

# Executive Summary

## Uganda NCD Mobile Phone Survey

### 1. Overview

This report summarizes results from the Uganda Noncommunicable Diseases (NCD) Mobile Phone Survey (MPS) implemented in November 2022 – March 2023. NCDs are the leading cause of death worldwide and according to the World Health Organization country profiles in 2019, NCDs contribute to 36% of all deaths in the Republic of Uganda [1]. Efficient monitoring and surveillance are cornerstones to track the progress of NCD burden, related risk factors, and policy interventions. The systematic monitoring of risk factors to generate accurate and timely data is essential for Uganda's ability to prioritize crucial resources and make sound policy decisions to address the growing NCD burden. With increasing access and use of mobile phones globally, opportunities exist to explore the feasibility of using mobile phone technology as an interim method to collect data and supplement household surveys.

In the survey, 5,408 individuals subscribed to MTN and Airtel/Tigo mobile phone networks anonymously participated in the survey using a combination of interactive voice response (IVR, phone call) and short message service (SMS, text messaging).

The survey was the culmination of significant work by the Republic of Uganda's Ministry of Health in collaboration with Makerere University, School of Public Health. Work included but was not limited to study ethical review approval from the Uganda National Council for Science and Technology, telecommunications approval from the Uganda Communications Commission, agreements with mobile network aggregators, and data hosting. The Ministry of Health led questionnaire development, sampling, the mass media campaign, and data collection. Technical assistance was provided by the US Centers for Disease Control and Prevention, RTI International, and InSTEDD. Bloomberg Philanthropies Data for Health Initiative provided financial support through the CDC Foundation.

This report is structured as follows:

- Goals (Section 2)
- Design and Implementation (Section 3)
- Results (Section 4)
- Conclusions (Section 5)

### 2. Goals

The goal of the Uganda Mobile Phone Survey was to provide nationally representative estimates of indicators that can provide information on NCDs to help make programmatic recommendations to improve and enhance NCD prevention and response in the country. The results may be used to supplement results of key behavior risk factors assessed in the WHO Stepwise survey or other national surveillance systems.

The NCD MPS included 35 core questions on the following topics:

- Demographics
- Tobacco Use
- Alcohol Use
- Diet (Salt, Fruit, and Vegetable Consumption)
- Hypertension
- Physical Activity

### 3. Design and Implementation

#### 3.1 Design

The design parameters used for the NCD MPS are shown below in Table 1.

**Table 1. MPS Design**

<i>Component</i>	<i>Design</i>
Mode	IVR and SMS
Sample	A two-phase sample of mobile phone numbers generated via random digit dialing (RDD), using the mobile phone prefixes for MTN and Airtel/Tigo. Uganda stratified by age and sex in the second phase.
Number of Interviews	5,408 interviews, allocated proportionally across strata to the general population distribution.
Strata	6 strata, created by crossing sex (male, female) with age categories (18-29, 30-44, 45+)
Questionnaire	The NCD MPS questionnaire consisted of 35 core questions and administered in seven languages (Ateso, Luganda, Lugbara, Luo, English, Runyankore, and Runyoro).
Contact times	All 7 days of the week, between 8am and 8pm each day
Contact attempts	<ul style="list-style-type: none"> <li>• Contact #1: IVR</li> <li>• Contact #2: IVR, 26 hours after Contact #1</li> <li>• Contact #3: IVR, 26 hours after Contact #2</li> <li>• Contact #4: SMS, 26 hours after Contact #3</li> <li>• Contact #5: SMS, 26 hours after Contact #4</li> <li>• Contact #6: SMS, 26 hours after Contact #5</li> </ul>
Cost to Respondents	None.
Incentives	UGX 10,000
Tool and Hosting	Surveda, with data hosted at the Uganda Ministry of Health

#### 3.2 Implementation

The Uganda NCD MPS implementation process consisted of four stages: Planning and Pre-Test, Full-scale Data Collection, Data Management and Analysis, and Data Release and Use.

Full-scale data collection commenced on 27 November 2022 and was completed on 24 March 2023 for Airtel/Tigo subscribers (data collection was paused from 5 January through 8 March 2023).

Data collection for MTN ran from 9 January through 13 February 2023. A total of 5,408 adults aged

18 years and older completed or partially completed the survey through the two mobile network operators.

## 4. Results

This section presents the following results:

- Demographics and Response Rates (section 4.1)
- Tobacco Use (section 4.2)
- Alcohol Use (section 4.3)
- Diet (section 4.4)
- Hypertension (section 4.5)
- Physical Activity (section 4.6)

### 4.1. Demographics and Response Rates

The Uganda NCD MPS included 5,408 interviews across six age by sex groups. Table 2 shows the mobile phone demographic distribution compared to the UN population national statistics for sex and age. Results presented for the sections on tobacco and alcohol use, diet, hypertension, and physical activity are restricted to respondents who were 18-99 years of age.

**Table 2. Mobile Phone Demographics**

	<i>Mobile Phone Sample</i>	<i>National</i>
	5,408	20,628,860
<b>Sex</b>		
Male	49.6%	47.2%
Female	50.4%	52.8%
<b>Age</b>		
18-29	49.1%	46.8%
30-44	32.3%	30.6%
45+	18.6%	22.5%

By the end of data collection, all strata sample sizes were achieved, except for 45+ females (65.5% filled).

To achieve the 5,408 interviews, we sent invitations to 185,649 mobile phone numbers over the course of both the pre-test and full-scale survey. Out of these, 42,325 provided some sort of response but only 28,133 consented and provided the age and sex information necessary to be eligible to participate. Of these, 2,022 were ineligible due to age, and 19,725 respondents of eligible age were rejected due to stratum sample size being full. The result was 6,386 eligible respondents, of which 5,408 provided interviews (completed or partial). The interview rate was 84.7% (5,408/6,386) and the overall response rate was 12.8%, which is described in detail below. The final disposition codes for this sample are shown in Table 3.

**Table 3. Final disposition codes for all dialed mobile phone numbers.**

Disposition	Definition	N	Percent
<b>1. Complete</b>	Answered all survey questions	4,810	2.6%
<b>2. Partial</b>	Answered at least <b>five</b> NCD questions but did not finish the survey	598	0.3%
<b>3. Breakoff: Eligible</b>	Answered age and sex questions but did not answer 5+ questions	978	0.5%
<b>4. Ineligible: Age</b>	Under age 18	2,022	1.1%
<b>5. Ineligible: Quotas</b>	Answered age and sex questions but quotas were full	19,725	10.6%
<b>6. Refused</b>	Refused consent	10,214	5.5%
<b>7. Breakoff: unknown eligibility</b>	Answered some questions but stopped before completing eligibility	3,978	2.1%
<b>8. No answer</b>	No answer, possibly nonworking number	143,324	77.2%
<b>Total</b>		<b>185,649</b>	<b>100.0%</b>

In this project, the sampling design involved two Phases. Each phase had a response rate. The final response rate was the product of Phase I and Phase II response rates.

$$\text{Phase I Response Rate} = \frac{\text{Number MPNs screened}}{\text{Number MPNs dialed}}$$

Or,

$$\text{Phase I Response Rate} = \frac{28,133}{185,649} = 15.2\%$$

$$\text{Phase II Response Rate } RR6_s = \frac{IP_s}{IP_s + O_s}, \text{ for stratum } s.$$

RR<sub>6</sub> was derived from the 2016 Standard Definitions of the [American Association for Public Opinion Research \(AAPOR\)](#). Phase II stratum-specific response rates (RR #6) are in Table 4.

**Table 4. Phase II response rates for stratum s**

Age	Males	Females
<b>18-29</b>	RR <sub>61</sub> = 86.2%	RR <sub>62</sub> = 84.3%
<b>30-44</b>	RR <sub>63</sub> = 85.0%	RR <sub>64</sub> = 86.5%
<b>45+</b>	RR <sub>65</sub> = 81.7%	RR <sub>66</sub> = 81.5%

The overall response rate is the product of Phase I and Phase II response rates, resulting in an overall response rate for the entire NCD MPS in Uganda:

$$RR_{overall} = \frac{IP_{overall}}{IP_{overall} + O_{overall}} * RR_{Phase I} = \frac{5,408}{5,408 + 978} * 0.1515 = 12.8\%$$

#### 4.2. Tobacco Use

Tobacco use is one of the most important risk factors for NCDs, shared across the world's four leading NCDs: cardiovascular disease, diabetes, cancer, and chronic respiratory diseases. Overall, 5.1% of Ugandan adults aged 18 years and older currently use some form of tobacco (6.9% among men and 3.5% among women). Overall, 3.9% of Ugandans reported being current tobacco smokers. Men reported higher rates of current tobacco smoking than women, 5.1% and 2.8%, respectively. Men also reported higher rates of daily tobacco smoking compared to women (2.1% vs. 0.9%, respectively). Overall, 1.8% reported current smokeless tobacco use (2.4% among men and 1.3% among women).

For environmental exposure to tobacco smoke, more than 1 in 3 (34.2%) reported exposure to tobacco smoke while at work (40.7% among men and 28.3% among women). While only 14.6% of adult Ugandans reported exposure to tobacco smoke in their home (18.3% for men and 11.4% for women).

Table 5 shows key outcomes from the NCD MPS on tobacco use.

**Table 5. Tobacco use overall and by sex**

Tobacco Use	Overall		Males		Females	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
<b>Tobacco Smokers</b>						
Current tobacco smokers	3.9	(3.4, 4.4)	5.1	(4.4, 6.1)	2.8	(2.2, 3.5)
Daily tobacco smokers	1.4	(1.1, 1.8)	2.1	(1.6, 2.7)	0.9	(0.6, 1.3)
Non-daily tobacco smokers	2.4	(2.0, 2.8)	3.0	(2.4, 3.7)	1.8	(1.3, 2.4)
Never smokers	90.9	(90.1, 91.7)	87.0	(85.7, 88.3)	94.4	(93.5, 95.2)
Former smokers	5.1	(4.6, 5.8)	7.7	(6.8, 8.8)	2.8	(2.2, 3.5)
Current daily smokers among smokers	37.7	(31.2, 44.6)	40.5	(32.5, 49.0)	32.9	(22.4, 45.4)
<b>Smokeless Tobacco Users</b>						
Current smokeless tobacco users	1.8	(1.5, 2.2)	2.4	(1.9, 3.0)	1.3	(0.9, 1.8)
Daily smokeless tobacco users	0.7	(0.5, 1.0)	1.0	(0.6, 1.4)	0.5	(0.3, 0.9)
Non-daily smokeless tobacco users	1.1	(0.8, 1.4)	1.4	(1.0, 1.9)	0.8	(0.5, 1.2)

<b>Never smokeless tobacco users</b>	95.8	(95.2, 96.3)	94.5	(93.6, 95.3)	97.0	(96.2, 97.6)
<b>Former smokeless tobacco user</b>	2.4	(2.0, 2.8)	3.1	(2.5, 3.8)	1.7	(1.3, 2.3)
<b>Current daily smokeless tobacco users among smokeless tobacco users</b>	40.1	(30.5, 50.6)	41.0	(28.9, 54.2)	38.9	(23.6, 56.8)
<b>Tobacco Users (any use)</b>						
<b>Current tobacco users</b>	5.1	(4.6, 5.7)	6.9	(6.0, 8.0)	3.5	(2.8, 4.3)
<b>Tobacco Smoke in Home or Work</b>						
<b>Tobacco smoke in home</b>	14.6	(13.7, 15.6)	18.3	(16.9, 19.8)	11.4	(10.2, 12.6)
<b>Tobacco smoke at work</b>	34.2	(32.9, 35.5)	40.7	(38.8, 42.6)	28.3	(26.6, 30.1)

### 4.3. Alcohol Use

Approximately one third of adult Ugandans consumed alcohol in the past 12 months (31.7%), men reported current alcohol consumption more frequently than women (37.5% vs. 26.5%, respectively). Of those who consumed alcohol in the past 12 months, one in eight (12.0%) reported consuming alcohol daily over the past 12 months, with slightly more men reporting daily consumption than women (14.4% vs. 9.0%, respectively). Both men and women most frequently reported consuming alcohol less than once per month (27.7% among men and 42.7% among women). Fewer adult Ugandans reported consuming alcohol in the past 30 days (22.7%) compared to the past 12 months, with men being slightly more likely (1.6 times) than women to report this behavior (28.5% and 17.4%, respectively). Table 6 shows reported alcohol use overall and by sex from the NCD MPS.

**Table 6. Alcohol use overall and by sex**

<b>Alcohol Use</b>	<b>Overall</b>			<b>Males</b>			<b>Females</b>		
	% (95% CI)			% (95% CI)			% (95% CI)		
<b>Alcohol use in the past 12 months</b>	31.7	(30.4, 33.0)	37.5	(35.6, 39.4)	26.5	(24.8, 28.2)			
<b>Alcohol Frequency among users in the past 12 months:</b>									
<b>Daily</b>	12.0	(10.5, 13.7)	14.4	(12.3, 16.7)	9.0	(7.0, 11.4)			
<b>3-6 days per week</b>	16.0	(14.3, 17.9)	18.8	(16.5, 21.4)	12.4	(10.1, 15.2)			
<b>1-2 days per week</b>	16.0	(14.3, 17.8)	17.9	(15.6, 20.5)	13.5	(11.1, 16.3)			
<b>1-3 days per month</b>	21.7	(19.8, 23.8)	21.2	(18.7, 23.9)	22.4	(19.4, 25.7)			
<b>Less than once per month</b>	34.3	(32.0, 36.6)	27.7	(25.0, 30.6)	42.7	(39.0, 46.5)			
<b>Current alcohol users (past 30 days)</b>	22.7	(21.6, 23.8)	28.5	(26.8, 30.3)	17.4	(16.0, 18.9)			

#### 4.4. Diet

Overall, 28.3% of adult Ugandans reported always or often adding salt or salty seasoning before eating. Almost half (46.2%) reported always or often adding some form of salt to food while cooking. Approximately 2 in 10 Ugandans (19.9%) reported always or often eating processed foods high in salt.

For fruit and vegetable consumption, only 1 in 10 (9.4%) adult Ugandans consumed the recommended number of servings of fruit or vegetables (five per day) with an average of 1.2 servings of fruit and 1.2 servings of vegetables eaten per day. Less than 1% reported consuming no fruits or vegetables per day (0.7%). Table 7 presents salt, fruit, and vegetable consumption overall and by sex.

**Table 7. Diet overall and by sex**

Diet	Overall		Males		Females	
	% (95% CI)		% (95% CI)		% (95% CI)	
<b>Salt Consumption</b>						
Always or often add salt or salty sauce to food before eating or as they're eating	28.3	(27.1, 29.5)	29.1	(27.4, 30.9)	27.5	(25.8, 29.3)
Always or often add salt or salty seasoning when cooking or preparing foods	46.2	(44.8, 47.7)	45.5	(43.5, 47.5)	46.9	(44.9, 48.9)
Always or often eat processed foods high in salt	19.9	(18.9, 21.1)	23.3	(21.7, 25.0)	16.9	(15.5, 18.4)
<b>Fruit Consumption</b>						
Average number of days per week fruits are consumed	3.0	(3.0, 3.1)	3.0	(2.9, 3.0)	3.0	(3.0, 3.1)
Average number of servings of fruit consumed per day	1.2	(1.1, 1.2)	1.2	(1.1, 1.2)	1.2	(1.1, 1.2)
<b>Vegetable Consumption</b>						
Average number of days per week vegetables are consumed	3.3	(3.3, 3.4)	3.2	(3.1, 3.2)	3.5	(3.4, 3.6)
Average number of servings of vegetables consumed per day	1.2	(1.2, 1.3)	1.2	(1.1, 1.2)	1.3	(1.2, 1.3)
<b>Fruit and Vegetable Consumption</b>						
Consume less than five servings of fruits OR vegetables per day	90.6	(89.8, 91.4)	91.0	(89.9, 92.0)	90.2	(89.0, 91.3)
Consume no fruits and vegetables	0.7	(0.5, 1.0)	0.5	(0.3, 0.9)	0.8	(0.5, 1.3)

#### 4.5. Raised Blood Pressure or Hypertension

Overall, 58.2% of adult Ugandans reported ever having their blood pressure measured by a health care professional (49.8% for men vs. 65.7% for women). Approximately one in four adult Ugandans, 25.7%, reported that they had ever been diagnosed by a doctor or health professional with raised blood pressure or hypertension. Among those who reported a diagnosis, 40.6% were currently on medication. Table 8 shows the rates of self-reported raised blood pressure or hypertension.

**Table 8. Raised blood pressure/hypertension overall and by sex**

<b>Raised Blood Pressure/Hypertension</b>	<b>Overall</b>			<b>Males</b>			<b>Females</b>		
	% (95% CI)			% (95% CI)			% (95% CI)		
<b>Had blood pressure measured by doctor or health care professional</b>	58.2	(56.9, 59.5)		49.8	(47.9, 51.7)		65.7	(63.9, 67.5)	
<b>Diagnosed by doctor or health care professional with raised blood pressure/ hypertension</b>	25.7	(24.1, 27.3)		24.8	(22.5, 27.3)		26.3	(24.2, 28.5)	
<b>Currently taking medication for raised blood pressure/ hypertension</b>	40.6	(37.1, 44.2)		41.6	(36.2, 47.1)		40.0	(35.3, 44.8)	

#### 4.6. Physical Activity

Overall, adult Ugandans reported having an average of 4.0 days per week with 30 or more minutes of moderate physical activity. There were no significant differences between men and women on average number of days reported. Table 9 shows the rates of self-reported physical activity.

**Table 9. Physical activity overall and by sex**

<b>Physical Activity</b>	<b>Overall</b>			<b>Males</b>			<b>Females</b>		
	% (95% CI)			% (95% CI)			% (95% CI)		
<b>Average number of days per week with 30 or more minutes of moderate physical activity</b>	4.0	(4.0, 4.1)		4.0	(4.0, 4.1)		4.1	(4.0, 4.1)	
<b>Days in the past week of moderate exercise for a total of 30 minutes or more:</b>									
<b>Daily</b>	16.2	(15.2, 17.3)		14.1	(12.8, 15.6)		18.1	(16.6, 19.8)	
<b>5 - 6 days</b>	27.1	(25.9, 28.4)		28.9	(27.1, 30.7)		25.5	(23.8, 27.3)	
<b>3 -4 days</b>	31.5	(30.1, 32.8)		33.1	(31.2, 35.0)		30.0	(28.1, 31.9)	
<b>1 - 2 days</b>	23.0	(21.8, 24.2)		22.2	(20.6, 23.9)		23.8	(22.1, 25.5)	
<b>None</b>	2.2	(1.8, 2.7)		1.7	(1.2, 2.3)		2.6	(2.0, 3.4)	

## 5. Conclusions

NCDs and their associated risk factors have profound consequences on the individual and Ugandan society at large. The data presented in the Uganda NCD MPS provide a strong foundation for the development of prevention and response strategies in Uganda. Some key outcomes included:

- Approximately 5.1% of Ugandan adults reported being current tobacco users with 3.9% reporting current tobacco smoking and 1.8% reporting current smokeless tobacco use. Men were two times more likely to report any type of tobacco use than women. Overall, 14.6% of adult Ugandans reported exposure to tobacco smoke in their home while more than double the percentage (34.2%) reported exposure at work.

- Overall, one third (31.7%) of adult Ugandans reported alcohol consumption in the past year, and 12.0% reported daily use. Slightly fewer (22.7%) reported consuming alcohol in the past 30 days. Men were more likely to drink alcohol in the past 12 months, 30 days, and report a higher frequency of consumption.
- Only 1 in 10 (9.4%) adult Ugandans reported consuming the recommended five servings of fruits or vegetables per day.
- Almost half (46.2%) of adult Ugandans reported always or often adding some form of salt to food while cooking or preparing food.
- One in four adult Ugandans (25.7%) reported ever being told that they have raised blood pressure by a doctor or health professional, of which less than half (40.6%) reported taking medication for their raised blood pressure or hypertension.
- Overall, adult Ugandans reported averaging 4.0 days per week with 30 or more minutes of moderate physical activity.

Findings from this survey help provide a national baseline on select NCD risk factors in Ugandan's aged 18 years and older. Results will inform the Ministry of Health in Uganda as they improve and enhance NCD prevention and response efforts. The timely reporting of MPS results also facilitate comparisons over time and across countries.

## 6. Limitations

The main limitation of any MPS includes the population's access to a mobile phone. Therefore, the population who do not have access to mobile phones was not represented in this survey. The results of the MPS were based on self-reports and may be influenced by recall or social desirability bias.

## 7. References

1. World Health Organization. Noncommunicable diseases data portal: Uganda country profile. Geneva: WHO; 2022. <https://ncdportal.org/CountryProfile/GHE110/UGA>
2. StataCorp. 2021. *Stata Statistical Software: Release 17*. College Station, TX: StataCorp LLC.