---|---|
| Proportion of population with raised blood glucose and are currently on medication for raised blood glucose (capillary whole blood value: ≥ 6.1 mmol/L) | | **7.6** (2.8-12.3) | **6.3** (3.8-8.8) |
| Mean total cholesterol (mmol/L) | | **5.0** (4.9-5.1) | **5.2** (5.1-5.3) |
| Proportion of population with raised total cholesterol (total cholesterol ≥ 5.0 mmol/L) or currently on medication for raised cholesterol | | **56.0** (50.1-62.0) | **67.3** (60.2-74.4) |
| Proportion of population with raised total cholesterol (total cholesterol ≥ 6.2 mmol/L) or currently on medication for raised cholesterol | | **6.2** (3.2-9.2) | **5.9** (3.8-8.1) |
| Mean fasting triglycerides (mmol/L) | | **1.4** (1.3-1.5) | **1.2** (1.2-1.3) |
| Proportion of population with raised fasting triglycerides ≥ 1.7 mmol/L | | **22.4** (17.1-27.6) | **17.1** (13.3-20.9) |
| Mean LDL-Low density lipoprotein (mmol/L) | | **3.0** (2.9-3.0) | **2.8** (2.7-2.8) |
| Percentage of respondents with raised LDL ≥ 3.0 mmol/L | | **47.5** (43.4-51.7) | **37.7** (34.1-41.4) |
| Mean HDL-High density lipoprotein (mmol/L) | | **1.2** (1.2-1.3) | **1.4** (1.4-1.5) |
| Proportion of population with low HDL (HDL: for men <1.03 mmol/L; for women <1.29 mmol/L) | | **30.9** (26.1-35.7) | **36.2** (31.8-40.6) |
| **Prevalence of Combined Common Risk Factors (Results for Mongolians aged 15–64 years, 95% CI)** | | | |
| • Current daily smoking<br>• Less than five servings of fruit and/or vegetables per day<br>• Not meeting WHO recommendations on physical activity for health | • Overweight or obese (BMI ≥ 25 kg/m2)<br>• Raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg and/or currently on medication for raised BP) | | |
| Percentage of respondents with none of the common risk factors | **1** (0.6-1.4) | **0.7** (0.3-1.0) | **1.3** (0.7-1.9) |
| Percentage of 15-44 year-old respondents with 3-5 of the common risk factors | **28.3** (26.1-30.5) | **35.2** (32.3-38.1) | **21.6** (18.4-24.9) |
| Percentage of 45-64 year-old respondents with 3-5 of the common risk factors | **53.2** (49.8-56.5) | **59.7** (55.6-63.7) | **46.2** (41.3-51.1) |
| Percentage of 15-64 year-old respondents with 3-5 of the common risk factors | **36.9** (34.6-39.1) | **43.9** (41.3-46.5) | **29.8** (26.7-33.0) |

## INJURIES AND VIOLENCE

| **Results for Mongolians aged 15-64 years** (incl. 95% CI) | **Both Sexes (N=6013)** | **Men (N=2719)** | **Women (N=3294)** |
|---|---|---|---|
| **Step 1. Injuries** | | | |
| Proportion of population involved in road traffic accident in the past 12 months | **3.4** (2.6-4.3) | **4.9** (3.7-6.4) | **1.8** (1.3-2.6) |
| Proportion of population injured in a non-road traffic accident that required medical attention | **6.9** (6.1-7.9) | **8.8** (7.3-10.6) | **5.1** (4.1-6.2) |
| Proportion of drivers or passengers of motor vehicle who do not use a seatbelt | **75.4** (**72.1-78.5**) | **70.1** (66.1-73.8) | **80.7** (77.1-84.3) |
| Proportion of population who rode in motor vehicle with the drivers under influence of alcoholic drinks in the past 30 days | **5.5** (4.2-7.1) | **7.6** (5.8-9.8) | **3.4** (2.3-5.0) |
| Proportion of drivers or passengers of a motorcycle or bicycle who do not always wear a helmet | **86.3** (79.0-91.4) | **82.4** (72.2-89.3) | **92.3** (87.9-95.2) |
| **Step 1. Violence** | | | |
| Proportion of population severely injured in a violent incidence that required medical services | **6.0** (4.5-8.2) | **6.5** (3.7-11.1) | **5.8** (3.9-8.6) |
| Proportion of population who reported being physically abused during their childhood | **48.2** (45.0-51.4) | **55.8** (52.0-59.6) | **40.7** (37.4-44.1) |
| Proportion of population who reported being frightened for the safety of themselves or their families because of the anger or threats of another person | **20.2** (17.9-22.7) | **14.7** (12.3-17.6) | **25.6** (22.6-28.8) |

## ORAL HEALTH

| **Results for Mongolians aged 15-64 years** (incl. 95% CI) | **Both Sexes (N=6013)** | **Men (N=2719)** | **Women (N=3294)** |
|---|---|---|---|
| **Step1. Oral health** | **Both Sexes (N=6013)** | **Men (N=2719)** | **Women (N=3294)** |
| Proportion of population with removable dentures | **29.9** (27.5-32.4) | **26.2** (23.7-28.9) | **33.6** (30.6-36.7) |
| Proportion of population had visited dentists during the past 12 mounths | **40.5** (37.9-43.1) | **46.5** (42.6-50.4) | **34.5** (31.3-37.6) |
| Proportion of population who clean teeth of least twice a day | **56.6** (53.5-59.7) | **43.8** (39.4-48.1) | **69.2** (66.6-71.9) |

## SUMMARY OF RESULTS AND FINDINGS (by locality)

| **Results for Mongolians aged 15-64 years** (incl. 95% CI) | **Urban (N=2993)** | **Rural (N=3020)** |
|---|---|---|
| **Step 1. Tobacco Use** | | |
| Percentage who currently smoke tobacco | **29.0** (25.9-32.4) | **25.4** (23.2-27.7) |
| Percentage of current daily smokers among smokers | **26.5** (23.5-29.8) | **23.3** (21.2-25.7) |
| *Current daily smokers among smokers:* | | |

| | | |
|---|---|---|
| Mean age started smoking (in years) | **19.8** (19.1-20.4) | **19.7** (18.8-20.6) |
| Mean duration of smoking (in years) | **19.2** (18.1-20.4) | **21.9** (20.6-23.1) |
| **Results for Mongolians aged 15-64 years** (incl. 95% CI) | **Urban (N=2993)** | **Rural (N=3020)** |
| Percentage of smokers who use manufactured cigarettes among daily smokers | **99.8** (99.1-100.0) | **90.6** (81.7-95.4) |
| Mean number of manufactured cigarettes smoked per day | **10.0** (9.1-10.9) | **9.9** (8.6-11.3) |
| Percentage of respondents exposed to second-hand smoke in the past 30 days. | **32.7** (29.4-36.1) | **19.0** (15.3-23.2) |
| **Step 1. Alcohol Consumption** | | |
| Proportion of population who consumed alcohol drinks in the past 12 months | **67.8** (61.1-73.9) | **61.7** (56.8-66.3) |
| Proportion of population who consumed alcohol drinks 5-6 days per week in the past 12 months | **0.2** (0.1-0.9) | **0.4** (0.1-1.7) |
| Proportion of population who consumed alcohol drinks less than once a month in the past 12 months | **60.4** (54.8-65.7) | **55.7** (50.9-60.4) |
| Proportion of population who consumed alcohol drinks in the past 30 days | **40.0** (36.5-43.6) | **33.1** (29.0-37.4) |
| Mean number of drinking occasions in the past 30 days (frequency) | **4.5** (3.4-5.6) | **2.7** (1.9-3.5) |
| Mean number of standard drinks consumed per drinking occasion in the past 30 days (1 standard drink=vodka 25 ml, beer 330 ml, wine 100 ml) | **8.5** (8.0-9.1) | **9.4** (8.3-10.6) |
| Proportion of population who consumed ≥6 standard drinks per drinking occasion in the past 30 days | **25.2** (22.8-27.8) | **22.0** (18.6-25.7) |
| **Step 1. Fruit and Vegetable Consumption (In a typical week: excluding holidays and celebrations)** | | |
| Mean number of days fruit consumed in a typical week | **1.4** (1.1-1.6) | **0.9** (0.7-1.0) |
| Mean number of servings of fruit on average per day (1 serving=80 g) | **0.6** (0.4-0.7) | **0.3** (0.2-0.4) |
| Mean number of days vegetables consumed in a typical week | **5.4** (5.2-5.6) | **3.8** (3.3-4.3) |
| Mean number of servings of vegetables on average per day | **1.2** (1.1-1.4) | **0.9** (0.7-1.0) |
| Mean number of servings of fruit and vegetables on average per day | **1.8** (1.5-2.0) | **1.2** (1.0-1.4) |
| Proportion of population who ate less than five servings of fruit and/or vegetables on average per day | **94.3** (92.0-96.1) | **98.1** (96.9-98.9) |
| **Step 1. Physical Activity** | | |
| Proportion of population with low level of physical activity (Less than 600 MET minutes per week) | **30.9** (24.5-38.0) | **14.7** (10.4-20.4) |
| Proportion of population who not meeting WHO recommendations on physical activity for health | **25.8** (20.6-31.8) | **11.7** (7.6-17.6) |
| Median time spent in physical activity on average per day, minutes | **57.1** (20.0-171.4) | **177.1** (60.0-385.7) |

| **Results for Mongolians aged 15-64 years** (incl. 95% CI) | **Urban (N=2993)** | **Rural (N=3020)** |
|---|---|---|
| Proportion of population not engaging in vigorous physical activity | **74.7** (70.5-78.5) | **59.6** (54.9-64.0) |
| **Step 2. Physical Measurements** | | |
| Mean Body Mass Index (BMI) (kg/м2) | **25.9** (25.7-26.2) | **26.0** (25.6-26.3) |
| Proportion of population who are overweight (BMI=25-29.9 kg/м2) | **54.7** (51.8-57.6) | **54.2** (51.0-57.4) |
| Proportion of population who are obese (BMI≥ 30 kg/м2) | **19.6** (17.6-21.8) | **19.7** (17.2-22.5) |
| Proportion of population classified as central obesity (waist circumference: for men≥90 см, for women≥80 см) | **56.8** (52.5-61.1) | **56.8** (53.2-60.3) |
| Mean systolic blood pressure (mm HG) | **126** (124.7-127.2) | **127.9** (126.3-129.4) |
| Mean diastolic blood pressure (mm HG) | **79.5** (78.7-80.3) | **80.2** (79.5-81.0) |
| Proportion of population with raised blood pressure (SBP ≥140 and/or DBP ≥ 90 mm HG) who are currently on medication for hypertension) | **26.7** (24.2-29.4) | **28.1** (25.5-30.9) |
| Proportion of population with raised blood pressure (SBP ≥160 and/or DBP ≥ 90 mm HG) who are currently on medication for hypertension | **13.4** (11.4-15.7) | **13.8** (11.8-16.1) |
| Proportion of population with raised blood pressure (SBP ≥140 and/or DBP ≥ 90 mm HG) who are not currently on medication for hypertension | **71.7** (64.9-77.6) | **72.0** (64.3-78.6) |
| **Step 3. Biochemical Measurements (among 25-64 year-old population, 95% CI)** | | |
| Mean fasting blood glucose (mmol/L) | **5.0** (4.8-5.2) | **4.9** (4.8-5.1) |
| Proportion of population with risks for raised blood glucose (capillary whole blood value: 5.6-6.0 mmol/L) | **8.4** (5.2-13.2) | **8.3** (5.2-12.9) |
| Proportion of population with raised blood glucose and are currently on medication for raised blood glucose (capillary whole blood value: ≥ 6.1 mmol/L) | **7.5** (4.7-11.7) | **6.4** (2.7-14.4) |
| Mean total cholesterol (mmol/L) | **5.1** (5.0-5.3) | **5.1** (5.0-5.3) |
| Proportion of population with raised total cholesterol (total cholesterol ≥ 5.0 mmol/L) or currently on medication for raised cholesterol | **62.1** (52.0-71.2) | **61.7** (54.1-68.7) |
| Proportion of population with raised total cholesterol (total cholesterol ≥ 6.2 mmol/L) or currently on medication for raised cholesterol | **6.4** (3.5-11.6) | **5.7** (3.8-8.5) |
| Mean fasting triglycerides (mmol/L) | **1.4** (1.3-1.5) | **1.3** (1.2-1.4) |
| Proportion of population with raised fasting triglycerides ≥ 1.7 mmol/L | **22.8** (17.0-30.0) | **17.1** (13.5-21.5) |
| Mean LDL-Low density lipoprotein (mmol/L) | **2.9** (2.9-2.9) | **2.9** (2.8-2.9) |
| Percentage of respondents with raised LDL ≥ 3.0 mmol/L | **42.5** (38.5-46.5) | **42.6** (38.3-46.9) |

| **Results for Mongolians aged 15-64 years** (incl. 95% CI) | **Urban (N=2993)** | **Rural (N=3020)** |
|---|---|---|
| Mean HDL-High density lipoprotein (mmol/L) | **1.3** (1.3-1.4) | **1.3** (1.3-1.4) |
| **Prevalence of Combined Common Risk Factors** (Results for Mongolians aged 15-64 years, 95% CI)<br>• Current Daily Smoking<br>• Less than five servings of fruit and/or vegetables per day<br>• Not meeting WHO recommendations on physical activity for health<br>• Overweight or obese (BMI ≥ 25 kg/m2)<br>• Raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg and/or currently on medication for raised BP) | | |
| Percentage of respondents with none of the common risk factors | **1.7** (0.9-2.9) | **0.4** (0.2-0.8) |
| Percentage of respondents with 3-5 of the common risk factors | **39.9** (36.3-43.5) | **34.2** (31.6-37.0) |

## INJURIES AND VIOLENCE

| **Results for Mongolians aged 15-64 years** (incl. 95% CI) | **Urban (N=2993)** | **Rural (N=3020)** |
|---|---|---|
| **Step 1. Injuries** | | |
| Proportion of population involved in road traffic accident in the past 12 months | **3.7** (2.5-5.3) | **3.1** (2.2-4.3) |
| Proportion of population injured in a non-road traffic accident that required medical attention | **8.8** (7.6-10.2) | **5.2** (4.2-6.5) |
| Proportion of drivers or passengers of motor vehicle who do not use a seatbelt | **71.2** (66.7-75.3) | **79.7** (73.9-84.4) |
| Proportion of population who rode in motor vehicle with the drivers under influence of alcoholic drinks in the past 30 days | **4.1** (3.2-5.2) | **6.7** (4.6-9.7) |
| Proportion of drivers or passengers of a motorcycle or bicycle who do not always wear a helmet | **92.0** (88.2-94.7) | **85.3** (76.6-91.2) |
| **Step 2. Violence** | | |
| Proportion of population severely injured in a violent incidence that required medical services | **6.2** (4.0-9.5) | **5.9** (3.9-8.8) |
| Proportion of population who reported being physically abused during their childhood | **46.8** (42.3-51.4) | **49.4** (44.9-53.9) |
| Proportion of population who reported being frightened for the safety of themselves or their families because of the anger or threats of another person | **23.2** (19.8-26.9) | **17.9** (15.2-20.3) |

## ORAL HEALTH

| **Results for Mongolians aged 15-64 years** (incl. 95% CI) | **Хот (N=2993)** | **Хөдөө (N=3020)** |
|---|---|---|
| Proportion of population with removable dentures | **33.6** (30.7-36.8) | **26.6** (23.8-29.6) |
| Proportion of population had visited dentists during the past 12 months | **44.3** (40.9-47.8) | **37.2** (33.5-41.0) |
| Proportion of population who clean teeth at least twice a day | **58.9** (55.2-62.6) | **54.5** (49.8-59.1) |

# CHAPTER 1. RATIONALE AND BACKGROUND

## 1.1. NON-COMMUNICABLE DISEASES WORLDWIDE

Non-communicable diseases (NCDs) are the leading causes of morbidity and death globally, and their prevalence is increasing in recent years. Current epidemiological trends suggest that during the past 20 years the global NCD trends has significantly changed, and NCDs such as cardiovascular diseases (CVDs), cancer, diabetes, and injuries attributed to behavioral risk factors are continuously increasing.

NCDs are largely caused by behavioral risk factors that can be modified and prevented.

Scientists proved that when NCD risk factors are recognized, understood and prevented, the stroke rate can be reduced by 80 percent and cancer rate by 40 percent, while type-2 diabetes can be totally prevented.

Currently, NCDs including cardiovascular diseases, diabetes mellitus and cancer present 43 percent of global morbidity, and more than 60% of all deaths worldwide stem from NCDs. According to the WHO estimates, by 2020, the annual NCD-attributable mortality is projected to increase up to 60 percent, and the annual NCD-related death-rate could reach 73 percent of all deaths worldwide. In the coming decade, an estimated 106 million people could die from NCDs, which is a 20 percent increase from the current rate.

Worldwide, annually 1.24 million deaths occur on the world's roads which represents an overall global road traffic fatality rate of 18 per 100 000 population. However, middle-income countries have the highest annual road traffic fatality rates, at 20.1 per 100 000, while the rate in high-income countries is lowest, at 8.7 per 100 000 population. Eighty percent of road traffic deaths occur in middle-income countries, which account for 72% of the world's population, but only 52% of the world's registered vehicles. Half of the world's road traffic deaths occur among motorcyclists (23%), pedestrians (22%) and cyclists (5%) – i.e. "vulnerable road users" – with 31% of deaths among car occupants and the remaining 19% among unspecified road users.

## 1.2. NONCOMMUNICABLE DISEASES IN MONGOLIA

In Mongolia, NCD-related death rates are increasing annually, and during the three decades morbidity and deaths attributable by cardiovascular diseases and cancers are continuously taking the first places among the leading causes of morbidity and death[s] among the population.

As of the end of 2012, the following diseases were the leading five causes of death[s] in Mongolia:

- Diseases of the circulatory system - 20.9 per 10,000 population
- Neoplasms / Cancers - 12.6 per 10,000 population
- Injury, poisoning and certain other consequences of external causes - 11.3 per 10,000 population
- Diseases of the digestive system - 5.3 per 10,000 population
- Diseases of the respiratory system - 2.3 per 10,000 population

In 2012, 35.1% of mortality was caused by circulatory system diseases, 21.2% by cancer, and 18.9% by injuries and poisoning, contributing together to 75.2% of all deaths in Mongolia. Annually, 6000-6500 deaths or one-third of mortality cases are caused by circulatory system diseases, 3500 deaths by cancer, and 3000 deaths, or one-fifth of the total deaths were caused by injuries, poisoning or certain other consequences of external causes.

The National NCD Prevention and Control Program 2005-2013, adopted by the Government of Mongolia in 2005 is currently being implemented in two phases. In the framework of the National NCD Prevention and Control Program, the first NCD STEPS survey was conducted in 2005, and the second NCDI STEPS survey in 2009 by the Public Health Institute (currently renamed as the National

Center for Public Health).

The results of the first 2005 NCD STEPS survey indicated that one in every ten people aged 15-64 had at least one NCD risk factor and 1 in every 5 people had three or more risk factors, or were at high risk. Males aged 45 years and above were at higher risk of developing NCDs. Results of the second NCD STEPS survey conducted in 2009 revealed that 1 in 5 Mongolian adults and 1 in 2 adults aged 45 to 64 years have three or more common modifiable NCD risk factors. Between the first and second NCD STEPS survey, the prevalence of most NCD risk factors remained stable and did not decrease, but some risk factors such as being overweight and obesity, increased. For example, the overweight and obesity rates among the study population increased by 8.3%; and of those, the obesity rate increased by 2.7% during the period between the first and second NCD STEPS surveys.

The prevalence of traffic injuries in the study population was 4%; one in five traffic injuries was due to speeding, and one in ten was due to drunk driving. In Mongolia, the morbidity and mortality due to injuries, poisoning and certain other consequences of external-causes have been increasing annually. In 2009, the morbidity due to injuries and poisoning per 10000 population was 416.9, and mortality was 8.7, whereas these indicators reached 502.8 for morbidity and 11.3 for mortality per 10000 population in 2012. According to the health statistics, injuries, poisoning and certain other consequences of externally-caused diseases and deaths were ranked as the 5th leading cause of population mortality in 1990 and have risen to the 3rd since 2000. In 2012, the mortality due to injuries and poisoning reached 11.25 per 10000 population.

Injuries and deaths due to traffic accidents are also increasing annually. Traffic accidents belong to the 'injuries, poisoning and certain other consequences of external-causes' group as a cause of mortality and morbidity. The mortality due to traffic accidents was 1.8 per 10000 population in 2010, and 1.9 in 2011, and reached 2.1 in 2012. Therefore, it is important to study the knowledge, attitude and practices of pedestrians, and drivers on traffic safety related issues in order to obtain scientifically sound data and evidence.

The needs for conducting the present survey were to furnish the necessary data for monitoring and evaluation of the implementation of the National Program on NCD Prevention and Control and Millennium Challenge Account Mongolia Health Project, establish baseline NCD data and provide evidence and information for the further planning and strategy in NCD prevention and control.

## 1.3. SURVEY GOAL AND OBJECTIVES

### 1.3.1. SURVEY GOAL

The survey is aimed to determine the current situation and future tendencies of the prevalence of common modifiable NCDI risk factors among the Mongolian population comparing the 2009 and 2013 survey results and findings, evaluate the impacts of MCA-M Health Project implementation, and contribute to monitoring and evaluation of the implementation of the National Program on NCD Prevention and Control.

### 1.3.2. SURVEY OBJECTIVES

1. To determine the prevalence of common modifiable behavioral risk factors for NCDs and injuries
2. To determine the prevalence of risk factors and evaluate screening and detection for arterial hypertension, diabetes, breast and cervical cancers
3. To investigate the prevalence of lipid metabolism disorders by determining total cholesterol, triglycerides, low density lipoprotein and high density lipoprotein in blood

4. To explore the tendencies in the prevalence of primary and intermediate NCDI risk factors among the population comparing the results and findings of the current and previous STEPS surveys
5. To analyze and evaluate the impacts of MCA-M Health Project and implementation of the National Program on NCD Prevention and Control.

## 1.4. THE NOVELTY AND IMPORTANCE OF THE SURVEY

The key importance of the survey is the evaluation of the results and effectiveness of implementation of the National Program on NCDI Prevention and Control and impacts of the Millennium Challenge Account Mongolia Health Project,

The subsequent and repeated surveys with the same internationally recognized and validated methods applied will enable international comparisons and capture the trends in the risk factors for non-communicable diseases among Mongolians providing comparable reliable evidence and data.

The survey uses WHO STEPS approach, standardized methods and procedures, and advanced software, laboratory tests and statistical methods, which will generate reliable information for future policy planning and program implementation.

# CHAPTER 2. METHODOLOGY AND TOOLS

## 2.1. Survey Population and Scope

A nationwide, cross-sectional survey was conducted covering 8 districts of Ulaanbaatar city and 21 aimags of Mongolia. A total of 6013 individuals aged 15-64 years old, representing the Mongolian adult population, were involved in the survey.

## 2.2. Sample Size, Sampling

**Sample size:** The STEPS survey approach was applied to calculate the sample size. The prevalence of overweight and obesity (P=39.8%) identified during the previous (2009) round of STEPS survey was used, assuming 95% confidence interval (Z=1.96), 5% acceptable margin of error (0.05), a complex sampling design effect coefficient of 1.5, and equal representation of genders in each age group (5 age groups for each gender, or a total of 10 groups). The calculated results gave a sample size of 5532 persons, which was further increased by 10% (6150) to account for contingencies such as non-response or recording error. Thus, we recruited 6150 randomly selected respondents and requested them to be involved in the survey.

$$n = \frac{Z^2 \times P(1-P)}{E^2}$$

Z= 95% confidence interval (1.96)
P - baseline indicator prevalence percentage (39.8% or 0.4)
E - acceptable margin of error (0.05 )

Calculation of sample size: $n = \frac{1.96^2 \times 0.4(1-0.4)}{0.0025} = 368.8$

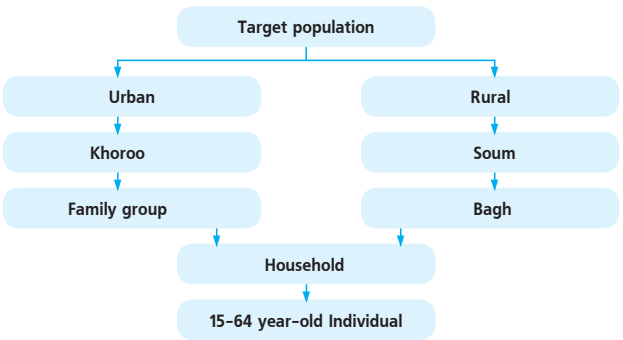
**Sample size** (N) = **n** x **complex sampling design effect x age-gender factor** = 368.8 x 1.5 x 10 = 5532

N / probability of non-response = 5532 / 0.90 = 6150

**Sampling:** The survey was designed to cover all geographical areas of Mongolia, and a multi stage stratified sampling process was carried out to randomly select participants from the target population. Given the urban vs. rural differences in lifestyle and disease status, the target population was stratified into urban and rural areas and the sample was drawn proportionally based on the target population in each area. Ulaanbaatar, Darkhan and Erdenet cities represented urban areas, while the remaining aimags and soums represented rural areas.

Primary units for Ulaanbaatar, Darkhan and Erdenet cities were khoroos, whereas soums served as primary units for rural areas. The same principle used in the previous STEPS surveys in 2005 and 2009 was applied for sampling unit selections for each stage. From each selected household at the tertiary units of multi-stage cluster sampling in both urban and rural areas, only one individual aged 15-64 years old was randomly selected.

**Figure 1.** Multi-stage Cluster Sampling



The survey covered a total of 65 cluster sampling units. These units included randomly selected individuals from 32 soums in 21 rural aimags and 33 khoroos in Ulaanbaatar, Darkhan and Erdenet cities. The below Table-1 presents selected clusters, cluster sampling units and the numbers and proportion of participants out of the total population.

**Table 1.** Selected Clusters and Survey Population, by urban and rural study sites

| | Cities/Aimags | Number of Clusters | Proportion of participants out of total population, N (%) |
|---|---|---|---|
| Urban | Ulaanbaatar | 29 | 2614 (43.5) |
| | Darkhan | 2 | 189 (3.1) |
| | Erdenet | 2 | 190 (3.2) |
| | Total | 33 | 2993 (49.8) |
| Rural | Arkhangai | 2 | 188 (3.1) |
| | Bayan-Ulgii | 2 | 190 (3.2) |
| | Bayankhongor | 2 | 187 (3.1) |
| | Bulgan | 1 | 95 (1.6) |
| | Gobisumber | 1 | 95 (1.6 ) |
| | Dornogobi | 1 | 95 (1.6) |
| | Dornod | 2 | 189 (3.1) |
| | Dundgobi | 1 | 95 (1.6) |
| | Zavkhan | 2 | 189 (3.1) |
| | Uvurkhangai | 2 | 184 (3.1) |
| | Umnugobi | 2 | 190 (3.2) |
| | Sukhbaatar | 1 | 95 (1.6) |
| | Selenge | 2 | 186 (3.1) |
| | Tuv | 2 | 187 (3.1) |
| | Uvs | 2 | 190 (3.2) |
| | Khovd | 2 | 190 (3.2) |
| | Khuvsgul | 3 | 285 (4.7) |
| | Khentii | 1 | 95 (1.6) |
| | Gobi-Altai | 1 | 95 (1.6) |
| | Total | 32 | 3020 (50.2) |

In order to be able to compare the survey results and findings by urban and rural areas, we conducted sampling based on the principles to select approximately similar numbers of participants from both urban and rural areas.

## 2.3. Data Collection

The survey field data collection was carried out between May 13 and June 20, 2013 in both urban and rural clusters. There was a total of 11 data collection teams, each with 5-6 members. Each team consisted of a team leader, interviewer, anthropometric measurer and laboratory technician.

Local assistants recruited by the survey team were asked to inform randomly selected individuals about the data collection procedures 1-2 days in advance of the actual field survey. Only informed persons who agreed to participate in the survey, and signed the survey consent forms were recruited.

In all stages of the survey, participant's information was collected using PDAs, handheld computers. The approximate time required for one participant was 40-55 minutes overall. This included a 15-20 minute questionnaire interview, 20-25 minutes spent on anthropometric measurements (depending on whether a fitness test was applied) and 10-15 minutes for step-3 laboratory procedures.

### 2.4. Training of Field Researchers and Pilot Study

The field researchers' training was organized by the 'Technical Working Group' in the conference room of the Public Health Institute in collaboration with WHO country office and professional experts from the relevant cooperating organizations. During the 5-day training held from 1-5 May, 2013, sixty national field researchers were trained on the survey methodology, tools and instruments to be used.

The pilot study was organized covering all steps of the actual survey. Pre-testing of the survey instruments during the pilot study aimed at validating the field researchers' skills in using survey questionnaires, performing physiological measurements and laboratory tests, and using PDAs. Based on the Family Health Centers' attendants, each researcher conducted experiments of questionnaire interview and anthropometric measurements with 2-3 persons. All field researchers were required to use both PDAs and paper to collect information from at least one of the subjects. The pilot study enabled us to ensure the consistency and smoothness of data collection using PDAs verses paper forms.

### 2.5. Ethical Considerations

The survey protocol and methodology were reviewed and approved by the Scientific Committee at the Public Health Institute on March 14, 2013. The Medical Ethical Committee at the Ministry of Health reviewed the survey materials and issued an approval on April 1, 2013. The survey protocol and materials were further reviewed by the Ethical Review Committee of Western Pacific Regional office of WHO (WRC-WPRO) and the proposal got approved on May 16, 2013.

### 2.6. Inclusion and Exclusion Criteria

Randomly selected individuals aged 15-64 years old were eligible to participate in the survey. From those selected at random, the persons who consented to attend and agreed to participate were recruited. For the STEP-3 laboratory analysis, one-third of the selected participants aged 25-64 years were recruited.

If the randomly selected individual had temporarily been out of the range of the survey clusters (soum/khoroo) during the whole period of the field work, he or she was excluded and re-sampling was conducted.

### 2.7. Survey Questionnaire

Based on the revised version of WHO STEPS survey protocol and existing guidelines, the survey scope, instrument and data collection methods were revised to take into consideration the country situation, specifics, needs and capacity. The study protocol covered a broad range of topics in each step. WHO STEPS survey instrument version 3.0 was used as a principal instrument for this survey, which was modified to meet Mongolia-specific needs. The instrument or survey questionnaire was further adapted to country specifics with local experts, the survey 'Technical Working Group' and with close collaboration and technical assistance from Dr. Leanne Really, Team Leader of the Surveillance and Prevention of NCDs Dept WHO Geneva, Switzerland. The questionnaire consists of 11 main sections including a total of 185 questions.

**Content and structure of the survey questionnaire**

- General information and demographics
- Primary behavioral risk factors
- Secondary intermediate NCD risk factor
- History of heart disease and diabetes and relevant lifestyle consultations
- Road traffic injury and violence
- Breast and cervical cancers
- Oral health
- Health service and expenditures of NCDs

- Household information
- Anthropometric indicators
- Biochemical indicators

## 2.8. Overview of the Survey Methodology

Prevalence of NCDI risk factors among the Mongolian population was studied and determined utilizing the 3-step approach recommended by the WHO. The validated questionnaires and instruments of the WHO "STEPS Survey on the Prevalence of NCD Risk Factors" were used for the survey data collection, after they were translated into Mongolian language, adapted to country specifics, and reviewed and approved by international and national experts and consultants.

**STEP ONE:** Questionnaire Survey – information and data on behavioral risk factors, such as, smoking, alcohol use, fruit and vegetable consumption, physical activity, history of arterial hypertension, diabetes, hypercholesterolemia, CVDs, screening for cervical and breast cancers, health services and expenses for these conditions,; oral health and causes of injuries and violence were collected utilizing the WHO's STEP-wise approach modified to reflect country-specific context and needs .

**STEP TWO:** Physical / Anthropometric Measurements – the secondary, intermediate risk factors for NCDs, or physiological factors, such as overweight and obesity (body weight, body height, waist and hip circumferences, and body lipid composition), raised arterial blood pressure (systolic and diastolic blood pressure, and pulse rate) and physical fitness skills (speed, strength, flexibility and balance) were measured using specific, standardized devices and techniques.

**STEP THREE:** Laboratory Analysis – blood glucose, total cholesterol and triglycerides were measured in peripheral (capillary) blood at the data collection site using dry chemical methods, biochemical analysis and automated analyzer.Serum samples were collected to analyze LDL and HDL cholesterol and spot urine was collected to determine sodium and creatinine levels in urine.

## 2.9. Assessment of the Survey Results

### 2.9.1. Step One

**Assessing alcohol consumption:** Alcohol consumption was assessed using the concept of 'standard drinks'. A **standard drink** is any alcoholic drink containing 10 grams of pure alcohol, ethanol. In other words, this assessment tool recommends considering any type of alcohol drink which contains 10 grams of spirit ethanol as a 'standard drink'. Table 2 illustrates the estimated 'standard drinks' in common alcoholic drinks.

**Table 2.** Standard Drinks Guide

| Alcoholic beverages | Amount | Alcohol content by Volume | Alcohol Amount | Standard drinks |
|---|---|---|---|---|
| Beer | 1 bottle / can (330 ml) | 4-5% | 15 г | 1.5 |
| Wine | 1 glass (100 ml) | 12,5% | 12.5 г | 1.3 |
| Vodka | 1 glass (50 ml) | 40% | 20 г | 2 |
| Home brewed vodka | 1 cup (100 ml) | 15% | 15 г | 1.5 |
| Mare's milk (fermented) | 1 bowl (500 ml) | 5% | 25 г | 2.5 |

Alcohol = Spirit Ethanol

In assessing alcohol consumption, 'binge drinking' was defined as consuming 6 or more standard drinks on one occasion for both males and females.

**Assessing tobacco use:** Tobacco use was assessed utilizing the WHO standard questionnaire to reveal whether the subject smokes, types of tobacco used, how many cigarettes per day, at what age they started smoking, and for how long the subject used tobacco.

**Assessing fruit and vegetable consumption:** Consumption of fruits and vegetables was assessed in terms of 'number of servings', and a serving size is equal to 80 g. In order to facilitate data collection, show cards were produced and used, containing over 50 different photo images of servings of 24 different types of fruits belonging to 14 fruit groups, 16 different types of vegetables belonging to 11 vegetable groups (Please refer to the Attachment 3 for the images of show cards). The show cards were used to collect data on fruit and vegetable consumption on a typical day. In addition, a poster with fruit and vegetable serving guide was used. When assessing the fruit and vegetable consumption, we considered the following amount of different fruits and vegetables as a 'serving size': a medium sized piece of fresh fruit; or a cup of fruit juice; or 5 pieces of small-sized fruits, such as prunes or apricots; or  cup of dried fruits; or a slice of watermelon; or  cup of natural, wild berries; or a cup of raw vegetables; or  cup of cooked or processed vegetables.

**Assessing physical activity:** We used MET (Metabolic Equivalents) in assessing physical activity, the MET are the most commonly used and recognized tools to express the intensity of physical activities. MET is a metabolic unit used to quantify the intensity of physical activity, which is defined as the ratio of the metabolic rate during exercise to the metabolic rate at rest (1 MET = 1 kcal/kg/hour). The estimations suggest that a typical adult spends 4 times more energy when involved in moderate physical activity, and 8 times more energy when involved in vigorous physical activity, compared to the amount of energy spent at rest. Therefore, for the calculation of a person's total physical activity, the following MET values were used (Table 3):

**Table 3.** Physical Activity Assessment using MET Value

| Physical Activity Type | MET Value |
|---|---|
| Work place | Moderate MET Value = 4.0<br>Vigorous MET Value = 8.0 |
| Commuting | Cycling and walking MET Value = 4.0 |
| Recreation | Moderate MET Value = 4.0<br>Vigorous MET Value = 8.0 |

Throughout a typical week, including activity for work, during transport and leisure time, in order to improve cardio-respiratory and muscular fitness, bone health and reduce the risks of NCDs, adults should do at least:

- 150 minutes of moderate-intensity physical activity, or
- 75 minutes of vigorous-intensity physical activity, or
- An equivalent combination of moderate- and vigorous-intensity physical activity achieving at least 600 MET-minutes per week.

**Determining the percentage of respondents with CVD risk of ≥30%, or existing CVD:** Percentage of respondents aged 40-64 years with a 10-year cardiovascular disease (CVD) risk* ≥30% or with existing CVD was determined using the following method: A 10-year CVD risk of ≥30% is defined considering their age, sex, arterial blood pressure, smoking status (current smokers, or those who quit smoking less than 1 year before the assessment), total cholesterol and diabetes status (previously diagnosed with diabetes, or with a fasting plasma glucose concentration >7.0.)

**Vulnerable population groups with higher risk of developing NCDs**

Vulnerable population groups, at higher risk of developing NCDs, were identified as follows: Population groups with 3 or more risk factors out of the 5 common modifiable risk factors, (1) current daily smoking, (2) consuming less than 5 servings of fruits and/or vegetables per day, (3) physically inactive or not meeting WHO recommendations on physical activity for health, (4) overweight and/or obese and (5) people with raised arterial blood pressure, are considered at high risk for developing NCDs.

### 2.9.2. STEP TWO

In step-2 of the survey, the anthropometric measurements such as body weight, height, waist and hip circumferences, body fat, arterial blood pressure, physical fitness and body development were taken and assessed in all survey participants.

**Body weight** was measured with electronic scales 'GIMA' produced in Italy. 'GIMA' is a bio impedance device highly suitable for research purposes, which measures body weight, body fat percentage, and water, muscle and bone mass with 0.1 % precision.

**Body height** was measured using the 'Somatometre-Stanley 04-116' device, suitable for research purposes, which has the capacity to measure height up to 2 meters with a precision of a millimeter difference, reading height values in centimeters. The anthropometric measurements, including body weight and height measurements were performed by trained researchers / measurers.

Body mass index (BMI) was calculated as a ratio of body weight in kilograms to the square of body height in meters.

$$BMI = \text{Body weight (kg)} / \text{Body height (m}^2\text{)}$$

**Waist and Hip Circumferences (WC/HC)** were measured with 'GIMA tape meter', a non-stretch tape with mm precision. Waist circumference was measured by placing a tape measure around the bare abdomen, just above the upper hip bone. The central obesity was defined for those men with waist circumference ≥90cm, and women with ≥80cm, according to the suggested interim lower values for Asians by the WHO recommended references (Table 4).

**Table 4.** Reference Values for Waist Circumference

| Gender | Normal | Abdominal/Central Obesity |
|---|---|---|
| Male | < 90.0 cm | ≥ 90.0 cm |
| Female | < 80.0 cm | ≥ 80.0 cm |

**Body fat** percentage was assessed using the 'GIMA body fat scale'. The device measures body fat percentage relative to the person's age, gender, weight and height. Body fat percentage was measured in all survey subjects (Table 5).

**Table 5.** Reference Values for Body Fat Percentage

| Gender | Body fat percentage | | | |
|---|---|---|---|---|
| | Low | Normal | High | Very high |
| Male | <10.0 | 10.0-19.9 | 20.0-24.9 | 25 |
| Female | <20.0 | 20.0-29.9 | 30.0-34.9 | 35 |

**Arterial Blood Pressure Measurement Techniques:** Arterial blood pressure was measured three times on the right arm of the survey participant in the sitting position using OMRON Model M5 automatic blood pressure monitor. The mean value of three measurements was taken for analysis of arterial blood pressure, and assessed using the reference values presented in the below Table 6. The measurements were taken after the participant had rested for at least 5 minutes. There was 3 minutes of resting time between each measurement.

**Table 6.** Reference Values for Arterial Blood Pressure

| Arterial Blood Pressure | Normal | Raised blood pressure |
|---|---|---|
| Systolic Pressure | < 140 mmHg | ≥ 140 mmHg |
| Diastolic Pressure | < 90 mmHg | ≥ 90 mmHg |

**Assessment of Physical Fitness and Body Development:** One in every three survey participants aged 15-64 years were selected to undergo a fitness test, which assessed physical fitness and body development by using 5 quality indicators, such as strength, speed, flexibility, endurance and balance.

### 2.9.3. STEP THREE

Randomly selected individuals aged 15-64 years old who were eligible to participate and agreed upon, and signed a consent form, were involved in the step-3, laboratory testing. A researcher who performed anthropometric measurements, and signed the survey card, checked if the participant was eligible, and selected for the step-3 laboratory analysis. For the STEP-3 laboratory analysis, one-third of the selected participants aged 25 -64 years were recruited. Laboratory analysis included testing for blood glucose, cholesterol, triglycerides, high density lipoprotein (HDL), and low density lipoprotein (LDL). Laboratory tests for LDL and HDL in blood, as well as sodium and creatinine content in urine were performed and analyzed in "Gyals" LLC's laboratory using biochemical automated analyzer.

**Dry chemical method:** Concentrations of glucose, cholesterol and triglycerides as the intermediate, secondary risk factors of NCDs, were measured in peripheral (capillary) blood at the data collection sites with dry chemical methods using multi-functional "Prima home test" diagnostic device. Prima Home Test Multicare-In Meter for Glucose/ Cholestrol/ Triglycerides Diagnostic device is equipped with 2 technologies: Amperometric with glucose electrodes strips and Reflectometric with cholesterol and triglycerides strips. This diagnostic kit is easy-to-use, very clean and hygienic because it has the strip ejector switch to avoid contact with the used strips. It has a memory capacity of 500 measurements with date and time and analyzes results within 30 seconds. Thus, the participants were informed about the test results directly, at the study sites.

The research team members of the STEP III or laboratory step were involved in researchers' training on how to use the "Prima home test" diagnostic kit, methodology to collect peripheral (capillary) blood at the data collection sites and safety measures.

**Measuring procedures:** After the "Prima home test" portable diagnostic device is regulated properly, a small size of blood sample is collected from a finger tip of a survey participant, and applied to the "yellow area" of a test strip. Blood glucose, cholesterol and triglycerides levels can be determined directly from this test. After each test, a laboratory staff member accurately entered the test results into a hand held computer, prior to starting the next participant's test.

The "Prima home test" portable diagnostic device has the capacity to measure within the following range:

- Glucose: 0.6-33.3 mmol/L
- Cholesterol: 3.3-10.2 mmol/L
- Triglycerides: 0.56 - 5.6 mmol/L

When the measurement result was lower than the measuring range of the device, the result was evaluated as "very low", and if the result was higher than the measuring range of the device, then the result was evaluated as "very high". For instance, the measuring capacity for the lowest level of glucose is 0.6 mmol/L, therefore, the measurement results lower than this level was evaluated as "very low". Similarly, if the glucose level was higher than 33.3 mmol/L, the highest level of the device's measuring range, the result was evaluated as "very high". The "very low" and "very high" measurement results were entered into computer programmes.

The measurement results for glucose, cholesterol and triglycerides levels in survey participants' blood samples were evaluated utilizing the following reference values shown in Table 7.

**Table 7.** Reference Values for Biochemical Indicators

| Biochemical Indicators | Evaluation | |
|---|---|---|
| | Normal | Increased |
| Glucose | < 110 mg/dl /<5.5 mmol/L | ≥ 110 mg/dl / ≥5.6 м mmol/L |
| Cholesterol | <200 mg/dl /< 5.0 mmol/L | ≥ 200 mg/dl / ≥5.0 mmol/L |
| Triglycerides | < 1.7 mmol/L | ≥ 1.7 mmol/L |

## Methodology for Biochemical Analysis:

High density lipoprotein (HDL) and Low density lipoprotein (LDL) content was measured in serum with an automatic analyzer using a direct or two-point linear method in 2,070 blood samples. Urine creatinine was determined using the Mindrayfafle method. A one-time (spot) test for sodium in the urine was determined using the electrolyte method in 2,058 urine samples, by "Gyals" LLC's Laboratory.

The following requirements were complied with in blood and urine sample collection and transportation:

- Blood sample size to be not less than 2-3 ml
- Urine sample size to be not less than 8-10 ml
- Store samples in a special container in order to prevent hemolyzed specimens and clotted samples
- Samples to be stored at the temperature range of 2-8 0C
- Deliver blood and urine samples to the laboratory within one day in Ulaanbaatar, and within three days in rural areas, complying with the required conditions for storage and transportation
- Referral sheet for laboratory test samples must contain the survey participant's age, sex, the date when a sample was collected, and the date when a sample was delivered to the laboratory.

The following reagents and diagnostic kits were used for the laboratory tests:

1. For determining High density lipoprotein (HDL) content: HDL – Cholesterol - Kit manufactured by "Mindray" firm (Lot #142112023, Expiry date: May 2014)
2. For determining Low density lipoprotein (LDL) content: LDL – Cholesterol - Kit (Lot #142012017, Expiry date: May 2014)
3. For determining Creatinine: Creatinine Kit (Lot #141012028, Expiry date: May 2014)
4. Sodium (Na) level: Electrolyte Buffer Solution

External and internal monitoring and evaluation were conducted on a regular basis in order to ensure the accuracy of, and compliance with, the standard requirements of the laboratory test results of the biochemical analysis. Regular internal quality control was conducted on a daily basis utilizing control serums "Multi control sera N" and "Multi control sera P" manufactured by the "Mindray" factory. In addition, the external independent quality control was conducted by the "Sysmex" corporation, where accuracy of the laboratory tests was monitored using "MEQAS for biochemistry" control samples prior to and during the biochemical analysis.

Gyals laboratory conducted the biochemical analysis during the period between May 14, 2013 and June 17, 2013 and handed over the test results coded by each survey participant to the PHI's research team.

The biochemical analysis results for High density lipoprotein (HDL) and Low density lipoprotein (LDL) content in the survey participants' serum samples were evaluated utilizing the following reference values shown in the Table 8.

**Table 8.** Reference Values for Blood Lipoprotein Level

| Biochemical Indicators | Evaluation | | |
|---|---|---|---|
| | Normal | Relatively increased | Decreased/Increased |
| High Density Lipoprotein (HDL) | ≥ 35 mg/dl<br>For men: ≥1.03 mmol/L,<br>For women ≥1.29 mmol/L | - | <35 mg/dl<br>For men: <1.03 mmol/L,<br>For women: >1.29 mmol/L |
| Low Density Lipoprotein (LDL) | <130 mg/dl<br>< 3.3 mmol/L | 130–160 mg/dl<br>3.3–4.1 mmol/L | ≥ 160 mg/dl<br>≥ 4.1 mmol/L |

## 2.10 Data Processing and Analysis

**Information Database:**

The survey database was created in the framework of the pre-developed questionnaires and surveys using the eSTEPS Questionnaire Designer in eSTEPS data management software and were reviewed and verified by several pilot trials. The information database was copied and installed into the PDAs used for the survey.

**Data entry, compilation and cleaning:**

When the data collection was fully completed, the survey data from the PDAs used by the data collection team in the field study were downloaded directly into a stationed desktop computer for incorporating and analysis. The data copied into the eSTEPS questionnaire designer software was converted into EPIDATA 3.1 software; thus, allowing an easy conversion of data into SPSS 18.0 version of statistical analysis software.

**Weighing of Data:**

Weighing of data and adjustments were performed to correct differences in the age-sex distribution of the sample versus the target population. Population data weighing was conducted based on the 2012 statistical demographic data of the Mongolian population aged 15-64 years old. The sample weighing was conducted based on the collected data in each step of the survey using Sampling 1.0 software. The product of the sample weight and the population adjustment weight was used in all weighed analysis.

**Data Processing and Analysis:**

Data analysis including cleaning, detection and correction of logical errors were performed using the SPSS 18.0 statistical analysis software program. The survey data analysis was conducted using the complex sampling design modules of the software.

Data Processing and Analysis were done utilizing the WHO methodology for determining the main indicators, and the results of the analysis was reviewed and verified by the WHO technical advisers.

The prevalence and measures of the general tendency of NCD risk factors were estimated. Outcome measures (prevalence and mean variance) and differences between groups (age, gender and location) were calculated with 95% confidence intervals (95% CI). Sampling error, which could potentially affect the accuracy of the results of the current survey, was measured by the standard error of variables. Margins of error in prevalence and measures of central tendency are represented by numeric values of lower and upper limits of 95% confidence interval.

# CHAPTER 3. SURVEY RESULT

## 3.1 Demographic Profile

### 3.1.1 Survey population

This chapter of the study report presents the findings and data analysis results of the information gathered on demographic indicators such as age, gender, education, ethnicity, occupation, household income and marital status of survey respondents.

The survey participants included 6,013 respondents aged 15-64 years from 32 soums of 21 aimags and 33 khoroos of Ulaanbaatar, Darkhan and Erdenet cities. Out of the total number of respondents, 2,719 were males and 3,294 were females (Table 9).

**Table 9.** Survey Sampling (by age groups and gender)

| Age Group (years) | Men | | Women | | Both Sexes | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| 15-24 | 798 | 48.3 | 853 | 51.7 | 1651 | 27.5 |
| 25-34 | 677 | 44.0 | 863 | 56.0 | 1540 | 25.6 |
| 35-44 | 548 | 42.6 | 737 | 57.4 | 1285 | 21.4 |
| 45-54 | 449 | 43.4 | 585 | 56.6 | 1034 | 17.2 |
| 55-64 | 247 | 49.1 | 256 | 50.9 | 503 | 8.0 |
| **Total** | **2719** | **45.2** | **3294** | **54.8** | **6013** | **100** |

In terms of locality, 2,993 (49.8%) of the survey respondents were from urban, and 3,020 (50.2%) respondents were from rural areas. In regards to ethnicity, representatives of the Khalkha ethnic group were 80.2%; Kazaks accounted for 3.5%, Buryads 4.0%, Durvuds 1.7% and other ethnic groups combined were 10.5% (Table 10).

**Table 10.** Percentage of Survey Population (by age groups and ethnicity)

| Age Group (years) | n | Khalkha % | Kazak % | Buryad % | Durvud % | Others % |
|---|---|---|---|---|---|---|
| 15-24 | 1651 | 81.9 | 2.9 | 3.9 | 1.6 | 9.6 |
| 25-34 | 1540 | 81.8 | 3.2 | 3.8 | 1.6 | 9.4 |
| 35-44 | 1285 | 78.6 | 4.1 | 4.5 | 1.6 | 11.1 |
| 45-54 | 1034 | 78.0 | 3.8 | 3.9 | 2.3 | 11.9 |
| 55-64 | 503 | 78.3 | 3.8 | 3.4 | 1.6 | 12.9 |
| **Total** | **6013** | **80.2** | **3.5** | **4.0** | **1.7** | **10.5** |

### 3.1.2 Marital Status

The majority (61.3%) of survey respondents were married, 26.4% were single, 8.1% were common law (living together without official marriage), 0.4% were separated, 1.7% were divorced, and 2.0% were widowed (Table 11).

**Table 11.** Marital Status of Survey Population (by age groups)

| Age Group (years) | n | % Never married | % Married/ certified | % Married/ not ertified, | % Separated | % Divorced | % Widowed | % Refused |
|---|---|---|---|---|---|---|---|---|
| 15-24 | 1651 | 80 | 10.8 | 8.9 | 0 | 0.1 | 0 | 0.2 |
| 25-34 | 1540 | 12.4 | 73.5 | 11.6 | 0.8 | 1.6 | 0.1 | 0 |
| 35-44 | 1285 | 4.2 | 82.7 | 8.6 | 0.5 | 2.7 | 1.2 | 0.1 |
| 45-54 | 1034 | 1.5 | 86.3 | 3.7 | 0.7 | 3.2 | 4.7 | 0 |
| 55-64 | 503 | 1 | 83.1 | 2.8 | 0.4 | 1.8 | 10.9 | 0 |
| **Total** | **6013** | **26.4** | **61.3** | **8.1** | **0.4** | **1.7** | **2.0** | **0.1** |

There was no significant difference in marital status of the study population by gender, however, the percentage of women who responded that they were divorced or widowed was slightly higher than those among men (Appendix 1: Table 1).

### 3.1.3 Education Level

The average number of years respondents attended school was 10.9 years. On average, males attended school for 10.5 years, whereas females attended school for 11.3 years. In each age group, females attended school for more years than males by an average of 0.3-1.1 years. However, the average number of years that men attended school increased by an average of 0.6 years in each age group, compared to the 2009 survey results (9.9 years). This tendency indicates that the interest of males to study and become educated has improved since the previous survey (Table 12).

**Table 12.** Number of years of education among respondents (by age groups and gender)

| Age Group (years) | | Men | | | Women | | | Both Sexes | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | 95% CI | n | Mean | 95% CI | n | Mean | 95% CI |
| 15-24 | 798 | 10.4 | 10.1-10.6 | 853 | 11.0 | 10.4-11.0 | 1651 | 10.7 | 10.3-10.7 |
| 25-34 | 677 | 10.5 | 9.9-11.1 | 863 | 11.6 | 11.1-12.1 | 1540 | 11.1 | 10.6-11.5 |
| 35-44 | 548 | 10.5 | 10.2-11.2 | 737 | 11.5 | 11.0-12.0 | 1285 | 11.1 | 10.7-11.6 |
| 45-54 | 449 | 10.6 | 9.8-11.0 | 585 | 11.5 | 10.9-11.6 | 1034 | 11.1 | 10.4-11.2 |
| 55-64 | 247 | 10.3 | 9.6-10.7 | 256 | 10.6 | 9.8-11.3 | 503 | 10.5 | 9.8-10.9 |
| **Total** | **2719** | **10.5** | **10.1–10.8** | **3294** | **11.3** | **10.9–11.6** | **6013** | **10.9** | **10.5–11.2** |

According to the survey findings, 1.4% of the surveyed population had no formal schooling, 1.6% had incomplete primary education (had only completed the first three grades or were illiterate), 6.9% had completed primary education, 19.6% had incomplete secondary education, 29.3% had completed secondary education, 15.2% had completed technical or vocational education, 23.7% had college or university education and 2.2% had completed a post-graduate degree (Table 13).

**Table 13.** Education level of survey population (by age groups)

| Age Group (years) | n | % No formal schooling | %Incomplete primary education | %Primary School completed | %Incomplete secondary education | %Complete secondary education | %Technical or vocational education | %Higher education | % Postgraduate degree completed |
|---|---|---|---|---|---|---|---|---|---|
| 15-24 | 1651 | 0.7 | 0.6 | 6.5 | 35.9 | 34.2 | 4.8 | 16.9 | 0.4 |
| 25-34 | 1540 | 2.6 | 3.5 | 8.1 | 10.9 | 25.5 | 6.6 | 39.7 | 3.1 |
| 35-44 | 1285 | 0.9 | 0.8 | 5.0 | 16.8 | 32.6 | 19.8 | 21.2 | 2.8 |
| 45-54 | 1034 | 1.3 | 1.4 | 5.0 | 14 | 27.2 | 31.2 | 17.0 | 2.9 |
| 55-64 | 503 | 2.0 | 2.2 | 13.1 | 11.7 | 20.3 | 31.0 | 17.5 | 2.2 |
| **Total** | **6013** | **1.4** | **1.6** | **6.9** | **19.6** | **29.3** | **15.2** | **23.7** | **2.2** |

A comparison of education level by gender revealed that the percentage of males aged 15-64 with no formal schooling or incomplete primary education (only completed the first three grades or illiterate) was 0.5% higher than their female counterparts. Compared to their female counterparts, males with primary education were more by 3.5%, with incomplete secondary education were more by 6.7%, and males with completed secondary education were more by 1.9%. However, the proportion of women was higher compared to their male counterparts in the fields of technical, vocational and higher education or having completed college/university education, and with a

postgraduate degree. The survey results demonstrated that there were more (by 12.0 percent) females with technical, vocational or higher education and by 0.8 percent more females with postgraduate education compared to their male counterparts.

The education level of women was relatively higher compared to men. Although the results of the 2009 survey indicated that the percentage of men with complete secondary education was lower (by 2.5%) compared to those of women, the present survey's findings show that this percentage increased by 1.9 percent (Appendix 1: Table 2).

A comparison of the levels of education by age groups revealed that 15-24 year old males (38.6%) were more likely to have incomplete secondary education compared to their female counterparts (5.2% more). In addition, the proportion of women having completed secondary, higher or college/ university education and graduate and postgraduate degree was higher compared to those of men in all age groups.

### 3.1.4 Employment and Household Income

According to the present survey results, 21.7% out of the total employed survey respondents were employed in governmental organizations and state/public agencies, 12.2% in nongovernmental organizations, 21.4% were self-employed, and 44.7% had occasional or seasonal work with no regular wage and salary (Table 14).

**Table 14.** Employment Status (by age groups)

| Age Group (years) | n | % Government / Public Employee | % Nongovernment Employee | % Self-employed | % Occasional work with no regular income |
|---|---|---|---|---|---|
| 15-24 | 1651 | 6.5 | 7.8 | 6.7 | 78.9 |
| 25-34 | 1540 | 26.2 | 17.8 | 27.7 | 28.2 |
| 35-44 | 1285 | 30.7 | 15 | 32 | 22.3 |
| 45-54 | 1034 | 32.3 | 11.2 | 28.2 | 28.2 |
| 55-64 | 503 | 12.3 | 4.8 | 9.3 | 73.6 |
| Total | 6013 | 21.7 | 12.2 | 21.4 | 44.7 |

Women were predominantly employed by government/state organizations and men by the private sector. The percentage of women who were employed by government organizations was 4.1% higher compared to men, while the percentage of self-employed men, and men working in the private sector was 10.1% greater compared to women (Appendix 1: Table 3).

The household income of the surveyed population was assessed based on average earnings over the past year, and the average reported household income per year was 3,380,371.40 tugrugs.

Among the unemployed survey respondents, 40.0% were students, 13.7% were homemakers, and 14.2% were retired citizens. Out of the total number of unemployed respondents, 21.3% were people who were able to work, and 7.0% were people with disabilities (Table 15).

**Table 15.** Unemployment (by age groups)

| Age Group (years) | n | % No income / unpaid | % Student | % Homemaker | % Retired | Unemployed | |
|---|---|---|---|---|---|---|---|
| | | | | | | % Able to work | % Disabled / Not able to work |
| 15-24 | 1303 | 1.5 | 80.0 | 6.5 | 0.0 | 10.6 | 1.5 |
| 25-34 | 434 | 7.4 | 6.5 | 40.3 | 0.7 | 39.6 | 5.5 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 35-44 | 286 | 7.7 | 1.0 | 23.4 | 2.4 | 49.3 | 16.1 |
| 45-54 | 292 | 5.5 | 0.3 | 11.6 | 22.3 | 36.0 | 24.3 |
| 55-64 | 370 | 2.7 | 0.0 | 2.2 | 82.7 | 4.6 | 7.8 |
| Total | 2685 | 3.7 | 40.0 | 13.7 | 14.2 | 21.3 | 7.0 |

According to the previous survey in 2009, the gender breakdown of the able-bodied unemployed demonstrated that there were slightly (9.9%) more males than females among the unemployed respondents, while the results of the present survey showed that this indicator has increased in females by 1.3 percent. However, there were more (by 20%) female homemakers (housewives) than male homemakers (Appendix 1: Table 4).

## 3.2 PREVALENCE OF PRIMARY MODIFIABLE NCD RISK FACTORS

### 3.2.1 Tobacco Use

The survey participants were asked questions about current smoking, previous smoking, the age they began smoking, duration of smoking, quantity of tobacco-smoked daily, use of smokeless tobacco, types of tobacco products used, and duration of exposure to second-hand smoke at work and home.

The prevalence of current smoking in the survey population was 27.1% with statistically significantly more males (49.1%) currently smoking as compared to females (5.3%). Among all those, as well as male smokers, the percentage of 15-24 year-old smokers was nearly half that of other age groups. For female smokers, the percentage of 15-24 year-old smokers was lower compared to the remaining age groups (Table 16).

**Table 16.** Percentage of current smokers (by age groups and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % Current smoker | 95% CI | n | % Current smoker | 95% CI | n | % Current smoker | 95% CI |
| 15-24 | 798 | 25.0 | 20.9-29.6 | 853 | 2.3 | 1.4-3.9 | 1651 | 14.1 | 11.7-16.9 |
| 25-34 | 677 | 56.7 | 51.7-61.6 | 863 | 6.7 | 4.5-9.8 | 1540 | 31.4 | 27.8-35.2 |
| 35-44 | 548 | 56.6 | 51.1-61.9 | 737 | 6.2 | 4.5-8.4 | 1285 | 29.7 | 26.7-32.8 |
| 45-54 | 449 | 49.2 | 44.5-54.0 | 585 | 5.2 | 3.0-8.8 | 1034 | 28.2 | 25.2-31.3 |
| 55-64 | 247 | 46.9 | 38.6-55.3 | 256 | 3.9 | 1.9-7.7 | 503 | 25.4 | 20.7-30.7 |
| Total | 2719 | 49.1 | 46.5-51.8 | 3294 | 5.3 | 4.0-7.0 | 6013 | 27.1 | 25.2-29 |

In terms of locality, 29.0% of urban (95% CI 25.9-32.4) and 25.4 % (95% CI 23.2-27.7) of rural population smoked presenting no statistically significant difference in terms of stratum. However, the current smoking rate among urban women was 8.6% (95% CI 6.6-11.1), or nearly 4 times higher than rural women (Appendix 1: Table 5).

In terms of the frequency of smoking, 24.8% of the study respondents were daily smokers, 2.3% – non-daily smokers and 72.9% were non-smokers with positive health attitude (Table 17).

**Table 17.** Tobacco use among total population (by age groups)

| Age Group (years) | n | Current smoker | | | | Non-smokers | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | % Daily | 95% CI | % Non-daily | 95% CI | % Former smoker | 95% CI | Never smoker | 95% CI |
| 15-24 | 1651 | 10.7 | 8.6-13.2 | 3.4 | 2.5-4.6 | 5.1 | 3.7-7 | 80.8 | 77.9-83.3 |
| 25-34 | 1540 | 27.9 | 24.5-31.5 | 3.5 | 2.5-5.1 | 7.5 | 6-9.3 | 61.1 | 57-65.1 |
| 35-44 | 1285 | 27.7 | 24.6-31 | 2 | 1.2-3.3 | 10.1 | 8.2-12.5 | 60.2 | 57.5-62.9 |

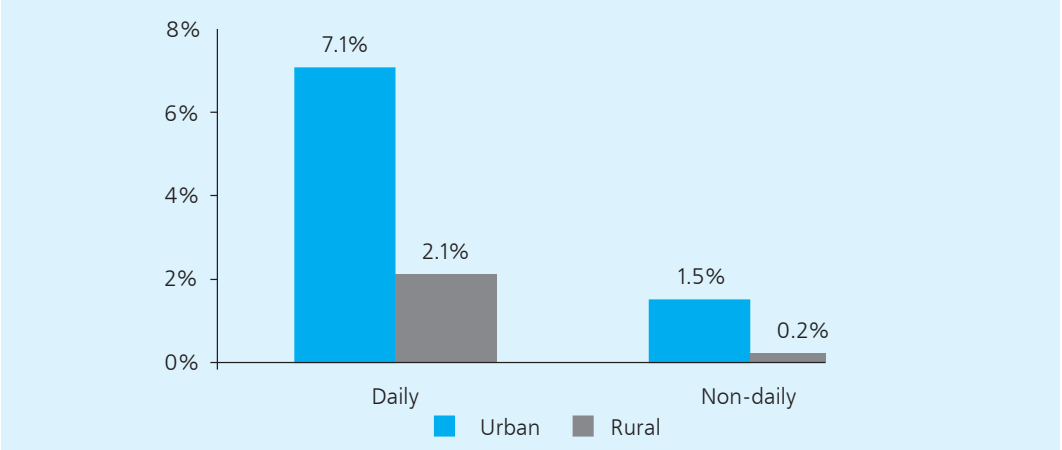
| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 45-54 | 1034 | 26.7 | 24-29.7 | 1.4 | 0.8-2.6 | 15.6 | 12-20 | 56.3 | 52.5-60 |
| 55-64 | 503 | 24.3 | 19.6-29.7 | 1.1 | 0.5-2.5 | 13 | 9.5-17.6 | 61.6 | 55.9-67 |
| Total | 6013 | 24.8 | 23-26.8 | 2.3 | 1.8-2.9 | 10.6 | 9.2-12.2 | 62.3 | 60-64.5 |

There were significant differences in the frequency of smoking between genders with 45.4% (95% CI 42.6-48.3) of males and 4.5% (95% CI 3.3-6.0) of females currently smoking daily, and 3.7% (95% CI 2.8-4.9) of males and 0.8% (95% CI 0.5-1.3) of females smoking non-daily (Appendix 1: Table 6).

In terms of the frequency of smoking by age groups, the percentage of daily smokers among smokers was lowest (10.7%) for 15-24 year-old smokers, while the percentage of non-daily smokers was relatively high among 15-34 year-old smokers compared to older age groups (Table 17).

Regarding the frequency of smoking by locality, the percentage of daily and non-daily smokers was not significantly different between urban and rural population, while the percentage of those who never smoked was relatively higher in rural areas compared to those of urban areas. There was no statistically significant difference in the frequency of smoking between rural and urban males; whereas the frequency of smoking among daily and non-daily female smokers was higher among urban females compared to rural females (Appendix 1: Table 7, Figure 2).

**Figure 2.** Frequency of smoking among women, by locality




Among current smokers, 91.7 % (95% CI 89.3-93.5) reported to smoke daily. In regard to gender, 92.5% (95% CI 90.1-94.3) of the men and 84.2% (95% CI 77.4-89.3) of the women smoked daily, indicating that this indicator was higher in men compared to those in women. In terms of the frequency of smoking among current smokers by age groups, it was relatively low (75.8%, 95% CI 68.6-81.7) in the age group of 15-24 year-olds compared to other age groups, while there was no statistically significant difference in this indicator between rural and urban areas (Appendix 1: Table 8).

Among smokers, the mean age of initiating smoking was 19.7 years and this indicator differed by sex. On average, males started to smoke at the age of 19, while females started at age of 25 ($p<0.001$) (Table 18).

**Table 18.** Mean age started smoking (by age groups and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean age | 95% CI | n | Mean age | 95% CI | n | Mean age | 95% CI |
| 15-24 | 166 | 16.9 | 16.3-17.5 | 15 | 17.7 | 16.6-18.8 | 181 | 17.0 | 16.4-17.5 |
| 25-34 | 340 | 17.8 | 17.3-18.3 | 39 | 22.9 | 21.2-24.7 | 379 | 18.3 | 17.8-18.8 |
| 35-44 | 274 | 19.3 | 18.4-20.1 | 40 | 26.8 | 22.4-31.2 | 314 | 20.0 | 19.3-20.6 |
| 45-54 | 207 | 19.6 | 18.3-20.9 | 32 | 27.4 | 22.8-32.1 | 239 | 20.3 | 19.1-21.5 |
| 55-64 | 104 | 22.5 | 19.9-25.0 | 11 | 29.6 | 22.8-36.4 | 115 | 23.1 | 20.6-25.5 |
| Total | 1091 | 19.1 | 18.6-19.7 | 137 | 25.9 | 23.6-28.2 | 1228 | 19.7 | 19.2-20.3 |

The duration of smoking has implications for health risks associated with tobacco use. The average duration of smoking among smokers was 20.5 years, and men smoked for a longer period of time than women 21.2 years (95% CI 20.2-22.1) for males, and 14.4 years (95% CI 11.1-17.6) for women. The findings show that the duration of smoking increased with the age of smokers (Appendix 1: Table 9).

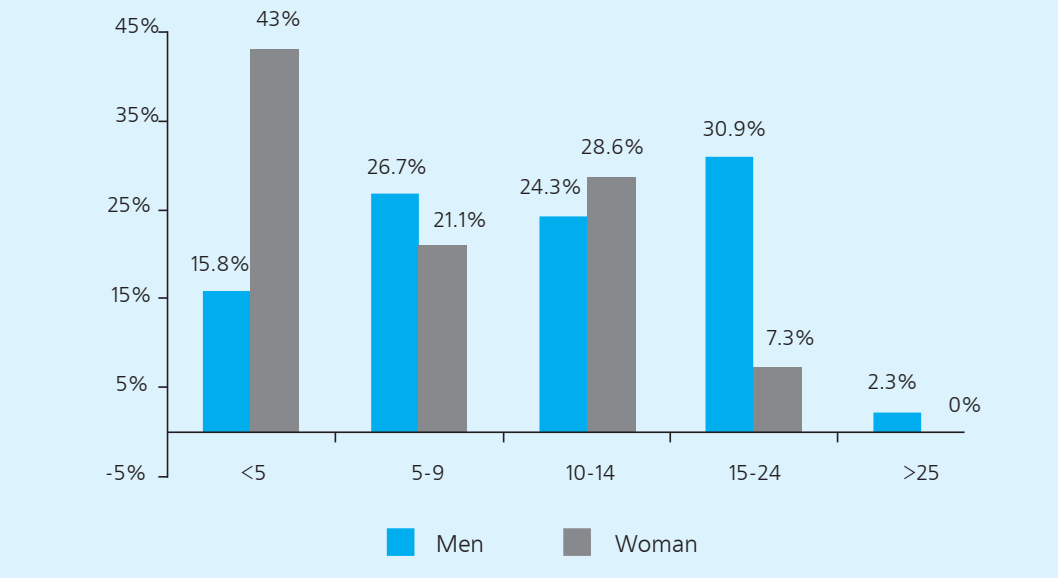
Smokers from rural areas smoked for a longer period of time (21.9 years, 95% CI 20.2-22.1) compared to urban smokers (19.2 years, 95% CI 20.2-22.1) (Appendix 1: Table 9).

Among current daily smokers, 95.2% used manufactured cigarettes. There was a statistically significant difference in the proportion of urban (99.8%) vs. rural (90.6%; 95%) consumers of manufactured cigarettes (Appendix 1: Table 10).

The majority of current smokers (95%) reported that they use manufactured cigarettes, whereas 8.8% used hand-rolled cigars, and only 0.9% of current smokers used tobacco pipes. None of survey respondents used whole leaf tobacco, shisha sessions, or water pipes.

Mean amount of tobacco used per day was 10.0 (95% CI 9.2-10.8) among current daily smokers. Men smoked 10.3 cigarettes (95% CI 9.5-11.2) daily, whereas women smoked 6.4 cigarettes (95% CI 5.5-7.4) per day ($p<0.001$) (Appendix 1: Table 11). Among male smokers, 15.8% smoked less than 5 cigarettes a day, while 43% of current female smokers used the same amount of tobacco per day. However, among current smokers 30.9% in males and 7.3% in females smoked 15-24 cigarettes a day (Appendix 1: Table 11, Figure 3).

**Figure 3.** Mean amount of manufactured cigarettes smoked per day, by gender



Comparing the mean amount of tobacco used per day by age groups revealed that young people aged 15-24 years-old used an average of 6 cigarettes a day (95% CI 5.1-7) which is relatively low compared to other age groups. There was no significant difference in the number of cigarettes smoked daily between the remaining age groups.

In respect to hand-rolled cigar users, the mean number of cigar smoked per day was 0.8, and men used this type of tobacco more (0.8 cigars, 95% CI 0.4-1.3) compared to women (0.2 cigars, 95% CI 0.1-0.4). There was no significant difference in this indicator between age groups (Appendix 1: Table 12).

Among survey respondents, 9.3% (95% CI 7.9-10.8) were former smokers who smoked daily in the past. Among those, 16.3% (95% CI 13.7-19.30) of men smoked daily in the past, which is 7 times greater than those (2.4%; 95% CI 1.7-3.3) among women (Appendix 1: Table 13).

For the survey respondents who quit smoking, the amount of time since they stopped smoking was 9.5 years (95% CI 8.2-10.9). This indicator differed by gender, it was 9.9 years (95% CI 8.3-11.5) in men, and 7.3 years (95% CI 5.8-8.8) in women (Appendix 1: Table 14).

Among current smokers, 42.3% reported that they have tried to stop smoking in the past 12 months. This percentage slightly differed between genders: it was 42.1% for men, and 44.8% for women. There were no statistically significant differences in this indicator between age groups, genders and locations (Appendix 1: Table 15).

Additionally, the percentage of survey respondents who have been advised by a doctor, or other health worker to quit smoking within the past 12 months was 33% (95% CI 26.9-39.7). There was no significant difference in this indicator by gender and age groups. However, 51.9% (95% CI 31.1-72.2) of the rural women and 13.5% (95% CI 6.8-25.2) of urban women received advice from doctors or other health workers to quit smoking, and thus the rural women tended to get more health advices than the urban women (Appendix 1: Table 16).

When studying the prevalence of smokeless tobacco use among survey population, we revealed that 0.5% (95% CI 0.2-0.8) of them were current smokeless tobacco users. There were no significant differences in this indicator in regard to age groups, gender and locality. Among all smokeless tobacco users, 20.3% (95% CI 7.8-43.4) used tobacco daily.

Exposure to second-hand smoke at home during the past 30 days was reported by 40.9% (95% CI 37.9-44) by survey respondents. In regard to gender, 45.8 % (95% CI 42.4-49.1) of females were exposed, which is higher than those among men (36%; 95% CI 32.5-39.7). There were no significant differences in second-hand or passive smoke practices in terms of age and location. At work, 25.5% (95% CI 22.7-28.5) of total respondents reported being exposed to second-hand smoke. Among those, 31.9% (95% CI 28.4-35.5) of males and 19.4% (95% CI 16.4-22.8) of females were exposed, indicating that more males than females had exposure to second-hand smoke.

Exposure to second-hand smoke at work was statistically significantly higher among the urban population (32.7%; 95% CI 29.4-36.1) compared to the rural population (19%; 95% CI 15.3-23.2). Particularly, urban men (43.4%; 95% CI 38.8-48.2) had greater exposure to second-hand smoke at work, than rural men (21.6%; 95% CI 18.4-25.3 (Appendix 1: Table 17).

### Discussion

According to the present survey, 27.1% of the population was current smokers, indicating no improvements or changes compared to the results of the previous survey. In particular, the results showed that one in two males smoked, indicating that the prevalence of smoking among men remained high.

In terms of the frequency of smoking, nine of every ten smokers used tobacco daily. Among daily smokers, the percentage of 15-24 years old smokers was lower as those among other age groups. It is commendable that smoking among young people aged 15-24 years decreased compared to the level from the previous survey.

However, there was no statistically significant difference in the mean amount of tobacco used by daily smokers between the two surveys (8.7 cigarettes per day, 95% CI 7.8-9.6 vs. 10 cigarettes per day, 95% CI 9.2-10.8), demonstrating that the amount of tobacco used among current smokers remained high.

It is commendable that 42.3% of current smokers have tried to stop smoking during the past 12 months. This result indicates that nearly half of the current smokers have positive attitude and motivation to stop smoking.

Over 40 percent of survey respondents were exposed to second-hand smoke at home indicating that there was no significant difference compared to the results of the previous survey. However, according to the present survey, exposure to second-hand smoke in workplaces relatively decreased, demonstrating a positive impact of implementing the recently endorsed Law on Tobacco Control.

### Conclusions

1. In Mongolia, one in every four people (27%) and one in every two males (49.1%) are current smokers. Tobacco use among the population remains high; there were no significant declines since the previous surveys.
2. Nine in every ten current smokers (91.7%) smoked regularly on a daily basis. When stratified by gender, 45.4% of males and 4.5% of females smoked daily. In particular, the prevalence of smoking daily is higher among women in urban areas compared to women in rural areas.
3. Duration of smoking, the percentage of daily smokers among current smokers, and the amount of tobacco used daily were higher among males compared to those in females.
4. Use of manufactured cigarettes among the population was higher compared to smokeless tobacco use.
5. Four in every ten persons (40.9%) were exposed to second-hand smoke at home, and one in every four persons (25.5%) were exposed to second-hand smoke in their workplaces. Exposure to second-hand smoke in workplaces was higher among urban populations, particularly among males in urban areas, compared to those in rural areas. Compared to the results of the previous survey, exposure to second-hand smoke in the workplaces decreased.

### 3.2.2 Alcohol consumption

As one of the common modifiable risk factors, alcohol consumption was studied in the present survey. We studied alcohol consumption patterns, frequency of drinking and risks associated with alcohol consumption among the survey respondents, and collating by gender, age and place of residency.

Out of the total number of survey participants, 23.4% (95%CI 28.7-39.6) including 14.8% (95%CI 19.3-28.8) of males and 31.9% (95%CI 38.1-51.0) of females were lifetime abstainers or teetotalers (Tables 19 and 20). In addition, 12.1% (95%CI 5.7-9.1) of the survey respondents reported no alcohol consumption in the past 12 months, and there was no difference by gender with regards to this indicator (Tables 19 and 20).

**Table 19.** Alcohol consumption status among total population (by age groups and locality)

| Indicator | n | % Current drinker (past 30 days) | 95% CI | % Drank in past 12 months, not current[1] | 95% CI | % Past 12 months abstainer | 95% CI | % Lifetime abstainer | 95% CI |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | | | | | | | | | |
| 15-24 | 1651 | 15.9 | 13.6-18.2 | 22.2 | 18.5-25.9 | 13.2 | 10.3-16.1 | 48.7 | 43.3-54.1 |
| 25-34 | 1540 | 43.7 | 38.9-48.5 | 29.0 | 25.6-32.4 | 11.0 | 8.1-13.8 | 16.3 | 11.7-20.9 |
| 35-44 | 1285 | 39.7 | 35.5-43.8 | 30.5 | 26.9-34.1 | 11.9 | 9.4-14.3 | 18.0 | 13.9-22.1 |
| 45-54 | 1034 | 39.8 | 34.8-44.9 | 27.7 | 23.7-31.6 | 11.9 | 8.0-15.7 | 20.6 | 15.8-25.5 |
| 55-64 | 503 | 27.9 | 22.6-33.3 | 29.9 | 24.3-35.5 | 15.0 | 10.4-19.6 | 27.1 | 20.9-33.3 |
| Total | 6013 | 36.3 | 33.3-39.3 | 28.2 | 25.8-30.6 | 12.1 | 10.2-14.0 | 23.4 | 19.5-27.3 |
| Locality | | | | | | | | | |
| Urban | 2993 | 40.0 | 36.5-43.6 | 27.9 | 24.0-32.1 | 10.7 | 8.2-13.9 | 21.5 | 15.8-28.5 |
| Rural | 3020 | 33.1 | 29.0-37.4 | 28.5 | 25.7-31.5 | 13.3 | 11.0-16.0 | 25.1 | 21.0-29.7 |

Among alcohol users, 28.2% (95%CI 16.1-23.5) reported drinking in the past 12 months, and 36.3% (95%CI 34.6-42.7) were current drinkers or reported using alcohol in the past 30 days. There was no gender difference among 'past 12 month' drinkers (Table 20). Alcohol consumption during the past 30 days among the urban population was slightly higher, but there was no statistically significant difference observed (Table 20).

In contrast, 48.8% (95%CI 44.7-54.8) of males vs. 24.1% (95%CI 23.0-31.3) of females were current drinkers or reported alcohol use in the past 30 days. The difference by gender in this indicator demonstrates that men used twice as much alcohol as women, presenting a statistically significant difference by gender (Table 20).

**Table 20.** Alcohol consumption status (by age groups and gender)

| Gender | Current drinker (past 30 days) | | | Drank in the past 12 months, not current | | Past 12 months abstainer | | Lifetime abstainer | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | % | 95% CI | % | 95% CI | % | 95% CI |
| Men | | | | | | | | | |
| 15-24 | 798 | 20.2 | 17.1-23.6 | 24.3 | 20.3-28.7 | 12.2 | 8.9-16.5 | 43.3 | 37.1-49.9 |
| 25-34 | 677 | 57.4 | 52.4-62.4 | 26.6 | 22.5-31.3 | 6.7 | 4.4-10.1 | 9.2 | 6.0-13.9 |
| 35-44 | 548 | 53.8 | 47.4-60.0 | 26.4 | 22.5-30.8 | 11.5 | 7.4-17.5 | 8.3 | 5.9-11.6 |
| 45-54 | 449 | 53.7 | 46.4-60.9 | 23.3 | 17.4-30.5 | 12.0 | 8.1-17.5 | 11.0 | 8.0-14.9 |
| 55-64 | 247 | 43.7 | 33.4-54.6 | 33.1 | 25.5-41.6 | 10.2 | 6.3-16.2 | 13.0 | 9.2-18.1 |
| Total | 2719 | 48.8 | 46.0-51.5 | 25.7 | 23.1-28.4 | 10.8 | 8.9-13.1 | 14.8 | 12.3-17.7 |
| Women | | | | | | | | | |
| 15-24 | 853 | 11.3 | 8.7-14.7 | 20.0 | 15.7-25.0 | 14.2 | 11.1-18.0 | 54.5 | 48.0-60.8 |
| 25-34 | 863 | 30.3 | 24.6-36.7 | 31.4 | 27.2-35.9 | 15.1 | 11.3-19.9 | 23.2 | 17.7-29.8 |
| 35-44 | 737 | 27.3 | 21.4-34.3 | 34.0 | 29.3-39.0 | 12.2 | 9.2-16.0 | 26.5 | 20.4-33.6 |
| 45-54 | 585 | 24.7 | 19.9-30.1 | 32.4 | 24.4-41.5 | 11.8 | 8.1-16.8 | 31.2 | 23.7-39.9 |
| 55-64 | 256 | 12.2 | 7.4-19.4 | 26.8 | 20.5-34.1 | 19.9 | 13.7-27.9 | 41.2 | 31.3-51.8 |
| Total | 3294 | 24.1 | 20.4-28.1 | 30.7 | 26.7-35.1 | 13.4 | 10.8-16.4 | 31.9 | 26.3-38.1 |

[1] Respondents who consumed alcohol during the past 30 days are not included.

From the above Table 20, it can be seen that the percentage of current drinkers who consumed alcohol during the past 30 days was highest among young adults in both sexes aged 25-34 years old, and was lowest among 15-24 year old people (p <0.001). See Table 20.

Of the survey respondents, 24.4% had stopped drinking due to health reasons as per the advice of a doctor or other health worker. When collated by gender, it was found that 27,3% of men and 22.2% of women had stopped drinking due to health reasons (Table 20). However, the difference in this indicator by gender was not statistically significant.

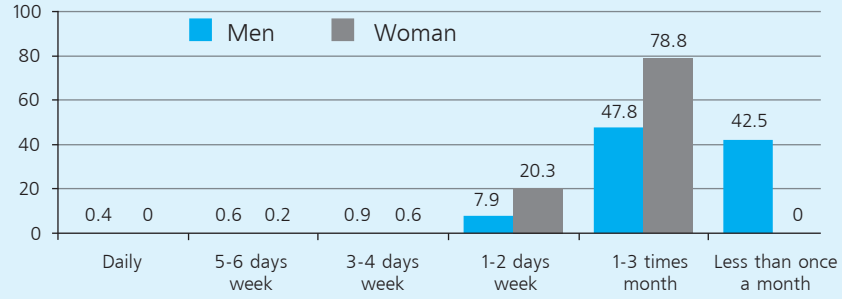
**Table 21.** Survey population who had abstained from drinking due to health reasons (by age groups, gender and locality)

| Indicator Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 98 | 6.3 | 1.6-11.1 | 124 | 17.2 | 8.9-25.5 | 222 | 12.0 | 6.6-17.4 |
| 25-34 | 47 | 20.7 | 0.0-43.0 | 137 | 21.7 | 11.8-31.7 | 184 | 21.4 | 12.4-30.4 |
| 35-44 | 52 | 34.1 | 19.0-49.3 | 102 | 24.2 | 14.0-34.4 | 154 | 28.7 | 19.6-37.8 |
| 45-54 | 57 | 33.0 | 14.4-51.5 | 69 | 25.9 | 14.1-37.8 | 126 | 29.6 | 18.3-40.9 |
| 55-64 | 30 | 30.1 | 11.5-48.8 | 56 | 14.4 | 3.2-25.5 | 86 | 19.7 | 8.5-31.0 |
| Total | 284 | 27.3 | 19.5-35.1 | 488 | 22.2 | 17.3-27.0 | 772 | 24.4 | 20.1-28.8 |
| Locality | | | | | | | | | |
| Urban | 108 | 26.1 | 15.6-40.5 | 223 | 25.8 | 18.6-34.5 | 331 | 25.9 | 18.9-34.6 |
| Rural | 176 | 28.1 | 19.5-38.7 | 265 | 19.7 | 14.2-26.5 | 441 | 23.4 | 18.6-28.9 |

In terms of the frequency of alcohol use by respondents reporting drinking in the past 12 months, 0.2% reported daily consumption of alcohol, 0.3% (95%CI 0.1-0.9) drank 5-6 days a week, 0.6% (95%CI 0.3-1.1) drank 3-4 days a week, 4.8 % (95%CI 3.8-6.0) drank 1-2 days a week, and 36.0 % (95%CI 32.4-39.9) used alcohol 1-3 times a month. Among respondents reporting drinking in the past 12 months, 58.0 % or over half (95%CI 3.8-6.0) of respondents used alcohol only once in 2 and/or more months, having relatively better attitudes and practices in alcohol consumption.

Analysis of the frequency of alcohol use by gender demonstrated that there was no statistically significant difference among drinkers who drank 3-4 days or 5-6 days a week. However, among the alcohol users who drank 1-2 days a week, males have higher risks posed by more frequent alcohol consumption compared to females. Among males, 0.4% of respondents used alcohol daily, 0.6 % drank 5-6 days a week, 0.9 % drank 3-4 days a week, and 7.9% drank 1-2 days a week, presenting a statistically significant difference compared to those in females. However, 42.5% of males used alcohol only once in 2 and/or more months, having relatively positive practices (Figure 4).

**Figure 4.** Frequency of alcohol consumption, by gender



There was no statistically significant difference observed when the frequency of alcohol use was analyzed by locality, urban and rural areas (Appendix 1: Table 18).

In the past 30 days current drinkers consumed alcohol on average 3.6 times (95% CI 2.9-4.4). As shown in the table below, mean number of times of alcohol consumption by men (4.3 times, 95% CI 3.3-5.2) was statistically significantly higher compared to those (2.4 times, 95% CI 1.9-2.9) of women (Table 22).

**Table 22.** Mean number of drinking occasions in the past 30 days among current (past 30 days) drinkers, by age groups, gender and locality

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95% CI | n | Mean | 95% CI | n | Mean | 95% CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 181 | 3.2 | 2.3-4.1 | 108 | 3.1 | 1.3-4.9 | 289 | 3.2 | 2.2-4.1 |
| 25-34 | 379 | 4.3 | 3.1-5.4 | 248 | 2.3 | 1.8-2.8 | 627 | 3.6 | 2.7-4.5 |
| 35-44 | 301 | 4.2 | 2.9-5.6 | 179 | 2.5 | 1.8-3.2 | 480 | 3.6 | 2.6-4.6 |
| 45-54 | 222 | 4.6 | 3.2-6.0 | 144 | 2.2 | 1.7-2.7 | 366 | 3.9 | 2.8-4.9 |
| 55-64 | 103 | 3.4 | 2.4-4.4 | 28 | 2.1 | 1.1-3.0 | 131 | 3.1 | 2.3-4 |
| Total | 1186 | 4.3 | 3.3-5.2 | 707 | 2.4 | 1.9-2.9 | 1893 | 3.6 | 2.9-4.4 |
| Locality | | | | | | | | | |
| Urban | 616 | 5.4 | 3.9-6.9 | 398 | 2.9 | 2.2-3.6 | 1014 | 4.5 | 3.4-5.6 |
| Rural | 570 | 3.2 | 2.2-4.1 | 309 | 1.6 | 1.3-2 | 879 | 2.7 | 1.9-3.5 |

There was no statistically significant difference observed when the mean number of drinking occasions during the past 30 days was analyzed by age groups. However, the mean number of urban women who used alcohol in the past 30 days (2.9 times, 95% CI 2.2-3.6) was statistically significantly higher than those of women in rural areas (1.6 times, 95% CI 1.3-2.0) (Table 22 ).

The alcohol consumption patterns were further studied by taking into account the frequency of drinking in the past 30 days and the amount of standard drinks on a drinking occasion. The survey findings demonstrated that during the past 30 days the survey population consumed on average 9.0 standard drinks (95% CI 8.3-9.6) per occasion. Among those, males consumed twice as many standard drinks (10.8 standard drinks, 95% I 9.9-11.8) than their female counterparts (5.2 standard drinks, 95% CI 4.8-5.6) on a drinking occasion. The table below demonstrates that in all age groups men consumed a greater number of standard drinks ($p<0.001$) than women per drinking occasion (Table 23).

**Table 23.** Mean number of standard drinks consumed per drinking occasion in the past 30 days (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Standard drinks | 95% CI | n | Standard drinks | 95% CI | n | Standard drinks | 95% CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 181 | 6.5 | 5.7-7.2 | 108 | 4.9 | 3.3-6.5 | 289 | 5.9 | 5.0-6.9 |
| 25-34 | 378 | 10.6 | 9.4-11.8 | 247 | 4.8 | 4.4-5.3 | 625 | 8.6 | 7.8-9.4 |
| 35-44 | 298 | 11.3 | 9.8-12.8 | 178 | 5.5 | 4.8-6.3 | 476 | 9.2 | 8.1-10.2 |
| 45-54 | 221 | 11.3 | 9.5-13.2 | 144 | 5.1 | 4.2-6.0 | 365 | 9.5 | 8.2-10.8 |
| 55-64 | 102 | 11.3 | 8.8-13.7 | 29 | 4.8 | 3.1-6.4 | 131 | 9.8 | 7.8-11.9 |
| Total | 1180 | 10.8 | 9.9-11.8 | 706 | 5.2 | 4.8-5.6 | 1886 | 9.0 | 8.3-9.6 |
| Locality | | | | | | | | | |
| Urban | 613 | 10.4 | 9.4-11.4 | 398 | 5.4 | 4.8-6.0 | 1011 | 8.5 | 8.0-9.1 |
| Rural | 567 | 11.3 | 9.6-12.9 | 308 | 4.9 | 4.4-5.5 | 875 | 9.4 | 8.3-10.6 |

When compared by age groups, the mean number of standard drinks consumed per drinking session in the past 30 days was lowest among 15-24 years old respondents, and was at a relatively similar level among current drinkers of the remaining age groups. (Table 23).

The risks associated with alcohol consumption were assessed in current drinkers using the WHO recommended indicators based on the average amount of pure alcohol or ethanol consumed per drinking occasion.

- High-risk consumers: For men ≥ 60 gr, For women ≥ 40 gr
- Medium-risk (intermediate) consumers: For men: 40-59.9 gr, For women: 20-39.9 gr
- Low-risk consumers: For men < 40 gr, For women < 20 gr

The table below demonstrates the risk level of alcohol consumption among the survey respondents determined using the above criteria (Table 24).

**Table 24.** Risk assessment of alcohol consumption

| Gender | n | High-end level | | Intermediate level | | Lower-end level | |
|---|---|---|---|---|---|---|---|
| | | % | 95% CI | % | 95% CI | % | 95% CI |
| Men | 2708 | 3.8 | 1.8-5.7 | 1.7 | 1.0-2.4 | 43.1 | 39.4-46.7 |
| Women | 3286 | 0.5 | 0.2-1.1 | 1.0 | 0.5-2.0 | 22.4 | 19.2-26.0 |
| Total | 5994 | 2.1 | 1.0-3.2 | 1.3 | 0.8-1.9 | 32.6 | 29.7-35.6 |

According to the survey results, 2.1 % (95%CI 1.0-3.2) of all respondents, among them 3.8% (95%CI 1.8-5.7) of males and 0.5% (95%CI 0.2-1.1) of females were at a high risk or Category III drinkers, with 7 times more men having such a risk compared to women. Medium level, or Category II risk was found in 1.3% (95%CI 0.5-1.5) of the survey population, among those, 1.7% (95%CI 0.5-1.8) of males and 1.0% (95%CI 0.8-1.9) of females had a medium level risk. Moreover, 43.1 % (95%CI 39.4-46.7) of men and 22.4% (95%CI 19.2-26) of women belonged to the low risk group, with this indicator being twice as high in men than in women (Table 24).

When compared by age groups, the risks associated with alcohol consumption was the lowest among 15-24 year old respondents, and was at a relatively similar level among current drinkers of the remaining age groups (Appendix 1, Table 19).

Analysis of the risk levels associated with alcohol consumption among current drinkers in the past 30 days by age groups suggests that it was lowest among 15-24 years old respondents, in 90.4% of respondents the risk was low, and 88.7% (95%CI 87.9-97.9) of men and 93.8% (95%CI 88.5-96.7) of women belonged to the low risk group (Table 25).

**Table 25.** Risk assessment of alcohol consumption among the survey population who drank in the past 30 days

| Gender | n | High-end level (For Men≥60gr, For Women≥40gr) | | Intermediate level (For Men≥40-59.9gr, For Women≥20-39.9gr) | | Lower-end level (For Men<40gr, For Women<20gr) | |
|---|---|---|---|---|---|---|---|
| | | % | 95%CI | % | 95%CI | % | 95%CI |
| Men | 2708 | 7.8 | 4.6-13.0 | 3.5 | 2.2-5.4 | 88.7 | 87.9-97.9 |
| Women | 3286 | 2.0 | 1.0-4.1 | 4.2 | 2.2-7.8 | 93.8 | 88.5-96.7 |
| Total | 5994 | 5.9 | 12.9-8.8 | 3.7 | 2.2-5.2 | 90.4 | 86.8-94.1 |

Moreover, the survey findings demonstrated that 3.5% (95%CI 2.2-5.4) of men and 4.2% (95%CI 2.2-7.8) of women drank at the intermediate level, and 7.8% (95%CI 4.6-13.0) of men and 2.0%

(95%CI 1.0-4.1) of women belonged to the high-risk consumers' category.

Overall, the above data demonstrates that among the current drinkers there is a 4 times higher risk posed by a greater level of alcohol consumption per session in males compared to females, with a statistically significant difference between the two genders (Table 25).

When asked what the maximum number of standard drinks consumed per drinking occasion in the past 30 days was, the study population had 10.3 standard drinks (95%CI 9.6-11.0) on average. When collated by gender, the mean maximum number of standard drinks consumed per drinking occasion was 12.7 for men, and 5.5 for women among those who excessively consumed alcohol, presenting 2.3 times higher consumption by men compared to women (Table 26).

**Table 26.** Mean maximum number of standard drinks consumed per drinking occasion in the past 30 days (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | an | Mean maximum number | 95%CI | n | Mean maximum number | 95%CI | n | Mean maximum number | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 181 | 7.7 | 6.7-8.6 | 108 | 5.3 | 3.7-6.9 | 289 | 6.8 | 5.9-7.8 |
| 25-34 | 378 | 12.5 | 11.1-13.8 | 247 | 5.2 | 4.6-5.7 | 625 | 9.9 | 9.0-10.8 |
| 35-44 | 298 | 12.8 | 11.3-14.4 | 178 | 5.9 | 5.1-6.7 | 476 | 10.2 | 9.2-11.3 |
| 45-54 | 222 | 13.5 | 11.5-15.5 | 144 | 5.3 | 4.4-6.2 | 366 | 11.1 | 9.6-12.5 |
| 55-64 | 102 | 13.4 | 10.6-16.1 | 29 | 4.9 | 3.1-6.6 | 131 | 11.5 | 9.2-13.9 |
| Total | 1181 | 12.7 | 11.6-13.8 | 706 | 5.5 | 5.1-5.9 | 1887 | 10.3 | 9.6-11.0 |
| Locality | | | | | | | | | |
| Urban | 613 | 12.5 | 11.1-13.9 | 398 | 5.8 | 5.2-6.3 | 1011 | 10 | 9.1-10.8 |
| Rural | 568 | 12.9 | 11.2-14.5 | 308 | 5.1 | 4.6-5.6 | 876 | 10.6 | 9.5-11.7 |

When compared by age groups, the mean maximum number of standard drinks consumed per drinking occasion during the past 30 days was the lowest among 15-24 year old male respondents ($p<0.001$). However, the mean maximum number of standard drinks consumed by women per drinking occasion during the past 30 days was relatively similar among current female drinkers of all age groups (Table 26).

According to the WHO recommendations to assess drinking levels, binge drinking is defined as consumption of 6 or more standard drinks at a drinking session for both males and females. Binge drinking is an important factor which significantly increases risks associated with alcohol consumption.

The survey findings demonstrated that during the past 30 days, 23.5% (95%CI 21.2-25.7) of current drinkers, 37.5% (95%CI 34.4-40.6) of men and 9.7% (95%CI 8.0-11.7) of women drank 6 or more standard drinks on a single occasion, and therefore, by definition, engaged in binge drinking (Table 27).

**Table 27.** Survey population who consumed ≥6 standard drinks per drinking occasion in the past 30 days (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 12.2 | 9.6-15.4 | 853 | 3.6 | 2.3-5.7 | 1651 | 8.1 | 6.1-10.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 25-34 | 677 | 45.2 | 39.9-50.5 | 863 | 10.6 | 8.3-13.4 | 1540 | 27.7 | 24.1-31.3 |
| 35-44 | 548 | 41.7 | 36.8-46.8 | 737 | 12.6 | 8.9-17.5 | 1285 | 26.2 | 23.1-29.2 |
| 45-54 | 449 | 42.1 | 34.4-50.2 | 585 | 9.7 | 7.0-13.3 | 1034 | 26.6 | 22.3-30.9 |
| 55-64 | 247 | 32.4 | 24.1-41.9 | 256 | 4.3 | 1.7-10.2 | 503 | 18.3 | 14.0-22.7 |
| Total | 2719 | 37.5 | 34.4-40.6 | 3294 | 9.7 | 8.0-11.7 | 6013 | 23.5 | 21.2-25.7 |
| Locality | | | | | | | | | |
| Urban | 1319 | 38.8 | 35.8-42 | 1674 | 12.3 | 9.7-15.5 | 2993 | 25.2 | 22.8-27.8 |
| Rural | 1400 | 36.3 | 31.4-41.5 | 1620 | 7.3 | 5.5-9.6 | 3020 | 22.0 | 18.6-25.7 |

Comparing the results of the present and the previous 2009 survey, alcohol consumption among the study population remained at similar levels, presenting no statistically significant difference during the period between the two surveys: 36.3% (95% CI 33.3-39,3) in 2013 vs. 38.6% (95% CI 34,6-42,7) in 2009. Analyzed by gender, there were no significant differences in alcohol consumption between the two surveys both: for men 48.8% (95% CI 46.0-51.5) in 2013 vs. 49.9% (95% CI 44.7-54.8) in 2009; and for women 24.1% (95% CI 20.2-27.9) in 2013 vs. 27.2% (95% CI 23.0-31.3) in 2009.

In terms of the amount of standard drinks in alcohol consumption, the mean number of standard drinks consumed per drinking session in the past 30 days had increased to 10.3 standard drinks (95%CI 9.6-11.0) in 2013 compared to the 2009 level of 8.8 (95%CI 8.2-9.4). In particular, this indicator considerably increased among men from 10.7 (95%CI 9.8-11.5) standard drinks in 2009 to 12.7 (95%CI 11.6-13.8) in 2013, presenting a statistically significant difference. Nevertheless, the mean number of standard drinks consumed per drinking occasion among women stayed stable during the period between the last two national surveys; 5.5 standard drinks (95%CI 5.1-5.9) in 2009 vs. 5.5 standard drinks (95%CI 4.9-6.2) in 2013.

## Discussion

Comparing the results of the present and the previous 2009 survey, alcohol consumption among the study population remained at similar levels, presenting no statistically significant difference during the period between the two surveys: 36.3% (95% CI 33.3-39,3) in 2013 vs. 38.6% (95% CI 34,6-42,7) in 2009. Analyzed by gender, there were no significant differences in alcohol consumption between the two surveys both: for men 48.8% (95% CI 46.0-51.5) in 2013 vs. 49.9% (95% CI 44.7-54.8) in 2009; and for women 24.1% (95% CI 20.2-27.9) in 2013 vs. 27.2% (95% CI 23.0-31.3) in 2009.

In terms of the amount of standard drinks in alcohol consumption, the mean number of standard drinks consumed per drinking session in the past 30 days had increased to 10.3 standard drinks (95%CI 9.6-11.0) in 2013 compared to the 2009 level of 8.8 (95%CI 8.2-9.4). In particular, this indicator considerably increased among men from 10.7 (95%CI 9.8-11.5) standard drinks in 2009 to 12.7 (95%CI 11.6-13.8) in 2013, presenting a statistically significant difference. Nevertheless, the mean number of standard drinks consumed per drinking occasion among women stayed stable during the period between the last two national surveys; 5.5 standard drinks (95%CI 5.1-5.9) in 2009 vs. 5.5 standard drinks (95%CI 4.9-6.2) in 2013.

## Conclusions:

1. One-third of the survey population was lifetime abstainers or teetotalers. Current drinking or consumption of alcohol in the past 30 days was reported by 36.3 % (or around 4 in every 10) of all respondents.
2. When analyzed by gender, the frequency of alcohol drinking was greater in males compared to that of females. On average, per drinking occasion, males consumed twice as much, whereas women drank 1.5 times more than the WHO-recommended alcohol

consumption limits.

3. One in every four survey respondents (23.5%), one in every three men (37.5%), among current drinkers were engaged in binge drinking, and binge drinking was 4 times more common in males compared to females.

4. The alcohol consumption rate among survey respondents did not decrease compared to the previous survey results, however, the number of standard drinks excessively consumed per drinking occasion had increased compared to the 2009 level. Thus, the key results in alcohol consumption indicate the importance of the effective implementation and enforcement of the Law against Alcoholism.

### 3.2.3 Fruit and Vegetable Consumption

Fruit and vegetable consumption of the survey population was assessed using indicators of "frequency of fruit and vegetable consumption per week" and "average daily consumption" stratified by gender, age and locations of residency.

### Fruit Consumption

The frequency of weekly fruit consumption in the survey population by gender, age and locality breakdown is shown in the table below (Table 28).

**Table 28.** Frequency of fruit consumption in a typical week (by age group, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | |
|---|---|---|---|---|---|---|---|---|
| | n | Mean number of days | 95%CI | n | Mean number of days | 95%CI | Mean number of days | 95%CI |
| Age Group (years) | | | | | | | | |
| 15-24 | 796 | 1.3 | 1.1-1.6 | 851 | 1.5 | 1.3-1.7 | 1.4 | 1.2-1.6 |
| 25-34 | 676 | 1.0 | 0.8-1.2 | 863 | 1.4 | 1.2-1.6 | 1.2 | 1.0-1.4 |
| 35-44 | 544 | 0.9 | 0.7-1.0 | 736 | 1.3 | 1.1-1.4 | 1.1 | 0.9-1.2 |
| 45-54 | 449 | 0.7 | 0.5-0.8 | 585 | 1.3 | 1.0-1.5 | 0.9 | 0.8-1.1 |
| 55-64 | 245 | 0.7 | 0.4-1.0 | 255 | 1.4 | 1.0-1.8 | 1.1 | 0.8-1.3 |
| Total | 2710 | 0.9 | 0.7-1.0 | 3290 | 1.3 | 1.2-1.5 | 1.1 | 1.0-1.2 |
| Locality | | | | | | | | |
| Urban | 1311 | 1.1 | 0.8-1.4 | 1673 | 1.6 | 1.3-1.9 | 1.4 | 1.1-1.6 |
| Rural | 1399 | 0.7 | 0.6-0.8 | 1617 | 1.1 | 0.9-1.2 | 0.9 | 0.7-1.0 |

The survey population consumed fruits on average 1.1 days (95%CI 1-1.2) a week. The corresponding numbers for males and females were 0.9 (95%CI 0.7-1.0) and 1.3 (95%CI 1.2-1.5) days a week, respectively. Mean number of days fruit consumed in a typical week was statistically significantly higher in women than in men (Table 28).

Analysis of data on frequency of fruit consumption by age groups revealed that the frequency of weekly fruit consumption was 1.4 days for 15-24 year-olds, which was higher compared to those of age group of 45-54 year-olds. There was no statistically significant difference in frequency of weekly fruit consumption between the remaining age groups.

With regards to the locality, urban residents consumed fruits 1.4 days (95% CI 1.1-1.6) a week, while rural residents – 0.9 days (95% CI 0.7-1.0) a week, demonstrating that the mean number of days when urban residents of both sexes consumed fruits per week was statistically significantly higher compared to those of rural residents (Table 28).

When daily fruit consumption was assessed by servings' amount, average daily fruit consumption was 0.4 servings (95%CI, 0.4-0.5) in the survey population, or 0.3 servings (95%CI, 0.3-0.4) for males and 0.5 servings (95%CI, 0.4-0.6) for females. There was no statistically significant difference in average daily fruit consumption between genders and age groups. Overall, fruit consumption in the survey respondents was insufficient (Table 29).

**Table 29.** Mean number of servings of fruit on average per day, in servings (by age group, gender and locality)

| Indicator | Men | | | Women | | | Toial | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Servings | 95%CI | n | Servings | 95%CI | n | Servings | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 793 | 0.6 | 0.4-0.7 | 850 | 0.6 | 0.5-0.8 | 1643 | 0.6 | 0.5-0.7 |
| 25-34 | 673 | 0.4 | 0.3-0.5 | 856 | 0.6 | 0.5-0.7 | 1529 | 0.5 | 0.4-0.6 |
| 35-44 | 542 | 0.4 | 0.3-0.5 | 734 | 0.5 | 0.4-0.6 | 1276 | 0.4 | 0.4-0.5 |
| 45-54 | 448 | 0.2 | 0.2-0.3 | 581 | 0.5 | 0.3-0.6 | 1029 | 0.3 | 0.3-0.4 |
| 55-64 | 244 | 0.2 | 0.1-0.4 | 253 | 0.5 | 0.3-0.6 | 497 | 0.4 | 0.3-0.5 |
| Total | 2700 | 0.3 | 0.3-0.4 | 3274 | 0.5 | 0.4-0.6 | 5974 | 0.4 | 0.4-0.5 |
| Total | | | | | | | | | |
| Urban | 1305 | 0.4 | 0.3- 0.6 | 1661 | 0.7 | 0.5-0.9 | 2966 | 0.6 | 0.4-0.7 |
| Rural | 1395 | 0.3 | 0.2-0.3 | 1613 | 0.4 | 0.3-0.5 | 3008 | 0.3 | 0.2-0.4 |

Comparison of the average daily fruit consumption between different age groups demonstrated the 15-24 year age group had the highest fruit consumption of 0.6 servings per day (95%CI 0.4-0.7), whereas 45-54 year olds consumed 0.3 servings per day (95%CI 0.2-0.3), presenting a statistically significant difference in fruit consumption between these age groups. There was no statistically significant difference observed in mean number of servings of fruit on average per day between 15-24 year olds and the respondents from the remaining age groups. Further breakdown by gender within age groups revealed that 15-24 year-old males had higher consumption of fruit (0.6 servings, 95%CI 0.4-0.7) than in men from an age group of 45-54 years old (0.2 servings, 95%CI 0.2-0.3). However, there was no difference observed in daily fruit consumption of women in different age groups (Table 29).

When analyzed by locality, daily fruit consumption was 0.6 servings (95%CI 0.4-0.7) for urban and 0.3 servings (95%CI, 0.2-0.4) for rural respondents. Average daily fruit consumption was slightly higher in urban vs. rural population, but the difference was not statistically significant (Table 29).

## Vegetable Consumption

The frequency of weekly vegetable (excluding potato) consumption in the survey population is shown in the table below by gender and locality breakdown (Table 30).

**Table 30.** Frequency of vegetable consumption (by age groups, gender and locality)
Mean number of days vegetable consumed in a typical week

| Indicator | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean number of days | 95%CI | n | Mean number of days | 95%CI | n | Mean number of days | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 796 | 4.7 | 4.3-5.0 | 853 | 4.7 | 4.3-5 | 4.7 | 4.3-5.0 | 0.5-0.7 |
| 25-34 | 672 | 4.8 | 4.4-5.1 | 863 | 4.7 | 4.3-5.2 | 4.8 | 4.4-5.1 | 0.4-0.6 |
| 35-44 | 546 | 4.6 | 4.2-5.1 | 737 | 4.6 | 4.2-5.0 | 4.6 | 4.3-5.0 | 0.4-0.5 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 45-54 | 448 | 4.2 | 3.6-4.8 | 585 | 4.5 | 4.1-4.9 | 4.3 | 3.9-4.8 | 0.3-0.4 |
| 55-64 | 247 | 4.1 | 3.5-4.7 | 256 | 4.2 | 3.6-4.7 | 4.1 | 3.6-4.7 | 0.3-0.5 |
| Total | 2709 | 4.5 | 4.1-4.9 | 3294 | 4.6 | 4.2-4.9 | 4.5 | 4.2-4.9 | 0.4-0.5 |
| Locality | | | | | | | | | |
| Urban | 1313 | 5.4 | 5.1-5.7 | 1674 | 5.4 | 5.3-5.6 | 5.4 | 5.2-5.6 | 0.4-0.7 |
| Rural | 1396 | 3.8 | 3.2-4.3 | 1620 | 3.8 | 3.3-4.4 | 3.8 | 3.3-4.3 | 0.2-0.4 |

The survey population consumed vegetables 4.5 days (95%CI 4.2-4.9) a week. The corresponding numbers for males and females were 4.5 days (95%CI 4.1-4.9) and 4.6 days (95%CI 4.2-4.9) a week, respectively. There was no statistically significant difference observed in weekly vegetable consumption by gender (Table 30).

With regards to the locality, urban respondents consumed vegetables 5.4 days (95%CI 5.2-5.6) whereas rural respondents consumed 3.8 days (95%CI 3.3-4.3) a week, presenting statistically significant difference by locations of residency. Breakdown of data by gender within a locality demonstrated that the frequency of weekly vegetable consumption for urban respondents of both sexes was higher ($p<0.001$) than those in rural respondents. Moreover, analysis of weekly vegetable consumption by age groups of respondents did not reveal any statistically significant difference between the different age groups (Table 30).

Mean number of servings of vegetables on average per day 1.0 serving (95% CI, 0.9-1.1) in the survey population, or 1.0 serving (95% CI, 0.9-1.1) for males and 1.1 servings (95% CI, 1.0-1.2) for females. When analyzed by gender and age groups, there was no significant difference observed in daily vegetable consumption for both sexes and different age groups (Table 31).

**Table 31.** Mean number of servings of vegetables on average per day, in servings (by age group, gender and locality)

| Indicator | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean number of servings | 95%CI | n | Mean number of servings | 95%CI | n | Mean number of servings | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 769 | 1.0 | 0.9-1.1 | 839 | 1.1 | 1.0-1.2 | 1608 | 1.0 | 1.0-1.1 |
| 25-34 | 664 | 1.1 | 1.0-1.3 | 852 | 1.1 | 1.0-1.3 | 1516 | 1.1 | 1.0-1.2 |
| 35-44 | 527 | 1.1 | 0.9-1.2 | 721 | 1.1 | 1.0-1.2 | 1248 | 1.1 | 1.0-1.2 |
| 45-54 | 438 | 0.9 | 0.8-1.0 | 577 | 1.0 | 0.9-1.2 | 1015 | 1.0 | 0.9-1.1 |
| 55-64 | 242 | 0.9 | 0.7-1.2 | 250 | 0.9 | 0.7-1.1 | 492 | 0.9 | 0.8-1.1 |
| Total | 2640 | 1.0 | 0.9-1.1 | 3239 | 1.1 | 1.0-1.2 | 5879 | 1.0 | 0.9-1.1 |
| Locality | | | | | | | | | |
| Urban | 1273 | 1.2 | 1.1-1.3 | 1649 | 1.3 | 1.1-1.4 | 2922 | 1.2 | 1.1-1.4 |
| Rural | 1367 | 0.9 | 0.7-1.0 | 1590 | 0.9 | 0.7-1.0 | 2957 | 0.9 | 0.7-1.0 |

Average daily vegetable consumption was statistically significantly higher in urban vs. rural population. Specifically, average daily vegetable consumption was 1.2 servings (95%CI 1.1-1.4) for urban and 0.9 servings (95% CI, 0.7-1.0) for rural respondents (Table 31).

## Fruit and Vegetable Consumption

WHO recommends a minimum of 5 servings, which is an equivalent of 400g of fruit and vegetables (excluding potatoes and other starchy tubers) per day. In this section of the survey we assessed fruit and vegetables consumption of the survey population comparing the collected data with the WHO recommendations.

Average daily consumption of fruit and vegetables was 1.5 servings (95%CI 1.3-1.6) in the survey population, or 1.3 servings (95%CI 1.2-1.5) for males and 1.6 servings (95% CI, 1.4-1.7) for females. When stratified by gender, there was no statistically significant difference revealed in average daily fruit and vegetables consumption among men and women (Table 32).

**Table 32.** Mean number of servings of fruit and/or vegetables on average per day, in servings (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean number of servings | 95%CI | n | Mean number of servings | 95%CI | n | Mean number of servings | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 797 | 1.5 | 1.4-1.7 | 853 | 1.7 | 1.5-1.9 | 1650 | 1.6 | 1.4-1.8 |
| 25-34 | 677 | 1.5 | 1.3-1.6 | 861 | 1.7 | 1.5-1.9 | 1538 | 1.6 | 1.4-1.8 |
| 35-44 | 547 | 1.4 | 1.2-1.6 | 736 | 1.6 | 1.4-1.7 | 1283 | 1.5 | 1.3-1.6 |
| 45-54 | 449 | 1.1 | 1.0-1.2 | 583 | 1.5 | 1.3-1.7 | 1032 | 1.3 | 1.2-1.4 |
| 55-64 | 247 | 1.2 | 0.9-1.4 | 255 | 1.3 | 1.0-1.6 | 502 | 1.3 | 1.0-1.5 |
| Total | 2717 | 1.3 | 1.2-1.5 | 3288 | 1.6 | 1.4-1.7 | 6005 | 1.5 | 1.3-1.6 |
| Locality | | | | | | | | | |
| Urban | 1317 | 1.6 | 1.4-1.8 | 1669 | 1.9 | 1.7-2.2 | 2986 | 1.8 | 1.5-2.0 |
| Rural | 1400 | 1.1 | 0.9-1.3 | 1619 | 1.2 | 1.0-1.5 | 3019 | 1.2 | 1.0-1.4 |

Comparison by age groups indicated that daily consumption of fruit and vegetables among 15-34 year-old males was higher than in men 45-54 year-old age group. There was no statistically significant difference revealed in average daily fruit and vegetables consumption among all respondents and women (Table 32).

Average daily consumption of fruit and vegetables according to number of servings is assessed and compared by gender, age groups and locality, and shown in the below Table 33.

**Table 33.** Results of grouped assessment of fruit and/or vegetables consumption of the survey population, in servings (by age group and locality)

| Indicator | n | % no fruit or vegetables | 95%CI | % 1-2 servings a day | 95%CI | % 3-4 servings a day | 95%CI | % ≥5 servings a day | 95%CI |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | | | | | | | | | |
| 15-24 | 1650 | 34.4 | 29.5-39.4 | 50.4 | 46.0-54.7 | 11.0 | 8.0-14.0 | 4.2 | 2.5-5.8 |
| 25-34 | 1538 | 34.0 | 28.6-39.4 | 51.1 | 46.4-55.8 | 10.5 | 7.4-13.5 | 4.4 | 2.7-6.2 |
| 35-44 | 1283 | 35.7 | 30.3-41.1 | 50.2 | 44.4-56.0 | 10.2 | 6.6-13.9 | 3.9 | 2.6-5.2 |
| 45-54 | 1032 | 41.9 | 35.2-48.5 | 48.5 | 41.5-55.5 | 7.0 | 4.8-9.2 | 2.6 | 1.6-3.7 |
| 55-64 | 502 | 48.2 | 38.9-57.5 | 40.2 | 32.3-48.0 | 8.3 | 5.3-11.3 | 3.3 | 1.4-5.3 |
| Total | 6005 | 37.7 | 32.7-42.7 | 49.3 | 44.3-54.3 | 9.4 | 6.9-11.8 | 3.6 | 2.7-4.6 |
| Locality | | | | | | | | | |
| Urban | 2986 | 26.1 | 23.4-29.1 | 56.9 | 51.2-62.5 | 11.3 | 7.4-16.7 | 5.7 | 3.9-8.0 |
| Rural | 3019 | 47.9 | 39.9-56.0 | 42.5 | 36.1-49.2 | 7.7 | 5.5-10.7 | 1.9 | 1.1-3.1 |

As shown in the above table, 37.7% (95%CI 32.7-42) of the survey population did not consume fruits or vegetables at all, 49.3 % (95%CI 44.3-54.3) consumed 1-2 servings a day, 9.4% (95%CI 6.9-11.8) consumed 3-4 servings a day, and only 3.6% (95%CI 2.7-4.6) consumed 5 or more servings a day on average (Table 33).

Analysis of the average daily consumption of fruit and vegetables assessed by the amount of servings consumed and stratified by age groups did not reveal any statistically significant difference in this indicator between the different age groups. However, when compared by locality, average daily fruit and vegetable consumption was statistically significantly higher in urban vs. rural population. For instance, the proportion of respondents that reported consuming 1-2 servings of fruits and vegetables daily was 56.9 % (95%CI 51.2-62.5) in urban and 42.5% (95%CI 36.1-49.2) in rural areas, whereas only 5.7% (95%CI 3.9-8.0) of urban, and 1.9% (95%CI 1.1-3.1) of rural population consumed 5 or more daily servings of fruits and vegetables (Table 33).

Among all male respondents, 39.7% (95%CI 34.2-45.1) of men reported that they do not consume any fruit or vegetables, whereas 49.1% (95%CI 43.0-55.3) said that they consumed 1-2 servings, 8.3% (95%ИСІ 5.7-10.8) consumed 3-4 servings daily, and only 2.9% (95%CI 1.9-3.9) reported consuming 5 or more servings of fruits and vegetables a day (Appendix 1: Table 21).

There was no statistically significant difference observed when male respondents' daily consumption in servings of fruit and vegetables was analyzed by age groups. However, when compared by locality, the proportion of male respondents that reported consuming 1-2 servings of fruits and vegetables daily was 58.2% (95% CI, 50.1-65.9) in urban men, and 41.5 % (95%CI, 34.3-49.0) in rural men, presenting a higher percentage in urban areas vs. rural areas. Moreover, the percentage of rural men who did not consume fruits or vegetables was higher (28.5%, 95%CI 24.6-32.7) than urban men (49.2%, 95%CI 40.8-57.6) (Appendix 1: Table 22).

In female respondents, 35.8% (95%CI 30.4-41.2) did not consume fruits and vegetables at all. Among those who reported consuming fruits and vegetables, 49.4% (95%CI 44.5-54.3) consumed 1-2 servings, 10.5% (95%CI 7.7-13.2) consumed 3-4 servings, and 4.3 % (95%CI 3.2-5.5) consumed 5 or more servings daily. There was no statistically significant difference observed when female respondents' daily consumption in servings of fruit and vegetables was analyzed by age groups. However, when compared by locality, the proportion of female respondents who reported consuming 5 or more servings of fruits and vegetables daily was 7.1% (95%CI 5.1-9.8), whereas this indicator was relatively lower, at 1.8 % (95%CI 1.1-3.1) among rural women (Appendix 1: Table 21).

The percentage of the survey population consuming less than 5 servings of fruits and vegetables a day, therefore having NCD risks, was determined and compared by gender, age groups and locality (Table 34).

**Table 34.** Proportion of population who had less than five servings of fruit and/or vegetables on average per day (by age group, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 797 | 96.1 | 94.5-97.7 | 853 | 95.5 | 93.4-97.7 | 1650 | 95.8 | 94.2-97.5 |
| 25-34 | 677 | 97.2 | 95.3-99.1 | 861 | 94.0 | 91.9-96.1 | 1538 | 95.6 | 93.8-97.3 |
| 35-44 | 547 | 96.2 | 94.4-98.0 | 736 | 96.1 | 94.4-97.7 | 1283 | 96.1 | 94.8-97.4 |
| 45-54 | 449 | 98.6 | 97.5-99.7 | 583 | 96.0 | 94.0-98.0 | 1032 | 97.4 | 96.3-98.4 |
| 55-64 | 247 | 96.2 | 92.9-99.5 | 255 | 97.1 | 95.2-99.0 | 502 | 96.7 | 94.7-98.6 |
| Total | 2717 | 97.1 | 96.1-98.1 | 3288 | 95.7 | 94.5-96.8 | 6005 | 96.4 | 95.4-97.3 |
| Locality | | | | | | | | | |
| Urban | 1317 | 95.8 | 93.3-97.5 | 1669 | 92.9 | 90.2-94.9 | 2986 | 94.3 | 92.0-96.1 |
| Rural | 1400 | 98.1 | 96.8-98.9 | 1619 | 98.2 | 96.9-98.9 | 3019 | 98.1 | 96.9-98.9 |

As presented in the above table, 96.4% (95%CI 95.3-97.3) of the survey respondents, 97.1% (95%CI 96.1-98.1) of men, 95.7% (95%CI 94.5-96.8) of women consumed less than 5 servings of fruits and vegetables a day. There was no statistically significant difference in this indicator by gender and different age groups (Table 34).

The percentage of rural women consuming less than 5 servings of fruits and vegetables daily (98.2%, 95%CI 96.9-98.9) was statistically significantly higher compared to those (92.9%, 95%CI 90.2-94.9) of urban women (Table 34).

### 3.2.4 Fat and Oil Consumption and Dining out

When asked about type of oil or fat most often used for meal preparations in households, 91.8% (95%CI 88.2-94.4) of the survey respondents reported using vegetable oil, 2.8% (95%CI 1.3-6.1) – animal fat or lard, and 2.5% (95%CI 1.1-5.3) butter or sour cream, 0.4% (95%CI 0.2-0.9) – other types of fats and oils, whereas only a very few percent of the survey population (0.3%, 95% CI, 0.1-0.5) did not use oil or fat for cooking at home.

When compared by locality, 96% (95%CI 94.0-97.4) of urban, 88% (95%CI 81.9-92.3) of rural respondents used vegetable oil. Moreover, animal fat or lard use for cooking at home was reported by 0.7% (95%CI 0.3-1.4) of urban vs. 4.6% (95%CI 1.9-10.8) of rural respondents, whereas only 0.1% of urban (95%CI 0-0.3), and 4.6% (95%CI 2.1-9.6) of rural respondents reported using butter or sour cream for meal preparations in their households. Vegetable use of urban population was statistically significantly higher compared to those of rural population ($p<0.003$).

However, animal fat or lard and butter use was statistically significantly higher in rural population compared to those of urban population (Table 35).

**Table 35.** Oil or fat consumption of the survey population (by types of fat and locality)

| Indicator | n | % Vegeta-ble oil | 95%CI | % Ani-mal fat or Lard | 95%CI | % Butter | 95%CI | % Margarine | 95%CI |
|---|---|---|---|---|---|---|---|---|---|
| Urban | 2987 | 96 | 94.0-97.4 | 0.7 | 0.3-1.4 | 0.1 | 0-0.3 | 0.1 | 0.0-0.1 |
| Rural | 3020 | 88 | 81.9-92.3 | 4.6 | 1.9-10.8 | 4.6 | 2.1-9.6 | 0.0 | - |
| Total | 6007 | 91.8 | 88.2-94.4 | 2.8 | 1.3-6.1 | 2.5 | 1.1-5.3 | 0.0 | - |

The frequency of dining outside of home was studied and analyzed by gender, age groups and locality (Appendix 1: Table 25). On average, the mean number of meals eaten outside a home was 1.5 times (95%CI 1.3-1.6) per household member per week. The survey results indicate that male respondents ate 1.7 times (95%CI 1.5-2.0), whereas females ate 1.2 times (95%CI 1.1-1.4) weekly. The frequency of dining outside of home for men was higher compared to those of women ($p<0.001$).

Comparison of the mean number of meals eaten outside a home by age groups demonstrate that the survey respondents belonging to an age group of 25-34 years old dined out the most, 1.8 times (95%CI 1.6-2.0) a week, which is statistically significantly higher than those in other age groups (Appendix 1: Table 23).

When compared by gender and age groups, the mean number of meals eaten outside a home for 25-34 year-old men was highest at 2.4 times (95%CI 2.1-2.7) a week, presenting a higher rate than those in the age groups 15-24, 45-54 and 55-64 years old. However, women aged 35-44 years ate outside the home (1.4 times, 95%CI 1.1-1.6) statistically significantly more often compared to women aged 55-64 years old (0.5 times, 95%CI 0.3-0.7)

Moreover, the mean number of meals per week eaten outside the home by urban population was statistically significantly higher compared to those in rural population. Specifically, urban respondents dined out 2.2 times (95%CI 2.0-2.4) a week on average, whereas rural respondents ate outside their homes 0.8 times (95%CI 0.6-1.0) weekly. Moreover, the survey findings indicate that urban men ate meals that were not prepared at home 2.7 times (95%CI 2.4-3.0) per week, whereas this indicator was 0.9 times (95%CI 0.7-1.1) in rural men, 1.7 times (95%CI 1.6-1.9) in urban women, and 0.7 times (95%CI 0.6-0.9) in rural women (Appendix 1: Table 24).

## Discussion

The results of recent epidemiological studies suggest that fruit and vegetables help reducing risks of non-communicable diseases (NCDs) including cardiovascular diseases (1-3), type II diabetes, as well as prevent from oral cavity, esophagus, larynx, pharynx, stomach and lung cancers. Thus, WHO recommends a minimum of 5 servings of fruit and vegetables (excluding potatoes and other starchy tubers) per day (12). Any nation's fruit and vegetable use will vary depending on various factors including the population age, gender, country's socio-economic conditions, population's knowledge, attitude and practices, behavior, individuals' beliefs, cultural context, locally available foods and dietary customs and other environmental factors (9, 10, 11-16).

The results of many studies proved that developing and maintaining of healthy behavior to use sufficient amount of fruits and vegetables as part of diversified, balanced and healthy diet will depend on many factors such as social and cultural context of the country, population's education and health, household income and others (9, 10, 11-16). For instance, low income population groups use less fruits and vegetables than high-income population groups (11). The findings of several recent studies proved that high prices on fruit and vegetables have negative impact on the population's fruit and vegetable consumption (11, 14, 15, 16). Improving the population's knowledge, attitude and practices on healthy diet, and the importance of adequate fruit and vegetable consumption contributes to increased use of fruit and vegetable use in their diet (10, 11, 12, 13).

The results of the National Survey 'Knowledge, Attitude and Practices (KAP) of General Population related to Non-communicable Diseases (NCDs)' conducted in 2010, indicated that 57.0% of the study population had awareness about the importance of daily consumption of fruit by stating it as 'important', 25.0% stating it as "very important", whereas 62.3% of the study population had awareness about the importance of daily consumption of vegetables by stating it as "important", 24.1% stating as "very important" (6). Commendably, the results of the second and most recent 'Knowledge, Attitude and Practices (KAP) of General Population related to Non-communicable Diseases (NCDs) - 2012' Study demonstrated that, in comparison with the previous 2010 study, the positive attitude to rate the daily consumption of fruits and vegetables as "important" and "very important" improved as follows: 65.0% of the study population had awareness about the importance of daily consumption of fruit and vegetables by stating it as "important", 27.0 % stating it as "very important".

Nevertheless, daily vegetable consumption of the survey population declined from 1.4 servings per day in 2009 to 1.0 serving in 2013, which could have been impacted by the time/season of the year when the survey data was collected.

Moreover, weekly fruit consumption of the survey population, with regards to both frequency and amount of fruit consumed during a typical week stayed at a similar level with the previous survey results. Particularly, mean number of days fruit consumed in a typical week has slightly declined from 1.2 days in 2009 (8) to 1.1 days in 2013. Also, the mean number of servings of fruit among the 15 64 year-old survey population did not change from the 2009 survey findings of 0.4 servings a day (8).

According to the results of the two National Surveys 'Knowledge, Attitude and Practices (KAP) of General Population related to Non-communicable Diseases (NCDs)' conducted in 2010 and 2012, the main factors hindering consumption of fruit and vegetables were high price (69.8%), lack of confidence in the quality and safety of the imported fruit and vegetables (36.9%) and traditional dietary customs (18.9%) among other factors (6,7).

The results and findings of some studies conducted in other countries indicate that the high price of fruit and vegetables serves as the main deterrent, along with other factors such as cultural context, traditional dietary customs and other environmental factors. (9,10,11-16).

As the results of the qualitative studies conducted as part of the 'Knowledge, Attitude and Practices (KAP) of General Population related to Non-communicable Diseases (NCDs) - 2012' show, although the knowledge, attitude and practices of the general population on the importance of healthy diet and fruit and vegetables consumption has improved overall, survey participants stated that the following factors have a negative impact on adequate use of fruits and vegetables: low quality of fruits and vegetables because of poor transportation and storage conditions when they are imported from distant places, products are uncertified, unreliable, they have poor knowledge about fruits and vegetables relevance to health, traditional dietary customs, not using many fruit and vegetables, no land to plant vegetables for family use, insufficient water supply, lack of knowledge about planting vegetables, do not have time to purchase fruit and vegetables, quality and safety do not meet the standard requirements, low income due to unemployment and poverty which have a negative impact on purchasing power (7).

According to results of some studies implemented in other countries, the main negative factors on dietary patterns including adequate use of fruit and vegetables are low income of the population and households, lack of social and economic support, negative environmental factors, unpleasant conditions of climate and weather, insufficient knowledge, attitude and practices of the population about the importance of using fruit and vegetables, lack of willingness and time to purchase and prepare meals which contain fruits and vegetables (9,10,11-16).

A common perception of the survey participants was that consumers do not trust the quality and safety of imported fruits and vegetables; therefore, the government needs to support domestic agricultural programs and projects with proper policies. It can be concluded that the above-mentioned multiple factors impact on the population's fruit and vegetables' use.

## Conclusions

1. Average daily consumption of fruit and vegetables was 1.8 servings in the survey population, which was 3.5 servings less than the WHO recommendations.
2. 96.4% of Mongolian population consumed less than 5 servings of fruit and vegetables daily. Fruit and vegetable use in rural areas was 1.5 times lower than in urban areas.
3. Urban residents predominantly used vegetable oil for cooking while rural residents tended to use animal fat or lard.
4. Daily salt intake was 7.3 grams per person with rural residents using 1.6 more grams of salt on average compared to their urban counterparts.
5. The survey respondents dine outside their homes 1.5 times a week. The mean number of meals eaten outside a home per week by the urban population was 2.2 times higher compared to the rural population.

### 3.2.5 Physical Activity

Physical activity was assessed in terms of intensity and duration, compared by different genders, age groups, and locality. In terms of intensity, physical activity is classified into three categories; high, moderate and low levels. The WHO physical activity recommendations for health suggest that adults should do at least 150 minutes of moderate-intensity physical activity or 75 minutes of vigorous-intensity physical activity.

The survey population's physical activity was assessed based on how the WHO physical activity recommendations for health were met. The survey results revealed that 18.3% (95%CI 14.5-22.2) of the population did not meet WHO physical activity recommendations for health (Table 36).

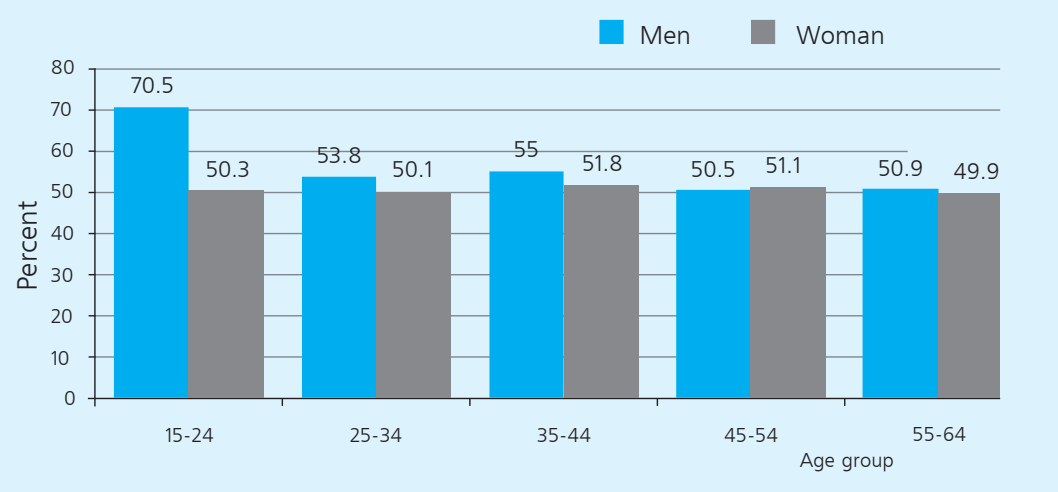
**Table 36.** Proportion of population who do not meet WHO recommendations on physical activity for health (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 792 | 5.7 | 3.2-8.2 | 843 | 14.0 | 9.7-18.4 | 1635 | 9.7 | 6.5-12.9 |
| 25-34 | 660 | 16.7 | 11.6-20.3 | 850 | 20.4 | 14.7-26.2 | 1510 | 18.2 | 13.8-22.6 |
| 35-44 | 539 | 20.3 | 15.2-25.4 | 731 | 20.2 | 14.7-25.7 | 1270 | 20.2 | 15.7-24.7 |
| 45-54 | 438 | 19.2 | 14.0-24.4 | 579 | 21.4 | 15.4-27.4 | 1017 | 20.3 | 15.8-24.7 |
| 55-64 | 242 | 18.5 | 12.2-24.9 | 253 | 20.5 | 13.5-27.6 | 495 | 19.5 | 14.2-24.9 |
| Total | 2671 | 16.9 | 13.3-20.4 | 3256 | 19.7 | 15.0-24.4 | 5927 | 18.3 | 14.5-22.2 |
| Locality | | | | | | | | | |
| Urban | 1297 | 22.3 | 17.5-27.8 | 1660 | 29.1 | 22.9-36.2 | 2957 | 25.8 | 20.6-31.8 |
| Rural | 1374 | 12.3 | 8.2-18.2 | 1596 | 11.1 | 6.8-17.7 | 2970 | 11.7 | 7.6-17.6 |

When compared by gender, there were no statistically significant differences observed in the survey population who did not meet WHO physical activity recommendations for health. In terms of age differences, the percentage of 15-24 year-old respondents was the lowest (9.7%, 95%CI 6.5-12.9) among the survey respondents who did not meet WHO physical activity recommendations for health, and was at a relatively similar level for the remaining age groups. In terms of locality, urban respondents were more likely to be physically inactive compared to their rural counterparts, presenting a difference of 14.4 % ($p<0.0001$).

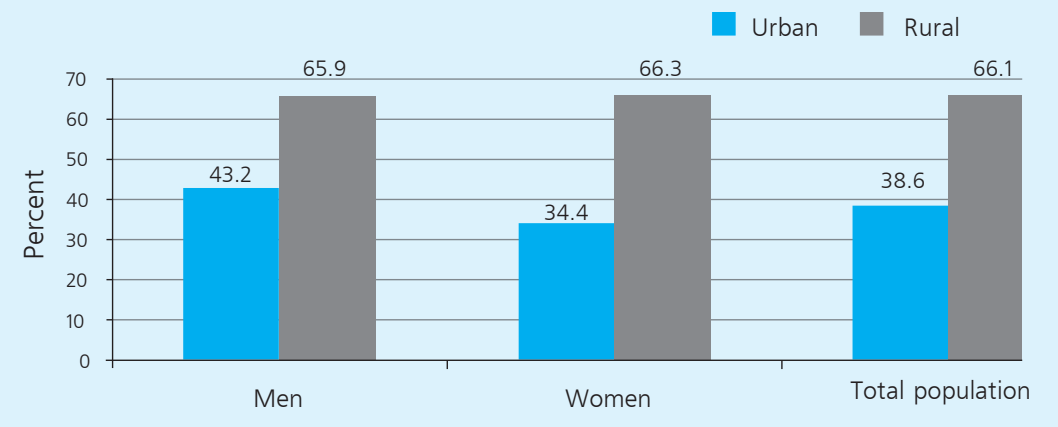
**High levels of physical activity:** According to the survey results, the prevalence of people engaged in high levels of physical activity was 53.2% (95%CI 46.5-60.0) with slightly more males 55.5% (95%CI 49.3-61.8) engaged in such activities than females 51.5% (95%CI 43.0-59.0). In terms of age differences, 15-24 year-old men most actively engaged in high level physical activities (70.5%, 95%CI 64.5-76.6). This indicator was at a relatively similar level for the remaining age groups (Figure 5).

**Figure 5.** Proportion of population engaged in vigorous-intensity physical activity by gender and age groups



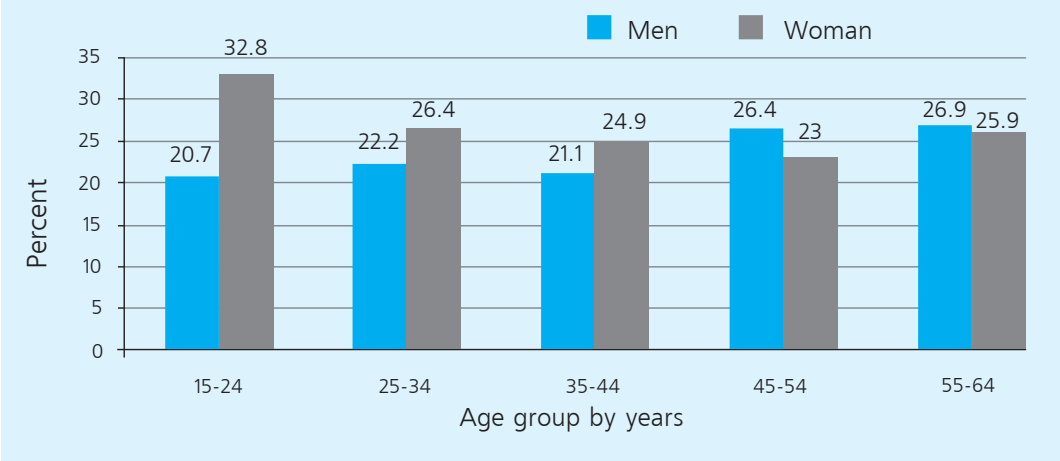

In terms of locality, rural respondents (66.1%) were more likely to engage in high levels of physical activity compared to their urban counterparts (38.6%), presenting a difference of 27.5 %. A similar trend is preserved when stratified by gender, with 43.2% (95%CI 33.8-53.1) of urban men, and 65.9% (95%CI 57.7-73.4) of rural men, for a difference of 22.5 %. There were 34.4% (95%CI 25.3-44.9) of urban women and 66.3% (95%CI 55.9-75.2) rural women engaged in high levels of physical activity with a difference of 31.9 % (Figure 6).

**Figure 6.** Proportion of population engaged in vigorous-intensity physical activity, by gender and locality



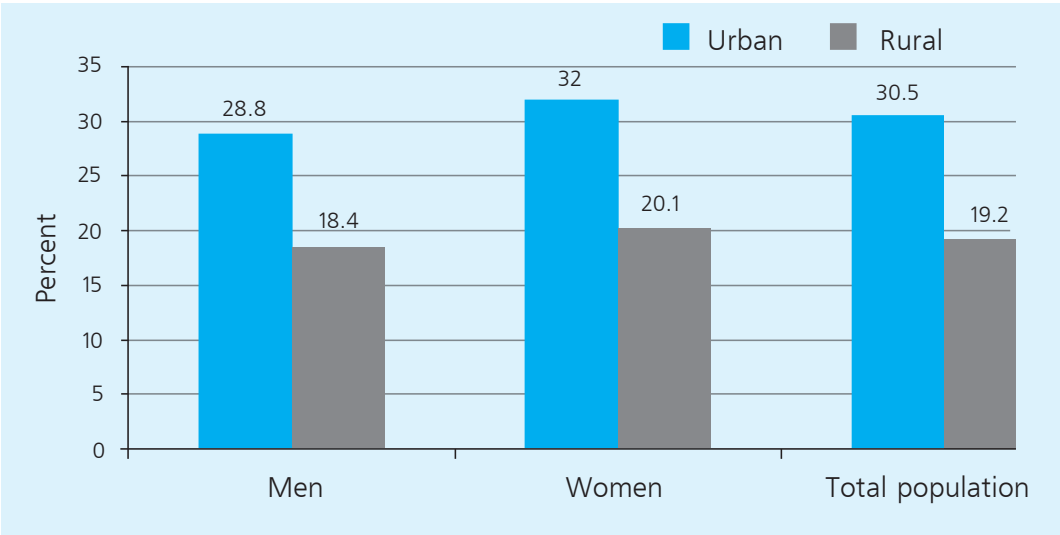

**Moderate levels of physical activity:** According to survey results, the prevalence of people engaged in moderate levels of physical activity was 24.5% (95%CI 20.8-28.2) with more females (25.8%, 95%CI 21.3-30.3) engaged in such activities than males (23.1%, 95%CI 19.7-26.6). When compared by gender, there was no statistically significant difference observed between men and women among all survey respondents engaged in moderate levels of physical activity. When compared by age groups, although there were slight differences identified between the different age groups, those differences were not statistically significant (Figure 7).

**Figure 7.** Proportion of population engaged in moderate-intensity physical activity, by gender and age groups




In terms of locality, significantly more urban respondents (30.5%, 95%CI 24.5-38.0) engaged in moderate levels of physical activity compared to their rural counterparts (19.2%, 95%CI 10.4-20.4). A similar trend is observed when collated by gender with more urban population of both sexes being engaged in moderate levels of physical activity compared to their rural counterparts, presenting a statistically significant difference ($p<0.001$). In particular, the proportion of urban men engaged in moderate levels of physical activity (28.8%) was higher by 10.4% compared to that of rural men (18.4%). Similarly, the proportion of urban women engaged in moderate levels of physical activity (32.0%) was higher by 11.9% compared to that of rural women (20.1%). Based on the above results, it can be concluded that rural population are engaged relatively less in moderate levels of physical activity (Figure 8).

**Figure 8.** Proportion of population engaged in moderate-intensity physical activity, by gender and locality




Compared to the previous survey results the percentage of rural population engaged in moderate levels of physical activity increased from 8.9% in 2009 to 19.0% in 2013. Similarly, the percentage of urban population engaged in moderate levels of physical activity increased from 17.4% in 2009 to 30.5 % in 2013 ($p<0.02$).

**Low levels of physical activity:** Of the survey population, 22.3% belonged to the physically inactive "risk group". The prevalence of physical inactivity was equally distributed by gender, presenting 21.3% (95%CI 17.3-25.3) in males, and 23.2% (95%CI 18.3-28.2) in females. In terms of age differences, the prevalence of physical inactivity was lowest among the 15-24 year-old men, whereas this indicator was at a relatively similar level for other age groups (Table 37).

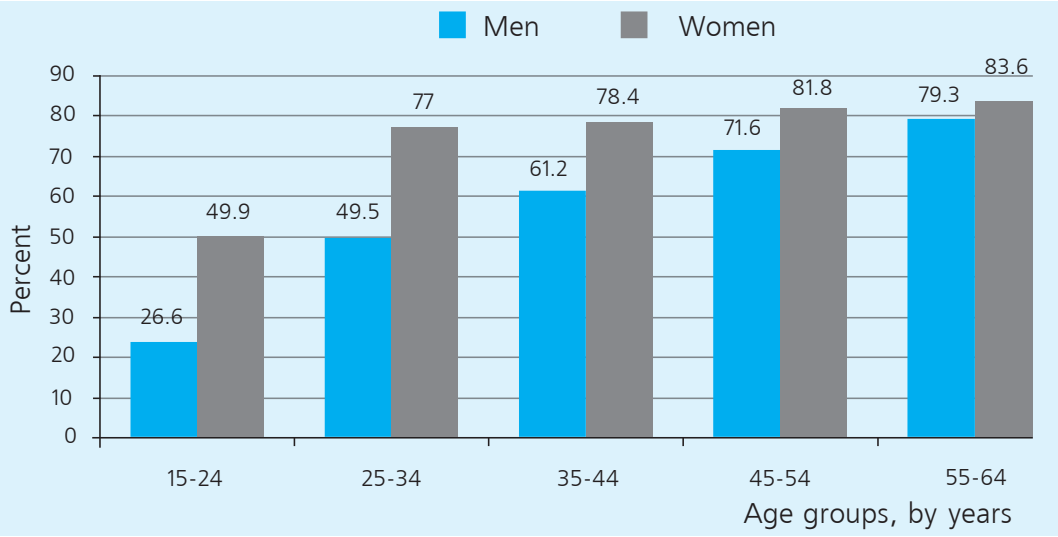
**Table 37.** Proportion of population with low level of physical activity (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 792 | 8.7 | 5.9-11.6 | 843 | 16.9 | 12.2-21.5 | 1635 | 12.6 | 9.2-16.1 |
| 25-34 | 660 | 24.0 | 18.9-29.1 | 850 | 23.5 | 17.8-29.2 | 1510 | 23.7 | 19.1-28.3 |
| 35-44 | 539 | 24.0 | 18.5-29.4 | 731 | 23.3 | 17.5-29.2 | 1270 | 23.6 | 18.8-28.5 |
| 45-54 | 438 | 23.2 | 17.7-28.6 | 579 | 25.9 | 19.7-32.0 | 1017 | 24.5 | 19.9-29.0 |
| 55-64 | 242 | 22.1 | 14.7-29.6 | 253 | 24.2 | 15.8-32.6 | 495 | 23.2 | 16.7-29.7 |
| Total | 2671 | 21.3 | 17.3-25.3 | 3256 | 23.2 | 18.3-28.2 | 5927 | 22.3 | 18.1-26.4 |
| Locality | | | | | | | | | |
| Urban | 1297 | 28.0 | 21.8-35.2 | 1660 | 33.6 | 26.3-41.6 | 2957 | 30.9 | 24.5-38.0 |
| Rural | 1374 | 15.7 | 11.3-21.4 | 1596 | 13.7 | 9.1-20.0 | 2970 | 14.7 | 10.4-20.4 |

Breakdown by gender and locality revealed that 28% (95%CI 21.8-35.2) of urban men, and 15.7%, (95%CI 11.3-21.4) of rural men, while 33.6% (95%CI 26.3-41.6) of urban women, and 13.7%, (95%CI 9.1-20) of rural women were physically inactive, presenting statistically significant differences by locations of residency in both sexes. Moreover, 30.9% of urban respondents and 14.7% were physically inactive having a lack of physical activity.

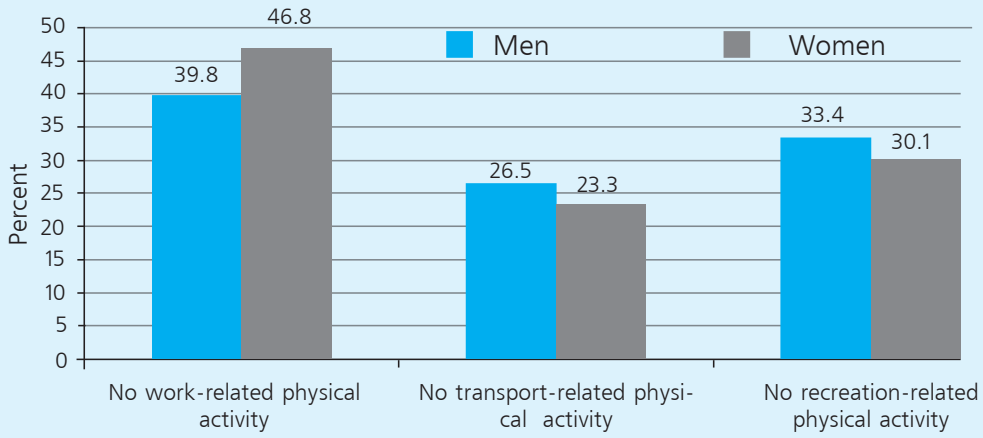
**Population not engaging in vigorous physical activity:** Among all respondents, 66.6% (95%CI 63.4-69.8) did not engage in vigorous physical activity at work and/or recreational settings. Collating by gender revealed a statistically significant difference between men and women in this indicator. In particular, the proportion of men and women not engaged in vigorous physical activity was 57.6% (95%CI 53.8-61.3) and 75.5% (95%CI 72.3-78.6) respectively. There was a tendency observed that the proportion increases with age irrespective of gender (Figure 9).

**figure 9.** Proportion of population not engaged in vigorous-intensity physical, by gender and age groups



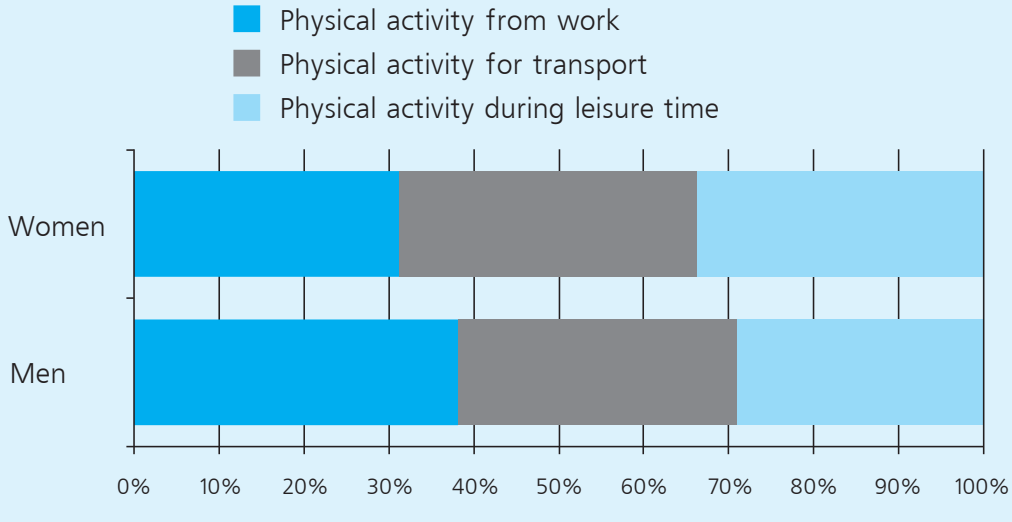
Percentage of population not engaged in vigorous physical activity at work was 43.3% (95%CI 36.9-49.8) whereas 24.9% (95%CI 22.0-27.8) not engaged in vigorous physical when they travelled to and from places and 31.7% (95%CI 26.1-37.3) not engaged in vigorous physical during their leisure time in recreational settings with no significant differences between genders. In particular, 39.8% (95%CI 33.5-46.5) of men, and 46.8% (95%CI 40.2-53.4) of women were not engaged in vigorous physical activity at work (Figure 10).

**Figure 10.** Proportion of population not engaged in work-, travel to and from places, transport-, and recreation-related physical activity, by gender




When daily physical activity was classified into three categories (physical activity at work, travel to and from places, recreational activities), 34.5% (95%CI 32.0-44.2) fell under the 'physical activity at work' group, 34.1% (95%CI 29.7-38.5) belonged to the 'travel to and from places' group, while 31.4% (95%CI 28.1-34.6) were in the 'recreational activities' group. When collated by gender and activity types or conditions, there were no significant differences being at relatively similar levels (Figure 11).

**Figure 11.** Involvement in work-, travel to and from places, transport-, and recreation-related physical activity (by age groups, gender and locality)



Median duration of time spent in vigorous activity was 105.7 minutes (95%CI 31.4-300.0) a day with no significant difference by gender. In particular, the median duration was 114.3 minutes (95%CI 36.4-317.1) for males and 95.7 minutes (95%CI 28.6-274.3) for females. When collated by age groups, there were no statistically significant differences observed in this indicator throughout the different age groups (Table 38).

**Table 38.** Median time spent on physical activity on average per day, in minutes (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Median minutes | 95%CI | n | Median minutes | 95%CI | n | Median minutes | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 792 | 128.6 | 64.3-270.0 | 843 | 80.0 | 34.3-217.1 | 1635 | 110.0 | 46.4-257.1 |
| 25-34 | 660 | 114.3 | 34.3-338.6 | 850 | 94.3 | 30.0-275.7 | 1510 | 102.9 | 31.4-300.0 |
| 35-44 | 539 | 120.0 | 31.4-345.7 | 731 | 104.3 | 28.6-308.6 | 1270 | 111.4 | 30.0-330.0 |
| 45-54 | 438 | 95.0 | 30.0-317.1 | 579 | 111.4 | 24.3-261.4 | 1017 | 100.7 | 29.3-287.1 |
| 55-64 | 242 | 100.0 | 42.8-240.0 | 253 | 94.3 | 28.6-257.1 | 495 | 94.3 | 30.0-247.1 |
| Total | 2671 | 114.3 | 36.4-317.1 | 3256 | 95.7 | 28.6-274.3 | 5927 | 105.7 | 31.4-300.0 |
| Locality | | | | | | | | | |
| Urban | 1297 | 70.0 | 25.0-205.7 | 1660 | 50.0 | 17.1-137.1 | 2957 | 57.1 | 20.0-171.4 |
| Rural | 1374 | 165.7 | 60.0-390.0 | 1596 | 180.0 | 60.0-375.0 | 2970 | 177.1 | 60.0-385.7 |

Rural respondents spent more time in physical activity than urban respondents. However, the difference was not statistically significant. For instance, median duration of daily vigorous activities was 57.1 minutes (95%CI 60.0-385.7) in urban areas compared to 177.1 minutes (95%CI 20.0-171.4) in rural areas.

Median duration of daily vigorous activities for the survey population was 11.4 minutes (95%CI 0.00-128.6) at work, 20.0 minutes (95%CI 1.4-51.4) during transport or when travelling to and from places, and 18.6 minutes (95%CI 0.00-60.0) in recreational settings. When compared by gender and age groups, there were no statistically significant differences observed in the duration of daily vigorous activities spent at work, when travelling to and from places, and recreation-related physical activities.

## Discussion

When analyzing data for a comparative study, the previous survey's data was re-processed aligning with recent changes of criteria and recommendations for assessing physical activity. According to the results of a comparative study, the percentage of population belonging to the physically inactive group engaged in low levels of physical activity increased from 7.2% in 2009 to 22.3% in the present survey.

Compared to the results of the previous 2009 survey (11.7%), the prevalence of people engaged in moderate levels of physical activity had increased by 12.8% in 2013 (23.1%). This change shows that the prevalence of population who meet the WHO physical activity recommendations for health had doubled. Although the median duration of daily vigorous activities for the survey population had declined from the 2009 level (342.8 MET/minutes), the difference was not statistically significant.

Percentage of population engaged in vigorous physical activity had slightly increased compared to the previous survey results. In particular, this indicator increased from 46.2% (95%CI 41.3-51.2) in 2009 to 53.2% (95%ИХ 46.5-60.0) in 2013.

### Conclusions

1. 22.3% of the survey population were physically inactive having a lack of physical activity. The urban population, especially urban women were more physically inactive, therefore at greater risk for NCDs.
2. Nearly one in five persons or 18.3% of the survey population was not meeting WHO physical activity recommendations for health.
3. On average, the median time spent in physical activity per day was 105.7 minutes and the median duration of daily vigorous activities for the survey population was 11.4 minutes at work, 20.0 minutes during transport or when travelling to and from places, and 18.6 minutes in recreational settings.
4. One in every three persons, or 34.5% of the survey population had vigorous physical activity at their work, indicating the possibility of conducting health promotion activities and healthy lifestyle education sessions at work places to be effective.
5. Women were relatively less engaged in vigorous and moderate levels of physical activities compared to men, possibly exposing them to higher risks for NCDs.

## 3.3 PREVALENCE OF INTERMEDIATE RISK FACTORS FOR NCDs

### 3.3.1 Body Mass Index

Anthropometric indicators, overweight and obesity belong to intermediate risk factors for NCDs. Trained staff performed anthropometric measurements of weight, height and waist and hip circumferences in 5773 survey participants aged 15-64 years. Anthropometric measurements were utilized to calculate Body Mass Index (BMI) and estimate the mean waist and hip circumferences in order to determine the prevalence of overweight and obesity among the survey population by age, gender and locality.

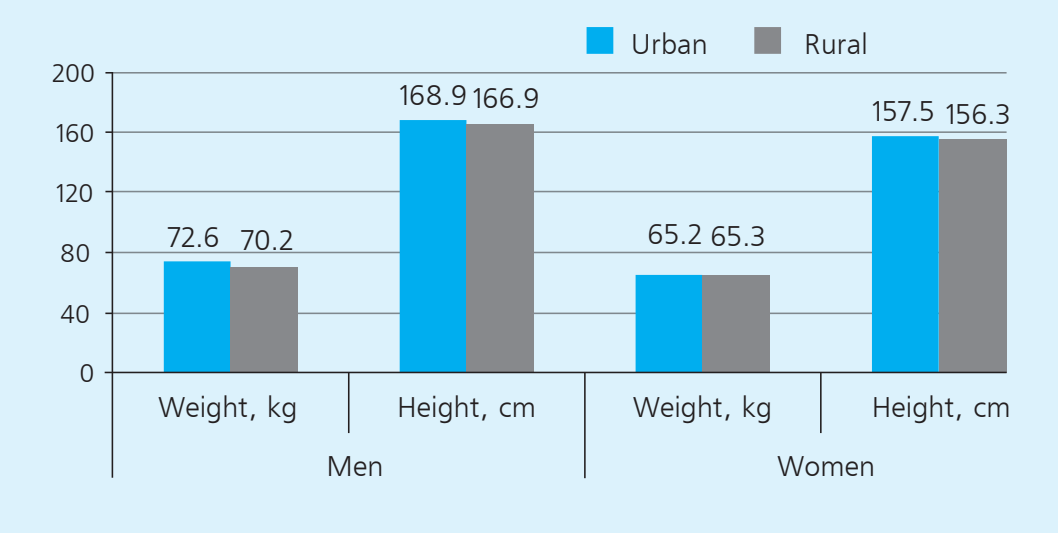
The mean body weight was 71.3 kg (95%CI 70.4-72.2) in the male population, while the mean height was 167.8 cm (95%CI 167.1-168.5). The corresponding indicators for females were 65.3 kg (95%CI 64.6-66.0) and 156.8 cm (95%CI 156.5-157.2) (Table 39).

**Table 39.** Mean level of body weight and height (by age groups and gender)

| Age Group (years) | Men | | | | Women | | | |
|---|---|---|---|---|---|---|---|---|
| | Weight in kg | | Height in cm | | Weight in kg | | Height in cm | |
| | Mean weight | 95%CI | Mean weight | 95%CI | Mean weight | 95%CI | Mean weight | 95%CI |
| 15-24 | 60.2 | 59.3-61.0 | 167.7 | 166.8-168.6 | 54.9 | 54.1-55.8 | 158.0 | 157.4-158.7 |
| 25-34 | 72.0 | 70.3-73.6 | 169.4 | 168.8-170.1 | 63.4 | 62.7-64.1 | 158.1 | 157.6-158.7 |
| 35-44 | 73.8 | 72.2-75.3 | 168.4 | 167.6-169.2 | 66.9 | 65.8-68.0 | 157.2 | 156.6-157.8 |
| 45-54 | 73.6 | 71.9-75.3 | 166.7 | 165.4-168.0 | 69.2 | 67.4-71.0 | 155.5 | 154.5-156.5 |
| 55-64 | 73.0 | 70.6-75.4 | 165.4 | 164.2-166.6 | 66.6 | 64.7-68.5 | 154.4 | 153.2-155.5 |
| Total | 71.3 | 70.4-72.2 | 167.8 | 167.1-168.5 | 65.3 | 64.6-66.0 | 156.8 | 156.5-157.2 |

There were no statistically significant differences in the mean body weight between urban and rural study participants. However, the mean height of the urban population was relatively higher compared to that of the rural population ($p<0.001$). For instance, the mean height of urban males was 168.9 cm (95%CI 167.8-170.0), while it was 166.9 cm (95%CI 166.2 -167.5) in rural males (Figure 12).

**Figure 12.** Mean body weight and height (by locality and gender)




There was no significant difference in the mean height of women by locality. The mean body height of urban and rural females was 157.5 cm (95%CI 156.8-158.1) and 156.3 cm (95%CI 155.9-156.6), respectively (Figure 13).

When collated by gender, the mean BMI for 15-64 year-old men and women was 26.6 (95%CI 26.3-26.9) and 25.3 (95%CI 25.0-25.6), respectively. The mean BMI was slightly higher in women than in men, and the difference was statistically significant. In both genders, the mean BMI had a tendency to increase with age ($p<0.001$). In general, the mean BMI in 15-24 year-old respondents was relatively lower than in other age groups (Table 40).

**Table 40.** Mean Body Mass Index (BMI), by age groups, gender and locality

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 783 | 21.4 | 21.1-21.6 | 805 | 22.0 | 21.7-22.3 | 1588 | 21.7 | 21.5-21.9 |
| 25-34 | 664 | 25.0 | 24.5-25.5 | 797 | 25.3 | 25.0-25.6 | 1461 | 25.2 | 24.9-25.4 |
| 35-44 | 536 | 26.0 | 25.5-26.6 | 700 | 27.2 | 26.7-27.6 | 1236 | 26.6 | 26.3-27.0 |
| 45-54 | 431 | 26.5 | 26.1-26.9 | 567 | 28.6 | 28.0-29.2 | 998 | 27.5 | 27.1-27.9 |
| 55-64 | 242 | 26.6 | 25.8-27.5 | 248 | 28.3 | 27.4-29.2 | 490 | 27.5 | 26.8-28.2 |
| Total | 2656 | 25.3 | 25.0-25.6 | 3117 | 26.6 | 26.3-26.9 | 5773 | 25.9 | 25.7-26.2 |
| Locality | | | | | | | | | |
| Urban | 1287 | 25.4 | 25.1-25.8 | 1579 | 26.4 | 26.1-26.7 | 2866 | 25.9 | 25.7-26.2 |
| Rural | 1369 | 25.2 | 24.8-25.6 | 1538 | 26.8 | 26.4-27.2 | 2907 | 26.0 | 25.6-26.3 |

* excluding pregnant women

The above table shows a statistically significant tendency of a mean BMI increase with age in both genders among the 15-64 year-old survey respondents. However, there was no statistically significant difference in the mean BMI in the 45–54 year-old and 54–64 year-old age groups, 27.5 (95%CI 27.1-27.9) vs. 27.5 (95%CI 26.8-28.2).

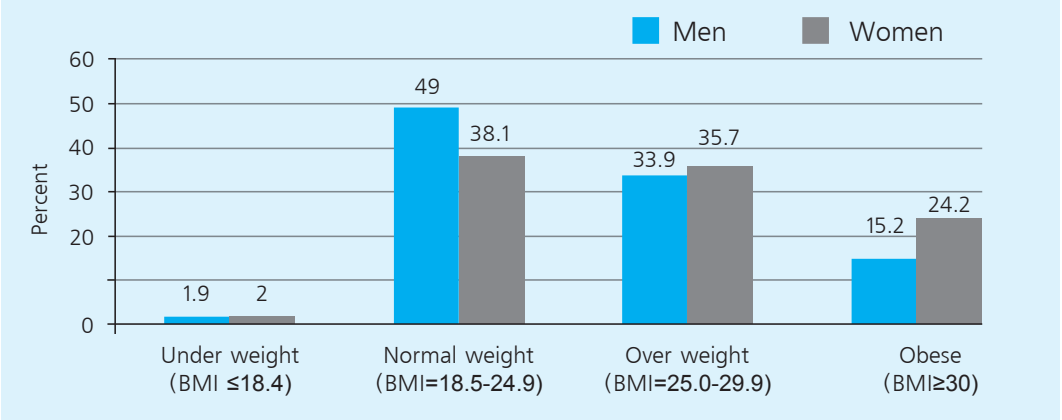
There was no statistically significant difference observed when the mean BMI was analyzed by locality. Among all the 15–64 year-old survey respondents, the mean BMI was 24.7 (95%CI 24.3-

25.0) in the urban population while this indicator was at 24.6 (95%CI 24.2-24.9) in the rural population. The above table also shows that there was no significant difference in the mean BMI in urban as opposed to rural areas when analyzed by gender, indicating that the mean BMI for urban and rural men and women is at a relatively similar level (Table 40).

### 3.3.2 Prevalence of Overweight and Obesity

The BMI risk assessment revealed that 2.0% (95%CI 1.4-2.5) of the 15-64 year-old survey population was underweight, 43.6% (95%CI 41.5-45.7) - normal, 34.8% (95%CI 32.6-36.9) - overweight, and the remaining 19.7% (95%CI 18.0-21.4) was obese (Appendix: Table 1). The survey results on BMI risk categories also demonstrated that 33.9 % (95%CI 31.0-36.7) of men were overweight and 15.2% (95%CI 13.3-17.0) were obese. The corresponding rates for women were 35.7% (95%CI 33.0-38.4) and 24.2% (95%CI 21.5-27.0), respectively (Figure 14).

**Figure 13.** Prevalence of overweight and/or obesity (by locality and gender)




When collated by gender, there was no statistically significant difference in the prevalence of being overweight between men and women, however, women were statistically significantly more obese than men (Figure 14).

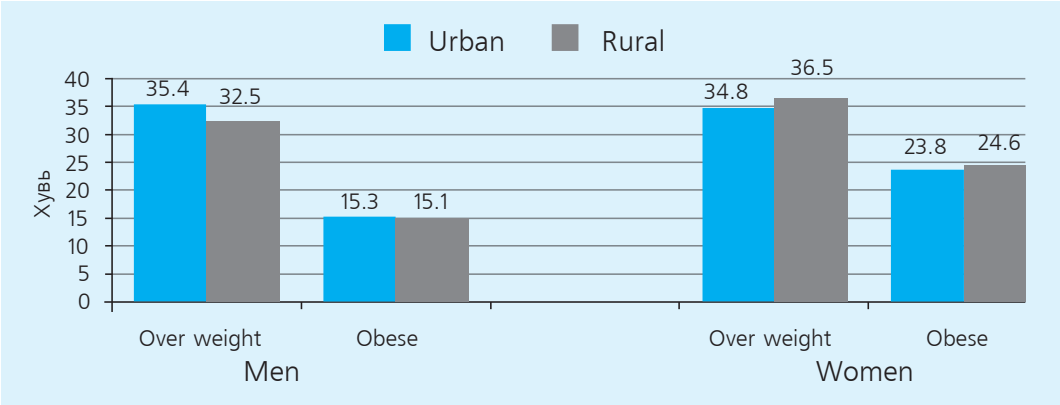
When the BMI risk assessment was analyzed by locality there was no statistically significant difference observed in the prevalence of overweight and obesity between urban and rural respondents (Table 41).

**Table 41.** Risk assessment of body weight, by locality

| Locality | n | % Underweight BMI <18.5 | | % Normal weight BMI 18.5-24.9 | | % Overweight BMI 25.0-29.9 | | % Obese BMI ≥30.0 | |
|---|---|---|---|---|---|---|---|---|---|
| | | % | 95%CI | % | 95%CI | % | 95%CI | % | 95%CI |
| Urban | 2866 | 2.1 | 1.4-3.3 | 43.5 | 40.4-45.9 | 35.1 | 32.7-37.7 | 19.6 | 17.6-21.8 |
| Rural | 2907 | 1.8 | 1.3-2.5 | 44.0 | 41.0-47.0 | 34.5 | 31.1-37.9 | 19.7 | 17.2-22.5 |

The survey results on BMI risk categories demonstrated that the prevalence of being overweight (BMI=25.0-29.9) was slightly higher in urban men and rural women when compared by gender and locality, but the difference was not statistically significant (Figure 14).

**Figure 14.** Prevalence of overweight and/or obesity (by locality and gender)




Overall, the survey results on BMI risk assessment revealed that 54.4% (95%CI 52.3-56.6) of the 15 – 64 year-old survey population was overweight and or obese having a BMI ≥25.0. According to the comparison results by gender, women were statistically significantly more overweight and/or obese (by 10.9%) compared to their male counterparts (Table 42).

**Table 42.** Prevalence of overweight and/or obesity (BMI ≥ 25 kg/м2), by age groups, gender and locality

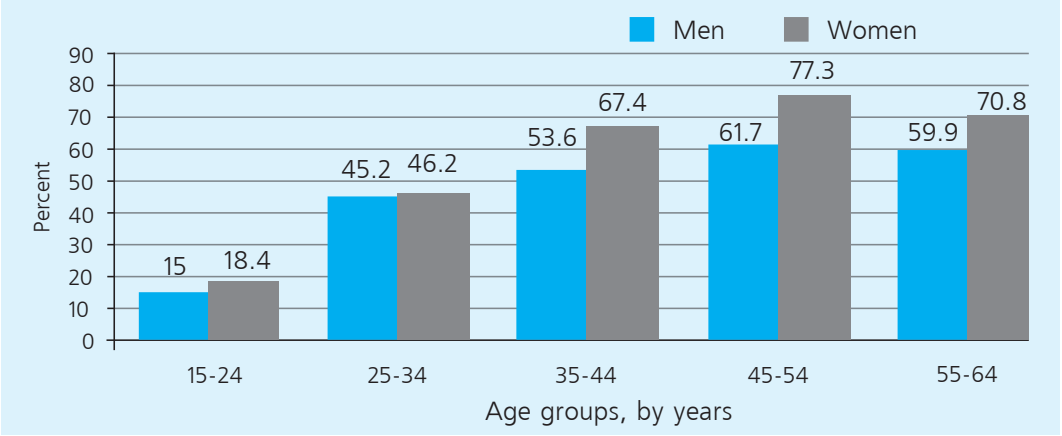
| Indicator | Men | | | Women* | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 783 | 15.0 | 12.2-17.8 | 805 | 18.4 | 15.3-21.4 | 1588 | 16.6 | 14.7-18.5 |
| 25-34 | 664 | 45.2 | 39.1-51.2 | 797 | 46.2 | 42.2-50.1 | 1461 | 45.7 | 42.0-49.3 |
| 35-44 | 536 | 53.6 | 48.3-59.0 | 700 | 67.4 | 63.7-71.1 | 1236 | 60.9 | 57.7-64.1 |
| 45-54 | 431 | 61.7 | 56.1-67.4 | 567 | 77.3 | 72.4-82.2 | 998 | 69.2 | 65.7-72.8 |
| 55-64 | 242 | 59.9 | 50.6-69.3 | 248 | 70.8 | 64.1-77.4 | 490 | 65.3 | 59.4-71.3 |
| Total | 2656 | 49.0 | 45.8-52.2 | 3117 | 59.9 | 57.7-62.1 | 5773 | 54.4 | 52.3-56.6 |
| Locality | | | | | | | | | |
| Urban | 1287 | 50.7 | 46.3-55.1 | 1579 | 58.6 | 56.1-61.1 | 2866 | 54.7 | 51.8-57.6 |
| Rural | 1369 | 47.6 | 43.1-52.1 | 1538 | 61.1 | 57.5-64.6 | 2907 | 54.2 | 51.0-57.4 |

* Excluding pregnant women

There was a statistically significant trend observed in 15-54 year-old respondents towards an increase in mean BMI with age. In other words, there was a statistically significant direct correlation between the prevalence of being overweight and obesity and age in 15-54 year-old in both genders. Moreover, the above table shows that the proportion of overweight and obese people in the 25-34 year age group was significantly higher compared to the 15-24 year age group. For instance, the proportion of overweight and obese men aged 25-34 years was 3.0 times more compared to 15-24 year-old men. Similarly, the proportion of overweight and obese women aged 25 – 34 years was 2.5 times more compared to 15-24 year-old women. The data in the above table also presents an alarming result that over 60 percent of the survey population aged 35-64 years were overweight or obese (Table 42).

In addition, the prevalence of overweight and obese women aged 35-54 years was statistically significantly higher compared to men from the same age group (Figure 15).

**Figure 15.** Prevalence of overweight and/or obesity (BMI ≥ 25 kg/м2), by age groups and gender




When collated by locality, there were no statistically significant differences in the prevalence of overweight and obesity (BMI ≥ 25 kg/м2) between urban and rural respondents. In particular, the prevalence of overweight and obesity among the 15-64 year-old survey population was 54.7% (95%CI 51.8-57.6) in urban areas, when the corresponding data for rural areas was 54.2% (95%CI 51.0-57.4). Compared by gender, there were no statistically significant differences in the prevalence of overweight and obesity between the urban and rural population (Table 42).

### 3.3.3 Central Obesity

The mean waist and hip circumferences were measured, and waist to hip ratio was calculated in order to determine the prevalence of central obesity in the study population. Body fat mass was measured using 'GIMA', a body composition analyzer.

The mean waist circumference among the study population was 87.6 cm (95% CI 86.6-88.5). The measurement results showed that this indicator was 0.7 cm more for men compared to women, being 87.9 cm (95%CI 86.9-88.8) in men, and 87.2 cm (95%CI 86.2-88.1) in women. However, the difference in this indicator between the two sexes was not statistically significant (Table 43).

**Table 43.** Mean waist circumference among all respondents, in cm (by age groups, gender and locality)

| Indicator | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | |
| 15-24 | 793 | 74.7 | 73.8-75.6 | 814 | 73.8 | 72.8-74.9 |
| 25-34 | 664 | 86.6 | 85.1-88.1 | 802 | 84.1 | 83-85.2 |
| 35-44 | 539 | 90.5 | 88.9-92 | 710 | 89.1 | 87.8-90.4 |
| 45-54 | 435 | 91.7 | 90.4-93.1 | 575 | 92 | 90.3-93.7 |
| 55-64 | 244 | 92.6 | 90.1-95 | 250 | 92.6 | 90.6-94.6 |
| Total | 2675 | 87.9 | 86.9-88.8 | 3151 | 87.2 | 86.2-88.1 |
| Locality | | | | | | |
| Urban | 1291 | 88.8 | 87.5-90 | 1596 | 86.4 | 85-87.8 |
| Rural | 1384 | 87.1 | 85.8-88.5 | 1555 | 87.8 | 86.5-89.2 |

When collated by age groups, the mean waist circumference was the highest among 55-64 year-old people ($p<0.001$). Moreover, the mean waist circumference of 35-64 year-old respondents of both sexes was statistically significantly higher compared to that of 15-34 year-old younger

respondents. A comparison of the mean waist circumference between urban and rural population revealed no statistically significant difference (Table 43).

The measurement results indicate that the mean hip circumference among women was 97.2 cm (95%CI 96.6-97.9 87.6), and 95.4 cm (95%ИХ 94.6-96.3) among men, revealing a statistically significant difference of 1.8 см between the two sexes (Table 44).

**Table 44.** Mean hip circumference in cm, (by age groups, gender and locality)

| Indicator | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | |
| 15-24 | 787 | 88.8 | 87.7-90 | 811 | 89.2 | 88.1-90.4 |
| 25-34 | 666 | 94.9 | 93.6-96.2 | 801 | 95.5 | 94.4-96.7 |
| 35-44 | 538 | 96.6 | 95.6-97.6 | 708 | 98.3 | 97.4-99.1 |
| 45-54 | 439 | 97.4 | 96.2-98.5 | 574 | 100.3 | 99.3-101.4 |
| 55-64 | 244 | 97.6 | 96.4-98.8 | 249 | 100.1 | 98.8-101.5 |
| Total | 2674 | 95.4 | 94.6-96.3 | 3143 | 97.2 | 96.6-97.9 |
| Locality | | | | | | |
| Urban | 1292 | 95.6 | 94.3-96.9 | 1592 | 96.9 | 95.8-98 |
| Rural | 1382 | 95.3 | 94.2-96.3 | 1551 | 97.6 | 96.9-98.3 |

The mean hip circumference had a tendency to increase with age. The highest mean hip circumference was observed in 55-64 year-old men, and 45-54 year-old women with a statistically significant difference ($p<0.001$) compared to that of the remaining age groups. A comparison of the mean hip circumference between urban and rural population revealed no statistically significant difference being at a relatively similar level (Table 44).

The mean waist to hip ratio (WHR) was 0.92 (95%CI 0.91-0.92) among men, whereas this indicator was 0.89 (95%CI 0.88-0.9) among women (Table 45).

**Table 45.** Mean Waist to Hip Ratio (WHR) by age groups, gender and locality

| Indicator | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | |
| 15-24 | 787 | 0.84 | 0.83-0.85 | 810 | 0.83 | 0.82-0.84 |
| 25-34 | 662 | 0.91 | 0.9-0.92 | 800 | 0.88 | 0.87-0.89 |
| 35-44 | 537 | 0.93 | 0.92-0.94 | 706 | 0.90 | 0.89-0.92 |
| 45-54 | 433 | 0.94 | 0.93-0.95 | 569 | 0.91 | 0.9-0.92 |
| 55-64 | 244 | 0.95 | 0.93-0.96 | 247 | 0.92 | 0.91-0.93 |
| Total | 2663 | 0.92 | 0.91-0.93 | 3132 | 0.89 | 0.88-0.9 |
| Locality | | | | | | |
| Urban | 1286 | 0.92 | 0.91-0.94 | 1588 | 0.89 | 0.88-0.90 |
| Rural | 1377 | 0.91 | 0.9-0.92 | 1544 | 0.90 | 0.88-0.91 |

The mean waist to hip ratio had a tendency to increase with age. The highest mean waist to hip ratio was observed in 55-64 year-old respondents of both sexes presenting a statistically significant difference ($p<0.001$) compared to that of the remaining age groups. However, there was no statistically significant difference in mean waist to hip ratio between urban and rural residents when collated by locality (Table 45).

The prevalence of central obesity was estimated using the waist circumference measurements in the study population. This indicator was evaluated by collating age groups, gender and locality. The prevalence of central obesity was 56.8% (95% CI 54.0-59.6) among the general population. This indicator was 1.6 times greater in women than in men, presenting 69.3% (95%CI 66.6-71.9) vs. 44.4% (95%CI 40.8-47.9) respectively (Table 46).

**Table 46.** Prevalence of central obesity (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 793 | 8.8 | 6.4-11.9 | 815 | 24.7 | 20.4-29.7 | 1608 | 13.5 | 13.5-19.5 |
| 25-34 | 667 | 38.9 | 32.6-45.5 | 803 | 60.0 | 55.6-64.2 | 1470 | 45.4 | 45.4-53.1 |
| 35-44 | 539 | 52.4 | 47.0-57.8 | 710 | 77.5 | 72.5-81.8 | 1249 | 61.6 | 61.6-69.6 |
| 45-54 | 437 | 54.5 | 49.0-59.9 | 578 | 84.5 | 79.7-88.4 | 1015 | 64.5 | 64.5-73.1 |
| 55-64 | 246 | 58.7 | 49.1-67.6 | 253 | 80.0 | 72.5-85.8 | 499 | 62.8 | 62.8-75.1 |
| Total | 2682 | 44.4 | 40.8-47.9 | 3159 | 69.3 | 66.6-71.9 | 5869 | 56.8 | 54.0-59.6 |
| Locality | | | | | | | | | |
| Urban | 1296 | 45.6 | 40.2-51.2 | 1600 | 67.5 | 64.0-70.8 | 2896 | 56.8 | 52.5-61.1 |
| Rural | 1386 | 43.3 | 38.8-47.9 | 1559 | 71.0 | 66.9-74.7 | 2945 | 56.8 | 53.2-60.3 |

*excluding pregnant women

The data in Table 46 above shows that there was a statistically significant tendency of increase in the prevalence of central obesity with age. Nevertheless, when collated by locality the prevalence of central obesity was at relatively similar levels without a statistically significant difference between the urban and rural population.

### 3.3.4 Body Fat Percentage

In the present survey, body fat content was determined by body fat percentage in total body weight, and evaluated by comparing the reference values indicated in the study methodology.

The mean body fat content of women was greater by 6.8% ($p<0.001$) compared to that of their male counterparts, being 31.4% (95%CI 30.8-32) in women vs. 24.6% (95%CI 24-25.3) in men (Table 47).

**Table 47.** Mean body fat (by age groups, gender and locality)

| Indicator | Men | | | Women | | |
|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | |
| 15-24 | 791 | 17.4 | 16.5-18.2 | 812 | 23.7 | 23.1-24.3 |
| 25-34 | 665 | 23.0 | 21.9-24.1 | 802 | 28.4 | 27.7-29.1 |
| 35-44 | 542 | 26.0 | 24.7-27.2 | 711 | 32.3 | 31.5-33.1 |
| 45-54 | 444 | 27.1 | 26.2-28 | 577 | 35.0 | 33.9-36.2 |
| 55-64 | 244 | 28.4 | 27.3-29.5 | 252 | 35.0 | 33.8-36.1 |
| Total | 2686 | 24.6 | 24-25.3 | 3154 | 31.4 | 30.8-32 |
| Locality | | | | | | |
| Urban | 1292 | 24.8 | 23.6-26 | 1593 | 31.1 | 30.3-31.9 |
| Rural | 1394 | 24.5 | 24-25 | 1561 | 31.6 | 30.7-32.4 |

Analysis of data on the prevalence of increased body fat content by age groups revealed that body fat content directly correlated with age. Body fat content was the highest among the 45-64 year-old respondents of both sexes and lowest among the 15-34 year-old respondents presenting a statistically significant difference (Table 47).

The survey results demonstrated that the prevalence of very high body fat content or obesity was 45.2% (95%CI 42.1-48.3) in men and 30.2% (95%CI 26.8-33.8) in women (Table 48).

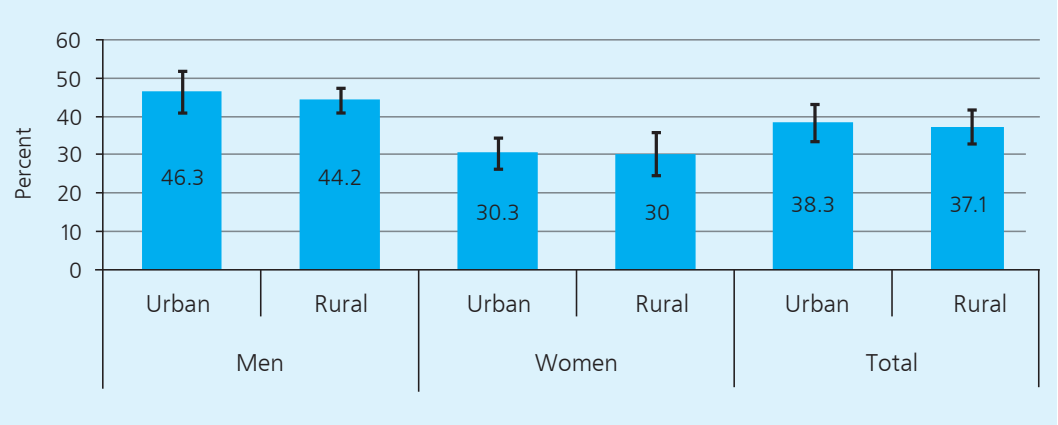
**Table 48.** Risk assessment of body fat, Body fat percentage categories (by age groups and gender)

| Age Group (years) | n | % Low (<10.0%) | 95%CI | % Normal (10.0-19.9) | 95%CI | % High (20.0-44.9) | 95%CI | % Very High (≥25%) | 95%CI |
|---|---|---|---|---|---|---|---|---|---|
| Men | | | | | | | | | |
| 15-24 | 791 | 8.9 | 5.3-14.5 | 64.8 | 58.6-70.6 | 14.7 | 11.1-19.3 | 11.5 | 9-14.6 |
| 25-34 | 665 | 3.2 | 1.7-6 | 31.5 | 26.1-37.6 | 30.6 | 26.1-35.6 | 34.6 | 28.5-41.3 |
| 35-44 | 542 | 0.6 | 0.3-1.5 | 20.7 | 16-26.3 | 29.9 | 25.6-34.5 | 48.8 | 44.4-53.2 |
| 45-54 | 444 | 1.7 | 0.7-4.1 | 12.4 | 9.1-16.5 | 25.6 | 21.3-30.4 | 60.3 | 55.5-64.9 |
| 55-64 | 244 | 0.4 | 0.1-3.1 | 8.3 | 5.2-13 | 24.5 | 18-32.3 | 66.8 | 57.7-74.9 |
| Total | 2686 | 2.6 | 1.7-4 | 26 | 23.2-29.1 | 26.2 | 23.8-28.7 | 45.2 | 42.1-48.3 |
| Women | | | | | | | | | |
| 15-24 | 812 | 20.5 | 16.6-25.1 | 67.2 | 62.7-71.4 | 7.4 | 5.6-9.7 | 4.8 | 3.1-7.5 |
| 25-34 | 802 | 7.5 | 4.7-11.9 | 53.2 | 47.8-58.6 | 23.4 | 20.3-26.7 | 15.8 | 13.3-18.8 |
| 35-44 | 711 | 2.4 | 1.3-4.3 | 37.9 | 32.3-43.7 | 31.1 | 27.3-35.3 | 28.7 | 23-35.1 |
| 45-54 | 577 | 2.3 | 1.2-4.2 | 22.5 | 18.5-27 | 26 | 21.9-30.6 | 49.2 | 42.3-56.2 |
| 55-64 | 252 | 4.7 | 2.4-9.2 | 22 | 16.3-29 | 23 | 17.6-29.6 | 50.2 | 44.3-56.2 |
| Total | 3154 | 5.9 | 4.7-7.2 | 39.3 | 36.7-42 | 24.6 | 22.2-27.3 | 30.2 | 26.8-33.8 |

The above table indicates that there is no significant difference in the prevalence of elevated body fat content or being overweight when collated by gender. The prevalence of increased body fat content was 26.2% (95%CI 23.8-28.7) for men and 24.6% (95%CI 22.2-27.3) for women. Moreover, when compared by age groups, the proportion of the survey respondents with very high fat content or obesity was the highest among the 55-64 year-old respondents of both sexes, whereas this indicator was the lowest ($p<0.001$) among the 15-34 year-old respondents (Table 48).

When compared by locality, there was no statistically significant difference observed in the prevalence of elevated body fat content between urban and rural respondents (Figure 16) (Appendix 1: Table 25).

**Figure 16.** Proportion of population with obesity or with high content of body fat, by locality and gender



In other words, the results of risk assessment of body fat content were at relatively similar levels in urban and rural areas (Figure 16).

## Discussion

Comparing the results of the present and the previous 2009 STEPS Survey on the Prevalence of Non-communicable Disease and Injury Risk Factors, the mean waist circumference increased by 4.7 cm (from the 2009 result of 83.2 cm (95%CI 82.2-84.3) in men, and by 4.6 cm (from the 2009 result of 82.6 cm (95%CI 81.7-*83*.5) in women presenting a statistically significant difference ($p<0.001$).

Analyzed by gender, the mean body fat content increased from the 2009 level of 22.2% (95%CI 21.4-23.0) to 24.6% (95%CI 24-25.3) in 2013 for the men ($p<0.001$). Similarly, this indicator increased for the women during the period between the two surveys; 29.3% (95%CI 28.5-30.2) in 2009 as opposed to 31.4% (95%CI 30.8-32) in 2013 ($p<0.001$).

When collated by locality, the mean body fat content increased among urban respondents of both sexes; from 21.6% (95%CI 20.6-22.6) in 2009 to 24.8% (95%CI 23.6-26) in 2013 for the urban men, and from 29.4% (95%CI 28.3-30.6) in 2009 to 31.1% (95%CI 30.3-31.9) for the urban women. Similarly, this indicator increased to 24.5% (95%CI 24-25) for rural men, and 31.6% (95%CI 30.7-32.4) for rural women, presenting a statistically significant difference ($p<0.001$) compared to the results of the previous 2009 survey.

Moreover, the proportion of men with a very high body fat or obesity had increased during the period between the two surveys, 34.0% (95%CI 29.9-38.1) in 2009 vs. 45.2% (95%CI 42.1-48.3) in 2013. A similar increase was observed for the females as well; 25.2% (95%CI 22.1-28.20) in 2009 compared with 30.2% (95%CI 26.8-33.8) in 2013 ($p<0.001$). Thus, survey results indicate that the percentage of men with a very high body fat or obesity had increased since the previous survey (Table 49).

**Table 49.** Comparative results of waist circumference and body fat (by gender in chronological order)

| Indicator | Men | | | | Women | | | |
|---|---|---|---|---|---|---|---|---|
| | 2009 | | 2013 | | 2009 | | 2013 | |
| | Mean | 95%CI | Mean | 95%CI | Mean | 95%CI | Mean | 95%CI |
| Waist circum-ference, in cm | 83.2 | 82.2-84.3 | 87.2 | 86.2-88.1 | 82.6 | 81.7-83.5 | 87.9 | 86.9-88.8 |
| Body fat, % | 22.2 | 21.4-23.0 | 24.6 | 24.0-25.3 | 29.3 | 28.5-30.2 | 31.4 | 30.8-32.0 |
| Percentage of respondents with very high fat content, % | 34.0 | 29.9-38.1 | 45.2 | 42.1-48.3 | 25.2 | 22.1-28.2 | 30.2 | 26.8-33.8 |

Although the percentage of women with a very high level of body fat or obesity had increased compared to the 2009 level, we conclude that the difference is not statistically significant due to overlapping of the variation range of these results (Table 50).

## Conclusions:

1. The mean BMI in the study population was 25.9, which is elevated compared to the WHO-recommended values. Collated by gender, the mean BMI was 25.3 in men, and 26.6 in women.
2. According to the BMI risk assessment, 54.4% of the 15-64 year-old Mongolian population was overweight or obese, with 34.8% overweight and 19.7% obese. These results indicate that the Mongolian population is affected by overweight pandemics similarly to many

other countries' populations Worldwide.

3. The prevalence of being overweight and obesity tended to increase with age and the proportion of overweight or obese women in all age groups was relatively high compared to their male counterparts.
4. The mean waist-to-hip ratio was greater than the recommended reference value (0.9 and 0.8) in both men (0.92) and women (0.89) demonstrating the risks for central obesity.
5. The prevalence of central obesity was 56.8% in the 15–64 year-old Mongolian population. The proportion of women with central obesity was 1.5 times higher compared to their male counterparts. The prevalence of central obesity had a tendency to increase with age.
6. Body fat percentage was very high or obese in 45.2% of men and 30.2% of women. The 45-64 year-old population had the highest body fat percentage.

### 3.3.5 Incidences of Combined Risk Factors

It is common that individuals have combined risk factors for non-communicable diseases. In particular, the following NCD risk factors are most common:

- Daily smoking
- Consuming less than five servings of fruit and/or vegetables per day
- Physical inactivity
- Overweight and obese (BMI≥25 kg/m2)
- Arterial hypertension (SBP≥140 or DBP≥90 mm HG) or who are currently on medication for hypertension

In order to determine the prevalence of combined common NCD risk factors among the 15-64 year-old survey population, the above-mentioned common modifiable risk factors were evaluated as follows: Respondents with none of the common risk factors for NCD were evaluated as having no risk for NCDs; respondents with 1-2 risk factors were evaluated as having risks for developing NCDs; and respondents having 3 or more common modifiable risk factors as having high risks for developing NCDs. The proportion of the population having 3-5 common modifiable NCD risk factors was 36.9% (95%CI 34.6-39.1) among the 15-64 year-old population, and 53.2% (95%CI 49.8-56.5) among the 45-64 year-old population; thus indicating high risks for developing NCDs. As shown in the table below, only 1% of the study population had none of the common modifiable NCD risk factors (Table 50).

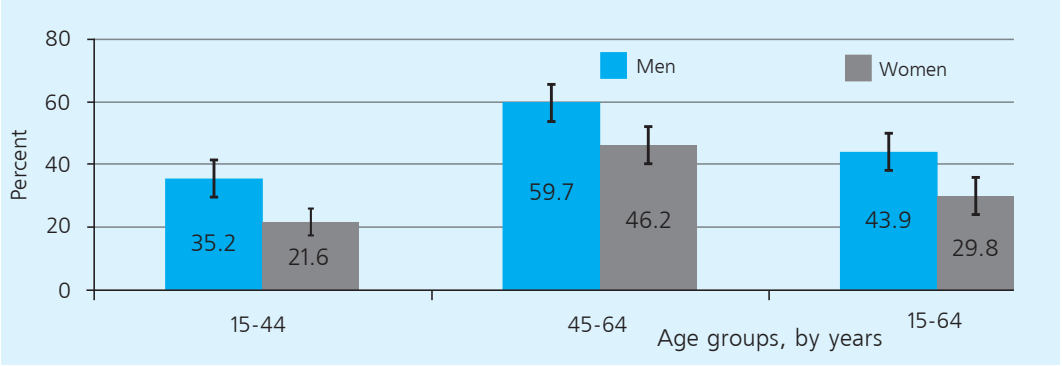
**Table 50.** Prevalence of combined common NCD risk factors (by age groups)

| Age Group (years) | n | Respondents with none of common risk factors | | Respondents with risks for developing NCDs | | Respondents with high risks for developing NCDs | |
|---|---|---|---|---|---|---|---|
| | | % with 0 risk factors | 95%CI | % with 1-2 risk factors | 95%CI | % with 3-5 risk factors | 95%CI |
| 15-44 | 4211 | 1.4 | 0.8-1.9 | 70.3 | 68.1-72.6 | 28.3 | 26.1-30.5 |
| 45-64 | 1453 | 0.3 | 0.0-0.6 | 46.6 | 43.2-49.9 | 53.2 | 49.8-56.5 |
| Total | 5664 | 1.0 | 0.6-1.4 | 62.2 | 59.9-64.4 | 36.9 | 34.6-39.1 |

The proportion of the respondents with a high risk for developing NCDs is relatively low among the 15-44 year-old population at 28.3% (95%CI 26.1-30.5), which is almost half compared to that indicator for the 45-64 year-old population (Table 50).

The percentage of the 15-64 year-old men with 3-5 common modifiable NCD risk factors is 1.5 times higher compared to that of their female counterparts ($p<0.001$). Particularly, 43.9% (95%CI 41.3-46.5) of men and 29.8% (95%CI 26.7-33.0) of women had high risks for developing NCDs (Figure 17).

**Figure 17.** Proportion of population with combined common modifiable risk factors, by age groups and gender




Moreover, the proportion of men who have 3-5 combined common modifiable NCDI risk factors in all age groups was statistically significantly higher compared to those in women (Figure 18).

The survey results demonstrate that the respondents having none of the common modifiable NCD risk factors was relatively low in rural areas ($p<0.001$). The percentage of the 15-64 year-old population with risks of developing NCDs was higher in rural areas (Table 51).

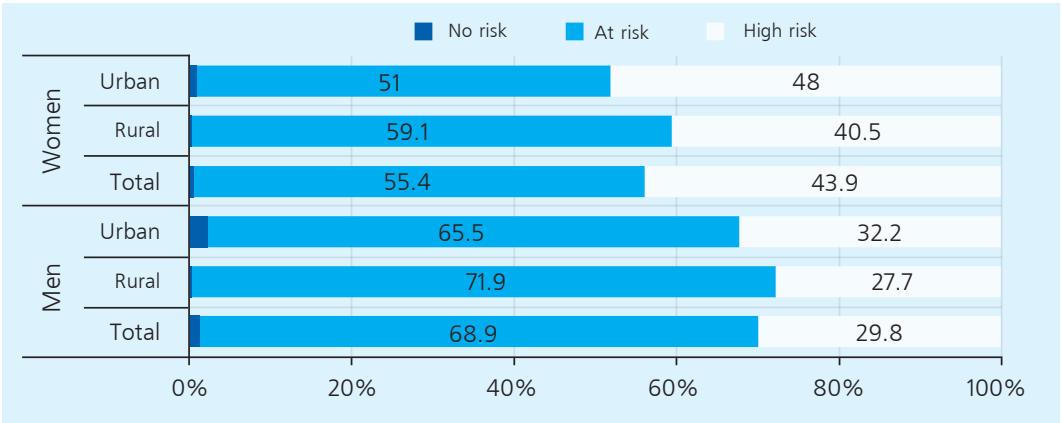
**Table 51.** Prevalence of combined common modifiable NCD risk factors (by locality)

| Age Group (years) | n | Respondents with none of common risk factors | | Respondents with risks for developing NCDs | | Respondents with high risks for developing NCDs | |
|---|---|---|---|---|---|---|---|
| | | % with 0 risk factors | 95%CI | % with 1-2 risk factors | 95%CI | % with 3-5 risk factors | 95%CI |
| Urban | 2811 | 1.7 | 0.9-2.9 | 58.5 | 54.6-62.3 | 39.9 | 36.3-43.5 |
| Rural | 2853 | 0.4 | 0.2-0.8 | 65.4 | 62.6-68.0 | 34.2 | 31.6-37.0 |

As shown in the above table, the percentage of the respondents with 3-5 NCD risk factors for developing NCDs was slightly higher in urban areas (39.9%, 95%CI 36.3-43.5), although the difference was not statistically significant. However, the percentage of the respondents with 1-2 NCD risk factors for developing NCDs was statistically significantly higher among the rural population compared to that of the urban population (Table 51).

When compared by locality, the proportion of 15-64 year-old men who had 1-2 common modifiable NCD risk factors was statistically significantly higher in rural men (59.1%, 95%CI 56.1-62.0) compared to that of urban men (51%, 95%CI 45.9-56.0) (Figure 18).

**Figure 18.** Proportion of population with combined common risk factors, by locality and gender



Conversely, the proportion of men who had 3-5 common modifiable NCD risk factors was greater in urban men (48.0%, 95%CI 43.2-52.8) than in rural men (40.5%, 95%CI 37.6-43.4). Nevertheless, the difference was not statistically significant. Moreover, the survey results indicate that the percentage of the 15-64 year-old women who had none of the common modifiable NCD risk factors was relatively high among the urban women compared to that of rural women presenting a statistically significant difference (2.3%, 95%CI 1.9-4.0 in urban women as opposed to 0.4%, 95%CI 0.2-0.9 in rural women). Collated by locality, the percentage of women with high and very high risks for developing NCDs was at a relatively similar level, with no significant difference (Figure 18).

### Conclusions

1. Among the Mongolian population, one in three of the 15-64 year-old population (36.9%), and more than a half of the 45 years and above population (53.2%) had 3-5 common modifiable NCD risk factors; thus indicating high risks of developing NCDs.
2. The proportion of the 15-64 year-old men who have 3-5 combined common modifiable NCDI risk factors was relatively higher (by 14.1%) compared to that of their female counterparts demonstrating that men have greater risks for developing NCDs than women.
3. The percentage of the 15-64 year-old population with risks for developing NCDs was relatively higher among the rural population. The proportion of respondents who had none of the common risk factors for NCD was only 0.4 percent.

## 3.4 CARDIOVASCULAR DISEASES AND ARTERIAL HYPERTENSION

The survey determined the prevalence of cardiovascular disease (CVD) risks using the questionnaire to clarify the relevant factors such as history of arterial hypertension, history of receiving aspirin or statins regularly to prevent or treat heart disease, taking medication for raised blood pressure or elevated blood cholesterol and lipid levels, and/or a traditional remedy for prevention or treatment purposes, and whether the respondents have ever had their blood pressure measured. Arterial hypertension as a risk factor for CVD and NCDs was assessed using physical measurements in addition to an analysis of the questionnaire results.

### 3.4.1 History of Cardiovascular Diseases

When asked 'Have you ever had a heart attack or chest pain from heart disease (angina), myocardial infarction, or stroke?", 12.4% of the 15-64 year-old Mongolian population, 11.7% of men, and13.0% of women answered 'yes'. Analyzed by gender, among those who have a past history of heart attack or chest pain from heart disease (angina), myocardial infarction and/or stroke, there was no statistically significant difference between men and women. However, when collated by age groups, the percentage of the population who had CVD history has a tendency to increase with age (Table 52).

**Table 52.** Population with history of cardiovascular diseases (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 2.8 | 1.7-4.5 | 853 | 5.5 | 3.1-9.7 | 1651 | 4.1 | 2.5-6.6 |
| 25-34 | 677 | 7.8 | 5-11.8 | 863 | 8.7 | 5.6-13.2 | 1540 | 8.2 | 5.9-11.3 |
| 35-44 | 548 | 10.3 | 6.8-15.2 | 737 | 13.1 | 9.1-18.6 | 1285 | 11.8 | 8.2-16.6 |
| 45-54 | 449 | 17.8 | 13.2-23.6 | 585 | 16.9 | 10.6-26 | 1034 | 17.4 | 13-22.8 |
| 55-64 | 247 | 22.7 | 16.5-30.5 | 256 | 24.7 | 17.6-33.5 | 503 | 23.7 | 18-30.5 |
| Total | 2719 | 11.7 | 9.2-14.8 | 3294 | 13 | 9.1-18.3 | 6013 | 12.4 | 9.4-16.1 |
| Locality | | | | | | | | | |
| Urban | 1319 | 10.7 | 7.9-14.2 | 1674 | 10.9 | 6.3-18.2 | 2993 | 10.8 | 7.5-15.3 |
| Rural | 1400 | 12.6 | 8.7-17.8 | 1620 | 14.9 | 9.4-23 | 3020 | 13.8 | 9.3-19.9 |

When analyzed by locality, the difference in the percentage of population having a past history of cardiovascular diseases between urban and rural respondents was not statistically significant. In particular, 10.8% (95%CI 7.5-15.3) of the urban and 13.8% (95%CI 9.3-19.9) of the rural population had a history of having had cardiovascular diseases in the past (Table 52).

The percentage of the 15-64 year-old population who are currently taking aspirin or statins regularly to prevent or treat heart disease was 11.3%, but this indicator was 9.0% for men, and 13.6% for women. The percentage of women who are currently taking aspirin was higher by 1.5% than men ($p<0.001$). Moreover, the aspirin use was increased with age. In particular, when collated by age groups there was a statistically significant difference observed among men who are currently taking aspirin; 4.7% for the 35-44 year-old men as opposed to 18.2% for the 45-54 year-old men. This trend was similar for the women as well. Analyzed by age groups there was a statistically significant difference revealed in the percentage of women who are currently taking aspirin; 11.7% for the 35-44 year-old women vs. 24.2% for the 45-54 year-old women (Table 53).

**Table 53.** Population who are currently taking aspirin to prevent or treat heart disease (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 2.5 | 1.2-5.2 | 853 | 3.1 | 1.4-6.6 | 1651 | 2.8 | 1.4-5.7 |
| 25-34 | 677 | 2.2 | 1.2-3.9 | 863 | 3.4 | 1.9-6.1 | 1540 | 2.8 | 1.8-4.5 |
| 35-44 | 548 | 4.7 | 2.9-7.4 | 737 | 11.7 | 8.8-15.2 | 1285 | 8.4 | 6.5-10.8 |
| 45-54 | 449 | 18.2 | 13.6-24 | 585 | 24.2 | 18.9-30.3 | 1034 | 21.1 | 17.5-25.1 |
| 55-64 | 247 | 22.6 | 16.2-30.6 | 256 | 31.8 | 24.7-39.7 | 503 | 27.2 | 22.1-32.9 |
| Total | 2719 | 9 | 7.1-11.3 | 3294 | 13.6 | 11.4-16 | 6013 | 11.3 | 9.7-13.2 |
| Locality | | | | | | | | | |
| Urban | 1319 | 7.8 | 5.6-10.8 | 1674 | 11.4 | 9.5-13.7 | 2993 | 9.7 | 8.3-11.1 |
| Rural | 1400 | 10.1 | 7.3-13.8 | 1620 | 15.5 | 12.1-19.7 | 3020 | 12.8 | 10.1-16.1 |

When collated by locality, 9.7% of urban population and 12.8% of rural population were taking aspirin to prevent or treat heart disease. These results show that the percentage of the respondents who were taking aspirin to prevent or treat heart disease was relatively higher in the rural population than in the urban population, although the difference was not statistically significant (Table 53).

As the results of the questionnaire indicate, 1.2% of the 15-64 year-old study population, 0.9% of men and 1.5% of women answered that they are currently taking statins (Atoris, Simvadenk, Lovastatine or any other statin) regularly to prevent or treat heart disease. Collated by gender, the current use of medication for raised total cholesterol and lipids was at a similar level for men and women. However, this indicator increased with age. In particular, the current use of statins was lowest among the 15-24 year-old respondents and highest among the 55-64 year-old population indicating a statistically significant difference. As for the women, the current use of statins regularly to prevent or treat heart disease was 2.5% (95%CI 1.4-4.4) for the 45-54 year-old group, and 3.6% (95%CI 0.2-6.3) for the 55-64 year-old group (Table 54).

**Table 54.** Population who are currently taking statins to prevent or treat heart disease (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 0.3 | 0.1-1.1 | 853 | 0.4 | 0.2-1.3 | 1651 | 0.4 | 0.2-0.8 |
| 25-34 | 677 | 0.2 | 0-0.9 | 863 | 0.3 | 0.1-1 | 1540 | 0.2 | 0.1-0.6 |
| 35-44 | 548 | 0.8 | 0.3-2.3 | 737 | 1.3 | 0.4-4 | 1285 | 1.1 | 0.5-2.4 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 45-54 | 449 | 1.7 | 0.8-3.6 | 585 | 2.5 | 1.4-4.4 | 1034 | 2.1 | 1.3-3.2 |
| 55-64 | 247 | 1.2 | 0.2-6.3 | 256 | 3.6 | 1.6-7.9 | 503 | 2.4 | 1.2-4.8 |
| Total | 2719 | 0.9 | 0.5-1.5 | 3294 | 1.5 | 1.0-2.2 | 6013 | 1.2 | 0.9-1.6 |
| Locality | | | | | | | | | |
| Urban | 1319 | 1.2 | 0.6-2.6 | 1674 | 1.9 | 1.2-3.0 | 2993 | 1.6 | 1.2-2.1 |
| Rural | 1400 | 0.6 | 0.3-1.4 | 1620 | 1.1 | 0.6-2.1 | 3020 | 0.8 | 0.5-1.5 |

When analyzed by locality, the percentage of the urban population who are currently taking statins (Atoris, Simvadenk, Lovastatine or any other statin) regularly to prevent or treat heart disease was (1.6%) slightly higher than that of the rural population (0.8%). However, the difference in this indicator between the urban and rural areas was not statistically significant (Table 54).

### 3.4.2 Prevalence of Higher Risks (≥30%) for Cardiovascular Diseases

The percentage of respondents aged 40-64 years with a 10-year cardiovascular disease (CVD) risk ≥30% or with existing CVD was determined using the analysis of the survey results. A 10-year CVD risk of ≥30% is defined according to the following factors and indicators:

- Age,
- Gender,
- Smoking status (current smokers OR those who quit smoking less than 1 year before the assessment),
- History of raised blood pressure,
- Arterial blood pressure measurements,
- Diabetes (previously diagnosed OR a fasting plasma glucose concentration >7.0 mmol/l,
- History of raised total cholesterol,
- Fasting plasma glucose and total cholesterol measurements.

As the analysis of the survey results indicate, the percentage of respondents aged 40-64 years with a 10-year cardiovascular disease (CVD) risk or with existing CVD was 17.8% (95%CI 12.0-23.6). The risk levels were not much different between the two genders. The study results show that 19.9% (95%CI 13.2-26.7) of men and 15.9% (95%CI 9.8-22.1) of women had a 10-year cardiovascular disease (CVD) risk ≥30%. Although the percentage of men with a 10-year cardiovascular disease (CVD) risk ≥30% or with existing CVD was slightly higher than women, the difference was not statistically significant.

When collated by age groups, the percentage of respondents with a 10-year cardiovascular disease (CVD) risk ≥30% or with existing CVD was relatively higher among the 55-64 year old population compared to that of the remaining age groups. Nevertheless, the difference was not statistically significant (Table 55).

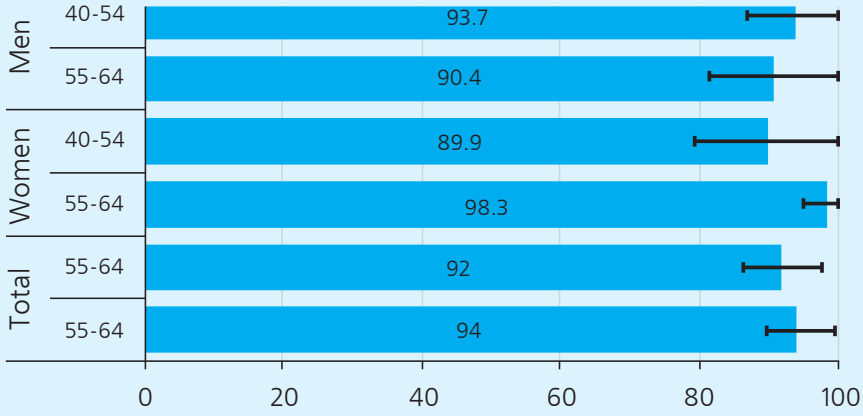
**Table 55.** Population with cardiovascular disease or high risks of cardiovascular disease (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 40-54 | 288 | 18.3 | 11.4-25.3 | 417 | 14.0 | 8.2-19.8 | 705 | 16.1 | 10.3-21.6 |
| 55-64 | 95 | 30.5 | 17.3-43.7 | 123 | 27.7 | 16.9-38.5 | 218 | 28.9 | 19.5-38.4 |
| Total | 383 | 19.9 | 13.2-26.7 | 540 | 15.9 | 9.8-22.1 | 923 | 17.8 | 12.0-23.6 |
| Locality | | | | | | | | | |
| Urban | 169 | 13.7 | 5.0-22.3 | 266 | 14.1 | 5.6-22.6 | 435 | 13.9 | 6.2-21.6 |
| Rural | 214 | 24.4 | 15.2-33.6 | 274 | 17.5 | 8.8-26.2 | 488 | 20.9 | 12.9-28.9 |

Analyzed by locality, the percentage of the rural population (20.9%, 95%CI 12.9-28.9) with a 10-year cardiovascular disease (CVD) risk ≥30% or with existing CVD was relatively higher compared to that of the urban population. Particularly, this indicator was higher among the rural men (24.4%, 95%CI 15.2-33.6). However, we conclude that the difference in this risk between the urban and rural respondents is not statistically significant due to overlapping of the variation range of these results (Table 55).

Moreover, the survey respondents with a cardiovascular disease (CVD) risk ≥30%, including those with existing CVD were asked whether they are receiving drug therapy and counseling to prevent heart attacks and strokes. The majority of the respondents (92.5%, 95%CI 87.9-97.2) with a cardiovascular disease (CVD) risk ≥30% or with existing CVD were currently receiving drug therapy and counseling to prevent heart attacks and strokes (Figure 19).

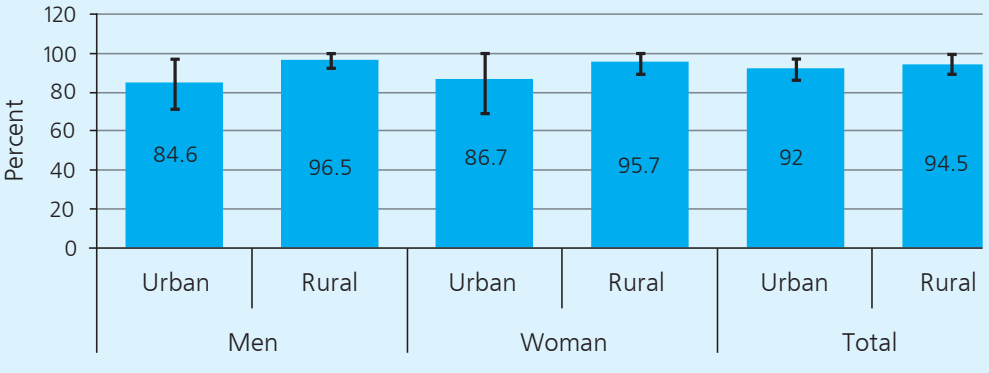
**Figure 19.** Respondents with cardiovascular disease or high risks of cardiovascular disease currently receiving drug therapy and counseling to prevent heart attacks and strokes, by age groups and gender




As shown in the above table, when collated by age groups and gender, the proportion of respondents with cardiovascular disease or high risks of cardiovascular disease currently receiving drug therapy and counseling to prevent heart attacks and strokes was not significantly different (Figure 19).

In addition, the percentage of respondents with cardiovascular disease or high risks of cardiovascular disease currently receiving drug therapy and counseling to prevent heart attacks and strokes was not significantly different by locality, being at relatively high levels in both urban and rural areas (Figure 20).

**Figure 20.** Respondents with cardiovascular disease or high risks of cardiovascular disease currently receiving drug therapy and counseling to prevent heart attacks and strokes, by gender and locality



Although the proportion of respondents with cardiovascular disease or high risks of cardiovascular disease currently receiving drug therapy and counseling to prevent heart attacks and strokes was slightly higher for the rural population than urban population, the difference was not statistically significant (Figure 20).

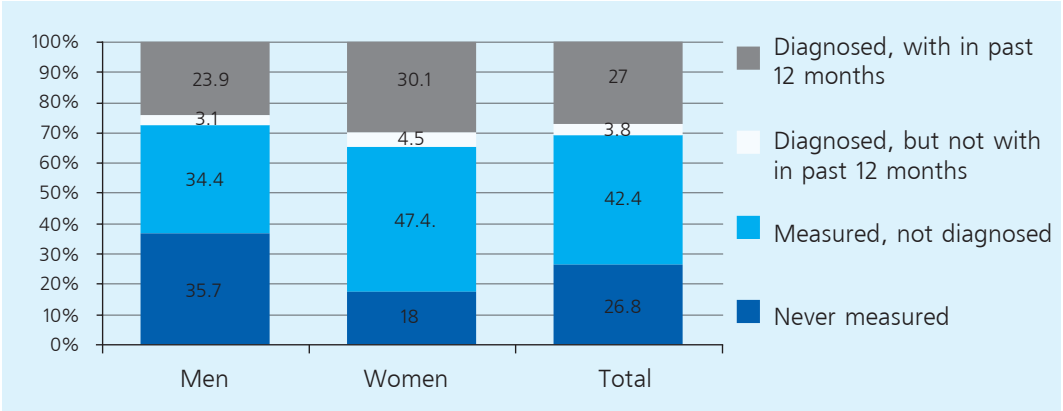
### Conclusions

1. As the survey results demonstrate, 12.4% of the 15-64 year-old population of Mongolia has a past history of cardiovascular diseases, and one in every ten persons was taking aspirin to prevent or treat heart disease. The prevalence of CVD and aspirin use among the study population increased with age.
2. The percentage of the study population taking statins regularly to prevent or treat heart disease was very low. Only 1.2% of the 15-64 year-old population was currently using statins to prevent or treat heart disease.
3. Among the 15-64 year-old population of Mongolia, one in every five (17.8%) was found as having a cardiovascular disease (CVD) risk ≥30%, including those with existing CVD. The majority of the respondents (92.5%) with a cardiovascular disease (CVD) risk ≥30% or with existing CVD were currently receiving drug therapy and counseling to prevent heart attacks and strokes

### 3.4.3 History of Arterial Hypertension

The percentage of the study population who has never had measured their arterial blood pressure was 26.8% (95%CI 23.5-30.1), 35.7% (95%CI 31.4-39.9) for men, 18.0% (95%CI 15.1-20.9) for women. Among those who have had their arterial blood pressure measured, 42.4% (95%CI 38.2-46.7) have never been diagnosed with raised blood pressure or hypertension; whereas 3.8 % (95%CI 3.0-4.5) have not been diagnosed with raised blood pressure or hypertension in the past 12 months (Figure 21).

**Figure 21.** Study population with arterial blood pressure measured and diagnosed with raised blood pressure or arterial hypertension, by gender




Moreover, among those who have ever had their arterial blood pressure measured, 27.0% (95%CI 24.9-29.2) have been diagnosed by a doctor or other health worker indicating that they have raised blood pressure or arterial hypertension. The percentage of men who have never had their arterial blood pressure measured (35.7%, 9%CI 31.4-39) was statistically significantly higher or almost twice as high compared to women (18%, 95%CI 15.4-20.9). When analyzed by locality, there was no statistically significantly difference observed in this indicator between the urban and rural population (Appendix 1: Table 26).

When the respondents' status of receiving hypertension treatment was studied, it was revealed that one in every two persons or 50.7% of the survey respondents were currently taking medication for raised blood pressure. Collated by gender, age groups and locality, there was no statistically significant differences observed in medication use for hypertension treatment (Table 56).

**Table 56.** Population currently on medication for raised blood pressure among those previously diagnosed with raised blood pressure (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 37 | 15.8 | 6-35.5 | 57 | 14.2 | 6.7-27.4 | 94 | 15 | 7.3-28.2 |
| 25-34 | 76 | 22.6 | 13.9-34.5 | 173 | 23 | 16-31.9 | 249 | 22.8 | 17.5-29.3 |
| 35-44 | 138 | 47.0 | 37.7-56.6 | 249 | 45.4 | 37.1-53.8 | 387 | 46 | 40.1-52 |
| 45-54 | 193 | 55.5 | 47.4-63.3 | 318 | 58.6 | 52.8-64.2 | 511 | 57.2 | 52.3-61.9 |
| 55-64 | 136 | 60.2 | 47.9-71.3 | 171 | 71.1 | 60.8-79.6 | 307 | 66.2 | 59.9-71.9 |
| Total | 580 | 49.8 | 44.3-55.3 | 968 | 51.3 | 47.9-54.8 | 1548 | 50.7 | 47.7-53.6 |
| Locality | | | | | | | | | |
| Urban | 258 | 46.0 | 38.7-53.5 | 454 | 51.2 | 46-56.5 | 712 | 48.9 | 43.7-54.2 |
| Rural | 322 | 52.9 | 45.2-60.4 | 514 | 51.4 | 46.8-55.9 | 836 | 52.0 | 48.7-55.3 |

As the data in the above table demonstrate, the medication use for hypertension treatment increased with age. However; when analyzed by gender, this indicator was at a relatively similar level for men and women (Table 56).

Among those who had previously been diagnosed with raised blood pressure or arterial hypertension, 7.8% stated that they had seen a traditional healer. When collated by gender and age groups there were no statistically significant differences observed in this indicator (Table 57).

**Table 57.** Population who sought advice or received treatment from a traditional healer for raised blood pressure among those previously diagnosed with raised blood pressure (by age groups, gender and locality)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| 15-24 | 37 | 3 | 0.4-19.9 | 57 | 7.3 | 2.5-19.6 | 94 | 5.2 | 2-13 |
| 25-34 | 76 | 6.5 | 2.3-16.8 | 173 | 6.5 | 3.7-11.3 | 249 | 6.5 | 3.9-10.8 |
| 35-44 | 138 | 3.3 | 1.3-8.5 | 249 | 5.9 | 2.9-11.8 | 387 | 4.9 | 2.7-8.8 |
| 45-54 | 193 | 6.4 | 2.8-14 | 318 | 11.3 | 7.7-16.4 | 511 | 9 | 6-13.4 |
| 55-64 | 136 | 8.9 | 4.7-16.2 | 171 | 14.8 | 9-23.3 | 307 | 12.1 | 8.3-17.5 |
| Total | 580 | 5.7 | 3.4-9.4 | 968 | 9.3 | 7.2-12 | 1548 | 7.8 | 6-9.9 |

The survey results indicate that 4.2% of respondents who had previously been diagnosed with arterial hypertension were currently taking herbal or traditional remedies for raised blood pressure. When analyzed by gender, age groups and locality, there were no statistically significant differences observed in the current use of herbal or traditional remedy as hypertension treatment (Appendix 1: Table 27).

### 3.4.4 The Mean Arterial Blood Pressure

The mean systolic blood pressure (SBP) was 127.0 (95%CI 125.9-128.0) among the 15-64 year-old population of Mongolia. When collated by gender, the mean SBP was 130 mmHg in men and 124 mmHg in their female counterparts and was statistically significantly higher in men than in women. In regard to the diastolic blood pressure (DBP), the mean value of this indicator was 79.9 (95%CI 79.3-80.4) for the study population, 80.6 (95%CI 79.7-81.5) for men, and 79.2 (95%CI 78.5-79.2)

for women, showing no statistically significantly difference for men and women. When the mean SBP and DBP were analyzed by locality, there was no statistically significant difference observed in these indicators between rural and urban areas (Table 58).

**Table 58.** The mean arterial blood pressure (by gender and locality)

| Indicator | n | SBP, mmHg | | DBP, mmHg | |
|---|---|---|---|---|---|
| | | Mean | 95%CI | Mean | 95%CI |
| Gender | | | | | |
| Men | 2706 | 130 | 128.7-131.4 | 80.6 | 79.7-81.5 |
| Women | 3276 | 124 | 122.7-125.3 | 79.2 | 78.5-79.9 |
| Total | 5982 | 127 | 125.9-128 | 79.9 | 79.3-80.4 |
| Locality | | | | | |
| Urban | 2969 | 126.0 | 124.7-127.2 | 79.5 | 78.7-80.3 |
| Rural | 3013 | 127.9 | 126.3-129.4 | 80.2 | 79.5-81 |

When collated by age groups, the mean arterial blood pressure statistically significantly increased with age (Appendix 1: Table 28).

### 3.4.5 Prevalence of Arterial Hypertension

The prevalence of raised blood pressure or arterial hypertension among the population was 27.5% (95%CI 25.6-29.4). Men had a statistically significantly higher prevalence (30.5%, 95%CI 27.4-33.7) of arterial hypertension compared to that of women (24.5%, 95%CI 22.5- 26.7). Moreover, according to the present study results, there was a statistically significant tendency for arterial hypertension to increase with age. The percentage of men with raised blood pressure or arterial hypertension was 46.3% for the 45-54 year-old age group and 59.9% for the 55-64 year-old age group. However, the difference in this indicator between the age groups was not statistically significant. This pattern is also observed in the prevalence of arterial hypertension among the female respondents. There was no significant difference revealed in the prevalence of arterial hypertension between the urban and rural populations; 26.7% for the urban population, and 28.1% for the rural population. When analyzed by gender, the prevalence of raised blood pressure or arterial hypertension among the urban men was 1.3 times higher than female.

These results indicate that when collated by gender the percentage of men and women with arterial hypertension is statistically significantly different in the urban areas. However, there was no statistically significantly difference in this indicator observed between men and women in the rural areas (Table 59).

**Table 59.** Prevalence of raised arterial pressure (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 795 | 10.2 | 8.1-12.9 | 849 | 4.2 | 3-5.9 | 1644 | 7.3 | 5.9-9.1 |
| 25-34 | 675 | 19.1 | 15.9-22.9 | 860 | 7.8 | 6.1-9.9 | 1535 | 13.4 | 11.5-15.5 |
| 35-44 | 547 | 26.0 | 20.9-31.8 | 734 | 22.1 | 18.9-25.7 | 1281 | 23.9 | 20.9-27.2 |
| 45-54 | 444 | 46.3 | 40-52.7 | 580 | 42.6 | 37.9-47.5 | 1024 | 44.5 | 40.5-48.6 |
| 55-64 | 246 | 59.9 | 49.5-69.4 | 253 | 54.8 | 46.9-62.5 | 499 | 57.4 | 51.6-62.9 |
| Total | 2707 | 30.5 | 27.4-33.7 | 3276 | 24.5 | 22.5-26.7 | 5983 | 27.5 | 25.6-29.4 |
| Locality | | | | | | | | | |
| Urban | 1309 | 30.8 | 26.5-35.4 | 1660 | 22.9 | 20.2-25.7 | 2969 | 26.7 | 24.2-29.4 |
| Rural | 1398 | 30.2 | 25.9-34.8 | 1616 | 26 | 23.2-29.1 | 3014 | 28.1 | 25.5-30.9 |

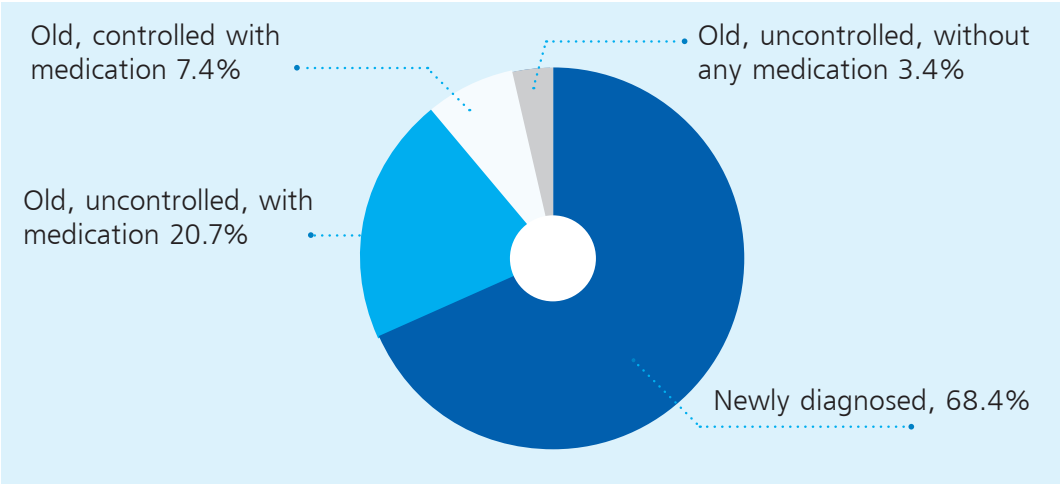
Among those who had raised blood pressure or arterial hypertension, 21.4% of all respondents, 25.2% of men, and 17.6% of women responded that they have not taken any drugs (medication) for raised blood pressure. The percentage of men who have not taken any medication for raised blood pressure was 1.4 times or statistically significantly higher compared to that of women. When analyzed by locality, there was no significant difference detected in medication use for arterial hypertension between the urban and rural population. However, when collated by gender within the urban areas, the proportion of the urban men who have taken medication for raised blood pressure was 1.6 times higher compared to their female counterparts (Table 60).

**Table 60.** Respondents with raised blood pressure or arterial hypertension (excluding people who are currently on medication for raised blood pressure, SBP≥140 and/or DBP≥90 mmHg)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 791 | 9.2 | 7.1-11.4 | 848 | 4.2 | 2.9-5.9 | 1639 | 6.8 | 5.3-8.2 |
| 25-34 | 666 | 18.2 | 14.7-21.7 | 843 | 6.2 | 4.7-8.3 | 1509 | 12.2 | 10.1-14.2 |
| 35-44 | 524 | 23.0 | 17.9-28.0 | 697 | 17.6 | 14.9-20.8 | 1221 | 20.2 | 17.1-23.2 |
| 45-54 | 381 | 37.4 | 30.4-44.4 | 495 | 30.5 | 25.2-36.5 | 876 | 34.2 | 30.0-38.3 |
| 55-64 | 201 | 49.8 | 38.5-61.0 | 195 | 39.2 | 30.9-48 | 396 | 44.7 | 38.2-51.1 |
| Total | 2563 | 25.2 | 21.7-28.7 | 3078 | 17.6 | 15.5-19.8 | 5641 | 21.4 | 19.4-23.4 |
| Locality | | | | | | | | | |
| Urban | 1239 | 25.8 | 21.4-30.8 | 1556 | 15.7 | 12.8-19.2 | 2795 | 20.7 | 18.1-23.5 |
| Rural | 1324 | 24.6 | 19.9-30.1 | 1522 | 19.2 | 16.8-21.9 | 2846 | 22 | 19.3-24.9 |

Among those with arterial hypertension, 68.4% (95%CI 63.4-73) were newly diagnosed or for the first time during the survey. The percentage of the respondents who were diagnosed with arterial hypertension as the result of measurements taken within the framework of the present survey was 73.2% (95%CI 66.7-78) for men, 62.6% ( 95%CI 62.6 - 68) for women. When analyzed by gender and locality, there were no statistically significant differences detected in the percentage of the respondents who were diagnosed with arterial hypertension newly or for the first time (Figure 22, Appendix 1: Table 30).

**Figure 22.** Prevalence composition of arterial hypertension



As the study results demonstrate, among those diagnosed previously with arterial hypertension (N=1350), 71.9% were not on medication for raised blood pressure, 20.7% were on medication, but still had high blood pressure (uncontrolled), and only 7.4% reported to be successfully controlled with medication. Analysis of hypertension control by gender demonstrated that 77% of hypertensive men and 65.6% of hypertensive women were not on medication for raised blood pressure. Only 5.3% of men and 10% of women reported that their blood pressure was successfully controlled with medication. Prevalence of uncontrolled hypertension was high in both sexes, for men and women. When collated by locality, the similar situation was observed in urban and rural areas with no statistically significant difference (Table 61, Appendix 1: Table 29).

**Table 61.** Treatment and control of raised arterial pressure (by gender and locality)

| Indicator | n | % Taking medication, SBP<140 and/or DBP<90 | 95%CI | % Taking medication, SBP≥140 and/or DBP≥90 | 95%CI | % Not taking medication, SBP≥140 and/or DBP≥90 | 95%CI |
|---|---|---|---|---|---|---|---|
| Gender | | | | | | | |
| Men | 707 | 5.3 | 3.1-8.8 | 17.7 | 13.6-22.7 | 77.0 | 70.8-82.2 |
| Women | 643 | 10.0 | 6.9-14.3 | 24.4 | 19.3-30.4 | 65.6 | 58.7-71.9 |
| Total | 1350 | 7.4 | 5.3-10.3 | 20.7 | 17.2-24.7 | 71.9 | 66.7-76.5 |
| Locality | | | | | | | |
| Urban | 663 | 21.9 | 17.2-27.4 | 6.5 | 4.1-10.1 | 71.7 | 64.9-77.6 |
| Rural | 687 | 19.8 | 14.9-25.7 | 8.2 | 5.1-12.8 | 72.0 | 64.3-78.6 |

## Discussion

The percentage of the population who have never had their arterial blood pressure measured declined from 34.5% (95%CI 31-37.9) in 2009 to 26.8% (95%CI 23.6-30.2) in 2013. This pattern was observed for the respondents of all age groups. A comparative analysis indicates that 50.5% (95%CI 47.2-53.7) of men and 34.5% (95%CI 31-37.9) of women previously have had their blood pressure measured in 2009, whereas this indicator declined to 35.7% (95%CI 31.4-39.9) for men and 18.0% (95%CI 15.1-20.9) for women in 2013.

Among those with raised blood pressure the percentage of respondents who have been treated for raised blood pressure with drugs (medication) prescribed by a doctor or other health worker was statistically significantly increased from 38.2% (95%CI 34.5-41.8) in 2009 to 50.7% (95%CI 47.7-53.6) in 2013. In 2009, 33.0% (95%CI 27.9-38.1) of men and 42.2% (95%CI 37.0-47.4) of women were treated for raised blood pressure with medication prescribed by a doctor or other health worker, while this indicator raised to 49.8% (95%CI 44.3-55.3) for men and 51.3% (95%CI 47.9-54.8) for women in 2013.

The above mentioned improvements in early detection, treatment with medication and control of arterial hypertension can be considered as the positive impacts of the public health campaigns and interventions in behavior change communication and early detection conducted within the framework of the MCA-M health project.

As the comparative study results show, there were no statistically significant differences detected between the mean SBP and DBP values in 2009 and 2013; the mean systolic blood pressure was 125.6 mmHg in 2009 vs. 127.0 mmHg in 2013, and the mean diastolic blood pressure was 78.9 mmHg in 2009 vs. 79.9 mmHg in 2013 in the study population. In addition, when collated by gender and locality there were no statistically significant differences observed in these indicators.

Comparing the 2009 and 2013 survey results, the prevalence of arterial hypertension among the study population remained at a similar level (27.3%, 95%CI 24.9-29.8 in 2009 and 27.5%, 95%CI

25.6-29.4 in 2013) with no statistically significant difference. Moreover, when compared with the 2009 survey results no significant difference in the prevalence of arterial hypertension was detected between genders. Among those with arterial hypertension, the percentage of respondents who have not been covered by medicinal treatment or control for raised blood pressure increased from 61.1% (95%CI 56.4-65.8) in 2009 to 71.9% (95%CI 66.7-76.5) in 2013 ($p<0.001$).

When compared with the 2009 level (46.0%, 95%CI 40.8-51.1), the percentage of women who do not use medication for raised blood pressure (46.0%, 95%CI 40.8-51.1) among those women who diagnosed with arterial hypertension increased by 1.4 times, showing a statistically significant difference. In general, medicinal treatment of those with raised blood pressure remains high, did not significantly change compared to the 2009 level.

### Conclusions

1. The percentage of the study population who have never had their arterial blood pressure measured was 26.8% and one in two persons (50.7%) among those diagnosed with arterial hypertension were currently taking medication for raised blood pressure prescribed by a doctor or health worker. Compared to the 2009 level, early detection and medicinal treatment and control of arterial hypertension were improved.
2. Among those previously diagnosed with arterial hypertension, 7.8% has sought advice or care from a traditional healer, and 4.2% received herbal or traditional remedies for raised blood pressure.
3. The mean systolic blood pressure (SBP) was 127mmHg in the 15-64 year-old population of Mongolia, 130 mmHg in men and 124 mmHg in women. Compared to the previous survey results, the mean SBP remained at a relatively similar level with no significant difference. Collated by gender, the mean SBP was statistically significantly higher in men than in women.
4. The prevalence of raised blood pressure or arterial hypertension among the study population was 27.3%. Men had a statistically significantly higher prevalence of arterial hypertension compared to that of women.
5. The percentage of respondents who did not monitor and/or were not taking medication for raised blood pressure remained high irrespective of gender and locality. When compared to the 2009 level, there were no changes detected in treatment and control of arterial hypertension.

## 3.5 DIABETES

The prevalence of diabetes was determined in accordance with widely recognized traditional epidemiological methods. In the present survey the following classification of diabetes was utilized: survey participants with a fasting blood glucose of less than 5.6 mmol/L were classified as healthy; survey participants with a fasting blood glucose between 5.6-6.0 mmol/L were included into the group of people with impaired fasting glucose (IFG); survey participants with a fasting blood glucose greater than 6.1 mmol/L or taking glucose-lowering medication were classified as having diabetes.

### 3.5.1 Mean Blood Glucose Level

The mean fasting blood glucose was 5.0 mmol/L (95%CI 4.8-5.1) in the 25-64 year-old study population, 5.0 mmol/L (95%CI 4.8-5.2) in men, and 4.9 mmol/L (95%CI 4.8-5.0) in women. Although the mean blood glucose appeared to be relatively high in both men and women from the 54-64 year-old age group, the difference was not statistically significant (Table 62).

**Table 62.** Mean fasting blood glucose (by age groups and gender)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95% CI | n | Mean | 95% CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 267 | 4.9 | 4.7-5.1 | 346 | 4.7 | 4.6-4.8 | 613 | 4.8 | 4.7-4.9 |
| 35-44 | 246 | 4.9 | 4.7-5.2 | 318 | 4.8 | 4.7-4.9 | 564 | 4.9 | 4.8-5.0 |
| 45-54 | 199 | 5.0 | 4.8-5.3 | 281 | 5.1 | 4.9-5.2 | 480 | 5.0 | 4.9-5.2 |
| 55-64 | 105 | 5.4 | 5.1-5.7 | 129 | 5.3 | 5.0-5.6 | 234 | 5.4 | 5.1-5.6 |
| Total | 817 | 5.0 | 4.8-5.2 | 1074 | 4.9 | 4.8-5.0 | 1891 | 5.0 | 4.8-5.1 |
| Locality | | | | | | | | | |
| Urban | 385 | 5.1 | 4.3-5.3 | 541 | 5.0 | 4.8-5.1 | 926 | 5.0 | 4.8-5.2 |
| Rural | 432 | 5.0 | 4.8-5.2 | 533 | 4.9 | 4.7-5.0 | 965 | 4.9 | 4.8-5.1 |

When analyzed by locality, the mean fasting blood glucose was 5.0 mmol/L (95% CI 4.8-5.2) in the urban and 4.9 mmol/L (95%CI 4.8-5.1) in the rural study population. There was no statistically significant difference revealed in this indicator between the urban and rural areas. (Table 62).

The prevalence of hidden diabetes or high risk for elevated impaired fasting glucose (IFG) was 8.3% (95%CI 6.0-11.5) among the study population. When collated by gender, the percentage of respondents with impaired fasting glucose (IFG) was 10.0% (95%CI 6.6-14.7) in males, and 6.8% (95%CI 4.7-9.7) in females. As these results show, although there was a slight difference in the percentage of respondents with impaired fasting glucose between men and women, the difference was not statistically significant. Moreover, when analyzed by locality, no statistically significant difference in this indicator was observed between urban and rural areas (Table 63).

**Table 63.** Impaired Fasting Glycaemia (by age groups and gender)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95% CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 267 | 6.9 | 4.1-11.6 | 346 | 6.1 | 2.7-13 | 613 | 6.5 | 3.8-11.0 |
| 35-44 | 246 | 10.6 | 5.5-19.3 | 318 | 4.7 | 2.4-8.8 | 564 | 7.4 | 4.3-12.4 |
| 45-54 | 199 | 10.1 | 5.8-16.9 | 281 | 9.0 | 5.6-14.2 | 480 | 9.5 | 6.6-13.7 |
| 55-64 | 105 | 14.3 | 8.3-23.7 | 129 | 9.7 | 4.6-19.3 | 234 | 11.9 | 7.7-17.9 |
| Total | 817 | 10.0 | 6.6-14.7 | 1074 | 6.8 | 4.7-9.7 | 1891 | 8.3 | 6.0-11.5 |
| Locality | | | | | | | | | |
| Urban | 385 | 7.8 | 4.5-13.1 | 541 | 8.9 | 5.2-14.7 | 926 | 8.4 | 5.2-13.2 |
| Rural | 432 | 11.9 | 6.9-19.5 | 533 | 4.9 | 3.1-7.7 | 965 | 8.3 | 5.2-12.9 |

When collated by locality, there was no statistically significant difference detected in the prevalence of impaired fasting glycaemia (IFG) in the respondents from urban and rural areas. When analyzed by gender the prevalence of impaired fasting glycaemia (IFG) was slightly higher among the rural men and urban women, although the difference was not statistically significant (Table 63).

### 3.5.2 Prevalence of Diabetes

The prevalence of diabetes (raised blood glucose or respondents who are currently on medication for diabetes) was 6.9% (95%CI 4.3-11) in the study population. When collated by gender, the prevalence of diabetes was 7.6% (95%CI 4.0-13.9), in males, and 6.3% (95%CI 4.2-9.3) in females. However, the difference between genders was not statistically significant (Table 64).

**Table 64.** Prevalence of Diabetes (by age groups and gender)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 267 | 6.0 | 1.9-17 | 346 | 4.1 | 1.3-12.1 | 613 | 5.0 | 1.7-13.8 |
| 35-44 | 246 | 7.3 | 3.8-13.7 | 318 | 5.6 | 2.7-11 | 564 | 6.4 | 3.6-11 |
| 45-54 | 199 | 7.4 | 3.2-15.9 | 281 | 7.0 | 4.3-11.2 | 480 | 7.2 | 4.4-11.4 |
| 55-64 | 105 | 13.6 | 6.7-25.9 | 129 | 11.6 | 6.2-20.6 | 234 | 12.5 | 8.1-18.9 |
| Total | 817 | 7.6 | 4.0-13.9 | 1074 | 6.3 | 4.2-9.3 | 1891 | 6.9 | 4.3-11 |
| Locality | | | | | | | | | |
| Urban | 385 | 9.1 | 4.6-17 | 541 | 6.0 | 3.8-9.3 | 926 | 7.5 | 4.7-11.7 |
| Rural | 432 | 6.3 | 1.9-18.9 | 533 | 6.5 | 3.5-12 | 965 | 6.4 | 2.7-14.4 |

As the above table shows, the prevalence of diabetes in different localities was not much different, being at relatively similar level in urban and rural respondents. Nevertheless, although the prevalence of diabetes was slightly higher in urban men, we conclude that the difference is not statistically significant due to overlapping of the variation range of these results (Table 64).

Among the all participants, 1.9% (95%CI 1.2-2.8) responded that they were taking oral glucose-lowering medication for diabetes. Collated by gender there was no statistically significant difference detected; 2.1% (95%CI 1.1-3.9) in men and 1.6% (95%CI 0.9-2.9) in women were currently on glucose-lowering medication for diabetes (Table 65).

**Table 65.** Population who are currently on medication for diabetes (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 275 | 0.1 | 0-0.7 | 355 | 0.0 | 0.0-0.0 | 630 | 0.0 | 0-0.3 |
| 35-44 | 260 | 2.2 | 0.9-5.4 | 322 | 1.0 | 0.3-3.5 | 582 | 1.6 | 0.8-3.2 |
| 45-54 | 209 | 3.1 | 1.2-7.8 | 289 | 2.9 | 1.2-6.6 | 498 | 3.0 | 1.6-5.5 |
| 55-64 | 107 | 2.5 | 0.8-7.1 | 133 | 3.3 | 1.1-9.5 | 240 | 2.9 | 1.4-6.2 |
| Total | 851 | 2.1 | 1.1-3.9 | 1099 | 1.6 | 0.9-2.9 | 1950 | 1.9 | 1.2-2.8 |
| Locality | | | | | | | | | |
| Urban | 406 | 2.4 | 1-5.2 | 554 | 1.3 | 0.6-2.8 | 960 | 1.8 | 1-3.4 |
| Rural | 445 | 1.9 | 0.8-4.8 | 545 | 1.9 | 0.8-4.3 | 990 | 1.9 | 1.1-3.4 |

Moreover, as the above table shows, there were no statistically significant differences observed in the percentage of respondents receiving diabetes treatment between the different age groups and genders (Table 65).

Among those with diabetes and receiving counseling and diabetes treatment advised by a doctor or other health worker, 24% (95%CI 17.8-31.5) were taking glucose-lowering medication for diabetes. The percentage of men taking glucose-lowering medication for diabetes was higher than that of their female counterparts ($p<0.0001$). In particular, 34.8% (95%CI 24.5-46.8) of men and 15.2% (95%CI 9.9-22.7) of women responded that they were currently taking glucose-lowering medication for diabetes. Moreover, 4.4% (95%CI 2.1-8.9) of those with impaired fasting glucose (IFG) and diabetes were on insulin treatment. The percentage of respondents who were receiving insulin treatment was 7.1% (95%CI 2.7-17.3) for men and 2.2% (95%CI 1-5) for women. These results show that collated by gender, the percentage of men currently taking insulin treatment was slightly higher in men than in women. Nevertheless, we conclude that the difference is not statistically significant due to overlapping of the variation range of these results.

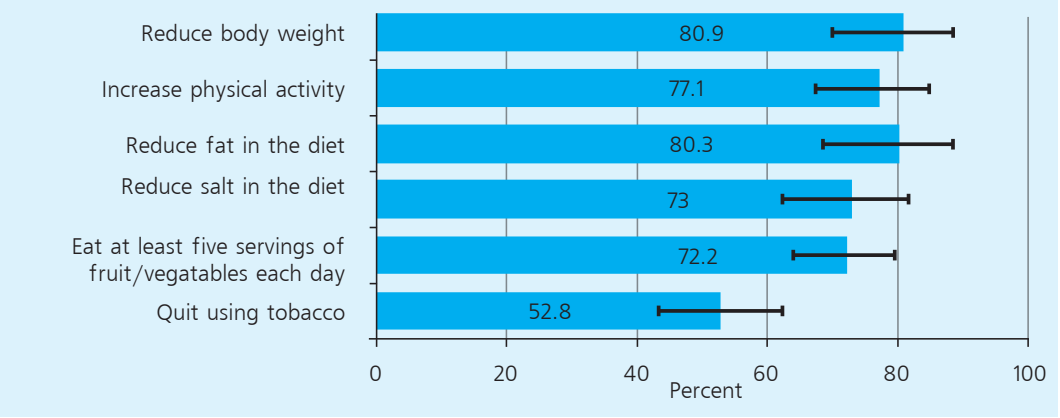
### 3.5.3 Status of people with diabetes involved in counseling

The survey respondents with an impaired fasting glucose (IFG) or those taking glucose-lowering medication for diabetes were asked whether they received counseling on health life styles by a doctor or other health worker.

Among current smokers, 52.8% (95%CI 43.1-62.3) of all smokers, 67.9% (95%CI 54.5-78.9) of male smokers, and 40.9% (95%CI 31.7-50.8) of female smokers received counseling on smoking cessation. As these results show the percentage of current smokers who received counseling on smoking cessation was statistically significantly higher in men than in women. When this indicator was analyzed by locality, there was no statistically significant difference revealed between urban and rural areas. (Appendix 1: Table 31).

Moreover, 72.2% (95%CI 63.8-79.4) of all respondents, 75.1% (95%CI 64.1-83.7) of men, and 69.9% (95%CI 57.7-79.9) of women responded that they received counseling on how to control their salt intake. Among those who had their blood glucose level elevated or currently taking glucose-lowering medication, 73% (95% CI 62.2-81.6) of all respondents, 76.4% (95%CI 61.8-86.6) of men, and 70.3% (95%CI 59.3-79.4) of women received counseling on increasing their fruit and vegetables consumption. The percentage of respondents who received counseling by a doctor or other health worker to control their fat and oil intake was 80.3% (95% CI 68.4-88.5) among all respondents, 85.1 % (95%CI 68.4-93.8) among men, and 76.5% (95%CI 63.4-86) among women. As the results indicate there were no statistically significant differences detected when the percentage of respondents who received counseling on healthy diet was analyzed by gender and locality (Figure 23, Appendix 1: Table 32).

**Figure 23.** Status of respondents with diabetes, receiving lifestyle advices




The survey results demonstrate that 77.1% (95%CI 67.2-84.7) of all respondents, 81.3% (95%CI 68.1-89.9) of men, and 73.7% (95%CI 62.5-82.5) of women reported receiving counseling on increasing the level of physical activity. Among those with diabetes, 80.9% (95%CI 69.8-88.5) of all respondents, 79.4% (95%CI 60-90.8) of men, and 82% (95%CI 71.1-89.4) of women received counseling by a doctor or other health worker on weight loss. Analyzed by locality, there was no statistically significant difference observed in the percentage of respondents who reported receiving counseling on weight loss between urban and rural areas (Appendix 1: Table 33).

### Discussion

The prevalence of diabetes and percentage of people with an impaired fasting glucose (IFG) among the 25-64 year-old population of Mongolia is at a similar level to those of other developing countries worldwide. In the present STEPS survey, the prevalence of diabetes was determined using a

traditional epidemiological method, according to which the survey participants with fasting blood glucose greater than 6.1 mmol/L or currently taking glucose-lowering medication were classified as having diabetes. Nevertheless this traditional epidemiological method is widely used and recognized, there are certain limitations of this method in determining prevalence of diabetes by morbidity status. In order to determine the prevalence of diabetes among the general population, it is recommended using additional diagnostic tests such as oral glucose tolerance test and HbA1c test (also called the glycated hemoglobin test or HbA1c) as well as a fasting blood glucose test.

### Conclusions

1. The mean fasting blood glucose in the study population was 5.0 mmol/L. When collated by age groups, gender, and locality, this indicator was at a relatively similar level for different population groups, with no statistically significant differences.
2. The prevalence of IFG (5.6-6.0 mmol/L) was 8.3 % in the study population, with no statistically significant differences observed when collated by gender and locality.
3. The prevalence of diabetes (with deviated levels of fasting blood glucose or currently taking glucose-lowering medication for diabetes) was 6.9% among the 25-64 year-old population of Mongolia.
4. Among those with elevated fasting blood glucose or currently taking glucose-lowering medication for diabetes, 72.2–80.9% reported receiving counseling by a doctor or other health worker on controlling their salt intake, increasing fruit and vegetable consumption, improving their levels of physical activity, and weight loss; and one in two persons received counseling on smoking cessation.

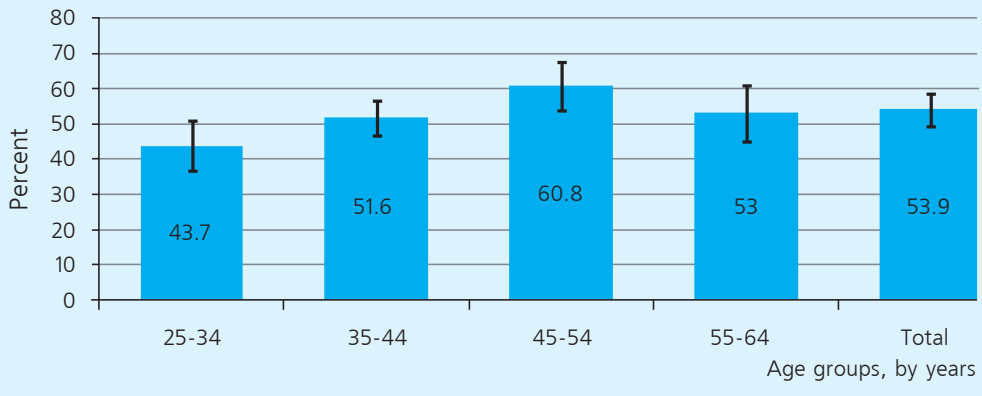
## 3.6 BREAST AND CERVICAL CANCER

The status of early screening of breast and cervical cancer among women was studied and compared and evaluated by age groups and locality.

### 3.6.1 Early Screening of Cervical Cancer

Of the 25-64 year-old female respondents, the percentage of women who have ever had a screening test for cervical cancer was 53.9% (95%CI 49.3-58.4). The proportion of early screening coverage was the highest for the 45-54 year-old women (60.8%, 95%CI 53.8-67.4), and the lowest for the 25-34 year-old women (43.7%, 95%CI 36.8-50.9) (Appendix 1: Table 34, Figure 24).

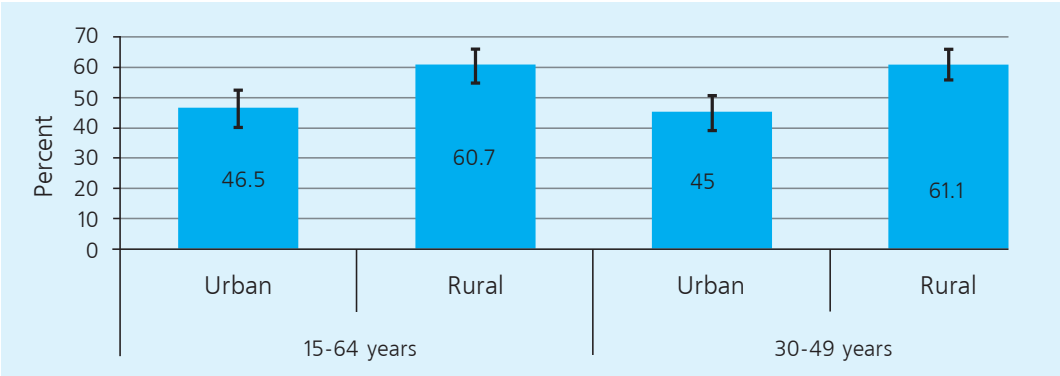
**Figure 24.** Women who have had screening tests for early detection of cervical cancer, by age groups




Analysis of data by age groups demonstrated that among the 30-49 year-old women who are most vulnerable to cervical cancer, early screening coverage was 53.5 % (95%CI 49.1-57.9).

When collated by locality, the percentage of the 15-64 year-old female respondents who have ever had a screening test for cervical cancer was statistically significantly higher for the rural women (60.7%, 95%CI 55.1-66.0) compared to their urban counterparts (46.5%, 95%CI 40.5-52.7) (Appendix 1: Table 35, Figure 25).

**Figure 25.** Women who have had screening tests for early detection of cervical cancer, by age groups and locality

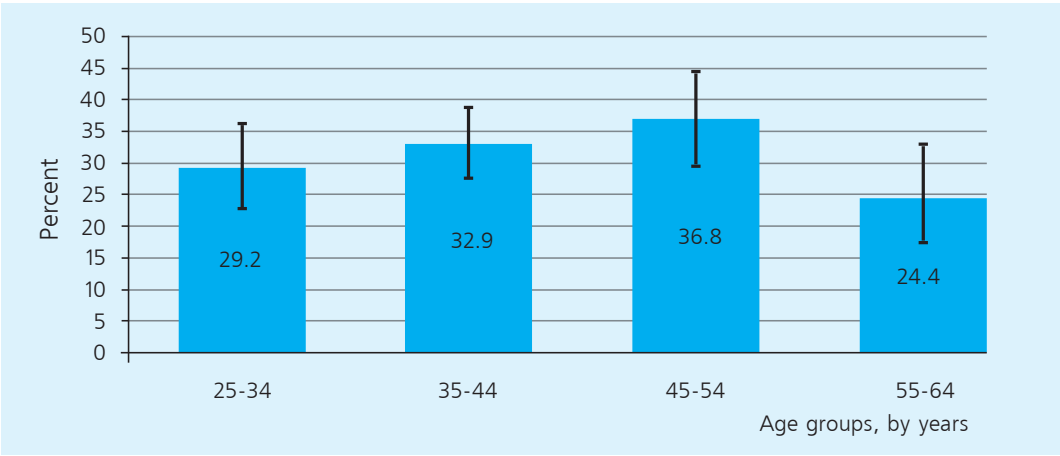



Moreover, as the above figure demonstrates the proportion of cervical cancer screening coverage for the urban women 30-49 year old (age group that is vulnerable to cervical cancer) (45.0%, 95%CI 39.2-50.9) was relatively lower ($p<0.001$) than that of their rural counterparts (61.1%, 95%CI 55.8-66.1) (Figure 25).

### 3.6.2 Early Screening of Breast Cancer

Among all female respondents, 33.1% (95%CI 27.9-38.8) reported that they had had a breast examination by a health care provider. When analyzed by age groups, the percentage of female respondents who had had their breast examined by a doctor or other health care provider was the lowest for the 55-64 year-old women. However, the difference was not statistically significant (Appendix 1: Table 36, Figure 26).

**Figure 26.** Women who have had a breast examination by health care provider, by age groups




The percentage of rural women who have had their breast examined (41%, 95%CI 33.9-48.5) by a health care provider was greater compared to that of urban women (24.6%, 95%CI 19.4-30.8) ($p<0.001$). Moreover, breast cancer screening coverage was 33.8 % (95%CI 28.1-40) among the 30-49 year-old women (Table 66).

**Table 66.** Women who have had a breast examination by health care provider (by age groups and locality)

| Locality | 25-64 year-old women | | | 30-49 year-old women | | |
|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI |
| Urban | 1000 | 24.6 | 19.4-30.8 | 709 | 24.1 | 18.4-31 |
| Rural | 987 | 41.0 | 33.9-48.5 | 745 | 42.3 | 35.0-50.0 |
| Total | 1987 | 33.1 | 27.9-38.8 | 1451 | 33.8 | 28.1-40 |

As shown in the above Table 66, the proportion of the 30-49 year-old women who have had their breast examined by a health care provider was statistically significantly higher in rural areas compared to urban areas. Among all 15-64 year-old female respondents, the percentage of women who have ever had a self breast examination was 53.2%, and there was no statistically significant difference observed between urban and rural areas (Table 67).

**Table 67.** Women who performed self breast examination (by age groups and locality)

| Locality | 25-64 year-old women | | | 30-49 year-old women | | |
|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI |
| Хот | 1000 | 55.7 | 50.7-60.6 | 709 | 55.1 | 49.6-60.5 |
| Хөдөө | 987 | 51.0 | 44.1-57.7 | 745 | 54.3 | 47.5-61.0 |
| Бүгд | 1987 | 53.2 | 48.9-57.5 | 1454 | 54.7 | 50.2-59.1 |

Moreover, 54.7% of female respondents aged 30-49 years have had a breast self examination. When collated by locality there was no significant difference detected in this indicator by urban and rural areas (Table 67).

## Discussion

The percentage of the 15-64 year-old female respondents who have ever had a screening test for cervical cancer has significantly increased from the result of the 2009 'STEPS Survey on the Prevalence of Noncommunicable Disease and Injury Risk Factors' (16.6%) to 53.9% in 2013. It can be concluded that the improvements in cervical cancer early screening coverage was one of the positive impacts of the interventions on early screening of cervical cancer among women in the framework of the health project of the Millennium Challenge Account. However, the 15-24 year-old female respondents were not covered by cervical cancer early screening, which require further attention.

The percentage of the women covered by cervical cancer early screening was significantly higher in rural areas compared to urban areas. These results demonstrate that public health education and interventions on early screening of cervical cancer were efficiently implemented in the rural areas, and participation and motivation of doctors and health care providers from the rural areas were active and effective in cervical cancer early screening.

Comparing the results of the two surveys conducted in 2009 and 2013, the percentage of women who have had their breast examined by health care provider drastically increased from 3.2% in 2009 to 33.1% in 2013. Moreover, the percentage of the 15-64 year-old women who had self breast examination was increased from 36.3 % in 2009 to 53.2 % in 2013. It can be concluded that these improvements in early screening of cervical and breast cancer among women are the positive impacts of the implementation of MCA-M health project.

## Conclusions

1. One in three women have had their breast examined by a health care provider, more than half of the female respondents were covered by early screening tests for cervical cancer.
2. Breast and cervical cancer screening coverage was relatively higher in the rural women

compared to the women from urban areas. The cancer screening coverage has improved since the last survey conducted in 2009, as a result of the implementation of the MCA-M health project.

3. The percentage of the female respondents who had carried out self breast examination was 53.2 %, and there was no statistically significant difference detected in this indicator between urban and rural areas.

## 3.7 BIOCHEMICAL RISK FACTORS

One in three respondents were tested for blood cholesterol, glucose, triglycerides and additionally for LDL and HDL utilizing biochemical methods. The risk assessment of biochemical indicators was conducted based on the biochemical test results. Results of the assessment of blood glucose are presented in the "Diabetes" chapter of the present report. Therefore, in the current section only the results of blood lipid testing are analyzed and discussed.

### 3.7.1 Total Blood Cholesterol

The mean bloodv cholesterol among the study population was 5.1 mmol/L, and analysis by gender showed no statistically significant difference; 5.0 mmol/L in men vs. 5.2 mmol/L in women. When collated by age groups, the mean blood cholesterol in the 25-34 year-old men was lower (4.9 mmol/L) when compared to men aged 55-64 years old ($p<0.001$). A similar trend was observed in women as well; the mean blood cholesterol in the 25-34 year-old women was lower (5.0 mmol/L) when compared to women aged 45-64 years old ($p<0.001$). The mean blood cholesterol levels tended to increase with age in both sexes ($p<0.001$) (Table 68).

**Table 68.** Mean total cholesterol, mmol/L (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 256 | 4.9 | 4.8-5 | 344 | 5.0 | 4.9-5.2 | 600 | 5.0 | 4.8-5.1 |
| 35-44 | 247 | 5.0 | 4.8-5.2 | 310 | 5.3 | 5.1-5.4 | 557 | 5.1 | 5-5.3 |
| 45-54 | 194 | 5.1 | 4.9-5.2 | 278 | 5.3 | 5.2-5.5 | 472 | 5.2 | 5.1-5.3 |
| 55-64 | 96 | 5.2 | 5-5.3 | 129 | 5.3 | 5.1-5.5 | 225 | 5.2 | 5.1-5.4 |
| Total | 793 | 5.0 | 4.9-5.1 | 1061 | 5.2 | 5.1-5.3 | 1854 | 5.1 | 5-5.2 |
| Locality | | | | | | | | | |
| Urban | 390 | 5.0 | 4.9-5.2 | 540 | 5.2 | 5.1-5.4 | 930 | 5.1 | 5.0-5.3 |
| Rural | 403 | 5.0 | 4.9-5.2 | 521 | 5.3 | 5.1-5.4 | 924 | 5.1 | 5.0-5.3 |

The proportion of the population diagnosed with an elevated level of blood cholesterol and taking medication within the past two weeks for raised blood cholesterol prescribed by a doctor or other health worker was 10.3% (95%CI 6.4-16.3). When analyzed by age groups and gender, no significant difference in this indicator was observed between different age groups and genders (Table 69).

**Table 69.** Population who are currently on medication for raised cholesterol (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 9 | 17.8 | 2.4-65.7 | 3 | 0.0 | 0-0 | 12 | 14.0 | 1.9-58 |
| 25-34 | 11 | 39.0 | 11.7-75.5 | 13 | 1.7 | 0.2-13.4 | 24 | 16.9 | 6.6-37 |
| 35-44 | 23 | 6.1 | 1.3-24.4 | 39 | 8.3 | 2.4-24.6 | 62 | 7.4 | 2.8-17.9 |
| 45-54 | 24 | 10.8 | 2.6-35.7 | 61 | 11.2 | 4.7-24.2 | 85 | 11.0 | 5.1-22.4 |
| 55-64 | 21 | 5.2 | 1.4-17.7 | 23 | 23.2 | 8.5-49.5 | 44 | 14.7 | 5.8-32.6 |
| Total | 88 | 10.2 | 4.6-21.2 | 139 | 10.4 | 5.6-18.7 | 227 | 10.3 | 6.4-16.3 |
| Locality | | | | | | | | | |
| Urban | 42 | 17.0 | 6.3-38.7 | 84 | 14.3 | 6.7-27.7 | 126 | 15.5 | 8.4-26.7 |
| Rural | 46 | 2.3 | 0.5-11.0 | 55 | 6.1 | 1.8-18.7 | 101 | 4.5 | 1.6-11.6 |

As shown in the above table the percentage of the population with a raised blood cholesterol and currently taking medication for raised cholesterol was higher in the urban areas. However, the difference was not statistically significant (Table 69).

The percentage of the population with a raised total cholesterol (≥5.0 mmol/L) or taking medication within the past two weeks for raised cholesterol prescribed by a doctor or other health worker was 61.9% (95%CI 55.9-67.9); with the prevalence of 67.3% in women and 56.0% in men. This indicator was relatively high in the 45-54 year-old women compared to that of other age group respondents of the same gender ($p<0.001$) (Table 70).

**Table 70.** Population with raised total cholesterol (≥5 mmol/L), by age groups, gender and locality

| Indicator | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 256 | 49.5 | 39.7-59.3 | 344 | 53.7 | 44.4-62.9 | 600 | 51.6 | 43.1-60.1 |
| 35-44 | 247 | 56.0 | 47.7-64.4 | 310 | 69.0 | 59.4-78.6 | 557 | 62.9 | 54.7-71.0 |
| 45-54 | 194 | 59.4 | 50.6-68.1 | 278 | 72.7 | 64.4-81.0 | 472 | 66.1 | 59.0-73.2 |
| 55-64 | 96 | 58.2 | 47.1-69.3 | 129 | 68.8 | 55.5-82.0 | 225 | 64.1 | 55.4-72.7 |
| Total | 793 | 56.0 | 50.1-62.0 | 1061 | 67.3 | 60.2-74.4 | 1854 | 61.9 | 55.9-67.9 |
| Locality | | | | | | | | | |
| Urban | 390 | 57.8 | 48.7-66.4 | 540 | 66.0 | 53.7-76.5 | 930 | 62.1 | 52.0-71.2 |
| Rural | 403 | 54.5 | 46.6-62.2 | 521 | 68.5 | 59.7-76.1 | 924 | 61.7 | 54.1-68.7 |

The above table presents the gender, age and locality distributions of the respondents with raised total cholesterol. As an analysis by locality suggests, the percentage of the population with raised total cholesterol was at a relatively similar level with no significant difference between the urban and rural areas (Table 70).

In regard to total cholesterol measurement and diagnosis among all respondents, 84.1% reported that their total cholesterol had never been measured; 11.2% measured, but not diagnosed; 1.3% diagnosed with raised total cholesterol, but not within the past 12 months; and 3.4% diagnosed with raised total cholesterol within the past 12 months. The prevalence of the study population who were diagnosed with an elevated blood cholesterol within the past 12 months was likely to increase with age ($p<0.001$) (Table 71).

**Table 71.** Total cholesterol measurement and diagnosis among all respondents (by age groups and locality)

| Indicator | n | % Never measured | 95%CI | % Measured, not diagnosed | 95%CI | % Diagnosed, but not within past 12 months | 95%CI | % Diagnosed within past 12 months | 95%CI |
|---|---|---|---|---|---|---|---|---|---|
| Age Group (years) | | | | | | | | | |
| 15-24 | 1651 | 97.0 | 95.6-97.9 | 2.4 | 1.6-3.7 | 0.3 | 0.1-0.8 | 0.3 | 0.1-0.7 |
| 25-34 | 1540 | 92.4 | 90.4-94 | 6.1 | 4.7-8 | 0.7 | 0.3-1.5 | 0.8 | 0.4-1.7 |
| 35-44 | 1285 | 82.2 | 78.2-85.7 | 12.3 | 9.1-16.3 | 1.6 | 0.9-2.8 | 3.9 | 2.7-5.5 |
| 45-54 | 1034 | 76.1 | 70.5-80.9 | 16.3 | 12.5-20.9 | 1.9 | 1.1-3.4 | 5.8 | 4.1-8 |
| 55-64 | 503 | 75.7 | 70.1-80.5 | 17.6 | 13.7-22.3 | 1.4 | 0.7-3 | 5.3 | 3.1-9 |
| Total | 6013 | 84.1 | 81.4-86.4 | 11.2 | 9.-13.5 | 1.3 | 0.9-2 | 3.4 | 2.8-4.2 |
| Locality | | | | | | | | | |
| Urban | 2993 | 81.7 | 78.1-84.8 | 12.9 | 10.1-16.4 | 1.6 | 0.9-2.6 | 3.8 | 3.1-4.8 |
| Rural | 3020 | 86.2 | 82.5-89.2 | 9.7 | 7.3-12.7 | 1.1 | 0.6-2.0 | 3.1 | 2.1-4.4 |

When the total cholesterol measurement was analyzed by locality, there was no statistically significant difference observed between the urban and rural areas.

Collated by gender, the percentage of men who have never had their total cholesterol measured (87.3%) was statistically significantly higher ($p<0.001$) compared to their female counterparts (80.9%) (Table 72).

**Table 72.** Total cholesterol measurement and diagnosis among all respondents (by age groups and gender)

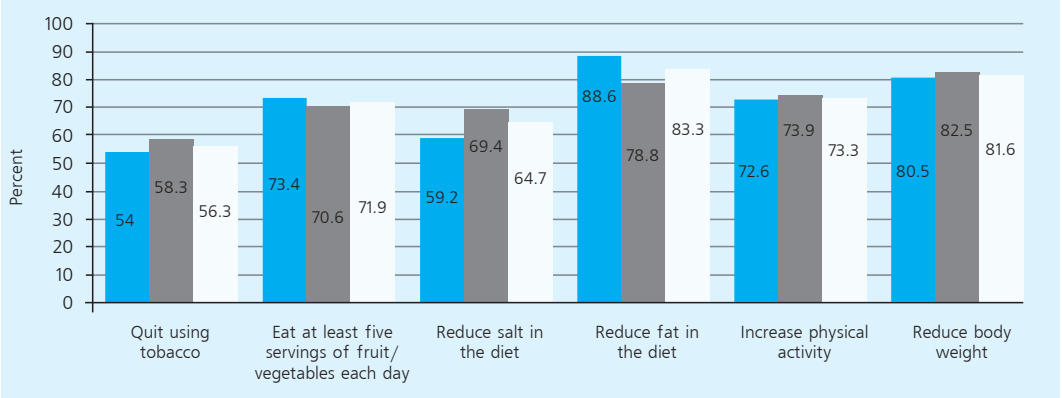
| Age Group (years) | n | % Never measured | 95%CI | % Measured, not diagnosed | 95%CI | % Diagnosed, but not within past 12 months | 95%CI | % Diagnosed within past 12 months | 95%CI |
|---|---|---|---|---|---|---|---|---|---|
| Men | | | | | | | | | |
| 15-24 | 798 | 97.0 | 95.0-98.2 | 2.1 | 1.1-3.9 | 0.5 | 0.2-1.4 | 0.4 | 0.1-1.2 |
| 25-34 | 677 | 94.6 | 92.4-96.2 | 4.2 | 2.9-6.1 | 0.3 | 0.0-2.0 | 0.9 | 0.4-2.0 |
| 35-44 | 548 | 87.1 | 83.2-90.2 | 7.9 | 5.4-11.7 | 1.7 | 0.6-4.6 | 3.3 | 1.8-6.2 |
| 45-54 | 449 | 79.9 | 71.2-86.5 | 13.9 | 9.2-20.4 | 0.9 | 0.3-2.6 | 5.4 | 2.9-9.8 |
| 55-64 | 247 | 78.8 | 70.6-85.2 | 14.8 | 9.6-22.0 | 1.1 | 0.4-3.2 | 5.3 | 2.7-10.0 |
| Total | 2719 | 87.3 | 84.5-89.7 | 8.6 | 6.8-10.7 | 1.0 | 0.5-1.8 | 3.2 | 2.7-10.0 |
| Women | | | | | | | | | |
| 15-24 | 853 | 96.9 | 95.3-98 | 2.8 | 1.8-4.4 | 0.1 | 0-0.5 | 0.2 | 0-0.9 |
| 25-34 | 863 | 90.2 | 87-92.7 | 8.0 | 5.6-11.4 | 1.0 | 0.4-2.6 | 0.7 | 0.3-1.8 |
| 35-44 | 737 | 78.0 | 71.3-83.5 | 16.1 | 10.5-23.7 | 1.5 | 0.7-3.4 | 4.4 | 2.8-7 |
| 45-54 | 585 | 72.0 | 63.3-79.3 | 18.8 | 12.8-26.8 | 3.0 | 1.6-5.5 | 6.2 | 4.2-9 |
| 55-64 | 256 | 72.5 | 64.9-79 | 20.4 | 15-27.2 | 1.8 | 0.6-5.2 | 5.3 | 3-9.4 |
| Total | 3294 | 80.9 | 77.4-83.9 | 13.8 | 11.1-17 | 1.6 | 1.1-2.5 | 3.7 | 2.7-5 |

Moreover, the percentage of women who have had their total cholesterol measured, but not diagnosed with raised cholesterol was higher by 5.2 points compared to that of their male counterparts (Table 72).

Among those who were diagnosed with a raised total cholesterol and received counseling on healthy lifestyles by a doctor or other health worker, 56.3% reported receiving counseling on

smoking cessation, 71.9% on reducing their salt intake, 64.4% on consuming not less than 5 servings of fruit, 83.3% on how to control their fat and oil intake, 81.6% on weight loss, and 73.3% on improving their level of physical activity (Figure 27).

**Figure 27.** Lifestyle advice for population with raised total cholesterol provided by doctors and health care providers




The above figure shows the gender and age distribution of lifestyle advice provided by doctors and health care providers to those respondents with raised total cholesterol. There was no statistically significant difference in these indicators detected between different age groups and genders (Figure 27, Appendix 1: Table 37).

### 3.7.2 Blood Triglyceride Level

Blood triglyceride level is one of the risk factors for cardiovascular diseases and diabetes, and is used as an indicator to evaluate body fat metabolism. Prior to determining the blood triglyceride level, the researchers asked survey respondents whether they had drunk water or any other liquid, or had meals within the past 12 hours and took notes on how they responded. The mean blood triglyceride level in the study population was 1.3 mmol/L (95% CI 1.2-1.4) in all respondents, 1.4 mmol/L in men, 1.2 mmol/L in women. When collated by gender, there was a statistically significant difference observed ($p<0.001$). However, when analyzed by age groups there were no significant differences in the mean fasting triglyceride between the different age groups, being at relatively similar levels (Table 73).

**Table 73.** Mean fasting triglycerides (mmol/L), by age groups, gender and locality

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 248 | 1.4 | 1.2-1.6 | 325 | 1.1 | 1.1-1.2 | 573 | 1.3 | 1.1-1.4 |
| 35-44 | 227 | 1.5 | 1.3-1.7 | 301 | 1.2 | 1.1-1.3 | 528 | 1.4 | 1.2-1.5 |
| 45-54 | 188 | 1.3 | 1.2-1.5 | 264 | 1.3 | 1.2-1.4 | 452 | 1.3 | 1.2-1.4 |
| 55-64 | 97 | 1.3 | 1.1-1.5 | 123 | 1.2 | 1.1-1.3 | 220 | 1.3 | 1.2-1.4 |
| Total | 760 | 1.4 | 1.3-1.5 | 1013 | 1.2 | 1.2-1.3 | 1773 | 1.3 | 1.2-1.4 |
| Locality | | | | | | | | | |
| Urban | 348 | 1.5 | 1.3-1.7 | 497 | 1.3 | 1.2-1.3 | 845 | 1.4 | 1.3-1.5 |
| Rural | 412 | 1.3 | 1.2-1.4 | 516 | 1.2 | 1.1-1.3 | 928 | 1.3 | 1.2-1.3 |

The mean blood triglyceride content was slightly higher ($p<0.01$) in the urban population, particularly in the urban men compared to their rural counterparts (Table 73).

The proportion of the population with an increased blood triglyceride or at risk of increased blood triglyceride level (≥1.7 mmol/L) was 19.6% (95%CI 15.7-23.5) in all respondents, 17.1% in women and 22.4% in men (Table 74).

**Table 74.** Population with raised fasting triglycerides (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 248 | 25.2 | 15.1-35.3 | 325 | 13.3 | 9.3-17.4 | 573 | 19.0 | 13.7-24.4 |
| 35-44 | 227 | 30.8 | 20.5-41.1 | 301 | 17.4 | 10.2-24.6 | 528 | 23.5 | 15.2-31.8 |
| 45-54 | 188 | 14.3 | 9.5-19.1 | 264 | 18.5 | 10.7-26.4 | 452 | 16.4 | 11.5-21.4 |
| 55-64 | 97 | 13.2 | 5.2-21.2 | 123 | 18.7 | 10.3-27.1 | 220 | 16.2 | 10.0-22.4 |
| Total | 760 | 22.4 | 17.1-27.6 | 1013 | 17.1 | 13.3-20.9 | 1773 | 19.6 | 15.7-23.5 |
| Locality | | | | | | | | | |
| Urban | 348 | 28.2 | 19.8-38.5 | 497 | 18.1 | 13.4-24.1 | 845 | 22.8 | 17.0-30.0 |
| Rural | 412 | 18.0 | 14.5-22.1 | 516 | 16.3 | 11.7-22.2 | 928 | 17.1 | 13.5-21.5 |

There were no statistically significant differences observed in the prevalence of increased blood triglyceride or risks of increased blood triglyceride between different age groups and genders. However, when collated by locality and gender, the proportion of the urban men with increased blood triglyceride or at risk of increased blood triglyceride was higher (28.2%) compared to that of their rural counterparts (18.0%) (Table 74).

### 3.7.3 Blood High Density Lipoprotein Level

The mean blood HDL level was 1.3 mmol/L (95% CI 1.3-1.4) in the study population. When collated by gender, the mean blood HDL for the men (1.2 mmol/L) was statistically significantly higher than that for the women (1.4 mmol/L) ($p<0.001$). However, analyzed by age groups, there were no significant differences observed between the different age groups (Table 75).

**Table 75.** Mean blood HDL (mmol/L), by age groups, gender and locality

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 272 | 1.2 | 1.1-1.3 | 346 | 1.4 | 1.4-1.5 | 618 | 1.3 | 1.3-1.4 |
| 35-44 | 255 | 1.2 | 1.2-1.2 | 313 | 1.4 | 1.4-1.5 | 568 | 1.3 | 1.3-1.3 |
| 45-54 | 204 | 1.3 | 1.2-1.3 | 278 | 1.4 | 1.4-1.5 | 482 | 1.3 | 1.3-1.4 |
| 55-64 | 105 | 1.2 | 1.2-1.3 | 132 | 1.5 | 1.4-1.5 | 237 | 1.4 | 1.3-1.4 |
| Total | 836 | 1.2 | 1.2-1.2 | 1069 | 1.4 | 1.4-1.5 | 1905 | 1.3 | 1.3-1.4 |
| Locality | | | | | | | | | |
| Urban | 406 | 1.2 | 1.2-1.3 | 547 | 1.5 | 1.4-1.5 | 953 | 1.3 | 1.3-1.4 |
| Rural | 430 | 1.2 | 1.2-1.3 | 522 | 1.4 | 1.3-1.5 | 952 | 1.3 | 1.3-1.4 |

As presented in Table 75, there was no significant difference in the mean blood HDL between the urban and rural respondents.

A blood HDL level below 1.03 mmol/L in men and below 1.29 mmol/L in women is considered as a risk factor for NCDs, and the prevalence of decreased blood HDL was 30.9% (95%CI 26.1-35.7) in men, and 36.2% (95%CI 26.1-35.7) in women with no statistically significant differences between the different age groups and genders (Table 76).

**Table 76.** Proportion of population with decreased HDL (mmol/L), by age groups, gender and locality

| Indicator | Men (HDL < 1.03 mmol/L) | | | Women (HDL < 1.29 mmol/L) | | |
|---|---|---|---|---|---|---|
| | N | % | 95%CI | N | % | 95%CI |
| Age Group (years) | | | | | | |
| 25-34 | 272 | 31.7 | 24.3-39.1 | 346 | 37.2 | 30.6-43.8 |
| 35-44 | 255 | 32.7 | 23.9-41.5 | 313 | 34.3 | 25.7-42.8 |
| 45-54 | 204 | 30.3 | 20.0-40.6 | 278 | 40.5 | 33.5-47.4 |
| 55-64 | 105 | 22.6 | 12.9-32.3 | 132 | 26.8 | 17.3-36.3 |
| Total | 836 | 30.9 | 26.1-35.7 | 1069 | 36.2 | 31.8-40.6 |
| Locality | | | | | | |
| Urban | 406 | 33.0 | 26.4-40.2 | 547 | 33.9 | 28.3-39.9 |
| Rural | 430 | 29.1 | 23.1-35.9 | 522 | 38.4 | 32.2-45.0 |

Moreover, when collated by locality and gender, the prevalence of a decreased blood HDL was slightly higher among the rural women and urban men. However, the differences were not statistically significant (Table 76).

### 3.7.4 Blood Low Density Lipoprotein Level

The mean blood LDL level was 2.9 mmol/L (95% CI 2.8-2.9) in the study population. When collated by gender, the mean blood LDL was 3.0 mmol/L for the men, 2.8 mmol/L for the women. When collated by age groups, the mean blood LDL of the 45-54 year-old women was statistically significantly higher than that of the 25-44 year-old women. Moreover, this indicator was higher in the 55-64 year-old women compared to the 25-35 year-old women. However, for the men, there were no significant differences observed between the different age groups (Table 77).

**Table 77.** Цусан Mean blood LDL (mmol/L), by age groups, gender and locality

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 272 | 2.9 | 2.8-3 | 346 | 2.5 | 2.4-2.6 | 618 | 2.7 | 2.6-2.8 |
| 35-44 | 255 | 3.0 | 2.8-3.1 | 313 | 2.7 | 2.6-2.8 | 568 | 2.8 | 2.8-2.9 |
| 45-54 | 204 | 3.0 | 2.9-3.2 | 278 | 3 | 2.8-3.1 | 482 | 3.0 | 2.9-3.1 |
| 55-64 | 105 | 3.0 | 2.8-3.2 | 132 | 2.9 | 2.7-3.1 | 237 | 3.0 | 2.8-3.1 |
| Total | 836 | 3.0 | 2.9-3 | 1069 | 2.8 | 2.7-2.8 | 1905 | 2.9 | 2.8-2.9 |
| Locality | | | | | | | | | |
| Urban | 406 | 3.0 | 3.0-3.1 | 517 | 2.8 | 2.7-2.8 | 953 | 2.9 | 2.9-2.9 |
| Rural | 430 | 2.9 | 2.8-3.0 | 522 | 2.8 | 2.7-2.9 | 952 | 2.9 | 2.8-2.9 |

As presented in the above table there was no significant difference with regard to locality, being at a relatively similar level in the urban and rural areas (Table 77).

The proportion of the study population at risk or with a raised blood LDL (≥3.0 mmol/L) was 42.5% (95%CI 39.6-45.5) among the all respondents. When analyzed by gender, the prevalence of an increased blood LDL or risks for an increased blood LDL was statistically significantly higher ($p<0.001$) in men (47.5%) compared to women (37.7%) (Table 78).

**Table 78.** Proportion of population with increased LDL (mmol/L), by age groups, gender and locality

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 272 | 43.4 | 36.1-51.1 | 346 | 24.9 | 19.6-31 | 618 | 34.3 | 29.6-39.5 |
| 35-44 | 255 | 48.1 | 40.4-55.8 | 313 | 34.9 | 27.2-43.5 | 568 | 41.3 | 36.5-46.3 |
| 45-54 | 204 | 48.3 | 40.4-56.3 | 278 | 46.5 | 40-53.1 | 482 | 47.4 | 42.1-52.9 |
| 55-64 | 105 | 52 | 40.8-62.9 | 132 | 44.5 | 32.9-56.7 | 237 | 47.9 | 38.4-57.6 |
| Total | 836 | 47.5 | 43.4-51.7 | 1069 | 37.7 | 34.1-41.4 | 1905 | 42.5 | 39.6-45.5 |
| Locality | | | | | | | | | |
| Urban | 406 | 49.5 | 44.8-54.8 | 547 | 35.7 | 30.4-41.3 | 953 | 42.5 | 38.5-46.5 |
| Rural | 430 | 45.5 | 39.1-52.1 | 522 | 39.6 | 35.0-44.3 | 952 | 42.6 | 38.3-46.9 |

When collated by age groups, the percentage of female respondents with and/or at a risk for elevated blood LDL was higher among the 45-64 year-old women compared to the 25-34 year-old women ($p<0.001$). However, no statistically significant differences were detected between the different age groups in men. In addition, no significant difference was observed in the prevalence of raised blood LDL between the urban and rural areas (Table 78).

## Conclusions

1. The mean blood cholesterol among the study population was 5.1 mmol/L. The percentage of population either with or at risk of raised total cholesterol was 61.9% (95%CI 55.9-67.9). The prevalence of raised total cholesterol increased with age, being relatively high among the respondents aged 45 and above years old.
2. The study respondents who were diagnosed with a raised total cholesterol received sufficient lifestyle advice and counseling by a doctor or other health worker on weight loss, reducing salt intake, controlling fat consumption, physical activity, and smoking cessation.
3. The percentage of the population with an increased blood triglyceride or at risk of increased blood triglyceride level was 19.6%, with no statistically significant differences between the different age groups and genders.
4. The mean blood HDL level was 1.3 mmol/L in all respondents. One in three among the 25-64 year-old population of Mongolia (30.9% of men, 36.2% of women) had a decreased blood HDL, having a greater risk for developing NCDs.
5. The mean blood LDL level was 2.9 mmol/L in all respondents, and the proportion of respondents being at a risk or with a raised blood LDL was 42.5%. The prevalence of an increased blood LDL or risks for an increased blood LDL was relatively high in all men, and 45-64 year-old women.

### 3.7.5 Salt Intake

In addition to the questionnaire to determine knowledge and practices of salt intake among the study population, one-third of the respondents' urine sodium and creatinine content was examined in a single urine sample using the spot urine method.

**The knowledge and practices related to salt intake among the study population:** In order to evaluate the knowledge and practices related to salt intake among the study population, the respondents were interviewed using specific instrument questions. In particular, the respondents were asked whether they add salt to their food before eating or as they are eating, add salt to their food when cooking or preparing meals at home, or use processed foods that are high in salt.

The percentage of respondents who always or often add salt to their food before they eat or as they are eating was 5.8% (95%CI 4.1-7.5) in the study population. When analyzed by gender, there was no significant difference observed in this indicator between men and women (Table 79).

**Table 79.** Population who add salt to their food before eating or as they are eating (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 3.9 | 1.5-6.3 | 853 | 4.6 | 2.5-6.6 | 1651 | 4.2 | 2.4-6.0 |
| 25-34 | 676 | 6.0 | 3.3-8.7 | 860 | 4.9 | 2.8-7.0 | 1536 | 5.4 | 3.7-7.2 |
| 35-44 | 548 | 8.0 | 3.7-12.4 | 737 | 6.7 | 4.0-9.5 | 1285 | 7.4 | 4.6-10.1 |
| 45-54 | 449 | 5.7 | 2.6-8.9 | 584 | 4.4 | 1.4-7.3 | 1033 | 5.1 | 3.1-7.1 |
| 55-64 | 247 | 7.6 | 3.2-12.0 | 256 | 3.9 | 0.8-7.0 | 503 | 5.8 | 2.9-8.6 |
| Total | 2718 | 6.3 | 4.1-8.5 | 3290 | 5.3 | 3.4-7.2 | 6008 | 5.8 | 4.1-7.5 |
| Locality | | | | | | | | | |
| Urban | 1319 | 9.0 | 5.9-13.4 | 1671 | 4.9 | 3.1-7.9 | 2990 | 6.9 | 4.8-9.9 |
| Rural | 1399 | 4.1 | 2.7-6.3 | 1619 | 5.6 | 3.4-9.4 | 3018 | 4.9 | 3.2-7.4 |

As shown in the above table, the percentage of respondents who always or often add salt to their food before they eat or as they are eating was not significantly different between various age groups. When collated by locality, this indicator was at a relatively similar level among all respondents. The percentage of male respondents who always or often add salt to their food before they eat or as they are eating was slightly higher among the urban men (9.0%) compared to that of their rural counterparts (4.1%). However, the difference was not statistically significant (Table 79).

The percentage of all respondents who always or often add salt to their food when cooking or preparing meal at home was 8.0% (95%CI 6.4-9.7), whereas this indicator was slightly higher in women (9.7%) than in men (6.4%). Nevertheless, the difference was not statistically significant due to overlapping of the variation range ($p<0.07$) of these results (Table 80).

**Table 80.** Population who always or often add salt to their food when cooking or preparing meal at home (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 794 | 5.0 | 2.5-7.5 | 853 | 8.8 | 6.3-11.3 | 1647 | 6.8 | 4.9-8.8 |
| 25-34 | 676 | 8.3 | 4.9-11.6 | 861 | 11.0 | 7.9-14.1 | 1537 | 9.6 | 7.3-12.0 |
| 35-44 | 547 | 7.9 | 4.9-10.9 | 737 | 10.5 | 7.4-13.7 | 1284 | 9.3 | 7.0-11.6 |
| 45-54 | 449 | 4.2 | 1.9-6.6 | 585 | 9.1 | 5.8-12.3 | 1034 | 6.6 | 4.6-8.6 |
| 55-64 | 247 | 7.0 | 2.5-11.4 | 256 | 5.6 | 2.4-8.8 | 503 | 6.3 | 3.3-9.2 |
| Total | 2713 | 6.4 | 4.7-8.1 | 3292 | 9.7 | 7.6-11.8 | 6005 | 8.0 | 6.4-9.7 |
| Locality | | | | | | | | | |
| Urban | 1316 | 8.0 | 5.8-10.9 | 1672 | 9.5 | 6.9-12.9 | 2988 | 8.8 | 6.6-11.5 |
| Rural | 1397 | 5.0 | 3.2-7.8 | 1620 | 9.9 | 7.3-13.3 | 3017 | 7.4 | 5.5-9.9 |

When analyzed by age groups and locality, there were no statistically significant differences observed in the percentage of respondents who always or often add salt to their food when cooking or preparing meal at home between the different groups (Table 80).

When the consumption of processed food high in salt was investigated, 15.0% (95%CI 13.5-16.6) of the 15-64 year-old study population reported that they always or often eat processed food products high in salt. Analyzed by gender, there was no statistically significant difference found between men and women. However, consumption of processed food high in salt differed among various age groups (Table 81).

**Table 81.** Population who always or often eat processed food products high in salt (by age groups, gender and locality)

| Age Group (years) | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 21.4 | 17.4-25.5 | 852 | 17.5 | 14.7-20.3 | 1650 | 19.5 | 17.3-21.8 |
| 25-34 | 674 | 19.5 | 14.5-24.5 | 860 | 17.9 | 14.8-21.0 | 1534 | 18.7 | 15.4-21.9 |
| 35-44 | 545 | 20.4 | 15.5-25.3 | 733 | 12.6 | 9.7-15.6 | 1278 | 16.3 | 13.6-19.0 |
| 45-54 | 448 | 10.9 | 7.7-14.1 | 583 | 9.6 | 6.4-12.8 | 1031 | 10.3 | 7.7-12.8 |
| 55-64 | 246 | 7.0 | 3.0-10.9 | 253 | 10.6 | 5.9-15.3 | 499 | 8.8 | 5.8-11.7 |
| Total | 2711 | 16.7 | 14.7-18.8 | 3281 | 13.3 | 11.4-15.3 | 5992 | 15.0 | 13.5-16.6 |
| Locality | | | | | | | | | |
| Urban | 1316 | 21.5 | 18.6-24.8 | 1672 | 16.7 | 13.9-20.0 | 2991 | 19.1 | 16.8-21.6 |
| Rural | 1397 | 12.6 | 10.2-15.6 | 1620 | 10.2 | 7.7-13.3 | 3001 | 11.4 | 9.4-13.8 |

In particular, the percentage of respondents who always or often eat processed food products high in salt was the highest (19.5%) among the 15-24 year-old population, whereas this indicator was the lowest (8.8%) among the 55-64 year-old population (Table 80). In general, consumption of processed food products high in salt was statistically significantly lower among the respondents of both sexes aged 45 and above compared to that of the respondents of both sexes aged 15-44 years old. This difference was more drastically observed among the men.

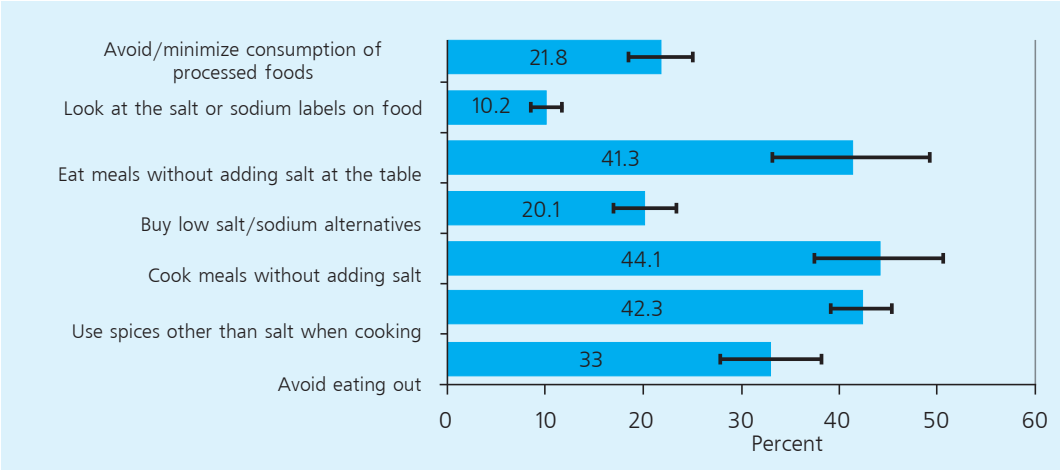
Moreover, when analyzed by locality, consumption of processed food products high in salt was statistically significantly different between the urban (19.1%) and the rural (11.4%) respondents. The above table indicates that consumption of processed food products high in salt was statistically significantly higher in the urban respondents of both sexes compared to their rural counterparts (Table 81).

The survey respondents were asked if they use the following methods on a regular basis in order to control their salt intake:

- Avoid and minimize consumption of processed food products that are high in salt
- Check salt or sodium content on the labels of food products
- Eat meals without adding salt at the table
- Purchase and consume low salt/sodium alternatives
- Cook and prepare meals without adding salt
- Use spices and seasoning other than salt when cook and prepare meals
- Avoid dining out
- Other alternative methods to control your salt intake

The percentage of respondents who regularly use control methods such as not adding salt and use spices and seasoning other than salt when they cook, prepare and eat meals in order to reduce their salt intake was 41.3-44.1% (Appendix1: Table 38, Figure 28)

**Figure 28.** Proportion of population who use control methods for their salt intake

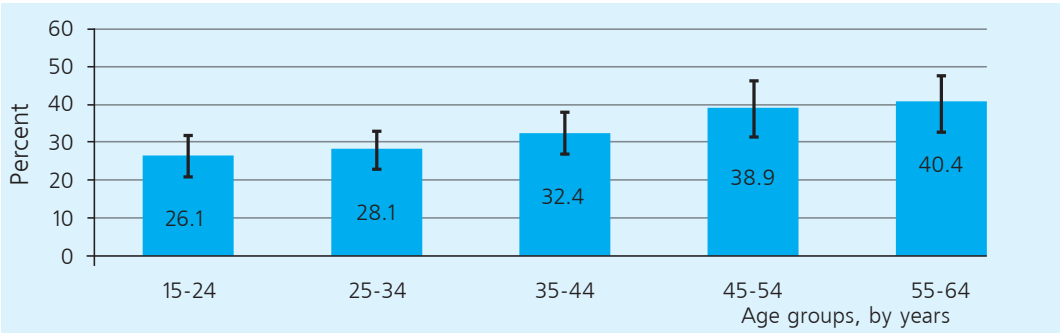



When collated by age groups, gender and locality, there were no statistically significant differences observed in the percentage of respondents who always or often add salt to their food before eating or as they are eating (Appendix 1: Table 38).

**Choose and consume low salt/sodium alternatives:** As presented in the above figure, the positive practices such as choosing and consuming low salt/sodium alternatives (20.1%, 95%CI 16.8-23.4) and checking salt or sodium content on the labels of food products (10.2% 95%CI 8.5-11.8) were insufficient among the study population (Figure 29). When compared by locality and age groups, healthy practices such as choosing and consuming low salt/sodium alternatives and checking salt or sodium content on the labels of food products were at relatively similar low (insufficient) level with no significant difference. However, the data analysis demonstrates that these indicators were statistically significantly higher among women compared to that of their male counterparts. For instance, 12.8% (95%CI 10.3-15.2) of the women and 7.5% (95%CI 6.0-9.0) of the men responded that they look at salt or sodium content on labels when they purchase or consume food products. Whereas, the practices of choosing and consuming low salt/sodium alternatives were at 25.1% (95%CI 21.2-29.1) for women, and 15.0%(95%CI 12.1-17.9) for men.

**Avoid dining out:** The percentage of respondents who avoid dining out in order to control their salt intake was slightly higher in women (37.9%, 95%CI 31.9-43.9) compared to that of their male counterparts (28.2%, 95%CI 23.1-33.2). However, the difference was not statistically significant ($p<0.09$). The practice of avoiding dine-out meals increased with age; this indicator was highest among the 55-64 year-old respondents (40.4%, 95%CI 32.9-47.8) and lowest among the 15-24 year-old respondents (26.1%, 95%CI 20.7-31.6) (Appendix 1: Table 39, Figure 29).

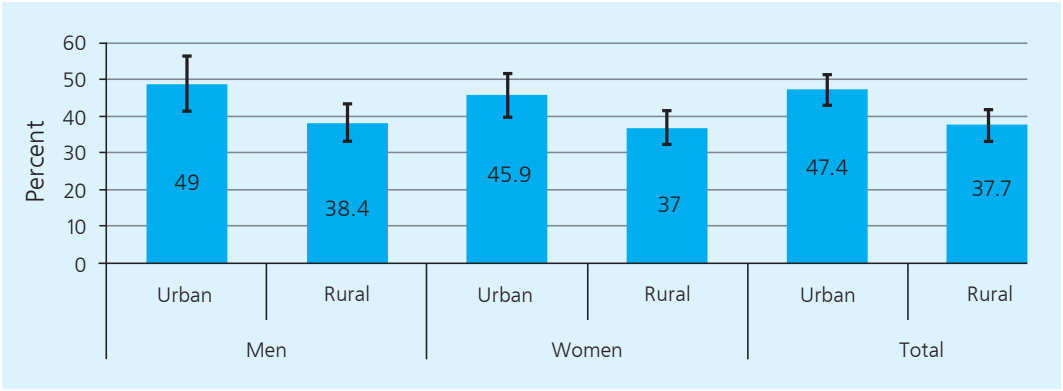
**Figure 29.** Proportion of population who avoid dining out in order to control their salt intake, by age groups



When compared by locality, the percentage of respondents who avoid dining out in order to control their salt intake was at a relatively similar level in urban and rural areas.

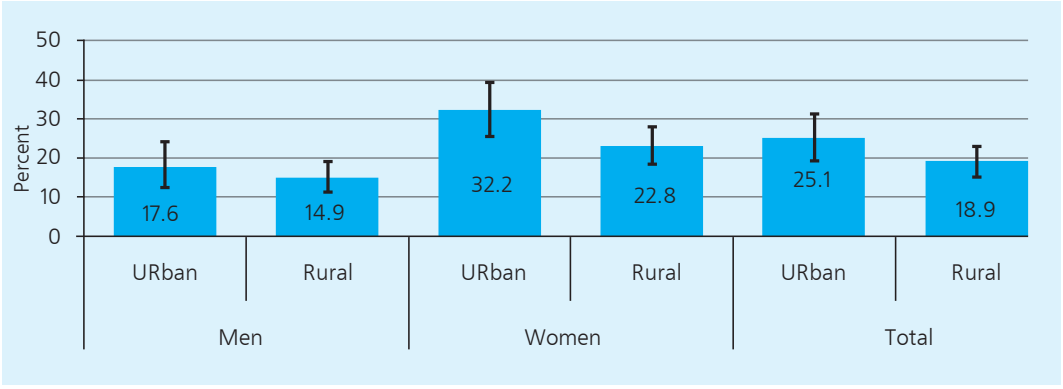
**Use spices and seasoning other than salt when cook and prepare meals:** The percentage of population who use spices and seasoning other than salt when they cook or prepare meals was not different when compared by gender and age groups. However, when analyzed by locality, this indicator was statistically significantly higher in urban respondents compared to their rural counterparts (p<0.001). In particular, the data analysis revealed that 47.4% (95%CI 43.3-51.5) of the urban, and 37.7% (95%CI 33.5-42.1) of the rural population used spices and seasoning other than salt when they cook or prepare meals in order to control their salt intake (Figure 30).

**Figure 30.** Proportion of population who use seasoning other than salt, by locality and gender




**Avoid/minimize consumption of processed food products that are high in salt:** There were statistically significant differences observed when the practices of avoiding/minimizing consumption of processed food products in order to control salt intake were compared by age groups and gender. For instance, 27.3% (95%CI 23.3-31.4) of women and 16.1% (95%CI 12.8-19.5) of men practiced avoiding the use of processed food products to reduce their salt intake (p<0.001). Moreover, when compared by age groups, it was found that 12% (95%CI 8.5-15.5) of 15-24 year-old; 26.4% (95%CI 21.9-30.9) of 45-54 year-old; and 27.7% (95%CI 22.1-33.2) of 55-64 year-old population avoided using of processed food products in order to control their salt intake.

**Figure 31.** Proportion of population who refuse using processed food, by locality and gender

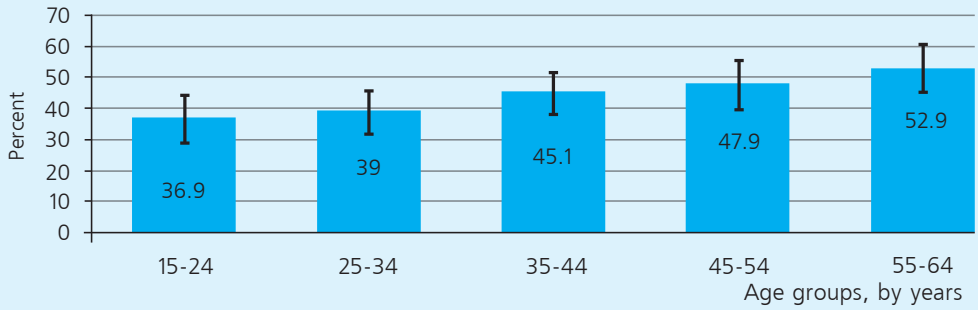



As presented in the above Figure, the practice of avoiding/minimizing the use of processed food products in order to control salt intake was slightly higher in the urban population compared to the rural population. However, due to overlapping of the variation range of these results, the difference could not be considered statistically significant (Figure 31).

**Having meals without adding salt at the table:** There were no statistically significant differences found when the percentage of respondents who do not add salt when they eat meals, was compared by gender and age groups. For instance, as the survey data suggests, 39.3% (95%CI 31.2-47.8) of men and 43.3% (95%CI 35.3-51.6) of women do not add salt when they eat. Moreover, when collated by locality there was no statistically significant difference observed in this indicator between the urban (41.1%, 95%CI 32.3-50.4) and rural (41.4%, 95%CI 29.3-54.7) areas.

**Not adding salt when cook or prepare meals:** The percentage of respondents who do not add salt when they cook or prepare meals was slightly higher among the women (48.1%, 95%CI 41.2-55.0) compared to men (40%, 95%CI 33.1-46.9). However, the difference was not statistically significant. Practicing of this positive behavior statistically significantly increased with age (Figure 32).

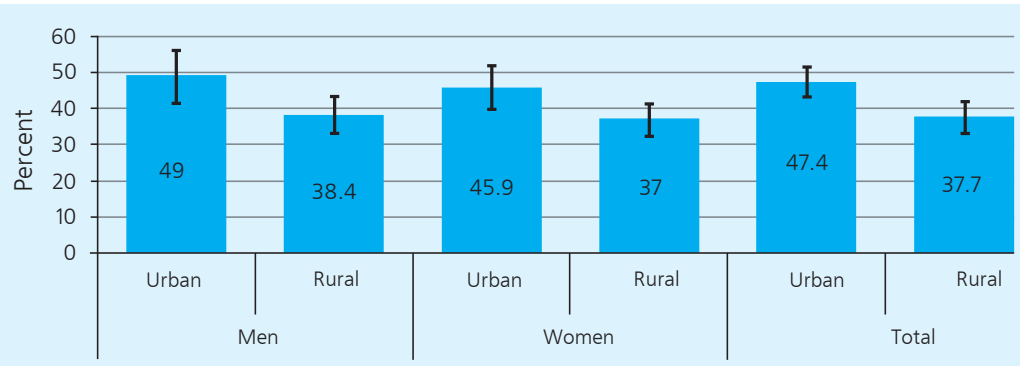
**Figure 32.** Proportion of population who do not add salt when they cook or prepare meals, by age groups




Moreover, analyzed by locality, the percentage of respondents who do not add salt when they cook or prepare meals was at a relatively similar among the urban (41.5%, 95%CI 34.0-49.6) and rural (46.3%, 95%CI 36.3-56.7) respondents.

**Use spices and seasoning other than salt when cook and prepare meals**: Compared by gender, the percentage of population who use spices and seasoning other than salt when they cook or prepare meals was not significantly different between men (43.3%, 95%CI 38.5-48.1) and women (41.2%, 95%ИХ 37.7-44.8). When analyzed by age groups, this indicator was higher among the 15-24 year-old youth (48.5 %, 95%CI 42.7-54.2) compared to that of the 55-64 year old people 38.4%, 95%CI 30.7-46.2. However, the difference was not statistically significant. The below Figure shows that the percentage of population who use seasoning other than salt when they cook or prepare meals in order to control their salt intake was statistically significantly higher in the urban respondents (47.4%, 95%CI 43.3-51.5) compared to their rural counterparts 37.7%, 95%CI 33.5-42.1 (Table 33).

**Figure 33.** Proportion of population who do not add salt when cooking or preparing meals, by gender and locality



In conclusion, it is alarming that the summary of the respondents who use the above-mentioned methods on a regular basis in order to control their salt intake was less than 50% of all respondents.

**Salt intake evaluated by spot urine method:** In the framework of Step-3 of the present survey, the sodium and creatinine concentrations were determined using a second portion of urine sample (following the initial urination voiding upon awakening, but before breakfast) obtained from the 25-64 year-old respondents selected for the third step of the survey. Daily salt intake of the respondents was evaluated utilizing the Kawasaki formula and the sodium and creatinine concentrations determined by the spot urine method.

The mean concentration of urinary sodium determined in a spot urine sample was 132.6 mmol/L (95%CI 125.2-139.9) in all eligible respondents, 139.8 mmol/L (95%CI 131.5-148.1) in men and 125.5 mmol/L (95%CI 117.4-133.5) in women. The mean sodium excretion by a spot urine method was relatively higher in the women, compared to men, although the difference was not statistically significant (Table 82).

**Table 82.** Sodium (Na) concentration in one-time urine sample (mmol/L) by a Spot Urine Method (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 272 | 151.1 | 139.1-163.0 | 342 | 140.5 | 132.5-148.5 | 614 | 145.9 | 137.1-154.7 |
| 35-44 | 255 | 143.5 | 129.7-157.4 | 311 | 130.1 | 119.5-140.7 | 566 | 136.6 | 125.8-147.5 |
| 45-54 | 203 | 130.4 | 121.9-138.9 | 275 | 113.7 | 104.5-122.9 | 487 | 122.2 | 115.5-128.9 |
| 55-64 | 105 | 133.2 | 122.3-144.1 | 132 | 115.8 | 105.6-126.0 | 237 | 123.8 | 116.7-130.8 |
| Total | 835 | 139.8 | 131.5-148.1 | 837 | 125.5 | 117.4-133.5 | 1895 | 139.8 | 131.5-148.1 |
| Locality | | | | | | | | | |
| Urban | 404 | 141.8 | 126.3-157.4 | 544 | 121.9 | 107.4-136.4 | 948 | 131.5 | 117.4-145.6 |
| Rural | 431 | 138.0 | 129.9-146.2 | 516 | 128.9 | 123.1-134.6 | 947 | 133.5 | 128.3-138.8 |

As presented in the above Table, the mean urine sodium concentration statistically significantly decreased with age. Moreover, the mean sodium concentration of urine determined in the spot urine sample was highest for 25-34 year-old respondents, whereas this indicator was lowest for the 45-55 year-old respondents ($p<0.001$). Analyzed by locality, the mean concentration of urinary sodium determined in the spot urine sample was at a relatively similar level, with no significant difference between urban and rural areas (Table 82).

The mean concentration of urinary creatinine determined in the spot urine sample was 123.2 mg/dl (95%CI 117.0-128.5) in all eligible respondents, 139.0 mg/dl (95%CI 132.2-145.7) in men and 101.7 mg/dl (95%CI 98.7-116.7) in women. The mean creatinine concentration in the spot urine sample was statistically significantly lower for women compared to their male counterparts (Table 83).

**Table 83.** Creatinine concentration in one-time urine sample (mg/dl) by Spot Urine Method (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | | | | |
| 25-34 | 272 | 155.8 | 148.0-163.6 | 342 | 128.6 | 118.6-138.7 | 614 | 142.6 | 135.5-149.6 |
| 35-44 | 255 | 140.8 | 126.9-154.8 | 311 | 112.2 | 103.1-121.4 | 566 | 126.1 | 118.9-133.2 |
| 45-54 | 205 | 130.4 | 120.2-140.5 | 276 | 98.9 | 84.4-113.3 | 481 | 114.8 | 105.8-123.8 |
| 55-64 | 105 | 124.0 | 109.5-138.5 | 132 | 75.9 | 68.3-83.5 | 237 | 97.9 | 91.0-104.8 |
| Total | 837 | 139.0 | 132.2-145.7 | 1061 | 101.7 | 98.7-116.7 | 1898 | 123.2 | 117.0-128.5 |
| Locality | | | | | | | | | |
| Urban | 406 | 139.8 | 129.2-150.4 | 545 | 110.8 | 95.5-126.2 | 951 | 124.8 | 117.4-132.2 |
| Rural | 431 | 138.2 | 129.5-146.9 | 516 | 104.7 | 96.2-113.1 | 947 | 121.7 | 114.6-129.2 |

The mean creatinine concentration in the spot urine sample statistically significantly decreased with age. The above Table shows that the mean creatinine concentration in the spot urine sample was highest for 25-34 year-old respondents, whereas this indicator was lowest for the 55-64 year-old

respondents (p<0.001). Moreover, when collated by locality, the mean concentration of urinary creatinine determined in the spot urine sample was at a relatively similar level with no significant difference between urban and rural areas (Table 83).

## Discussion

Salt intake is directly correlated to arterial hypertension. Therefore restriction of salt intake lowers blood pressure in hypertensive patients. Moreover, salt intake plays a critical role in increasing effectiveness of antihypertensive medications, and reducing the risks for cardiovascular diseases.

In addition to Mongolian traditional culture of having tea with salt, consumption of processed food products with high content of hidden salt is becoming more and more common among the population. According to the 'Knowledge, Attitudes and Practices related to Non-communicable Diseases among Mongolian General population – 2013' Survey Report, the knowledge about hidden salt intake was insufficient and more than half of the survey population aged 15-64 years old had no proper knowledge about the salt content of some commonly used food products such as white bread, ketchup and fried potatoes. The survey results suggest that four in ten respondents had no knowledge about high salt content in fried potatoes, and over a quarter of all respondents (26.4%) described meals as too salty when dining out and one in every ten respondents (10.6%) stated that they always or often added salt when they eat or cook their meals.

'Salt Intake of the Population – Reduce Approach, Mongolia 2011' Survey results revealed that the average daily salt intake in the 25-64 year-old population was 11.1 grams, 2-times higher than the WHO recommendations.

The present survey results are not comparable with the above mentioned survey results due to different methods being utilized for determining salt intake. In the framework of the 'Salt Intake of the Population – Reduce Approach, Mongolia 2011' Survey, urinary sodium was measured and daily salt intake was estimated through a 24-hour urine collection, whereas in the present survey daily salt intake of the respondents was evaluated utilizing the Kawasaki formula and the sodium and creatinine concentrations determined by the spot urine method. A comparative analysis of the two surveys' results was not conducted due to the differences of methods used to evaluate daily salt intake of the respondents.

Dietary salt intake among the Mongolian population did not decrease, staying higher than the WHO recommendations due to insufficient knowledge about health risks of excessive consumption of salt, and the lack of positive attitudes and practices among the population in reducing their salt intake.

## Conclusions

1. The percentage of respondents who always or often add salt to their food before they eat or as they are eating was 5.5%, whereas the percentage of respondents who always or often add salt to their food when cooking or preparing meal at home was 8.0% in the study population.
2. In all respondents, 15.0% always or often had processed food products which have high content of salt. One in five respondents (19.5%) aged 15-24 years old reported that they always or often eat processed food products high in salt.
3. The proportion of population who apply the following simple methods on a regular basis in order to control their salt intake was insufficient; the percentage of respondents who avoid consumption of processed food products that are high in salt was 20.8%, who check and look at salt or sodium content on the labels of food products was 10.2%, and avoid dining out was 33%. Over a half (45.9%-89.8%) of the survey population did not use any methods to reduce their salt intake.
4. The mean sodium and creatinine concentrations in a spot urine sample in the 25-64 year-old Mongolian population were 132.6 mmol/L and 123.2 mg/dl respectively, and these indicators decreased with age.

## 3.8 RESULTS OF THE COMPARATIVE STUDY

The goal of the present 'STEPS Survey on the Prevalence of Non-communicable Disease Risk Factors' was to evaluate the impact of the Integrated National Program on NCD Prevention and Control, and the Health Project of the Millennium Challenge Account of Mongolia (MCAM). Within the framework of this goal, besides determining the prevalence of common risk factors for NCDs and injuries collated by age, gender and locality, a comparative analysis of the 2009 and 2013 results was conducted. (Table: Results of Comparative Study of the Prevalence of Non-communicable Disease Risk Factors).

### 3.8.1 Results of Comparisons in the Prevalence of Primary Modifiable NCD Risk Factors

#### Tobacco Use

The prevalence of current smoking in the survey population was 27.1% (95%CI 25.2-29) which is at a relatively similar level with the results of the 2009 survey (27.7%; 95%CI 26.0-29.4). Collated by gender, there were no significant changes observed between the two surveys: 48.0% (95%CI 44.5-51.5) in 2009 vs. 49.1% (95%CI 46.5-51.8) in 2013 for men, and 6.9% (95%CI 5.2-8.5) in 2009 vs. 5.3% (95%CI 4.0-7.0 in 2013 for women.

In terms of the frequency of smoking, the percentage of daily smokers also remained stable (24.3%; 95%CI 22.9-25.7 and 24.8%; 95%CI 23.0-26.8). However, when collated by age groups, the percentage of daily smokers among the young 15-24 year-old smokers (10.7%, 95%CI 8.6-13.2) decreased compared to the 2009 results (16.4%; 95%CI 13.0-19.9).

Among smokers, the mean age started smoking (19.7, 95%CI 19.2-20.3) remained at a relatively similar level compared to the 2009 results (19.3, 95%CI 18.9-19.6). Analyzed by gender, there were no statistically significant differences observed in the mean age when smokers started smoking for both sexes during the period between the two surveys.

The average duration of smoking among smokers increased from 15.8 years (95%CI 14.9-16.7) in 2009 to 20.5 years (95%CI 19.5-21.5) in 2013. This increase occurred mostly among men. The average duration of smoking among male smokers increased from 16.1 years (95%CI 15.1-17.0) in 2009 to 21.2 years (95% CI 20.2-22.1) in 2013.

The percentage of current smokers who use manufactured cigarettes increased from 84.6% (95%CI 78.8-90.395.2%) in 2009 to 95.2% (95%CI 90.5-97.6) in 2013 indicating that the use of manufactured cigarettes among smokers became more popular during the period between the two surveys. In particular, manufactured cigarette consumption among rural smokers (90.6%; 95%CI 81.7-95.4) significantly increased compared to the 2009 level (71%; 95%CI 61.1-80.8).

The mean amount of tobacco used per day (10.0 cigarettes, 95%CI9.2-10.8) slightly increased compared to the 2009 result (8.7 cigarettes; 95%CI 7.8-9.6), although the difference was not statistically significant.

Exposure to second-hand smoke at home remained stable at a relatively similar level (40.9%, 95% CI 37.9-44) compared to the previous survey result (42.9%; 95%CI 38.4-47.3). However, the percentage of respondents who reported being exposed to second-hand smoke at work declined from 35.6% (95%CI 31.1-40.1) in 2009 to 25.5% (95%CI 22.7-28.5) in 2013.

#### Alcohol consumption

In order to compare the previous 'STEPS Survey on the Prevalence of Non-communicable Disease Risk Factors -2009' survey results, the alcohol consumption was evaluated by the status of drinking during the past 12 months. The percentage of respondents reporting drinking in the past 12 months slightly increased from 58.5% in 2009 to 64.5% in 2013. However, the difference was not statistically significant. Thus, we conclude that alcohol consumption among the study population

remained at similar levels during the period between the two surveys. Moreover, the percentage of respondents who reported drinking alcohol in the past 30 days remained stable at a relatively similar level compared to the previous survey results: 38.6% in 2013 and 36.3% in 2009.

In terms of the frequency of alcohol use by respondents reporting alcohol drinking in the past 12 months, the proportion of current drinkers who drank 5 or more days a week did not change much in 2013 (0.3%) compared to the 2009 level (0.8%). On average however, the current drinkers consumed more standard drinks (9.0) per occasion compared to the previous 2009 level (7.7). Thus, a comparative analysis of the two surveys' findings demonstrates that the number of standard drinks excessively consumed per drinking occasion or binge drinking among the current drinkers significantly increased during the period between the two surveys ($p<0.001$). However, out of the total number of survey participants, 23.4% (95%CI 28.7-39.6) including 14.8% (95%CI 19.3-28.8) of males and 31.9% (95%CI 38.1-51.0) of females were lifetime abstainers or teetotalers (Tables 19 and 20). In addition, 12.1% (95%CI 5.7-9.1) of the survey respondents reported no alcohol consumption in the past 12 months, and there was no difference by gender with regards to this indicator (Tables 19 and 20).

Nevertheless, there were some positive changes observed in alcohol consumption patterns: the percentage of survey respondents reporting no alcohol consumption in the past 12 months statistically significantly increased from 7.4% in 2009 to 12.1% in 2013.

### Fruit and vegetable consumption

When compared to the previous 2009 survey results, weekly fruit consumption of the survey population, with regard to frequency of fruit and vegetables consumed during a typical week, remained at a similar level with no significant changes. In particular, the frequency of weekly vegetable consumption among the survey respondents remained stable at 4.8 days (95%CI 4.3-5.3) in 2009 and 4.5 days (95%CI 4.2-4.9) in 2013. Similarly, there were no significant changes observed in the frequency of fruit consumed in a typical week between the present (1.1 days, 95%CI 1.0-1.2) and the previous survey findings (1.2 days, 95%CI 1.0-1.3).

Not only did daily fruit and vegetable consumption of the 15-64 year-old survey population not increase, but vegetable consumption decreased. Particularly, daily vegetable consumption of the survey population declined from 1.4 servings per day in 2009 to 1.0 serving in 2013 ($p<0.001$). Moreover, daily fruit consumption of the survey population did not have any positive changes during the period between the last two surveys, staying at the same level in 2013 (0.4 servings, 95%CI 0.4-0.5) with the previous 2009 survey results (0.4 servings, 95%CI 0.4-0.5).

The researchers who conducted the current survey conclude that the main reasons for fruit and vegetable consumption among the Mongolian population remaining low with no positive changes over the past years is the population's common perception of poor quality and safety of imported fruit and vegetables when 60% of annual fruit and vegetable provision are imports. In addition, it is possible that this indicator has been impacted by the time and season of the year when the survey data was collected (May-June, 2013) because the provision of and access to fruit and vegetables significantly declines during spring and summer seasons which in turn raises the price. Thus, we suggest that continuous insufficient consumption of fruit and vegetable among the study population is attributed to a combination of the above-mentioned factors.

The percentage of respondents who consumed less than 5 servings of fruit and vegetables daily increased by 4.1%, from 92.3% (95%CI 88.7-95.8) in 2009 to 96.4% (95%CI 95.3--97.2) in 2013, although the difference was not statistically significant.

### Physical activity

The comparative data proves that the percentage of population engaged in vigorous physical activity had statistically significantly declined compared to the previous 2009 survey results. In particular, this indicator decreased from 80.8% in 2009 to 53.2% in 2013. Correlatively, the proportion of respondents not engaging in vigorous physical activity increased to 66.6% in 2013 compared to the 2009 level of 48.5% ($p<0.001$).

Moreover, according to results of a comparative study, the percentage of the population belonging to the physically inactive group engaging with low levels of physical activity statistically significantly increased from 7.5% in 2009 to 22.3% in the present survey. These alarming negative changes are proven by a decline in the median time spent in physical activity per day decreasing from 342.9 MET minutes in 2009 to 105.7 MET minutes in 2013.

Although the percentage of the population engaged in vigorous physical activity declined compared to the previous 2009 survey results, this indicator is only used to determine the types of physical activity having low impacts on health. Conversely, negative changes such as an increase in the percentage of population belonging to the physically inactive group and a decline in the median time daily spent in physical activity require closer and appropriate attention.

## 3.8.2 Results of Comparisons to Prevalence of Secondary/Intermediate NCD Risk Factors

### Prevalence of overweight and obesity

According to a comparative BMI risk assessment, the mean BMI in the study population statistically significantly increased from 24.6 kg/m$^2$ in 2009 to 25.9 kg/m$^2$ in 2013. Correlatively, the prevalence of population with overweight and obesity also statistically significantly increased from 39.8% in 2009 to 54.4 in the present survey findings. Moreover, the comparative data revealed that the prevalence of population with obesity increased by 7.2% ($p<0.001$) compared to the previous 2009 survey result (12.5%).

### Prevalence of Arterial Hypertension

Comparative study results show that there were no statistically significant differences observed between the mean SBP values in 2009 and 2013; the mean systolic blood pressure was 125.6 mmHg in 2009 vs. 127.0 mmHg in 2013. In regards to the mean diastolic blood pressure, there was a slight increase of 1% between the previous (78.9 mmHg) and the current survey findings (79.9 mmHg) although the difference was not statistically significant.

Comparing the 2009 and 2013 survey results, the prevalence of arterial hypertension among the study population remained at a similar level (27.3%, 95%CI 24.9-29.8 in 2009 and 27.5%, 95%CI 25.6-29.4 in 2013) with no statistically significant difference.

Among those with arterial hypertension, the percentage of respondents who currently were not on medicinal treatment for raised blood pressure statistically significantly increased from 61.1% in 2009 to 71.9% in 2013 ($p<0.001$).

Moreover, the percentage of respondents with efficiently controlled blood pressure (with SBP and DBP less than 140 mmHg and 190 mmHg respectively) among those diagnosed previously with arterial hypertension and taking medication for raised blood pressure statistically significantly increased from 13.9% in 2009 to 20.7% in 2013. This positive change demonstrates that medicinal control of arterial hypertension has improved in the period between the last two surveys.

### Prevalence of diabetes

The mean fasting blood glucose level in the study population slightly increased from 4.7 mmol/L in

2009 to 5.0 mmol/L in 2013, nevertheless the difference was not statistically significant.

Comparing the 2009 and 2013 survey results, there was a slight decline observed in the prevalence of respondents with higher risks for raised fasting glucose between the previous (9.4%) and current (8.3%) survey findings. However, we conclude that the difference is not statistically significant due to overlapping of the variation range of these results.

Moreover, there was no statistically significant difference found in the prevalence of population with deviated levels of fasting blood glucose or currently taking glucose-lowering medication for diabetes between the previous (6.5%) and the current (6.9%) survey results.

### Blood lipid values

The mean fasting blood cholesterol among the study population increased from 4.4 mmol/L in 2009 to 5.1 mmol/L in 2013. This negative change occurred during the period between the two studies was statistically significant because the variation range of these results were not overlapping.

In addition, the percentage of the population with a raised total cholesterol or currently taking medication for raised cholesterol (61.9%) significantly increased compared to the previous 2009 level (25.0%). Although, the actual reason for this negative change can't be fully explained based on the current survey data only, our research team suggests that the season of the year when the survey data was collected could serve as a contributing factor because of very limited provisions of and access to fruit and vegetables during the spring time.

### Conclusions

1. The prevalence of tobacco use has not steadily decreased and the mean age started smoking became younger. Although alcohol consumption during the past 12 months has not decreased in the study population, the percentage of lifetime teetotalers increased. The frequency of alcohol consumption has increased, and is becoming an issue that requires close attention.
2. Although the mean number of days fruit and vegetables consumed in a typical week did not decrease compared to the 2009 level, daily vegetable consumption of the survey population declined by around 30 percent. The negative changes such as an increase in the percentage of population belonging to the physically inactive group, and a decline in the median time daily spent in physical activity require closer and appropriate attention.
3. The mean BMI in the study population statistically significantly increased in addition to an increase in the prevalence of overweight and obesity by 14.6 percent and the prevalence of obesity by 5.2%. The mean fasting blood cholesterol among the study population increased and correlatively, the percentage of the population with raised total cholesterol or currently taking medication for raised cholesterol significantly increased as well. The above results prove and might contribute to an increase of the prevalence of overweight and obesity among the study population.
4. The prevalence of arterial hypertension among the study population remained stable, with no significant changes. Among those with arterial hypertension, the percentage of respondents who currently were on medicinal treatment for raised blood pressure with efficiently controlled hypertension significantly increased compared to the 2009 level.
5. The mean fasting blood glucose level in the 25-64 year-old population of Mongolia increased slightly, but without a statistically significant difference. Moreover, prevalence of the population with raised fasting blood glucose or currently taking glucose-lowering medication for diabetes remained stable, with no significant changes compared to the 2009 level.

## Mongolia STEPS Surveys on the Prevalence of NCD Risk Factors – 2005, 2009 and 2013

| **Mongolia: Results for adults aged 15-64 years** (incl. 95%CI) | **2005 (N=3411)** | **2009 (N=5438)** | **2013 ОН (N=6013)** |
|---|---|---|---|
| ***Step 1. Tobacco Use*** | | | |
| Percentage who currently smoke tobacco | **26.6%** (23.8 29.4) | **27.6** (26.0–29.4) | **27.1** (25.2-29.0) |
| Percentage who currently smoke tobacco daily | **23.3%** (20.8–25.8) | **24.3** (22.9–25.7) | **24.8** (23-26.8) |
| *Among those who smoke tobacco daily:* | | | |
| Average age started smoking (years) | **20.1** (19.6-20.6) | **19.2** (18.7-19.6) | **19.7** (19.2-20.3) |
| Percentage of daily smokers smoking manufactured cigarettes | **89.9** (78.8-90.3) | **84.6** (78.8-90.3) | **95.2** (90.5-97.6) |
| Mean number of manufactured cigarettes smoked per day (among smokers of manufactured cigarettes) | **10.2** (8.8-12.3) | **8.7** (7.8-9.6) | **10.0** (9.2-10.8) |
| ***Step 1. Alcohol Consumption*** | | | |
| Percentage who consumed alcohol in the past 12 months | **66.9** (64.2–69.5) | **58.5** (54.2-62.7) | **64.6** (60.3-68.6) |
| Percentage who drank on 5 or more days per week in the past 12 months | **0.6** (0.4-0.9) | **0.8** (0.3-1.2) | **0.3** (0.0-0.9) |
| Percentage who drank less than once a month in the past 12 months | - | **62.0** (55.0-69.0) | **58.0** (54.1-61.8) |
| Percentage who consumed alcohol in the past 30 days | - | **38.6** (34.6-42.7) | **36.3** (33.3-39.3) |
| Mean number of standard drinks consumed on a drinking occasion among current (past 30 days) drinkers | - | **7.7** (7.1-8.3) | **9.0** (8.3-9.6) |
| ***Step 1. Fruit and Vegetable Consumption (in a typical week)*** | | | |
| Mean number of days fruit consumed | **1.8** (1.7-1.9) | **1.2** (1.0-1.3) | **1.1** (1.0-1.2) |
| Mean number of servings of fruit consumed on average per day | **0.8** (0.7-0.9) | **0.4** (0.3-0.5) | **0.4** (0.4-0.5) |
| Mean number of days vegetables consumed | **5.7** (5.6-5.8) | **4.8** (4.3-5.3) | **4.5** (4.2-4.9) |
| Mean number of servings of vegetables consumed on average per day | **1.6** (1.5-1.7) | **1.4** (1.2-1.7) | **1.0** (0.9-1.1) |
| Mean number of servings of fruit and vegetables consumed on average per day | **3.2** (3.16-3.24) | **1.8** (1.5-2.2) | **1.5** (1.3-1.6) |
| Percentage who had less than 5 servings of fruit and/or vegetables on average per day | **90.0** (88.3-91.8) | **92.3** (88.7-95.8) | **96.4** (95.3-97.2) |
| ***Step 1. Physical Activity*** | | | |
| Percentage with low levels of activity (defined as < 600 MET-minutes per week) | **7.4** (6.0-8.8) | **7.5** 5.2-9.9 | **22.3** 18.4-26.7 |
| Percentage with high levels of activity (defined as ≥ 3000 MET-minutes per week) | **181.4** (85.7-330.0) | **342.9** (158.6-510.0) | **105.7** (31.4-300.0) |
| Percentage not engaging in vigorous activity | **58.9** (52.3-65.6) | **48.5** (43.3-53.6) | **66.6** (63.4-69.8) |
| **Mongolia: Results for adults aged 15-64 years** (incl. 95%CI) | **2005 ОН** | **2009 ОН** | **2013 ОН** |

| | | | |
|---|---|---|---|
| ***Step 2. Physical Measurements*** | | | |
| Mean Body Mass Index - BMI (kg/m$^2$) | **23.9** (23.7-24.1) | **24.6** (24.3-24.9) | **25.9** (25.7-26.2) |
| Percentage who are overweight (BMI ≥ 25 kg/m$^2$) | **32.4** (30.3-34.4) | **39.8** (37.1-42.5) | **54.4** (52.3-56.6) |
| Percentage who are obese (BMI ≥ 30 kg/m$^2$) | **10.2** (9.0-11.4) | **12.5** (10.8-14.3) | **19.7** (18-21.5) |
| Mean systolic blood pressure - SBP (mmHg) | **124.6** (123.8-125.5) | **125.6** (124.3-126.9) | **127** (125.9-128) |
| Mean diastolic blood pressure - DBP (mmHg) | **76.9** (76.4-77.4) | **78.9** (78.1-79.6) | **79.9** (79.3-80.4) |
| Percentage with raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP) | **28.5** (26.1-30.8) | **27.3** (24.9-29.8) | **27.5** (25.6-29.4) |
| Percentage with raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg) who are not currently on medication for raised BP | **50.4** (45.1-55.8) | **61.1** (56.4-65.8) | **71.9** (66.7-76.5) |
| ***Step 3 Biochemical Measurement: among adults aged 25-64 years (incl. 95%CI)*** | | | |
| Mean fasting blood glucose, including those currently on medication for raised blood glucose (mmol/L)[2] | **4.9** (4.8-5.0) | **4.7** (4.6-4.9) | **5.0** (4.8-5.1) |
| Percentage with impaired fasting glycaemia (with glucose 5.6-6.0 mmol/L) | **10.3** (7.9-12.6) | **9.4** (7.4-11.5) | **8.3** (6.0-11.5) |
| Percentage with raised fasting blood glucose (with glucose ≥6.1 mmol/L) or currently on medication for raised blood glucose | **10.0** (7.7-12.3) | **6.5** (4.5-8.4) | **6.9** (4.3-11) |
| Mean total blood cholesterol (mmol/L) | **4.7** (4.6-4.8) | **4.4** (4.1-4.6) | **5.1** (5.0-5.2) |
| Percentage with raised total cholesterol or currently on medication for raised cholesterol | **23.9** (20.5-27.3) | **41.7** (37.4-46.0) | **61.9** (55.7-67.6) |
| **Prevalence of Combined NCD Risk Factors (among adults aged 15-64 years, incl. 95%CI):**<br>• Current daily smokers<br>• Consuming less than 5 servings of fruit and/or vegetables per day<br>• Low level of physical activity<br>• Overweight (BMI ≥ 25 kg/m2)<br>• Raised BP (SBP ≥ 140 and/or DBP ≥ 90 mmHg or currently on medication for raised BP) | | | |
| Percentage with none of the above NCD risk factors | **3.4** (2.6-4.3) | **3.0** (1.7-4.2) | **1.0** (0.6-1.5) |
| Percentage with 3-5 of the above NCD risk factors, among respondents aged 15-44 years | **15.8** (13.9-17.7) | **19.4** (17.3-21.5) | **28.2** (26.1-30.4) |
| Percentage with 3-5 of the above risk factors, among respondents aged 45-64 years | **53.0** (49.6-56.5) | **53.8** (49.4-58.1) | **53.2** (49.8-56.5) |
| Percentage with 3-5 of the above risk factors, among respondents aged 15-64 years | **23.8** (21.7-25.9) | **26.4** (24.1-28.7) | **36.9** (34.6-39.1) |

[2] including those currently on medication for raised blood glucose

## 3.9 NCD HEALTH CARE

The present Chapter of the report includes information about general health insurance coverage, as well as the health care and services coverage of the study population. The survey results are presented in the following four sections; Health care coverage, Health care utilization, Home care, and Disability.

### 3.9.1 Health care coverage

The majority of the study population (92.1%) was covered by health insurance. The health insurance coverage was 5.6% higher for the women compared to men (p<0.001) (Table 84).

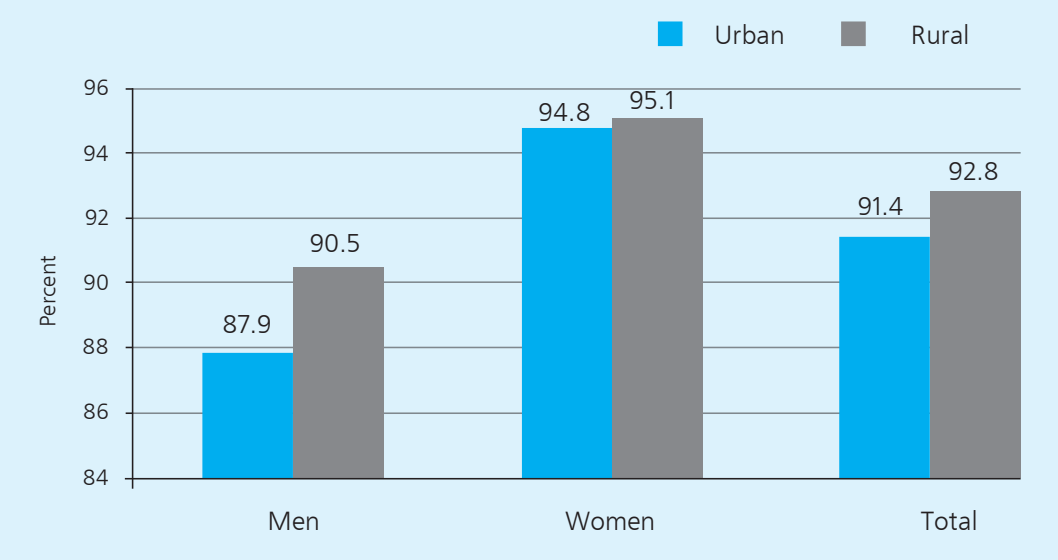
**Table 84.** Health insurance coverage (by age groups and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI | n | Mean | 95%CI |
| 15-24 | 798 | 92.0 | 88.9-95.0 | 853 | 94.9 | 93.0-96.9 | 1651 | 93.4 | 91.1-95.7 |
| 25-34 | 677 | 86.1 | 81.9-90.4 | 863 | 94.7 | 92.7-96.7 | 1540 | 90.5 | 87.6-93.3 |
| 35-44 | 548 | 85.0 | 78.8-91.2 | 737 | 95.1 | 93.1-97.0 | 1285 | 90.4 | 86.7-94.0 |
| 45-54 | 449 | 93.2 | 89.4-97.0 | 585 | 93.8 | 90.2-97.4 | 1034 | 93.5 | 90.1-96.9 |
| 55-64 | 247 | 94.8 | 91.4-98.3 | 256 | 99.4 | 98.4-100.0 | 503 | 97.1 | 95.4-98.9 |
| Total | 2719 | 89.3 | 85.9-92.7 | 3294 | 94.9 | 93.0-96.9 | 6013 | 92.1 | 89.6-94.7 |

Collated by age groups, health insurance coverage was the highest (97.1%) among the 55-64 year-old population. The percentage of respondents covered by health insurance was statistically significantly higher among the women belonging to 25-34 and 35-44 year-old groups compared to their male counterparts of the same age (Table 84).

The health insurance coverage was 92.8% (95%CI 90.4-94.6) for the rural population. Compared by locality, there was no significant difference observed between the urban and rural areas (Appendix 1: Table 40, Figure 34).

**Figure 34.** Health insurance coverage, by age groups and gender



Analyzed by locality and gender, the health insurance coverage was greater for the women compared to their male counterparts, although the difference was not statistically significant.

Among those insured, 92.1% were covered by 'compulsory health insurance' (Table 85).

**Table 85.** Types of health insurance (by age groups)

| Age Group (years) | n | %, Compulsory health insurance | 95%CI | %, Voluntary health insurance | 95%CI |
|---|---|---|---|---|---|
| 15-24 | 1543 | 94.9 | 92.5-97.4 | 5.1 | 2.6-7.5 |
| 25-34 | 1405 | 93.6 | 91.0-96.2 | 6.4 | 3.8-9.0 |
| 35-44 | 1171 | 89.3 | 84.9-93.8 | 10.7 | 6.2-15.1 |
| 45-54 | 975 | 91.6 | 87.6-95.5 | 8.4 | 4.5-12.4 |
| 55-64 | 488 | 98.0 | 96.2-99.8 | 2.0 | 0.2-3.8 |
| Total | 5582 | 92.1 | 89.1-95.2 | 7.9 | 4.8-10.9 |

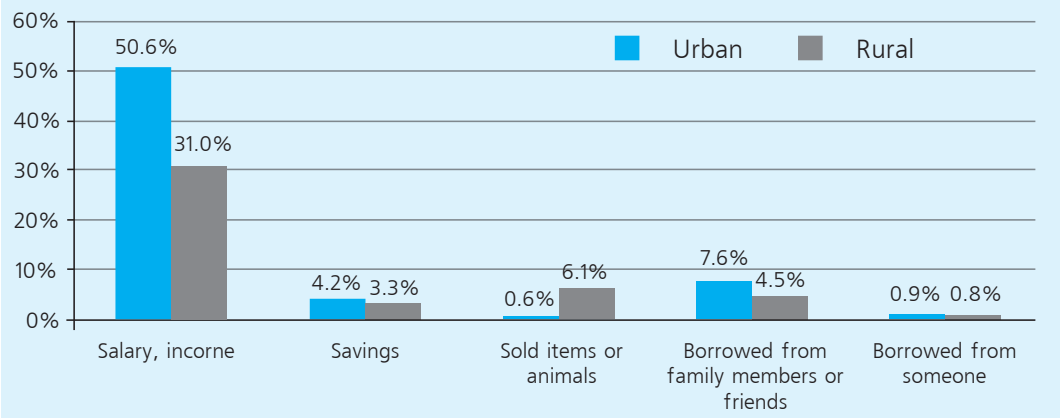
As presented in the above Table 85, 7.9% of the study population was insured by voluntary health insurance. Collated by locality, the voluntary health insurance coverage was slightly higher in the rural population (11.0%, 95%CI 7.0-16.8) compared to the urban population. However, the difference was not statistically significant. Moreover, analyzed by gender there were no statistically significant differences observed in the different types of health insurance coverage between men and women (Table 86).

**Table 86.** Health insurance coverage (by gender and locality)

| Indicator | % Compulsory health insurance | 95%CI | % Voluntary health insurance | 95%CI |
|---|---|---|---|---|
| | | Хот | | |
| Men | 95.0 | 90.3-97.5 | 5.0 | 2.5-9.7 |
| Women | 96.3 | 93.0-98.1 | 3.7 | 1.9 -7.0 |
| Total | 95.7 | 91.9-97.8 | 4.3 | 2.2-8.1 |
| | | Rural | | |
| Men | 88.2 | 82.2-92.4 | 11.8 | 7.6-17.8 |
| Women | 89.8 | 83.8-93.8 | 10.2 | 6.2-16.2 |
| Total | 89.0 | 83.2-93.0 | 11.0 | 7.0-16.8 |

Despite most of the study population being covered by health insurance, 48.7% of those insured had paid their medical costs (counseling, diagnosis, treatment, inpatient care, patient care at home, etc.,) privately, (from their own pocket) in the past 12 months. Among those insured, 40.2% (95%CI 34.0-46.4) paid their medical care costs from their salaries and any other income in the past 12 months (Figure 35, Appendix 1: Table 41).

**Figure 35.** Proportion of population who paid privately for their health care services during the past 12 months, by payment types and locality



The percentage of respondents who paid their health care costs privately, out of their income, was relatively higher among the urban (50.6%, 95%CI 41.5-59.7) respondents compared to their rural counterparts (31%, 95%CI 26.5-35.9) (p<0.001). However, the percentage of respondents who paid their health care costs by bartering or selling their belongings and livestock was statistically significantly greater for the rural population (6.1%, 95%CI 4.9-7.7) compared to the urban population (0.6%, 95%CI 0.2-1.3).

### 3.9.2 Health care utilization

In this Section, the findings and results related to NCD morbidity status and health care coverage of the study population are presented.

Of the all respondents, 17.2% reported having NCDs currently or in the past. When compared by gender, there was no significant difference in the prevalence of NCDs between men and women. However, this indicator differed in various age groups (Table 87).

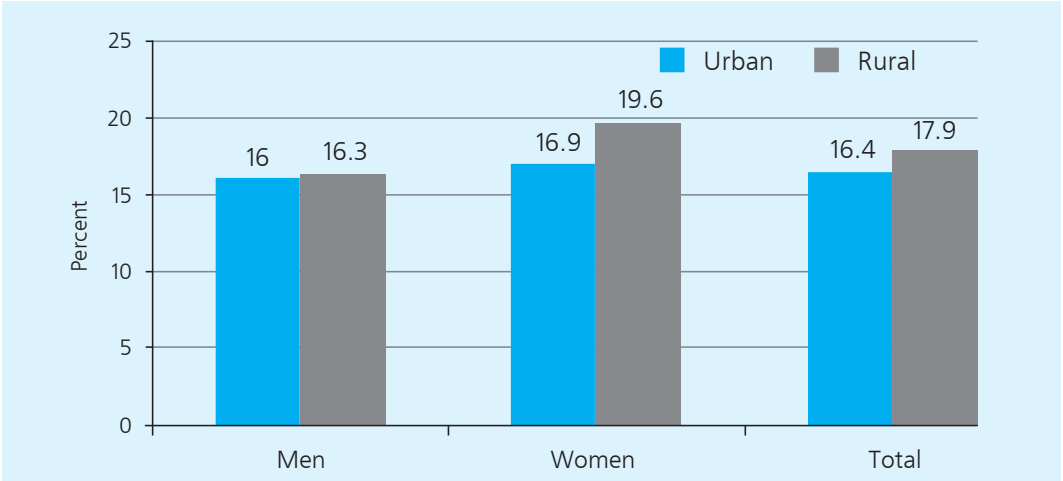
**Table 87.** Population previously and/or currently diagnosed with NCD (by age groups and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| 15-24 | 798 | 3.5 | 1.9-5.2 | 853 | 6.1 | 3.7-8.6 | 1651 | 4.8 | 3.1-6.5 |
| 25-34 | 677 | 6.0 | 3.1-8.9 | 863 | 9.7 | 7.1-12.4 | 1540 | 7.9 | 5.8-9.9 |
| 35-44 | 548 | 15.3 | 10.9-19.6 | 737 | 17.1 | 13.6-20.6 | 1285 | 16.2 | 13.0-19.4 |
| 45-54 | 449 | 25.4 | 20.3-30.5 | 585 | 26.4 | 19.6-33.1 | 1034 | 25.9 | 21.2-30.5 |
| 55-64 | 247 | 36.1 | 28.6-43.5 | 256 | 42.6 | 34.4-50.8 | 503 | 39.3 | 33.4-45.2 |
| Бүгд | 2719 | 16.1 | 13.3-19.0 | 3294 | 18.3 | 15.5-21.2 | 6013 | 17.2 | 14.8-19.6 |

The incidences of CVD, stroke, cancer, chronic respiratory diseases and diabetes increased with age (p<0.0001). For instance, the percentage of NCD incidences was 4.8% for the 15-24 year-old group, 16.2% for the 35-44 year-old group, 25.9% for the 45-54 year-old group, and 39.3% for the 55-64 year-old group, gradually increasing with age (Table 87).

Collated by locality, the incidences of current or past NCDs among the rural population (17.9%, 95%CI 14.9-19.8) was 1.5% higher than that of the urban population (16.4%, 95%CI 13.4-20.0). But, the difference was not statistically significant. The percentage of female respondents with NCDs in both urban and rural areas was slightly higher than their male counterparts (p=0.09) (Appendix 1: Table 43, Figure 36).

**Figure 36.** Proportion of population previously or currently diagnosed with NCD, by gender and locality



Among those who reported having NCDs previously or currently, 39.3% of all respondents, 40.8% of women, 37.5% of men had sought health care from health facilities during the past 30 days (Table 88).

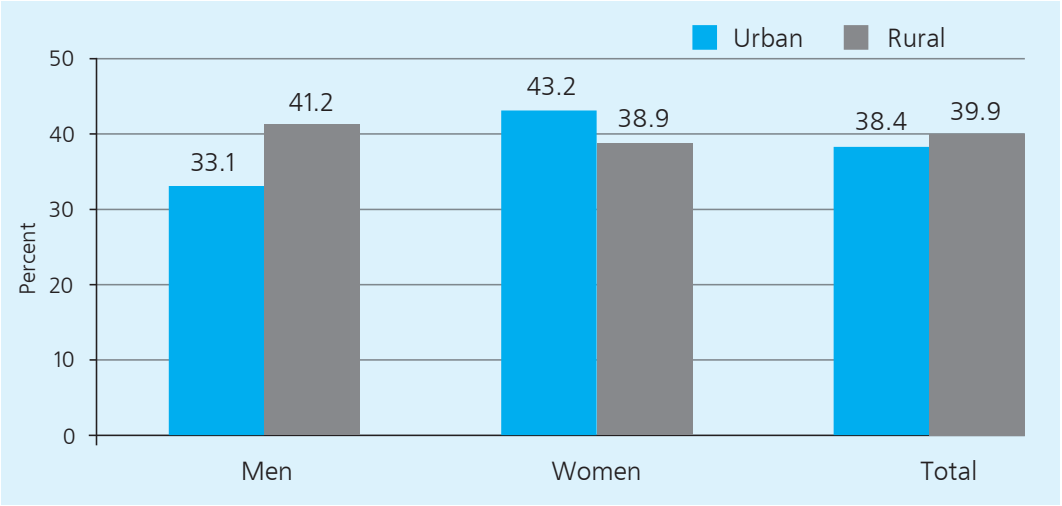
**Table 88.** Population who sought medical care from clinics, hospitals and health care providers (by age groups and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| 15-24 | 31 | 9.8 | 0.0-22.0 | 50 | 31.4 | 12.0-50.8 | 81 | 23.1 | 10.5-35.8 |
| 25-34 | 41 | 29.6 | 5.3-53.8 | 70 | 31.8 | 17.4-46.2 | 111 | 31.0 | 19.5-42.5 |
| 35-44 | 86 | 30.7 | 20.2-41.2 | 120 | 42.3 | 28.3-56.4 | 206 | 37.2 | 27.7-46.7 |
| 45-54 | 109 | 44.2 | 33.8-54.5 | 147 | 41.2 | 31.0-51.3 | 256 | 42.7 | 34.5-51.0 |
| 55-64 | 84 | 40.1 | 27.1-53.1 | 93 | 45.1 | 31.8-58.4 | 177 | 42.8 | 33.0-52.6 |
| Total | 351 | 37.5 | 30.2-44.8 | 480 | 40.8 | 33.9-47.6 | 831 | 39.3 | 33.5-45.0 |

The percentage of respondents who had sought health care from health facilities during the past 30 days increased with age. This indicator was higher for the women belonging to the age groups of 15-24, 25-29, 30-34 years compared to their male counterparts. However, the difference was not statistically significant. Comparing by gender, the percentage of the 45 and above years old respondents seeking health care from health facilities and health care providers was not significantly different between men and women (Table 88).

When collated by locality, the status of seeking medical care due to NCDs was at a similar level between the urban (38.4%, 95%CI 30.9-46.5) and rural (39.9%, 95%CI 32.0-48.4) population, with no significant difference (Appendix 1: Table 44, Figure 37).

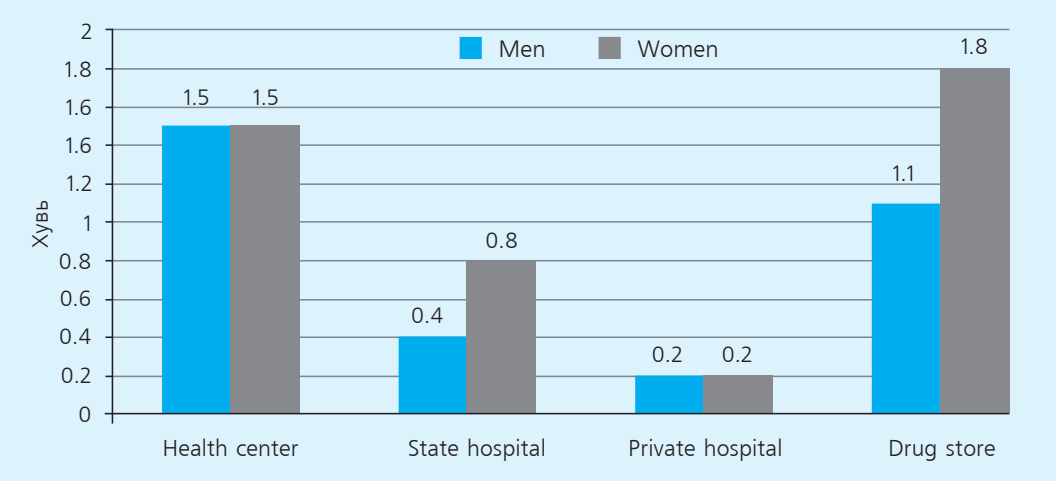
**Figure 37.** Proportion of population who sought medical care from clinics, hospitals and health care providers during the past 30 days, by gender and locality




The percentage of respondents looking for health care and/or services due to NCDs was slightly higher for the urban women (43.2%CI 33.9-53.0) and for the rural men (41.2,95%CI 31.8-51.2), although the differences were not statistically significant (Figure 37).

The mean number of occasions seeking health care from primary health care provider (family clinic or soum health center) and pharmacy during the past 30 days was 1.5 times. There were no incidences reported by the survey respondents seeking care from foreign countries' health care facilities and intensive care units (Figure 38).

**Figure 38.** Mean number of times seeking medical care and services due to NCDs, by gender and types of health organizations




Women more frequently sought care or services from pharmacies (1.8%, 95%CI 1.3-2.4) compared to men (1.1%, 95%CI 0.6-1.6), although the difference was not statistically significant (Figure 38).

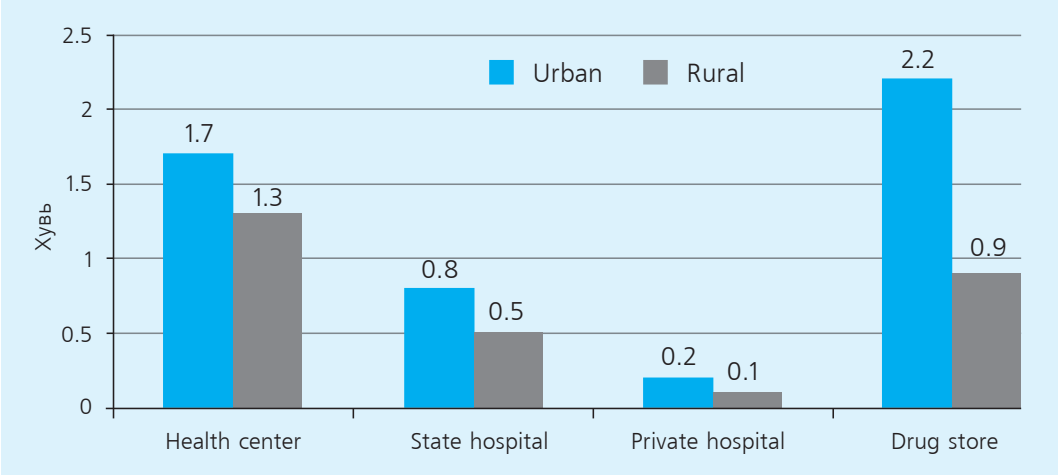
When collated by types of health care providers and age groups, the mean number of times health care and services were sought due to NCDs from primary health care providers (family clinics or soum health center) was relatively high for the 55-64 year-old respondents, whereas the mean number of times health services from pharmacies were looked for was relatively high for the 15-24 year-old young people (p=0.57) (Table 89).

**Table 89.** Mean number of population seeking medical care from health care providers (by age groups and types of health care facilities)

| Age Group (years) | n | Family clinics or Soum health center | | State health organizations | | Private health organizations | | Pharmacies | |
|---|---|---|---|---|---|---|---|---|---|
| | | Mean | 95%CI | Mean | 95%CI | Mean | 95%CI | Mean | 95%CI |
| 15-24 | 18 | 1.6 | 0.5-2.6 | 0.7 | 0.2-1.1 | 0.4 | 0.1-0.7 | 2.9 | 0.0-6.1 |
| 25-34 | 34 | 1.1 | 0.8-1.4 | 0.8 | 0.1-1.6 | 0.1 | 0.0-0.2 | 0.9 | 0.1-1.7 |
| 35-44 | 77 | 1.3 | 0.9-1.7 | 0.5 | 0.3-0.7 | 0.2 | 0.0-0.3 | 1.5 | 0.9-2.1 |
| 45-54 | 116 | 1.5 | 1.2-1.8 | 0.7 | 0.1-1.3 | 0.2 | 0.1-0.3 | 1.5 | 0.9-2.2 |
| 55-64 | 75 | 1.9 | 1.6-2.3 | 0.4 | 0.1-0.7 | 0.1 | 0.0-0.2 | 1.3 | 0.8-1.9 |
| Total | 320 | 1.5 | 1.2-1.7 | 0.6 | 0.3-0.9 | 0.2 | 0.1-0.3 | 1.5 | 1.0-1.9 |

Although the overall average need for health care due to NCDs was higher in the rural population, it was not deemed to be statistically significant (Appendix 1: Table 45, Figure 39).

**Figure 39.** Mean number of times seeking medical care and services due to NCDs, by locality and types of health organizations




However, the frequency of looking for health care and services due to NCDs from pharmacies was statistically significantly higher for the urban respondents (2.2 times, 95%CI 1.4-3.1) compared to the rural respondents (0.9 times, 95%CI 0.5-1.3).

The mean amount of funds spent on medical examinations, check-ups, diagnosis and laboratory tests was 65092.4 MNT, and this indicator was highest (119950.5 MNT) for the 55-64 year-old respondents (Table 90).

**Table 90.** Health care expenditure spent on NCDs during the past 30 days, in MNT (by types of health care and gender)

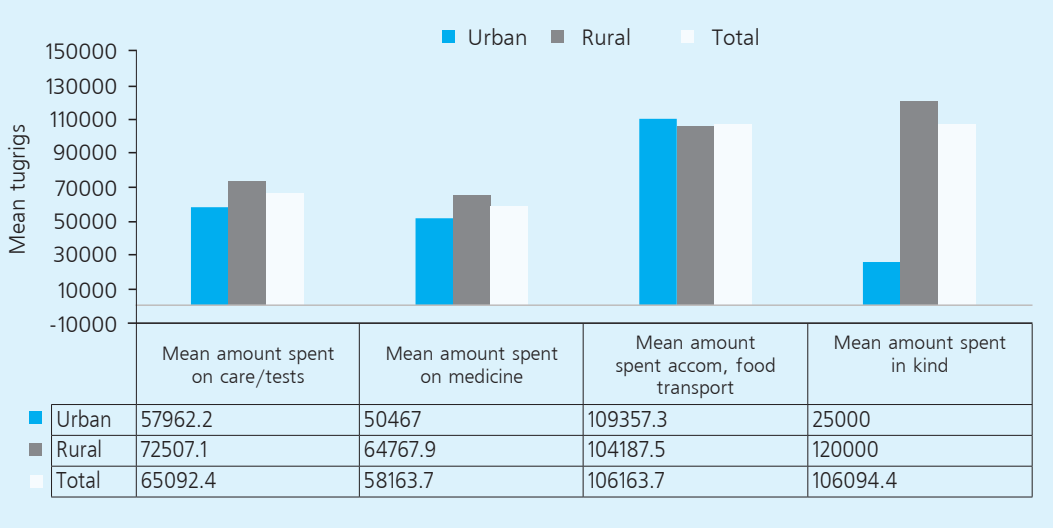
| Health care type | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Amount in MNT | 95%CI | n | Amount in MNT | 95%CI | n | Amount in MNT | 95%CI |
| Examination, diagnosis, and laboratory tests | 19 | 104332.8 | 22466.2-186199.4 | 40 | 42077.1 | 30569.6-53584.6 | 59 | 65092.4 | 32840.1-97344.7 |
| Medication, injections and vitamins | 50 | 63868.1 | 25051.8-102684.4 | 82 | 54179 | 37282.2-71075.9 | 132 | 58163.7 | 39944.5-76382.9 |
| Accommodation, food, and transportation | 11 | 121394 | 25109.6-217678.4 | 16 | 88785.9 | 9660.7-167911 | 27 | 106163.7 | 39012.2-173315.2 |
| Doctors and health workers | 1 | 120000 | 120000-120000 | 1 | 120000 | 120000-120000 | 2 | 106094.4 | 106094.4-106094.4 |

On average, the study population had spent 58163.7 MNT on medications, injections and vitamins due to NCDs in the past 30 days. This indicator was at a relatively similar level for all age groups excluding the 15-24 year-old group.

The mean amount spent whilst seeking health care due to NCDs during the previous 30 days was 106163.7 MNT for accommodation, food and transportation; 106094.4 MNT paid to doctors and other health care providers. The mean amount spent on accommodation, food and transportation was higher for the 35-55 year-old respondents as compared to the remaining age groups.

The mean expenditure on medical examinations, diagnosis and medications was higher for the rural population compared to their urban counterparts, whereas expenditure on accommodation, food and transportation was greater for the urban population as compared to the rural population (Figure 40).

**Figure 40.** Mean expenditure spent on health care due to NCDs during the past 30 days, in MNT




| | Mean amount spent on care/tests | Mean amount spent on medicine | Mean amount spent accom, food transport | Mean amount spent in kind |
|---|---|---|---|---|
| Urban | 57962.2 | 50467 | 109357.3 | 25000 |
| Rural | 72507.1 | 64767.9 | 104187.5 | 120000 |
| Total | 65092.4 | 58163.7 | 106163.7 | 106094.4 |

During the past 12 months, 35.2% of respondents had been provided with in-patient healthcare services in hospitals due to NCDs. Compared by gender there was no significant difference in the percentage of respondents having received in-patient healthcare services between men and women (Table 91).

**Table 91.** Respondents hospitalized due to NCDs during the past 12 months (by age groups and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| 15-24 | 31 | 26.6 | 7.4-45.9 | 50 | 14.6 | 2.3-26.9 | 81 | 19.2 | 10.2-28.3 |
| 25-34 | 41 | 27.4 | 9.3-45.5 | 70 | 19.4 | 9.4-29.5 | 111 | 22.4 | 13.4-31.4 |
| 35-44 | 86 | 16.8 | 8.1-25.5 | 120 | 37.7 | 24.9-50.4 | 206 | 28.5 | 19.0-38.0 |
| 45-54 | 109 | 45.8 | 32.6-59.0 | 147 | 40.5 | 30.9-50.1 | 256 | 43.2 | 33.6-52.8 |
| 55-64 | 84 | 50.1 | 35.1-65.1 | 93 | 27.6 | 17.3-37.9 | 177 | 37.9 | 28.0-47.8 |
| Total | 351 | 36.0 | 27.2-44.8 | 480 | 34.4 | 27.4-41.5 | 831 | 35.2 | 28.7-41.6 |

As presented in the above Table 91, the percentage of respondents having received in-patient healthcare services in hospitals due to NCDs increased with age. For instance, the percentage of respondents hospitalized due to NCDs during the previous 12 months was relatively higher in the 45-64 year-old population as compared to the 15-34 year-old population ($p<0.002$).

Only 19 persons responded that they paid privately from their pocket the costs for their in-patient healthcare due to NCDs during the previous 12 months. They reported that the greater portion of the healthcare costs (196314.9 төгрөг) was spent on accommodation, food and transportation (Table 92).

**Table 92.** Mean expenditure spent on hospital care due to NCDs during the previous 12 months, in MNT (by age groups and expenditure types)

| Age Group (years) | n | % (95%CI) Examination, diagnosis and laboratory tests | n | % (95%CI) Medication, injections and vitamins | n | % (95%CI) Accommodation, food and transportation |
|---|---|---|---|---|---|---|
| 15-24 | | | | | | |
| 25-34 | 1 | 200000 (200000-200000) | 1 | 600000 (600000-600000) | 1 | 280000 (280000-280000) |
| 35-44 | 6 | 63101.1 (28640.4-97561.8) | 6 | 153962.6 (88195.2-219729.9) | 8 | 110636 (-12724.9-233996.8) |
| 45-54 | 7 | 176913.8 (-642.;|00.8-418028.4) | 7 | 68368.1 (32681.7-104054.6) | 8 | 292651.5 (143056.4-442246.6) |
| 55-64 | 5 | 243950 (116222-371678.1) | 5 | 94147.1 (-42843.2-231137.3) | 2 | 107061.3 (93291.3-120831.4) |
| Total | 19 | 136629.3 (19647.4-253611.2) | 19 | 122715.6 (62059-183372.1) | 19 | 196314.9 (102404.6-290225.2) |

The mean expenditure spent on medications, injections and vitamins was highest for the 25-44 year-old respondents, whereas 45-64 year-old respondents spent more on medical examinations and laboratory tests (Table 92).

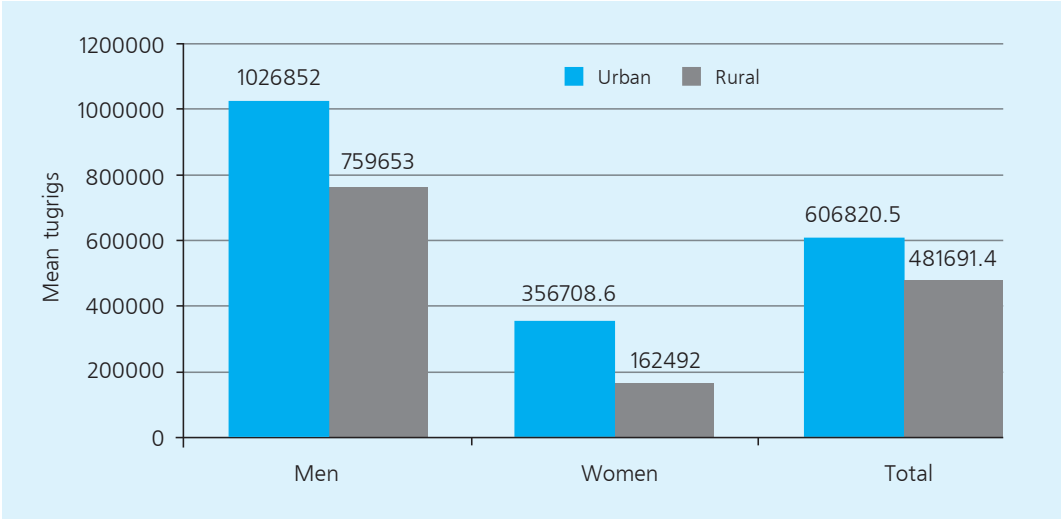
The mean expenditure spent on in-patient care while hospitalized due to NCDs was 525345.3 MNT for all respondents, 832399 MNT (95%CI 376205.3-1288592.6) for the men, and 243888.4 MNT (95%ИХ 132594.1-355182.7) for the women, with men spending statistically significantly more than women (Table 93).

**Table 93.** Mean expenditure spent on hospital care due to NCDs in MNT (by age groups and gender)

| Age Group (years) | Men | | Women | | Both Sexes | | |
|---|---|---|---|---|---|---|---|
| | n | Mean expenditure | n | Mean expenditure | n | Mean expenditure | 95%CI |
| 15-24 | 2 | 265767.1 | 2 | 308835 | 4 | 286364.5 | 190951.4-381777.6 |
| 25-34 | 6 | 689120.8 | 2 | 160189.7 | 8 | 539965.9 | 136128.6-1216060.4 |
| 35-44 | 8 | 289602.3 | 21 | 188776.5 | 29 | 212425.2 | 130893.6-293956.8 |
| 45-54 | 20 | 628749.5 | 21 | 261907.5 | 41 | 494837.6 | 331674.8-658000.3 |
| 55-64 | 13 | 2882250.0 | 11 | 419395.4 | 24 | 1540895 | 59494.7-3141285 |
| Total | 49 | 832399 | 57 | 243888.4 | 106 | 525345.3 | 290536.6-760154 |

The mean expenditure spent on hospital care for men increased with age, and men of all age groups spent more on this category compared to their female counterparts. On average, the urban population spent more (606820.5 MNT) on hospital care compared to the rural population (481691.4 MNT), although the difference was not statistically significant (Appendix 1: Table 42, Figure 41).

**Figure 41.** Mean expenditure spent on hospital care due to NCDs during the past 12 months, in MNT (by gender and locality)




The mean expenditure spent on hospital care due to NCDs during the past 12 months was higher for the men than the women in both urban and rural areas (Figure 41)

### 3.9.3 Home Care

With regard to home care provided to NCD patients, 9.9% of all respondents had received home care from their family or friends during the past 30 days. When compared by gender, there was no statistically significant difference revealed in this indicator between men and women (Table 94).

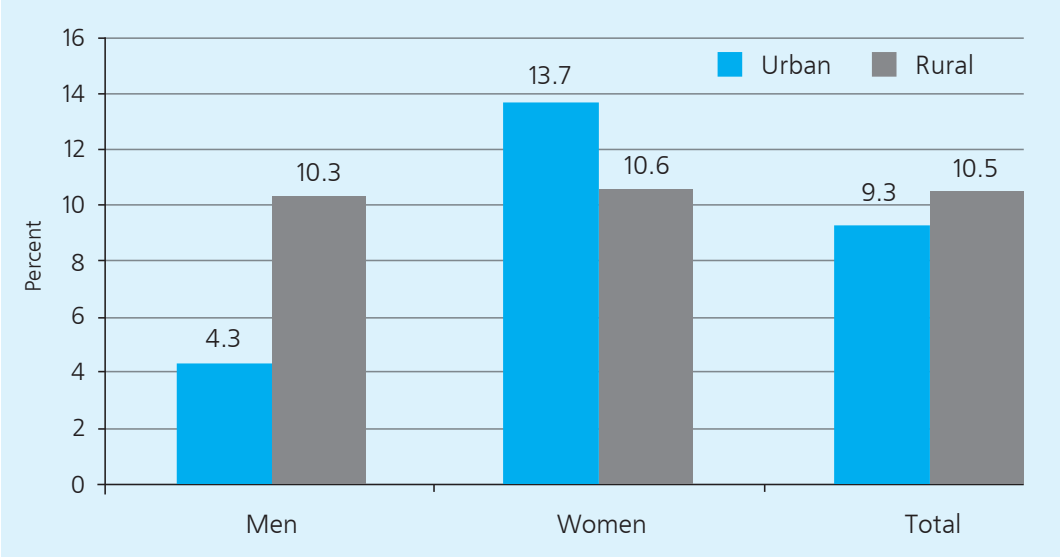
**Table 94.** Home care to NCD patients provided by family members or friends during the past 30 days (by age groups and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| 15-24 | 31 | 0.0 | 0.0-0.0 | 50 | 22.7 | 5.3-40.0 | 81 | 14.0 | 3.5-24.4 |
| 25-34 | 41 | 5.3 | 0.0-12.1 | 70 | 6.4 | 0.5-12.3 | 111 | 6.0 | 1.6-10.4 |
| 35-44 | 86 | 7.9 | 1.8-14.1 | 120 | 10.3 | 4.2-16.5 | 206 | 9.3 | 4.9-13.7 |
| 45-54 | 109 | 8.8 | 2.4-15.2 | 147 | 14.6 | 5.1-24.2 | 256 | 11.6 | 5.7-17.6 |
| 55-64 | 84 | 5.6 | 0.0-11.6 | 93 | 9.1 | 0.2-18.1 | 177 | 7.5 | 2.4-12.6 |
| Total | 351 | 7.6 | 3.7-11.4 | 480 | 12.0 | 7.0-17.0 | 831 | 9.9 | 6.5-13.4 |

When collated by gender and age groups, the mean number and percentage of respondents who were provided with home care by their family or friends due to NCDs were not statistically significantly different between men and women of different age groups (Table 94).

Although the percentage of the urban women (13.7%, 95%CI 8.6-21.0) and the rural men (10.3%, 95%CI 5.5-18.5) who were provided with home care by their family or friends due to NCDs was slightly higher compared to other groups, the differences were not statistically significant (Appendix 1: Table 46, Figure 42).

**Figure 42.** Home care to NCD patients provided by family members or friends during the past 30 days, by gender and locality




The respondents who provided home care to NCD patients spent on average 14.9 hours a week. Collated by gender, there was no statistically significant difference observed in the mean number of hours per week spent on providing home care to NCD patients in the past 30 days (Table 95).

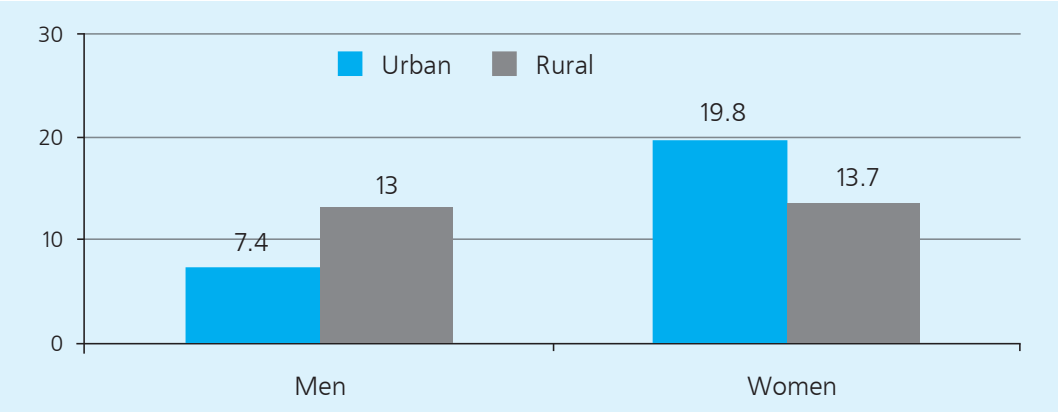
**Table 95.** Mean number of hours per week spent on home care to NCD patients during the past 30 days (by age groups and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI | n | Mean | 95%CI |
| 15-24 | | | | 10 | 16.4 | 0.0-33.3 | 10 | 16.4 | 0.0-33.2 |
| 25-34 | 3 | 33.8 | 0.0-85.5 | 4 | 44.1 | 0.0-88.9 | 7 | 39.9 | 6.4-73.4 |
| 35-44 | 7 | 6.4 | 3.1-9.8 | 11 | 7.3 | 0.1-14.5 | 18 | 7.0 | 2.5-11.5 |
| 45-54 | 6 | 11.3 | 0.0-30.1 | 20 | 14.7 | 3.2-26.2 | 26 | 13.5 | 1.6-25.4 |
| 55-64 | 6 | 16.8 | 8.2-25.5 | 6 | 43.8 | 7.7-79.9 | 12 | 33.8 | 6.2-61.4 |
| Total | 22 | 11.4 | 1.4-21.5 | 51 | 16.8 | 7.2-26.3 | 73 | 14.9 | 6.6-23.3 |

Moreover, when analyzed by age groups, 25-34 and 55-64 year-old respondents spent more time on providing home care to NCD patients compared to that of the remaining age groups. However, the differences were not statistically significant (Table 95).

When collated by locality, there was no statistically significant difference observed in the mean duration for receiving home care due to NCDs between the urban and rural population. On average, this indicator was 17 hours (95%CI 6.8-27.2) for the rural and 13.4 hours (95%CI 1.4-25.4) for the urban population (Appendix 1: Table 47, Figure 43).

**Figure 43.** Mean number of hours per week spent on home care, by gender and locality




Moreover, the mean hours spent on home care was slightly higher for the urban women as well as for the rural men compared to other groups, although the differences were not statistically significant (Figure 43).

### 3.9.4 Loss of ability to work

As part of the survey, the incidences and duration of temporary losses of ability to work (including formal job, study and house work) due to NCDs during the past 30 days were studied comparing by age groups, gender and locality.

During the past 30 days 14.1% of all respondents, 15.8% of women and 12.0% of men temporarily lost their ability to work or study (Table 96).

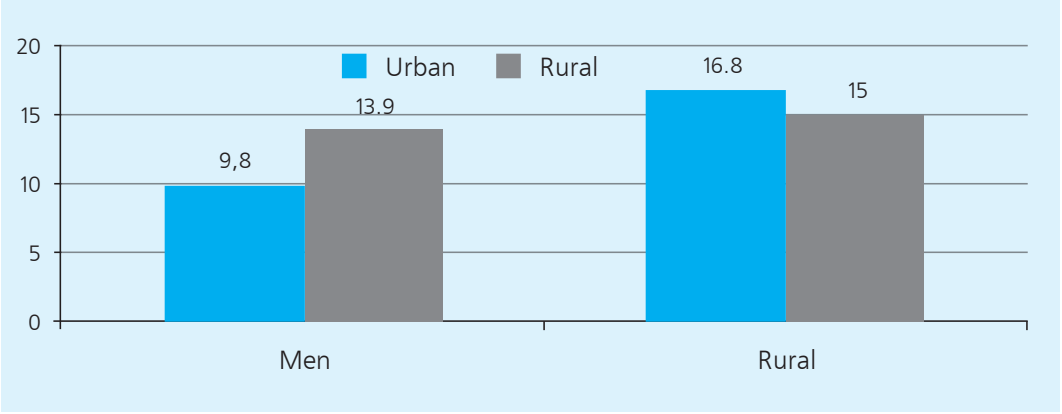
**Table 96.** Population who were not able to fulfill their job/work responsibilities due to NCDs (by age groups and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| 15-24 | 31 | 16.5 | 0.8-32.1 | 50 | 16.7 | 3.7-29.6 | 81 | 16.6 | 7.1-26.0 |
| 25-34 | 41 | 7.9 | 0.0-16.6 | 70 | 14.5 | 3.7-25.3 | 111 | 12.0 | 5.6-18.5 |
| 35-44 | 86 | 12.7 | 5.6-19.8 | 120 | 18.2 | 9.7-26.7 | 206 | 15.8 | 10.5-21.0 |
| 45-54 | 109 | 12.6 | 5.5-19.7 | 147 | 17.4 | 9.6-25.1 | 256 | 14.9 | 9.8-20.0 |
| 55-64 | 84 | 9.8 | 2.5-17.0 | 93 | 7.1 | 1.2-13.0 | 177 | 8.3 | 3.7-13.0 |
| Total | 351 | 12.0 | 7.8-16.2 | 480 | 15.8 | 11.3-20.3 | 831 | 14.1 | 10.8-17.3 |

Collated by age groups and gender, there were no statistically significant differences observed between different groups in the percentage of respondents who were not able to fulfill their job/work responsibilities due to NCDs (Table 96).

Moreover, compared by locality there was no statistically significant difference in this indicator between the urban (13.5%, 95%CI 9.1-19.6) and rural (14.5%, 95%CI 10.9-19.0) areas (Figure 44).

**Figure 44.** Population who were not able to fulfill their job/work responsibilities due to NCDs, by gender and locality



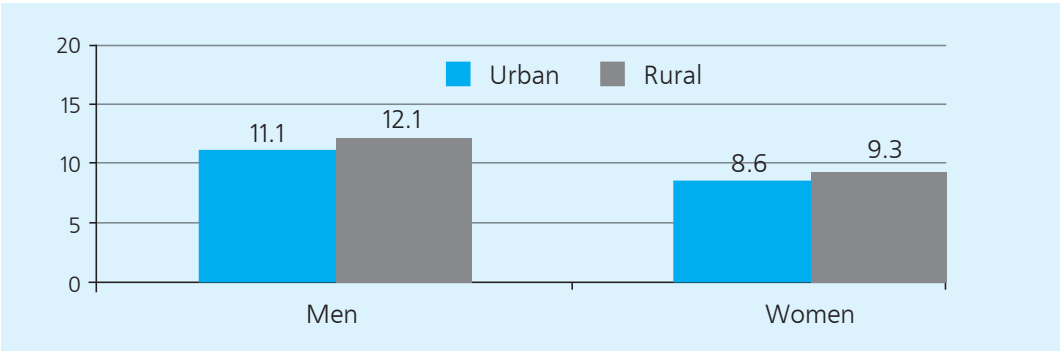

On average, the number of days when they were not able to fulfill their job/work responsibilities due to NCDs was 10.1 days for all respondents, 11.8 days for the men, and 9.0 days for the women (Table 97).

**Table 97.** Number of days when the job responsibilities were not fulfilled due to NCDs during the past 30 days (by age groups and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI | n | Mean | 95%CI |
| 15-24 | 6 | 9.1 | 5.7-12.6 | 10 | 5.3 | 2.3-8.2 | 16 | 6.7 | 4.0-9.5 |
| 25-34 | 4 | 5.7 | 1.0-10.4 | 11 | 7.9 | 2.2-13.6 | 15 | 7.3 | 3.0-11.7 |
| 35-44 | 16 | 11.7 | 5.6-17.7 | 27 | 9.1 | 5.9-12.3 | 43 | 10.0 | 7.5-12.5 |
| 45-54 | 13 | 11.6 | 7.0-16.3 | 25 | 9.6 | 4.6-14.5 | 38 | 10.4 | 7.2-13.6 |
| 55-64 | 9 | 16.5 | 8.1-24.9 | 8 | 8.2 | 3.4-13.0 | 17 | 12.7 | 7.0-18.4 |
| Total | 48 | 11.8 | 9.0-14.6 | 81 | 9.0 | 6.2-11.7 | 129 | 10.1 | 8.2-12.0 |

The mean number of days in the past 30 days when the respondents were not able to fulfill their job responsibilities due to NCDs increased with age, although the trend was not statistically significant (Table 97).

**Figure 45.** Mean number of days when the job responsibilities were not fulfilled due to NCDs, by gender and locality)




Moreover, there were no statistically significant differences in the mean duration of temporary loss of ability to work due to NCDs when collated by locality and gender (Appendix 1: Table 48, Figure 45).

## Conclusions

1. The majority of the study population or 92.1% were covered by compulsory health insurance. However, among those insured over a half paid privately for their medical costs.
2. 17.2% of the survey respondents reported having NCDs currently or in the past. Among those who reported having NCDs previously or currently, 39.3% had sought health care and services from health organizations during the past 30 days. The percentage of respondents in search of health care from health organizations increased with age. The majority of the population sought healthcare from primary health care providers such as family group practices or soum health centers and pharmacies.
3. During the past 12 months, one third of the study population had received in-patient healthcare services in hospitals due to NCDs. The percentage of respondents hospitalized due to NCDs was higher in the men of all age groups compared to their female counterparts.
4. On average, the study population spent 60 000 MNT on medical examinations, laboratory tests and medication, and 500 000 MNT on in-patient hospital care. The study population spent more on accommodation, food and transportation compared to other categories of healthcare related expenditure.
5. Due to NCDs, 9.9% of the survey respondents had to receive home care and 14.1% had some temporary loss of ability to work.

## 3.10 INJURIES

Regular use of seat belts is one of the important measures in mitigating the potential negative impacts of traffic accidents. When seatbelt use was studied in the past 30 days, 75.4% (95%CI 72.1-78.5) of respondents did not use a seatbelt every time, responding only 'sometimes', when they drove or rode as a passenger.

This indicator was statistically significantly higher ($p<0.001$) for women (80.9%) compared to men (70.1%). Collated by age groups, the percentage of 15-24 year-old respondents who reported using seat belt 'sometimes' was higher compared to that of other age groups, and this percentage decreased with age ($p<0.001$). Analyzed by locality, seat belt use was lower by almost 10% among the rural population compared to their urban counterparts (Table 98).

**Table 98.** Proportion of drivers or passengers who do not use a seatbelt (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 705 | 81.9 | 76.4-86.3 | 700 | 89.2 | 84.5-92.6 | 1405 | 85.2 | 80.9-88.7 |
| 25-34 | 628 | 69 | 63-74.4 | 768 | 80.2 | 75.5-84.1 | 1396 | 74.5 | 69.9-78.6 |
| 35-44 | 500 | 69.9 | 64.1-75.2 | 648 | 80 | 74.5-84.6 | 1148 | 75.2 | 70.6-79.3 |
| 45-54 | 387 | 64.2 | 56.6-71.1 | 491 | 77.7 | 71.7-82.8 | 878 | 70.6 | 65.8-74.9 |
| 55-64 | 191 | 73 | 63.7-80.7 | 201 | 85.8 | 79.5-90.4 | 392 | 79.3 | 73.9-83.9 |
| Locality | | | | | | | | | |
| Urban | 1196 | 64.8 | 61.2-68.3 | 1513 | 77.2 | 70.4-82.8 | 2709 | 71.2 | 66.7-75.3 |
| Rural | 1215 | 74.9 | 67.8-80.9 | 1295 | 85 | 79.8-89 | 2510 | 79.7 | 73.9-84.4 |
| Total | 2411 | 70.1 | 66.1-73.8 | 2808 | 80.9 | 77.1-84.3 | 5219 | 75.4 | 72.1-78.5 |

When asked about wearing a helmet when riding a bicycle, moped or motorcycle in the past 30 days, 86.3% (95%CI 79.0-91.4) did not use helmets regularly, and there were no statistically

significant differences observed between genders, different age groups and locality (Table 99).

**Table 99.** Proportion of drivers or passengers of a motorcycle or bicycle who do not always wear a helmet (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 403 | 86.3 | 78.3-91.7 | 219 | 91.2 | 83.2-95.6 | 622 | 87.9 | 81.2-92.4 |
| 25-34 | 273 | 83.9 | 74.3-90.4 | 222 | 89.9 | 83.6-93.9 | 495 | 86.5 | 79.4-91.4 |
| 35-44 | 187 | 78 | 63.2-88 | 170 | 93.9 | 87.5-97.2 | 357 | 85.1 | 74.9-91.6 |
| 45-54 | 124 | 82.9 | 68.1-91.7 | 101 | 92.9 | 86.7-96.3 | 225 | 86.8 | 76.9-92.8 |
| 55-64 | 63 | 81.9 | 69.7-89.9 | 34 | 91.4 | 78.8-96.8 | 97 | 85.6 | 75.5-92 |
| Locality | | | | | | | | | |
| Urban | 239 | 92.5 | 87.8-95.5 | 126 | 91.1 | 86.9-95.6 | 365 | 92.0 | 88.2-94.7 |
| Rural | 811 | 80.4 | 68.4-88.6 | 620 | 92.5 | 87.3-95.6 | 1431 | 85.3 | 76.6-91.2 |
| Total | 1050 | 82.4 | 72.2-89.3 | 746 | 92.3 | 87.9-95.2 | 1796 | 86.3 | 79.0-91.4 |

In recent years, traffic accidents have drastically increased. The prevalence of self-reported traffic injuries in the past 12 months was 3.4% in the study population. Traffic injuries were statistically significantly more common ($p<0.001$) in men than in women. Compared by locality, there was no significant difference found in this indicator between urban and rural areas. When collated by age groups, the prevalence of traffic injuries was most common among young people aged 15-24 years. Moreover, the percentage of respondents involved in traffic injuries was lower for 45-54 year old men, and higher for the 45-54 year old women compared to that of other age groups (Table 100).

**Table 100.** Proportion of population involved in road traffic accident in the past 12 months (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 5.6 | 3.9-8 | 677 | 6.3 | 4.2-9.3 | 548 | 6.3 | 4.2-9.4 |
| 25-34 | 449 | 3.1 | 1.6-5.9 | 247 | 0.7 | 0.2-2.5 | 853 | 3.1 | 1.9-4.9 |
| 35-44 | 863 | 2.2 | 1.3-3.7 | 737 | 1.8 | 0.9-3.3 | 585 | 1.4 | 0.6-3.2 |
| 45-54 | 256 | 0.2 | 0-1.7 | 1651 | 4.4 | 3.2-6 | 1540 | 4.2 | 2.9-6.1 |
| 55-64 | 1285 | 3.9 | 2.7-5.6 | 1034 | 2.3 | 1.4-3.8 | 503 | 0.5 | 0.2-1.4 |
| Locality | | | | | | | | | |
| Urban | 1319 | 5 | 3.3-7.7 | 1674 | 2.4 | 1.5-3.8 | 2993 | 3.7 | 2.5-5.3 |
| Rural | 1400 | 4.8 | 3.4-6.8 | 1620 | 1.3 | 0.8-2.1 | 3020 | 3.1 | 2.2-4.3 |
| Total | 2719 | 4.9 | 3.7-6.4 | 3294 | 1.8 | 1.3-2.6 | 6013 | 3.4 | 2.6-4.3 |

Analysis of traffic injury causes revealed that the most common causes of traffic injuries were speeding and external factors related to road conditions (such as slippery roads, unsafe road conditions, poor road side lighting or lack of road traffic signs) followed by drunk driving. The percentage of respondents who reported being involved in traffic accidents due to drunk driving was higher ($p<0.001$) among the men than women.

Collated by locality there were no statistically significant differences observed in the causative factors of traffic injuries between the urban and rural areas (Appendix 1: Table 49).

The average number of hours a day spent driving was 3.5 (95%CI 3.2-3.7) among all respondents with no statistically significant differences by locality or age groups. However, when compared by

gender it was revealed that men spent more time behind the wheel compared to women (p<0.001) (Table 101).

**Table 101.** Mean number of hours spent driving a motor vehicle per day, in hours (by age groups, gender and locality)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 256 | 2.8 | 2.5-3.2 | 63 | 2.1 | 1.5-2.7 | 319 | 2.7 | 2.4-3.1 |
| 25-34 | 501 | 3.4 | 3.1-3.8 | 202 | 2.8 | 1.9-3.8 | 703 | 3.3 | 2.9-3.7 |
| 35-44 | 371 | 4.2 | 3.7-4.6 | 131 | 2.5 | 2.0-3.0 | 502 | 3.8 | 3.4-4.2 |
| 45-54 | 254 | 3.5 | 3.1-4.0 | 62 | 2.7 | 1.9-3.5 | 316 | 3.4 | 3-3.9 |
| 55-64 | 92 | 3.0 | 2.5-3.5 | 6.0 | 2.1 | 0.5-3.7 | 98 | 3.0 | 2.5-3.4 |
| Locality | | | | | | | | | |
| Urban | 673 | 4.1 | 3.6-4.6 | 260 | 3.0 | 2.1-3.9 | 933 | 3.8 | 3.4-4.3 |
| Rural | 801 | 3.4 | 3.1-3.7 | 204 | 2.2 | 1.8-2.6 | 1005 | 3.2 | 2.9-3.4 |
| Total | 1474 | 3.7 | 3.4-3.9 | 464 | 2.6 | 2.1-3.1 | 1938 | 3.5 | 3.2-3.7 |

The percentage of 15-64 year-old respondents who drive a motor vehicle was 54.2% for men, and 14.1% for women. When collated by locality, this indicator was 3.3 times higher among men compared to women in urban areas; whereas 4.5 times more men than women drove motor vehicles in rural areas. Analyzed by gender, the percentage of driving was higher by 6.2 points among rural men compared to their urban counterparts, whereas this indicator was higher by 3.0 points among urban women compared to rural women (51.0% and 57.2% for the men, 15.5% and 12.6% for the women).

Drunk driving is one of the main causes of road traffic injuries. In the past 30 days, 5.5% of respondents rode in a motorized vehicle with a driver under the influence of alcohol. More men (7.6%) than women (3.4%) rode in a vehicle with a drunk driver (p<0.001). This pattern was also similar in rural areas; more rural men than their female counterparts rode in a vehicle with a driver under the influence of alcohol. Collated by age groups, the percentage of respondents who reported riding in a vehicle operated by a drunk driver was higher for the 25-34 year old men compared to that of the men aged 45 years and above. Similarly, this indicator was higher among 25-34 year-old women than 35-44 year-old women (Table 102).

**Table 102.** Proportion of population who in the past 30 days rode in a motorized vehicle where the driver had alcoholic drinks (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | 95%CI | n | Mean | 95%CI | n | Mean | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 789 | 7.0 | 4.5-10.7 | 846 | 5.1 | 3.1-8.3 | 1635 | 6.1 | 4.1-8.8 |
| 25-34 | 673 | 11.6 | 8.7-15.4 | 856 | 6.2 | 4.2-9.0 | 1529 | 8.9 | 6.9-11.4 |
| 35-44 | 542 | 9.2 | 6-13.7 | 733 | 2.1 | 1.2-3.7 | 1275 | 5.4 | 3.7-7.7 |
| 45-54 | 449 | 4.7 | 2.7-8.0 | 577 | 3.0 | 1.5-6.0 | 1026 | 3.9 | 2.3-6.5 |
| 55-64 | 243 | 2.7 | 0.9-7.6 | 255 | 1.1 | 0.3-4.4 | 498 | 1.9 | 0.8-4.4 |
| Locality | | | | | | | | | |
| Urban | 1308 | 6.0 | 4.5-7.8 | 1660 | 2.4 | 1.4-4.2 | 2968 | 4.1 | 3.2-5.2 |
| Rural | 1388 | 8.9 | 6.1-12.8 | 1607 | 4.4 | 2.7-7.1 | 2995 | 6.7 | 4.6-9.7 |
| Total | 2696 | 7.6 | 5.8-9.8 | 3267 | 3.4 | 2.3-5.0 | 5963 | 5.5 | 4.2-7.1 |

In the past 12 months, 6.0% of all respondents were injured in a non-road traffic related accident which required medical attention. The percentage of respondents injured in a non-road traffic related accident requiring medical attention was slightly higher (by 0.7%) in the men (6.5%) than in the women (5.8%), although with no statistically significant difference. Comparing locality and age groups, there were no statistically significant differences observed between urban and rural areas as well as for the different age groups (Table 103).

**Table 103.** Proportion of population who injured in a non-road traffic related accident that required medical attention in the past 12 months (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 796 | 10.9 | 8.3-14.3 | 853 | 6.5 | 5-8.5 | 1649 | 8.8 | 7.2-10.8 |
| 25-34 | 676 | 9.7 | 6.7-13.9 | 863 | 4.4 | 3.3-5.8 | 1539 | 7.0 | 5.4-9.1 |
| 35-44 | 547 | 9.0 | 6.0-13.4 | 737 | 4.2 | 2.6-6.8 | 1284 | 6.5 | 5-8.3 |
| 45-54 | 449 | 7.9 | 5.4-11.3 | 585 | 4.6 | 2.9-7.2 | 1034 | 6.3 | 4.7-8.4 |
| 55-64 | 247 | 4.6 | 2.5-8.6 | 256 | 10.4 | 6.3-16.7 | 503 | 7.5 | 4.8-11.6 |
| Locality | | | | | | | | | |
| Urban | 232 | 7.1 | 3.7-13.3 | 412 | 5.6 | 2.8-10.8 | 644 | 6.2 | 4.0-9.5 |
| Rural | 181 | 5.6 | 2.1-14.0 | 404 | 6,0 | 4.0-9.0 | 585 | 5.9 | 3.9-8.8 |
| Total | 413 | 6.5 | 3.7-11.1 | 816 | 5.8 | 3.9-8.6 | 1229 | 6.0 | 4.5-8.2 |

A breakdown in the different types of injury causes demonstrated that the most common causes of serious injuries other than road traffic accidents that required medical attention were falls (65.3%, 95%CI 59.2-71.1), hit (15.9%, 95%CI 11.1-22.1 ), and cuts (8.7%, 95%CI 5.3-13.9 ) (Appendix 1. Table 50). There were no statistically significant differences observed when collated by gender, age groups, and locality. However, certain injuries such as falls, cuts and being struck were more common among men, whereas burns and animal bites were more common injuries among women.

In regard to locations of injuries, among those injured in a non-road traffic related accident which required medical attention 35.4% (95%CI 29.2-42.2) were injured outdoors on the streets, 23.1% (95%CI 17.9-29.4) got domestic injuries at home, 18.5% (95%CI 12.9-25.7) at their work places or school (Appendix 3). Analyzed by gender, age groups, and locality, there were no statistically significant differences observed in this indicator. Although the differences were not statistically significant, more men than women were injured at work or school and in sports activities, whereas women more commonly injured at home or on streets.

## Discussion

Regular use of seat belts by drivers and passengers has statistically significantly improved compared to the previous 2009 STEPS Survey results. These positive changes could be related to the measures and interventions towards improving road traffic safety implemented in recent years. Despite some improvements compared to the previous survey results, the rate of seat belt use remains at an insufficiently low level. The lower rate of seatbelt use by women compared to that of men could be explained by significantly more men currently driving than women (with a 6:1 ratio) and correlatively, women were less informed about road traffic safety issues. Similar to the seat belt use, the rate of helmet use by motorcycle or bicycle riders was insufficient. These results demonstrate that education on behavior change in this field needs to be improved and the appropriate actions and measures are required to be enforced.

Although there was some decline observed in the prevalence of road traffic injuries in the past years, the difference was not statistically significant. This could be related to the drastically increasing number of motor vehicles as well as an increase in the load of road traffic. Moreover, the

comparative data of the two surveys indicate that the prevalence of road traffic accidents remain higher in men compared to women. The main causes of road traffic accidents were speeding, external factors related to poor road conditions (such as slippery roads, unsafe road conditions, poor road side lighting, or lack of road traffic signs) and driving under influence of alcohol. Therefore, the efficient measures and actions to mitigate the above-mentioned risks need to be implemented.

### Conclusions

1. Among all respondents, 75.4% did not regularly use a seatbelt or only used a seatbelt 'sometimes', and this rate was lower for women compared to men. Seatbelt use of the study population was insufficient, showing a decrease compared to the 2009 level.
2. The majority, or 86.3% of the study population, did not use helmets regularly when riding a motorcycle or bicycle.
3. The prevalence of self-reported traffic injuries was 3.4% in the study population. Traffic injuries were significantly more common in men than in women.
4. The mean number of hours per day spent driving was 3.5 among all respondents. On average, men spent more time driving than women each day.
5. In the past 30 days, 5.5% of the survey respondents rode in a motorized vehicle with a driver under the influence of alcohol, indicating that drunk driving still exists.
6. In the past 12 months, 6.9% of all respondents were injured in a non-road traffic related accident requiring medical care and services. The most common causes of those injuries were falls, being struck and cuts.



## 3.11 VIOLENCE

Violence as a public health issue and a negative type of interpersonal communication was studied and evaluated and compared with the 2009 results.

### 3.11.1 Violence Status

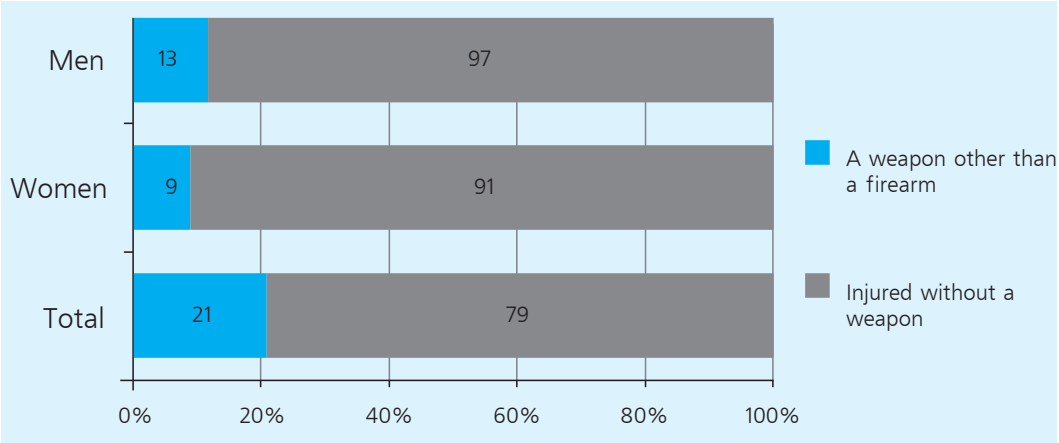
In the past 12 months, 6.0% (95%CI 4.5-8.2) of the survey respondents got injured requiring medical attention due to a violent incident. Collated by gender, there was no statistically significant difference in this indicator, with 6.5 % (95%CI 3.7-11.1) of men and 5.8% (95%CI 3.9-8.6) of women involved in a violent incident resulting in an injury that required medical care or services. As presented in the Table 104 below, analysis by age groups and locality did not reveal any statistically significant differences in the percentage of respondents seriously injured from violent incidents requiring medical attention between different groups of population (Table 104).

**Table 104.** Proportion of population involved in a violent incident resulting in an injury that required medical attention during the past 12 months (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 166 | 6.5 | 3-13.3 | 274 | 3.8 | 1.7-8.3 | 440 | 4.9 | 2.6-9.1 |
| 25-34 | 109 | 5.3 | 2.1-12.9 | 226 | 7.7 | 4.4-12.9 | 335 | 6.9 | 4.2-11 |
| 35-44 | 65 | 4.8 | 1.2-17.7 | 175 | 3.9 | 1.6-9.1 | 240 | 4.2 | 1.9-8.8 |
| 45-54 | 58 | 9.5 | 3-25.8 | 99 | 9.2 | 4.2-18.8 | 157 | 9.3 | 5.1-16.3 |
| 55-64 | 15 | 0 | 0-0 | 42 | 4.7 | 1.1-17.7 | 57 | 3.5 | 0.8-13.7 |
| Total | 413 | 6.5 | 3.7-11.1 | 816 | 5.8 | 3.9-8.6 | 1229 | 6 | 4.5-8.2 |
| Locality | | | | | | | | | |
| Urban | 232 | 7.1 | 3.7-13.3 | 412 | 5.6 | 2.8-10.8 | 644 | 6.2 | 4.0-9.5 |
| Rural | 181 | 5.6 | 2.1-14.0 | 404 | 6.0 | 4.0-9.0 | 585 | 5.9 | 3.9-8.8 |

When the causes of injuries were analyzed among those involved in a violent incident resulting in an injury during the past 12 months, the majority or 79% (95%CI 51.6-93.0) of the respondents reported being injured by kicking, pushing, hitting or biting, without using a weapon or a firearm (Appendix 1: Table 51, Figure 46).

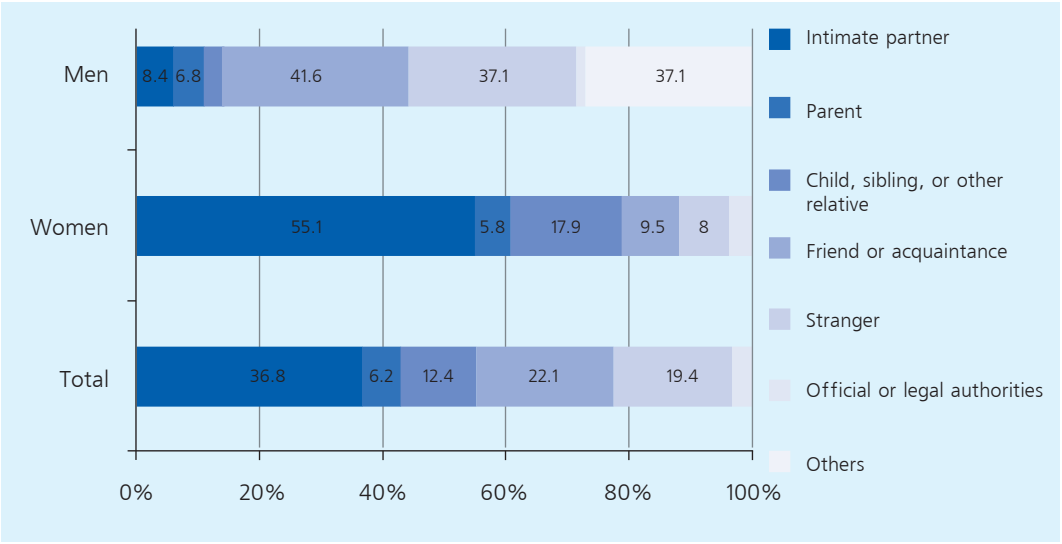
**Figure 46.** The objects with which people got injured according to people who affected by violence during the past 12 months




One in five (21%, 95%CI 7.0-48.4) in the survey respondents became victims of violence using a weapon, and there were no statistically significant differences observed in this indicator between different age groups and localities (Figure 46).

When a relationship status was investigated between respondents involved in a violent incident resulting in an injury and those who committed violence that caused their injuries in the past 12 months, 36.8% (95%CI 21.8-54.9) of respondents reported getting injured by their intimate partners, 19.4% (95%CI 6.8-44.3) by strangers, 12.4% (95%CI 4.3-30.8) by their children, siblings, and other relatives (Figure 47).

**Figure 47.** Perpetrators who committed violence according to the study population



As shown in the above Figure, men got injured as a victim of violence outside their homes and families whereas more women were victims of domestic violence resulting in physical injury (Figure 47).

Analyzed by locality, the percentage of women who got injured as a result of violent actions against them by their intimate partners was higher in the rural areas (68.9%, 95%CI 38.7-88.6) as compared to urban areas (40.1%, 95%CI 15.4-71.1). However, the difference was not statistically significant. Moreover, the percentage of the urban women becoming victims of violence committed by strangers was 16.7% (95%CI 5.6-40.4), whereas this indicator was zero for the rural women, with no woman reporting violence committed against her by a stranger. Based on these findings it could be assumed that there were different types of violence against women committed in the streets and public places in the urban areas because of population density and increasing influx and migration, whereas the rural women were less impacted by stranger's violence due to less densely populated remote locations where people all know each other.

According to the survey respondents, 16.4% (95%CI 8-30.7) in the urban and 28.8% (95%CI 10.4-58.4) in rural areas became victims of violence by their friends or acquaintances, while 34.5% (95%CI 12.2-66.7) of the urban and 1.9% (95%CI 0.2-13.9) of the rural population reported being victims of violence by strangers. However, as the confidence intervals indicate, the differences were not statistically significant.

### 3.11.2 Child Abuse

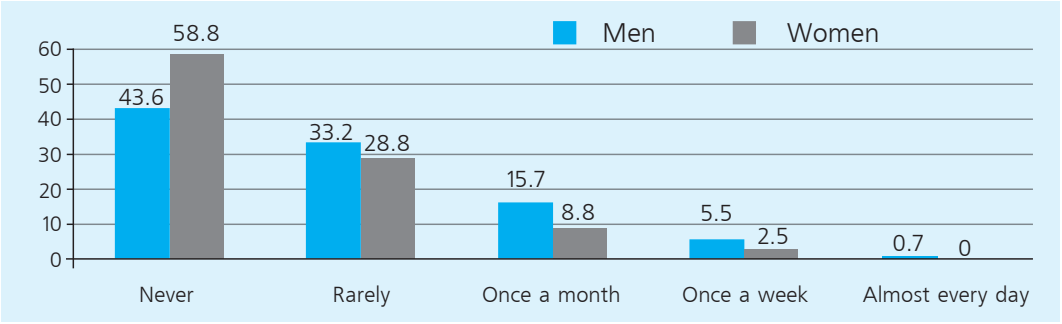
Based on the respondents answers recalling their childhood memories the social attitude regarding violence against children and the status of services provided to victims of child abuse was studied comparing the key indicators by age groups, gender and locality. The percentage of those who reported being physically abused (including push, grab, shove, slap, hit, burn, or throw something at them) during their childhood by a parent or other adult in the household was 48.2% (95%CI 45.0-51.4) in all respondents. This indicator was statistically significantly higher in the men 55.8% (95%CI 52-59.6) than in the women (40.7%, 95%CI 37.4-44.1) (Table 105).

**Table 105.** Proportion of population who reported being physically abused during their childhood (by age groups, gender and locality)

| Inidicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 796 | 58.2 | 52.5-63.7 | 851 | 42.8 | 38.2-47.5 | 1647 | 50.8 | 46.8-54.8 |
| 25-34 | 663 | 58.8 | 53.6-63.8 | 853 | 44.4 | 39.6-49.3 | 1516 | 51.5 | 48.2-54.7 |
| 35-44 | 541 | 55.9 | 50.4-61.2 | 727 | 40.4 | 35.5-45.6 | 1268 | 47.6 | 43.2-52 |
| 45-54 | 444 | 53.5 | 47.9-59.1 | 582 | 37.9 | 33-42.9 | 1026 | 46 | 41.7-50.5 |
| 55-64 | 237 | 52.2 | 43.5-60.7 | 255 | 39 | 29.9-49 | 492 | 45.5 | 39.9-51.2 |
| Total | 2681 | 55.8 | 52-59.6 | 3268 | 40.7 | 37.4-44.1 | 5949 | 48.2 | 45-51.4 |
| Locality | | | | | | | | | |
| Urban | 1298 | 55.3 | 50.1-60.4 | 1655 | 38.8 | 33.7-44.1 | 2953 | 46.8 | 42.3-51.4 |
| Rural | 1383 | 56.3 | 50.7-61.8 | 1613 | 42.5 | 38.0-47.1 | 2996 | 49.4 | 44.9-53.9 |

Although the frequency of violence was evaluated as being low by those who reported being physically abused during their childhood, it was based on a misperception about violence and its consequences as they did not consider being hit or slapped by somebody due to their childish mistakes or mischievous behavior as child abuse (Figure 48).

**Figure 48.** Frequency of child physical abuse, by gender




The percentage of respondents who reported that others attempted to involve them in sexual intercourse during their childhood was 2.3% (95%CI 1.6-3.4) in the study population (Table 106).

**Table 106.** Proportion of population who reported that others attempted to involve them in sexual intercourse during their childhood (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 796 | 1.9 | 0.9-3.9 | 853 | 3.6 | 2.3-5.5 | 1651 | 2.7 | 1.8-4.1 |
| 25-34 | 663 | 1.2 | 0.5-2.4 | 863 | 6.5 | 3.8-11.1 | 1540 | 3.9 | 2.4-6.2 |
| 35-44 | 541 | 0.4 | 0.1-2.1 | 737 | 3.2 | 1.9-5.4 | 1285 | 1.9 | 1.2-3.1 |
| 45-54 | 444 | 0.4 | 0.0-2.5 | 585 | 3.0 | 1.5-5.9 | 1034 | 1.6 | 0.7-3.4 |
| 55-64 | 237 | 0.4 | 0.0-2.7 | 256 | 4.9 | 2.0-11.3 | 503 | 2.6 | 1.2-5.8 |
| Total | 2719 | 0.8 | 0.4-1.4 | 3294 | 3.9 | 2.7-5.8 | 6013 | 2.3 | 1.6-3.4 |
| Locality | | | | | | | | | |
| Urban | 1319 | 1.0 | 0.5-2.2 | 1655 | 5.1 | 3.3-7.7 | 2953 | 3.1 | 2.2-4.4 |
| Rural | 1400 | 0.5 | 0.2-1.5 | 1613 | 2.9 | 1.4-5.5 | 2996 | 1.7 | 0.8-3.3 |

The percentage of respondents who reported that others attempted to involve them in sexual intercourse during their childhood through touching or teasing them physically for sexual purposes was statistically significantly higher in the women (3.9%, 95%CI 2.7-5.8) compared to that of their male counterparts (0.8%, 95%CI 0.4-1.4). However, there were no statistically significant differences observed in this indicator when collated by age groups and locality (Table 106).

### 3.11.3 Violence and Stress

Among the study population, 20.2% (95%CI 17.9-22.7) reported being frightened for their safety or that of their families because of the anger or threats of another person.

The percentage of respondents who reported being frightened for their safety or that of their families was statistically significantly higher for the women (25.6%, 95%CI 22.6-28.8) compared to the men (14.7%, 95%CI 12.3-17.6) (Table 107).

**Table 107.** Proportion of population who reported being frightened for the safety of themselves or their families because of the anger or threats of another person (by age groups, gender and locality)

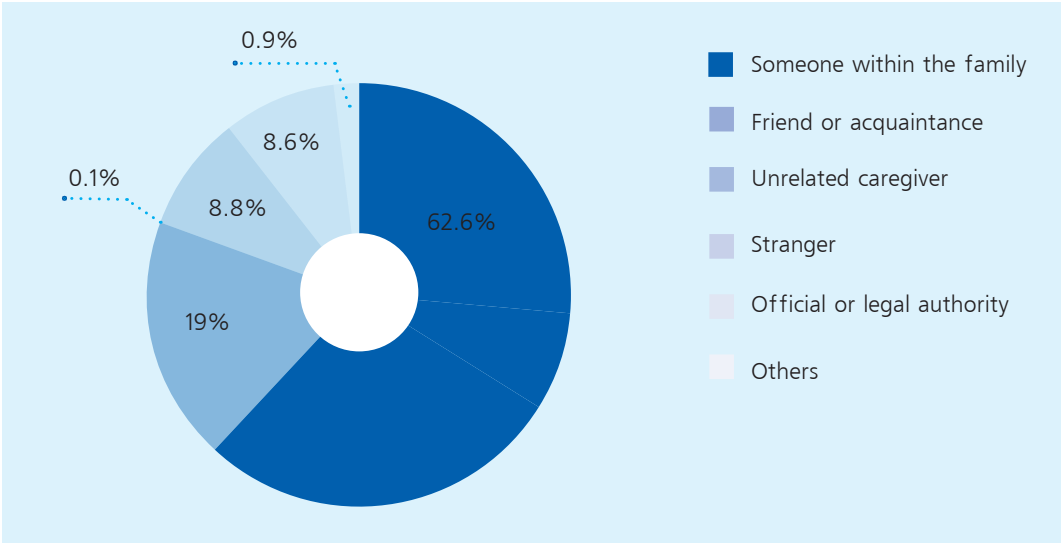
| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 20.1 | 17.0-23.5 | 853 | 31.9 | 28.2-35.8 | 1651 | 25.7 | 22.9-28.8 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 25-34 | 677 | 16.0 | 12.6-20.1 | 863 | 30.5 | 25.0-36.6 | 1540 | 23.4 | 20.3-26.8 |
| 35-44 | 548 | 13.5 | 9.6-18.7 | 737 | 26.7 | 22.6-31.6 | 1285 | 20.6 | 17.3-24.3 |
| 45-54 | 449 | 14.4 | 9.8-20.8 | 584 | 19.6 | 16.0-23.8 | 1033 | 16.9 | 13.4-21.0 |
| 55-64 | 247 | 5.8 | 3.0-10.9 | 255 | 16.5 | 11.4-23.4 | 502 | 11.2 | 7.9-15.5 |
| Total | 2719 | 14.7 | 12.3-17.6 | 3292 | 25.6 | 22.6-28.8 | 6011 | 20.2 | 17.9-22.7 |
| Locality | | | | | | | | | |
| Urban | 1319 | 18.4 | 15.3-22.0 | 1673 | 27.6 | 23.2-32.5 | 2992 | 23.2 | 19.8-26.9 |
| Rural | 1400 | 11.6 | 8.5-15.5 | 1619 | 23.7 | 20.3-27.6 | 3019 | 17.6 | 15.2-20.3 |

The percentage of respondents who reported being frightened for their safety or that of their families because of the anger or threats of another person decreased with age. In particular, this indicator was the highest (25.7%, 95%CI 22.9-28.8) among the 15-24 year-old population while being the lowest (11.2%, 95%CI 7.9-15.5) among the 55-64 year-old population ($p<0.0001$). Moreover, as shown in the above Table, compared by locality the percentage of respondents who reported being frightened for the safety of themselves or their families because of the anger or threats of another person was slightly different between the urban and rural areas, but without a statistically significant difference (Table 107).

Among those having reported being frightened for the safety of themselves or their families because of the anger or threats of another person, 26.6% (95%CI 22.9-30.6) were frightened by their intimate partners, 28% (95%CI 24.0-32.5) by their child, sibling or other relatives, and 18% (95%CI 15.7-22.2) by their friends or acquaintances (Figure 49).

**Figure 49.** Potential Proportion of respondents who were concerned for their safety because of the anger or threats of another person

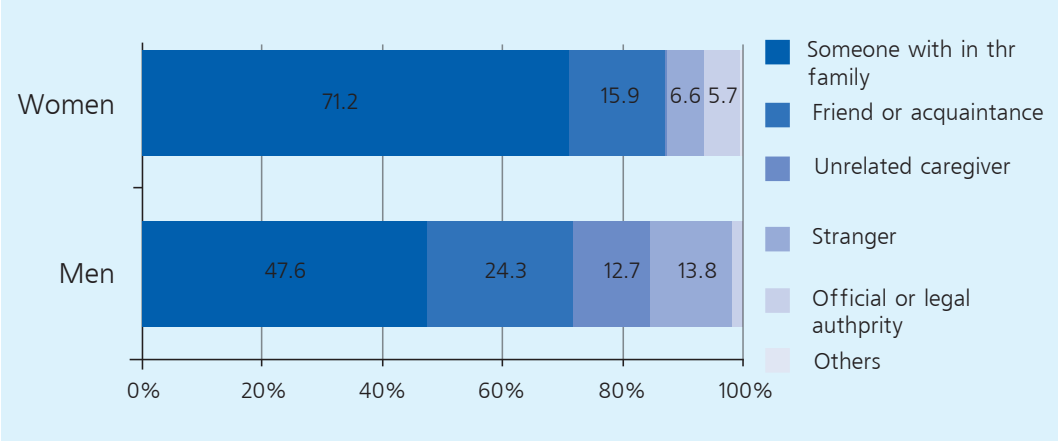



Compared by locality, there was no statistically significant difference observed in this indicator between the urban and rural areas. The majority of the respondents who reported being frightened for the safety of themselves or their families because of the anger or threats of another person named their intimate partners, children, siblings or other relatives, friends or acquaintances as perpetrators (Appendix 1: Table 52).

Moreover, when collated by gender, the percentage of respondents who reported being frightened for the safety of themselves or their families because of the anger or threats of their intimate

partners was higher (p<0.0001) for the women (35.4%, 95%CI 31.0-40.0) than for the men (11.0%, 95%CI 7.0-16.9) (Appendix 1: Table 52, Figure 50).

**Figure 50.** Potential perpetrators reported by respondents for being frightened for their own safety or that of their families because of the perpetrator's anger or threats, by gender




The percentage of potential perpetrators other than the respondents' family members was slightly different with no statistical significance (Appendix 1: Table 52).

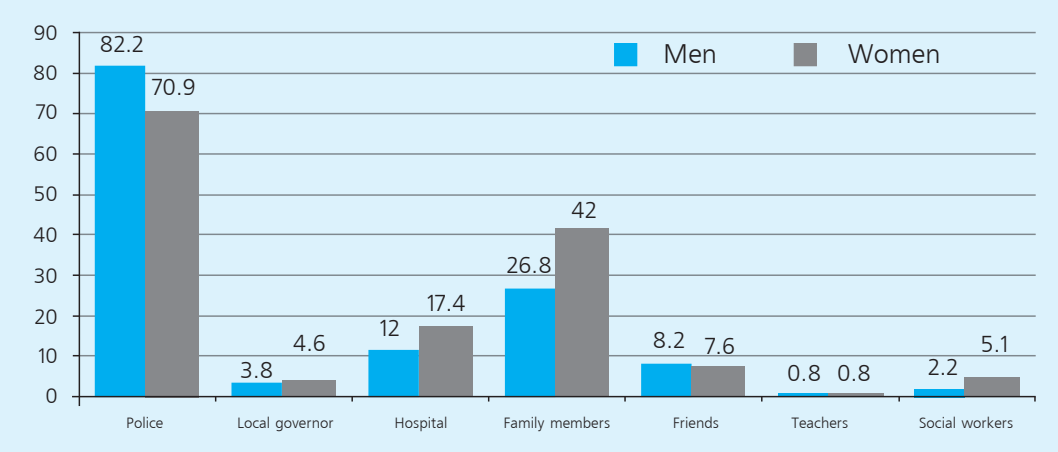
### 3.11.4 Population knowledge about where to refer in case of violence

When the respondents' perception about whom to address when affected by violence studied, 0.3% of respondents refused to respond, and among those who did respond 4.3% (95%CI 3.3-5.6) answered that they didn't know where to go for assistance. When analyzed by gender (5.2%, 95%CI 3.9-6.7 for the men compared to 3.5%, 95%CI 2.4-5.0 for the women) and locality (5%, 95%CI 3.8-6.7 for the urban areas compared to 3.7% 95%CI 2.3-5.8 for the rural areas), there was no statistically significant difference observed in the percentage of respondents who did not know where to refer for help in case of violence.

Among those who responded, 76.4% (95%CI 73.2-79.4) said that if they become a victim of violence they would approach the police, 34.5% (95%CI 30.8-38.5) their family members, 14.7% (95%CI 11.8-18.3) health care providers, 7.9% (95%CI 6.3-9.9) their friends, 4.2% (95%CI 3.1-5.7) local officials, 3.7 % (95%CI 2.8-4.8) social workers.

Collated by gender, the percentage of respondents who said that they would go to the police for help in case of violence was statistically significantly higher in the men compared to their female counterparts. On the contrary, the percentage of respondents who answered that they would go to their family or social worker was statistically significantly greater in the women compared to their male counterparts. Moreover, the percentage of respondents who thought seeking help from the health care providers in case of violence was slightly higher in the women compared to that for the men. However, the difference was not statistically significant (Figure 51).

**Figure 51.** Respondents' perception on whom to address when affected by violence, by gender




Analyzed by age groups, the percentage of respondents who thought of seeking assistance from the police or health organizations statistically significantly increased with age. However, the percentage of respondents who said that they will go to their 'family' or 'friends' for help in case of violence statistically significantly declined with age. For instance, 53% (95%CI 48.3-57.7) of the 15-24 year-old population and 84.6% (95%CI 77.6-89.7) of the 55-64 year-old population responded that they would seek assistance from the police in case of violence (Table 108).

**Table 108.** Responses of the survey population on whom to address when affected by violence (by age groups)

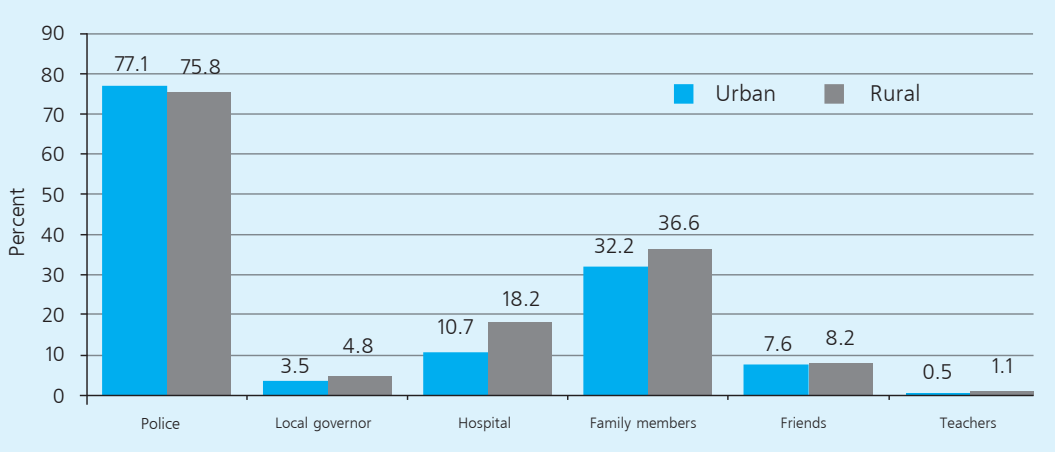
| Age Group (years) | n | Police | | Health organizations | | Family | | Friends | |
|---|---|---|---|---|---|---|---|---|---|
| | | % | 95%CI | % | 95%CI | % | 95%CI | % | 95%CI |
| 15-24 | 1583 | 53.0 | 48.3-57.7 | 11.2 | 9.0-13.8 | 58.2 | 54.3-62.0 | 17.4 | 14.4-20.9 |
| 25-34 | 1457 | 76.4 | 72.1-80.2 | 16.7 | 12.9-21.2 | 38.4 | 33.4-43.7 | 10.4 | 7.9-13.5 |
| 35-44 | 1222 | 80.3 | 76.6-83.5 | 12.3 | 9.0-16.6 | 30.3 | 26.4-34.4 | 6.3 | 4.4-9.0 |
| 45-54 | 991 | 82.1 | 78.3-85.3 | 16.7 | 12.4-22.1 | 27.5 | 22.3-33.4 | 4.4 | 2.8-6.8 |
| 55-64 | 467 | 84.6 | 77.6-89.7 | 21.3 | 15.8-28.2 | 23.4 | 18.0-29.8 | 2.8 | 1.5-5.4 |
| Total | 5720 | 76.4 | 73.2-79.4 | 14.7 | 11.8-18.3 | 34.5 | 30.8-38.5 | 7.9 | 6.3-9.9 |

As presented in the above Table, the percentage of respondents who thought of seeking assistance from their family or friends was the highest for the 15-24 year-old population, while this indicator was the lowest for the 55-64 year-old population. In other words, there was a statistically significant trend observed that the percentage of respondents who would ask for help from their family or friends in case of violence increased with age (Table 108).

Moreover, compared by age groups the percentage of respondents who thought of approaching the local administrations or authorities for help in a case of violence increased with age, while the percentage of respondents who would approach their teachers for assistance decreased with age. The differences in the above trends were statistically significant.

Analyzed by locality, the percentage of respondents who thought of approaching their teachers for assistance in case of violence was statistically significantly higher for the rural population (1.1%, 95%CI 0.8-1.6) compared to their urban counterparts (0.5%, 95%CI0.3-0.7) (Figure 52).

**Figure 52.** Responses of the survey population on whom to address when affected by violence, by locality




The percentage of respondents answering that they would go to health facilities for help in a case of violence was by 7.5% higher for the rural population (18.2%, 95%CI13.4-24.3) compared to their urban counterparts (10.7%, 95%CI 8.3-13.7). Nevertheless, the difference was not statistically significant due to overlapping of the confidence interval variation range of these results (Figure 52).

## Discussion

The percentage of survey respondents, who were injured by violent incidents that required medical attention during the past 12 months, increased twice as much when compared to the 2009 level. These findings demonstrate that the interpersonal violence has became more common, although they could be also considered as the results of better understanding of the definition of violence by the respondents.

The percentage of respondents who reported being physically abused during their childhood remained at a similar level with the previous survey results, with no decline observed. These results indicate that the traditional perception of parents and caregivers that physical punishment helps educate children in order to make them patient and strong, still exist.

Although the percentage of respondents who reported that others attempted to involve them in sexual intercourse during their childhood was quite low, there is a need for public health education for prevention any forms of sexual abuse against children.

There was a common tendency observed in the study population to approach the police for help in case of violence. Moreover, the results demonstrate that the general population trusts and approaches the local authorities, doctors and other health professionals, and school teachers for assistance. Therefore, in case of violence, training and capacity development at all levels of those officials is required in the detection, registration and information, collection of evidences, and referral, as well as organizing of awareness raising events, and advocacy.

The percentage of the survey population who responded that in the case of potential or actual violence they would approach the local authorities, teachers and social workers seeking help was relatively low. Thus, awareness-raising of the general public regarding violence prevention is very important taking into account the likelihood of violence to be repeated.

The survey findings show that the percentage of respondents seriously injured as result of violence that required medical attention statistically significantly increased reaching 6.0 percent compared

to the previous 2009 survey results (3.5%, 95%CI 2.6-4.3). Therefore, there are comprehensive preventive actions required to be implemented along with improving access to and quality of injury care.

In both urban and rural areas, one in two respondents was affected by inter-personal violence. Victims of violence were wanting to get help and care by someone, and that that should be covered by public services and care. Thus, awareness-raising, advocacy and training of police personnel, doctors, school teachers and social workers needs to be conducted in order to provide specialized care.

Similarly, one in every two children was abused to become a victim of violence. All types of violence against children existed in the society. There is a tendency to consider violence against children as a disciplinary method among both of perpetrators and victims of child abuse.

One in three respondents who were exposed to violence expressed that they would seek help from their family and friends, indicating that public awareness in violence prevention needs to be improved.

Collated by age groups, both perpetrators and victims of violence were relatively young people, indicating that tailored and focused actions and interventions in violence prevention are required to be intensified among younger population groups.

### Conclusions

1. Six percent of survey respondents were subject to violence and injured requiring medical attention. This indicator had increased compared to the previous 2009 level. One in every two respondents were victims of interpersonal violence, and preferred to be covered by public services.

2. One in every two survey respondents were abused as a child. Children are physically abused for wrongdoing, and both perpetrators and victims of child abuse tend to consider violence against children as a disciplinary method.

3. One in every three survey respondents preferred to seek help and support from family and friends. However, this might provoke further violence, and therefore, public education campaigns and awareness-raising activities in violence prevention need to be improved.

4. Relatively young respondents were more likely to fall victims of violence. Thus, tailored and focused actions and interventions in violence prevention are required to be intensified among younger population groups.

## 3.12 ORAL HEALTH

According to the WHO, oral health is essential to general health and the quality of life and it is a state of being free from mouth and facial pain, oral and throat inflammation, oral infection and sores, periodontal (gum) disease, tooth decay, tooth loss, and thereby contribute to reducing other diseases and disorders such as cardiovascular disease, arthritis, kidney disease, digestive tract disorders and allergic diseases. Therefore, worldwide, countries are collaboratively implementing the Global Oral Health Programme 2000-2020 in oral health promotion and oral disease prevention.

### 3.12.1 Number of Natural Teeth

Oral health is one of the actual public health issues, and an integral part of the comprehensive actions in preventing and reducing non-communicable diseases. The human dental health is not only an important health indicator, but also serves as one of the key factors that prevent disorders of the digestive tract and other diseases. A total of 6013 respondents aged 15-64 years old were involved in the survey to determine the oral health status of the study population. When the responses were analyzed by the number of natural teeth, 73.7% of survey participants reported having 20 or more natural teeth, 16.7% had 10-19 teeth, 7.4% had 1-9 teeth, while 2.1% said that they have no natural permanent teeth. Collated by age groups, among the age groups over 35 years old the number of respondents who had 1-9 or 10-19 natural teeth was higher, and the number of respondents who had 20 or more natural teeth was lower when compared to other age groups ($p<0.001$). Analyzed by gender, the percentage of men who had no natural teeth was 1.4 times higher when compared to their female counterparts, the percentage of men with 10-19 natural teeth was 1.3 times lower, while the percentage of men with 20 or more natural teeth was 1.05 times higher. However, the differences in this indicator between the two genders were not statistically significant. Similarly, there was no statistically significant difference was observed in the number of natural teeth between the urban and rural respondents.

### 3.12.2 Usage of Removable Dentures

Replacing the lost teeth by removable dentures helps in dental and general health rehabilitation. In addition, this indicator helps to determine the availability of and access to dental care, and the health-consciousness of the population.

The percentage of respondents who have removable dentures was 29.9% among the 15-64 year-old study population. Collated by gender, 33.6% of men and 26.6% of women had removable dentures, with a statistically significant difference between the two sexes ($p<0.001$). When analyzed by age groups, the percentage of respondents who have removable dentures increased among the 35 and older year-old men, while this indicator for women increased among the 25 and older year-olds ($p<0.001$). The percentage of survey respondents having no natural teeth statistically significantly increased with age. However, the percentage of respondents who have no natural teeth was statistically significantly lower compared to other age groups ($p<0.001$). As the survey results indicate, the percentage of respondents who have no natural teeth was relatively similar in men and women. Nevertheless, more women than men had dentures, which could be explained by the fact that women pay more attention and invest more in their health and beauty compared to their male counterparts. Collated by locality, the usage of removable dentures was 1.3 times higher among the urban population compared to their rural counterparts (Table 109).

**Table 109.** Proportion of population with removable dentures (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 2.3 | 1.2-4.3 | 853 | 2.2 | 1.3-3.8 | 863 | 9.9 | 7.5-13.1 |
| 25-34 | 677 | 9.6 | 6.6-13.8 | 737 | 35.7 | 28.3-43.8 | 585 | 54.7 | 49.4-59.9 |
| 35-44 | 548 | 28.4 | 23-34.6 | 256 | 69.3 | 60.8-76.7 | 1651 | 2.3 | 1.5-3.4 |
| 45-54 | 449 | 41.1 | 36-46.4 | 1540 | 9.8 | 8.1-11.7 | 1285 | 32.3 | 26.6-38.6 |
| 55-64 | 247 | 49.4 | 41.1-57.7 | 1034 | 47.6 | 43.5-51.8 | 503 | 59.4 | 53.4-65 |
| Locality | | | | | | | | | |
| Urban | 1319 | 27.9 | 24.8-31.3 | 1400 | 24.7 | 21.1-28.7 | 2719 | 26.2 | 23.7-28.9 |
| Rural | 1674 | 39 | 35.2-43 | 1620 | 28.5 | 25.4-31.9 | 3294 | 33.6 | 30.6-36.7 |
| Total | 2993 | 33.6 | 30.7-36.8 | 3020 | 26.6 | 23.8-29.6 | 6013 | 29.9 | 27.5-32.4 |

### 3.12.3 Visit to Dentists

The percentage of respondents having seen a dentist during the past 12 months was 40.5% in the survey population. Collated by gender, 12 % more women (46.5%) visited a dentist compared to men (34.5%) (p<0.001). Comparing by locality, the percentage of respondents having seen a dentist during the past 12 months was 7.1% higher in the urban population (44.3%) compared to their rural counterparts (37.2%). When analyzed by gender in the urban areas, there was no statistically significant difference observed in this indicator between men and women. However, more rural women responded that they have seen a dentist compared to urban women and rural men (p<0.001) (Table 110).

**Table 110.** Proportion of population who visited dentists during the past 12 months (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 42.6 | 37.6-47.6 | 853 | 52.3 | 46.2-58.4 | 1651 | 47.3 | 42.7-51.9 |
| 25-34 | 677 | 30.1 | 26.2-34.0 | 863 | 47.6 | 42.0-53.2 | 1540 | 38.9 | 35.4-42.4 |
| 35-44 | 548 | 36.6 | 31.0-42.2 | 737 | 44.6 | 39.3-50.0 | 1285 | 40.9 | 37.2-44.7 |
| 45-54 | 449 | 31.3 | 26.2-36.4 | 585 | 45.8 | 39.8-51.8 | 1034 | 38.2 | 34.0-42.5 |
| 55-64 | 247 | 31.8 | 24.3-39.4 | 256 | 43.9 | 35.0-52.9 | 503 | 37.9 | 31.4-44.4 |
| Locality | | | | | | | | | |
| Urban | 1319 | 38.3 | 33.7-43.2 | 1400 | 31.2 | 27.8-34.7 | 2993 | 44.3 | 40.9-47.8 |
| Rural | 1400 | 31.2 | 27.8-34.7 | 1620 | 43.3 | 38.1-48.7 | 3020 | 37.2 | 33.5-41 |
| Total | 2719 | 34.5 | 31.3-37.6 | 3294 | 46.5 | 42.6-50.4 | 6013 | 40.5 | 37.9-43.1 |

The percentage of survey participants who have never received dental care was 8.2% among all respondents. However, this indicator was higher among the rural population (11.5 %). Collated by gender, the percentage of men (9.7%) who have never received dental care was 3% greater compared to that of women (5.7%) (Table 111).

**Table 111.** Proportion of population who have never received dental care (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 17.8 | 14.4-21.2 | 853 | 15.9 | 12.2-19.6 | 1651 | 16.9 | 14.1-19.6 |
| 25-34 | 677 | 13.9 | 9.9-18.0 | 863 | 9.9 | 6.6-13.3 | 1540 | 11.9 | 9.2-14.6 |
| 35-44 | 548 | 7.3 | 4.1-10.4 | 737 | 3.7 | 1.8-5.7 | 1285 | 5.4 | 3.4-7.4 |
| 45-54 | 449 | 5.3 | 2.8-7.9 | 585 | 3.9 | 1.5-6.3 | 1034 | 4.7 | 3.0-6.3 |
| 55-64 | 247 | 9.7 | 5.2-14.3 | 256 | 5.7 | 0.6-10.8 | 503 | 7.7 | 4.2-11.3 |
| Locality | | | | | | | | | |
| Urban | 1319 | 6 | 4.3-8.2 | 1400 | 2.8 | 2-3.9 | 2993 | 4.3 | 3.3-5.7 |
| Rural | 1400 | 12.7 | 10.5-15.5 | 1620 | 10.3 | 7.8-13.5 | 3020 | 11.5 | 9.5-13.9 |
| Total | 2719 | 9.6 | 8.0-11.3 | 3294 | 6.7 | 4.9-8.4 | 6013 | 8.2 | 6.7-9.6 |

Although replacing the lost teeth by dentures and receiving dental care are related to the population's dental health status, the survey results indicate that dental care coverage was better in the urban areas compared to rural areas. In addition, the results show that the women pay more attention to their dental health.

When the main reasons for the survey respondents' last visit to a dentist were analyzed, the most common reasons were treatment and follow up, pain or trouble with teeth, and periodontal (gum) disease. Among all respondents, 6.9% visited a dentist for routine check-ups. The percentage of respondents who had seen a dentist for treatment and follow up was higher in the urban population compared to the rural population, and in the women compared to men, while the percentage of respondents who visited a dentist for pain or trouble with teeth was higher in the rural population compared to their urban counterparts. The percentage of women who visited a dentist with the above-referenced reasons was by 5.4% higher compared to that of men.

### 3.12.4 Cleaning of Teeth

The percentage of respondents cleaning their teeth at least once a day was 94.1% in the 15-64 year-old population, 97.5% in the women, and 90.6% in the men, with a statistically significant difference between the two genders. Collated by age groups, the 15-24 year-olds cleaned their teeth more regularly compared to the 55-65 year-old population ($p<0.001$). Comparing by gender, women had better teeth cleaning behavior compared to their male counterparts (Table 112).

**Table 112.** Proportion of population who clean their teeth at least once a day (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 93.1 | 90.6-95.7 | 853 | 97.8 | 96.4-99.2 | 1651 | 95.4 | 93.7-97.0 |
| 25-34 | 677 | 91.0 | 87.1-94.8 | 863 | 99.0 | 98.2-99.8 | 1540 | 95.0 | 93.0-97.0 |
| 35-44 | 548 | 91.5 | 88.5-94.6 | 737 | 98.4 | 97.3-99.6 | 1285 | 95.2 | 93.5-97.0 |
| 45-54 | 449 | 89.8 | 86.4-93.2 | 585 | 96.0 | 94.0-98.1 | 1034 | 92.8 | 90.9-94.7 |
| 55-64 | 247 | 83.2 | 77.9-88.6 | 256 | 94.0 | 90.1-97.9 | 503 | 88.6 | 84.8-92.4 |
| Locality | | | | | | | | | |
| Urban | 1319 | 90.4 | 88-92.4 | 1400 | 97.4 | 95.5-98.5 | 2993 | 94 | 92.3-95.3 |
| Rural | 1400 | 90.8 | 87.4-93.3 | 1620 | 97.7 | 96.2-98.6 | 3020 | 94.2 | 92.2-95.7 |
| Total | 2719 | 90.6 | 88.8-92.5 | 3294 | 97.5 | 96.6-98.5 | 6013 | 94.1 | 93.0-95.3 |

When the frequency of teeth cleaning was examined, 56.6% of the study population cleaned their teeth at least twice a day (Table 113). Collated by gender, statistically significantly ($p<0.001$) more females (62.9%) than males (43.8%) cleaned their teeth at least twice a day, with 19.1% difference between men and women. However, when analyzed by locality there was no statistically significant difference observed between the urban (58.9%) and rural (54.5%) respondents. When compared by age groups and gender, a frequency of teeth cleaning decreased with age in both men and women ($p<0.001$) (Table 113).

**Table 113.** Proportion of population who clean their teeth at least twice a day (by age groups, gender and locality)

| Indicator | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95%CI | n | % | 95%CI | n | % | 95%CI |
| Age Group (years) | | | | | | | | | |
| 15-24 | 798 | 54.8 | 50.4-59.2 | 853 | 76.7 | 72.5-80.9 | 1651 | 65.3 | 62.0-68.7 |
| 25-34 | 677 | 51.0 | 43.9-58.2 | 863 | 72.0 | 67.5-76.4 | 1540 | 61.6 | 56.9-66.4 |
| 35-44 | 548 | 45.0 | 39.7-50.4 | 737 | 69.8 | 65.5-74.2 | 1285 | 58.3 | 54.1-62.4 |
| 45-54 | 449 | 35.5 | 28.4-42.5 | 585 | 64.3 | 58.9-69.7 | 1034 | 49.3 | 44.5-54.0 |
| 55-64 | 247 | 29.1 | 20.4-37.7 | 256 | 62.3 | 54.2-70.5 | 503 | 45.7 | 39.1-52.4 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Locality | | | | | | | | | |
| Urban | 1319 | 45.9 | 40.2-51.7 | 1400 | 71.2 | 68.5-73.8 | 2993 | 58.9 | 55.2-62.6 |
| Rural | 1400 | 41.9 | 35.9-48.2 | 1620 | 67.4 | 62.9-71.6 | 3020 | 54.5 | 49.8-59.1 |
| Total | 2719 | 43.8 | 39.4-48.1 | 3294 | 69.2 | 66.6-71.9 | 6013 | 56.6 | 53.5-59.7 |

## Discussion

Dental cavities and periodontal (gum) disease are major causes of tooth loss and tooth loss statistics serve as a oral health indicator of the population[3,4]. In recent years, the rate of tooth loss is decreasing in developed countries as a result of preventive programs' implementation and good oral care coverage[5]. According to our survey results, the complete loss of natural teeth was 2.1% (95%CI 1.6-2.8) among the respondents. This indicator was slightly higher in men compared to women, and in the urban population compared to the rural population.

The percentage of respondents with complete loss of natural teeth was 3.76% among the 20-64 year-old population, which is lower compared to the results of a study conducted in the USA and higher compared to the results of a study conducted in the Sri-Lanka (1.9)[6].

Furthermore, complete loss of natural teeth observed in the 34 and above year-old population, and statistically significantly increased with age in the 34-44, 45-54, 55-64 year-old population groups. These findings present a similar tendency with the results of an oral health survey conducted in Brazil[7], where the tooth loss rate was higher in the 34-44, 45-54, 55-64 year-old population compared to other age groups ($p<0.0001$). According to the oral health survey conducted in Brazil in 2002-2003, loss of natural teeth was higher in the rural population and in the women[8]. The percentage of the population who has 20 or more natural teeth was 77.5% (74-80.5) among the 34-45 year-old population of Mongolia, while in Hungary the percentage of the population who have 21 or more natural teeth in the population of same age group was lower, at 73.1[9] %, as of 2000.

According to our study, when the population's oral health status was collated by gender and locality, the women and the urban respondents paid more attention and took better care for their teeth and oral cavities; and access to and availability of dental care and services were better in the urban areas.

One of the important factors for healthy teeth is positive and healthy dental hygiene. According to the present survey results, 95.4% of the 15-24 year-old respondents cleaned their teeth at least once a day, while 65.3% cleaned their teeth at least twice a day. These indicators have slightly decreased, compared to the 2010 oral health survey results conducted among youth and adolescents of Ulaanbaatar city (98%; 74% for the 18 year-old youth). This difference might be related to the factors such as the above-referenced study covered only Ulaanbaatar city and different age groups. However, the results of both surveys indicate that the youth and adolescents have a positive behavior in oral health hygiene.

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[6] Int Dent J. 2011 Feb;61(1):7-11. doi: 10.1111/j.1875-595X.2011.00002.x.Perera R, Ekanayake L. Tooth loss in Sri Lankan adults.
[7] International Journal of Dentistry. Volume 2012 (2012), Article ID 719750, 5 pages
[8] P. R. Barbato, H. C. M. Nagano, F. N. Zanchet, A. F. Boing, and M. A. Peres, "Tooth loss and assoИХated soИХoeconomic, demographic, and dental-care factors in Brazilian adults: an analysis of the Brazilian Oral Health Survey, 2002-2003," Cadernos de Saude Publica, vol. 23, no. 8, pp. 1803–1814, 2007.
[9] BMC Public Health 2008, 8:364 doi:10.1186/1471-2458-8-364

According to the 2012 survey results conducted by the International Association for Dental Research, the percentage of respondents who have 20 or more natural teeth was 100% in the 15-18 year-old population, 68.6% in the 35-44 year-old population, and 17.7% in the 65 or above year-old population. In the present survey, these indicators decreased to 99.3% for the 15-24 year-old respondents, and 77.5% for the 35-44 year-old respondents.

Over half of the survey population (54.3%) sought dental care only when they have pain or trouble with teeth, showing an ignorant attitude to their dental health, and insufficient coverage by preventive consultations and routine check-ups. Systematic reviews by Cochrane Oral Health Group suggest that cleaning teeth twice a day using fluoride toothpaste protects from dental caries and decay[10]. According to the results of "Oral health knowledge, attitudes and behaviour of adults in China" survey, 35% of the 35-44 year-old population (48% in the urban and 16% in the rural areas) cleaned their teeth at least twice a day. The results of our survey indicate that these indicators were higher in Mongolia, in particular the percentage of respondents who cleaned their teeth at least twice a day was 56.6% (95%CI 53.5-59.7) for the same age group 58.9%, (95%CI 55.2-62.6) in the urban and 54.5%, (95%CI 49.8-59.1) in the rural areas.

Collated by locality, dental care coverage was lower among the rural population compared to the urban population, indicating insufficient access to and availability of dental care in the rural areas. Although the differences were not statistically significant, the rate of complete loss of natural teeth and the percentage of population with a few natural teeth was lower among the rural respondents compared to their urban counterparts, which might be contributed by their traditional diet using plenty of dairy products and less sweets.

## Conclusions

1. 73.7% of the survey respondents had 20 or more natural teeth, while 2.1% had no natural teeth. The number of natural teeth decreased and complete loss of teeth increased with age. The percentage of respondents who have removable dentures was 29.9% in the survey population, 33.6% in the women and 26.2% in the men.

2. During the past 12 months, 40.5% of the survey respondents sought dental care for treatment and follow-ups, and pain or trouble with teeth. The percentage of respondents who visited a dentist for treatment and follow-ups was relatively higher in the urban areas, and among the women. However, the percentage of respondents who sought dental care because of pain or trouble with teeth was higher in the rural population.

3. The percentage of respondents cleaning their teeth at least once a day was 94.1%, while 56.6% cleaned their teeth at least twice daily. Teeth cleaning behavior decreased with age. More women cleaned their teeth regularly compared to their male counterparts.

[10] Inequalities in young people's health. Health Behaviour in Schoolaged Children (HSBC) international report from the 2005/2006 survey. Eds Currie C,Gabhainn SN, Godeau E, et al. WHO ISBN 97 892 890 7195 6 pp 97-100.

# CHAPTER 4. GENERAL CONCLUSIONS

One in every four Mongolians aged 15-64 years old are current smokers. Tobacco use among the population remains high; there were no significant declines since the previous surveys. Furthermore, the mean age for starting smoking is getting younger. The alcohol consumption in the past 12 months among survey respondents did not decrease compared to the previous survey results. Around 4 in every 10 respondents were current drinkers reporting alcohol consumption in the past 30 days. The frequency of alcohol drinking has increased this requires appropriate attention.

Although the mean number of days fruit and vegetables were consumed in a typical week by the survey population did not decline compared to the 2009 level the average daily consumption of vegetables decreased by around 30%. The majority of the study population had risky behavior using less than 5 servings of fruit and vegetables on average per day. It illustrated that the percentage of the population not meeting the WHO physical activity recommendations for health increased, and the median time spent in physical activity per day decreased.

The mean BMI in the study population increased. The prevalence of being overweight and obesity raised by 14.6%, while the prevalence of obesity also increased by 5.2%. In addition, the mean blood cholesterol among the study population increased, and the percentage of the population either with or at risk of raised total cholesterol significantly increased reaching 61.9%, confirming the increased prevalence of overweight and obesity.

One in every three among the 25-64 year-old population of Mongolia had a decreased blood HDL, having a greater risk for developing NCDs, and one in four had an increased blood LDL or risks for an increased blood LDL. The prevalence of an increased blood LDL or risks for an increased blood LDL was relatively high in all men, and 45-64 year-old women. Despite the relatively high percentage of the population with increased blood LDL or risks for an increased blood LDL, only 1.2% of those were currently taking medication for elevated blood lipids.

One in four persons among the study population had a raised blood pressure or arterial hypertension, and men had relatively higher prevalence of arterial hypertension compared to that of women. Although the prevalence of arterial hypertension remained stable without significant changes, the early detection and medicinal treatment and control of arterial hypertension were improved compared to the 2009 level.

The prevalence of an Impaired Fasting Glucose was 8.3% in the 25-64 year-old Mongolian population, whereas the prevalence of diabetes with deviated levels of fasting blood glucose or currently taking glucose-lowering medication was at 6.9%. These results demonstrate that the prevalence of diabetes remained stable compared to the 2009 level.

The mean sodium and creatinine concentrations in a spot urine sample in the 25-64 year-old Mongolian population were 132.6 mmol/L and 123.2 mg/dl respectively, and these indicators decreased with age. Furthermore, over a half of the survey population did not use any methods to reduce their salt intake. The proportion of the population who apply the following simple methods on a regular basis in order to control their salt intake was insufficient; avoid consumption of processed food products that are high in salt, check and look at salt or sodium content on the labels of food products, and avoid dining out.

Among the 15-64 year-old population of Mongolia, one in every five was found as having a cardiovascular disease (CVD) risk including those with existing CVD. The majority or 92.5% of the respondents with a cardiovascular disease (CVD) risk ≥30% or with existing CVD were currently receiving drug therapy and counseling to prevent heart attacks or strokes.

One in three of the 15-64 year-old Mongolian population and over a half of the 45 years and above population had 3-5 common modifiable NCD risk factors; thus indicating high risks of developing NCDs. The percentage of the 15-44 year-old men who have 3-5 combined common modifiable

NCDI risk factors was by 14.1% higher compared to that of their female counterparts.

One in every three women have had their breast examined by a health care provider, over a half of the female respondents were covered by early screening tests for cervical cancer. Breast and cervical cancer screening coverage was relatively higher in the rural women compared to the women from urban areas. The cancer screening coverage has improved since the last survey conducted in 2009, possibly as a result of the implementation of the MCA-M health project.

17.2% of the survey respondents reported having NCDs currently or in the past. Among those who reported having NCDs previously or currently, 39.3% had sought health care and services from health organizations during the past 30 days. The percentage of respondents seeking health care from health organizations increased with age. The majority of the population sought healthcare from primary health care providers such as family group practices or soum health centers and pharmacies.

Three in four survey respondents did not regularly use a seatbelt or only used a seatbelt 'sometimes', while the majority or 86.3% of the study population, did not use helmets regularly when riding a motorcycle or bicycle. The prevalence of self-reported traffic injuries was 3.4% in the study population. Traffic injuries were significantly more common in men than in women.

Among all respondents, 6% were subject to violence and injured requiring medical attention. This indicator was increased compared to the previous 2009 level. One in every two respondents was a victim of interpersonal violence, and preferred to be covered by public services. One in every two survey respondents was abused as a child, and all forms of violence against children still exist in the society.

Although the majority of the 15-64 year-old Mongolian population cleaned their teeth, only around six in ten respondents clean their teeth at least twice a day. More women cleaned their teeth regularly compared to their male counterparts and teeth cleaning behavior decreased with age.

# CHAPTER 5. RECOMMENDATIONS

Advocacy, awareness raising, BCC and public health education about health risks and harms are to be organized and enhanced; Improve the implementation of the Law on Tobacco Control, and intensify the monitoring of the law enforcement,

Behavior change communication and public health education for the targeted population groups to be implemented by health care providers and health-related organizations, improve the quality of services and counseling in giving up the use of tobacco, promote initiatives in creating smoke-free environments in work places, business entities and services, and in homes and households,

Advocacy, awareness raising and public health education about health risks and harms of the excessive use of alcohol, continue to conduct the public health interventions implemented by the Millennium Challenge Account, Mongolia (MCA-M) health project, increase excise tax on alcohol, improve the implementation and enforcement of the Law against Alcoholism, promote public movements in reducing alcohol consumption,

Promote and provide socio-economic support for the behavior change communication and public health education in reducing the excessive use of animal fat and oil, the sufficient daily consumption of fruit and vegetables, support income generation and improve the living standards of the population, provide favorable environments and conditions to introduce and develop the advanced technologies in food industries, improve health and nutrition and education of the population, BCC activities in a well-balanced diet,

Promote fruit and vegetables gardening at a household level, daily sufficient use of fruit and vegetables, regularly organize public health education campaigns and training sessions in food safety and food preparation technologies,

In collaboration with the relevant specialists and teachers, develop tailored training programmes reflecting specific needs for different regions, education levels of the target population groups, and conduct training sessions for the general public in the risk factors of overweight and obesity, diseases and disorders attributable to overweight and obesity and their prevention.

Based on WHO physical activity recommendations for health, develop the methodological guidelines for body weight monitoring and maintenance, and regularly conduct public health education sessions for the general public through primary health care providers such as family clinics and soum health centers.

Establish and utilize a database of people having overweight and obesity based on existing health information and registration of the family group practices, regularly provide counseling in healthy lifestyles, and public health education in risk factors, prevention and early detection of overweight and obese people,

Implement comprehensive actions and interventions to promote a well-balanced diet and physical activities; develop and publish the IEC materials, guidelines, manuals and recommendations and disseminate the same to households,

Regularly organize the information dissemination and public health education sessions for the public, particularly for the target groups such as men and young people and adolescents about salt; improve skills in public health education and counseling of primary health care providers, intensify IEC and BCC in reducing salt intake,

In order to prevent cardiovascular diseases, develop and implement a public health education programme including BCC in healthy lifestyles and improving knowledge, attitude and practices towards NCD risk factors,

Establish and develop a surveillance system to regularly monitor the prevalence of NCD risk factors among the population of different age groups, develop the guidelines in early detection, prevention and control of NCDs for primary health care providers, conduct training sessions on how to use the

guidelines in order to build capacity of health professionals in NCD prevention and control,

Advocacy, awareness raising, BCC and public health education about the importance of early detection of cervical cancer for the 15-24 year-old young women, continue organizing MCA-M initiated and implemented counseling and testing for early detection of breast and cervical cancers,

Improve and intensify the implementation of the National Programme on Oral Health, promote and improve public health education in oral health, develop and distribute the tailored IEC materials and conduct BCC activities for the target population groups by gender, different age groups, and locality, take and implement comprehensive measures to improve the quality and accessibility of dental care, particularly in the rural areas,

Improve and intensify awareness raising, advocacy, BCC and public health education about violence and violence prevention for the general public, and the relevant stakeholders and service providers such as doctors, the police, and social workers in order to develop capacity in responding to violence,

In the framework of the National Programme on Injury Prevention, to establish and operate one-spot service centers within the premises of the regional centers for diagnosis and treatment in order to provide social worker's services and care to victims of violence, and improve the registration and information of violence,

In order to reduce violence against children, advocacy, awareness raising, BCC and public health education for families, service providers and the general population need to be regularly organized and collaboratively conducted by the relevant sectors, stakeholders and organizations in health, education and social protection and welfare using a comprehensive and participatory approach.

Appendix 1

# SURVEY REQUESTS

## Demographic indicator

**Table 1. Marital status**

| Age Group (years) | n | % Never married | % Married/ certified | % Married/ not certified | % Separated | % Divorced | % Widowed | % Widowed |
|---|---|---|---|---|---|---|---|---|
| | | | | **Men** | | | | |
| 15-24 | 798 | 87.1 | 7.1 | 5.4 | 0 | 0 | 0 | 0.4 |
| 25-34 | 677 | 13.6 | 74.3 | 10.3 | 0.7 | 1 | 0 | 0 |
| 35-44 | 548 | 4 | 84.3 | 9.5 | 0.4 | 1.5 | 0.2 | 0.2 |
| 45-54 | 449 | 0.7 | 91.3 | 4.5 | 0.7 | 2.2 | 0.7 | 0 |
| 55-64 | 247 | 0.8 | 91.9 | 3.2 | 0 | 0 | 4 | 0 |
| **Total** | **2719** | **29.9** | **61** | **7.1** | **0.4** | **0.9** | **0.5** | **0.1** |
| | | | | **Women** | | | | |
| 15-24 | 853 | 73.4 | 14.2 | 12.2 | 0.0 | 0.2 | 0.0 | 0.0 |
| 25-34 | 863 | 11.5 | 72.9 | 12.6 | 0.8 | 2.1 | 0.1 | 0.0 |
| 35-44 | 737 | 4.3 | 81.5 | 7.9 | 0.5 | 3.7 | 2 | 0.0 |
| 45-54 | 585 | 2.1 | 82.4 | 3.1 | 0.7 | 3.9 | 7.9 | 0.0 |
| 55-64 | 256 | 1.2 | 74.6 | 2.3 | 0.8 | 3.5 | 17.6 | 0.0 |
| **Total** | **3294** | **23.4** | **61.4** | **9** | **0.5** | **2.4** | **3.2** | **0.0** |
| | | | | **Both Sexes** | | | | |
| 15-24 | 1651 | 80 | 10.8 | 8.9 | 0 | 0.1 | 0 | 0.2 |
| 25-34 | 1540 | 12.4 | 73.5 | 11.6 | 0.8 | 1.6 | 0.1 | 0 |
| 35-44 | 1285 | 4.2 | 82.7 | 8.6 | 0.5 | 2.7 | 1.2 | 0.1 |
| 45-54 | 1034 | 1.5 | 86.3 | 3.7 | 0.7 | 3.2 | 4.7 | 0 |
| 55-64 | 503 | 1 | 83.1 | 2.8 | 0.4 | 1.8 | 10.9 | 0 |
| **Total** | **6013** | **26.4** | **61.3** | **8.1** | **0.4** | **1.7** | **2** | **0.1** |

**Table 2. Highest level of education**

| Age Group (years) | n | % No formal schooling | % Less than primary school | % Primary school completed | % Secondary school completed | % High school completed | % College/ University completed | % University | % Post graduate degree completed |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Men** | | | | |
| 15-24 | 798 | 1.3 | 0.3 | 7.3 | 38.6 | 35.2 | 3.6 | 13.5 | 0.3 |
| 25-34 | 677 | 2.8 | 4.1 | 10.9 | 11.8 | 28.7 | 6.4 | 33.1 | 2.2 |
| 35-44 | 548 | 1.1 | 1.3 | 7.5 | 21 | 34.7 | 14.4 | 17.5 | 2.6 |
| 45-54 | 449 | 1.1 | 2.2 | 6.5 | 20.7 | 25.6 | 24.9 | 16.7 | 2.2 |
| 55-64 | 247 | 2.4 | 2.4 | 14.6 | 15 | 17.4 | 27.5 | 18.2 | 2.4 |
| **Total** | **2719** | **1.7** | **1.9** | **8.8** | **23.3** | **30.3** | **12.2** | **20.2** | **1.7** |
| | | | | | **Women** | | | | |
| 15-24 | 853 | 0.2 | 0.9 | 5.7 | 33.4 | 33.3 | 5.9 | 20 | 0.5 |
| 25-34 | 863 | 2.4 | 3 | 5.8 | 10.2 | 23.1 | 6.8 | 45 | 3.7 |
| 35-44 | 737 | 0.8 | 0.4 | 3.1 | 13.7 | 31.1 | 23.9 | 24 | 3 |
| 45-54 | 585 | 1.4 | 0.7 | 3.9 | 8.9 | 28.4 | 36.1 | 17.3 | 3.4 |
| 55-64 | 256 | 1.6 | 2 | 11.7 | 8.6 | 23 | 34.4 | 16.8 | 2 |
| **Total** | **3294** | **1.2** | **1.4** | **5.3** | **16.6** | **28.4** | **17.7** | **26.7** | **2.5** |

**Table 3. Employment status**

| Age Group (years) | n | % Government employee | % Non-government employee | % Self-Employed | % Unpaid |
|---|---|---|---|---|---|
| | | | **Men** | | |
| 15-24 | 798 | 5.8 | 7.1 | 9.8 | 77.2 |
| 25-34 | 677 | 26.9 | 20.2 | 37.2 | 15.7 |
| 35-44 | 548 | 25.4 | 15.9 | 41.6 | 17.2 |
| 45-54 | 449 | 28.3 | 11.1 | 32.3 | 28.3 |
| 55-64 | 247 | 13.8 | 4.5 | 13.8 | 68 |
| **Total** | **2719** | **19.4** | **12.6** | **27.1** | **40.9** |
| | | | **Women** | | |
| 15-24 | 853 | 7.3 | 8.4 | 3.8 | 80.5 |
| 25-34 | 863 | 25.7 | 15.9 | 20.3 | 38 |
| 35-44 | 737 | 34.6 | 14.4 | 24.8 | 26.1 |
| 45-54 | 585 | 35.4 | 11.3 | 25.1 | 28.2 |
| 55-64 | 256 | 10.9 | 5.1 | 5.1 | 78.9 |
| **Total** | **3294** | **23.5** | **12** | **16.7** | **47.8** |

**Table 4. Unpaid work and unemployed**

| Age Group (years) | n | % Non-paid | % Student | %Home-maker | % Retired | Unemployed | |
|---|---|---|---|---|---|---|---|
| | | | | | | % Able to work | % Not able to work |
| | | | | **Men** | | | |
| 15-24 | 616 | 1.8 | 86.2 | 0.5 | 0 | 9.6 | 1.9 |
| 25-34 | 106 | 19.8 | 7.5 | 2.8 | 0.9 | 55.7 | 13.2 |
| 35-44 | 94 | 13.8 | 1.1 | 3.2 | 6.4 | 52.1 | 23.4 |
| 45-54 | 127 | 8.7 | 0 | 4.7 | 19.7 | 36.2 | 30.7 |
| 55-64 | 168 | 4.8 | 0 | 1.2 | 68.5 | 9.5 | 16.1 |
| **Total** | **1111** | **5.8** | **48.6** | **1.5** | **13.2** | **20.6** | **10.3** |
| | | | | **Women** | | | |
| 15-24 | 687 | 1.2 | 74.4 | 11.9 | 0 | 11.5 | 1 |
| 25-34 | 328 | 3.4 | 6.1 | 52.4 | 0.6 | 34.5 | 3 |
| 35-44 | 192 | 4.7 | 1 | 33.3 | 0.5 | 47.9 | 12.5 |
| 45-54 | 165 | 3 | 0.6 | 17 | 24.2 | 35.8 | 19.4 |
| 55-64 | 202 | 1 | 0 | 3 | 94.6 | 0.5 | 1 |
| **Total** | **1574** | **2.2** | **33.9** | **22.4** | **14.9** | **21.9** | **4.8** |

## TOBACCO USE

**Table 5 . Smoking status (Age groups, gender)**

| Age Group (years) | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Current smoker | 95% CI | n | Current smoker | 95% CI | n | Current smoker | 95% CI |
| **Urban** | 1319 | 50.6 | 45.8-55.4 | 1674 | 8.6 | 6.6-11.1 | 2993 | 29 | 25.9-32.4 |
| **Rural** | 1400 | 47.9 | 45-0.7 | 1620 | 2.3 | 1.2-4.6 | 3020 | 25.4 | 23.2-27.7 |
| **Total** | **2719** | **49.1** | **46.5-51.8** | **3294** | **5.3** | **4-7** | **6013** | **27.1** | **25.2-29** |

**Table 6. Smoking status (Age groups, gender)**

| Age Group (years) | n | Current smoker | | | | Non-smoker | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | % Daily | 95% CI | % Non-daily | 95% CI | % Former smoker | 95% CI | % Never smoke | 95% CI |
| **Men** | | | | | | | | | |
| 15-24 | 798 | 19.3 | 15.5-23.8 | 5.6 | 3.9-8.2 | 7.9 | 5.5-11.2 | 67.1 | 62.2-71.8 |
| 25-34 | 677 | 50.6 | 45.7-55.6 | 6.1 | 4.1-8.9 | 10.4 | 7.7-14 | 32.9 | 27.7-38.5 |
| 35-44 | 548 | 53.8 | 48-59.5 | 2.8 | 1.5-5 | 18.6 | 14.6-23.5 | 24.8 | 20.3-29.9 |
| 45-54 | 449 | 46.7 | 42-51.5 | 2.5 | 1.3-4.7 | 26.1 | 19.8-33.7 | 24.6 | 19.2-31 |
| 55-64 | 247 | 44.7 | 36.2-53.5 | 2.2 | 0.9-4.9 | 23.2 | 16.7-31.1 | 30 | 23.4-37.5 |
| **Total** | **2719** | **45.4** | **42.6-48.3** | **3.7** | **2.8-4.9** | **18** | **15.4-21** | **32.8** | **30.2-35.6** |
| **Women** | | | | | | | | | |
| 15-24 | 853 | 1.3 | 0.7-2.6 | 1 | 0.5-2.1 | 2.2 | 1.3-3.7 | 95.5 | 93.4-96.9 |
| 25-34 | 863 | 5.6 | 3.6-8.7 | 1.1 | 0.6-1.9 | 4.7 | 3.4-6.4 | 88.7 | 84.6-91.8 |
| 35-44 | 737 | 4.9 | 3.5-6.7 | 1.3 | 0.6-2.7 | 2.7 | 1.7-4.3 | 91.1 | 88.6-93.2 |
| 45-54 | 585 | 5 | 2.8-8.6 | 0.2 | 0-1.3 | 4 | 2.4-6.8 | 90.8 | 86.4-93.9 |
| 55-64 | 256 | 3.9 | 1.9-7.7 | 0 | 0-0 | 2.9 | 1.3-6.4 | 93.2 | 88-96.2 |
| **Total** | **3294** | **4.5** | **3.3-6** | **0.8** | **0.5-1.3** | **3.4** | **2.6-4.4** | **91.3** | **89.1-93.1** |

**Table7. Frequency of smoking (Gender, by locality)**

| Age Group (years) | n | Current smoker | | | | Non-smoker | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | % Daily | 95% CI | % Non-daily | 95% CI | % Former smoker | 95% CI | % Never smoke | 95% CI |
| **Men** | | | | | | | | | |
| **Urban** | 1319 | 47 | 42.3-51.7 | 3.6 | 2.4-5.4 | 17.8 | 13.8-22.5 | 31.6 | 27.9-35.7 |
| **Rural** | 1400 | 44.1 | 40.9-47.4 | 3.8 | 2.6-5.5 | 18.3 | 14.8-22.3 | 33.9 | 30.3-37.6 |
| **Total** | **2719** | **45.4** | **42.6-48.3** | **3.7** | **2.8-4.9** | **18** | **15.4-21** | **32.8** | **30.2-35.6** |
| **Women** | | | | | | | | | |
| **Urban** | 1674 | 7.1 | 5.5-9.2 | 1.5 | 0.9-2.4 | 6.4 | 4.9-8.4 | 85 | 81.6-87.8 |
| **Rural** | 1620 | 2.1 | 1-4.4 | 0.2 | 0.1-0.7 | 0.5 | 0.3-1.1 | 97.2 | 94.9-98.4 |
| **Total** | **3294** | **4.5** | **3.3-6** | **0.8** | **0.5-1.3** | **3.4** | **2.6-4.4** | **91.3** | **89.1-93.1** |

**Table 8. Current daily smokers among smokers (Age groups, gender)**

| Age Group (years) | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| 15-24 | 220 | 77.4 | 68.3-84.5 | 25 | 56.6 | 32-78.3 | 245 | 75.8 | 68.6-81.7 |
| 25-34 | 388 | 89.3 | 84.6-92.7 | 51 | 84.2 | 72.2-91.6 | 439 | 88.7 | 84.2-92.1 |
| 35-44 | 289 | 95.1 | 91.1-97.3 | 52 | 79.2 | 63-89.5 | 341 | 93.3 | 89.0-96.0 |
| 45-54 | 220 | 94.9 | 90.6-97.2 | 34 | 95.8 | 78-99.3 | 254 | 94.9 | 91.1-97.2 |
| 55-64 | 111 | 95.4 | 89.3-98.1 | 11 | 100 | 100-100 | 122 | 95.8 | 90.2-98.2 |
| **Total** | **1228** | **92.5** | **90.1-94.3** | **173** | **84.2** | **77.4-89.3** | **1401** | **91.7** | **89.3-93.5** |

**Table 9. Mean age started smoking (Age groups , gender, by locality)**

| Age Group (years) | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean age | 95% CI | n | Mean age | 95% CI | n | Mean age | 95% CI |
| **Age groups** | | | | | | | | | |
| 15-24 | 166 | 3.9 | 3.1-4.6 | 15 | 4.1 | 3.4-4.7 | 181 | 3.9 | 3.2-4.6 |
| 25-34 | 340 | 11.5 | 10.9-12.1 | 39 | 6.5 | 4.8-8.2 | 379 | 11.0 | 10.5-11.5 |
| 35-44 | 274 | 19.7 | 18.5-20.8 | 40 | 13.0 | 9.2-16.8 | 314 | 19.1 | 18.2-19.9 |
| 45-54 | 207 | 29.8 | 28.5-31.1 | 32 | 21.1 | 16.1-26.0 | 239 | 29.0 | 27.8-30.3 |
| 55-64 | 104 | 36.4 | 33.9-38.8 | 11 | 28.8 | 21.6-36 | 115 | 35.7 | 33.4-38.1 |
| **Total** | **1091** | **21.2** | **20.2–22.1** | **137** | **14.4** | **11.1–17.6** | **1228** | **20.5** | **19.5–21.5** |
| **Locality** | | | | | | | | | |
| **Urban** | 561 | 20.2 | 19.1-21.3 | 108 | 13.3 | 10.2-16.4 | 669 | 19.2 | 18.1-20.4 |
| **Rural** | 530 | 22.1 | 20.8-23.4 | 29 | 17.7 | 10.7-24.6 | 559 | 21.9 | 20.6-23.1 |

**Table 10. Manufactured cigarette smokers among daily smokers**

| Age Group (years) | Men | | | Women | | | Total | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % Manu-factured cigarette smoker | 95% CI | n | % Manu-factured cigarette smoker | 95% CI | n | % Manu-factured cigarette smoker | 95% CI |
| 15-24 | 171 | 99.4 | 95.8-99.9 | 15 | 100 | 100-100 | 186 | 99.5 | 96.0-99.9 |
| 25-34 | 342 | 98.7 | 95.1-99.7 | 39 | 100 | 100-100 | 381 | 98.8 | 95.5-99.7 |
| 35-44 | 274 | 97.3 | 92.1-99.1 | 40 | 100 | 100-100 | 314 | 97.6 | 92.8-99.2 |
| 45-54 | 207 | 90.2 | 80.3-95.4 | 32 | 96 | 73.4-99.5 | 239 | 90.7 | 81.3-95.7 |
| 55-64 | 104 | 85.3 | 73.9-92.2 | 11 | 100 | 100-100 | 115 | 86.5 | 75.8-92.9 |
| **Locality** | | | | | | | | | |
| **Urban** | 566 | 99.8 | 99-100 | 108 | 100 | 100-100 | 674 | 99.8 | 99.1-100 |
| **Rural** | 532 | 90.4 | 81.3-95.3 | 29 | 95.1 | 66.9-99.5 | 561 | 90.6 | 81.7-95.4 |
| **Total** | **1098** | **94.8** | **89.8–97.5** | **137** | **98.8** | **91.3–99.9** | **1235** | **95.2** | **90.5–97.6** |

**Table 11. Mean amount of tobacco used by daily smokers by type( gender)**

| Age Group (years) | n | <5 тобacco % | 95% CI | 5-9 тобac-co % | 95% CI | 10-14 тобacco % | 95% CI | 15-24 тобac-co % | 95% CI | ≥ 25 тобacco % | 95% CI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Men** | | | | | | | | | | | |
| 15-24 | 171 | 36.0 | 26.6-45.5 | 44.0 | 34.6-53.3 | 13.0 | 5.7-20.4 | 5.1 | 0.9-9.3 | 1.9 | 0.0-5.6 |
| 25-34 | 342 | 14.5 | 9.1-19.9 | 31.5 | 25.1-38.0 | 26.8 | 20.2-33.5 | 26.5 | 21.0-32.1 | 0.6 | 0.0-1.3 |
| 35-44 | 274 | 12.4 | 7.0-17.8 | 27.9 | 19.8-36.1 | 26.8 | 19.5-34.1 | 29.8 | 22.1-37.5 | 3.1 | 0.0-6.9 |
| 45-54 | 207 | 15.2 | 9.2-21.2 | 19.2 | 12.3-26.0 | 23.4 | 15.4-31.4 | 40.3 | 31.7-49.0 | 1.9 | 0.0-4.4 |
| 55-64 | 102 | 21.9 | 10.5-33.2 | 22.7 | 10.7-34.6 | 17.5 | 8.8-26.3 | 31.9 | 21.2-42.6 | 6.0 | 1.1-11.0 |
| **Total** | **1096** | **15.8** | **12.5–19.0** | **26.7** | **21.5–31.9** | **24.3** | **19.4–29.2** | **30.9** | **26.2–35.6** | **2.3** | **0.8–3.9** |
| **Women** | | | | | | | | | | | |
| 15-24 | 15 | 57.8 | 34.1-81.5 | 19.6 | 0.0-41.2 | 22.6 | 0.0-48.5 | 0.0 | 0.0-0.0 | 0.0 | - |
| 25-34 | 39 | 57.9 | 32.4-83.4 | 27.3 | 10.9-43.8 | 10.8 | 0.0-21.9 | 3.9 | 0.0-9.8 | 0.0 | - |
| 35-44 | 40 | 33.9 | 14.0-53.8 | 19.3 | 1.8-36.8 | 43.5 | 17.6-69.4 | 3.3 | 0.0-8.9 | 0.0 | - |
| 45-54 | 32 | 42.2 | 12.9-71.4 | 18.5 | 2.1-35.0 | 23.1 | 1.4-44.8 | 16.2 | 1.3-31.1 | 0.0 | - |
| 55-64 | 11 | 37.4 | 8.3-66.4 | 22.7 | 0.0-48.2 | 33.1 | 0.0-71.7 | 6.9 | 0.0-20.9 | 0.0 | - |
| **Total** | **137** | **43.0** | **31.2–54.8** | **21.1** | **11.4–30.8** | **28.6** | **16.2–41.0** | **7.3** | **2.4–12.2** | **0.0** | - |

**Table 12. Mean amount of tobacco used by daily smokers by type**

| Age Group (years) | n | Mean # of manufactured cig. | 95% CI | n | Mean # of hand-rolled cig. | 95% CI | n | Mean # of pipes of tobacco | 95% CI | n | Mean # of other type of tobacco | 95% CI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Men** | | | | | | | | | | | | |
| 15-24 | 171 | 6.1 | 5.1-7.1 | 171 | 0.5 | -0.3-1.3 | 171 | 0 | 0-0 | 169 | 0.5 | -0.3-1.3 |
| 25-34 | 342 | 9.9 | 9-10.7 | 342 | 0.4 | 0-0.8 | 342 | 0 | 0-0.1 | 340 | 0.2 | 0-0.4 |
| 35-44 | 274 | 10.9 | 9.7-12.1 | 274 | 0.4 | 0.1-0.6 | 274 | 0 | 0-0 | 272 | 0.4 | 0-0.7 |
| 45-54 | 207 | 11 | 9.5-12.4 | 207 | 1.4 | 0.5-2.3 | 207 | 0 | 0-0 | 203 | 0.7 | 0-1.5 |
| 55-64 | 104 | 9.6 | 7.3-11.9 | 104 | 2.2 | 1-3.4 | 104 | 0.6 | 0.1-1.2 | 103 | 0.7 | 0.1-1.5 |
| **Total** | **1098** | **10.3** | **9.5–11.2** | **1098** | **0.8** | **0.4–1.3** | **1098** | **0** | **0–0.1** | **1087** | **0.5** | **0.1–0.8** |
| **Women** | | | | | | | | | | | | |
| 15-24 | 15 | 4.5 | 2.9-6.2 | 15 | 0 | 0-0 | 15 | 0.1 | -0.1-0.2 | 15 | 0.1 | 0.1-0.3 |
| 25-34 | 39 | 5.3 | 3.9-6.7 | 39 | 0 | 0-0 | 39 | 0 | 0-0 | 39 | 0 | 0-0 |
| 35-44 | 40 | 7 | 5.2-8.7 | 40 | 0 | 0-0 | 40 | 0 | 0-0 | 40 | 0 | 0-0 |
| 45-54 | 32 | 6.8 | 4.5-9 | 32 | 0.6 | -0.2-1.4 | 32 | 0.4 | -0.3-1.1 | 32 | 0.2 | 0.2-0.6 |
| 55-64 | 11 | 7.1 | 4.2-10.1 | 11 | 0 | 0-0 | 11 | 0 | 0-0 | 11 | 0 | 0-0 |
| **Total** | **137** | **6.4** | **5.5–7.4** | **137** | **0.2** | **–0.1–0.4** | **137** | **0.1** | **–0.1–0.3** | **137** | **0.1** | **0.1–0.2** |
| **Both Sexes** | | | | | | | | | | | | |
| 15-24 | 186 | 6.0 | 5.1-7 | 186 | 0.5 | 0.2-1.2 | 186 | 0 | 0-0 | 185 | 0.8 | -0.2-1.9 |
| 25-34 | 381 | 9.4 | 8.6-10.3 | 381 | 0.3 | 0-0.7 | 381 | 0 | 0-0 | 380 | 0.2 | 0-0.4 |
| 35-44 | 314 | 10.5 | 9.4-11.7 | 314 | 0.3 | 0.1-0.6 | 314 | 0 | 0-0 | 312 | 0.3 | 0-0.6 |
| 45-54 | 239 | 10.6 | 9.2-12 | 239 | 1.3 | 0.5-2.2 | 239 | 0 | 0-0.1 | 235 | 0.7 | 0-1.4 |
| 55-64 | 115 | 9.4 | 7.3-1.5 | 115 | 2 | 0.9-3.1 | 115 | 0.5 | 0.1-1.1 | 114 | 0.6 | -0.1-1.4 |
| **Total** | **1235** | **10.0** | **9.2–10.8** | **1235** | **0.8** | **0.3–1.2** | **1235** | **0.1** | **0–0.1** | **1226** | **0.5** | **0.1–0.8** |

**Table 13. Former daily smokers (who don't smoke currently) among all respondents**

| Age Group (years) | Former daily smokers (who use before) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Men | | | Woman | | | Both Sexes | | |
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| 15-24 | 798 | 4.8 | 3.2-7.2 | 853 | 0.8 | 0.3-1.7 | 1651 | 2.9 | 2-4.2 |
| 25-34 | 677 | 9.7 | 7-13.3 | 863 | 2.9 | 1.9-4.4 | 1540 | 6.3 | 4.9-8 |
| 35-44 | 548 | 16.5 | 12.9-20.8 | 737 | 1.9 | 1.1-3.1 | 1285 | 8.7 | 7.1-10.6 |
| 45-54 | 449 | 24.5 | 18.2-32.3 | 585 | 3.5 | 2-6.1 | 1034 | 14.5 | 10.9-19 |
| 55-64 | 247 | 23.4 | 16.9-31.4 | 256 | 1.7 | 0.7-3.8 | 503 | 12.5 | 9.1-17.1 |
| **Total** | **2719** | **16.3** | **13.7–19.3** | **3294** | **2.4** | **1.7–3.3** | **6013** | **9.3** | **7.9–10.8** |

**Table 14. Period of not smoking (by average, year)**

| Age Group (years) | Time after quit smoking (by year, average) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Men | | | Woman | | | Both Sexes | | |
| | n | Mean years | 95% CI | n | Mean years | 95% CI | n | Mean years | 95% CI |
| 15-24 | 71 | 2.2 | 1.5-2.9 | 20 | 2.4 | 1.5-3.2 | 91 | 2.2 | 1.6-2.8 |
| 25-34 | 76 | 4.8 | 3.7-5.9 | 41 | 4.9 | 3.3-6.4 | 117 | 4.8 | 3.9-5.6 |
| 35-44 | 96 | 8.5 | 6.4-10.6 | 21 | 7.5 | 4.1-11 | 117 | 8.4 | 6.5-10.3 |
| 45-54 | 100 | 11.9 | 8.5-15.4 | 14 | 8.2 | 4.9-11.5 | 114 | 11.5 | 8.6-14.5 |
| 55-64 | 56 | 17.4 | 12.7-22.1 | 11 | 20.7 | 13.8-27.5 | 67 | 17.8 | 13.5-22.1 |
| **Бүгд** | **399** | **9.9** | **8.3–11.5** | **107** | **7.3** | **5.8–8.8** | **506** | **9.5** | **8.2–10.9** |

**Table 15. Status of current smokers**

| Age Group (years) | Who make quit smoke (among the smokers) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Men | | | Woman | | | Both Sexes | | |
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| 15-24 | 220 | 49.9 | 41.7-58.2 | 25 | 21.9 | 7.4-49.7 | 245 | 47.7 | 39.5-56.1 |
| 25-34 | 388 | 44 | 37.7-50.5 | 51 | 39.7 | 29.4-50.9 | 439 | 43.5 | 37.3-49.9 |
| 35-44 | 289 | 37.2 | 30.5-44.4 | 52 | 40.7 | 25-58.5 | 341 | 37.6 | 31-44.6 |
| 45-54 | 220 | 46 | 37.1-55.1 | 34 | 66.5 | 39.5-85.8 | 254 | 47.8 | 39.2-56.6 |
| 55-64 | 111 | 35.3 | 23.8-48.8 | 11 | 15.5 | 4.2-43.3 | 122 | 33.8 | 23.7-45.6 |
| **Total** | **1228** | **42.1** | **38.1-46.1** | **173** | **44.8** | **32.5-57.9** | **1401** | **42.3** | **38.5-46.3** |

**Table 16. Status of survey respondents who have been advised by doctor**

| Age Group (years) | Status of people reseived advice from doctors ar other health workers to quit smoking | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Men | | | Woman | | | Both Sexes | | |
| | Too | % | 95%ИХ | Too | % | 95%ИХ | Too | % | 95%ИХ |
| **Urban** | 520 | 26.6 | 18.7-36.4 | 113 | 13.5 | 6.8-25.2 | 633 | 24.6 | 17.3-33.7 |
| **Rural** | 533 | 40.3 | 32.6-48.5 | 29 | 51.9 | 31.1-72.2 | 562 | 40.9 | 33-49.2 |
| **Total** | **1053** | **34.1** | **28-40.7** | **142** | **23.1** | **13-37.5** | **1195** | **33** | **26.9-39.7** |

**Table 17. Persons were exposed to second-hand smoke at home and workplace**

| Age Group (years) | Status of exposure to second-hand smoking at home during the past 30 days | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Men | | | Woman | | | Both Sexes | | |
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| 15-24 | 792 | 48.5 | 43.2-53.9 | 846 | 43.8 | 39.3-48.5 | 1638 | 46.3 | 42.4-50.2 |
| 25-34 | 674 | 33.7 | 28.8-38.9 | 861 | 45.1 | 39.2-51 | 1535 | 39.4 | 35-44.1 |
| 35-44 | 545 | 33.5 | 29.4-37.9 | 736 | 50.4 | 45.5-55.4 | 1281 | 42.6 | 39.2-46.1 |
| 45-54 | 449 | 32.4 | 26.9-38.3 | 582 | 42.4 | 37.5-47.5 | 1031 | 37.2 | 33.1-41.4 |
| 55-64 | 245 | 42.5 | 32.5-53.1 | 256 | 39.8 | 32.7-47.4 | 501 | 41.2 | 34.2-48.5 |
| **Total** | **2705** | **36** | **32.5-39.7** | **3281** | **45.8** | **42.4-49.1** | **5986** | **40.9** | **37.9-44** |
| **Status of exposure to second-hand smoking at during the past 30 days** | | | | | | | | | |
| 15-24 | 788 | 24.1 | 19.3-29.8 | 852 | 15 | 11.9-18.8 | 1640 | 19.7 | 16.3-23.6 |
| 25-34 | 647 | 38.5 | 31.7-45.8 | 860 | 22.2 | 17.9-27.3 | 1507 | 30.1 | 25.6-35 |
| 35-44 | 526 | 36.7 | 31.2-42.6 | 728 | 18.6 | 14.7-23.3 | 1254 | 26.9 | 23.4-30.8 |
| 45-54 | 436 | 30.3 | 25.7-35.3 | 576 | 20.5 | 16.5-25.3 | 1012 | 25.6 | 22.1-29.5 |
| 55-64 | 237 | 15.4 | 10.2-22.5 | 254 | 19.3 | 12.4-28.8 | 491 | 17.4 | 12.9-23.1 |
| **Total** | **2634** | **31.9** | **28.4-35.5** | **3270** | **19.4** | **16.4-22.8** | **5904** | **25.5** | **22.7-28.5** |
| **Locality** | | | | | | | | | |
| Urban | 1298 | 43.4 | 38.8-48.2 | 1668 | 22.6 | 19-26.7 | 2966 | 32.7 | 29.4-36.1 |
| Rural | 1336 | 21.6 | 18.4-25.3 | 1602 | 16.3 | 11.9-21.9 | 2938 | 19 | 15.3-23.2 |

## Alcohol Consumption

**Table 18. Alcohol consumption status, genders**

| Gender | n | % Daily | 95% CI | % 5-6 days/ week | 95% CI | % 3-4 days/ week | 95% CI | % 1-2 days/ week | 95% CI | % 1-3 days/ month | 95% CI | % < once a month | 95% CI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Men | 1895 | 0.4 | 0.2-0.9 | 0.6 | 0.2-1.6 | 0.9 | 0.5-1.7 | 7.9 | 6.1-10.2 | 47.8 | 44.3-51.3 | 42.5 | 38.4-46.6 |
| Woman | 1607 | 0.0 | 0.0-0.1 | 0.2 | 0.0-0.5 | 0.6 | 0.2-1.1 | 20.3 | 15.6-25.0 | 78.8 | 74.0-83.6 | 0 | |

**Table .19. Risk assessment of alcohol consamption, age group, by gender**

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % ≥60g | 95% CI | n | % ≥40g | 95% CI | n | % high-end level | 95% CI |
| **Drinking at high-end level among all respondents (≥60g of pure alcohol on average per occasion among men and ≥40g of pure alcohol on average per occasion among women)** | | | | | | | | | |
| 15-24 | 798 | 0.3 | 0.0-0.6 | 853 | 0.8 | 0.2-3.0 | 1651 | 0.5 | 0.0-1.1 |
| 25-34 | 673 | 3.6 | 1.5-5.7 | 861 | 1.1 | 0.4-2.8 | 1534 | 2.3 | 0.9-3.8 |
| 35-44 | 544 | 4.3 | 1.2-7.4 | 735 | 0.4 | 0.1-1.5 | 1279 | 2.2 | 0.6-3.8 |
| 45-54 | 448 | 5.4 | 0.7-10.1 | 582 | 0.1 | 0.0-0.5 | 1030 | 2.9 | 0.4-5.3 |
| 55-64 | 245 | 2.2 | 0.3-4.2 | 255 | 0.3 | 0.0-2.0 | 500 | 1.2 | 0.3-2.2 |
| **Total** | **2708** | **3.8** | **1.8–5.7** | **3286** | **0.5** | **0.2–1.1** | **5994** | **2.1** | **1.0–3.2** |
| **Drinking at intermediate level among all respondents (40–59.9g of pure alcohol on average per occasion among men and 20–39.9g of pure alcohol on average per occasion among women)** | | | | | | | | | |
| 15-24 | 798 | 0.7 | 0.0-1.6 | 853 | 0.2 | 0--0.6 | 1651 | 0.5 | 0.0-0.9 |
| 25-34 | 673 | 1.6 | 0.5-2.8 | 861 | 0.6 | 0.2--1.8 | 1534 | 1.1 | 0.5-1.7 |
| 35-44 | 544 | 1.9 | 0.5-3.3 | 735 | 1.9 | 0.8--4.4 | 1279 | 1.9 | 0.8-3.0 |
| 45-54 | 448 | 2.3 | 0.6-3.9 | 582 | 0.7 | 0.2--2.3 | 1030 | 1.5 | 0.5-2.5 |
| 55-64 | 245 | 0.4 | 0.0-1.1 | 255 | 0.5 | 0.1--3.6 | 500 | 0.4 | 0.0-1.0 |
| **Total** | **2708** | **1.7** | **1.0–2.4** | **3286** | **1.0** | **0.5--2** | **5994** | **1.3** | **0.8–1.9** |
| **Drinking at lower-end level among all respondents (<40g of pure alcohol on average per occasion among men and <20g of pure alcohol on average per occasion among women)** | | | | | | | | | |
| 15-24 | 798 | 19.1 | 16.4-21.9 | 853 | 10.4 | 7.7-13.9 | 1651 | 14.9 | 12.9-17.0 |
| 25-34 | 673 | 52.0 | 46.5-57.5 | 861 | 28.5 | 23.3-34.4 | 1534 | 40.1 | 35.5-44.8 |
| 35-44 | 544 | 47.0 | 40.5-53.6 | 735 | 24.9 | 20.0-30.6 | 1279 | 35.2 | 31.1-39.2 |
| 45-54 | 448 | 45.9 | 40.0-51.8 | 582 | 23.6 | 18.7-29.2 | 1030 | 35.2 | 30.7-39.8 |
| 55-64 | 245 | 41.0 | 31.0-50.9 | 255 | 11.4 | 6.7-18.6 | 500 | 26.2 | 21.0-31.3 |
| **Total** | **2708** | **43.1** | **39.4–46.7** | **3286** | **22.4** | **19.2–26.0** | **5994** | **32.6** | **29.7–35.6** |

**Table 20. Mean number of times with six or more drinks during a single occasion in the past 30 days among current drinkers**

| Age Group (years) | Men | | | Woman | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean number of times | 95% CI | n | Mean number of times | 95% CI | n | Mean number of times | 95% CI |
| 15-24 | 181 | 1 | 0.8-1.2 | 108 | 0.6 | 0.2-1 | 289 | 0.8 | 0.7-1 |
| 25-34 | 381 | 1.5 | 1.3-1.7 | 248 | 0.5 | 0.4-0.6 | 629 | 1.2 | 1-1.3 |
| 35-44 | 299 | 1.6 | 1.1-2 | 180 | 0.6 | 0.5-0.7 | 479 | 1.2 | 0.9-1.5 |
| 45-54 | 222 | 1.9 | 1.3-2.4 | 146 | 0.6 | 0.3-1 | 368 | 1.5 | 1.1-1.9 |
| 55-64 | 104 | 1.9 | 1-2.9 | 29 | 0.7 | 0-1.5 | 133 | 1.7 | 0.9-2.4 |
| **Total** | **1187** | **1.6** | **1.4–1.9** | **711** | **0.6** | **0.5–0.7** | **1898** | **1.3** | **1.1–1.4** |

## Fruit and Vegetable Consumption

**Table 21. Number of servings of fruit and/or vegetables on average per day**

| Age Group (years) | n | % no fruit and/or vegetables | 95% CI | % 1-2 servings | 95% CI | % 3-4 servings | 95% CI | % ≥5 servings | 95% CI |
|---|---|---|---|---|---|---|---|---|---|
| **Men** | | | | | | | | | |
| 15-24 | 797 | 36.5 | 30.7-42.4 | 48.3 | 42.6-54.0 | 11.3 | 7.5-15.1 | 3.9 | 2.3-5.5 |
| 25-34 | 677 | 34.8 | 28.6-41.1 | 51.9 | 46.2-57.6 | 10.4 | 6.1-14.7 | 2.8 | 0.9-4.7 |
| 35-44 | 547 | 36.7 | 29.8-43.6 | 51.3 | 43.2-59.5 | 8.1 | 3.7-12.6 | 3.8 | 2.0-5.6 |
| 45-54 | 449 | 45.4 | 36.2-54.6 | 47.8 | 38.0-57.6 | 5.5 | 2.9-8.0 | 1.4 | 0.3-2.5 |
| 55-64 | 247 | 48.8 | 37.9-59.7 | 39.1 | 28.7-49.4 | 8.3 | 3.9-12.8 | 3.8 | 0.5-7.1 |
| **Total** | **2717** | **39.7** | **34.2-45.1** | **49.1** | **43.0-55.3** | **8.3** | **5.7-10.8** | **2.9** | **1.9-3.9** |
| **Women** | | | | | | | | | |
| 15-24 | 853 | 32.2 | 26.6-37.7 | 52.6 | 47.7-57.6 | 10.7 | 7.6-13.9 | 4.5 | 2.3-6.6 |
| 25-34 | 861 | 33.2 | 26.5-39.9 | 50.3 | 44.6-56.0 | 10.5 | 7.6-13.5 | 6.0 | 3.9-8.1 |
| 35-44 | 736 | 34.7 | 29.2-40.3 | 49.2 | 43.6-54.9 | 12.1 | 7.8-16.3 | 3.9 | 2.3-5.6 |
| 45-54 | 583 | 38.1 | 30.9-45.2 | 49.3 | 42.2-56.3 | 8.7 | 5.5-11.9 | 4.0 | 2.0-6.0 |
| 55-64 | 255 | 47.6 | 36.2-58.9 | 41.3 | 31.8-50.7 | 8.3 | 3.9-12.7 | 2.9 | 1.0-4.8 |
| **Total** | **3288** | **35.8** | **30.4-41.2** | **49.4** | **44.5-54.3** | **10.5** | **7.7-13.2** | **4.3** | **3.2-5.5** |
| **Urban/ Rural** | | | | | | | | | |
| Urban | 1317 | 28.5 | 24.6-32.7 | 58.2 | 50.1-65.9 | 9.2 | 5.5--14.8 | 4.2 | 2.5-6.7 |
| Rural | 1400 | 49.2 | 40.8-57.6 | 41.5 | 34.3-49.0 | 7.5 | 5.0-11.0 | 1.9 | 1.1-3.2 |

**Table 22. Results of grouped assessment of fruit and/or vegetables consumption of the survey population, in servings (by age group and locality)**

| Age Group (years) | n | % no fruit and/or vegetables | 95% CI | % 1-2 servings | 95% CI | % 3-4 servings | 95% CI | % ≥5 servings | 95% CI |
|---|---|---|---|---|---|---|---|---|---|
| **Men** | | | | | | | | | |
| Urban | 1317 | 28.5 | 24.6-32.7 | 58.2 | 50.1-65.9 | 9.2 | 5.5-14.8 | 4.2 | 2.5-6.7 |
| Rural | 1400 | 49.2 | 40.8-57.6 | 41.5 | 34.3-49 | 7.5 | 5-11 | 1.9 | 1.1-3.2 |
| Total | 2717 | 39.7 | 34.3-45.2 | 49.1 | 43.1-55.2 | 8.2 | 6-11.2 | 2.9 | 2.1-4.1 |
| **Women** | | | | | | | | | |
| Urban | 1669 | 24 | 20.3-28 | 55.7 | 51.2-60.1 | 13.2 | 8.9-19.2 | 7.1 | 5.1-9.8 |
| Rural | 1619 | 46.6 | 37.7-55.8 | 43.6 | 36.2-51.3 | 7.9 | 5.5-11.2 | 1.8 | 1.1-3.1 |
| Total | 3288 | 35.8 | 30.6-41.3 | 49.4 | 44.6-54.3 | 10.5 | 8-13.5 | 4.3 | 3.3-5.7 |

## Oil or fat consumption of the survey population (by types of fat and locality)

**Table 23. Mean number of meals eaten outside a home, ages group, gender, urban/rural**

| Age Group (years) | n | mean | 95% CI | n | mean | 95% CI | n | mean | 95% CI |
|---|---|---|---|---|---|---|---|---|---|
| | **Men** | | | **Woman** | | | **Both Sexes** | | |
| 15-24 | 798 | 1.4 | 1.2-1.7 | 853 | 1.2 | 1.0-1.5 | 1651 | 1.3 | 1.1-1.5 |
| 25-34 | 676 | 2.4 | 2.1-2.7 | 863 | 1.3 | 1.1-1.5 | 1539 | 1.8 | 1.6-2.0 |
| 35-44 | 548 | 2 | 1.6-2.5 | 737 | 1.4 | 1.1-1.6 | 1285 | 1.7 | 1.4-1.9 |
| 45-54 | 449 | 1.4 | 1.1-1.8 | 584 | 1.1 | 0.9-1.4 | 1033 | 1.3 | 1.1-1.5 |
| 55-64 | 247 | 0.4 | 0.3-0.5 | 256 | 0.5 | 0.3-0.7 | 503 | 0.4 | 0.3-0.6 |
| **Total** | **2718** | **1.7** | **1.5–2.0** | **3293** | **1.2** | **1.1–1.4** | **6011** | **1.5** | **1.3–1.6** |
| | | | | **Urban/Rural** | | | | | |
| Urban | 1318 | 2.7 | 2.4-3.0 | 1673 | 1.7 | 1.6-1.9 | 2991 | 2.2 | 2.0-2.4 |
| Rural | 1400 | 0.9 | 0.7-1.1 | 1620 | 0.7 | 0.6-0.9 | 3020 | 0.8 | 0.6-1.0 |
| **Total** | **1318** | **1.7** | **1.5–2.0** | **1673** | **1.2** | **1.1–1.4** | **2991** | **1.5** | **1.3–1.6** |

**Table 24. Mean number of meals eaten outside**

| Age Group (years) | Men | | | Woman | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | mean | 95% CI | n | mean | 95% CI | n | mean | 95% CI |
| 15-24 | 798 | 1.4 | 1.2-1.7 | 853 | 1.2 | 1-1.5 | 1651 | 1.3 | 1.1-1.5 |
| 25-34 | 676 | 2.4 | 2.1-2.7 | 863 | 1.3 | 1.1-1.5 | 1539 | 1.8 | 1.6-2 |
| 35-44 | 548 | 2 | 1.6-2.5 | 737 | 1.4 | 1.1-1.6 | 1285 | 1.7 | 1.4-1.9 |
| 45-54 | 449 | 1.4 | 1.1-1.8 | 584 | 1.1 | 0.9-1.4 | 1033 | 1.3 | 1.1-1.5 |
| 55-64 | 247 | 0.4 | 0.3-0.5 | 256 | 0.5 | 0.3-0.7 | 503 | 0.4 | 0.3-0.6 |
| **Total** | **2718** | **1.7** | **1.5–2** | **3293** | **1.2** | **1.1–-1.4** | **6011** | **1.5** | **1.3–1.6** |
| | | | | **Urban/Rural** | | | | | |
| Urban | 1318 | 2.7 | 2.4-3 | 1673 | 1.7 | 1.6-1.9 | 2991 | 2.2 | 2-2.4 |
| Rural | 1400 | 0.9 | 0.7-1.1 | 1620 | 0.7 | 0.6-0.9 | 3020 | 0.8 | 0.6-1 |
| **Total** | **1318** | **1.7** | **1.5–2** | **1673** | **1.2** | **1.1–1.4** | **2991** | **1.5** | **1.3–1.6** |

## Body Fat Percentage

**Table 25. Proportion of population with obesity or very high body fat, by locality and gender**

| Age Group (years) | Men | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | %Low <10.0 | 95% CI | %Normal 10.0-19.9 | 95% CI | %High 20.0-24.9 | 95% CI | % Very High ≥25 | 95% CI |
| Urban | 1292 | 3.9 | 2.2-6.9 | 25.2 | 20.3-30.7 | 24.6 | 20.2-29.7 | 46.3 | 40.8-51.9 |
| Rural | 1394 | 1.6 | 0.8-3 | 26.7 | 23.7-30 | 27.4 | 24.9-30.1 | 44.2 | 41-47.5 |
| **Total** | **2686** | **2.6** | **1.7–4** | **26** | **23.2–29.1** | **26.2** | **23.8–28.7** | **45.2** | **42.1–48.3** |
| | | | | | **Women** | | | | |
| Urban | 1593 | 7.1 | 5.3-9.5 | 39.8 | 36.6-43.2 | 22.7 | 20-25.7 | 30.3 | 26.5-34.5 |
| Rural | 1561 | 4.7 | 3.4-6.4 | 38.9 | 34.9-43 | 26.4 | 22.5-30.8 | 30 | 24.7-36 |
| **Total** | **3154** | **5.9** | **4.7–7.2** | **39.3** | **36.7–42** | **24.6** | **22.2–27.3** | **30.2** | **26.8–33.8** |

## History of Cardiovascular Diseases

**Table 26. Blood pressure measurement and diagnosis**

| Age Group (years) | n | % Never measured | 95% CI | % measured, not diagnosed | 95% CI | % diagnosed, but not within past 12 months | 95% CI | % diagnosed within past 12 months | 95% CI |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | **Men** | | | | |
| Urban | 1319 | 36.9 | 29.1-45.6 | 37.2 | 29.5-45.6 | 2.3 | 1.5-3.7 | 23.5 | 20.3-27.1 |
| Rural | 1400 | 34.6 | 30.8-38.6 | 37.5 | 32.4-43 | 3.7 | 2.4-5.6 | 24.2 | 20.4-28.3 |
| **Total** | **2719** | **35.7** | **31.6–40** | **37.4** | **32.8–42.2** | **3.1** | **2.2–4.2** | **23.9** | **21.3–26.6** |
| | | | | | **Men** | | | | |
| Urban | 1674 | 19.5 | 14.5-25.7 | 49.4 | 41.9-56.9 | 4.2 | 3-6 | 26.9 | 23.5-30.5 |
| Rural | 1620 | 16.6 | 14.3-19.2 | 45.5 | 41.4-49.7 | 4.7 | 3.7-6.1 | 33.1 | 29.9-36.5 |
| **Total** | **3294** | **18** | **15.3–21** | **47.4** | **43–51.8** | **4.5** | **3.6–5.6** | **30.1** | **27.6–32.8** |
| | | | | | **Urban/ Rural** | | | | |
| Urban | 2993 | 28 | 22-34.8 | 43.5 | 36.2-51 | 3.3 | 2.4-4.5 | 25.2 | 22.5-28.2 |
| Rural | 3020 | 25.7 | 22.8-28.8 | 41.5 | 37.4-45.8 | 4.2 | 3.3-5.4 | 28.6 | 25.6-31.8 |
| **Total** | **6013** | **26.8** | **23.6–30.2** | **42.4** | **38.2–46.7** | **3.8** | **3.1–4.6** | **27** | **24.9–29.2** |

**Table 27. Currently taking herbal or traditional remedy for raised blood pressure among those previously diagnosed**

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % taking trad. meds | 95% CI | n | % taking trad. meds | 95% CI | n | % taking trad. meds | 95% CI |
| 15-24 | 37 | 0 | 0-0 | 57 | 0 | 0-0 | 94 | 0 | 0-0 |
| 25-34 | 76 | 3 | 0.7-11.6 | 173 | 1.4 | 0.4-4.6 | 249 | 2.1 | 0.7-6.3 |
| 35-44 | 138 | 2.3 | 0.7-7.6 | 249 | 2.9 | 1.5-5.8 | 387 | 2.7 | 1.4-5.1 |
| 45-54 | 193 | 5.5 | 2-14.1 | 318 | 4.5 | 2.4-8.3 | 511 | 5 | 2.5-9.6 |
| 55-64 | 136 | 8.9 | 4.5-16.6 | 171 | 6.2 | 2.5-14.8 | 307 | 7.4 | 4.4-12.2 |
| **Total** | **580** | **4.7** | **2.5–8.6** | **968** | **3.8** | **2.5–5.8** | **1548** | **4.2** | **2.8–6.3** |

**Table 28 . Blood pressure measurement and diagnosis**

| Age Group (years) | n | SBP, MMHG. | | DBP, MMHG | |
|---|---|---|---|---|---|
| | | mean | 95% CI | mean | 95% CI |
| | | | Нийт хүн ам | | |
| 15-24 | 1643 | 116.8 | 115.5-118.2 | 70.7 | 70.1-71.4 |
| 25-34 | 1535 | 119.8 | 118.8-120.9 | 75.3 | 74.7-76 |
| 35-44 | 1281 | 125.8 | 124.6-127 | 80.8 | 79.9-81.6 |
| 45-54 | 1024 | 134.8 | 132.9-136.7 | 85.2 | 84.1-86.3 |
| 55-64 | 499 | 142.6 | 139.6-145.6 | 85.5 | 84.5-86.5 |
| **Total** | **5982** | **127** | **125.9–128** | **79.9** | **79.3–80.4** |

**Table 29. Population haven't medication for raised blood pressure**

| Age Group (years) | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
|---|---|---|---|---|---|---|---|---|---|
| Urban | 1239 | 25.8 | 21.4-30.8 | 1556 | 15.7 | 12.8-19.2 | 2795 | 20.7 | 18.1-23.5 |
| Rural | 1324 | 24.6 | 19.9-30.1 | 1522 | 19.2 | 16.8-21.9 | 2846 | 22 | 19.3-24.9 |
| **Total** | **2563** | **25.2** | **21.7–28.7** | **3078** | **17.6** | **15.5–19.8** | **5641** | **21.4** | **19.4–23.4** |

**Table 30. Prevance of Arterial Hypertension, gender, age group, locality**

| Age Group (years) | n | Newly diagnosed | | Old controlled with medicatian | | Old controlled with un medication | | Old uncontrolled without any medication | |
|---|---|---|---|---|---|---|---|---|---|
| | | % | 95% CI | % | 95% CI | % | 95% CI | % | 95% CI |
| **Gender** | | | | | | | | | |
| Men | 707 | 73.2 | 66.7-78.8 | 17.7 | 13.6-22.7 | 5.3 | 3.1-8.8 | 3.8 | 2.3-6.2 |
| Woman | 643 | 62.6 | 55.9-68.8 | 24.4 | 19.3-30.4 | 10 | 6.9-14.3 | 3 | 1.8-5 |
| **Age Group(years)** | | | | | | | | | |
| 15-24 | 108 | 92.8 | 81.7-97.4 | 3 | 0.4-18.8 | 3.6 | 0.9-12.9 | 0.6 | 0.1-4.5 |
| 25-34 | 209 | 84.1 | 76.5-89.6 | 6.1 | 3.5-10.6 | 4.3 | 2.1-8.5 | 5.5 | 2.6-11.2 |
| 35-44 | 305 | 76.7 | 70.3-82 | 13.1 | 8.6-19.4 | 6.6 | 3.8-11.3 | 3.6 | 1.8-7.3 |
| 45-54 | 452 | 61.4 | 54.7-67.7 | 26.4 | 20.6-33.1 | 9 | 5.7-14 | 3.2 | 1.9-5.5 |
| 55-64 | 276 | 56.9 | 49.4-64.1 | 33.1 | 26.2-40.7 | 7 | 4.1-11.5 | 3.1 | 1.5-6.2 |
| **Locality** | | | | | | | | | |
| Urban | 663 | 69 | 62.5-74.8 | 21.9 | 17.2-27.4 | 6.5 | 4.1-10.1 | 2.7 | 1.4-5 |
| Rural | 687 | 68 | 60.2-74.8 | 19.8 | 14.9-25.7 | 8.2 | 5.1-12.8 | 4.1 | 2.6-6.4 |
| **Total** | **1350** | **68.4** | **63.4–73.1** | **20.7** | **17.2–24.7** | **7.4** | **5.3–10.3** | **3.4** | **2.3–5** |

## History of Diabetes

**Table 31. Status of people smokers received counseling on smoking cessation (age group and gender)**

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| 15-24 | 6 | 59 | 15-92.1 | 3 | 0 | 0-0 | 9 | 38.6 | 10.3-77.4 |
| 25-34 | 9 | 57.7 | 23.1-86.1 | 15 | 34 | 11.6-66.9 | 24 | 40.5 | 19.2-66 |
| 35-44 | 21 | 71.1 | 44.3-88.4 | 35 | 55.1 | 33.9-74.6 | 56 | 61.1 | 41.8-77.5 |
| 45-54 | 32 | 70.8 | 45.5-87.6 | 46 | 32.9 | 19-50.7 | 78 | 51.3 | 38.3-64.2 |
| 55-64 | 21 | 57.2 | 31.6-79.5 | 29 | 26.9 | 10.8-52.8 | 50 | 42.5 | 30.2-55.7 |
| 25-64 | 89 | 67.9 | 54.5-78.9 | 128 | 40.9 | 31.7-50.8 | 217 | 52.8 | 43.1-62.3 |

**Table 32. Status of respondents with diabetes, reseiving lifestyle advices**

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| Reduce body weigth | 89 | 79.4 | 60-90.8 | 128 | 82 | 71.1-89.4 | 217 | 80.9 | 69.8-88.5 |
| Increase physical activity | 89 | 81.3 | 68.1-89.9 | 128 | 73.7 | 62.5-82.5 | 217 | 77.1 | 67.2-84.7 |
| Reduce fat in the diet | 89 | 76.4 | 68.4-93.8 | 128 | 76.5 | 63.4-86 | 217 | 80.3 | 62.2-81.6 |
| Eat at least five servings of fruit/ vegetables each day | 89 | 76.4 | 61.8-86.6 | 128 | 70.3 | 59.3-79.4 | 217 | 73 | 62.2-81.6 |
| Reduce salt in the diet | 89 | 75.1 | 64.1-83.7 | 128 | 69.9 | 57.7-79.9 | 217 | 72.2 | 63.8-79.4 |
| Quit using tobacco | 89 | 67.9 | 54.5-78.9 | 128 | 40.9 | 31.7-50.8 | 217 | 52.8 | 43.1-62.3 |

**Table 33. Status of respondents with diabetes receiving lifestyle advices**

| Age Group (years) | Urban | | | Rural | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| Reduce body weigth | 122 | 78.1 | 58.7-90 | 95 | 84.6 | 73.6-91.5 | 217 | 80.9 | 69.8-88.5 |
| Increase physical activity | 122 | 76.6 | 61.2-87.1 | 95 | 77.8 | 65.1-86.8 | 217 | 77.1 | 67.2-84.7 |
| Reduce fat in the diet | 122 | 77.8 | 56.6-90.4 | 95 | 83.8 | 73-90.8 | 217 | 80.3 | 68.4-88.5 |
| Eat at least five servings of fruit/ vegetables each day | 122 | 72.6 | 54.6-85.3 | 95 | 73.6 | 63.1-81.9 | 217 | 73 | 62.2-81.6 |
| Reduce salt in the diet | 122 | 67.1 | 53.7-78.2 | 95 | 79.2 | 68.2-87.2 | 217 | 72.2 | 63.8-79.4 |
| Quit using tobacco | 122 | 54.3 | 41.9-66.1 | 95 | 50.8 | 36.5-65 | 217 | 52.8 | 43.1-62.3 |

## Cervical Cancer Screening

**Table 34. Women who have screening tests for early detection of cervical cancer, by age groups.**

| Age Group (years) | n | % ever tested | 95% CI |
|---|---|---|---|
| 25-34 | 464 | 43.7 | 36.8-50.9 |
| 35-44 | 735 | 51.6 | 46.8-56.4 |
| 45-54 | 584 | 60.8 | 53.8-67.4 |
| 55-64 | 256 | 53 | 45.1-60.7 |
| **Total** | **2039** | **53.9** | **49.3-58.4** |

**Table 35. Women who have screening tests for early detection of cervical cancer, age groups and by locality**

| Age Group (years) | Total age | | | 30-49 age | | |
|---|---|---|---|---|---|---|
| | n | % ever tested | 95% CI | n | % ever tested | 95% CI |
| Urban | 1027 | 46.5 | 40.5-52.7 | 707 | 45 | 39.2-50.9 |
| Rural | 1012 | 60.7 | 55.1-66 | 744 | 61.1 | 55.8-66.1 |
| **Total** | **2039** | **53.9** | **49.3-58.4** | **1451** | **53.5** | **49.1-57.9** |

**Table 36. Women who have had a breast examination by health care provider (by age groups and locality)**

| Age Group (years) | n | % ever tested | 95% CI |
|---|---|---|---|
| 25-34 | 410 | 29.2 | 22.9-36.4 |
| 35-44 | 736 | 32.9 | 27.6-38.8 |
| 45-54 | 585 | 36.8 | 29.6-44.5 |
| 55-64 | 256 | 24.4 | 17.5-33 |
| 25-64 | 1987 | 33.1 | 27.9-38.8 |

## Biochemical risk factors

**Table 37. Lifestyle advice for population with raised total cholesterol provided by doctors and health care providers, by locality**

| Age Group (years) | Urban | | | Rural | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| Reduce body weigth | 97 | 86.6 | 76.5-92.8 | 72 | 76.1 | 56.5-88.6 | 169 | 81.6 | 70.8-89 |
| Increase physical activity | 97 | 77.5 | 59.9-88.8 | 72 | 68.7 | 52.8-81.1 | 169 | 73.3 | 61.4-82.5 |
| Reduce fat in the diet | 97 | 80.5 | 60.9-91.7 | 72 | 86.3 | 72.9-93.7 | 169 | 83.3 | 71.9-90.7 |
| Eat at least five servings of fruit/ vegetables each day | 97 | 66.8 | 48.6-81.1 | 72 | 62.4 | 47.1-75.6 | 169 | 64.7 | 52.8-75.1 |
| Reduce salt in the diet | 97 | 66.8 | 47.9-81.5 | 72 | 77.5 | 66.4-85.7 | 169 | 71.9 | 61-80.7 |
| Quit using tobacco | 97 | 58.3 | 41.1-73.7 | 72 | 54.1 | 33.3-73.6 | 169 | 56.3 | 42.6-69.2 |

**Table 38. Proportion of population who use methods for controlling their salt intake**

| Age Group (years) | Urban | | | Rural | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| Avoid/ consumption of processed foods | 2719 | 16.1 | 12.8-19.5 | 3294 | 27.3 | 23.3-31.4 | 6013 | 21.8 | 18.4-25.1 |
| Look at the salt or the sodium labels on food | 2719 | 7.5 | 6.0-9.0 | 3294 | 12.8 | 10.3-15.2 | 6013 | 10.2 | 8.5-11.8 |
| Eat meals without adding salt at the table | 2719 | 39.2 | 30.9-47.6 | 3294 | 43.3 | 35.1-51.5 | 6013 | 41.3 | 33.1-49.4 |
| Buy law solt/ sodium alternitives | 2719 | 15.0 | 12.1-17.9 | 3294 | 25.1 | 21.2-29.1 | 6013 | 20.1 | 16.8-23.4 |
| Cook meals without adding salt | 2719 | 40.0 | 33.1-46.9 | 3294 | 48.1 | 41.2-55.0 | 6013 | 44.1 | 37.4-50.7 |
| Use species other than salt when cooking | 2719 | 43.3 | 38.5-48.1 | 3294 | 41.2 | 37.7-44.8 | 6013 | 42.3 | 39.1-45.4 |
| Avoid eating out | 2719 | 28.2 | 23.1-33.2 | 3294 | 37.9 | 31.9-43.9 | 6013 | 33.0 | 27.8-38.3 |

**Table 39. Proportion of population who avoid dining out in order**

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| 15-24 | 798 | 24.1 | 18.2-30.1 | 853 | 28.3 | 22.0-34.5 | 1651 | 26.1 | 20.7-31.6 |
| 25-34 | 677 | 23.6 | 18.6-28.5 | 863 | 32.5 | 26.4-38.6 | 1540 | 28.1 | 23.1-33.0 |
| 35-44 | 548 | 25.7 | 20.0-31.3 | 737 | 38.3 | 31.5-45.2 | 1285 | 32.4 | 26.9-37.9 |
| 45-54 | 449 | 33.8 | 25.2-42.4 | 585 | 44.4 | 36.6-52.3 | 1034 | 38.9 | 31.7-46.1 |
| 55-64 | 247 | 36.9 | 28.3-45.4 | 256 | 43.8 | 33.9-53.8 | 503 | 40.4 | 32.9-47.8 |
| **Total** | **2719** | **28.2** | **23.1-33.2** | **3294** | **37.9** | **31.9-43.9** | **6013** | **33.0** | **27.8-38.3** |

## NCD health care

### Table 40. Health insurance coverage, by age groups and gender

| Locality | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Health insurance coverage, | 95% CI | n | Health insurance coverage, | 95% CI | n | Health insurance coverage, | 95% CI |
| Urban | 1319 | 87.9 | 79.2-93.3 | 1674 | 94.8 | 90.2-97.3 | 2993 | 91.4 | 85-95.2 |
| Rural | 1400 | 90.5 | 87.4-92.9 | 1620 | 95.1 | 92.5-96.8 | 3020 | 92.8 | 90.4-94.6 |
| **Total** | **2719** | **89.3** | **85.3–92.3** | **3294** | **94.9** | **92.6–96.5** | **6013** | **92.1** | **89.2–94.3** |

### Table 41. Proportion of population who paid privately for their health care services during the past 12 months, by payment types and locality

| Age Group (years) | n | Salary, income % | 95% CI | Savings % | 95% CI | Sold items or animals % | 95% CI | Sold items or % | 95% CI | Borrowed from family members or friends % | 95% CI | Borrowed from someone % | 95% CI | Other % | 95% CI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 15-24 | 1651 | 16.0 | 12.4-19.6 | 2.7 | 1.7-3.7 | 0 | 0.0 | 0.8 | 0.3-1.4 | 11.2 | 9.0-13.5 | 1.0 | 0.4-1.5 | 5.5 | 2.9-8.1 |
| 25-34 | 1540 | 41.8 | 35.0-48.7 | 5.3 | 3.6-7.0 | 0 | 0.0 | 3.8 | 2.2-5.3 | 6.1 | 4.5-7.8 | 1.1 | 0.4-1.8 | 2.4 | 1.1-3.7 |
| 35-44 | 1285 | 43.5 | 35.2-51.7 | 3.8 | 2.6-5.1 | 0 | 0.0 | 3.8 | 2.3-5.3 | 4.5 | 3.1-5.9 | 0.8 | 0.3-1.3 | 2.1 | 1.1-3.1 |
| 45-54 | 1034 | 47.1 | 39.9-54.3 | 3.4 | 2.0-4.8 | 0 | 0.0 | 4.1 | 2.5-5.6 | 5.2 | 3.3-7.0 | 0.5 | 0.1-0.8 | 2.4 | 1.3-3.5 |
| 55-64 | 503 | 42.3 | 35.0-49.5 | 2.3 | 0.9-3.8 | 0 | 0.0 | 4.9 | 2.5-7.3 | 4.5 | 1.9-7.0 | 0.3 | 0.0-0.7 | 8.1 | 4.0-12.2 |
| **Total** | **6013** | **40.2** | **34.0–46.4** | **3.7** | **2.9–4.5** | **0** | **0.0** | **3.5** | **2.5–4.5** | **6.0** | **4.8–7.1** | **0.8** | **0.5–1.0** | **3.1** | **2.1–4.1** |

### Table 42. Proportion of population previously or currently diagnosed with NCD, by gender and locality

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | % | 95% CI | n | % | 95% CI | n | % | 95% CI |
| Urban | 1319 | 16 | 12.1-20.9 | 1674 | 16.9 | 13.8-20.4 | 2993 | 16.4 | 13.4-20 |
| Rural | 1400 | 16.3 | 12.9-20.2 | 1620 | 19.6 | 15.6-24.5 | 3020 | 17.9 | 14.8-21.6 |
| **Total** | **2719** | **16.1** | **13.5–19.2** | **3294** | **18.3** | **15.6–21.3** | **6013** | **17.2** | **14.9–19.8** |

### Table 43. Proportion of population who sought medical care from clinics, hospitals andhealth care providers during the past 30 days, by gender and locality

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Health care providers , % | 95% CI | n | Health care providers , % | 95% CI | n | Health care providers , % | 95% CI |
| Urban | 175 | 33.1 | 23.5-44.4 | 239 | 43.2 | 33.9-53.0 | 414 | 38.4 | 30.9-46.5 |
| Rural | 176 | 41.2 | 31.8-51.2 | 241 | 38.9 | 29.8-48.8 | 417 | 39.9 | 32.0-48.4 |
| **Total** | **351** | **37.5** | **30.5–45.1** | **480** | **40.8** | **34.1–47.7** | **831** | **39.3** | **33.7–45.1** |

### Table 44. Mean number of times seeking medical services due to NCDs, by locality and types of health organizations

| Age Group (years) | Health center | | | State hospital | | | Private hospital | | | Drug store | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | Mean number | 95% CI | n | Mean number | 95% CI | n | Mean number | 95% CI | n | Mean number | 95% CI |
| Urban | 157 | 1.7 | 1.3-2.1 | 157 | 0.8 | 0.6-1 | 157 | 0.2 | 0-0.4 | 157 | 2.2 | 1.4-3.1 |
| Rural | 163 | 1.3 | 1.1-1.6 | 163 | 0.5 | 0-0.9 | 163 | 0.1 | 0.1-0.2 | 163 | 0.9 | 0.5-1.3 |
| **Total** | **320** | **1.5** | **1.2–1.7** | **320** | **0.6** | **0.3–0.9** | **320** | **0.2** | **0.1–0.3** | **320** | **1.5** | **1–1.9** |

### Table 45. Health care expenditure spent on NCDs during the past 30 days, in MNT (by types of health care and gender)

| Age Group (years) | Men | | | Women | | | Both Sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Amount in MNT | 95% CI | n | Amount in MNT | 95% CI | n | Amount in MNT | 95% CI |
| Urban | 17 | 1026852 | -151645.4-2205350 | 23 | 356708.6 | 83471.7-629945.4 | 40 | 606820.5 | 102928-1110713 |
| Rural | 32 | 759653 | 286972.5-1232333.6 | 34 | 162492 | 65401.9-259582.1 | 66 | 481691.4 | 221243.5-742139.4 |
| **Total** | **49** | **832399** | **376205.3–1288592.6** | **57** | **243888.4** | **132594.1–355182.7** | **106** | **525345.3** | **290536.6–760154** |

**Table 46. Home care to NCD patients provided by family members or friends during the past 30 days (by age groups and gender)**

| Age Group (years) | Men | | | Women | | | Both sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Home care % | 95% CI | n | Home care % | 95% CI | n | Home care % | 95% CI |
| Urban | 175 | 4.3 | 1.9-9.6 | 239 | 13.7 | 8.6-21 | 414 | 9.3 | 6.4-13.2 |
| Rural | 176 | 10.3 | 5.5-18.5 | 241 | 10.6 | 5.2-20.6 | 417 | 10.5 | 6-17.6 |
| **Total** | **351** | **7.6** | **4.5-12.4** | **480** | **12** | **7.8-17.9** | **831** | **9.9** | **7-14** |

**Table 47. Mean number of hours per week spent on home care to NCD patients during the past 30 days (by age groups and gender)**

| Age Group (years) | Men | | | Women | | | Both sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean time | 95% CI | n | Mean time | 95% CI | n | Mean time | 95% CI |
| Urban | 7 | 7.4 | 1.1-15.8 | 32 | 19.8 | 8.5-31.2 | 39 | 17 | 6.8-27.2 |
| Rural | 15 | 13 | 0.7-26.8 | 19 | 13.7 | 0.2-27.1 | 34 | 13.4 | 1.4-25.4 |
| **Total** | **22** | **11.4** | **1.4-21.5** | **51** | **16.8** | **7.2-26.3** | **73** | **14.9** | **6.6-23.3** |

**Table 48. Population who were not able to fulfill their job/work responsibilities due to NCDs (by age groups and gender)**

| Age Group (years) | Men | | | Women | | | Both sexes | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean time | 95% CI | n | Mean time | 95% CI | n | Mean time | 95% CI |
| Urban | 20 | 11.1 | 4.9-17.3 | 43 | 8.6 | 4.8-12.3 | 63 | 9.4 | 6.4-12.4 |
| Rural | 28 | 12.2 | 9.7-14.8 | 38 | 9.3 | 5.5-13.2 | 66 | 10.6 | 8.1-13 |
| **Total** | **48** | **11.8** | **9-14.6** | **81** | **9** | **6.2-11.7** | **129** | **10.1** | **8.2-12** |

## Violence and Injury

**Table 49. Cause of crash among those respondents involved in road traffic crash in the past 12 months, gender, age, locality (%)**

| Age Group (years) | n | % Alcoholic drink | 95% CI | % Rec. medicine | 95% CI | % fatigue / illness | 95% CI | % excess speed | 95% CI | % didn't use pedes-tri-an route | 95% CI | % external factor | 95% CI | % Other | 95% CI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Men** | | | | | | | | | | | | | | | |
| Urban | 79 | 6.6 | 2.1-18.8 | 1.4 | 0.2-9.9 | 1.1 | 0.2-5.5 | 43.8 | 26.3-62.9 | 1.3 | 0.3-5.8 | 9.0 | 3.1-23.6 | 36.8 | 19.1-59 |
| Rural | 66 | 9.9 | 3.6-24.6 | 0.0 | 0.0-0.0 | 8.2 | 1.3-37.5 | 22.8 | 13.9-35 | 5.4 | 0.9-27.5 | 24.2 | 11.8-43.2 | 29.5 | 18-44.4 |
| **Total** | **145** | **8.4** | **3.9-17.1** | **0.7** | **0.1-4.7** | **4.9** | **0.9-21.6** | **32.6** | **22.3-44.9** | **3.5** | **0.8-14.6** | **17.1** | **9.3-29.3** | **32.9** | **22.1-45.9** |
| **Women** | | | | | | | | | | | | | | | |
| Urban | 44 | 1.5 | 0.2-11.1 | 0.0 | 0.0-0.0 | 2.3 | 0.6-8.4 | 36.7 | 22.6-53.6 | 0.0 | 0.0-0.0 | 2.6 | 0.7-9.2 | 56.8 | 41.6-70.8 |
| Rural | 23 | 0.0 | 0.0-0.0 | 0.0 | 0.0-0.0 | 8.1 | 2.5-23.6 | 37.4 | 20.3-58.5 | 12.6 | 2.1-49.5 | 19.1 | 4.6-53.5 | 22.7 | 8.2-49.1 |
| **Total** | **67** | **1.0** | **0.1-7,0** | **0.0** | **0.0-0.0** | **4.5** | **1.8-10.8** | **37** | **25.6-50.1** | **4.7** | **0.8-22.6** | **8.8** | **2.6-26** | **44.1** | **31.9-57.2** |
| **Total** | | | | | | | | | | | | | | | |
| Urban | 123 | 4.9 | 1.8-12.7 | 0.9 | 0.1-6.1 | 1.5 | 0.4-5.3 | 41.4 | 27.8-56.6 | 0.9 | 0.2-3.8 | 6.9 | 2.4-18.1 | 43.5 | 28.3-60 |
| Rural | 89 | 7.9 | 2.9-19.7 | 0 | 0-0 | 8.2 | 1.9-28.9 | 25.8 | 16.8-37.4 | 6.9 | 1.8-22.9 | 23.2 | 11.1-42.1 | 28.1 | 17.4-42 |
| **Total** | **212** | **6.4** | **3.1-12.7** | **0.5** | **0.1-3.3** | **4.8** | **1.4-15.1** | **33.8** | **24.8-44.1** | **3.8** | **1.2-11.5** | **14.9** | **7.9-26.2** | **35.9** | **26.5-46.7** |

**Table 50. Percentage of respondents who were seriously injured other than road traffic crashes**

| Age Group (years) | n | % Fall | 95% CI | % Burn | 95% CI | % Cut | 95% CI | % near drown-ing | 95% CI | % Animal Bites | 95% CI | % Frost-bite | 95% CI | % Hit by Obj | 95% CI | % Other | 95% CI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Men** | | | | | | | | | | | | | | | | | |
| 15-24 | 85 | 71 | 56.2-82.3 | 3.8 | 1.3-10.4 | 2 | 0.5-7.7 | 1.6 | 0.2-11.3 | - | - | 0 | 0-0 | 15 | 8.1-26.3 | 6.6 | 2.7-15.2 |
| 25-34 | 64 | 49.6 | 35.4-63.9 | 0.9 | 0.1-5.9 | 16.8 | 7.2-34.5 | 0 | 0-0 | - | - | 1.7 | 0.2-11.5 | 16.4 | 8.6-29.1 | 14.5 | 6.7-28.8 |
| 35-44 | 35 | 59.6 | 36.8-78.8 | 7.9 | 1.9-27.9 | 10.4 | 2.8-31.4 | 0 | 0-0 | - | - | 0 | 0-0 | 18.1 | 8.3-34.9 | 4.1 | 0.9-15.9 |
| 45-54 | 30 | 61.5 | 39.8-79.4 | 2 | 0.3-14.1 | 11.5 | 1.7-49.2 | 0 | 0-0 | - | - | 0 | 0-0 | 21.2 | 10.1-39.3 | 3.7 | 0.5-23.7 |
| 55-64 | 11 | 72.8 | 39.4-91.7 | 5.3 | 0.7-30.3 | 0 | 0-0 | 0 | 0-0 | - | - | 0 | 0-0 | 9.4 | 1.2-47.1 | 12.5 | 1.6-55.1 |
| Urban | 139 | 60 | 48.2-70.7 | 5.6 | 1.8-16.2 | 10 | 4.7-19.9 | 0.5 | 0.1-3.3 | - | - | 0 | 0-0 | 20.5 | 11.7-33.2 | 3.5 | 1.5-7.9 |
| Rural | 86 | 61.5 | 46.2-74.8 | 1.8 | 0.4-8.4 | 10.3 | 3.4-27.1 | 0 | 0-0 | - | - | 0.8 | 0.1-6.3 | 13.6 | 7.3-24 | 11.9 | 5.5-23.6 |
| **Total** | **225** | **60.6** | **51.3-69.2** | **4.1** | **1.5-10.5** | **10.1** | **5.4-18.1** | **0.3** | **0-2** | **-** | **-** | **0.3** | **0-2.5** | **17.7** | **11.7-26** | **6.9** | **3.7-12.4** |
| **Women** | | | | | | | | | | | | | | | | | |
| 15-24 | 50 | 71 | 53.1-84.1 | 0 | 0-0 | 8.8 | 3.2-21.6 | - | - | 4.7 | 1.4-14.8 | 0 | 0.0-0.0 | 12.3 | 4.4-29.9 | 3.3 | 1-10.3 |
| 25-34 | 34 | 56.6 | 36.5-74.7 | 0 | 0-0 | 16.6 | 6.5-36.5 | - | - | 3.5 | 0.8-13.3 | 0 | 0.0-0.0 | 19.4 | 7.2-42.7 | 3.9 | 0.7-19.6 |
| 35-44 | 32 | 66.9 | 47.1-82.1 | 2.4 | 0.3-16.7 | 1.9 | 0.3-13.2 | - | - | 7 | 1-34.9 | 0 | 0.0-0.0 | 16.6 | 6.3-36.9 | 5.2 | 1.1-21.3 |
| 45-54 | 33 | 89 | 77.8-95 | 0 | 0-0 | 6.1 | 1.7-19.5 | - | - | 0 | 0-0 | 0 | 0.0-0.0 | 4.8 | 1.4-14.9 | 0 | 0-0 |
| 55-64 | 23 | 83.8 | 58.8-94.9 | 0 | 0-0 | 0 | 0-0 | - | - | 3.6 | 0.6-18 | 0 | 0.0-0.0 | 10.6 | 2.1-39.9 | 2 | 0.3-14.4 |
| Urban | 109 | 79.9 | 71.4-86.4 | 1.2 | 0.2-8.1 | 6.8 | 3.3-13.6 | - | - | 0.5 | 0.1-2.2 | 0 | 0.0-0.0 | 8.1 | 4.4-14.6 | 3.4 | 1.1-10.3 |
| Rural | 63 | 64 | 51-75.2 | 0 | 0-0 | 5.3 | 1.9-14.1 | - | - | 9 | 2.5-27.5 | 0 | 0.0-0.0 | 19.4 | 9.2-36.2 | 2.3 | 0.5-9.9 |
| **Total** | **172** | **73.5** | **65.9-79.9** | **0.7** | **0.1-5** | **6.2** | **3.5-11** | **-** | **-** | **3.9** | **1.1-12.3** | **0** | **0.0-0.0** | **12.7** | **7.6-20.4** | **3** | **1.2-7.3** |
| **Both sexes** | | | | | | | | | | | | | | | | | |
| 15-24 | 135 | 71 | 58-81.2 | 2.4 | 0.9-6.6 | 4.4 | 1.9-10.1 | 1 | 0.1-7.5 | 1.7 | 0.5-5.6 | 0 | 0-0 | 14.1 | 8-23.4 | 5.4 | 2.6-11 |
| 25-34 | 98 | 51.8 | 40.3-63.1 | 0.6 | 0.1-4 | 16.8 | 8.6-30.1 | 0 | 0-0 | 1.1 | 0.3-4.6 | 1.1 | 0.2-8.1 | 17.4 | 9.6-29.3 | 11.2 | 5.6-21.2 |
| 35-44 | 67 | 62.2 | 46.4-75.7 | 6 | 1.7-19.2 | 7.4 | 2.3-21.1 | 0 | 0-0 | 2.5 | 0.3-16 | 0 | 0-0 | 17.5 | 9.7-29.7 | 4.5 | 1.5-12.6 |
| 45-54 | 63 | 71.1 | 54.1-83.7 | 1.3 | 0.2-9.4 | 9.7 | 2.2-34.1 | 0 | 0-0 | 0 | 0-0 | 0 | 0-0 | 15.5 | 7.7-28.9 | 2.4 | 0.3-15.7 |
| 55-64 | 34 | 80.4 | 61.9-91.2 | 1.6 | 0.2-11.5 | 0 | 0-0 | 0 | 0-0 | 2.5 | 0.4-12.8 | 0 | 0-0 | 10.3 | 3-30 | 5.3 | 1.1-22.4 |
| Urban | 248 | 67.3 | 59.1-74.6 | 4 | 1.4-10.6 | 8.8 | 4.8-15.6 | 0.3 | 0-2.1 | 0.2 | 0-0.8 | 0 | 0-0 | 15.9 | 9.9-24.6 | 3.5 | 1.6-7.5 |
| Rural | 149 | 62.4 | 52.7-71.3 | 1.1 | 0.2-5.3 | 8.5 | 3.7-18.2 | 0 | 0-0 | 3.3 | 0.8-12.2 | 0.5 | 0.1-4 | 15.8 | 9.1-25.9 | 8.3 | 4.1-16.2 |
| **Total** | **397** | **65.3** | **59.2-71.1** | **2.8** | **1.2-6.8** | **8.7** | **5.3-13.9** | **0.2** | **0-1.3** | **1.4** | **0.4-5** | **0.2** | **0-1.6** | **15.9** | **11.1-22.1** | **5.4** | **3.2-9.2** |

## Violence and Injury

**Table51. The objects with which people got injured according to people who affected by violence during the past 12 months**

| Age Group | n | % A weapon other than a firearm | 95% CI | % Injured without a weapon | 95% CI |
|---|---|---|---|---|---|
| Men | 9 | 13 | 1.4-60.7 | 87 | 39.3-98.6 |
| Women | 43 | 9 | 2.3-29.8 | 91 | 70.2-97.7 |
| **Total** | **66** | **21** | **7-48.4** | **79** | **51.6-93** |

**Table 52. Proportion of respondents who were concerned for their safety because of the anger or threats of another person**

| Age Group | n | % Intimate partner | 95% CI | % Friend or ac-quain-tance | 95% CI | % Child, sibling, or other relative | 95% CI | % Stranger | 95% CI | %Official or legal authorities | 95% CI | % Other | 95% CI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Urban | 661 | 63.9 | 53.6-73 | 16.1 | 12.2-21.1 | 0 | 0-0 | 9.4 | 7.2-12 | 9.2 | 4.3-18.5 | 1.4 | 0.5-4 |
| Rural | 588 | 61.3 | 54.7-67.4 | 22.2 | 17.7-27.4 | 0.2 | 0.1-0.7 | 8.1 | 5.6-11.6 | 8 | 4.2-14.6 | 0.3 | 0-2 |
| **Total** | **1249** | **62.6** | **56.6-68.3** | **19** | **15.9-22.5** | **0.1** | **0-0.3** | **8.8** | **7-10.9** | **8.6** | **5.2-14.1** | **0.9** | **0.4-2.2** |
| Men | 417 | 47.6 | 35.2-60.3 | 24.3 | 18.3-31.5 | - | - | 12.7 | 8.5-18.6 | 13.8 | 5.6-30.5 | 1.6 | 0.5-4.7 |
| Women | 832 | 71.2 | 66.9-75.1 | 15.9 | 12.2-20.6 | 0.1 | 0--0.5 | 6.6 | 4.6-9.4 | 5.7 | 3.6-8.9 | 0.5 | 0.2-1.2 |

## Oral health

**Annex 53. Main reason for last visit to the dentist, gender, age, location (%)**

| Age Group (years) | n | % consultation/ advice | 95% CI | % pain or trouble with teeth | 95% CI | % treatment follow up | 95% CI | % routine check-up | 95% CI | % other | 95% CI |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Men** | | | | | | | | | | | |
| Urban | 1220 | 2.4 | 1.3-4.5 | 38.3 | 33.4-43.5 | 50 | 44.9-55 | 5 | 3.4-7.2 | 4.3 | 2.3-7.8 |
| Rural | 1176 | 2.8 | 1.6-4.8 | 49 | 41.5-56.5 | 37.4 | 29.2-46.4 | 5.5 | 3.4-8.9 | 5.3 | 2.5-10.8 |
| **Total** | **2396** | **2.6** | **1.5–3.7** | **43.9** | **39.1–48.7** | **43.4** | **38.1–48.8** | **5.3** | **3.6–6.9** | **4.8** | **2.5–7.2** |
| **Women** | | | | | | | | | | | |
| Urban | 1614 | 3.2 | 1.9-5.5 | 29.7 | 22.9-37.4 | 56.3 | 48.3-64 | 7.7 | 6-9.9 | 3.1 | 2-4.8 |
| Rural | 1430 | 4 | 2.6-6 | 47.4 | 40.1-54.8 | 36.3 | 28.5-44.8 | 9.3 | 6.2-13.5 | 3.1 | 1.8-5.2 |
| **Total** | **3044** | **3.6** | **2.4–4.8** | **38.6** | **32.7–44.4** | **46.3** | **39.6–53.0** | **8.5** | **6.4–10.6** | **3.1** | **2.0–4.1** |
| **Both sexes** | | | | | | | | | | | |
| Urban | 2834 | 2.8 | 1.7-4.7 | 33.8 | 28.5-39.6 | 53.3 | 47.7-58.8 | 6.4 | *4.9-8.4* | *3.7* | 2.2-6 |
| Rural | 2606 | 3.4 | 2.2-5.2 | 48.2 | 41.3-55.1 | 36.8 | 29.2-45.2 | 7.4 | *5-10.9* | *4.2* | 2.4-7.4 |
| **Total** | **5440** | **3.1** | **2.1–4.1** | **41.2** | **36.2–46.1** | **44.9** | **39.3–50.4** | **6.9** | **5.2–8.7** | **3.9** | **2.4–5.5** |

Appendix 2.

# NCD STEPS questionnary

## MONGOLIA

| Survey Information | | | |
|---|---|---|---|
| **Location and Date** | | **Response** | **Code** |
| 1 | Aimag/District name | | I1 |
| 2 | Soum/khoroo name | | I2 |
| 3 | Interviewer ID | ⌊_⌊_⌊_ | I3 |
| 4 | Date of completion of the instrument | ⌊_⌊_ ⌊_⌊_ ⌊_⌊_⌊_⌊_ dd mm year | I4 |

**Participant ID number** ⌊_⌊_ ⌊_⌊_ ⌊_⌊_⌊_⌊_

| **Consent, Interview Language and Name** | | **Response** | **Code** |
|---|---|---|---|
| 5 | Consent has been read and obtained | Yes 1<br>No 2 If NO, END | I5 |
| 6 | Time of interview<br>(24 hour clock) | Hour, minute<br>⌊_⌊_ : ⌊_⌊_ | I6 |
| 7 | Family Surname | | I7 |
| 8 | First Name | | I8 |
| Additional Information that may be helpful | | | |
| 9 | Contact phone number where possible | | I9 |

### Step 1 Demographic Information

| **CORE: Demographic Information** | | | | |
|---|---|---|---|---|
| **Question** | | **Response** | | **Code** |
| 10 | Sex (Record Male / Female as observed) | Male 1<br>Female 2 | | C1 |
| 11 | What is your date of birth?<br>Don't Know 77 77 7777 | ⌊_⌊_ ⌊_⌊_ ⌊_⌊_⌊_⌊_ dd mm year *If known, Go to C4* | | C2 |
| 12 | How old are you? | Years | ⌊_⌊_ | C3 |
| 13 | *In total, how many years have you spent at school and in full-time study (excluding pre-school)?* | Years | ⌊_⌊_ | C4 |

| | | | |
|---|---|---|---|
| **EXPANDED: Demographic Information** | | | |
| 14 | What is the highest level of education you have completed?<br><br>[INSERT COUNTRY-SPECIFIC CATEGORIES] | No formal schooling 1<br>Less than primary school 2<br>Primary school completed 3<br>Secondary school completed 4<br>High school completed 5<br>Technical school/College completed 6<br>University completed 7<br>Post graduate degree (Master, PhD) 8<br>Refused 88 | C5 |
| 15 | What is your [insert relevant ethnic group / racial group / cultural sub-group / others] background? | Khalkh 1<br>Khazakh 2<br>Buriad 3<br>Durvud 4<br>Other 5 If Other go to C6 other<br>Refused 88 | C6 |
| | | Other please specify ⌊_⌊_⌊_⌊_⌋ | C6 бусад |
| 16 | What is your marital status? | Never married 1<br>Married/certified 2<br>Married/not certified 3<br>Separated 4<br>Divorced 5<br>Widowed 6<br>Cohabitating 7<br>Refused 88 | C7 |
| 17 | Which of the following best describes your main work status over the past 12 months?<br><br>[INSERT COUNTRY-SPECIFIC CATEGORIES]<br><br>(USE SHOWCARD) | Government employee 1<br>Non-government employee 2<br>Self-employed 3<br>Non-paid 4<br>Student 5<br>Homemaker 6<br>Retired 7<br>Unemployed (able to work) 8<br>Unemployed (unable to work) 9<br>Refused 88 | C8 |
| **STEP 1 BEHAVIOURAL MEASUREMENTS** | | | |
| **CORE: Tobacco Use** | | | |
| **Now I am going to ask you some questions about tobacco use.** | | | |
| **Question** | | **Response** | **Code** |
| 18 | Do you **currently** smoke any **tobacco** products, such as cigarettes, cigars or pipes? (USE SHOWCARD) | Yes 1<br>No 2 If No, go to T8 | T1 |
| 19 | Do you currently smoke tobacco products **daily**? | Yes 1<br>No 2 | T2 |

| | | | | |
|---|---|---|---|---|
| 20 | How old were you when you **first started** smoking? | Age (years)<br>Don't know | ⌊_⌊_⌋ If Known, go to T5a/T5aw<br>77 | T3 |
| 21 | Do you remember how long ago it was?<br><br>(RECORD ONLY 1, NOT ALL 3)<br><br>Don't know 77 | In Years | ⌊_⌊_⌋ If Known, go to T5a/T5aw | T4a |
| | | OR in Months | ⌊_⌊_⌋ If Known, go to T5a/T5aw | T4в |
| | | OR in Weeks | ⌊_⌊_⌋ | T4c |
| 22 | On average, how many of the following products do you smoke each day/week?<br><br>(IF LESS THAN DAILY, RECORD WEEKLY)<br><br>(RECORD FOR EACH TYPE, USE SHOWCARD)<br><br>Don't Know 7777 | | Daily ↓ Weekly ↓ | |
| | | Manufactured cigarettes | ⌊_⌊_⌋ ⌊_⌊_⌋ | T5a/T5aw |
| | | Hand-rolled cigarettes | ⌊_⌊_⌋ ⌊_⌊_⌋ | T5b/T5bw |
| | | Pipes full of tobacco | ⌊_⌊_⌋ ⌊_⌊_⌋ | T5c/T5cw |
| | | Cigars, cheroots, cigarillos | ⌊_⌊_⌋ ⌊_⌊_⌋ | T5d/T5dw |
| | | Number of Shisha sessions | ⌊_⌊_⌋ ⌊_⌊_⌋ | T5e/T5ew |
| | | Other | ⌊_⌊_⌋ ⌊_⌊_⌋<br>If Other, go to T5other, else go to T6 | T5f/Tfw |
| | | Other (please specify): | ⌊_⌊_⌊_⌋ | T5other/ T5otherw |
| 23 | During the past 12 months, have you tried to **stop smoking**? | Yes<br>No | 1<br>2 | T6 |
| 24 | During any visit to a doctor or other health worker in the past 12 months, were you advised to quit smoking tobacco? | Yes 1<br>No 2<br>No visit during the past 12 months 3 | If T2=Yes, go to T12; if T2=No, go to T9<br>If T2=Yes, go to T12; if T2=No, go to T9<br>If T2=Yes, go to T12; if T2=No, go to T9 | T7 |
| 25 | In the past, did you ever smoke any tobacco products? (USE SHOWCARD) | Yes<br>No | 1<br>2 If No, go to T12 | T8 |
| 26 | In the past, did you **ever** smoke **daily**? | Yes<br>No | 1 If T1=Yes, go to T12, else go to T10<br>2 If T1=Yes, go to T12, else go to T10 | T9 |
| **EXPANDED: Tobacco Use** | | | | |
| 27 | How old were you when you stopped smoking? | Age (years)<br>Don't Know | ⌊_⌊_⌋ If Known, go to T12<br>77 | T10 |
| 28 | How long ago did you stop smoking?<br><br>(RECORD ONLY 1, NOT ALL 3)<br><br>Don't Know 77 | Years ago | ⌊_⌊_⌋ If Known, go to T12 | T11a |
| | | OR Months ago | ⌊_⌊_⌋ If Known, go to T12 | T11b |
| | | OR Weeks ago | ⌊_⌊_⌋ | T11c |

| | | | | |
|---|---|---|---|---|
| 29 | Do you **currently use** any **smokeless tobacco** products such as [snuff, chewing tobacco, betel]? (USE SHOWCARD) | Yes<br>No | 1<br>2 If No, go to T17 | T12 |
| 30 | Do you **currently use smokeless tobacco** products **daily**? | Yes<br>No | 1<br>2 If No, go to T14aw | T13 |
| 31 | On average, how many times a day/week do you use ....<br><br>(IF LESS THAN DAILY, RECORD WEEKLY)<br><br>(RECORD FOR EACH TYPE, USE SHOWCARD)<br><br>Don't Know 7777 | | Daily ↓ 7 Weekly ↓ | |
| | | Snuff by mouth | ⌊_⌊_⌊ ⌊_⌊_⌊ | T14a/ T14aw |
| | | Snuff by nose | ⌊_⌊_⌊ ⌊_⌊_⌊ | T14b/ T14bw |
| | | Chewing tobacco | ⌊_⌊_⌊ ⌊_⌊_⌊ | T14c/ T14cw |
| | | Betel, quid | ⌊_⌊_⌊ ⌊_⌊_⌊ | T14d/ T14dw |
| | | Other | ⌊_⌊_⌊ ⌊_⌊_⌊<br>If Other, go to T14other, if T13=No, go to T16, else go to T17 | T14e/ T14ew |
| | | Other (please specify): | ⌊_⌊_⌊<br>If T13=No, go to T16, else go to T17 | T14other/ T14otherw |
| 32 | During the past 7 days, did anyone smoke in your home? | Yes<br>No | 1<br>2<br>77 | T17 |
| 33 | During the past 7 days, did anyone smoke in closed areas in your work-place (in the building, in a work area or a specific office)? | Yes<br>No<br>Don't work in a closed area | 1<br>2<br>77 | T18 |
| 34 | During the past 7 days, on how many days did someone smoke in an enclosed public area? (inside a store, bus, etc.) | Yes<br>No<br>Don't know or Don't work in a closed area | 1 Number of days ⌊_⌊_⌊<br>2<br>77 | X2 |

| | | | |
|---|---|---|---|
| **CORE: Alcohol Consumption** | | | |
| **The next questions ask about the consumption of alcohol.** | | | |
| 35 | Have you ever consumed any alcohol such as beer, wine, spirits or [add other local examples]? (USE SHOWCARD OR SHOW EXAMPLES) | Yes 1<br>No 2 If No, go to A16 | A1 |
| 36 | Have you consumed any alcohol within the **past 12 months?** | Yes 1 If Yes, go to A4<br>No 2 | A2 |
| 37 | Have you stopped drinking due to health reasons, such as a negative impact on your health or on the advice of your doctor or other health worker? | Yes 1 If Yes, go to A16<br>No 2 If No, go to A16 | A3 |

| | | | |
|---|---|---|---|
| 38 | During the past 12 months, how frequently have you had at least one standard alcoholic drink?<br><br>(READ RESPONSES, USE SHOWCARD) | Daily 1<br>5-6 days per week 2<br>3-4 days per week 3<br>1-2 days per week 4<br>1-3 days per month 5<br>Less than once a month 6 | A4 |
| 39 | Have you consumed any alcohol within the **past 30 days**? | Yes 1<br>No 2 If No, go to A13 | A5 |
| 40 | During the past 30 days, on how many **occasions** did you have at least one standard alcoholic drink? | Number ⌊_⌊_⌋<br>Don't know 77 | A6 |
| 41 | During the past 30 days, when you drank alcohol, how many **standard drinks on average** did you have during one drinking occasion?<br>(USE SHOWCARD) | Number ⌊_⌊_⌋<br>Don't know 77 | A7 |
| 42 | During the past 30 days, what was the largest number of standard drinks you had on a single occasion, counting all types of alcoholic drinks together? | Largest number ⌊_⌊_⌋<br>Don't Know 77 | A8 |
| 43 | During the past 30 days, how many times did you have **six or more** standard drinks in a single drinking occasion? | Number of times ⌊_⌊_⌋<br>Don't Know 77 | A9 |
| 44 | During each of the past 7 days, how many standard drinks did you have each day?<br><br>(USE SHOWCARD) | Monday ⌊_⌊_⌋ | A10a |
| | | Tuesday ⌊_⌊_⌋ | A10b |
| | | Wednesday ⌊_⌊_⌋ | A10c |
| | | Thursday ⌊_⌊_⌋ | A10d |
| | | Friday ⌊_⌊_⌋ | A10e |
| | | Saturday ⌊_⌊_⌋ | A10f |
| | | Sunday ⌊_⌊_⌋ | A10g |
| **CORE: Alcohol Consumption, continued** | | | |
| 45 | During the past 7 days, did you consume any homebrewed alcohol, any alcohol brought over the border/ from another country, any alcohol not intended for drinking or other untaxed alcohol?<br>[AMEND ACCORDING TO LOCAL CONTEXT]<br>(USE SHOWCARD) | Yes 1<br><br>No 2 If No, go to A13 | A11 |

| | | | | |
|---|---|---|---|---|
| 46 | On average, how many standard drinks of the following did you consume during the past 7 days?<br><br>[INSERT COUNTRY-SPECIFIC EXAMPLES] (USE SHOWCARD) | Homebrewed spirits, e.g. moonshine | ⌊_⌊_⌋ | A12a |
| | | Homebrewed beer or wine, e.g. beer, palm or fruit wine | ⌊_⌊_⌋ | A12b |
| | | Alcohol brought over the bor-der/from another country | ⌊_⌊_⌋ | A12c |
| | | Alcohol not intended for drinking, e.g. alcohol-based medicines, perfumes, after shaves | ⌊_⌊_⌋ | A12d |
| | | Other untaxed alcohol in the country | ⌊_⌊_⌋ | A12e |
| **EXPANDED: Alcohol Consumption** | | | | |
| 47 | During the **past 12 months**, how often have you found that you were not able to stop drinking once you had started? | Daily or almost daily<br>Weekly<br>Monthly<br>Less than monthly<br>Never | 1<br>2<br>3<br>4<br>5 | A13 |
| 48 | During the **past 12 months**, how often have you failed to do what was normally expected from you because of drinking? | Daily or almost daily<br>Weekly<br>Monthly<br>Less than monthly<br>Never | 1<br>2<br>3<br>4<br>5 | A14 |
| 49 | During the **past 12 months**, how often have you needed a first drink in the morning to get yourself going after a heavy drinking session? | Daily or almost daily<br>Weekly<br>Monthly<br>Less than monthly<br>Never | 1<br>2<br>3<br>4<br>5 | A15 |
| 50 | During the **past 12 months**, have you had family problems or problems with your spouse/partner due to **someone else's** drinking? | Yes, more than monthly<br>Yes, monthly<br>Yes, several times but less than monthly<br>Yes, once or twice<br>No | 1<br>2<br>3<br>4<br>5 | A16 |

**CORE: Diet**

The next questions ask about the fruits and vegetables that you usually eat. I have a nutrition card here that shows you some examples of local fruits and vegetables. Each picture represents the size of a serving. As you answer these questions please think of a typical week in the last year.

| | Question | Response | | Code |
|---|---|---|---|---|
| 51 | In a typical week, on how many days do you **eat fruit**? (USE SHOWCARD) | Number of days<br>Don't Know | ⌊_⌊_⌋ If Zero days, go to D3<br>77 | D1 |
| 52 | How many **servings** of fruit do you eat on **one** of those days? (USE SHOWCARD) | Number of servings<br>Don't Know | ⌊_⌊_⌋<br>77 | D2 |
| 53 | In a typical week, on how many days do you **eat vegetables**? (USE SHOWCARD) | Number of days<br>Don't Know | ⌊_⌊_⌋ If Zero days, go to D5<br>77 | D3 |
| 54 | How many **servings** of vegetables do you eat on one of those days? (USE SHOWCARD) | Number of servings<br>Don't know | ⌊_⌊_⌋<br>77 | D4 |

| | | | |
|---|---|---|---|
| **EXPANDED: Diet** | | | |
| 55 | What type of oil or fat is most often used for meal preparation in your household?<br><br>(USE SHOWCARD)<br>(SELECT ONLY ONE) | Vegetable oil 1<br>Lard or suet 2<br>Butter or ghee 3<br>Margarine 4<br>Other 5 *If Other, go to D5 other*<br>None in particular 6<br>None used 7<br>Don't know 77 | D5 |
| | | Other ⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌋ | D5 |
| 56 | On average, how many meals per week do you eat that were not prepared at a home? By meal, I mean breakfast, lunch and dinner. | Number ⌊_⌊_⌋<br>Don't know 77 | D6 |
| **CORE: Dietary salt** | | | |
| The next questions ask about your knowledge, attitudes and behaviour towards dietary salt. Dietary salt includes ordinary table salt, unrefined salt such as sea salt, iodized salt and salty sauces such as soya sauce or fish sauce (see showcard). The following questions are on adding salt to the food right before you eat it, on how food is prepared in your home, on eating processed foods that are high in salt such as [insert country specific examples], and questions on controlling your salt intake. Please answer the questions even if you consider yourself to eat a diet low in salt. | | | |
| 57 | How often do you **add salt** to your food before you eat it or as you are eating it?<br><br>(SELECT ONLY ONE)<br><br>(USE SHOWCARD) | Always 1<br>Often 2<br>Sometimes 3<br>Rarely 4<br>Never 5<br>Don't know 77 | DS1 |
| 58 | How often is **salt added** in cooking or preparing foods in your household? | Always 1<br>Often 2<br>Sometimes 3<br>Rarely 4<br>Never 5<br>Don't know 77 | DS2 |
| 59 | How often do you eat **processed food high in salt**, such as [add country specific examples]?<br><br>[INSERT EXAMPLES]<br><br>(USE SHOWCARD) | Always 1<br>Often 2<br>Sometimes 3<br>Rarely 4<br>Never 5<br>Don't know 77 | DS3 |

| Do you do anything of the following on a regular basis to control your salt intake? (RECORD FOR EACH) | | | |
|---|---|---|---|
| 60 | Avoid/minimize consumption of processed foods | Yes 1<br>No 2 | DS4a |
| | Look at the salt or sodium labels on food | Yes 1<br>No 2 | DS4b |
| | Do not add salt on the table | Yes 1<br>No 2 | DS4c |
| | Buy low salt/sodium alternatives | Yes 1<br>No 2 | DS4d |
| | Do not add salt when cooking | Yes 1<br>No 2 | DS4e |
| | Use spices other than salt when cooking | Yes 1<br>No 2 | DS4f |
| | Avoid eating out | Yes 1<br>No 2 | DS4g |
| | Other | Yes 1 If Yes, go to S7other<br>No 2 | DS4h |
| | Other (please specify) | ⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌊ | DS4 other |

**CORE: Physical Activity**

Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person.
Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment. [Insert other examples if needed]. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.

| № | Question | Response | Code |
|---|---|---|---|
| | **Work** | | |
| 61 | Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like [carrying or lifting heavy loads, digging or construction work] for at least 10 minutes continuously?<br>[INSERT EXAMPLES] (USE SHOWCARD) | Yes 1<br>No 2 If No, go to P 4 | P1 |
| 62 | In a typical week, on how many days do you do vigorous-intensity activities as part of your work? | Number of days ⌊_⌋<br>77 | P2 |
| 63 | How much time do you spend doing vigorous-intensity activities at work on a typical day? | Hours : Minutes ⌊_⌊_⌋ : ⌊_⌊_⌋<br>hrs mins | P3 (a-b) |
| 64 | Does your work involve moderate-intensity activity, that causes small increases in breathing or heart rate such as brisk walking [or carrying light loads] for at least 10 minutes continuously?<br>[INSERT EXAMPLES] (USE SHOWCARD) | Yes 1<br>No 2 If No, go to P 7 | P4 |
| 65 | In a typical week, on how many days do you do moderate-intensity activities as part of your work? | Number of days ⌊_⌋<br>77 | P5 |

| | | | |
|---|---|---|---|
| 66 | How much time do you spend doing moderate-intensity activities at work on a typical day? | Hours: minutes ⌊_⌊_⌋ : ⌊_⌊_⌋ hrs mins | P6 (a-b) |
| **Travel to and from places** | | | |
| The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship. [Insert other examples if needed] | | | |
| 67 | Do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places? | Yes 1<br>No 2 If No, go to P 10 | P7 |
| 68 | In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places? | Number of days ⌊_⌋<br>77 | P8 |
| 69 | How much time do you spend walking or bicycling for travel on a typical day? | Hours: minutes ⌊_⌊_⌋ : ⌊_⌊_⌋ hrs mins | P9 (a-b) |
| **CORE: Physical Activity, Continued** | | | |
| The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure), [Insert relevant terms]. | | | |
| 70 | Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running or football] for at least 10 minutes continuously? [INSERT EXAMPLES] (USE SHOWCARD) | Yes 1<br>No 2 If No, go to P 13 | P10 |
| 71 | In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (leisure) activities? | Number of days ⌊_⌋<br>77 | P11 |
| 72 | How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day? | Hours: minutes ⌊_⌊_⌋ : ⌊_⌊_⌋ hrs mins | P12 (a-b) |
| 73 | Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, [cycling, swimming, volleyball] for at least 10 minutes continuously? [INSERT EXAMPLES] (USE SHOWCARD) | Yes 1<br>No 2 If No, go to P16 | P13 |
| 74 | In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities? | Number of days ⌊_⌋<br>77 | P14 |
| 75 | How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day? | Hours: minutes ⌊_⌊_⌋ : ⌊_⌊_⌋ hrs mins | P15 (a-b) |

| **EXPANDED: Physical Activity** | | | | |
|---|---|---|---|---|
| **Sedentary behaviour** | | | | |
| The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent sitting at a desk, sitting with friends, traveling in car, bus, train, reading, playing cards or watching television, but do not include time spent sleeping.<br>[INSERT EXAMPLES] (USE SHOWCARD) | | | | |
| 76 | How much time do you usually spend sitting or reclining on a typical day? | Hours : minutes | ⌊⌊⌋⌋ : ⌊⌊⌋⌋<br>hrs mins | P16 (a-b) |

| **CORE: History of Raised Blood Pressure** | | | |
|---|---|---|---|
| **Question** | | **Response** | **Code** |
| 77 | Have you ever had your blood pressure measured by a doctor or other health worker? | Yes 1<br>No 2 If No, go to H6 | H1 |
| 78 | Have you ever been told by a doctor or other health worker that you have raised blood pressure or hypertension? | Yes 1<br>No 2 If No, go to H6 | H2a |
| 79 | Have you been told in the past 12 months? | Yes 1<br>No 2 | H2b |
| 80 | In the past two weeks, have you taken any drugs (medication) for raised blood pressure by a doctor or other health worker? | Yes 1<br>No 2 | H3 |
| 81 | Have you ever seen a traditional healer for raised blood pressure or hypertension? | Yes 1<br>No 2 | H4 |
| 82 | Are you currently taking any herbal or traditional remedy for your raised blood pressure? | Yes 1<br>No 2 | H5 |

| **CORE: History of Diabetes** | | | |
|---|---|---|---|
| **Question** | | **Response** | **Code** |
| 83 | Have you ever had your blood sugar measured by a doctor or other health worker? | Yes 1<br>No 2 If No, go to H12 | H6 |
| 84 | Have you ever been told by a doctor or other health worker that you have raised blood sugar or diabetes? | Yes 1<br>No 2 If No, go to H12 | H7a |
| 85 | Have you been told in the past 12 months? | Yes 1<br>No 2 | H7b |
| 86 | In the past two weeks, have you taken any drugs (medication) for diabetes prescribed by a doctor or other health worker? | Yes 1<br>No 2 | H8 |
| 87 | Are you currently taking insulin for diabetes prescribed by a doctor or other health worker? | Yes 1<br>No 2 | H9 |

| | | | |
|---|---|---|---|
| 88 | Have you ever seen a traditional healer for diabetes or raised blood sugar? | Yes 1<br>No 2 | H10 |
| 89 | Are you currently taking any herbal or traditional remedy for your diabetes? | Yes 1<br>No 2 | H11 |
| 90 | Have someone in your family/close relatives ever been diagnosed by diabetes? | Yes 1<br>No 2 | X3 |

| **CORE: History of Raised Total Cholesterol** | | | |
|---|---|---|---|
| **Questions** | | **Response** | **Code** |
| 91 | Have you ever had your cholesterol measured by a doctor or other health worker? | Yes 1<br>No 2 If No, go to H18 | H12 |
| 92 | Have you ever been told by a doctor or other health worker that you have raised cholesterol? | Yes 1<br>No 2 If No, go to H18 | H13a |
| 93 | Were you told in the past 12 months? | Yes 1<br>No 2 | H13b |
| 94 | In the past two weeks, have you taken any oral treatment (medication) for raised total cholesterol prescribed by a doctor or other health worker? | Yes 1<br>No 2 | H14 |

| **CORE: History of Cardio-vascular Diseases** | | | |
|---|---|---|---|
| **Question** | | **Response** | **Code** |
| 95 | Have you ever had a heart attack or chest pain from heart disease (angina), or a stroke (cerebrovascular accident or incident)? | Yes 1<br>No 2 | H17 |
| 96 | Are you currently taking aspirin regularly to prevent or treat heart disease? | Yes 1<br>No 2 | H18 |
| 97 | Are you currently taking statins (for example Lovostatin/Simvastatin/ Atorvastatin) regularly to prevent or treat heart disease? | Yes 1<br>No 2 | H19 |

| CORE: Lifestyle Advice | | | |
|---|---|---|---|
| **Questions** | | **Response** | **Code** |
| 98 | ***During the past three years, has a doctor or other health worker advised you to do any of the following?*** *(RECORD FOR EACH)* | | |
| | Quit using tobacco or don't start | Yes 1<br>No 2 | H20a |
| | Reduce salt in your diet | Yes 1<br>No 2 | H20b |
| | Eat at least five servings of fruit and/or vegetables each day | Yes 1<br>No 2 | H20c |
| | Reduce fat in your diet | Yes 1<br>No 2 | H20d |
| | Do at least 30 minutes of physical activity on at least 5 days per week | Yes 1<br>No 2 | H20e |
| | Maintain a healthy body weight or lose weight | Yes 1 If C1=1 go to M1<br>No 2 If C1=1 go to M1 | H20f |

| CORE: Injury | | | |
|---|---|---|---|
| The next questions ask about different experiences and behaviours that are related to road traffic injuries. | | | |
| | **Question** | **Response** | **Code** |
| 99 | In the past 30 days, how often did you use a seat belt when you were the driver or passenger of a motor vehicle? | All of the time 1<br>Sometimes 2<br>Never 3<br>Have not been in a vehicle in past 30 days 4<br>No seat belt in the car I usually am in 5<br>Don't Know 77<br>Refused 88 | V1 |
| 100 | In the past 30 days, how often did you wear a helmet when you drove or rode as a passenger on a motorcycle or motor-scooter? | All of the time 1<br>Sometimes 2<br>Never 3<br>Have not been on a motorcycle or motor-scooter in past 30 days 4<br>Do not have a helmet 5<br>Don't Know 77<br>Refused 88 | V2 |
| 101 | In the past 12 months, have you been involved in a road traffic crash as a driver, passenger, pedestrian, or cyclist? | Yes (as driver) 1<br>Yes (as passenger) 2<br>Yes (as pedestrian) 3<br>Yes (as a cyclist) 4<br>No 5 If No, go to X7<br>Don't know 77 If don't know, go to X7<br>Refused 88 If Refused, go to X7 | V3 |

| | | | |
|---|---|---|---|
| 102 | Please indicate which of the following was the main reason for this road traffic crash? | Alcoholic drink 1<br>Recreational medicine 2<br>Fatigue / Illness 3<br>Excess speed 4<br>Pedestrian passed through wrong route / Failed to go by pedestrian route 5<br>External factor (e.g. poor signage, poor road quality, poor lighting) 6<br>Other (specify) 7<br>Don't Know 77<br>Refused 88 | X6 |
| | | Other (please specify) ---------- | X6 other |
| 103 | On average, how many hours do you drive a motor vehicle per day? | Hour ⌊_⌊_⌋<br>Don't drive 77 | X10 |
| The next questions ask about the most serious accidental injury you have had in the past 12 months. | | | |
| 104 | In the past 12 months, were you injured accidentally, other than in a road traffic injury - which required medical attention? | Yes 1<br>No 2 If No, go to V10<br>Don't know 77 If don't know, go to V10<br>Refused 88 If Refused, go to V10 | V5 |
| 105 | Please indicate which of the following was the cause of this injury. | Fall 1<br>Burn 2<br>Poisoning 3<br>Cut 4<br>Near-drowning 5<br>Animal bite 6<br>Frostbite 7<br>Hit by object / object fell on me 8<br>Other 9 If other go to V6other<br>Don't know 77<br>Refused 88 | V6 |
| | | Other (please specify) ---------- | V6 other |
| 106 | Where were you when you had this injury? | Home 1<br>School 2<br>Workplace / Construction Site 3<br>Road / Street / Highway / Tunnel (Transheine) 4<br>Farm 5<br>Sports / athletic area 6<br>Public show / event 7<br>River 8<br>Other 9<br>If other go to V7other<br>Don't know 77<br>Refused 88 | V7 |
| | | Other (please specify) ---------- | V7 other |

| EXPANDED: Unintentional Injury | | | |
|---|---|---|---|
| 107 | In the past 30 days, how many times have you been ridden in a motorized vehicle where the driver has had alcohol use? | Yes 1 number of times ⌊_⌋⌊_⌋<br>No 2<br>Don't no 77<br>Refused 88 | V10 |

| CORE: Violence | | | |
|---|---|---|---|
| The following questions are about different experiences and behaviors that are related to violence. | | | |
| **Question** | | **Response** | **Code** |
| 108 | In the past 12 mounths, how many times were you involved in a violent incident in which you were injured and required medical attention | Never 1 If never, go to V14<br>Rarely (1- 2 times) 2<br>Sometimes (3 – 5 times) 3<br>Often (6 or more times) 4<br>Don't know 77 If don't know, go to V14<br>Refused 88 If Refused, go to V14 | V11 |
| The next questions ask about the most serious violent incidence you have had in the past 12 months. | | | |
| 109 | Please indicate which of the following caused your most serious injury in the last 12 months. (USE SHOWCARDS) | Being shot with a firearm - 1<br>A weapon (other than a firearm) used by the person who injured me - 2<br>Being injured without any weapon (slapped, pushed…) - 3<br>Don't know - 77<br>Refused - 88 | V12 |
| 110 | Please indicate the relationship between yourself and the person(s) who caused your injury. | Intimate partner - 1<br>Parent - 2<br>Child, sibling, or other realtive relative - 3<br>Friend or acquaintance - 4<br>Unrelated caregiver - 5<br>Stranger - 6<br>Official or legal authorities - 7<br>Other (specify) - 8<br>Refused - 88 | V13 |
| | | Other (please specify) ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ | V13 other |
| 111 | Looking back on your childhood (before age of 18 years), did a parent or adult in the household ever push, grab, shove, slap, hit, burn, or throw something at you? | Never - 1<br>Very rarely (less than once a month) - 2<br>Once a month - 3<br>Once a week - 4<br>Almost daily - 5<br>Don't know - 77<br>Refused - 88 | V14 |
| 112 | Looking back on your childhood, did an adult or anyone at least five years older than you ever touch you sexually or try to make you touch them sexually or force you to have sex? | Yes 1<br>No 2<br>Refused 88 | V15 |

| EXPANDED: Violence | | | |
|---|---|---|---|
| **Question** | | **Response** | **Code** |
| 113 | In the past 12 months, have you been frightened for the safety of yourself or your family because of the anger or threats of another person(s)? | Yes 1<br>No 2 If no, go to X8<br>Refused 88 If refused, go to X8 | V17 |
| 114 | If refused, go to | Intimate partner 1<br>Parent 2<br>Child, sibling, or other relative 3<br>Friend or acquaintance 4<br>Unrelated caregiver 5<br>Stranger 6<br>Official or legal authority 7<br>Other (specify) 8<br>Refused 88 | V18 |
| | | Other (please specify) ⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌋ | V18 other |
| 115 | Who would you directly contact if you were frightened for the safety of yourself or your family? | Police 1<br>Public administration staff 2<br>Doctor or other health worker 3<br>Family 4<br>Friends 5<br>Teacher 6<br>Strangers 7<br>Don't know 77<br>Refused 88 | X11 |

| CORE: BREAST AND CERVICAL CANCER | | | |
|---|---|---|---|
| **Question** | | **Response** | **Code** |
| 116 | Have you ever had a cervical cancer examination? | Yes 1<br>No 2 If no go to CX2<br>Don't know 77 If don't know go to CX2 | CX1 |
| 117 | How often have you had VIA test? ( visual inspection of uterine cervix with acidic acid) | Once a 3 year 1<br>Less than once every 3 year 2<br>Never 3<br>Don't know 77 | CX1a |
| 118 | How often have you had a PAP smear test? | Once a 3 year 1<br>Less than once every 3 year 2<br>Never 3<br>Don't know 77 | CX1b |
| 119 | Have you ever had a breast cancer examination by health care provider? | Yes 1<br>No 2 If no go to HC1 | CX2 |
| 120 | How often did you have a clinical examination of the breast? (examination by a health care provider) | Once a year 1<br>Once in two years 2<br>Once in three years 3<br>Less than once in three years 4<br>Don't know 77 | CX2a |
| 121 | Have you ever had a mammogram? | Yes 1<br>No 2 If no go to CX4<br>Don't know 77 If don't know go to CX4 | CX3 |

| | | | | |
|---|---|---|---|---|
| 122 | How often did you had a mammogram? | Once a year<br>Once in two years<br>Once in three years<br>Less than once in 3 years<br>Don't know | 1<br>2<br>3<br>4<br>77 | CX3a |
| 123 | How often did you do breast self examination? | At least once a month<br>Less than once a month<br>Never | 1<br>2<br>3 | CX4 |

**CORE: ORAL HEALTH**

| Question | | Response | | Code |
|---|---|---|---|---|
| 124 | How many natural teeth do you have? | No natural teeth<br>1-9 teeth<br>10-19 teeth<br>20 teeth or more<br>Don't know | 1<br>2<br>3<br>4<br>77 | O1 |
| 125 | Do you have any removable dentures? | Yes<br>No | 1<br>2 | O2 |
| 126 | How long has it been since you last saw a dentist? | Less than 6 months<br>6-12 months<br>More than 1 year but less than 2 years<br>2 or more years but less than 5 years<br>5 or more years<br>Never received dental care | 1<br>2<br>3<br>4<br>5<br>6 | O3 |
| 127 | What was the main reason for your last visit to the dentist? | Consultation/advice<br>Pain or trouble with teeth, gums or mouth<br>Treatment / follow-up treatment<br>Routine check-up treatment<br>Other | 1<br>2<br>3<br>4<br>5 | O4 |
| | | Other (please specify) ⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌋ | | O4 other |
| 128 | How often do you clean your teeth? | Never<br>Once a month<br>2-3 times a month<br>Once a week<br>2-6 times a week<br>Once a day<br>Twice or more a day | 1<br>2<br>3<br>4<br>5<br>6<br>7 | O5 |

**Health Care Module**

Next I am going to ask you about your health insurance coverage and your use of health services in relation to any noncommunicable disease (NCD) you may have. NCDs include cardiovascular diseases (such as heart diseases, cerebrovascular disease and stroke, peripheral arterial disease, and deep vein thrombosis and pulmonary embolism), cancers, chronic respiratory diseases (such as asthma, chronic obstructive pulmonary disease, occupational lung diseases or pulmonary hypertension) and diabetes.

**Health Care Coverage**

Please provide information about your current health insurance coverage.

| | | | | | |
|---|---|---|---|---|---|
| 129 | Do you currently have any kind of health insurance or health care coverage? | Yes 1<br>No 2 | If No, go to HC3 | | HC1 |
| 130 | What kind of health insurance or health care coverage do you currently have?<br><br>[INSERT COUNTRY-SPECIFIC CATEGORIES] | Private health insurance plan purchased directly<br>Private health insurance plan from employer<br>Other<br>Don't know | 1<br>2<br>3 If Other, go to HC2other<br>77 | | HC2 |
| | | Other | ⌊_⌊_⌊_⌊_⌊_⌊_⌊ | | HC2 бусад |
| 131 | During the past 12 months, did you have to pay yourself for medicines or health services such as consultations, treatment, hospitalization or patient care? | Yes<br>No | 1<br>2 If no go to HC4 | | HC3 |
| 132 | Did you have to do any of the following in order to pay for medicines or health services such as consultations, treatment, hospitalization or patient care? | Salary/whole/ | Yes<br>No | 1<br>2 | HC3a |
| | | Sell possessions | Yes<br>No | 1<br>if no go to HC4-рүү шилж | HC3b |
| | | Use savings | Yes<br>No | 1<br>2 | HC3c |
| | | Borrow money from family or friends | Yes<br>No | 1<br>2 | HC3d |
| | | Borrow money from someone other than a friend or family member | Yes<br>No | 1<br>2 | HC3e |
| | | Other | Yes<br>No | 1 If Other, go to HC3other<br>2 | HC3f |
| | | Other | ⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌊ | | HC3 other |

| **Health Care Utilization, out of pocket expense** | | | | |
|---|---|---|---|---|
| Please think about all your visits to any health center and the treatments you received there which were related to an NCD you have. | | | | |
| 133 | Have you ever had or do you currently have a non-communicable disease (NCD) such as cardiovascular disease including heart disease and stroke, cancer, chronic respiratory disease, or diabetes? | Yes 1<br>No 2 If No, go to HC11 | | HC4 |
| 134 | During the past 30 days, have you visited any health care facility due to an NCD you have? Please exclude any hospitalization. | Yes 1<br>No 2 | If No, go to HC11 | HC5 |
| 135 | During the past 30 days, how many times have you visited a health care facility due to an NCD you have?<br>(RECORD FOR EACH)<br>Don't know 77 | Health Center ⌊_⌋⌊_⌋ | | HC9a |
| | | Public hospital (excl. emergency room) ⌊_⌋⌊_⌋ | | HC9b |
| | | Emergency Room ⌊_⌋⌊_⌋ | | HC9c |
| | | Private hospital ⌊_⌋⌊_⌋ | | HC9d |
| | | Care/diagnostics in foreign country ⌊_⌋⌊_⌋ | | HC9e |
| | | Pharmacy ⌊_⌋⌊_⌋ | | HC9f |
| 136 | During the past 30 days, taking all your visits of a health care facility due to an NCD into account, how much did you pay for these visits in total?<br>(RECORD FOR EACH OR PUT TOTAL AMOUNT)<br>Don't know 77 | Care / Tests ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ [local] | | HC10a |
| | | Medicine/vitamin ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ [local] | | HC10b |
| | | Accommodation, food, transportation ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ [local] | | HC10c |
| | | In kind (cash) given health workers ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ [local] | | HC10d |
| | | **OR Total Amount** ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ [local] | | HC10e |
| 137 | During the past 12 months, have you been hospitalized due to an NCD? | Yes 1<br>No 2 If No, go to HC17 | | HC11 |
| 138 | During the past 12 months, taking all your visits of a hospital due to an NCD into account, how much did you pay for these visits in total?<br>(RECORD FOR EACH OR PUT TOTAL AMOUNT)<br>Don't know 77 | Care / Tests ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ [local] | | HC13a |
| | | Medicine/vitamin ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ [local] | | HC13b |
| | | Accommodation, food, transportation ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ [local] | | HC13c |
| | | In kind (cash) given health workers ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ [local] | | HC13d |
| | | **OR Total Amount** ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋ [local] | | HC13e |

| | | | | |
|---|---|---|---|---|
| **Home Care** | | | | |
| Please think about home care from family members and/or friends because of an NCD you have. | | | | |
| 139 | During the past 30 days, has a family member or friend provided care for you at home due to your NCD? | Yes<br>No | 1<br>*2 If No, go to HC17* | HC15 |
| 140 | During the past 30 days, how many hours per week has this person/have these people provided care for you?<br><br>Don't know 77 | Hours per week | ⌊_⌊_⌊_⌋<br>hrs | HC16 |
| **Loss of Productivity** | | | | |
| Please think about the time you couldn't do your usual activity (work, work at home, school) because of an NCD you have. | | | | |
| 141 | During the past 30 days, have you missed any time of your usual activity (work, work at home, school) due to an NCD? | Yes<br>No | 1<br>2 If No, go to [next section] | HC17 |
| 142 | Сүүлийн 30 хоногт та ХБӨ-ний улмаас хэдэн өдөр ажил үүргээ гүйцэтгэж чадаагүй вэ?<br>*Мэдэхгүй 77* | Days | ⌊_⌊_⌋<br>days | HC18 |

| | | | | |
|---|---|---|---|---|
| **Household Information** | | | | |
| 143 | How many people, including yourself, live in your household? | Number of people<br>Don't know<br>Refused | ⌊_⌊_⌋<br>2<br>77 | X1 |
| 144 | How many people older than 18 years, including yourself, live in your household? | Number of people<br>Don't know<br>Refused | ⌊_⌊_⌋<br>2<br>77 | C9 |
| 145 | Taking the past year, can you tell me what the average earnings of the household have been?<br>(RECORD ONLY ONE, NOT ALL 3) | Per week | ⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌋<br>Go to C12 | C10a |
| | | OR per month | ⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌋<br>Go to C12 | C10b |
| | | OR per year | ⌊_⌊_⌊_⌊_⌊_⌊_⌊_⌋<br>Go to C12 | C10c |
| | | Refused | 88 | C10d |
| 146 | If you don't know the amount, can you give an estimate of the annual household income if I read some options to you? Is it<br>[INSERT QUINTILE VALUES IN LOCAL CURRENCY]<br><br>(READ OPTIONS) | 170000<br>170000 – 370000<br>370001 - 570000<br>570001 – 770000<br>770001 – 970000<br>≥ 970001<br>Don't know<br>Refused | 1<br>2<br>3<br>4<br>5<br>6<br>77<br>88 | C11 |

| | | | | | |
|---|---|---|---|---|---|
| 147 | Firstly, your main dwelling where you live most of the time: Does it have any of the followings? Answer yes or no? | | Yes | No | X4 |
| | | Electricity from grid | | | |
| | | Electricity from generator | | | |
| | | Television | | | |
| | | Fixed line phone | | | |
| | | Refrigerator | | | |
| | | Computer | | | |
| | | Running water | | | |
| | | Radio | | | |
| 148 | Next, does anyone in your main dwelling own any of the following items? Again, yes or no? | | Yes | No | X5 |
| | | Mobile phone | | | |
| | | Motorcycle | | | |
| | | Bicycle | | | |
| | | Five stock animals | | | |
| | | Car | | | |
| | | Truck/tractor | | | |
| | | Savings | | | |
| | | Land | | | |
| 149 | What is the type of your dwelling? | Apartment 1<br>House 2<br>Dormitory 3<br>Ger 4<br>Other 5 | | | X7 |

| **STEP 2 PHYSICAL MEASUREMENTS** | | | |
|---|---|---|---|
| **CORE:** Blood Pressure | | | |
| **Question** | | **Response** | **Code** |
| 150 | Interviewer ID | ⌊_⌊_⌊_⌋ | M1 |
| 151 | Device ID for blood pressure | ⌊_⌊_⌋ | M9 |
| 152 | Cuff size used | Small 1<br>Medium 2<br>Large 3 | M10 |
| 153 | Reading 1 | Systolic (mmHg) ⌊_⌊_⌊_⌋ | M11a |
| | | Diastolic (mmHg) ⌊_⌊_⌊_⌋ | M11b |
| 154 | Reading 2 | Systolic (mmHg) ⌊_⌊_⌊_⌋ | M12a |
| | | Diastolic (mmHg) ⌊_⌊_⌊_⌋ | M12b |
| 155 | Reading 3 | Systolic (mmHg) ⌊_⌊_⌊_⌋ | M13a |
| | | Diastolic (mmHg) ⌊_⌊_⌊_⌋ | M13b |
| 156 | During the past two weeks, have you been treated for raised blood pressure with drugs (medication) prescribed by a doctor or other health worker? | Yes 1<br>No 2 | M14 |

| | | | | |
|---|---|---|---|---|
| 157 | For women: Are you pregnant? | Yes<br>No | If Yes, go to M 8 | M5 |
| **CORE: Height and Weight** | | | | |
| 158 | Device IDs for height and weight | Height<br>Weight | ⌊⌊⌋<br>⌊⌊⌋ | M2a<br>M2b |
| 159 | Height | in Centimetres (cm) | ⌊⌊⌊⌋.⌊⌋ | M3 |
| 160 | Weight<br>If too large for scale 666.6 | in Kilograms (kg) | ⌊⌊⌊⌋.⌊⌋ | M4 |
| **CORE: Waist** | | | | |
| 161 | Device ID for waist | | ⌊⌊⌋ | M6 |
| 162 | Waist circumference | in Centimetres (cm) | ⌊⌊⌊⌋.⌊⌋ | M7 |
| **EXPANDED: Hip Circumference and Heart Rate** | | | | |
| 163 | **Hip circumference** | in Centimeters (cm) | ⌊⌊⌊⌋.⌊⌋ | M15 |
| 164 | Heart Rate | | | |
| | Reading 1 | Beats per minute | ⌊⌊⌊⌋ | M16a |
| | Reading 2 | Beats per minute | ⌊⌊⌊⌋ | M16в |
| | Reading 3 | Beats per minute | ⌊⌊⌊⌋ | M16c |
| 165 | Body Fat | | | X13 |

**PHYSICAL FITNESS TEST**

| | **Measure** | **Test** | **Result** | **Code** |
|---|---|---|---|---|
| 166 | Would you like to perform physical fitness test? | | Yes 1<br>No 2 In no GO to B1 | X14 |
| 167 | Power | Push up | Number of attempts in 1 minute ⌊⌊⌋ | X15 |
| 168 | Speed | Running in place | Number of attempts within 10 seconds ⌊⌊⌋ | X16 |
| 169 | Flexibility | Upward from sitting position (record only the highest number from two attempts) | Number ⌊⌊⌋ | X17 |
| 170 | Balance | Standing on one leg | Duration ⌊⌊⌋ seconds | X18 |
| 171 | Tolerability | Deep breath in and out | Duration of breathing ⌊⌊⌋ seconds | X19 |
| 172 | Does any physical defect observed? | | Yes 1<br>No 2 | XX20 |

| STEP 3: BIOCHEMICAL MEASUREMENTS | | | |
|---|---|---|---|
| | **Question** | **Response** | **Code** |
| **CORE: Blood Glucose** | | | |
| 173 | During the past 12 hours have you had anything to eat or drink, other than water? | Yes 1<br>No 2 | B1 |
| 174 | Technician ID | ⌊_⌊_⌊_⌊_⌋ | B2 |
| 175 | Device ID | ⌊_⌊_⌋ | B3 |
| 176 | Time of day blood specimen taken (24 hour clock) | Hours: minutes ⌊_⌊_⌋ : ⌊_⌊_⌋<br>hrs mins | B4 |
| 177 | Fasting blood glucose<br>Choose accordingly: mmol/l or mg/dl | mmol/l ⌊_⌊_⌋ . ⌊_⌊_⌋<br>mg/dl ⌊_⌊_⌊_⌋ . ⌊_⌋ | B5 |
| 178 | Today, have you taken insulin or other drugs (medication) that have been prescribed by a doctor or other health worker for raised blood glucose? | Yes 1<br>No 2 | B6 |
| **CORE: Blood Lipids** | | | |
| 179 | Total cholesterol<br>Choose accordingly: mmol/l or mg/dl | mmol/l ⌊_⌊_⌋ . ⌊_⌊_⌋<br>mg/dl ⌊_⌊_⌋ . ⌊_⌊_⌋ | B8 |
| 180 | During the past two weeks, have you been treated for raised cholesterol with drugs (medication) prescribed by a doctor or other health worker? | Yes 1<br>No 2<br>Don't know 77 | B9 |
| **EXPANDED: Triglycerides, LDL,HDL Cholesterol** | | | |
| 181 | Triglycerides<br>Choose accordingly: mmol/l or mg/dl | mmol/l ⌊_⌊_⌋ . ⌊_⌊_⌋<br>mg/dl ⌊_⌊_⌋ . ⌊_⌊_⌋ | B10 |
| 182 | HDL Cholesterol<br>Choose accordingly: mmol/l or mg/dl | mmol/l ⌊_⌊_⌋ . ⌊_⌊_⌋<br>mg/dl ⌊_⌊_⌋ . ⌊_⌊_⌋ | B11 |
| 183 | LDL Cholesterol<br>Choose accordingly: mmol/l or mg/dl | mmol/l ⌊_⌊_⌋ . ⌊_⌊_⌋<br>mg/dl ⌊_⌊_⌋ . ⌊_⌊_⌋ | X21 |
| 184 | Sodium /spot urine/ | mmol/l ⌊_⌊_⌋ . ⌊_⌊_⌋ | X22 |
| 185 | Creatinine/urine | µmmol/l ⌊_⌊_⌊_⌋ . ⌊_⌋ | X24 |

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