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Manual for Screening of Non-Communicable Diseases and Risk Factors

Directorate of Non-Communicable Diseases
Ministry of Health, Sri Lanka.
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Directorate of Non-Communicable Diseases
Ministry of Health

Manual for Screening of Non-Communicable Diseases and Risk Factors

Prepared by the Directorate of Non-Communicable Diseases to serve as a reference for the health staff carrying out screening of non-communicable diseases and risk factors at Healthy Lifestyle Centres.

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Figure 1: Outline of Standard Screening Programme

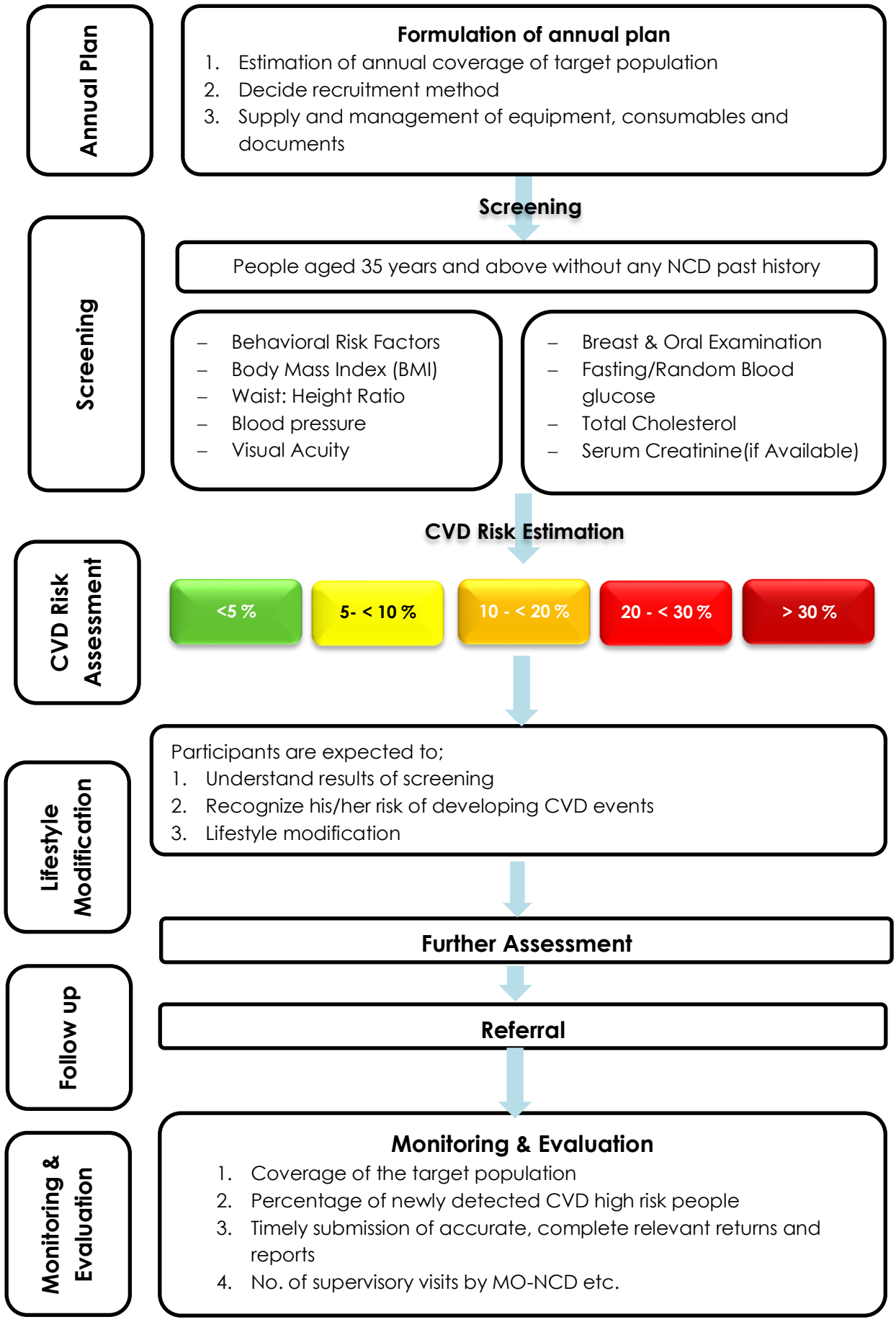
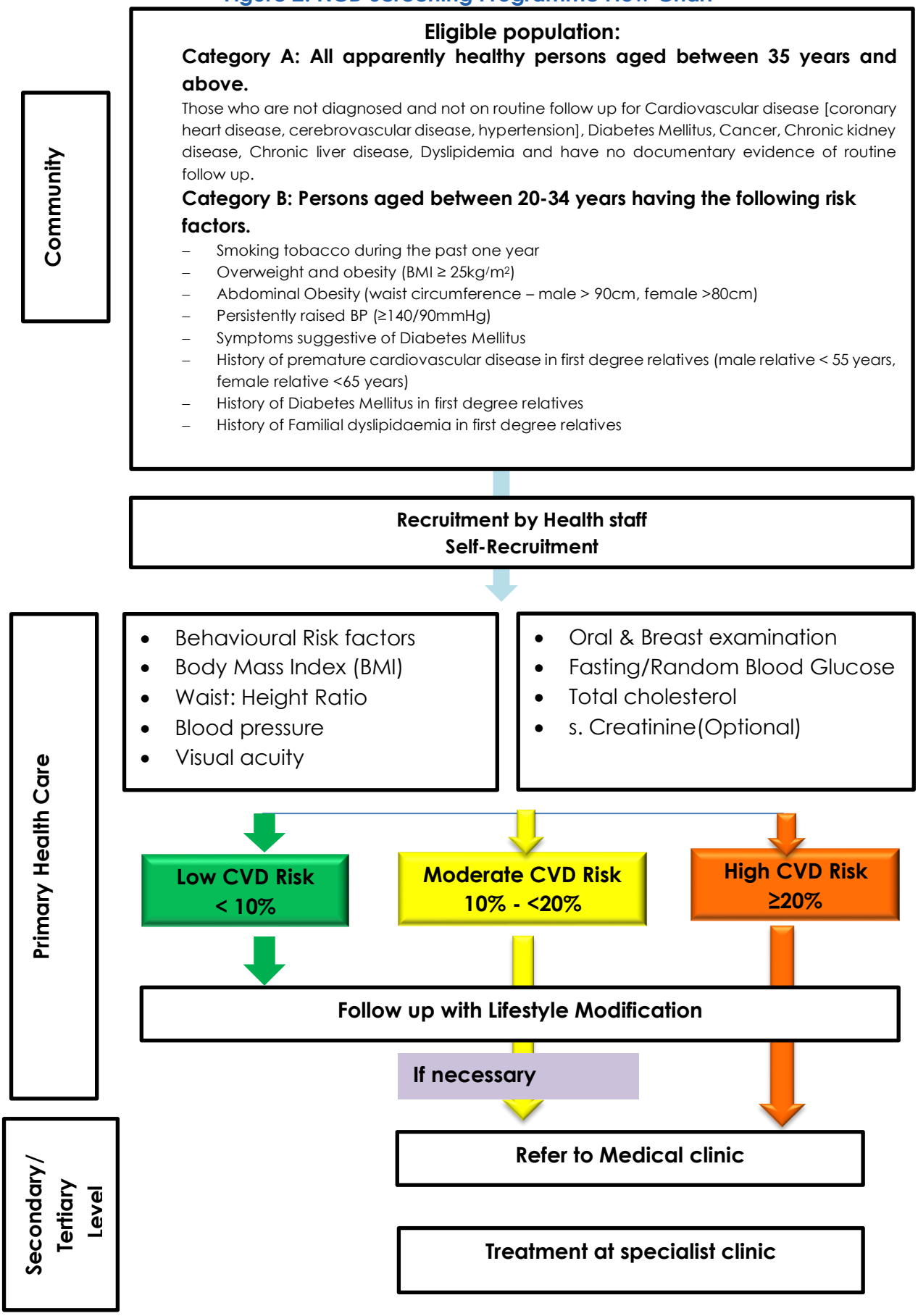


Figure 2: NCD Screening Programme Flow Chart



Planning at the Institutional level

Each institution is expected to adhere to the district annual plan and develop a plan accordingly at the institution level.

Points that need to be considered are listed below.

Methodology	• Frequency of screening programmes per month • Number of participants per session • Recruitment methodology • Logistics (materials, equipment, consumables etc.)

Training Schedule	• Trainings on,
	  o NCD management guideline
	  o NCD surveillance systems
	  o Lifestyle modification guidelines in collaboration with MO-NCD
	  o other suitable trainings (e.g. quality assurance)

Monitoring and Evaluation	• Screening Coverage • Timely submission of accurate and complete returns • Percentage of trained staff • Practicing of Quality improvement activities in Healthy Lifestyle Centers • Availability of consumables and stock management

Welcome and Orientation

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Emphasize the following points to participants before starting the screening so that the screening programme is smoothly conducted.

- Importance of NCD screening
- Procedures of NCD screening

2.1 Importance of NCD screening

Briefly explain current situation of NCDs in Sri Lanka and the purpose of the screening programme to participants based on the following information in simple words.

2.1.1 Current situation of NCDs in Sri Lanka

The Non-Communicable Diseases (NCDs) mainly cardiovascular diseases, chronic respiratory diseases, diabetes and cancer — are top killers in the South-East Asia Region, claiming an estimated 8.5 million lives each year. According to WHO, estimated deaths due to NCDs in Sri Lanka was 118,700, 83% of the total in 2016. The highest proportional mortality rate of 34 % accounted for Cardiovascular Diseases, while 14%, 9% and 8% accounted for cancers, Diabetes and Chronic Respiratory Diseases respectively. The premature mortality (30-70 years) rate in 2016 was 17% with males being affected more (22%) than females (13%) (WHO, 2018).

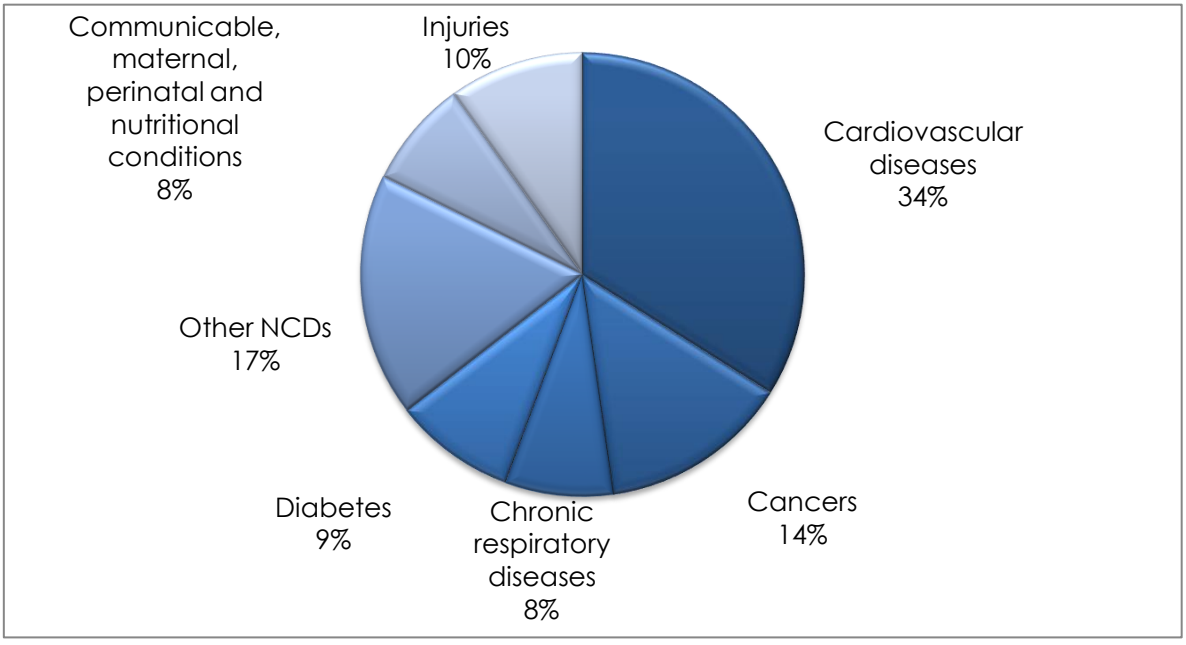


Figure 3: Proportional mortality (WHO, 2016)

The common, modifiable risk factors underlying these major NCDs are use of alcohol and tobacco, unhealthy diet and physical inactivity, leading in clustering effect to the intermediate risk factors like overweight/obesity, raised blood pressure, raised blood sugar and raised blood cholesterol level. In Sri Lanka, nearly 30% of the population over the age of 18 years was considered as physically inactive (less than recommended 150 min per week), and it showed that females are more inactive compared to males (38% Vs. 22%). As expected, 34% of females were overweight compared to 25% among males. Unhealthy diet is also identified as a main risk factor

for developing NCDs and the mean population salt intake among adults aged over 20 years was 10 g/day which is above the recommended level of 5 g/day. Nearly three quarter of the population do not consume sufficient fruit and vegetables while 26% of the adults aged 18-69 years always or often eat processed food high in salt. Among the male population between the ages of 18-69 years, around 46 % were tobacco users. Out of males, 29% smoke tobacco while 26% use smokeless tobacco. One third of the males were current alcohol users. Prevalence of the risk factors of NCD are given

Table 1. (STEPS, 2015).

Table 1: Estimated prevalence of risk factors (%), STEPS 2015

	Males	Females	Total
Behavioral risk factors			
Currently smoke tobacco	29.4%	0.1%	15.0%
Currently drink alcohol[1]	34.8%	0.5%	17.9%
Insufficient physical activity[2]	22.5%	38.4%	30.4%
Metabolic risk factors			
Raised blood pressure[3] or currently on medication for raised BP	25.4%	26.7%	26.1%
Raised fasting blood glucose level[4] or currently on medication for raised blood glucose	7.3%	7.6%	7.4%
Overweight[5]	24.6%	34.3%	29.3%
Obesity[6]	3.5%	8.4%	5.9%

2.1.2 Purpose of NCD screening

The purpose of this NCD screening is to evaluate an individual's CVD risk when they are symptom free. The screening allows us to do early diagnosis and provide treatment for underlying diseases such as hypertension, diabetes, obesity and dyslipidaemia to avoid more serious health problems as well as to reduce CVD risk. Even if the person feels that they are in the best shape of their life, a serious condition with no signs or symptoms may put their lives at risk.

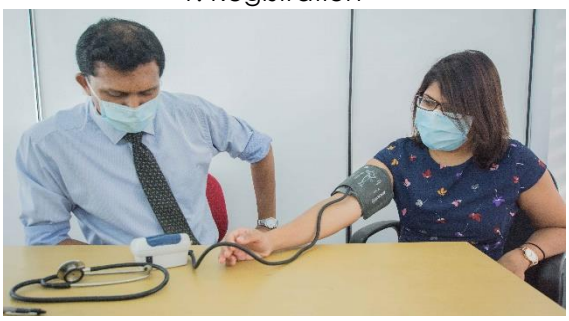
[1] Those who drank alcohol in the past 30 days
[2] Less than 150 minutes of moderate-intensity activity per week, or equivalent
[3] SBP ≥ 140 and/or DBP ≥ 90 mmHg
[4] Plasma venous value ≥ 126 mg/dl
[5] BMI ≥ 25 kg/m^2
[6] BMI ≥ 30 kg/m^2

2.2 Procedure of NCD Screening

Explain the order of procedures to all the participants. It is ideal to prepare a notice board to explain the screening process.

An example of the NCD screening procedure

1. Registration



3. Blood Pressure Measurement

4. Blood Glucose, Cholesterol

6. Lifestyle Modification

2. Height and Weight Measurement

5. CVD Risk Assessment

Registration and data entry

3.1 Material and Equipment Required

Type	Item
Documents	Registers to be kept in the institution • **H 1236 A** - Participants' Register(Male) • **H 1236 B** - Participants' Register(Female) • **H 1237** - Follow up Register • **H 1239** - Monthly Report of activities Done for Non-Communicable Disease Screening
	Personal Medical Records, which will be provided to each participant at the registration. • **H 1309** - Personal Medical Record-Males • **H 1310** - Personal Medical Record-Females
	Reception Number Cards
Equipment	Desk top/laptop computers
Stationary	Ruler
	Pen
Furniture	Chairs
	Tables

3.2 Preparation

1. Arrange the registration station at the entrance. The registration station should be placed in a way that health staff do not miss any participant after the checkup.
2. Keep all the reception number cards in ascending order. Place the participants' registers and personal medical records in an accessible place.

3.3 Registration at the Beginning for the new participants for Screening

- Welcome the participant.
- Check whether participant is eligible to participate in the NCD checkup or not.
- Check the eligibility of the participants according to Figure 2: NCD Screening Programme Flow Chart for NCD screening before the registration.

  ➢ The main target group is participants aged 35 years and above (Category A) who are apparently healthy.
  Those who are not diagnosed and/or not on routine follow up for Cardiovascular diseases [coronary heart disease, cerebrovascular disease, hypertension], Diabetes Mellitus, Cancer, Chronic kidney disease, Chronic liver disease, Dyslipidemia and have no documentary evidence of routine follow up.

- If the participant is in the age group of 20-34 years but having any of the following risk factors (Category B) should be screened.
    - Smoking tobacco during the past one year
    - Overweight and obesity(BMI ≥ 25kg/m^2)
    - Abdominal Obesity (waist circumference – male > 90cm, female >80cm)
    - Raised BP (≥140/90mmHg)
    - Symptoms suggestive of Diabetes Mellitus
    - History of premature cardiovascular disease in first degree relatives (male relative < 55 years, female relative <65 years)
    - History of Diabetes Mellitus in first degree relatives
    - History of Familial dyslipidaemia in first degree relatives

- Check the medical history of each participant. If they have suffered from cardiovascular disease [coronary heart disease, cerebrovascular disease, and hypertension], diabetes, cancer, chronic kidney disease, chronic liver disease or dyslipidemia, the participant is not eligible.

- If they have a medical history, ask them whether they are under treatment and routine follow up. Documented evidence (e.g. clinic book) is required. Such clients should not be registered at the HLC and they should be encouraged to continue the routine follow up.

- If the participant has a medical history, is not being regularly followed up and without any documentary evidence, he/she should be registered at HLC and screened for HLC.

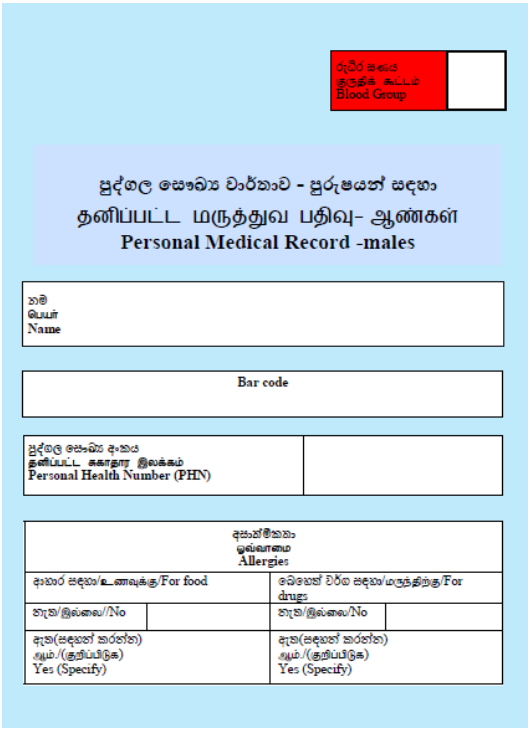
- If the participant has a medical history and is not being regularly followed up in the medical clinic but with documentary evidence, he/she should be redirected to the medical clinic in order to recommence medical management. The patient should be adequately informed with regard to medical clinic date and time in a manner to strengthen the compliance

- Select the appropriate register according to the sex of the participant
  - **H 1236 A** - Participants' Register(Male)-Blue
  - **H 1236 B** - Participants' Register(Female)-Pink

- After checking the eligibility of a participant, fill out the following columns of the Participants' Register for each participant.
  - Serial No.
  - GN Division
  - Name with initials
  - Age in completed years
  - NIC number and Date of Birth
  - Personal Health Number (PHN)[7]
  - Address
  - Telephone number (if available)

Note: Date should be mentioned in the Participants' Registers at the beginning of each session.

- Refer to the guidelines available in the Participants' Register to fill the columns.
- After filling the basic information on the register, same should be transferred to the Personal Medical Record (PMR).
- Hand over the PMR to the participant.



රුධිර කණ්ඩය
குருதிக் கூட்டம்
Blood Group

පුද්ගල සෞඛ්‍ය වාර්තාව - පුරුෂයන් සඳහා
தனிப்பட்ட மருத்துவ பதிவு- ஆண்கள்
Personal Medical Record -males

නම
பெயர்
Name

Bar code

පුද්ගල සෞඛ්‍ය අංකය
තනිපුද්ගල ලේඛන අංකය
Personal Health Number (PHN)

අසාත්මිකතා ஒவ்வாமை Allergies	
ආහාර සඳහා/உணவுக்கு/For food	වෙනත් වර්ග සඳහා/மருந்திற்கு/For drugs
නැත/இல்லை/No	නැත/இல்லை/No
ඇත(සඳහන් කරන්න) ஆம்./(குறிப்பிடுக) Yes (Specify)	ඇත(සඳහන් කරන්න) ஆம்./(குறிப்பிடுக) Yes (Specify)

රුධිර කණ්ඩය
குருதிக் கூட்டம்
Blood Group

පුද්ගල සෞඛ්‍ය වාර්තාව - ස්ත්‍රීන් සඳහා
தனிப்பட்ட மருத்துவ பதிவு-பெண்கள்
Personal Medical Record -Females

නම
பெயர்
Name

Bar code

පුද්ගල සෞඛ්‍ය අංකය
තනිපුද්ගල ලේඛන අංකය
Personal Health Number (PHN)

අසාත්මිකතා ஒவ்வாமை Allergies	
ආහාර සඳහා/உணவுக்கு/For food	වෙනත් වර්ග සඳහා/ மருந்திற்கு/For drugs
නැත/இல்லை/No	නැත/இல்லை/No
ඇත(සඳහන් කරන්න) ஆம்./(குறிப்பிடுக) Yes (Specify)	ඇත(සඳහන් කරන්න) ஆம்./(குறிப்பிடுக) Yes (Specify)

[7] PHN is issued through HIMS cloud when registering clients of the empanelled population.

- Provide the reception card number to each eligible participant on first come first serve basis where an appointment system is not in place

- Instruct participants to keep the reception number card during screening, to read the health messages on the other side of the number card and to return it at the end of the screening to the registration station.

- Once the clinical assessment (history, risk factor assessment, examinations and investigations) is completed, direct the participant back to the registration station so that health staff can record their results on the Participants' Registers and HLC module of the HIMS cloud system (If available).

3.4 Recording data at the end of the screening

Be attentive of when the first participant finishes all the steps in the screening process.

1. Collect the reception number card.

2. Check the participant's registration number and copy the results to all relevant columns for behavioral risk factors, clinical and biochemical assessments from their PMR to the registry and to HLC module of the HIMS cloud system (if available). Refer the guidelines provided in the participants' Register when completing the register.

3. Please tick the appropriate referrals made under the follow up column in the "Referral and Follow up" section in the Participants' Register. If the client to be reviewed at the HLC, the date to be reviewed should be mentioned in the "Referred to" section under HLC visits in the PMR.

4. Every participant except who are referred to medical clinic should be reviewed at least once in three years at HLC. Those who are with modifiable risk factors and/or the CVD risk is between 10 %- 20% should be reviewed more frequently according to the guidelines. Clinician has the liberty to review the participants more frequently considering the clinical, social and cultural circumstances of the participants where such move is justifiable.

5. Once the data entry is completed, return the PMR to the participant. Emphasize the importance of keeping the PMR safe and taking it to any encounter with a healthcare provider.

6. The page summary should be filled once all the rows for individual data entry in each page of the Participants' Register is completed.

7. Monthly report needs to be prepared once all screening sessions for each month have been completed. The report is expected to be submitted to MO-NCD, RDHS

office by the 5th day of the following month with the signature of the Medical Officer-In Charge (MO-IC).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தொற்றா நோய்களிற்கான பரிசோதனை செயற்பாடுகள் தொடர்பான மாதாந்த அறிக்கை

Monthly Report of Activities Done for Non Communicable Disease Screening

3.5 Registration of Follow up participant at HLC

- Details of the follow up paticipant i.e.routine follow up of apparently healthy participants aged 35 years and above every 3 years, participants aged 20- 34 years with risk factors annually and those with high CVD risk as required(e.g. CVD risk >10 % ,high blood pressure, blood sugar levels and BMI), should be entered to the Follow Up Register (H 1237) at the entrance.

- Follow up register should be filled according to the guideline given along with the register.

- PMR should be filled accordingly.

- At the end of the provision of required service, follow up register needs to be updated.

Note: Follow up register is only for the HLC participants. All the participants who were offered drug treatment should be followed up in a medical clinic. The participants who are followed up for a specific intervention (tobacco cessation and other health promotive action specific for the HLC) need to be followed up in a separate book depending on the intervention.

Measurements and Examinations

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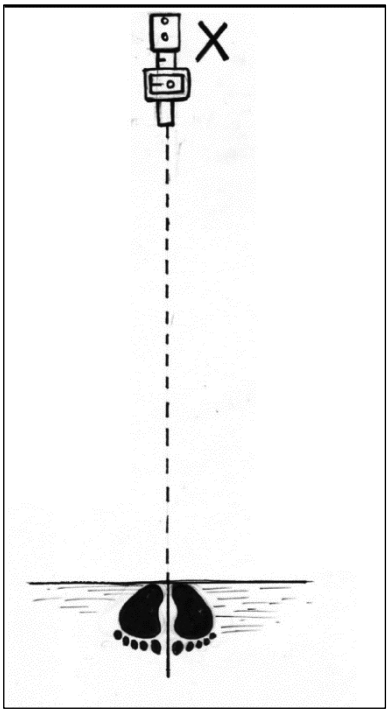
4.1 Materials and Equipment Required

Type	Item
Equipment	Stadiometer
	Weighing Scale
	Measuring tape
	Blood pressure apparatus (digital/aneroid)
	Stethoscopes
	Good light source to examine inside of the mouth **(**examination light or torch**)**
	Sterile or disposable tongue depressors/spatula
	Snellen Chart
Documents/ Stationary	BMI Chart
	WHO CVD risk chart 2019
	Ruler
	Calculator
	Pens
Furniture	Examination bed
	Stool
	Screen
	Table
	Chairs
Consumables	Sterile piece of gauze
	Examination gloves and surgical mask
	Extra Batteries

4.2 Height

4.2.1 Measurement of height using the wall mounted stadiometer

Preparation of the stadiometer



- **For the first time**

1. Select a wall for the stadiometer. A flat and smooth wall is suitable.
2. Place the stadiometer on the floor.
3. Pull up the tape until "0" reaches the red line, keep the position, and fix the stadiometer on the wall with a screw. Don't remove the stadiometer at the end of every screening in order to minimize the damage to the wall.
4. Draw a line on the floor underneath the fixed stadiometer so that the participant can keep their feet on either side of the line correctly.
5. Check your height to test the set-up.

- **For the second time**

Measure your height to check the accuracy of the installation position of the stadiometer.

Height measurement

1. Ask the participant to remove heavy outer clothing if necessary and footwear (to check the position of the heels).
2. Ask the participant to undo or adjust hairstyles and remove hair accessories that interfere with the measurement.
3. Ask the participant to stand on the floor with their feet on either side of the line that has been drawn on the floor. Heels of both feet should be together and the toes pointed slightly outwards. Participant should be facing forward and standing straight with their arms hanging loosely at their sides.
4. Check the position of the heels, the buttocks, shoulder blades, and the back of the head for contact with the wall. Depending on the overall body conformation

of the individual, all points may not touch. In such case, make sure the participant's trunk is vertical above the waist, and the arms and shoulders are relaxed.

5. Ensure the participant's head is in the "Frankfort plane". This position is an imaginary line from the center of the ear hole to the lower border of the eye socket. This line should be parallel to the floor and perpendicular to the vertical backboard.

6. Ask the participant to take a deep breath and hold.

7. Bring the head plate down onto the head, ensuring that it rests on the crown of the head.

8. Make sure the headpiece is set at right angle and touches the wall.

9. Read the measurement. Eyes should be in level with counter / pointer (this may require a stool/small ladder).

10. Record the measurement to the nearest centimeter in the PMR.(Example: 161.5cm → 162cm, 160.2cm → 160cm)

    Note: The participant should be able to step off the stadiometer without ducking their head.

4.2.2 Measurement of height using the stand-alone stadiometer

Preparation of the stadiometer

- Ensure that the stadiometer is checked and validated.
- Place on a flat surface
- Place in a well illuminated place.

Method

Adhere to the principles mentioned above.

NOTE :
If a participant is taller than the health care staff, it can be difficult to measure at eye level. Use a stool so that you can measure the person accurately.

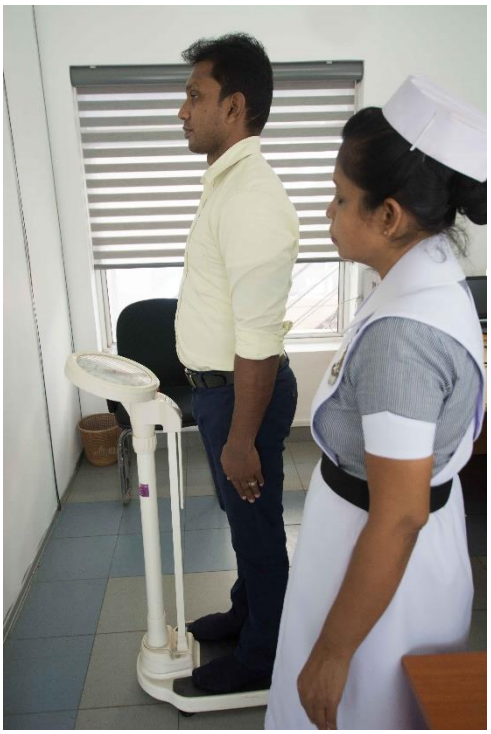
4.3 Weight

1. Check whether the weighing scale properly works and calibrate the weighing scale once a month.

2. Make sure to prepare an extra battery or arrange an analogue weighing scale in case the battery runs down during the screening.

3. Be sure that the scale is placed on a hard, leveled floor surface without carpet or rugs of any kind.

Measurement of Weight



1. Stand in the side of the scale.

2. Ask the participant to take off all the heavy outer clothing (belts), their shoes and remove all items from their pockets.

3. Check whether the arms of the scale rests on "00".

4. Ask the participant to step on the scale and stand in the center. Weight should be evenly distributed on each feet with feet slightly apart, arms relaxed and hanging down loosely at the sides of the body.

5. Read the measurement

6. Round off the measured weight to the nearest whole number[8].
   (eg. 45.3kg→ 45kg, 67.8kg→68kg)

7. Write the rounded weight in kilograms on their personal medical record.

8. Ask the participant to step off the scale.

[8] Weight in the BMI chart is given as a whole number.

4.4 BMI

Checking of BMI

1. This can be done using the BMI chart, BMI wheel or calculated using the below mentioned equation.

$$\boldsymbol{BMI = \frac{Weight(kg)}{Height(m) \times Height(m)}}$$

Example:

Weight= 42 kg;
Height = 142 cm
BMI= $\frac{42(kg)}{1.42(m) \times 1.42(m)}$ =20.8 kg/m^2

2. When using the BMI chart, get the height and weight of each participant and get the BMI value in the cell where the height and weight cross.

3. Write the BMI in the PMR.

BMI interpretation

- BMI<18.5 (Undernourished)
- BMI 18.5-22.9 (Desirable)
- BMI 23.0-24.9 (At risk of becoming overweight)
- BMI 25.0-29.9 (Overweight)
- BMI ≥ 30.0 (Obese)

4.5 Waist circumference

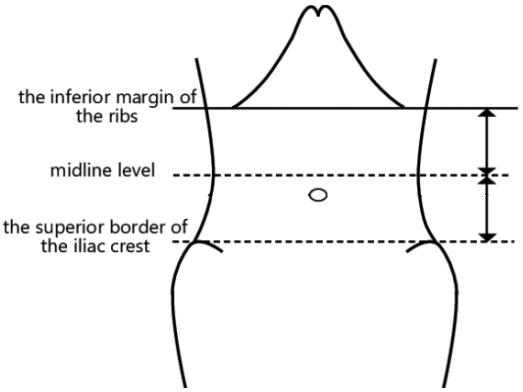
Measurement of waist circumference

1. Explain the participant regarding the measurement of waist circumference.

2. Stand to the side of the participant, locate and mark the inferior margin of the lowest rib and the top of the hip bone/iliac crest with a fine pen.

3. Find the mid-point (at the midline level marked in the figure) and mark the point.

4. Apply the tension tape over the marked mid-point and ask the participant to wrap it around themselves.



5. Make sure the tape is horizontal in the back and the front of the participant.

6. Ask the participant to stand straight with relaxed abdomen and arms relaxed and kept at sides. Advise the participant to keep the feet together.

7. Take two measurements to the nearest 0.1 cm at the time the participant breathes out gently.

8. Finally average the two measurements and take as the waist circumference.

Ideal waist circumference
Males- 90 cm or less
Females- 80cm or less

4.6 Waist to height ratio

1. Use the following formula to calculate the ratio.

$$\boldsymbol{Waist: Height\ ratio} = \frac{\boldsymbol{Waist\ (cm)}}{\boldsymbol{Height(cm)}}$$

2. Example: Waist=72cm, Height=160cm =72/160 = 0.45

3. Write the waist: height ratio in the PMR.

Ideal waist: height ratio-less than 0.5

4.7 Blood Pressure

Make sure to use a properly maintained, calibrated and validated device.

1. Check whether the blood pressure apparatus works properly.
2. If it's digital, check the battery.

NOTE :
Ensure that cellular phones, PCs or other electrical devices are not placed near the Blood pressure apparatus as measurements might be affected by strong magnetic fields.

4.7.1 Measurement of Blood Pressure using digital BP apparatus

1. Ask the participant to sit quietly and rest for 5 mins with their legs uncrossed.
2. Place the right arm of the participant on the table with the palm facing upward.
3. Remove or roll up clothing on the arm.
4. Select the appropriate cuff size for the participant using the following table.

Arm Circumference(cms)	Cuff Size
17-22	Small(S)
22-32	Medium(M)
>32	Large (L)

5. Position the cuff above the elbow aligning the mark 'ART' on the cuff with the brachial artery.
6. Wrap the cuff snugly onto the arm and securely fasten with the Velcro.(Lower edge of the cuff should be placed 1.5 to 2.5 cm above the inner side of the elbow joint. Make sure that there's a space of about two fingers between the cuff and the arm.)

7. Keep the level of the cuff at the same level as the heart during the measurement. (Place the arm of the participant on the table so that the arm cuff and the heart are at the same level. If the participant needs to raise their arm, put a cushion under their arm and keep the arm at an appropriate height.)

8. Press the "start" button.

9. Wait until the value of blood pressure appears on the screen.

10. Deflate the cuff fully and leave the arm to rest for 1-2 minutes (between each reading).

11. Two BP measurements should be recorded and if there is a substantial difference between the two readings, a third BP measurement should be taken. Take the mean of the second and third reading as the clinic blood pressure.

12. Inform the participant the blood pressure readings only after the whole process is completed.

4.7.2 Procedure for BP apparatus

1. Apply the cuff (as detailed above) to the right hand.

2. Palpate the pulse either at the brachial or radial artery. Take the pulse count for one full minute.

3. Pump up pressure and inflate the cuff until unable to feel pulse.

4. Continue to inflate cuff 30 mmHg beyond this point.

5. Gently place the stethoscope on the right antecubital fossa below the cuff.

6. Listen for pulse sound while deflating the cuff slowly.

7. Record the systolic blood pressure (SBP) when a pulse is first audible. Record the diastolic blood pressure (DBP) when the pulse sound disappears. Measurements should be given to the nearest 2 mmHg.

8. Deflate the cuff fully and leave the arm to rest for 1-3 minutes (between each reading).

9. Two BP measurements should be recorded and if there is a substantial difference between the two readings, a third BP measurement should be taken. Take the mean of the second and third reading as the clinic blood pressure.

10. Inform the participant the blood pressure readings only after the whole process is completed.

Note: Ideally to estimate the individual's level of blood pressure, an average of ≥ 2 readings obtained on ≥ 2 occasions to be taken.

BP Interpretation

BP category	SBP	DBP
Optimal	< 120	< 80
Normal	120 - 129	80 - 84
High normal	130 - 139 and / or	85 - 89
Grade 1 hypertension (mild)	140 - 159 and / or	90 - 99
Grade 2 hypertension	160 - 179 and / or	100 - 109

Important:
Errors in the measurement of blood pressure can occur for several reasons:

- Errors with regard to
  - Defective equipment
  - Using an inappropriate-sized cuff
  - Inappropriate BP measurement technique
  - When the cuff and heart are not at the same level

Digital BP apparatus

- The measurement of each digital BP apparatus may vary. When the difference is more than 10 mmHg, the device should be brought to the notice of MO-NCD.

- It is advisable to check the digital BP monitor against an aneroid BP apparatus or another device at regular interval (at least once a month).

- It is important to calibrate a device according to the manufacturer's instructions.

- It is generally recommended to have each device inspected every two years to maintain proper function and accuracy. Contact MO/NCD or RDHS when requesting service from the authorized dealer.

4.8 Visual Acuity (VA)

Visual acuity is a measure of the resolution power of the eye. In very simple terms this is the power to recognize a shape as different from another.

Eg: Ability to differentiate number six from number eight. If the visual acuity is good, this can be done. But if the acuity is poor, six may be identified as eight or zero or even as a line or dot.

Preparation

1. Place the Snellen chart at eye level with seating/standing arrangement for the client with six metres distance between each other. (Same can be done by allowing to read the mirror image of the Snellen chart through a mirror placed in front of the client in three metres distance).

2. Ensure good natural light or illumination on the chart.

3. Wash and dry the occlude and pinhole. (If an occlude is not available, ask the participant to wash his/her hands as they will use their hand to cover the eye).

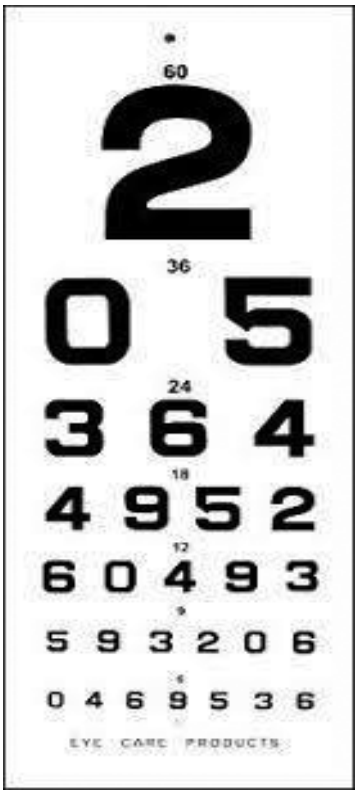
Procedure

1. Position the participant, sitting or standing.

2. Ask the participant to wear spectacles if he/she uses normally for distant vision. Cover one eye with his/her hand (or with a plain occlude). Test each eye separately – the 'good' eye first.

3. Instruct participant to read from the top row to bottom along the chart.

4. The smallest number line he/she can read (the VA) will be expressed as a fraction, e.g. 6/18 or 6/24 (usually written on the chart). The upper number refers to the distance the chart is from the participant (six metres) and the lower number is the distance in metres at which a person with normal vision should be able to see the chart.



Documentation

1. Record the VA for each eye, stating whether it is with or without correction (spectacles), in the participant's record.

Example:

Right VA=6/18 with correction Left VA=6/24 with correction

2. If 6/6 (normal vision) is not achieved, test one eye at a time with a pinhole occlude (plus any current spectacles) and repeat the above procedure at 6 metres only. The use of the pinhole enables assessment of central vision.

3. If the vision improves, it indicates that the visual impairment is due to a refractive error, which is correctable with spectacles or a new prescription for spectacles.

4. Repeat the whole procedure for the other eye.

5. Summarize the VA of both eyes in the documentation, for example: L 6/18 with correction (PH 6/9)

Points to Remember:

- Test each eye separately
- Use distance correction if normally worn by the client
- Use an occlude or cupped hand
- Use pinhole if patient does not reach 6/6 line

4.9 Oral Examination for Oral Potentially Malignant Disorders (OPMDs) and suspected Oral Cancers

Following procedure is recommended to conduct oral examination for Oral Potentially Malignant Disorders (OPMDs) and suspected Oral Cancers by Medical Officers (participant is seated on a normal chair and using a normal light source).

Oral examination is a clinical procedure requiring proper facilities and should be conducted by a trained examiner who is familiar with oral structures. Ideally, it should be conducted by a Dental Surgeon when the participant is seated comfortably on a dental chair with a focused light source. Therefore, if available, it is always preferable to use dental clinic facilities for oral examination.

4.9.1 Aim of oral examination

OPMDs and suspected Oral Cancers can appear anywhere in the mouth with different clinical presentations. Therefore, the aim of the oral examination is to detect these abnormal signs and symptoms by systematic visual inspection and palpation of the mouth.

It should consist of two parts; extra-oral examination and intra-oral examination.

The following are common signs and symptoms of OPMDs and suspected Oral Cancers. Existing risk habits and medical history of the person will also be useful to identify these abnormal signs and symptoms.

- White/red lesions
- Ulcers, erosions, fissuring
- Raised patches
- Soft tissue/hard tissue growths and lumps
- Pigmentations
- Pale and blanching appearance in the oral mucosa
- Presence of fibrous bands in the oral mucosa
- Lymph node enlargements
- Restricted mouth opening
- Dysphagia
- Burning sensation of the mouth

- It is important to note that oral manifestations of systemic diseases, drug reactions and most benign lesions are also present with similar signs and symptoms. Therefore, in case of any indecision, please refer the person to the nearest Dental Surgeon for further management.
- Moreover, if a person is having risk habits of using tobacco and areca-nut (e.g. betel chewing), intra-oral examination is extremely difficult due to staining of oral mucosa and most lesions will be missed. Therefore, in such situations, it is better to refer the person to a Dental Surgeon for proper oral examination.

4.9.2 Preparation and procedure: steps

1. Ask the participant to remove any dentures and wash the mouth thoroughly to remove food debris
2. Wash your hands
3. Wear gloves and a mask
4. Ask the participant to sit on the chair and focus the light to participant's mouth
5. Stand in front of the participant
6. Start with extra-oral examination
7. Proceed to intra-oral examination

Refer Annex 01 for the method of oral examination.
In addition to oral examination, persons complaining of symptoms such as burning sensation, dysphagia and difficulty in opening the mouth should be referred appropriately.

4.10 Breast examination

Clinical breast examination is used as a method of early detection of breast lesions as well as a component in triple assessment in diagnosing breast cancer. A detailed history and thorough clinical examination provide important information on which, further investigations would be based.

4.10.1 Clinical history

- Relevant history includes the details of breast symptoms

Breast Lump	• Site – constant or changing
	• Duration – when and how it was noticed
	• Any new changes since first notice
	• Relationship to menstrual cycles or exogenous hormones
	• Associated symptoms
Breast Pain	• Site – constant or changing/ unilateral or bilateral
	• Cyclical or noncyclical
	• Duration – how long and characteristics of pain
	• Any recent change such as intensity, frequency, site of pain
	• Relationship to menstrual cycles or exogenous hormones
	• Associated symptoms
Nipple discharge or nipple changes	• Duration – when and how first noted (Spontaneous or not)
	• Any changes since first notice
	• Bilateral or unilateral
	• From single duct or multi duct

- Previous history of any pathological condition in either breast.
- Previous breast investigations:

– Most recent imaging if available (screening or diagnostic)- date and results – Biopsy results – FNAC/Histology/Lumpectomy

- Risk factors – history should be taken on the risk factors

4.10.2 Steps of clinical breast examination (CBE)

CBE should be done in a covered room with good light. A female chaperone should be there if the examiner is a male. Before starting the examination, it is necessary to explain the procedure to the participant.

Inspection

The breast should be inspected in each of the following positions.

1. Arms relaxed by the sides
2. Arms raised over her head
3. Hands placed on the hips and pushing inward (contraction of the Pectoralis Major muscle)

The breasts should be inspected from the front and from the sides.

Pay particular attention to:

- Breast size, contour, shape, symmetry
- Skin changes such as erythema, dimpling, tethering or puckering, Peau d' orange, eczematous skin changes, visible lumps

Nipple – position, height, any inversion, retraction, erythema, eczema, nodules ulceration and discharge

Step 1 – Arms by the side

Step 2 – Arms over the head

Step 3 – Hands on hip and Leaning forward

Palpation

The ability to identify breast cancers by palpation is influenced by;

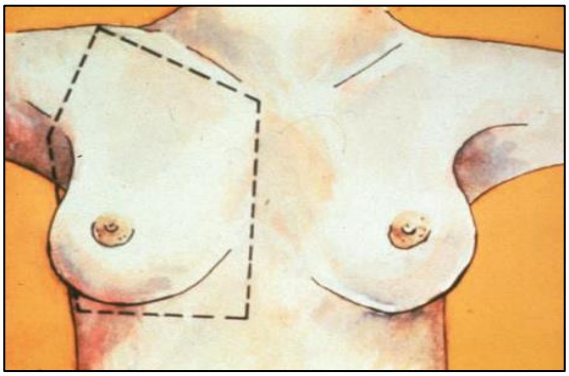
- the characteristics of the tumour
- the surrounding breast tissue
- the position of the lesion in the breast
- proper positioning of the client
- thoroughness of the search
- the area covered
- use of a consistent pattern of search

During the process of palpation, the participant should feel comfortable and the examiner needs to ask about it.

Step 4 – Positioning the female for palpation
For the palpation of the breasts, participant should be placed in the supine position. Place both arms under head, which will facilitate palpation of outer quadrant of a large breast. Use both hands to stabilize breast position.

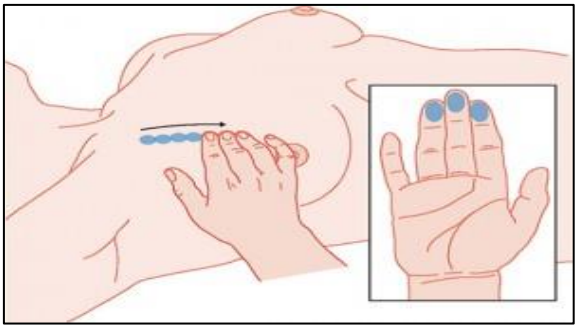
Step 5 – Identifying the perimeter of the breast.

Perimeter of breast should be noted during clinical breast examination.
Anatomically, breast tissue extends superiorly from the second rib or clavicle, medially to the lateral border of the sternum, inferiorly to the sixth rib and laterally to the Latissimus Dorsi muscle.



Step 6 – Palpation technique

The examiner should use the distal phalanges of middle three fingers to palpate the breast. The entire breast should be palpated using overlapping dime – sized circles. Use three different levels of pressure (superficial, intermediate and deep) to palpate each point to palpate different layers of the breast.



Start with applying 'minimal' pressure as indicated (to feel the area just beneath the skin) and then gradually increase the pressure (to feel the tissue deeper within)

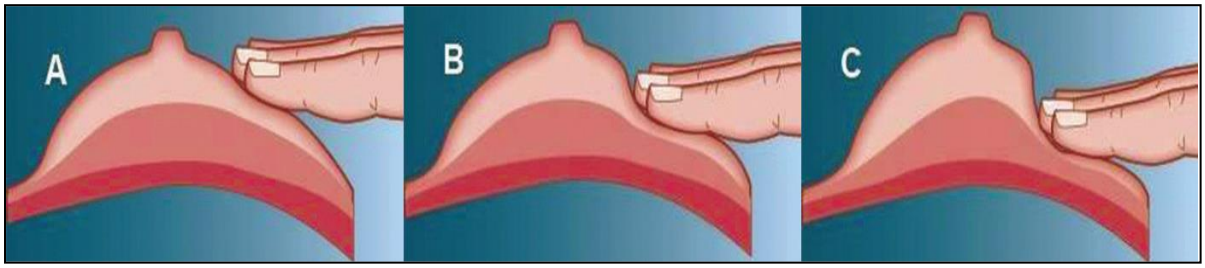


Figure 4: Depths of palpation

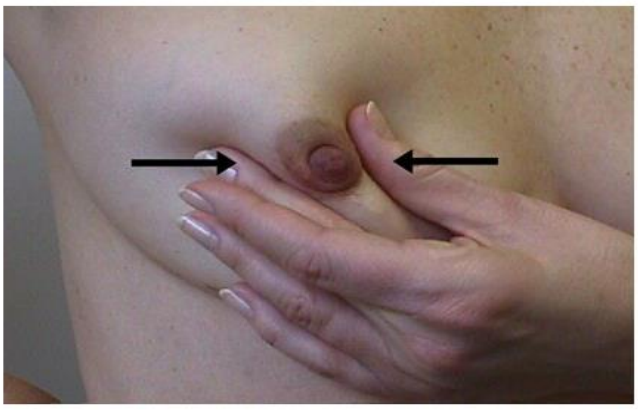
There are three typical patterns used to palpate the breast:

- Circular technique
- Radial spoke technique
- Vertical strip technique

Figure 5: Patterns used to palpate the breast

Note that the circular method does not always cover the entire perimeter of the breast unless a conscious effort is made to do so.

The woman should be asked to squeeze areolar region of the nipple to see whether there is any nipple discharge. Nipple discharge that occurs only with nipple or breast stimulation is a normal physiological function.



Step 7 - Palpation of Regional Lymph Nodes

The regional lymph nodes need to be examined as shown in the figure while the participant is in the sitting position. These lymph nodes include the supraclavicular, infra-clavicular and axillary nodes.

Palpation of axillary lymph nodes

Palpation of infra and supra clavicular lymph nodes

Figure 6: Palpation of regional lymph nodes

If any of the above-mentioned change/s detected during clinical breast examination, it should be informed to the participant in a way that she will not be panicked and should ensure her to attend for further care.

Biochemical Investigations

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5.1 Material and equipment required

Type	Item
Equipment / Consumables[9]	Validated devices(glucometer ,cholesterol meter)
	Strips with the pre-check strip
	Lancets (one lancet for one participant)
	Cotton swabs
	Sharps disposal box (sharps bin)
	Extra batteries for devices
	Disposable gloves

NOTE :

To reduce the chances of infection:

- ALWAYS use a new and sterile lancet. A lancet is intended for single use only.
- ALWAYS use a new test strip. A test strip is intended for single use only.
- Discard all the used lancets properly in accordance with local laws.

5.2 Preparation

- Follow the instructions given in the instruction manual provided for the glucometer and the cholesterol meter when using the device.
- Check the accuracy of the device by performing a control solution test. Follow the instructions given in the instruction manual.

[9] If facilities are available to check serum creatinine in the health care institution, follow the standard procedure for blood sample collection.

When to perform a control solution test,

- When you use a new glucometer/cholesterol meter.
- At least once a week to routinely check the meter and the test strips
- When you use a new batch of test strips.
- When you suspect that the meter or test strips are not working properly
- When your blood glucose test results are not consistent with how you feel, or if you think the results are not accurate
- When you dropped or think that you may have damaged the meter

- If the result falls in the specified range that is printed on the test strip bottle, it means that the glucometer/cholesterol meter works properly.
- If a result falls outside the specified range, repeat the same procedure three times. If the result till falls outside, strips and /or glucometer should not be used to test until the error is fixed.

Results falling outside the specified range may be caused by:

- Errors in performing the test
- Expired or contaminated control solution
- Expired or contaminated test strips
- Wrong coding of the meter
- Malfunctioning of the device

5.3 Participant preparation required for testing

Table 2 : Fasting state for the tests

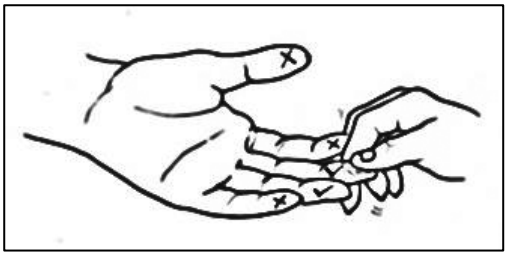
Test	Fasting state
Random blood glucose test	Fasting not necessary
Fasting blood glucose test	Need 8-10 hrs of fasting.*
Total cholesterol test	Fasting not necessary

*Allowed to drink water only

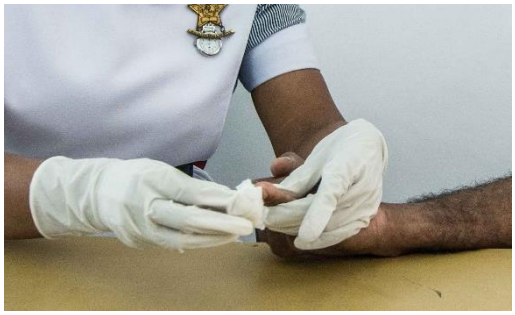
5.4 Procedure for total cholesterol & blood glucose measurement

1. Ask the participant to sit on a chair comfortably.
2. Confirm the participant's state of fasting for the test according to the Table 2.
3. Insert the respective strip into the glucometer and cholesterol meter. If there is a drop mark on the screen, the device is ready to use.

4. Wash hands and put on a pair of gloves.
5. Select a place to be punctured. Choose the side of a finger, but not the tip. Also avoid the index finger, thumb and little finger.

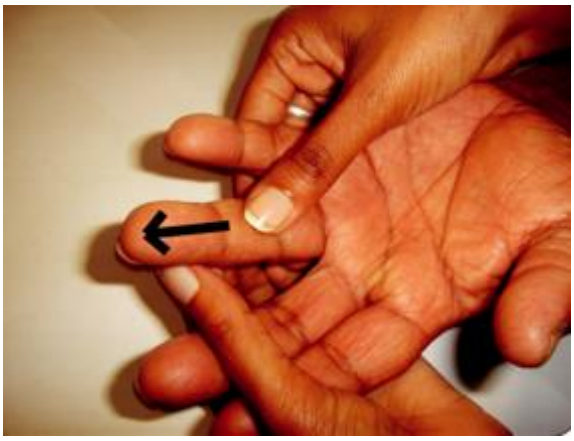


6. Wipe the selected place with an alcohol swab (participant can be instructed to wash his/her hands with soap and water if facilities are available prior to step 1)
7. Puncture the selected place.
8. Wipe off the first drop of blood[10]. The first drop of blood should not be used when the participant has not washed their hands with soap and water just before the measurement.



[10] Before doing the glucose test, it is recommended that the participants wash their hands with soap and water and dry them. The first drop of blood can then be used. However if washing hands is not possible, and the persons hands are not visibly soiled or exposed to a sugar-containing product, it is acceptable to use the second drop of blood after wiping away the first drop in order to avoid contamination with any impure substances (American Diabetes Association, the Diabetes UK Guidelines, Netherlands Study)

9. Do not squeeze the finger. In case it is necessary, stroke his/her hand and finger gently towards the puncture site. Firm squeezing or milking of the finger should be avoided. External high pressure may lead to unreliable readings.



10. Put the next drop of blood on the tip of the cholesterol strip and then to the glucometer strip. Wait until the strips absorb blood and the meters beep.

11. Place the devices on the table until it displays the measurement on the screen.

12. Provide the participant with cotton wool. Advise them to press on the puncture site so that bleeding stops.

13. Dispose the used lancet into a sharps disposal box.

14. Read the measurement, inform the value to the participant and record it on the participant's personal medical record.

NOTE:
To obtain an accurate result, make sure the confirmation window of the test strip is completely filled with the blood sample.

Assessment of 10 year cardiovascular risk and strategy for treatment

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6.1 WHO cardiovascular disease risk assessment

Risk based assessment involves identification of those at high risk of a CVD event due to a combination of multiple risk factors. The decision to initiate preventive interventions or treatment intensity are guided by the level of the participant's total risk. CVD risk stratification consists of the grouping and management of people according to their chance of having a cardiovascular event (ischemic heart disease and cerebrovascular disease).

6.2 What is 10-year CVD risk?

The level of risk of a fatal or non-fatal major cardiovascular events, expressed as a probability of developing it in 10 years.

It is determined with simple risk-scoring tools and calculated as the combined effect of multiple risk factors, including age, sex, smoking status, blood pressure and diabetes status, and total cholesterol or Body Mass Index (BMI).

6.3 WHO CVD risk chart 2019

WHO updated and validated the 2007 CVD risk prediction charts in 2019 for 21 global regions.
The updated WHO CVD risk charts are presented as two charts;

1. Laboratory-based charts (Used for treatment decisions)
2. Non-laboratory-based charts (Used for decisions to refer to a higher level)

On whom the 2019 risk preduction charts can be used:
Age ≥ 35 years and ≤ 74 years

6.4 Materials Required

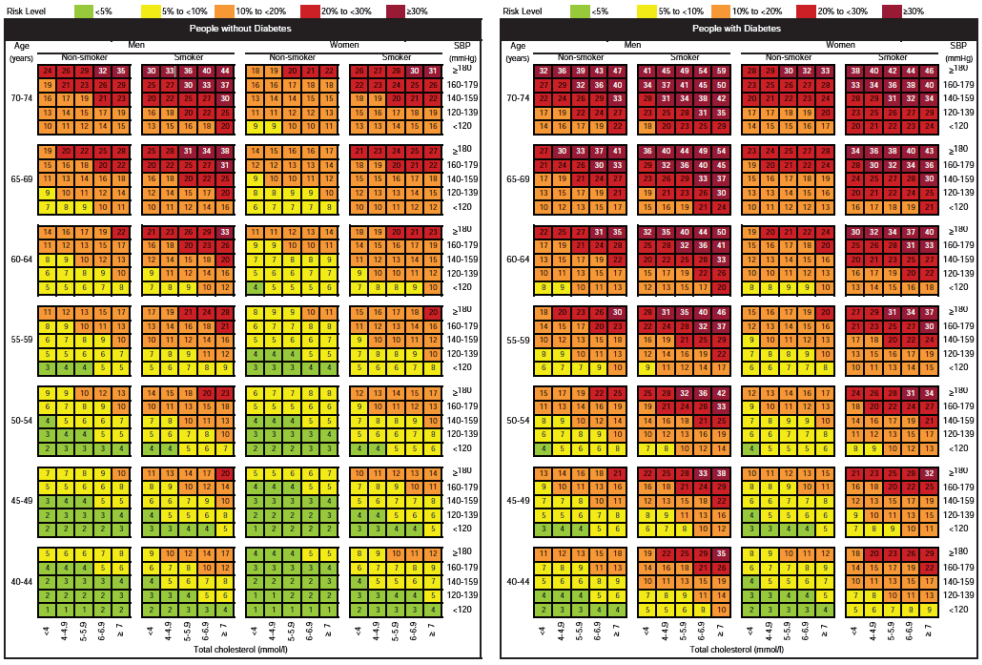
Type	Item
Documents	WHO Risk Prediction Chart (Country Office for SEAR B) 2019
	The guideline for Primary Health Care Providers for Cardiovascular Risk Management

6.5 Procedure for accessing CVD Risk

6.5.1 How to use Laboratory based risk charts

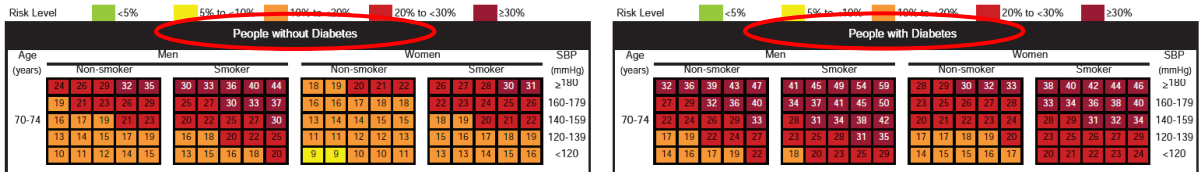
Following parameters are needed when assessing CVD risk using the laboratory based charts

1. Age
2. Sex
3. Smoking status (Smoker or non-smoker)
4. Presence or absence of diabetes (Fasting plasma glucose ≥ 7.0 mmol/L (126 mg/dl) or 2 hour plasma glucose ≥ 11.1 mmol/L (200 mg/dl) or HbA1c ≥ 6.5% is considered as presence of diabetes).
5. Systolic blood pressure
6. Total blood cholesterol



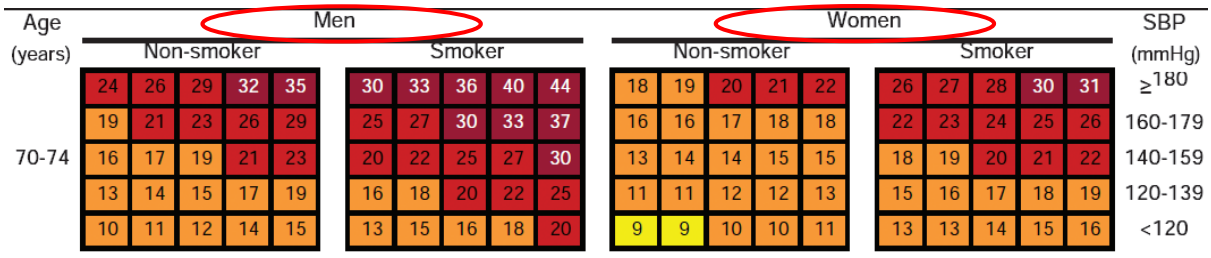
Step 1

- Select the appropriate section depending on fasting blood glucose level (FBG) or random glucose level (RBG). If the fasting plasma glucose level is ≥ 7.0 mmol/L (126 mg/dl) or 2 hour plasma glucose level is ≥ 11.1 mmol/L (200 mg/dl), select the section with "People with diabetes". If not, select the section "People without Diabetes".



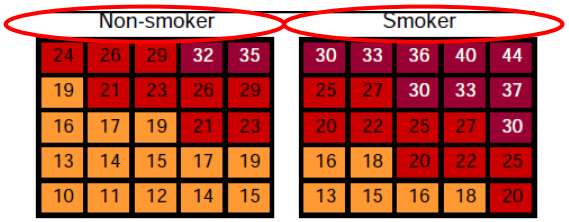
Step 2

- Select the appropriate section according to the gender.



Step 3

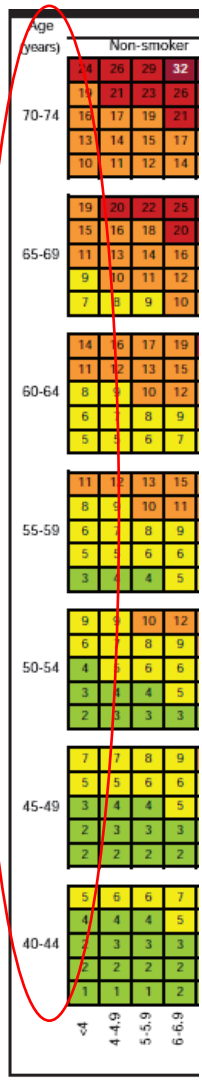
- Select either "Smoker" or "Non-smoker".
- Ask the person whether they smoke or have smoked within the last one year from assessment
- Smoking includes cigarettes, beedi, cigar, pipes etc. If they answer "yes", consider the person as a smoker.



NOTE:
Tobacco includes betel chewing as well, but when calculating potential risk, consider only smoking of cigarettes, beedi and pipes.

Step 4

- Select the box/section for the appropriate age group. E.g.
  - If the participant is 53, select 50-54 section.
  - If he/she is 67, select 65-69 section.



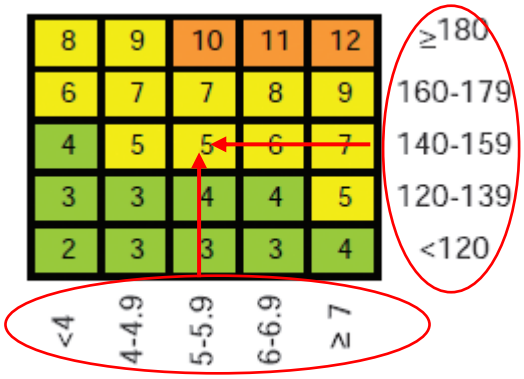
Step 5

- The total cholesterol level is indicated in the WHO risk prediction chart in mmol/l. Therefore, convert the participant's cholesterol level in mg/dl to mmol/l using the following table.

mmol/l	mg/dl
< 4	154
4 – 4.9	155 - 192
5 – 5.9	193 - 231
6 – 6.9	232 - 269
≥ 7	270

Step 6

- Within the selected box (after following step 1-4), find the cell where the individual's systolic blood pressure and total blood cholesterol intersects.



- The colour of the cell represents the CVD risk (the 10-year risk of a fatal or non-fatal CVD event) percentage category according to the following table. The value within the cell indicate the risk percentage.

	Green	<5%
	Yellow	5% to <10%
	Orange	10% to <20%
	Red	20% to <30%
	Deep Red	>30%

- Record the CVD risk percentage in the PMR.
- Counsel the participant according to risk level. Refer for treatments if necessary.

Example of CVD Risk Assessment using laboratory based charts

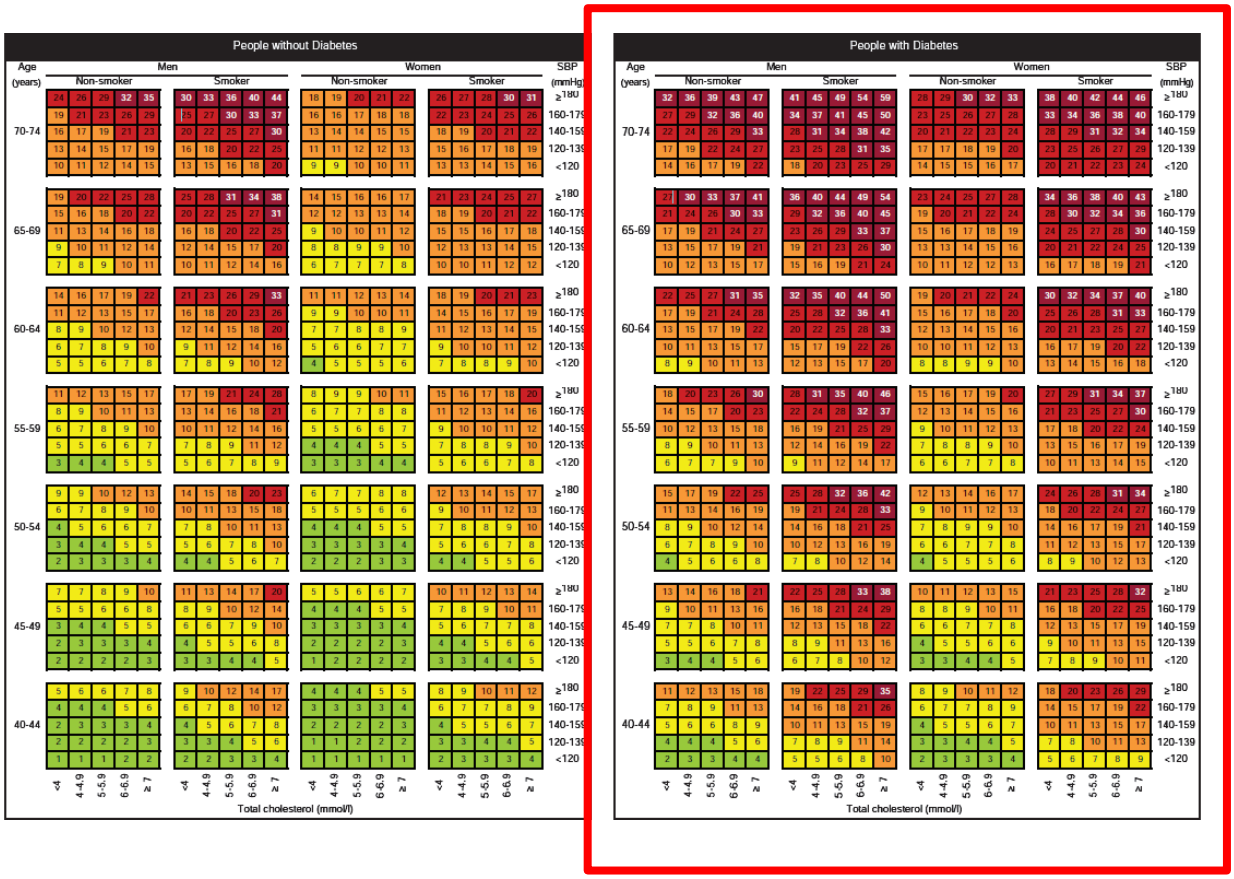
Screening Results of Mr Anura

- Male
- 56 years
- Smoking: 3 cigarettes a day
- Blood Pressure: 154/90 mmHg
- Fasting Blood Glucose(FBG): 130 mg/dl
- Total Cholesterol: 290 mg/dl

Step 1

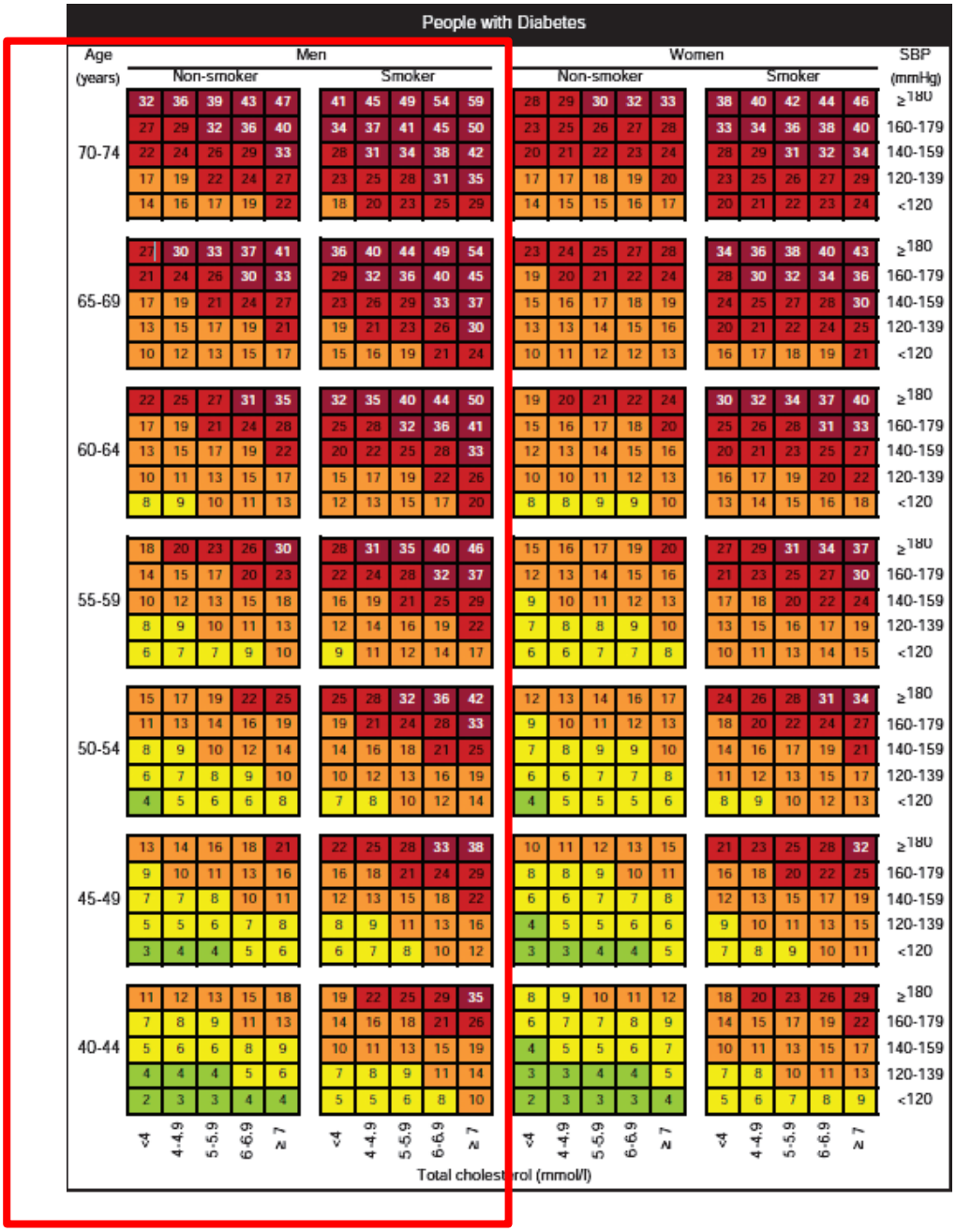
Select the appropriate section depending on fasting blood glucose level.

His FBG level is 130 mg/dl which is more than 126 mg/dl. Therefore, select the section under "People with diabetes".



Step 2

- Select the sex.
- He is a male. So select the left side (the left two columns) of the table for "People with Diabetes".

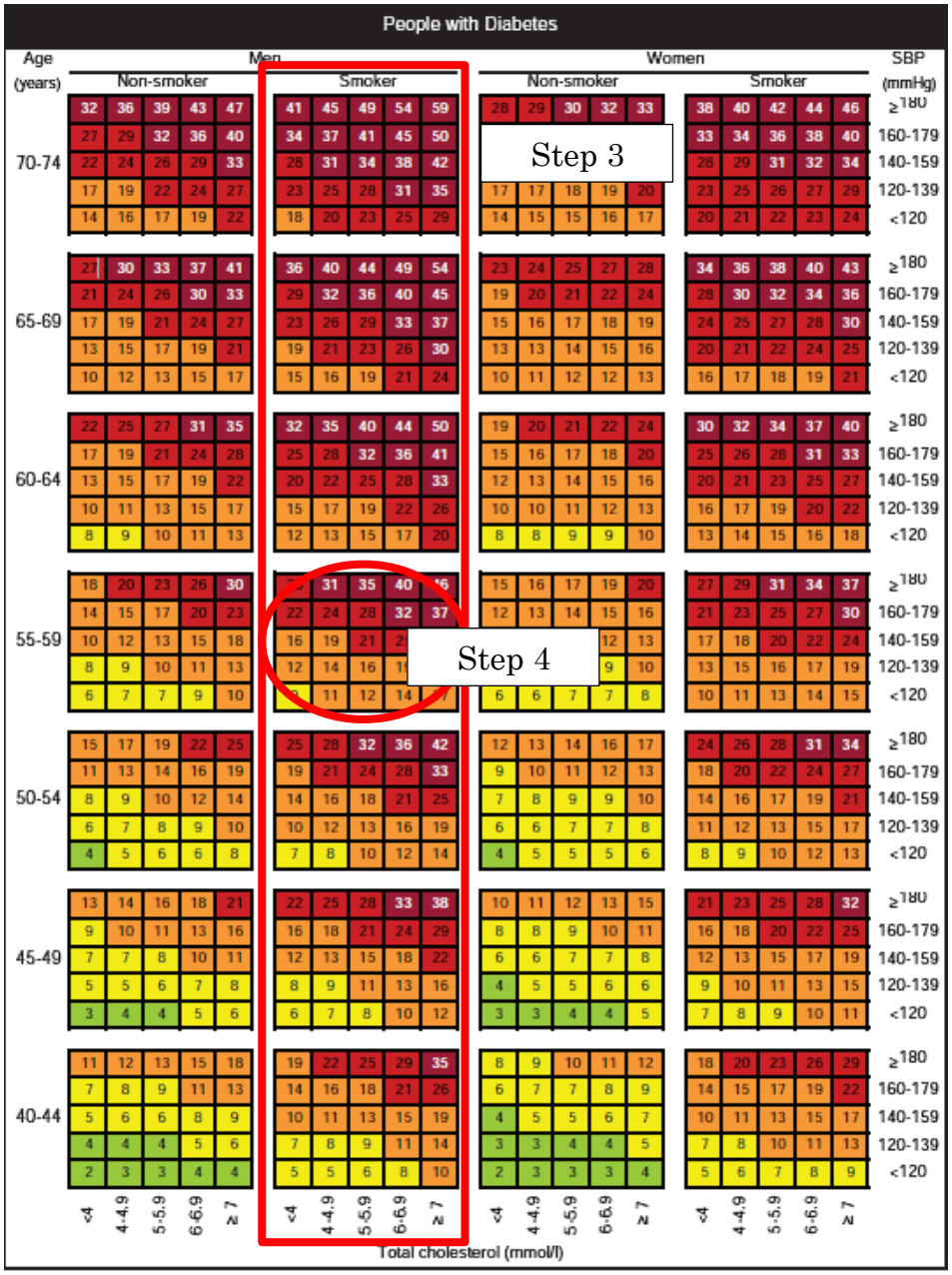


Step 3

- Select either smoker or non-smoker section under "Men".
- As he is a smoker, select the "Smoker" section.

Step 4

- Select the appropriate age group.
- He is 56 years old. So select the box for those aged between 55 and 59.



Step 5

- His systolic blood pressure is 154 mmHg. So, select the row 140-159 under systolic blood pressure/SBP.
- Use the total cholesterol conversion chart (mmol/l to mg/dl) available with the CVD risk chart. So, his total cholesterol value is ≥7 mmol/l (290 mg/dl).
- Get the cell in the intersection of SBP 140-159 mmHg row and total cholesterol ≥7 mmol/l column.

28	31	35	40	46	≥180
22	24	28	32	37	160-179
16	19	21	25	29	140-159
12	14	16	19	22	120-139
9	11	12	14	17	<120
<4	4-4.9	5-5.9	6-6.9	≥7	

Step 6

- Mr. Anura's CVD risk is 29%.
- Record the value in the PMR and counsel the participant on further management.

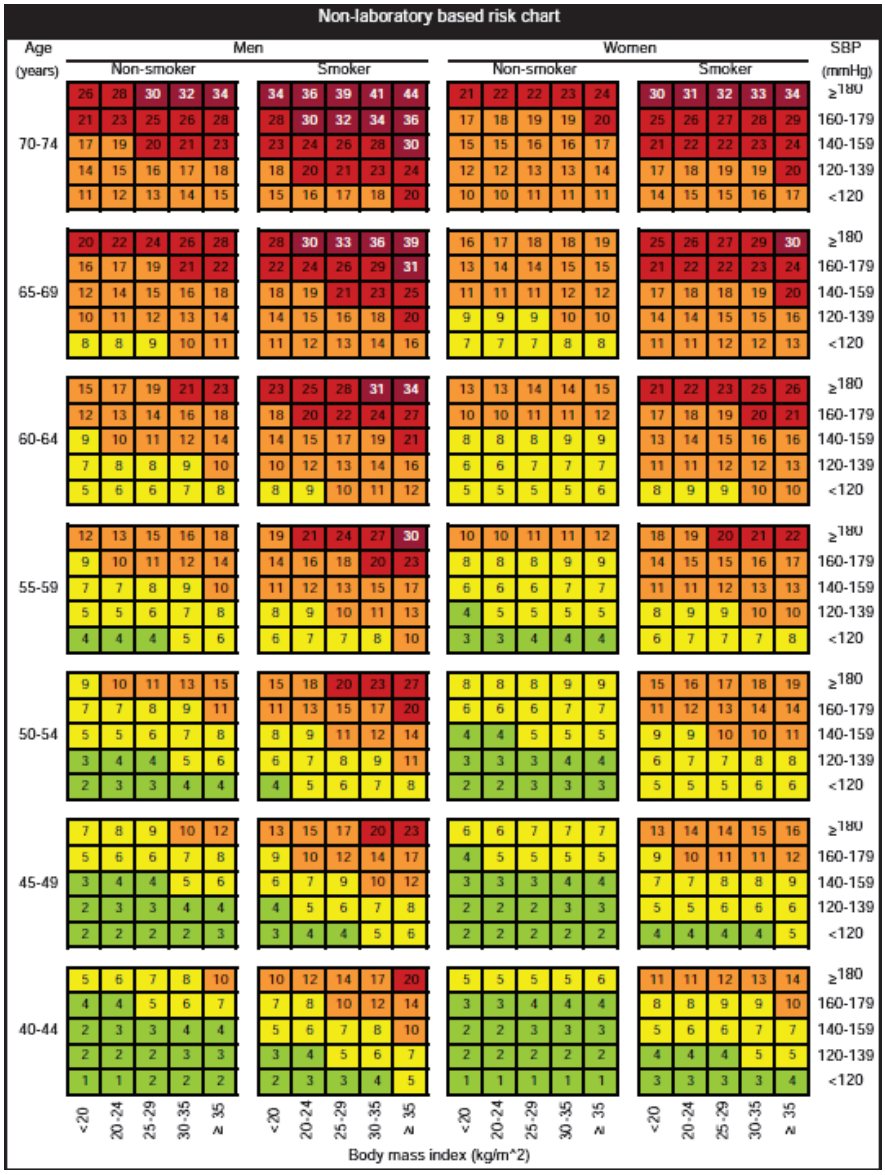
His ten year CVD risk is 29 %

Note: The CVD risk calculated using the above chart can be used to take decisions on management as well as referrals.

6.5.2 How to use the non-laboratory-based charts

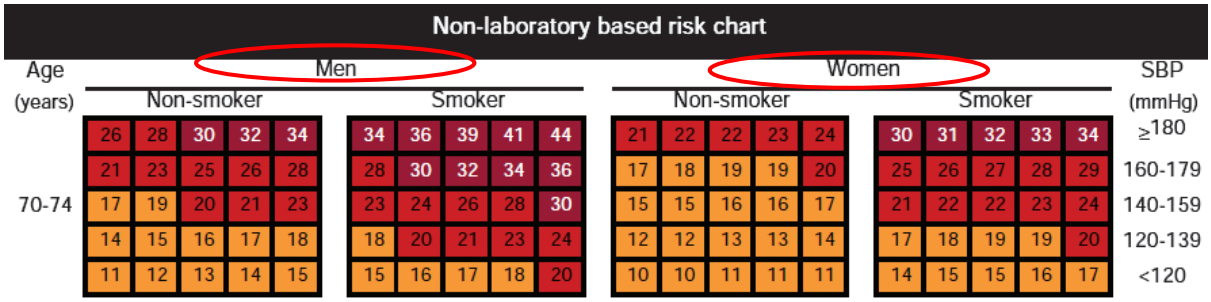
Following parameters are needed when assessing CVD risk using the laboratory based charts

1. Age
2. Sex
3. Smoking status (smoker or non-smoker)
4. Systolic blood pressure
5. Body Mass Index (BMI)



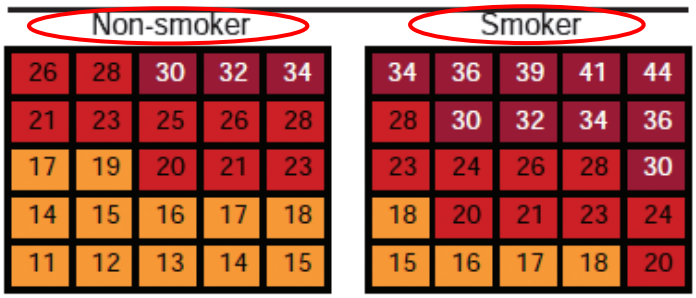
Step 1

- Select the appropriate section according to the gender.



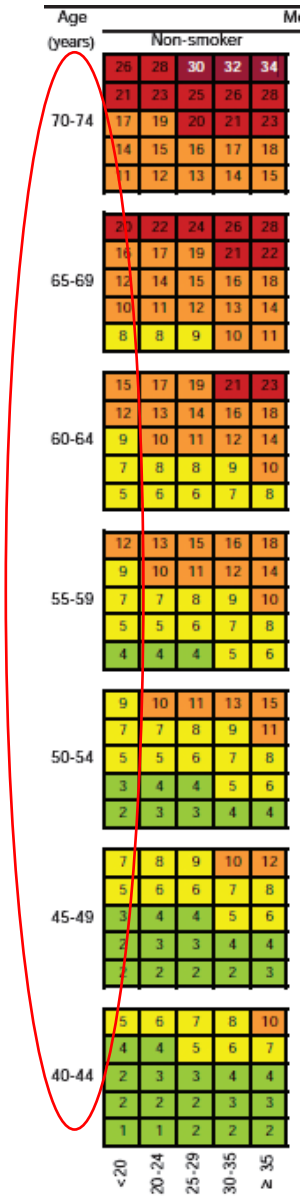
Step 2

- Select either smoker or non-smoker.
  (Refer previous section for details on how to determine the smoking status of the participant)



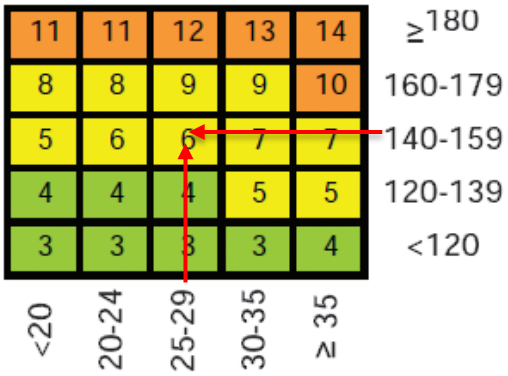
Step 3

- Select the box/section for the appropriate age group.



Step 4

- Within the selected box (after following step 1-3), find the cell where the individual's systolic blood pressure (row) and BMI value (column) intersects.



- The colour of the cell represents the CVD risk (the 10-year risk of a fatal or non-fatal CVD event) percentage category and the value in the cell indicates the risk percentage.
- Record the CVD risk percentage in the PMR.
- Counsel the participant according to risk level. Refer for treatments if necessary.

6.6 Treatment strategy

1. Refer "**The guideline for Primary Health Care Providers for Cardiovascular Risk Management**".
2. Advise all participants to make their lifestyle healthier.

Lifestyle Modification

Four key risk factors that are associated with chronic NCDs; smoking, alcohol, unhealthy diet and physical inactivity. This chapter will provide with the necessary scientific information on risk factors for non-communicable diseases.

The chapter focuses on 10 areas that are considered important for life style modification

1. Stop smoking
2. Stop alcohol use
3. Maintain optimum body mass index
4. Engage in regular physical activity
5. Take five servings of fruits and vegetables per day
6. Restrict added salt consumption to one teaspoon per person per day
7. Restrict sugar consumption
8. Minimize consumption of foods containing trans fatty acids.
9. Engage in activities that will promote mental health
10. Know your health status

7.1 Stop smoking

Smoking is found to be harmful, either it is active or passive. This includes the use of tobacco smoking as well as smokeless tobacco products such as betel quid, babul, sarawita etc.

Why should we quit or abstain from smoking?
Tobacco smoking contains 7000 odd harmful chemicals including carbon monoxide, nicotine, tar and other carcinogens.
People who use tobacco are more likely to have heart attacks, high blood pressure, blood clots, strokes, hemorrhages, aneurysms and other disorders of the cardiovascular system.

- There is a strong dose related relationship between smoking, heart attacks, strokes and lung cancer.

- Cigarette smoking is identified as a major cause of stroke by increasing clotting factors in the blood, decreasing HDL cholesterol levels, increasing triglyceride levels and damaging the lining of blood vessels. The risk for stroke increases as the number of cigarettes smoked increases.

- As soon as a person quits smoking, his/her body begins to repair the damage caused by tobacco use. Within a few days or weeks, exercise endurance and cardiovascular capacity improve and HDL (protective, "good" cholesterol) increases. Among people who quit smoking, the risk of death from coronary heart disease is 50 % lower than that of people who continue to smoke after one year of abstinence.

Tips & facts

- Encourage all non-smokers not to start smoking.
- Strongly advice all smokers to stop smoking and support them in their effort.
- Individuals who use other forms should be advised to quit
- Currently there is legislation banning smoking in all enclosed public places.
- For further details, please refer to "Brief Interventions for tobacco cessation in Primary healthcare" published by the Directorate of NCD.

7.2 Stop Alcohol use

- People should not be advised to start taking alcohol for health reasons.

Harmful effects of alcohol

- Increases blood pressure
- Alcohol Dementia
- Liver failure
- Cirrhosis of the liver
- Liver cancer
- Impotence and subfertility

- Alcohol abstinence should be reinforced.
- People who take lower quantity of alcohol may also progress to heavy use or occasional binge drinking with consequent harmful effect.

Myths on use of alcohol

- Alcohol reduces stress
- Taking a small amount is heart healthy
- Taking a small amount reduces physical fatigue

7.3 Maintain adequate body mass index

- **How do you interpret your BMI?**
  - BMI<18.5(Undernourished)
  - BMI 18.5-22.9(Desirable)
  - BMI 23.0-24.9(At risk of becoming overweight)
  - BMI 25.0-29.9(Overweight)
  - BMI ≥ 30.0(Obese)

Life style modification should be advocated for those who have BMI > 23.0

- **What are the health effects of being overweight or obese?**

Obesity shows a strong relationship with major cardiovascular risk factors such as high blood pressure, type 2 diabetes and dyslipidemia.

- **When should one get their BMI assessed?**

You should get your BMI checked at least once a year

- **How do you maintain a good BMI?**
  If your BMI is in the overweight or obese range, you need to have a balanced diet and be physically active.

- **What are the alternate ways of knowing if you are overweight or obese?**
  - Waist circumference can be used
    ≥ 90cm (36'') for males and ≥ 80cm (32'') for females is not good

  - Waist: Height ratio can be used
    ≥ 0.5 is not good

- **What advice can you give on food practices for those who are overweight or obese?**

  a. Advice for a balanced low-Calorie Diet (Portion control)
  - Number of calories needed per day depend on weight, height, age, sex and activity level
  - Consider the following facts when food are being consumed
    - No caloric beverages
    - Minimum amount of bakery food products (Buns, Short-eats, Biscuits)
    - Moderate level of fat & oil
    - High levels of mono and poly unsaturated fats (Avocado, Peanuts, Gingerly, Pumpkin seeds, Kottan)
    - Low levels of saturated fats (1 coconut per day for 5 people/deep fried food)
    - High amount vegetables (6-8 servings per day)
    - 1-2 servings of fruits and legumes per day
    - Use unsweetened dairy products 1 to 2 servings per day (yogurts, curd, milk, cheese)
    - Fish or Poultry daily (Egg, small fish, chicken)
    - Low amount of Red Meat and Meat Products

  b. Exercise-obesity guidelines
  - 150 min of moderate-intensity aerobic physical activity throughout the week(at least 5 days per week, 30 minutes each day) or 75 min of vigorous-intensity aerobic physical activity throughout the week(at least 5 days per week, 15 minutes each day), or an equivalent combination of both.
  - Muscle strengthening activities involving major muscle groups on 2 -3 non-consecutive days per week.

- Main role of exercise is the prevention of weight regain rather than causing weight loss.
  E.g. To lose 500g, an obese person has to run 7 Km every day for a week or consume 500 kcal/day energy deficit diet for a week.

Benefits of exercise

- Modest contribution to weight loss in overweight and obese adults
- May reduce abdominal fat
- Increases cardiorespiratory fitness
- Reduces cardiovascular and diabetes risks.
- May reduce loss of muscle mass associated with diet

c. Behavioral Therapy

- Setting realistic goals
- Self-monitoring (food diaries and activity records)
- Slow down the eating process

7.4 Engage in regular physical activity

a. Why do we need regular physical activity?

- Physical inactivity increases the risk of coronary heart disease, diabetes and stroke.
- Physical activity promotes psychological wellbeing, improves self-confidence & self-esteem, and reduces stress and anxiety.
- Regular exercise with aging can keep you fit, prevent falls and lessen dependenay on others.
- Regular exercise is important to maintain ideal body weight.
- Reduce the risk of cancers such as colon cancer and breast cancer.
- Reduces BP.
- Improves lower back pain.
- Improves sleep.
- Exercise strengthens bones and muscles, improves joint flexibility.
- Exercise is good especially for preventing osteoporosis, bone fractures & hunching.

b. Classification of the intensity of physical activities

Intensity	Degree	Example
Sedentary	Activities done sitting/ lying down	• Occupational • Leisure (Watching, Television, Computer use, Reading) • Travel (In bus, car, train)
Light	Activities that require standing up and moving around	• Housework (hanging out, washing, ironing, dusting, cooking)
Moderate (Approximately 3-6 METS)	Activities are at an intensity that requires some effort, but allow a conversation to be held	• Brisk walking • Gentle swimming • Dancing • Gardening • Swimming • House work • Carrying/moving moderate loads (<20 Kg)
Vigorous (Approximately >6 METs)	Activities that lead to harder breathing, or puffing and panting (depending on fitness)	• Aerobics • Jogging • Running • Fast cycling • Fast swimming • Competitive sports and games • Carrying/moving heavy loads (>20 kg)

For further details please refer the relevant guidelines developed by the Directorate of NCD with the collaboration of stakeholders.

7.5 Take five servings of fruits and vegetables per day

a. Why should we eat five servings of fruits and vegetables?

- There is strong evidence that continued use of more than 400g of fruits and vegetables in daily diet reduces cancer risk and cardiovascular mortality.
- Fruits and vegetables are rich in fiber
- They help to reduce the blood glucose level and cholesterol levels
- Fruits and vegetables prevent constipation
- In addition, fruits and vegetables are rich in vitamins and minerals
- Fruits and vegetables are rich in antioxidants like beta carotene, vitamin C & E which protect us from chronic illnesses

b. How much fruits and vegetables should we eat?

- We should eat 5 servings of fruits and vegetables per day (400g)
- One serving is equivalent to
  - One small orange
  - Half a mango
  - One small banana
  - One small apple
  - 1/4th medium sized papaya
- Select 5 items out of these and spread throughout the day. It is important that the five servings are of different types. E. g. eating 5 bananas is definitely not good. Advice to select from different varieties and colors

c. What is the best way to consume vegetables and fruits?

- Fresh as much as possible (salad / sambol)
- Boil or steam
- Do not overcook

7.6 Restrict added salt consumption to one teaspoon per person per day

a. Why do we need salt?

- Sodium ions present in salt is required for a variety of functions of the body.
- Some of these functions include maintenance of fluids in the body and functioning of nerves and muscles.
- Body cannot make its own salt.

b. How do we get salt?

- Salt is present naturally in food items we consume.
- 80% of the salt requirement is obtained from food where salt is naturally available.
- In addition, salt requirement is obtained from where salt is naturally available.
- Some food items have high salt content due to added salt. (E.g. dry fish, jadi, bites such as Murukku, chips, tipi tip, tinned fish, marmite, processed meat, pickles, sauces, malted drinks, seasoning cube, etc).

c. How much salt should we get per day?

- The recommended daily amount of salt is 5g per day (1 teaspoon of salt per day per person).
- Do not add salt to food given to children less than one year of age. (This will prevent them from getting used to salt taste as well as the risk of hypertension).

d. What will happen with high salt intake?

- Reduce the daily consumption of food items that contain high amounts of salt.
- Reduce the use of salt when cooking food by adding more spices like lime and herbs. E.g. do not add salt when cooking rice as a habit.
- Discourage serving salt separately at the table.
- Suggest practical ways to judge salt consumption and avoid over use. E.g. keep aside the required amount of daily salt for the household per day.

  OR

  25g of salt is adequate for a household of 5 members per day and therefore a packet of salt of 450g should last for 18-20 days.

7.7 Restrict sugar consumption

a. What is refined sugar?

- Refined sugar come from sugar cane or sugar beet, which are processed to extract sugar. It is typically found as sucrose which is a combination of glucose and fructose.
- It does not provide any other micronutrients in significant quantity.
- Sugar is digested to glucose and absorbed inside the body.

b. Do we need refined sugar?

- Since other carbohydrates are converted to glucose in the body, we do not need to take sugar separately.
- Therefore, we can easily cut down on refined sugar when we want to restrict calories.

c. What will happen with high sugar intake?

- High sugar intake will result in overweight and obesity.
- High sugar intake will lead to diabetes which will have complications such as eye, nerve and kidney damage.
- High sugar intake will cause damage to vessels and may promote development of strokes and heart attacks.
- High sugar intake will lead to dental caries.

d. How much sugar should we have per day?

- The recommended maximum amount of sugar per person per day is 6 tea spoons (30 grams). It may be contained in sugary food and the food items prepared with added sugar.

- Refined sugars should be restricted or minimized by those who are overweight or obese.

e. What are the food items that have high content of sugar?

- Tea/coffee/milk with added sugar
- Desserts with added sugar
- Biscuits – One chocolate biscuit has at least 1 teaspoon of sugar
- Sweets-Kevum, Athiraha, milk toffees, etc.
- Fizzy drinks/Sugar sweetened beverages-200ml bottle will have 4-6 teaspoons of sugar.

f. How to reduce sugar consumption?

- Do not add sugar to food given to children less than one year of age (This will prevent them from getting used to high sugar taste as well as to reduce the risk of diabetes).
- Reduce the amount of sugar added to tea/coffee to only one tea spoon or less.
- Instead of sugary desserts, select desserts made out of fruits/ vegetables. (Prepare desserts with reduced amount of sugar)
- If you take sweet desserts, take smaller servings.

7.8 Minimize consumption of foods containing trans-fatty acids.

a. What are trans-fatty acids?

Trans-fats are chemically altered unsaturated fats. It is commonly available and widely consumed through preparations that have polyunsaturated fats such as table margarines. Polyunsaturated fats such as sunflower oil, vegetable oil (excluding coconut) and olive oil are converted to trans-fatty acids during overheating.

b. Why are they harmful?

Trans fatty acids have the effect of increasing LDL (bad cholesterol) and lowers HDL (good cholesterol) and increases the risk of cardiovascular diseases (heart attacks, strokes and peripheral vascular disease).

c. What is the recommended amount?

- Ideally less than 1% of total daily calorie intake is the recommended amount.
- E.g. one thin spread of margarine on a slice of bread may contain approx. 1-2g of margarine which could exceed the daily recommended amount of trans -fatty acids.

d. What are the foods containing trans fatty acids?

- Margarine (hard sticks)
- fried food
- pastries
- biscuits
- cake
- bakery items

e. How can we reduce consumption?

- By reducing the quantity of any oil used for shallow frying
- Avoid use of polyunsaturated fats(e.g. sunflower oil and vegetable oil) for deep frying
- Coconut oil can be used for deep frying, however when shallow frying with coconut oil, it is important not to overheat the oil to the point of smoking.
- Read labels, look for the % of trans fat in 1g (If there is more than 1% in 1g, this food should be avoided).

Useful facts on fats

- None of the commonly used fats of vegetable origin have cholesterol in their natural form
- Animal fats such as lard, ghee, pork, red meat and egg yolk will have cholesterol in the natural form
- Polyunsaturated fats like sunflower oil, vegetable oil and olive oil should not be used for deep frying, but can be used for shallow frying. If there is overheating, even in shallow frying, there is production of trans fat that are harmful
- Coconut oil and palm oil have a higher proportion of short chain saturated (cholesterol promoting and carcinogenic) fats and will produce cholesterol inside the body
- Coconut oil can be used for deep frying as it will not form trans fats. But deep-fried food should be drained of excess oil.
- Any fat should be used in moderation, but minimized for those who are overweight and/or have high cardiovascular disease risk

7.9 Engage in activities that will promote mental health

Mental health is a state of well-being where the individual realizes his or her own abilities, can cope with normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community (WHO 2001).

a. What is mental stress?

It is the psychological burden experienced by an individual.

a. Why do we need activities that promote mental health?

- It reduces anger
- It reduces accidents
- It improves family and work place harmony
- It reduces job stress, improves management and leadership skills
- It reduces exam stress
- Mind is important to promote our health
- Stress contributes to high blood pressure and increases cardiovascular mortality
- Activities that promote mental health help us to enjoy our life
- Poor mental wellbeing is associated with other risk behaviors such as alcohol, tobacco consumption, bad eating habits such as indulging in oily, salty or sweet foods and physical inactivity

b. **What could be practiced to improve mental health?**
   - Daily meditation/prayers
   - Listening to music
   - Physical exercise especially activities such as walking, tai chi and yoga
   - Leisure activities that vary from person to person
   - Laughter
   - Early to bed, early to rise
   - Nature therapy-Enjoying the environment, star gazing
   - Pet therapy
   - The methods to be suggested should be relevant to the individual
   - Spending time with your family and children, going for a movie or a trip

c. How often should we be engaged in activities that promote mental health?
   - We should practice activities that promote mental health on a regular basis in order for it to have an impact on our mental health status.
   - We should start with small periods of such exercise and gradually increase up to at least one hour per day

7.10 Know your Health status

All healthcare workers should actively promote people to know their own health status

a. It is important to know your health status because there are affordable and simple measures to improve your health status.
b. Every person should get themselves screened for NCDs and risk factors at 35 years of age and every 3 intervals if the screening is normal
c. If there are other risk factors such as family history, then even at younger ages screening could be done.

Lifestyle targets:

- Maintain
  - ➢BMI between 18.5-23.0
  - ➢BP of 120/80 or less
  - ➢Waist circumference of ≤90cm for males and ≤80cm for females
- Abstain from smoking and alcohol
- Minimum of 150 minutes of moderate physical activity for 3-5 days per week
- Salt consumption to only 5g per person per day

Summary

It is important that everyone knows their lifestyle targets. Note that all other details mentioned (e.g. sugar and trans fatty acid reduction, fruit and vegetable consumption etc.) contribute to the achievement of one or more of these targets.

Annexure 01: Methods of oral examination[11]

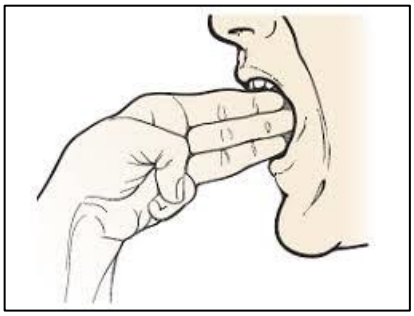
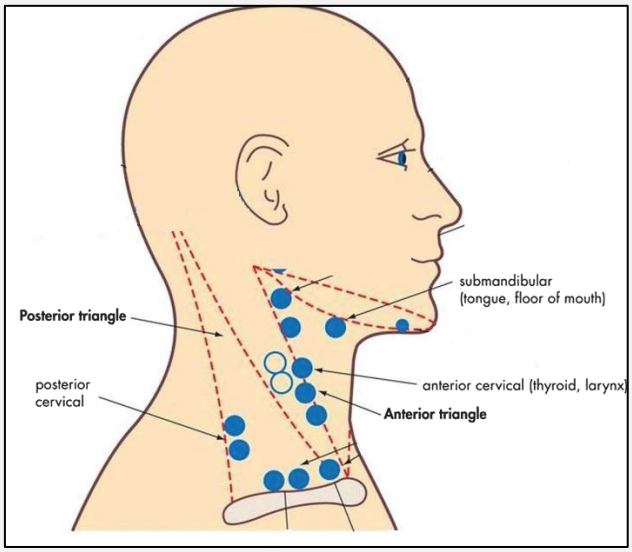
<table>
<tr><th colspan="3">Extra-oral examination</th></tr>
<tr><th>Site</th><th>Procedure</th><th>What to look for</th></tr>
<tr><td>Mouth opening</td><td>Ask to open the mouth
 
Figure 7 : Mouth opening measurement ' 3 Fingers'</td><td>Look for restrictions in opening. (Normal mouth opening is about 30-40mm – '3 fingers' see Figure 7)</td></tr>
<tr><td>Lymph nodes</td><td>Digital bimanual palpation of submandibular and cervical lymph nodes</td><td>Submandibular and cervical lymph node enlargements</td></tr>
<tr><td colspan="3"> 

Figure 8 : Submandibular and cervical lymph nodes</td></tr>
</table>

[11] Interpretation of findings of oral examination and management outline is given in "National guidelines for management of Oral Potentially Malignant Disorders for Dental and Medical Practitioners" published by National Cancer Control Programme.
Available at: www.nccp.health.gov.lk

Intra-oral examination		
Site	**Procedure**	**What to look for**
Lips and vermillion border	Raise the upper lip using two fingers. Then examine and palpate the upper lip. Turn the lower lip down and follow the same procedure. (Figure 9: A, B, D)	• Cracking • Ulcers • Feel for fibrous bands • White/red patches • Pigmentation • Blanching of lips • Growths/lumps
Commissure	Retract left and right commissural regions separately using your fingers. Examine commissure. Note: Make sure to examine the area that was covered with your fingers	• White/red patches • Pigmentation • Fissuring/ulcer
Buccal mucosa including buccal sulci	Retract one side of the cheek with tongue depressor/spatula. Examine and palpate buccal mucosa using your finger. (Figure 9: C) Note: Make sure to examine the area that was covered with the tongue depressor/spatula	• Feel for fibrous bands • White/red patches/lines • Pigmentations • Growths/lumps • Ulcers/erosions • Generalized whitening (pallor) • Blanching of mucosa
Tongue	Ask to put tongue out and examine the dorsum of the tongue Hold the tip of the tongue with a sterile piece of gauze or cloth and then move the tongue sideways and examine lateral surfaces (Figure 9: H)	• Restriction of movements • white / red patches • Fissuring/ulcerations • Pigmentations • Areas of depapillation • Smooth leathery surfaces • Growths/lumps
Floor of mouth including lingual sulci	Ask to lift the tongue up and examine the ventral surface of the tongue, the floor of the mouth and lingual sulci (Figure 9: G)	• White/red patches • Pigmentations • Growths/lumps • Ulcerations
Gingivae	Retract lips and buccal mucosae using fingers and examine for changes in gingivae of upper and lower arches (Figure 9: B, D)	• White/red patches • Pigmentations • Ulcers/erosions • Growths/lumps
Hard and soft palate	Examine hard palate and visually inspect soft palate as far back as you can see. (Figure 9: E)	• White (fibrous) bands in soft palate • White/red patches • Pigmentations

		• Ulcers/erosions • Growths/lumps
Throat	Ask the participant to say "AAH" and visually inspect the back of the throat (tonsils, the uvula, palatal folds, and posterior pharyngeal wall) (Figure 9: F)	• White/red patches • Ulcers • Growths/lumps • Changes in the uvula (shape, size and appearance)
Teeth	Systematically examine teeth; start from teeth in the upper arch and examine from posterior to anterior. Follow the same for the teeth in the lower arch.	• Abnormal mobility of teeth • Sharp tooth edges that traumatizing soft tissues

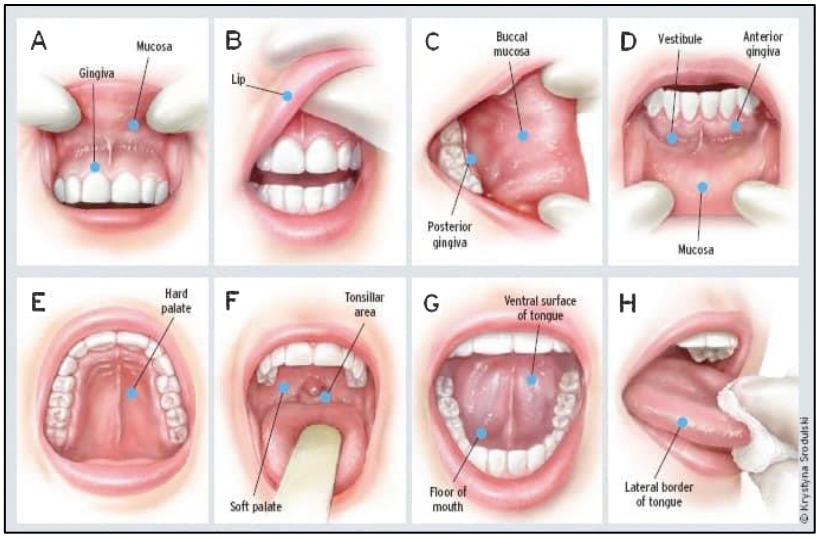
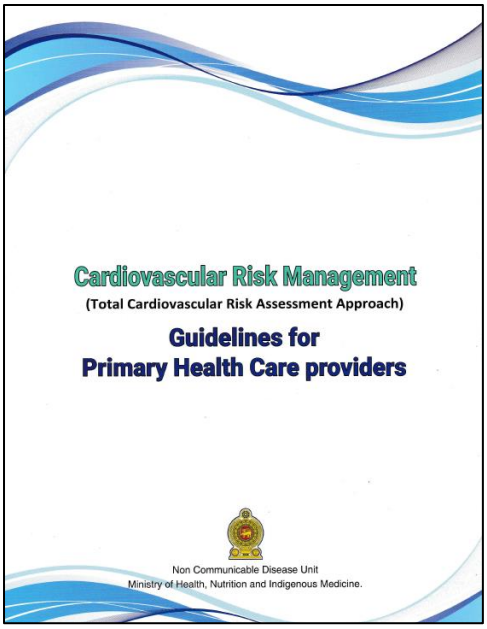
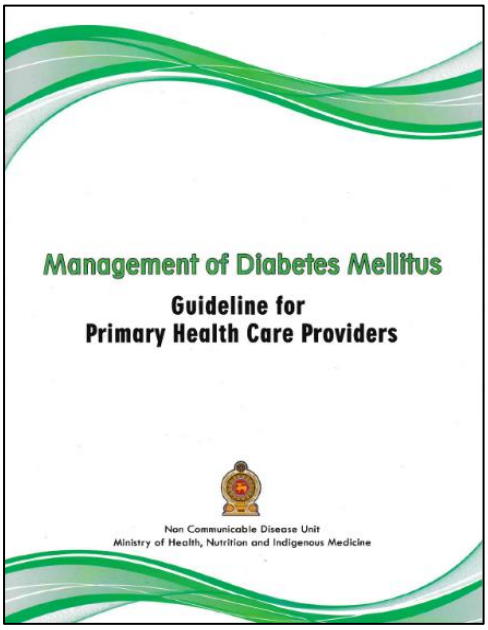


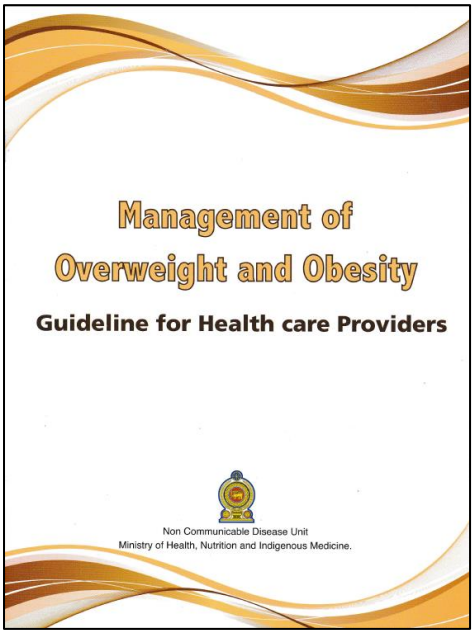
Figure 9 : Steps of intra-oral examination for OPMD and suspected Oral Cancer

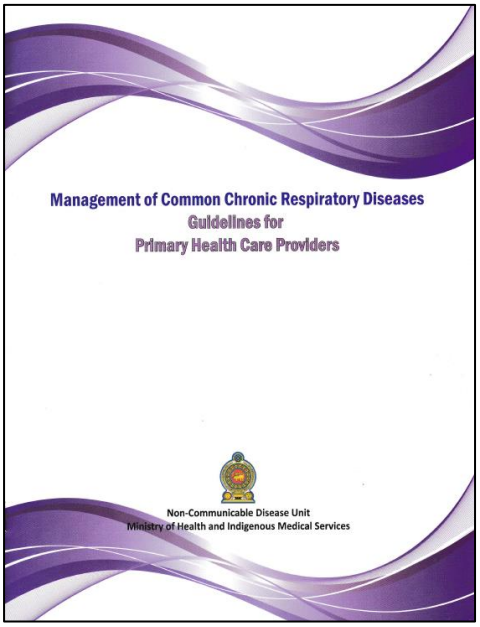
Annexure 02: Available guidelines

The following guidelines are available from the NCD Unit, Ministry of Health.









Annexure 03: Sample of NCD Screening Invitation Letter

Ministry of Health

Healthy Lifestyle Center

Towards a Healthy Lifestyle
Non Communicable Disease Unit
Ministry of Health

If you are 35 years and above,

And you are not at present receiving treatment for any of the following diseases,

- Diabetes Mellitus
- Hypertension
- Heart disease
- Stroke
- High cholesterol level
- Cancer
- Chronic Liver Disease
- Chronic Kidney Disease

We Invite you to help us identify your risk factors and take relevant services from us.

Please follow the instructions below

Please bring your National Identity

Please fast for 8-10 hours before the checkup (You can drink water)

Please bring this instruction letter when you come for the checkup.

Place:
Date:
Time:

Reduce your risk through awareness

Bring your breakfast with you.

Ministry of Health

PHM area: .....

Towards a Healthy Lifestyle
Non Communicable Disease Unit
Ministry of Health

Dear Sir/Madam,

We would like to invite you to the free health check up activity conducted by Ministry of Health.

The aim of the checkup is to identify whether you already have an unidentified NCD or have a high risk of acquiring such a disease as a person aged 35 years and above.

Please come to check up on the following date.

Date :

.....

Time :

.....

Venue :.....

Please follow the following instructions.

When you attend the check up,please bring your national identity card,driving license or passport.

Since you will be checked for fasting blood glucose,please fast for 8 – 10 hours from the previous day.

If you are identified to have hypertension or diabetes,will be refferred for treatment and high risk people will receive health messages on the same day you attend.

Please bring this document as well.

Annexure 04: HLC Participants' Register

Participants' Register(Female) H1236 B

Date:................................

Serial No	GN Division	Name with initials	Age in completed years	NIC Number and Date of Birth	Personal Health Number	Address and Telephone Number	Physical Activity(Physically active (A)/Not physically active(N))	Tobacco smoking (Yes(Y)/No(N))	Betel chewing(with tobacco or arecanut)(Yes(Y)/No(N))	Other tobacco or arecanut preparations use (Yes(Y)/No(N))	Alcohol consumption (Yes(Y)/No(N))	Body Mass Index (kg/m^2)	Waist Circumference (cm)	Waist:Height Ratio	Blood Pressure (mmHg)	Oral examination (Normal(N) / OPMD(A))	Breast examination (Normal(N) / Abnormal(A))	Pap smear (done or not) (within 5 years)	Random Glucose Level (mg/dl)	Fasting Glucose Level (mg/dl)	Serum Creatinine (Normal(N)/High(H))	Serum cholesterol Level (mg/dl)	Risk Percentage for Cardiovascular Diseases				referral and follow up				
																							< 10 %	10 % - < 20 %	20 % - < 30 %	≥ 30 %	Medical Clinic in the Institution	Specialist Clinic	Healthy Lifestyle Center	Well women clinic	Dental Clinic
				N.I.C.		Address																					Referred	Referred	Referred	Referred	Referred
				D.O.B.		Tel No.																					Reached	Reached	Reached	Reached	Reached
				N.I.C.		Address																					Referred	Referred	Referred	Referred	Referred
				D.O.B.		Tel No.																					Reached	Reached	Reached	Reached	Reached
				N.I.C.		Address																					Referred	Referred	Referred	Referred	Referred
				D.O.B.		Tel No.																					Reached	Reached	Reached	Reached	Reached
				N.I.C.		Address																					Referred	Referred	Referred	Referred	Referred
				D.O.B.		Tel No.																					Reached	Reached	Reached	Reached	Reached

1236 B NCD Screening package - Page summary

Age(in completed years)		20-34		35-70		> 70		Total	
Total No. of eligible clients									
Physical Activity	Physically active								
	Not physically active								
Tobacco Use	No. of Tobacco Smokers								
	No. of betal chewers(with tobacco or arecanut)								
	No. of other tobacco or arecanut preparations users								
Alcohol Use	No. of Alcohol users								
Body Mass Index (kg/m^2)	< 18.5								
	18.5 -22.9								
	23 - 24.9								
	25 -29.9								
	≥30								
Waist circumference	> 80 cm								
Waist:Height Ratio	< 0.5								
	≥ 0.5								
Blood Pressure (mmHg)	<120/80								
	121-139/81-89								
	≥140/90								
No. of participants who have undergone the below examinations	Oral examination								
	Breast examination								
	Pap smear(within 5 years)								
Random Glucose Level (mg/dl)	< 140								
	140-199								
	≥ 200								
Fasting Glucose Level (mg/dl)	< 100								
	100 -125								
	≥126								
Serum Creatinine	Normal								
	High								
Serum cholesterol Level (mg/dl)	<240								
	240-299								
	≥300								
Risk Percentage for Cardiovascular Diseases	< 10 %								
	10% - < 20%								
	20 %-< 30 %								
	≥30 %								
Referral and follow up	Medical clinic in the Institution	Referred	Reached	Referred	Reached	Referred	Reached	Referred	Reached
	Specialist Clinic	Referred	Reached	Referred	Reached	Referred	Reached	Referred	Reached
	Healthy Lifestyle Center	Referred	Reached	Referred	Reached	Referred	Reached	Referred	Reached
	Well women clinic	Referred	Reached	Referred	Reached	Referred	Reached	Referred	Reached
	Dental Clinic	Referred	Reached	Referred	Reached	Referred	Reached	Referred	Reached

Monthly Report of Activities Done for Non Communicable Disease Screening H1239

Male/Female	Age (in years)	Total No. of eligible clients	NCD Screening package																													referral and follow up				
			Physical Activity		Tobacco Use			Alcohol Use	Body Mass Index (Kg/m^2)					Waist circumference	Waist:Height Ratio	Blood Pressure (mmHg)			No. of participants who have undergone the below examinations			Random Glucose Level (mg/dl)			Fasting Glucose Level (mg/dl)			Serum Creatinine		Serum cholesterol Level (mg/dl)			Risk Percentage for Cardiovascular Diseases				
			Physically active	Not physically active	No. of Tobacco Smokers	No. of betal chewers(with tobacco or arecanut)	No. of other tobacco or arecanut preparations users	No. of Alcohol users	< 18.5	18.5 - 22.9	23 – 24.9	25 - 29.9	30 or above	Males >90cm Females >80cm	0.5 or above	≤ 120/80	121-139/81-89	≥ 140/90	Oral examination	Breast examination	Pap smear (within 5 years)	<140	140 - 199	≥200	<100	100 - 125	≥126	Normal	High	<240	240 - 299	≥ 300	< 10%	10% - <20%	20% - <30%	≥ 30%	Medical clinic in the Institution	Specialist Clinicist Clinic	Healthy Lifestyle Center	Well women clinic	Dental Clinic
Male	20 -34																																				
	35 -70																																				
	above 70																																				
Female	20 -34																																				
	35 -70																																				
	above 70																																				
Total	20 -34																																				
	35 -70																																				
	above 70																																				

Fill in 2 copies. Send one to district MO-NCD before 5th of the next month and keep the other one in your institute.

Year:

Month:

MOH Area:

Name of the HLC:

No. of clinics conducted:

Signature of MO-IC/MOH

Date:……

Annexure 05: HLC Monthly Report of Activities Done for Non Communicable Disease Screening

Annexure 06: Follow up Register

Follow up Register H1237

Serial No						DD/MM/YY/xxx					DD/MM/YY/xxx				
Name with initials															
Personal Health Number															
Address and Telephone Number						Address				Tel No.	Address				Tel No.
Male/Female															
Clinic Visit						1st	2nd	3rd	4th	5th	1st	2nd	3rd	4th	5th
Date						DD/MM/YY	DD/MM/YY	DD/MM/YY	DD/MM/YY	DD/MM/YY	DD/MM/YY	DD/MM/YY	DD/MM/YY	DD/MM/YY	DD/MM/YY
Age(years)															
Reason for follow up	Routine														
	High Risk(Specify)														
Duration since last HLC vist															
Physical Activity(Physically active (A)/Not physically active(N))															
Tobacco smoking (Yes(Y)/No(N))															
Betel chewing(with tobacco or arecanut)(Yes(Y)/No(N))															
Other tobacco or arecanut preparations use (Yes(Y)/No(N))															
Alcohol consumption (Yes(Y)/No(N))															
Body Mass Index (Kg/m^2)															
Waist Circumference (cm)															
Waist:Height Ratio															
Blood Pressure (mmHg)															
Oral examination (Normal(N) / OPMD(A))															
Breast examination (Normal(N) / Abnormal(A))															
Pap smear (done or not) (within 5 years)															
Random Glucose Level (mg/dl)															
Fasting Glucose Level (mg/dl)															
Serum Creatinine (Normal(N)/High(H))															
Serum cholesterol Level (mg/dl)															
Risk Percentage for Cardiovascular Diseases	< 10 %														
	10 % - < 20 %														
	20 % - < 30 %														
	≥ 30 %														
Rreferrals	Medical Clinic in the Institution														
	Specialist Clinic														
	Well women clinic														
	Dental Clinic														
Actions taken															
Next visit in															

Annexure 07: Sample reception card number

Annexure 08: BMI chart

BMI CHART

Underweight <18.5 | Normal 18.5 – 22.9 | Pre- overweight 23.0 – 24.9 | Overweight 25.0 – 29.9 | Obesity >=30.0

BMI = Weight / (Height* Height) *10,000

W \ H	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
36	17.1	16.9	16.7	16.4	16.2	16.0	15.8	15.6	15.4	15.2	15.0	14.8	14.6	14.4	14.2	14.1
37	17.6	17.4	17.1	16.9	16.7	16.4	16.2	16.0	15.8	15.6	15.4	15.2	15.0	14.8	14.6	14.5
38	18.1	17.8	17.6	17.3	17.1	16.9	16.7	16.4	16.2	16.0	15.8	15.6	15.4	15.2	15.0	14.8
39	18.5	18.3	18.0	17.8	17.6	17.3	17.1	16.9	16.7	16.4	16.2	16.0	15.8	15.6	15.4	15.2
40	19.0	18.8	18.5	18.3	18.0	17.8	17.5	17.3	17.1	16.9	16.6	16.4	16.2	16.0	15.8	15.6
41	19.5	19.2	19.0	18.7	18.5	18.2	18.0	17.7	17.5	17.3	17.1	16.8	16.6	16.4	16.2	16.0
42	20.0	19.7	19.4	19.2	18.9	18.7	18.4	18.2	17.9	17.7	17.5	17.3	17.0	16.8	16.6	16.4
43	20.5	20.2	19.9	19.6	19.4	19.1	18.9	18.6	18.4	18.1	17.9	17.7	17.4	17.2	17.0	16.8
44	20.9	20.6	20.4	20.1	19.8	19.6	19.3	19.0	18.8	18.6	18.3	18.1	17.9	17.6	17.4	17.2
45	21.4	21.1	20.8	20.5	20.3	20.0	19.7	19.5	19.2	19.0	18.7	18.5	18.3	18.0	17.8	17.6
46	21.9	21.6	21.3	21.0	20.7	20.4	20.2	19.9	19.7	19.4	19.1	18.9	18.7	18.4	18.2	18.0
47	22.4	22.0	21.8	21.5	21.2	20.9	20.6	20.3	20.1	19.8	19.6	19.3	19.1	18.8	18.6	18.4
48	22.8	22.5	22.2	21.9	21.6	21.3	21.1	20.8	20.5	20.2	20.0	19.7	19.5	19.2	19.0	18.8
49	23.3	23.0	22.7	22.4	22.1	21.8	21.5	21.2	20.9	20.7	20.4	20.1	19.9	19.6	19.4	19.1
50	23.8	23.5	23.1	22.8	22.5	22.2	21.9	21.6	21.4	21.1	20.8	20.5	20.3	20.0	19.8	19.5
51	24.3	23.9	23.6	23.3	23.0	22.7	22.4	22.1	21.8	21.5	21.2	21.0	20.7	20.4	20.2	19.9
52	24.7	24.4	24.1	23.7	23.4	23.1	22.8	22.5	22.2	21.9	21.6	21.4	21.1	20.8	20.6	20.3
53	25.2	24.9	24.5	24.2	23.9	23.6	23.2	22.9	22.6	22.3	22.1	21.8	21.5	21.2	21.0	20.7
54	25.7	25.3	25.0	24.7	24.3	24.0	23.7	23.4	23.1	22.8	22.5	22.2	21.9	21.6	21.4	21.1
55	26.2	25.8	25.5	25.1	24.8	24.4	24.1	23.8	23.5	23.2	22.9	22.6	22.3	22.0	21.8	21.5
56	26.6	26.3	25.9	25.6	25.2	24.9	24.6	24.2	23.9	23.6	23.3	23.0	22.7	22.4	22.2	21.9
57	27.1	26.7	26.4	26.0	25.7	25.3	25.0	24.7	24.3	24.0	23.7	23.4	23.1	22.8	22.5	22.3
58	27.6	27.2	26.8	26.5	26.1	25.8	25.4	25.1	24.8	24.5	24.1	23.8	23.5	23.2	22.9	22.7
59	28.1	27.7	27.3	26.9	26.6	26.2	25.9	25.5	25.2	24.9	24.6	24.2	23.9	23.6	23.3	23.0
60	28.5	28.1	27.8	27.4	27.0	26.7	26.3	26.0	25.6	25.3	25.0	24.7	24.3	24.0	23.7	23.4
61	29.0	28.6	28.2	27.8	27.5	27.1	26.8	26.4	26.1	25.7	25.4	25.1	24.7	24.4	24.1	23.8
62	29.5	29.1	28.7	28.3	27.9	27.6	27.2	26.8	26.5	26.1	25.8	25.5	25.2	24.8	24.5	24.2
63	30.0	29.6	29.2	28.8	28.4	28.0	27.6	27.3	26.9	26.6	26.2	25.9	25.6	25.2	24.9	24.6
64	30.4	30.0	29.6	29.2	28.8	28.4	28.1	27.7	27.3	27.0	26.6	26.3	26.0	25.6	25.3	25.0
65	30.9	30.5	30.1	29.7	29.3	28.9	28.5	28.1	27.8	27.4	27.1	26.7	26.4	26.0	25.7	25.4
66	31.4	31.0	30.5	30.1	29.7	29.3	28.9	28.6	28.2	27.8	27.5	27.1	26.8	26.4	26.1	25.8
67	31.9	31.4	31.0	30.6	30.2	29.8	29.4	29.0	28.6	28.3	27.9	27.5	27.2	26.8	26.5	26.2
68	32.3	31.9	31.5	31.0	30.6	30.2	29.8	29.4	29.0	28.7	28.3	27.9	27.6	27.2	26.9	26.6
69	32.8	32.4	31.9	31.5	31.1	30.7	30.3	29.9	29.5	29.1	28.7	28.4	28.0	27.6	27.3	27.0
70	33.3	32.8	32.4	32.0	31.5	31.1	30.7	30.3	29.9	29.5	29.1	28.8	28.4	28.0	27.7	27.3
71	33.8	33.3	32.9	32.4	32.0	31.6	31.1	30.7	30.3	29.9	29.6	29.2	28.8	28.4	28.1	27.7
72	34.2	33.8	33.3	32.9	32.4	32.0	31.6	31.2	30.8	30.4	30.0	29.6	29.2	28.8	28.5	28.1
73	34.7	34.2	33.8	33.3	32.9	32.4	32.0	31.6	31.2	30.8	30.4	30.0	29.6	29.2	28.9	28.5
74	35.2	34.7	34.2	33.8	33.3	32.9	32.5	32.0	31.6	31.2	30.8	30.4	30.0	29.6	29.3	28.9
75	35.7	35.2	34.7	34.2	33.8	33.3	32.9	32.5	32.0	31.6	31.2	30.8	30.4	30.0	29.7	29.3
76	36.1	35.7	35.2	34.7	34.2	33.8	33.3	32.9	32.5	32.0	31.6	31.2	30.8	30.4	30.1	29.7
77	36.6	36.1	35.6	35.2	34.7	34.2	33.8	33.3	32.9	32.5	32.0	31.6	31.2	30.8	30.5	30.1
78	37.1	36.6	36.1	35.6	35.1	34.7	34.2	33.8	33.3	32.9	32.5	32.1	31.6	31.2	30.9	30.5

BMI CHART

Underweight <18.5 | Normal 18.5 – 22.9 | Pre- overweight 23.0 – 24.9 | Overweight 25.0 – 29.9 | Obesity >=30.0

BMI = Weight / (Height* Height) *10,000

H / W	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178
47	18.1	17.9	17.7	17.5	17.3	17.1	16.9	16.7	16.5	16.3	16.1	15.9	15.7	15.5	15.3	15.2	15.0	14.8
48	18.5	18.3	18.1	17.8	17.6	17.4	17.2	17.0	16.8	16.6	16.4	16.2	16.0	15.9	15.7	15.5	15.3	15.1
49	18.9	18.7	18.4	18.2	18.0	17.8	17.6	17.4	17.2	17.0	16.8	16.6	16.4	16.2	16.0	15.8	15.6	15.5
50	19.3	19.1	18.8	18.6	18.4	18.1	17.9	17.7	17.5	17.3	17.1	16.9	16.7	16.5	16.3	16.1	16.0	15.8
51	19.7	19.4	19.2	19.0	18.7	18.5	18.3	18.1	17.9	17.6	17.4	17.2	17.0	16.8	16.7	16.5	16.3	16.1
52	20.1	19.8	19.6	19.3	19.1	18.9	18.6	18.4	18.2	18.0	17.8	17.6	17.4	17.2	17.0	16.8	16.6	16.4
53	20.4	20.2	19.9	19.7	19.5	19.2	19.0	18.8	18.6	18.3	18.1	17.9	17.7	17.5	17.3	17.1	16.9	16.7
54	20.8	20.6	20.3	20.1	19.8	19.6	19.4	19.1	18.9	18.7	18.5	18.3	18.0	17.8	17.6	17.4	17.2	17.0
55	21.2	21.0	20.7	20.4	20.2	20.0	19.7	19.5	19.3	19.0	18.8	18.6	18.4	18.2	18.0	17.8	17.6	17.4
56	21.6	21.3	21.1	20.8	20.6	20.3	20.1	19.8	19.6	19.4	19.2	18.9	18.7	18.5	18.3	18.1	17.9	17.7
57	22.0	21.7	21.5	21.2	20.9	20.7	20.4	20.2	20.0	19.7	19.5	19.3	19.0	18.8	18.6	18.4	18.2	18.0
58	22.4	22.1	21.8	21.6	21.3	21.0	20.8	20.5	20.3	20.1	19.8	19.6	19.4	19.2	18.9	18.7	18.5	18.3
59	22.8	22.5	22.2	21.9	21.7	21.4	21.2	20.9	20.7	20.4	20.2	19.9	19.7	19.5	19.3	19.0	18.8	18.6
60	23.1	22.9	22.6	22.3	22.0	21.8	21.5	21.3	21.0	20.8	20.5	20.3	20.0	19.8	19.6	19.4	19.2	18.9
61	23.5	23.2	23.0	22.7	22.4	22.1	21.9	21.6	21.4	21.1	20.9	20.6	20.4	20.1	19.9	19.7	19.5	19.3
62	23.9	23.6	23.3	23.1	22.8	22.5	22.2	22.0	21.7	21.5	21.2	21.0	20.7	20.5	20.2	20.0	19.8	19.6
63	24.3	24.0	23.7	23.4	23.1	22.9	22.6	22.3	22.1	21.8	21.5	21.3	21.0	20.8	20.6	20.3	20.1	19.9
64	24.7	24.4	24.1	23.8	23.5	23.2	22.9	22.7	22.4	22.1	21.9	21.6	21.4	21.1	20.9	20.7	20.4	20.2
65	25.1	24.8	24.5	24.2	23.9	23.6	23.3	23.0	22.8	22.5	22.2	22.0	21.7	21.5	21.2	21.0	20.7	20.5
66	25.5	25.1	24.8	24.5	24.2	24.0	23.7	23.4	23.1	22.8	22.6	22.3	22.1	21.8	21.6	21.3	21.1	20.8
67	25.8	25.5	25.2	24.9	24.6	24.3	24.0	23.7	23.5	23.2	22.9	22.6	22.4	22.1	21.9	21.6	21.4	21.1
68	26.2	25.9	25.6	25.3	25.0	24.7	24.4	24.1	23.8	23.5	23.3	23.0	22.7	22.5	22.2	22.0	21.7	21.5
69	26.6	26.3	26.0	25.7	25.3	25.0	24.7	24.4	24.2	23.9	23.6	23.3	23.1	22.8	22.5	22.3	22.0	21.8
70	27.0	26.7	26.3	26.0	25.7	25.4	25.1	24.8	24.5	24.2	23.9	23.7	23.4	23.1	22.9	22.6	22.3	22.1
71	27.4	27.1	26.7	26.4	26.1	25.8	25.5	25.2	24.9	24.6	24.3	24.0	23.7	23.5	23.2	22.9	22.7	22.4
72	27.8	27.4	27.1	26.8	26.4	26.1	25.8	25.5	25.2	24.9	24.6	24.3	24.1	23.8	23.5	23.2	23.0	22.7
73	28.2	27.8	27.5	27.1	26.8	26.5	26.2	25.9	25.6	25.3	25.0	24.7	24.4	24.1	23.8	23.6	23.3	23.0
74	28.5	28.2	27.9	27.5	27.2	26.9	26.5	26.2	25.9	25.6	25.3	25.0	24.7	24.4	24.2	23.9	23.6	23.4
75	28.9	28.6	28.2	27.9	27.5	27.2	26.9	26.6	26.3	26.0	25.6	25.4	25.1	24.8	24.5	24.2	23.9	23.7
76	29.3	29.0	28.6	28.3	27.9	27.6	27.3	26.9	26.6	26.3	26.0	25.7	25.4	25.1	24.8	24.5	24.3	24.0
77	29.7	29.3	29.0	28.6	28.3	27.9	27.6	27.3	27.0	26.6	26.3	26.0	25.7	25.4	25.1	24.9	24.6	24.3
78	30.1	29.7	29.4	29.0	28.7	28.3	28.0	27.6	27.3	27.0	26.7	26.4	26.1	25.8	25.5	25.2	24.9	24.6
79	30.5	30.1	29.7	29.4	29.0	28.7	28.3	28.0	27.7	27.3	27.0	26.7	26.4	26.1	25.8	25.5	25.2	24.9
80	30.9	30.5	30.1	29.7	29.4	29.0	28.7	28.3	28.0	27.7	27.4	27.0	26.7	26.4	26.1	25.8	25.5	25.2
81	31.2	30.9	30.5	30.1	29.8	29.4	29.0	28.7	28.4	28.0	27.7	27.4	27.1	26.8	26.4	26.1	25.9	25.6
82	31.6	31.2	30.9	30.5	30.1	29.8	29.4	29.1	28.7	28.4	28.0	27.7	27.4	27.1	26.8	26.5	26.2	25.9
83	32.0	31.6	31.2	30.9	30.5	30.1	29.8	29.4	29.1	28.7	28.4	28.1	27.7	27.4	27.1	27.8	26.5	26.2
84	32.4	32.0	31.6	31.2	30.9	30.5	30.1	29.8	29.4	28.1	28.7	28.4	28.1	27.7	27.4	72.1	26.8	26.5
85	32.8	32.4	32.0	31.6	31.2	30.8	30.5	30.1	29.8	29.4	29.1	28.7	28.4	28.1	27.8	27.4	27.1	26.8
86	33.2	32.8	32.4	32.0	31.6	31.2	30.8	30.5	30.1	29.8	29.4	29.1	28.7	28.4	28.1	27.8	27.5	27.1
87	33.6	33.2	32.7	32.3	32.0	31.6	31.2	30.8	30.5	30.1	29.8	29.4	29.1	28.7	28.4	28.1	27.8	27.5
88	33.9	33.5	33.1	32.7	32.3	31.9	31.6	31.2	30.8	30.4	30.1	29.7	29.4	29.1	28.7	28.4	28.1	27.8
89	34.3	33.9	33.5	33.1	32.7	32.3	31.9	31.5	31.2	30.8	30.4	30.1	29.7	29.4	29.1	28.7	28.4	28.1
90	34.7	34.3	33.9	33.5	33.1	32.7	32.3	31.9	31.5	31.1	30.8	30.4	30.1	29.7	29.4	29.1	28.7	28.4
91	35.1	34.7	34.3	33.8	33.4	33.0	32.6	32.2	31.9	31.5	31.1	30.8	30.4	30.1	29.7	29.4	29.0	28.7
92	35.5	35.1	34.6	34.2	33.8	33.4	33.0	32.6	32.2	31.8	31.5	31.1	30.7	30.4	30.0	29.7	29.4	29.0
93	35.9	35.4	35.0	34.6	34.2	33.7	33.3	33.0	32.6	32.2	31.8	31.4	31.1	30.7	30.4	30.0	29.7	29.4

BMI CHART

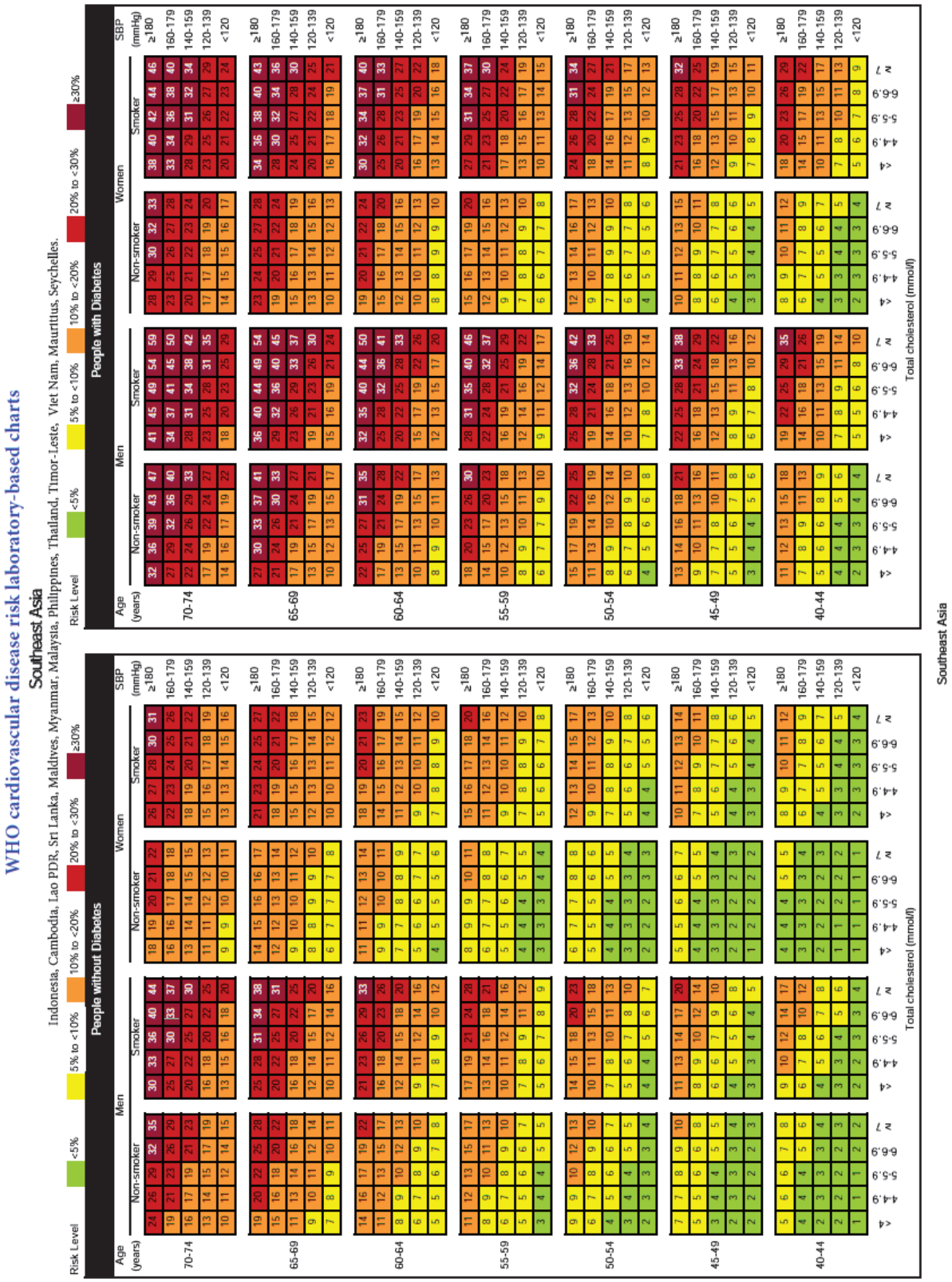
Underweight <18.5 | Normal 18.5 – 22.9 | Pre- overweight 23.0 – 24.9 | Overweight 25.0 – 29.9 | Obesity >=30.0

BMI = Weight / (Height* Height) *10,000

H / W	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193
60	19.2	18.9	18.7	18.5	18.3	18.1	17.9	17.7	17.5	17.3	17.2	17.0	16.8	16.6	16.4	16.3	16.1
61	19.5	19.3	19.0	18.8	18.6	18.4	18.2	18.0	17.8	17.6	17.4	17.3	17.1	16.9	16.7	16.5	16.4
62	19.8	19.6	19.4	19.1	18.9	18.7	18.5	18.3	18.1	17.9	17.7	17.5	17.4	17.2	17.0	16.8	16.6
63	20.1	19.9	19.7	19.4	19.2	19.0	18.8	18.6	18.4	18.2	18.0	17.8	17.6	17.5	17.3	17.1	16.9
64	20.4	20.2	20.0	19.8	19.5	19.3	19.1	18.9	18.7	18.5	18.3	18.1	17.9	17.7	17.5	17.4	17.2
65	20.7	20.5	20.3	20.1	19.8	19.6	19.4	19.2	19.0	18.8	18.6	18.4	18.2	18.0	17.8	17.6	17.5
66	21.1	20.8	20.6	20.4	20.1	19.9	19.7	19.5	19.3	19.1	18.9	18.7	18.5	18.3	18.1	17.9	17.7
67	21.4	21.1	20.9	20.7	20.5	20.2	20.0	19.8	19.6	19.4	19.2	19.0	18.8	18.6	18.4	18.2	18.0
68	21.7	21.5	21.2	21.0	20.8	20.5	20.3	20.1	19.9	19.7	19.4	19.2	19.0	18.8	18.6	18.4	18.3
69	22.0	21.8	21.5	21.3	21.1	20.8	20.6	20.4	20.2	19.9	19.7	19.5	19.3	19.1	18.9	18.7	18.5
70	22.3	22.1	21.8	21.6	21.4	21.1	20.9	20.7	20.5	20.2	20.0	19.8	19.6	19.4	19.2	19.0	18.8
71	22.7	22.4	22.2	21.9	21.7	21.4	21.2	21.0	20.7	20.5	20.3	20.1	19.9	19.7	19.5	19.3	19.1
72	23.0	22.7	22.5	22.2	22.0	21.7	21.5	21.3	21.0	20.8	20.6	20.4	20.2	19.9	19.7	19.5	19.3
73	23.3	23.0	22.8	22.5	22.3	22.0	21.8	21.6	21.3	21.1	20.9	20.7	20.4	20.2	20.0	19.8	19.6
74	23.6	23.4	23.1	22.8	22.6	22.3	22.1	21.9	21.6	21.4	21.2	20.9	20.7	20.5	20.3	20.1	19.9
75	23.9	23.7	23.4	23.1	22.9	22.6	22.4	22.2	21.9	21.7	21.4	21.2	21.0	20.8	20.6	20.3	20.1
76	24.3	24.0	23.7	23.5	23.2	22.9	22.7	22.4	22.2	22.0	21.7	21.5	21.3	21.1	20.8	20.6	20.4
77	24.6	24.3	24.0	23.8	23.5	23.2	23.0	22.7	22.5	22.3	22.0	21.8	21.6	21.3	21.1	20.9	20.7
78	24.9	24.6	24.3	24.1	23.8	23.5	23.3	23.0	22.8	22.5	22.3	22.1	21.8	21.6	21.4	21.2	20.9
79	25.2	24.9	24.7	24.4	24.1	23.8	23.6	23.3	23.1	22.8	22.6	22.4	22.1	21.9	21.7	21.4	21.2
80	25.5	25.2	25.0	24.7	24.4	24.2	23.9	23.6	23.4	23.1	22.9	22.6	22.4	22.2	21.9	21.7	21.5
81	25.9	25.6	25.3	25.0	24.7	24.5	24.2	23.9	23.7	23.4	23.2	22.9	22.7	22.4	22.2	22.0	21.7
82	26.2	25.9	25.6	25.3	25.0	24.8	24.5	24.2	24.0	23.7	23.4	23.2	23.0	22.7	22.5	22.2	22.0
83	26.5	26.2	25.9	25.6	25.3	25.1	24.8	24.5	24.3	24.0	23.7	23.5	23.2	23.0	22.8	22.5	22.3
84	26.8	26.5	26.2	25.9	25.6	25.4	25.1	24.8	24.5	24.3	24.0	23.8	23.5	23.3	23.0	22.8	22.6
85	27.1	26.8	26.5	26.2	25.9	25.7	25.4	25.1	24.8	24.6	24.3	24.0	23.8	23.5	23.3	23.1	22.8
86	27.5	27.1	26.8	26.5	26.3	26.0	25.7	25.4	25.1	24.9	24.6	24.3	24.1	23.8	23.6	23.3	23.1
87	27.8	27.5	27.2	26.9	26.6	26.3	26.0	25.7	25.4	25.1	24.9	24.6	24.4	24.1	23.8	23.6	23.4
88	28.1	27.8	27.5	27.2	26.9	26.6	26.3	26.0	25.7	25.4	25.2	24.9	24.6	24.4	24.1	23.9	23.6
89	28.4	28.1	27.8	27.5	27.2	26.9	26.6	26.3	26.0	25.7	25.5	25.2	24.9	24.7	24.4	24.1	23.9
90	28.7	28.4	28.1	27.8	27.5	27.2	26.9	26.6	26.3	26.0	25.7	25.5	25.2	24.9	24.7	24.4	24.2
91	29.0	28.7	28.4	28.1	27.8	27.5	27.2	26.9	26.6	26.3	26.0	25.7	25.5	25.2	24.9	24.7	24.4
92	29.4	29.0	28.7	28.4	28.1	27.8	27.5	27.2	26.9	26.6	26.3	26.0	25.8	25.5	25.2	25.0	24.7
93	29.7	29.4	29.0	28.7	28.4	28.1	27.8	27.5	27.2	26.9	26.6	26.3	26.0	25.8	25.5	25.2	25.0
94	30.0	29.7	29.3	29.0	28.7	28.4	28.1	27.8	27.5	27.2	26.9	26.6	26.3	26.0	25.8	25.5	25.2
95	30.3	30.0	29.6	29.3	29.0	28.7	28.4	28.1	27.8	27.5	27.2	26.9	26.6	26.3	26.0	25.8	25.5
96	30.6	30.3	30.0	29.6	29.3	29.0	28.7	28.4	28.0	27.7	27.5	27.2	26.9	26.6	26.3	26.0	25.8
97	31.0	30.6	30.3	29.9	29.6	29.3	29.0	28.7	28.3	28.0	27.7	27.4	27.2	26.9	26.6	26.3	26.0
98	31.3	30.9	30.6	30.2	29.9	29.6	29.3	28.9	28.6	28.3	28.0	27.7	27.4	27.1	26.9	26.6	26.3
99	31.6	31.2	30.9	30.6	30.2	29.9	29.6	29.2	28.9	28.6	28.3	28.0	27.7	27.4	27.1	26.9	26.6
100	31.9	31.6	31.2	30.9	30.5	30.2	29.9	29.5	29.2	28.9	28.6	28.3	28.0	27.7	27.4	27.1	26.8
101	32.2	31.9	31.5	31.2	30.8	30.5	30.2	29.8	29.5	29.2	28.9	28.6	28.3	28.0	27.7	27.4	27.1
102	32.6	32.2	31.8	31.5	31.1	30.8	30.5	30.1	29.8	29.5	29.2	28.9	28.6	28.3	28.0	27.7	27.4

Annexure 09: WHO CVD Risk Prediction Charts

Laboratory based charts



Non-laboratory based charts

WHO cardiovascular disease risk non-laboratory-based charts

Southeast Asia

Indonesia, Cambodia, Lao PDR, Sri Lanka, Maldives, Myanmar, Malaysia, Philippines, Thailand, Timor-Leste, Viet Nam, Mauritius, Seychelles.