

Executive Summary

NCD Mobile Phone Survey

1. Overview

This report summarizes results from the 2017 Zambia Noncommunicable Diseases (NCD) Mobile Phone Survey. NCDs are the leading cause of death worldwide. According to the Zambian Ministry of Health, NCDs contribute to 34% of all deaths in Zambia[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 Zambia'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, 6,056 individuals subscribed to the Zamtel, Airtel, and MTN mobile phone networks participated in the survey using short message service (SMS) and interactive voice response (IVR) modes.

The survey was the culmination of significant work by the Ministry of Health, including but not limited to ethical approval from the Biomedical Research Ethics Committee, telecommunications approval from the Zambia Information and Communications Technology Authority, agreements with mobile network operators, data hosting, and management at the Zambia National Data Center. The Ministry of Health led questionnaire development, sampling, 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 Zambia 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 Zambia. The results supplemented the results of key behavior risk factors assessed in the WHO Stepwise survey and other national surveillance systems.

The NCD Mobile Phone Survey included 18 core questions on the following topics:

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

3. Design and Implementation

3.1 Design

The design parameters used for the NCD Mobile Phone Survey are shown below in Table 1.

Table 1. Mobile Phone Survey Design	
Component	Design
Mode	IVR and SMS
Mode Strategy	Each contacted phone number was randomly assigned to 1 of 2 conditions: <ol style="list-style-type: none"> 1. IVR with SMS fallback 2. SMS with IVR fallback The “fallback” mode initiated if the respondent did not complete the survey in the primary mode.
Sample	A two-phase sample of mobile phone numbers generated via random digit dialing (RDD), using the mobile phone prefixes for Airtel, MTN, and Zamtel stratified by age and sex in the second phase.
Number of Interviews	6,056 interviews, allocated proportionally across strata to the general population distribution.
Strata	6 strata, created by crossing sex (male, female) with age (18-29, 30-44, 45+)
Questionnaire	The NCD Mobile Phone Survey questionnaire, which included 20 questions in 8 languages: English, Bemba, Nyanja, Tonga, Luvale, Lozi, Kaonde, Lunda
Contact times	All 7 days of the week, between 8am and 8pm each day
Contact attempts	<ul style="list-style-type: none"> • Contact #1: IVR • Contact #2: IVR, 50 hours after Contact #1 • Contact #3: SMS, 50 hours after Contact #2 • Contact #4: SMS, 50 hours after Contact #3
Cost to Respondents	None. Incoming voice calls and SMS messages are free. The channels were configured to not invoice any data charges to respondents.
Incentives	Every person who completed the survey were sent 10 Kwacha talktime.
Tool and Hosting	Surveda, with data hosted at the Zambia National Data Center (ZNDC)

3.2 Implementation

The Zambia NCD Mobile Phone Survey implementation process consisted of five stages: Engagement, Planning and Pre-Test, Full-scale Data Collection, Data Management and Analysis, and Data Release and Use.

Full-scale data collection commenced on July 27th. Data collection deployed in a 3-phase approach, each took approximately a month. A total of 6,056 individuals completed or partially completed (defined as answering at least one NCD behavior or risk factor question) the survey through the three major mobile network operators by the middle of October 2017.

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)
- Diabetes (section 4.5)
- Hypertension (section 4.6)

4.1 *Demographics and Response Rates*

The Zambia Mobile Phone Survey included 6,056 interviews across 6 age by sex groups. Table 2 shows the Mobile Phone Demographic distribution compared to the UN population national statistics for sex and age.

	Mobile Phone Sample	National
Sex	6,056	7,457,678
Male	55.2%	49.1%
Female	44.8%	50.9%
Age		
18-29	49.1%	46.7%
30-44	33.7%	34.4%
45+	17.2%	18.9%

By the end of data collection, all the strata were achieved, except for 45+ females.

To achieve the 6,056 interviews, we sent invitations to 339,073 mobile phone numbers. Due to the nature of the RDD (random digit dialing) sampling, it was expected that many of these mobile phone numbers were invalid or unregistered. Out of these, 32,386 provided some sort of response but only 13,010 consented and provided the age and sex information necessary to be eligible to participate: 4,732 females and 8,278 males. There were 6,056 completed and partial interviews out of these potential respondents with known sex. Completed interviews were defined as answering all survey questions. Partial interviews were defined as answering at least one NCD question and not finishing the survey. Of these, 1,816 were ineligible due to age, and 4,688 respondents of eligible age were rejected due to stratum sample size being full. The result was 6,506 eligible respondents, of which 6,056 provided interviews. The interview rate was 93.1%.

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
1. Complete	Answered all survey questions	3,397	1.00%
2. Partial	Answered at least once NCD question but did not finish the survey	2659	0.78%
3. Breakoff: Eligible	Answered age and sex questions but did not answer any NCD questions	450	0.13%
4. Ineligible: Age	Under age 18	1,816	0.54%
5. Ineligible: Quotas	Answered age and sex questions but quotas were full	4,688	1.38%
6. Refused	Refused consent	7,341	2.17%
7. Breakoff: unknown eligibility	Answered some questions but stopped before age or sex	12,035	3.55%
8. No answer	No answer, possibly nonworking number	306,687	90.45%
<i>Total</i>		339,073	

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.

$$\text{Phase I Response Rate} = \frac{\text{Number MPNs screened}}{(\text{number MPNs dialed} * \text{Proportion MPNs with active subscribers})}$$

Or,

$$\text{Phase I Response Rate} = \frac{13,010}{(339,073 * 0.570303)} = 0.067279$$

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

RR_6 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 5:

Age	Males	Females
18-29	$RR6_1 = 0.954399$	$RR6_2 = 0.953905$
30-44	$RR6_3 = 0.917275$	$RR6_4 = 0.920040$
45+	$RR6_5 = 0.890797$	$RR6_6 = 0.894587$

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 Mobile Phone Survey in Zambia:

$$RR6_{overall} = \frac{IP_{overall}}{IP_{overall} + O_{overall}} * RR_{Phase I} = \frac{6,056}{6,056 + 450} * 0.067279 = 0.930833 * 0.067279 = 0.062625$$

4.2 Tobacco Use

Tobacco use is one of the most important risk factors for NCDs. Overall, 24.3% of Zambians aged 18 years and older used some form of tobacco. Men reported much higher rates of current tobacco smoking, 21.4%, of smoking tobacco use than women, 13.4%. Men also reported higher rates of daily tobacco smoking compared to women (9.0% vs. 3.5% respectively).

Table 5 shows key outcomes from the NCD Mobile Phone Survey on tobacco use.

Table 5. Tobacco Use Overall and by Sex

Tobacco Use	Overall		Males		Females	
	% (95% CI)		% (95% CI)		% (95% CI)	
Tobacco Smokers						
Current tobacco smokers	17.3	(15.8 ,18.9)	21.4	(19.3 ,23.6)	13.4	(11.4 ,15.7)
Daily tobacco smokers	6.2	(5.3 ,7.2)	9.0	(7.5 ,10.6)	3.5	(2.5 ,4.9)
Smokeless Tobacco Users						
Current smokeless tobacco users	17.2	(15.7 ,18.9)	19.1	(17.0 ,21.3)	15.5	(13.4 ,17.9)
Daily smokeless tobacco users	5.7	(4.8 ,6.7)	6.7	(5.5 ,8.2)	4.6	(3.5 ,6.1)
Tobacco Users (any use)						
Current tobacco users	24.3	(22.6 ,26.1)	28.3	(26.0 ,30.7)	20.5	(18.2 ,23.1)

4.3 Alcohol Use

Approximately one-third of adult Zambians consumed alcohol in the past 30 days (32.1%), with males reporting current alcohol consumption more frequently than females (38.4% vs. 26.2% respectively). Among Zambians who reported drinking in the past 30 days prior to the survey, 27.7% reported drinking six or more drinks in a single drinking occasion. Males had nearly one and a half more of heavy drinking occasions. More males reported heavy episodic drinking than females.

Table 6 shows reported alcohol use overall and by sex from the NCD Mobile Phone Survey. Males reported current and heavy episodic drinking more often than did females.

Table 6. Alcohol Use overall and by Sex

Alcohol Use	Overall			Males			Females		
	% (95% CI)			% (95% CI)			% (95% CI)		
Current alcohol users (past 30 days)	32.1	(30.2 ,34.0)		38.4	(35.8 ,41.0)		26.2	(23.5 ,29.1)	
Heavy episodic drinkers (percentage of drinkers had 6+ drinks)	27.7	(25.9 ,29.6)		34.1	(31.6 ,36.7)		21.7	(19.2 ,24.5)	

4.4 Diet

With regard to salt consumption, 79.6% of Zambians always or often added salt in some form when cooking. One-third of Zambians reported always or often eating processed foods high in salt.

For fruit and vegetable consumption, 78.6% of all Zambians consumed less than five servings of fruit or vegetables per day with an average of 2.5 servings of vegetables and 1.1 servings of fruits per day.

Table 7 shows salt, fruit, and vegetable consumption overall and by sex.

Table 7. Diet Overall and by Sex

Diet	Overall		Males		Females	
<i>Salt Consumption</i>	%	(95% CI)	%	(95% CI)	%	(95% CI)
Always or often add salt or salty sauce to food before eating or as they're eating	56.6	(54.4 ,58.8)	57.7	(54.9 ,60.6)	55.5	(52.1 ,58.9)
Always or often add salt or salty seasoning when cooking or preparing foods	79.6	(77.8 ,81.4)	78.4	(75.9 ,80.6)	80.8	(77.9 ,83.4)
Always or often eat processed foods high in salt	35.0	(32.9 ,37.2)	37.9	(35.1 ,40.8)	32.3	(29.1 ,35.6)

Table 7. Diet Overall and by Sex, continued

Diet	Overall		Males		Females	
<i>Fruit Consumption</i>	Mean (95% CI)		Mean 95% CI		Mean 95% CI	
Average number of days per week fruits are consumed	2.8	(2.7 ,2.9)	2.7	(2.6 ,2.8)	2.9	(2.7 ,3.0)
Average number of servings of fruit consumed per day	1.1	(1.1 ,1.2)	1.2	(1.1 ,1.3)	1.1	(1.0 ,1.1)
<i>Vegetable Consumption</i>	Mean (95% CI)		Mean 95% CI		Mean 95% CI	
Average number of days per week vegetables are consumed	5.5	(5.4 ,5.6)	5.2	(5.1 ,5.3)	5.8	(5.6 ,5.9)
Average number of servings of vegetables consumed per day	2.5	(2.4 ,2.6)	2.5	(2.3 ,2.6)	2.6	(2.4 ,2.7)
<i>Fruit and Vegetable Consumption</i>	% (95% CI)		% (95% CI)		% (95% CI)	
Consume less than five servings of fruits OR vegetables per day	78.6	(76.8 ,80.3)	77.6	(75.1 ,79.9)	79.5	(76.9 ,81.9)
Consume NO fruits or vegetables	0.5	(0.1 ,1.5)	0.3	(0.1 ,0.9)	0.6	(0.1 ,3.4)

4.5 Diabetes

Overall, 6.0% of Zambians indicated they were told they had diabetes. Of those, 41.7% reported that they were currently on medication for high blood glucose or diabetes.

Table 8 shows the rates of self-reported diabetes.

Table 8. Diabetes Overall and by Sex

	Overall	Males	Females
Raised Blood Glucose/Diabetes	% (95% CI)	% (95% CI)	% (95% CI)
Diagnosed by doctor or health care professional with raised blood glucose/diabetes	6.3 (5.1 ,7.6)	6.5 (5.2 ,8.1)	6.0 (4.3 ,8.4)
Currently taking medication for raised blood glucose/diabetes	41.7 (31.8 ,52.3)	45.5 (34.0 ,57.4)	37.9 (22.7 ,55.9)

4.6 Hypertension

Approximately a quarter of adult Zambians reported that their hypertension was diagnosed by a doctor or health professional. Among those who reported they were hypertensive, 37.3% were currently on medication for hypertension.

Table 9 shows the rates of self-reported hypertension.

Table 9. Hypertension Overall and by Sex

	Overall	Males	Females
Raised Blood Pressure/Hypertension	% (95% CI)	% (95% CI)	% (95% CI)
Diagnosed by doctor or health care professional with raised blood pressure/hypertension	22.5 (20.6 ,24.5)	19.3 (17.1 ,21.6)	25.7 (22.7 ,28.9)
Currently taking medication for raised blood pressure/hypertension	37.3 (32.3 ,42.5)	32.2 (26.6 ,38.4)	40.9 (33.7 ,48.6)

5. Conclusions

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

- Almost a quarter of respondents reported being current tobacco users, almost 6% reported being daily tobacco smokers. Men were much more likely to report current or daily tobacco smoking than women.

- Overall, 32% of respondents reported current alcohol consumption. Men were more likely to be heavy episodic drinkers than women.
- Respondents overall were more likely to report daily vegetable consumption than daily fruit consumption. A large percentage (80%) of respondents reported consuming less than five servings of fruits or vegetables per day.
- Self-reported salt use and consumption were very high among respondents. About 80% of respondents reported always or often adding a form of salt as they prepared a meal.
- Only a small (6%) percentage of respondents reported a clinical diagnosis of diabetes. Less than half (37%) of diabetic respondents reported taking medication for diabetes.
- About a quarter of respondents indicated their hypertension was diagnosed by a doctor or health professional. Similar percentages of men and women reported taking medication for hypertension.

Conclusions:

Findings from this survey help provide a national baseline on select NCD risk factors for Zambian adults aged 18 years and older. Results will inform ministries in Zambia as they advance efforts to improve and enhance NCD prevention and response strategies. The timely reporting of mobile phone survey results such as these will also facilitate cross-country comparisons.

Limitations:

The main limitation of any mobile phone survey 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 mobile phone survey were based on self-reports and may be influenced by recall or social desirability bias.

6. *References*

1. World Health Organization. Noncommunicable diseases country profiles 2014. Geneva: WHO; 2014