Guideline for
Community-Based Screening of Non-Communicable Diseases
(Hypertension, Diabetes Mellitus,
assessment of Cardiovascular risk and overweight and obesity)
Screening

1st Edition: 2024

Department of Public Health
Ministry of Health,
Royal Government of Bhutan

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Foreword

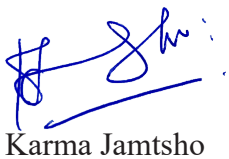
Non-communicable diseases (NCDs) have emerged as a significant public health challenge in Bhutan, and addressing them requires concerted efforts at both individual and systemic levels. Based on the findings from the National Health Survey 2023, the Ministry of Health has identified NCDs as one of the key thrust areas for intervention. The increasing burden of NCDs highlights the need for early detection and effective management to mitigate their impact on the health and well-being of our population.

In response to this challenge, the Ministry of Health launched a series of initiatives aimed at strengthening NCD screening, treatment, and control. The Department of Public Health, in collaboration with National Medical Services (NMS), with the support from WHO is implementing initiatives such as the **Service with Care and Compassion Initiative (SCCI),** which provides holistic NCD management across all twenty districts. To enhance early detection and timely care, the Ministry is committed to offering community-based screening opportunities among the general population in 2024, covering the whole of the country.

The Ministry of Health has adopted the ambitious 80-80-80 targets to guide our efforts in combating NCDs. These targets aim to screen 80% of the target population for key NCDs and their associated risk factors, provide treatment to 80% of those diagnosed with NCDs and achieve treatment control targets in 80% of individuals under medical treatment by the end of 13th plan. The Ministry of Health remains committed to ensuring that every individual has the opportunity to participate in community-based screening, which is critical for early detection and timely intervention.

This guideline serves as a comprehensive tool for health workers and service providers involved in NCD screening and management. It outlines the protocols and best practices that will ensure the consistent and effective delivery of services across the country. I believe that with continued dedication and collaboration, we will make significant progress in reducing the burden of NCDs and improving the overall health outcomes of our population.

Together, let us strive towards a healthier Bhutan, where every individual has the opportunity to live a life free from the devastating impact of non-communicable diseases.



Karma Jamtsho
Director
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Preface

Bhutan is facing a growing prevalence of noncommunicable diseases (NCDs) such as cardiovascular diseases, Diabetes mellitus chronic respiratory diseases, and cancers, which now account for a significant share of morbidity and mortality in the country. The National Health Survey 2023 findings show an increasing trend in risk factors, which means NCDs will continue to affect individuals, households, communities and drain limited healthcare resources.

In response, the Ministry of Health in collaboration with development partners and sectors are considering a multi-pronged approach including multisectoral actions for addressing NCD risks while strengthening the capacity of the healthcare system to effectively detect and manage the NCDs. The "Guideline for Community-based Screening of Non-Communicable Diseases" has been developed to provide a standardised approach to community-based NCD screening in Bhutan. It offers a detailed and practical guide for healthcare professionals, agencies, institutions, and organisations involved in the screening process, ensuring uniformity, accuracy, and efficiency. Through this guideline, healthcare workers will be better prepared to identify NCDs early, make timely referrals for medical care, and promote healthier lifestyles among the population

As we embark on nationwide screening for NCDs starting November 2024, this guideline will be useful to intensify our interventions for prevention and control of NCDs and integrate into primary healthcare to achieve universal health coverage.

Acknowledgment

The development of this guideline involved a series of discussions with various healthcare workers and experts to ensure it is user-friendly and practical. The Department of Public Health would like to express sincere gratitude to all individuals who contributed to this process. Our heartfelt thanks go to the Medicine Department, JDWNRH, and the NCD Screening Task Force for their expertise and support.

We are truly indebted to WHO for their guidance and support. The technical input from the Regional Advisor for NCDs at WHO SEARO has been invaluable in shaping this guideline. We extend our sincere gratitude to the contributors listed below for their expertise, insights and dedication. Our collective efforts have made this guideline possible for NCD screening in Bhutan.

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CONTENTS

List of abbreviations

BMI	Body Mass Index
BP	Blood Pressure
CVD	Cardiovascular Disease
DM	Diabetes Mellitus
DBP	Diastolic Blood Pressure
HTN	Hypertension
LSRD	Lifestyle Related Disease
MoH	Ministry of health
NCD	Non-Communicable Diseases
PHC	Primary Health Centre
RGoB	Royal Government of Bhutan
SBP	Systolic Blood Pressure
SCCI	Service with Care and Compassion Initiatives
SEARO	South East Asia Region Organization
WHO	World Health Organization

1. Background

Globally, noncommunicable diseases (NCDs) are responsible for an increasing proportion of morbidity and mortality, accounting for approximately 74% (41 million) of all deaths annually. The majority of these deaths occur in low- and middle-income countries, with many occurring before the age of 70.Common NCDs include cardiovascular diseases, chronic respiratory diseases,Diabetes mellitus, and cancers *(WHO, 2023)*

In Bhutan, NCDs contribute to about 70% of total deaths, with an estimated 23% of these classified as premature mortality. Among NCDs, cardiovascular diseases (CVDs) account for 28% of deaths, followed by chronic respiratory diseases (14%), cancers (11%), and Diabetes mellitus (5%) *(WHO, n.d.).* To address the rising burden of NCDs, the Ministry of Health has implemented several initiatives, including the Service with Care and Compassion Initiative (SCCI) and the Multi-Sectoral Action Plan for the Prevention and Control of NCDs (MSAP).

Despite these efforts, the prevalence of NCDs continues to rise due to the complex, multifactorial nature of these conditions. The National Health Survey (NHS) 2023 highlighted an upward trend in cases of elevated blood pressure and blood sugar levels among Bhutanese adults. An alarming 62% of adults with high blood pressure and 59.4% with high blood glucose levels were unaware of their conditions, putting them at increased risk of life-threatening complications. Furthermore, only 8% of hypertensive patients and 25.8% of those with Diabetes mellitus were found to have their conditions under control even with ongoing treatment *(Ministry of Health, 2023).* Elevated blood pressure, blood glucose and overweight and obesity are the leading metabolic risk factors contributing to ischemic heart disease, stroke, and chronic kidney disease (Canto et al., 2019, WHO, 2023)

Effective prevention and control of NCDs require controlling modifiable risk factors through various interventions. One of the key interventions are early detection of the conditions and addressing the risk factors. The implementation of population-based screening allows for early detection and timely interventions, including lifestyle modifications and initiation of appropriate treatments of hypertension and Diabetes mellitus which otherwise would remain asymptomatic and lead to more severe complications.

In this context, the development of a national guideline for NCD screening in Bhutan is essential. Such a guideline ensures standardisation, consistency, efficiency, and effectiveness in screening programmes. This document has been carefully developed, drawing from international guidelines, evidence, and extensive stakeholder consultations, while being adapted to Bhutan's specific context. It serves as a critical tool for healthcare professionals, agencies, institutions, and organisations, providing a unified approach to NCD screening and facilitating timely monitoring and evaluation of the programme’s impact.

1.1 Situations of NCD Risk factors in Bhutan

Bhutan has been experiencing an increasing burden of morbidity and mortality related to NCDs. In addition, the prevalence of risk factors for NCDs remains high, requiring urgent and target interventions.

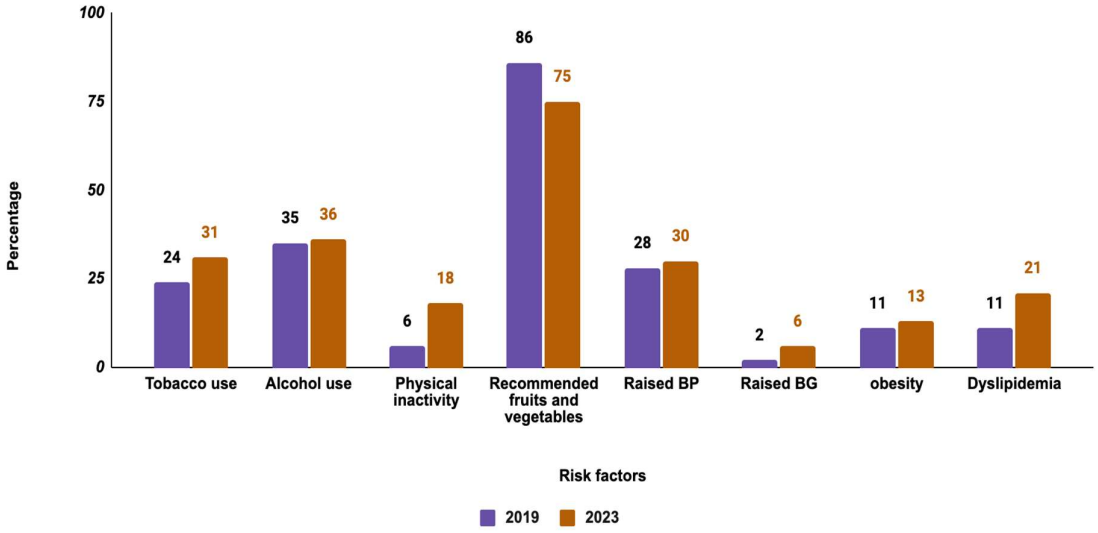


Figure 1: Trend of NCD risk factors 2019-2023

Alcohol: According to the National Health Survey 2023, 40.2% of the surveyed population consumed alcohol in the past 12 months and 34.5% consumed alcohol in the past 30 days. Beer was the most popular beverage followed by home-brewed *ara* and *singchang.*

Tobacco: There were 31.4% who reported using various forms of tobacco products and 14.4% were current smokers with mean age of smoking initiation at 18.2 years.

Areca nut: The proportion of those who consumed areca nut or areca nut-containing products was 59.7% with 45.4% reported daily consumption.

Dietary habit: The prevalence of insufficient fruits and vegetables intake (less than 5 servings per day) was 74.6%. The average daily intake of fruits was 1.6 servings and average vegetable intake was 3.7 servings.

Dietary salt: The average daily intake of salt was higher than recommended daily allowance. The average daily salt intake was 8.5 grams.

Physical activity: The percentage of the population with insufficient physical activity was 18.3%.

Body mass index: The proportion of adults who were overweight was 33% and the proportion who were obese was 12.5%.

Raised blood sugar: The proportion of the population with raised blood sugar was 5.6%. Among these individuals, 59.4% of them were not aware of their raised blood sugar levels. Among those who were aware about their raised blood sugar levels, 1.3% were not on any treatment, 13.5% were on treatment but had uncontrolled good sugar, and 25.8% were on treatment and had controlled sugar levels.

Raised blood cholesterol: The prevalence of raised blood cholesterol was 20.9%. Among these individuals, 90.5% were not aware of their raised cholesterol levels. Among those who were aware about their raised cholesterol levels, 2.4% were not receiving any treatment, 0.9% were on treatment but had uncontrolled cholesterol levels, and 6.1% were on treatment and had controlled cholesterol levels.

Cardiovascular disease (CVD) risk: Among populations older than 40 years, the proportion of population with >30% CVD risk was around 6% (Ministry of Health 2023).

1.3 Scope

This CBS-NCDs guideline applies to all health facilities nationwide, ensuring a uniform and standardised approach to Non-Communicable Disease screening. It is intended for use by a wide range of stakeholders, including health professionals, agencies, and organisations involved in screening programs. The guideline provides technical guidance to ensure screenings are consistent, evidence-based, and aligned with best practices at resource limit setting, aiming to improve health outcomes by facilitating early detection, diagnosis, and management of NCDs.

1.4 The objectives of NCD screening are to:

1. Ensure Early detection, diagnosis and referral of hypertension andDiabetes mellitus in a population.
2. Prevent complications associated with hypertension and Diabetes mellitus by implementing standardised treatment protocols.
3. Enhance health promotion measures for the prevention and control of NCDs
4. Improve equity in the management and prevention ofDiabetes mellitus and hypertension.

2. Community based screening of NON COMMUNICABLE DISEASES (CBS-NCDs)

Community-based screening for non-communicable diseases (NCDs) aims to detect conditions like raised blood sugar, raised blood pressure, and identify risk factors for cardiovascular diseases.It is particularly aimed at enabling the at risk individuals to avail timely interventions while also advocating for healthier lifestyles to the general public to improve health and wellbeing.

The key elements of screening will include the following:

1. Screening for overweight and obesity
2. Screening for hypertension
3. Screening for raised blood glucose
4. Estimating 10 years risk for cardiovascular event based on WHO/ISH CVD risk chart

Following interventions are the integral components following screening:

1. Referral of the screen positive individuals for confirmation and management at the nearest health facilities.
1. Provide health education on the NCDs and lifestyle counselling on NCD risk factors
2. Devise a system to register those diagnosed with NCDs to ensure timely care.
3. Ensure proper record keeping to enable informed decision making.

This guideline involves the following key steps:

Steps	Key activities
Step 1	**Planning** • Forming a team to provide notification to the general public on NCD screening event including date and locations etc Estimating the target population and ensure adequate resources are available for the event
Step 2	**Implementation** • Provide awareness on NCDs • Conduct screening • Provide intervention • Follow up
Step 3	**Conclusion** Monitoring and evaluation

Table 1: Key steps in Community-based screening of Non Communicable Diseases

STEP 1: PLANNING COMMUNITY BASED NCD SCREENING

1.1 Notification for the general public on NCD screening

1.1.2 Communication Strategy

Conducting mass non-communicable disease screening requires a well-structured communication strategy to effectively reach the public, identify risk factors, and encourage healthy behaviours. The following are some appropriate communication approaches and channels:

Objective	Target	Strategies
General awareness of the programme	General public, service providers	• Policy and Program Advocacy (Official Launch of the programme) • Media advocacy (Panel discussion on National TV, newspapers) • Digital Communication (Radio scripts, PSA though radio stations, community radio, bulk SMSs, social media MMS, Old-New cases notification)
Effective implementation of the program	Management; Local Government; Health Service Providers	• Social mobilisation (sensitization programme (schedules, contact points, outreach volunteers, Desuups), • Call centre (HHC Toll-free No. • Screening Guideline • Official Notifications • Executive Orders

Objective	Target	Strategies
Generating demand of NCD services at different levels.	General population	• Videos/Narrative/Infographic/MoH social media handles • Public Announcements & notifications • Panel discussions/Talk shows • Health talk during the camp • VHWs and DHWs for community awareness • Elected leaders from the community/constituencies
Improve the programme coverage	General population; Service Providers	• Settings based approach (schools, monastic, armed forces, etc) • Innovations (elected leaders, community programs, partnerships with CSOs)

Table 2: Community strategy

1.2 Target Population

A) Target Age:

Age: >=18 years with no history of the following conditions:

- Diabetes mellitus
- hypertension
- And on medications for any of the above conditions

B) Estimation of target population:

- Source of data: Latest Annual Household Survey or Population data from Thromde
- Method of estimation:
  - Inclusion: 18 years and above
  - For Blood Glucose test: >-40 years
  - Exclusion criteria: Known case of hypertension,Diabetes mellitus and on medication of these cases from health facility data of respective health centres.

1.3 Resource Estimation and Allocation

1. **Human Resources:** The screening team should be Health Professionals and Non-health Professionals depending on the scope of the activities. The strength of the team must be based on the feasibility and availability of the health human resources in the health facility to ensure efficient and effective implementation of the programme. The team is responsible for ensuring that all necessary equipment and consumables are in place before departing for the screening.
2. **Equipment and Consumables:** The equipment and consumables required for screening should be of a standard and align with the items listed in Annexure 3.1 of this guideline. The quantity for each item should be determined based on the size of the target population. When estimating the necessary resources, a 5-10% buffer stock must be included to account for any unforeseen requirements.

STEP 2: SCREENING AND INTERVENTION

2.1 Planning for local NCD screening activities

District health sector will work closely with hospitals, PHCs, institutions and agencies to streamline screening programs considering all local factors and context to ensure maximum coverage of the targeted population. District health partners are to consider all local factors and context to ensure maximum coverage of the targeted population in the screening activities.

Some of the best buys in achieving higher coverage include proper planning, coordination with community leaders and public awareness ahead of screening activities. Public awareness should include what activities will be included in the screening program and the advantages it offers to the public in a language that is easily understood.

Any agency who wishes to carry out NCD screening should map out the geographic areas where screening activities will be conducted and plan the resources available and the equipment needed.

2.2 NCD screening activities

- The NCD screening activities should be carried out at locations that are easily accessible and convenient to the target population.
- At the screening centre, there should be appropriate signage on the screening activities and numbered stations.
- The health staff involved in performing the screening activities should be friendly and polite with the clients.
- Every screening day should start with health education on any of the NCD topics. Health education should focus on positive reinforcement, prevention of risk factors, treatment adherence and addressing commonly held misconceptions.

The screening stations include the following

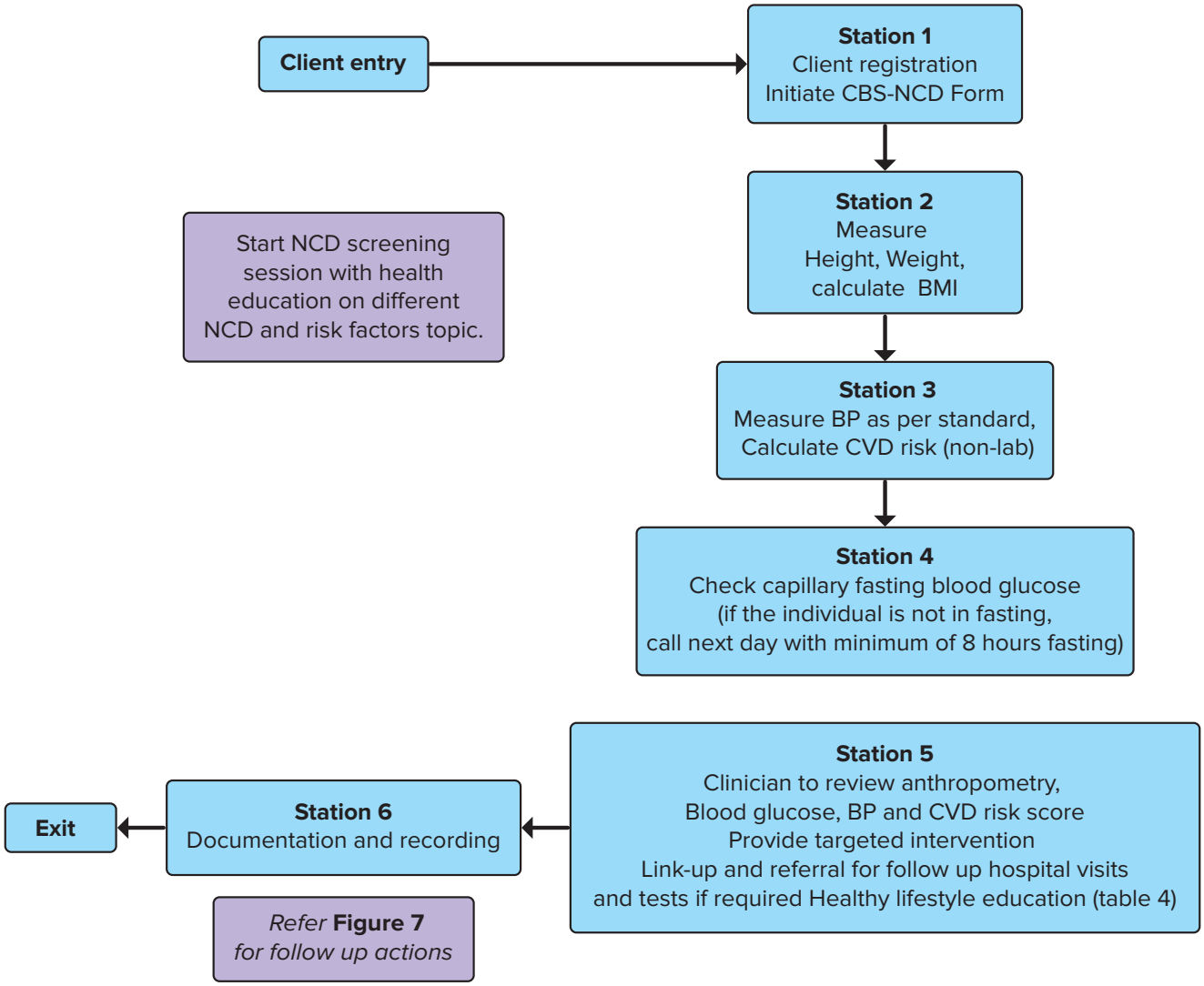


Figure 2: Client flow during NCD screening activities

Station 1: Client Registration

Client Registration Details:

- Name
- Age
- Sex
- CID number
- Contact number
- Present address

Registration Platform:

- Individual screening Form
- Google sheet-based standard form as given in Annexure 3.1

*If an Electronic Patient Information System (ePIS) is available, all recordings should be done on ePIS.

Station 2: Anthropometry

Anthropometry includes the measurement of the following parameters:

- Height
- Weight
- Calculate Body Mass Index (BMI)*

*The calculation of BMI should be based on Annexure 2.

Station 3: Blood Pressure Measurement and CVD Risk Assessment

A) Measurement of Blood Pressure

- While measuring blood pressure, use a standard BP device
- Follow standard procedures while measuring BP (given in and figure 3 or table 8 (Annexure 3)

Figure 2. Screening and diagnosis of hypertension based on SCCI Protocol-based Management for Hypertension

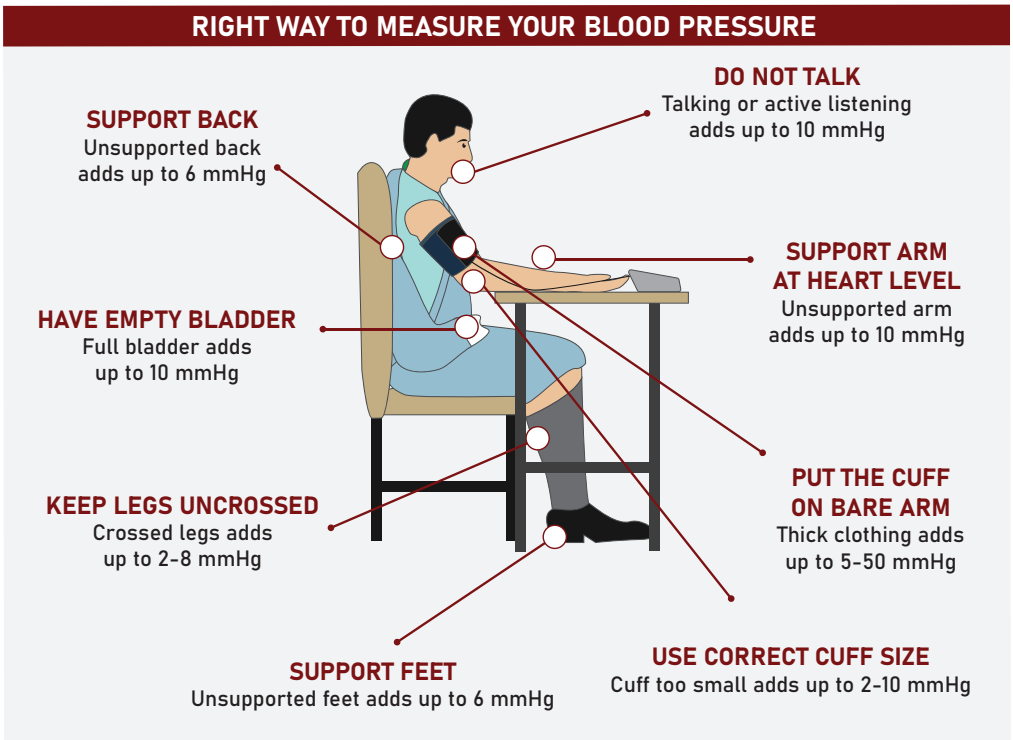


Figure 3: Standard Posture for BP measurement

B) Cardiovascular Risk Assessment

- Eligible Population: Age 40 years and above
- Method:
  - o Assess CVD risk using non-laboratory-based CVD risk charts in your health facility **OR**
  - o Download WHO PEN application to assess CVD risk

Follow this to download the WHO PEN Application

Download and Install Application in you mobile phone

The application is available for Android and IOS Platforms, click on the below link to download the application:

Android - https://play.google.com/store/apps/details?id=org.who.WHOPEN

iOS – https://apps.apple.com/us/app/whopen/id1566338877

- Record the findings on the NCD screening form (Annexure 5) as well as in the Standardised Google Sheet (Annexure 6).

Station 4: Fasting Blood Glucose Testing

- Eligible Population:
  - Age 40 years and Above
  - Below 40 years with
    - overweight and obesity (BMI>=25)
    - First-degree relative withDiabetes mellitus (>30 years)
    - History of gestational diabetes mellitus

- Method:
  - Fasting Capillary Blood Glucose (FCBG) Testing.
  - Record the findings on the NCD Screening Form (Annexure 5) as well as in the Standardised Google Sheet (Annexure 6).
- Procedure:
  1. Make sure the glucometer is clean and ready to use.
  2. After removing a test strip, immediately close the test strip container tightly. Test strips can be damaged if they are exposed to moisture.
  3. Wash your hands with soap and water.
  4. Use a lancet to prick the finger. Squeeze from the base of the finger, and wipe away the first drop of blood. Place the strip in the meter, and gently place the second drop of blood onto the test strip.
  5. After a few seconds, the reading will appear. Record your results. Add notes about anything that might have made the reading out of your target range, such as food, activity, etc.
  6. Properly dispose of the lancet and strip in a trash container.
  7. Do not share blood sugar monitoring equipment, such as lancets, with anyone, even other family members.
  8. Store test strips in the container provided. Do not expose them to moisture, extreme heat, or cold temperatures.
  9. Record the findings on the NCD Form (given in Annexure 5) as well as in the Standardised Google Sheet (given in Annexure 6).

Station 5: Clinical Assessment and health advice

Upon completion of the above screening processes, a competent health worker should review and interpret the following screening results, and provide necessary interventions.

- Anthropometry
- Blood glucose, BP and CVD risk score
- Provide targeted intervention
- Link-up with care and referral for further confirmatory diagnosis (if requires)
- Advise when to do follow up screening
- Provide healthy lifestyle education (Table 4)

Interpretation of Screening Results and Interventions:

The client should be made aware of the findings and their interpretations. The concerned health worker should write clear instructions for any referrals made to the hospitals for subsequent tests or visits.

a) Blood Pressure

The BP of the individual should be interpreted and intervened as per the figure 4.

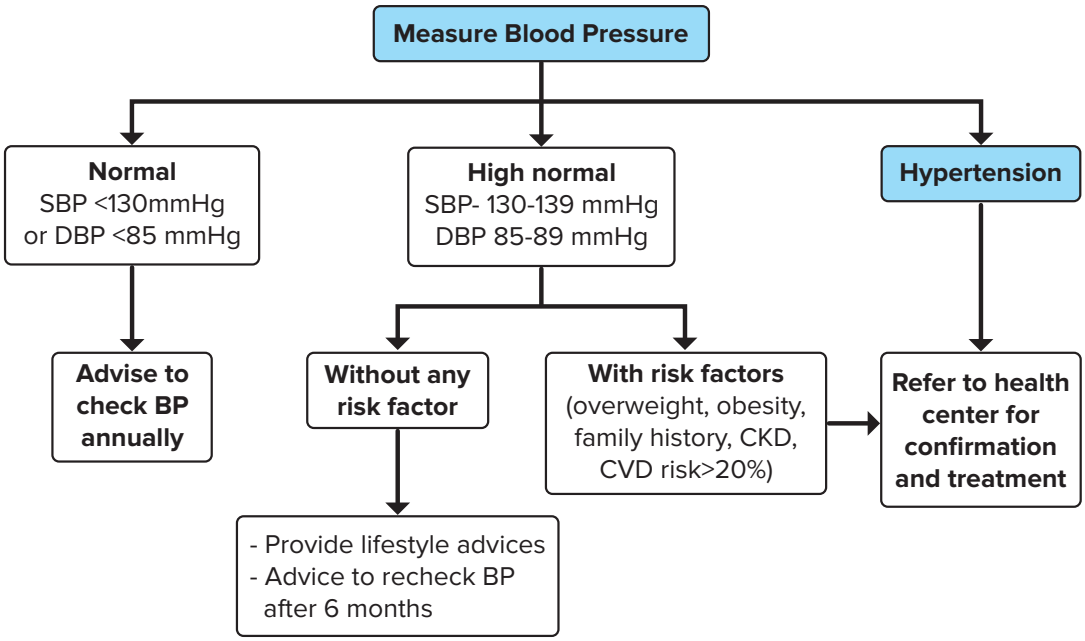


Figure 4: Flow chart for blood pressure measurement

b) BMI: Individual should be classified based on the BMI as per the table given below:

BMI (Kg/m2)	Classification
Below 18.5	Underweight
18.5 – 24.9	Normal weight
25.0 – 29.9	Overweight
30.00 and above	Obese

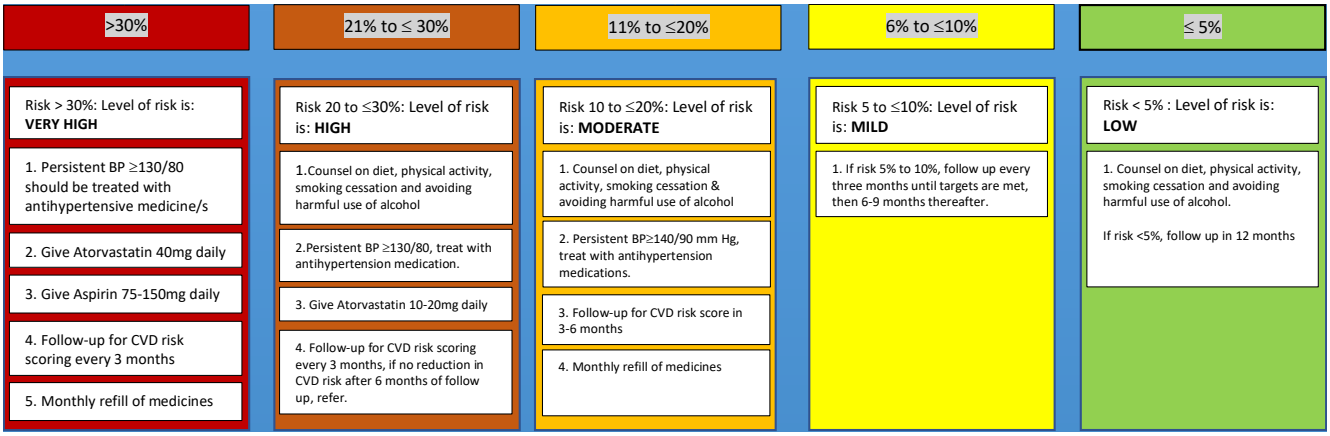
Source: (WHO and UNICEF 2017)

Table 3: Classification of body mass index (BMI)

- The BMI should be informed to the client and provide appropriate intervention including health education as per table 4.
- Explain the health risk of being overweight and obesity

c) Cardiovascular Risk (Non-laboratory): CVD risk prediction model estimates risk of developing a fatal or non-fatal major cardiovascular event (myocardial infarction or stroke) in the next 10-year, according to sex, age, systolic blood pressure, tobacco smoking status and your BMI

The CVD risk must be interpreted and intervened as per the CVD Risk Chart given in Figure 4.



Source: (WHO, 2020)

Figure 5: WHO/ISH cardiovascular risk prediction

d) Fasting Blood Glucose:

- Method of screening blood glucose level:
  - Fasting capillary blood glucose (FCBG).

  FCBG is considered to be a convenient, practicable screening method in low-resource rural communities with acceptable test properties (Zhao et al., 2013. WHO, 2003, Al-Baghli et al., 2010, Khatib & WHO. Regional Office for the Eastern Mediterranean, 2006).
- All people aged 40 and above should come to the screening station with fasting for at least 8 hours (no caloric intake except for water).
- The results of the blood test should be interpreted and provide necessary interventions as per figure 5.
- Provide necessary health education and rescreening schedule as per table 4.

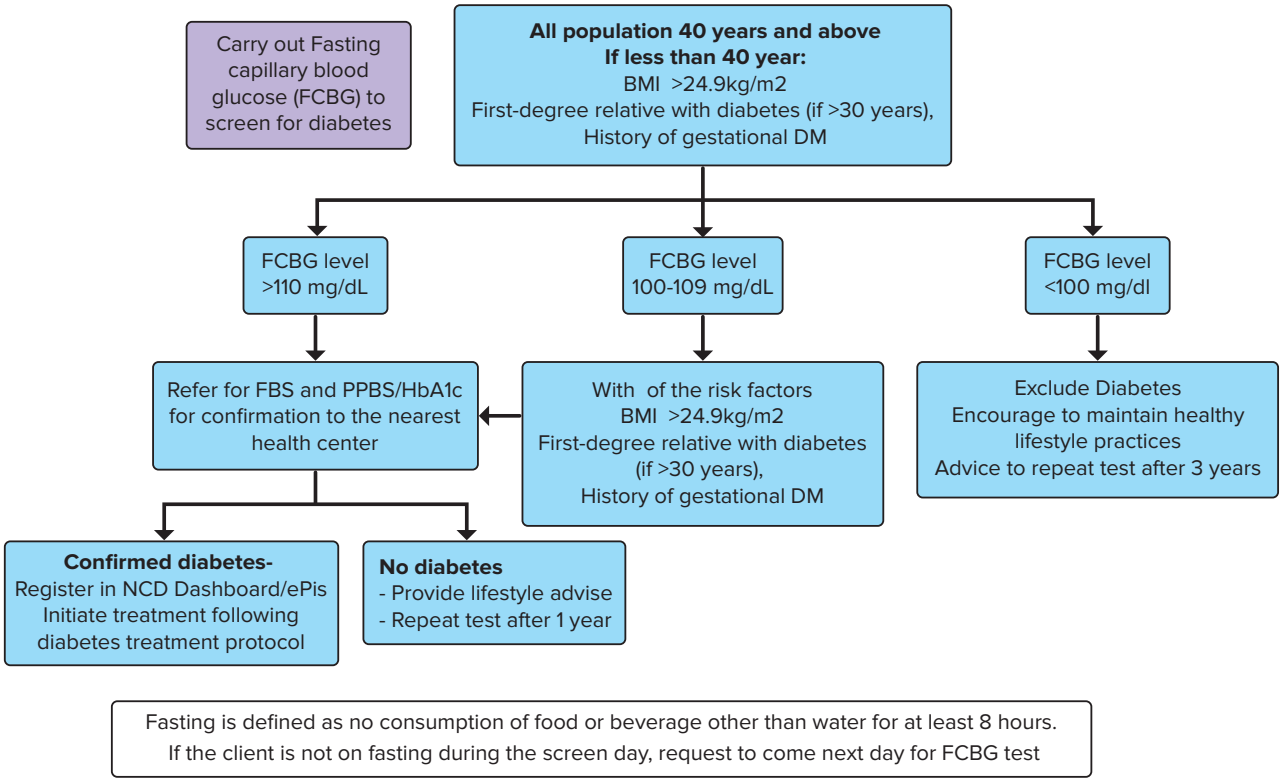


Figure 6: Screening for diabetes mellitus using capillary Fasting blood glucose during community

Interpretation of fasting blood and plasma glucose levels

Fasting Blood glucose level	Interpretation
<100 mg/dL	ExcludeDiabetes mellitus
100-109 mg/dL	indication of diagnostic testing at Health facility among high risk individuals
>110 mg/dL	Indication of diagnostic testing in Health facility Refer, record and follow up

(Khatib & WHO. Regional Office for the Eastern Mediterranean, 2006)

Health Education for management NCD risk factors for Prevention and Control

Risk factors	General advice
Weight control	All individuals who are overweight or obese should be encouraged to lose weight through a combination of a reduced energy diet (dietary advice) and increased physical activity.
Physical activity	All individuals should be encouraged to do • At least 30 minutes of moderate physical activity (brisk walking) a day OR • 150 minutes Moderate PA per week or • 75 minutes of vigorous PA per week or • At least 5 days of a week of leisure time, daily tasks and work related activities.
Dietary changes	All individuals should be encouraged to; • Gradually reduce daily salt intake by at least one third and if possible to < 5gm (one teaspoon) per day. • Limit eating processed food and fast food • Restrict consumption of refined-sugar including sugar sweetened beverages. • Consume at least five fruit and vegetables (recommendation is at least 400-500 gm a day) • Limit consumption of fats o fats from animal source(Butter, Ghee, fat meat) o Industrially produced trans fat (margarine, vegetable shortening, Vanaspati ghee, fried foods, and baked goods such as crackers, biscuits and pies) o Baked and fried street and restaurant foods often contain industrially produced trans • Encourage consumption of lean meat and fish
Tobacco Cessation	• All non-smokers should be encouraged not to start smoking. • All tobacco users should be strongly encouraged to quit all forms of tobacco. (smoking and chewing tobacco)
Alcohol intake	• Alcohol abstinence should be reinforced. • People should be advised not to start consuming alcohol for health reasons.

Table 4: Health education

Station 6: Record and Documentation

Upon completion of all the screening stages, record all the findings and advises including follow-up actions in the Standardised Google Sheet* (given in Annexure 3.6). The final record must include following information:

- Client Demographic Details (Name, Age, Sex, CID number, Contact number, present address)
- BMI result
- BP reading
- CVD Risk score
- RBS result
- Advises or Follow-up Notes

**If an Electronic Patient Information System (ePIS) is available, all data management should be done on ePIS*

Follow-up actions for new cases diagnosed during screening

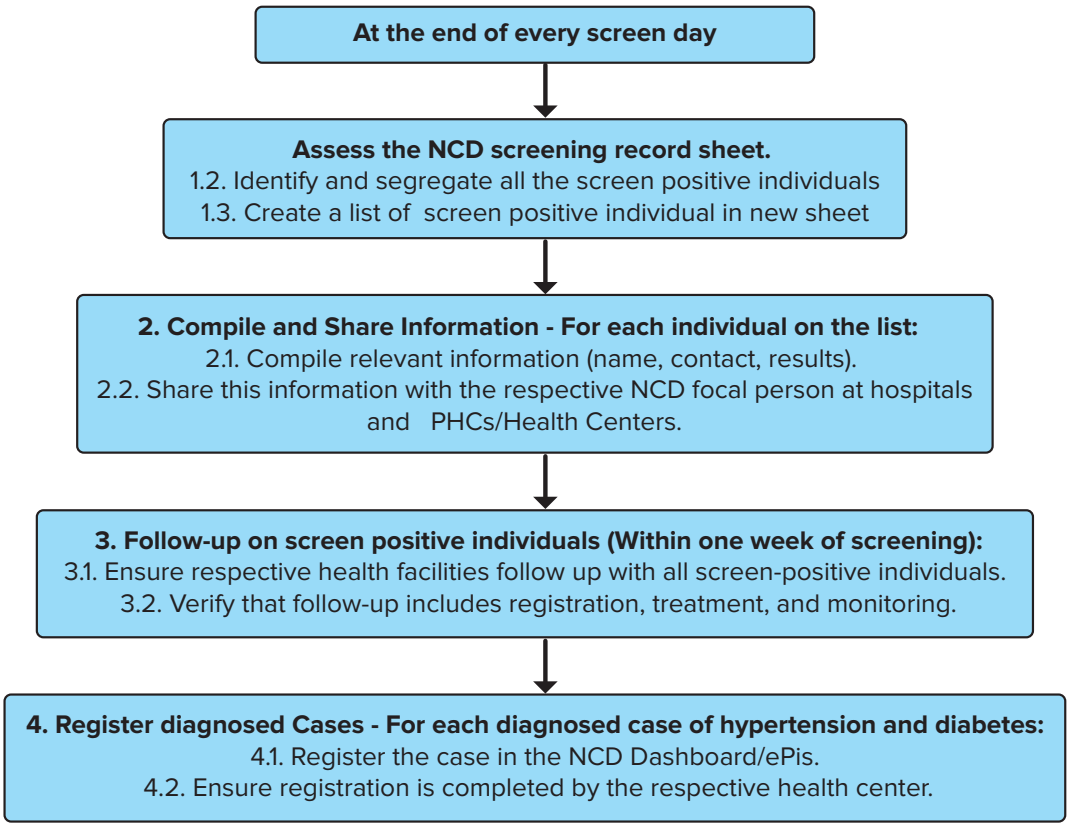


Figure 7: follow up action

Information Sharing Mechanism: The screening team leader should verify and validate the screening report and submit it to the respective District Public Health Officers within three working days after completion of the programme. The DPHO should further validate the report and submit it to DoPH within two weeks of the completion of the programme.

**If an Electronic Patient Information System (ePIS) is available, all data can be directly accessed by DoPH through ePIS.*

STEP 3: MONITORING AND EVALUATION

Monitoring and Evaluation (M&E) of the screening programme is to assess the program's performance, effectiveness, and impact. The M&E framework must guide the implementation of the programme at various levels, the national, district and community level. For the NCD screening programme, the M&E Framework given in table 6 should be used to monitor and evaluate the success of the programme.

The performance, effectiveness, efficiency, relevancy and efficiency must be periodically evaluated. This will generate critical evidence for effective risk management, program improvements, and the development of policies related to NCD prevention and control.

Further, having a clearly defined roles and responsibilities is imperative for a successful implementation of the programme and the achievement of desired health outcomes. Therefore, roles and responsibilities have been defined in table 7 for NCD screening programme implementation;

1. Roles and responsibilities

The Roles and Responsibilities in Implementation of the NCD Screening Programme

Responsible Person	Roles and responsibilities
Programme Manager	• Oversee overall implementation of the program, ensuring alignment with national health priorities. • Collect and analyse data, prepare monitoring reports, coordinate evaluation activities, and submit reports for policy decisions.
District Public Health Officer (DPHO)	• Oversee overall implementation of the program in the respective district. • Coordinate with CMO/Medical Superintendent for planning and implementation. • Verify and validate the screening programme report, and timely reporting to DoPH.
CMO/Medical Superintendent	• Provide technical support in planning and implementation of the programme including resource mobilisation (Human resource and medical supplies) • Provide essential support to ensure proper follow-up for patients requiring ongoing care after the screening program.
Health Workers	• Conduct screening and maintain records. • Carry out case follow-up as per this guideline • Report data regularly.

Table 5: Roles and responsibilities

2. M&E Framework

Level	Indicator	Data Source	Frequency
Input	Availability of HR for screening	HF Staff records	Bi-annually
	Availability of screening equipment and supplies	Inventory records	
Process	Number of awareness sessions carried out	Screening Report	Quarterly
	Proportion of target population screened for NCDs	Screening Records/ Google Sheet/ePIS	
Output	Percentage of positive cases referred for further diagnosis or treatment	Screening Records/ Google Sheet/ePIS	Quarterly
	Proportion of NCD-positive cases that initiated treatment	Screening Records/ Google Sheet/ePIS	Quarterly
	Proportion of positive cases		
Outcome	Percentage of people with controlled blood pressure/Diabetes mellitus within 9 months of diagnosis	Screening Records/ Google Sheet/ePIS	Bi-annually
	Percentage of people with controlledDiabetes mellitus within 9 months of diagnosis	Screening Records/ Google Sheet/ePIS	Bi-annually
	Percentage of people with reduced CVD risk within 9 months of diagnosis	Screening Records/ Google Sheet/ePIS	Bi-annually
Impact	Reduction in morbidity and mortality rates due to NCDs (CVD and CKD) in the target population	HMIS data	Annually

Table 6: Monitoring and evaluation framework

References

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ANNEXURES

1. Checklist of items required for NCD screening activities

The following is the checklist for NCD screening activities. Based on the context-specific planning, ensure that adequate quantity is available during the screening day.

Sl. No.	Items/Particular	Qty.	Remarks
1	Stethoscope		
2	Digital BP machine or Anroid BP machine (Functional & Calibrated)		
3	Stadiometer for height Measurement (Functional)		
4	Weighing scale (Functional & Calibrated)		
5	Gluco-meter with strips		
6	Blood lancets		
7	Cotton swabs		
8	Sharp disposal box (sharp bin)		
9	Extra batteries for gluco-metre		
10	Extra batteries for digital BP machine		
11	Extra batteries for weighing scale		
12	NCDs Register book or Laptop for Google Sheet		
13	Printed individual screening form		
14	CVD risk chart (Non-Lab chart)		
15	CVD intervention chart (MoH website)		
16	Blank A4 copier Paper		
17	Pen		
18	Ruler		

Table 7: Checklist of items required for NCD screening activities

2. Measurement of height, weight and body mass index

Calculation of BMI

- Check the height and weight.
- Round off the measured weight to the nearest whole number. Eg.45.3kg to 45kg, 67.8kg to 68kg)
- Use the following formula to calculate their BMI.
- BMI = Weight (kg) / Height (m) × Height (m)

3. Recommendation for Blood Pressure measurement

Measure BP as per standard with following recommended conditions.

Condition	• Before measurement: avoid smoking, caffeine and exercise for 30 minutes. • Remain seated and relaxed for 3-5 mins, empty bladder. • Both patient and staff should not talk at the time of BP measurement.
Position (see figure)	Sitting: • Arm resting on the table with mid-arm at heart level, • Back supported on the chair and • Legs uncrossed and feet flat on the ground.
Devices	Use calibrated BP instrument
Cuff	• Use cuff size according to the individual's arm circumference • For manual auscultatory devices the inflatable bladder of the cuff must cover 75% -100% of the arm circumference • For electronic devices use cuff according to device instruction
Protocol	If BP is more than 140/90 mmHg; • Take 2 more measurements with 1 min between them. • Calculate the average of the last 2 measurements and record.
Interpretation	Blood pressure of ≥140/90 mm Hg on 2 occasions indicates Hypertension

Table 8: Right way to measure blood pressure

After measuring BP, please record it in the individual screening form and Google Form or ePIS. For interpretation and interventions based on BP readings, please see Section 2 of this guideline.

4. CVD risk assessment (non-laboratory)

Estimate the 10- year cardiovascular risk to follows:

1. Select the appropriate chart depending on the presence or absence ofDiabetes mellitus
2. Select male or female tables
3. Select smoker or non-smoker boxes
4. Select age group box (if age is 55, select the range 55 – 59 years, if age is 60, select the range 60 – 64 years).
5. Record the CVD risk assessment percentage.

For interpretation of CVD risk, **please see Section 2 of this guideline.**

5. NCD screening Form

<table>
<tr><td colspan="3">Non Communicable Disease Screening Form
Department of Public Health, Ministry of Health, Bhutan</td></tr>
<tr><td colspan="2">Date: …….....</td><td>Location: .....</td></tr>
<tr><td>Name:</td><td>Age / Sex:</td><td rowspan="2">Present Address / Residential area:
Occupation:</td></tr>
<tr><td>CID No.:</td><td>Mobile No.:</td></tr>
<tr><td colspan="3">Do you use any form of tobacco? □ Yes □ No</td></tr>
<tr><td colspan="3">Do you currently consume alcohol? □ Yes □ No</td></tr>
<tr><td colspan="3">Do you currently chew doma? □ Yes □ No</td></tr>
<tr><td colspan="2">Height (cm):</td><td>Pulse rate:

Blood pressure (BP):</td></tr>
<tr><td colspan="2">Weight (kg):</td><td>Fasting capillary blood glucose:</td></tr>
<tr><td colspan="2">BMI (kg/m2) :
BMI category:
□ Normal □ Overweight
□ Obesity □ Underweight</td><td>CVD risk score (age >40 years):</td></tr>
<tr><td colspan="3">Provisional Diagnosis after screening: □ HTN □ DM □ both</td></tr>
<tr><td colspan="2">Health provider note:
(If any other problems or referral)</td><td>Refer to and Reason:</td></tr>
<tr><td colspan="3">Signature & Reg No of clinician:</td></tr>
</table>

6. NCD Screening record sheet

Relevant NCD Focal Person to maintain this Google Sheet and share it with the respective District Public Health Officer. Respective DPHO to compile all Google Sheets and submit to the Lifestyle Related Diseases Program, Ministry of Health.

Table: Headings for screening record sheet in Google Sheet

Sl. No	Name	Age	Sex	CID No	Contact No.:	Address:	Health Assessment							Probable Diagnosis (drop down)			Provide Brief Interventions	Referred to: Name of PHC / hospital	1st Qtr - Follow up 1		2nd Qtr - Follow up 2		3rd Qtr - Follow up 3		4th Qtr - Follow up 4	
							Wt (kg)	Ht (cm)	BMI	Systolic	Diastolic	FBS	CVD risk	HTN	Diabetes mellitus	Both HTN / Diabetes mellitus			Date	Findings	Date	Findings	Date	Findings	Date	Findings

7. Reporting format for District Public Health Officer

Reporting format for each facility:
District name:
Total gewogs:

Indicator	Male	Female	Total
Target population			
Total screened			
Alcohol user			
Tobacco user (include smoking)			
Doma user			
BMI			
Normal			
Overweight			
Obese			
Blood glucose			
FCBG <110 mg/dL			
FCBG 110 – 126 mg/dL			
CVD risk ≥20%			
New Diabetes mellitus diagnosed			
New hypertension diagnosed			
Number referred to hospital			
For FBS/PPBS			
For BP reassessment			
Other reasons			
Any other details:			

Report submitted by: