The background of the entire page is a repeating ECG (heart rate) pattern in a light blue color, set against a white grid background. The text is centered and reads:

**HYPERTENSION  
INDICATORS  
FOR IMPROVING  
QUALITY  
AND COVERAGE  
OF SERVICES**

**Virtual meeting,  
1-2 March 2021: REPORT**



# **HYPERTENSION INDICATORS FOR IMPROVING QUALITY AND COVERAGE OF SERVICES**

**Virtual meeting,  
1-2 March 2021: REPORT**

Hypertension indicators for improving quality and coverage of services, virtual meeting, 1-2 March 2021: report

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# EXECUTIVE SUMMARY

Hypertension is a major cause of cardiovascular deaths, affecting more than one billion people around the world with two thirds of them in low- and middle- income countries. Delays in diagnosis and incomplete and interrupted treatment of hypertension can lead to poor health outcomes and premature deaths. The World Health Organization (WHO) and partners developed the HEARTS technical package to provide a strategic primary health care approach to improve cardiovascular health in countries. It is composed of six modules, including a HEARTS Systems for Monitoring module (HEARTS-S) that contains five indicators for health facility, subnational and national monitoring.

On 1-2 March 2021 WHO convened countries, experts and partners to review implementation of data collection for hypertension with a focus on HEARTS-S and other related hypertension indicators. Countries updated on their implementation of hypertension indicators such as those listed in the HEARTS-S and related patient and programme monitoring systems, while experts provided their assessment of utility of HEARTS-S and quality metrics for clinical indicators.

Countries are at different phases of HEARTS technical package implementation, from pilot phase to nationwide roll-out. These are set up as a national hypertension programme or integrated into existing national noncommunicable disease (NCD) programmes such as country WHO Package of Essential NCD interventions

(PEN), where components of HEARTS are adapted to national guidelines. Six countries shared their experiences in implementing HEARTS-S and hypertension indicators. Countries found the HEARTS-S module to be useful in designing forms and developing indicators for clinical management. They adapted indicators according to national protocols and information needs. Indicator modifications included revised blood pressure targets, age groupings, time frame of indicators and frequency of reporting. Not all hypertension indicators in HEARTS-S are reported by all countries and countries also use other indicators to monitor hypertension programmes at various levels, from health facility level to district, province, state and/or to national or central levels.

Countries also vary in their levels of adoption of digital technologies in their patient and programme monitoring systems. One country reported non-use of digital applications while some countries have used electronic health records and digital patient tracking applications. Despite their transition to digital systems, countries continue to face issues in data sharing across facilities and across levels of care in private and public sector. Other challenges identified by countries include high patient load, low capacities for monitoring, and ineffective incentivized mechanisms for reporting of programme goals.

Experts agreed that the HEARTS-S module provides a simple, focused and practical framework for monitoring at health facility, subnational and national levels in resource-

constrained settings. It includes highly useful tools for recording and reporting that can be easily adapted by countries and a set of standardized indicators that track achievement of major goals of the hypertension programme. All HEARTS-S indicators are considered relevant but lack socio-economic aggregation to reveal inequalities in health care access, specifically among vulnerable populations and fail to identify critical gaps along the cascade of care that should be overcome in order to optimize patient outcomes. Variable measurement of indicators exists due to differences in control targets, denominators and multiple sources. Experts recommended further standardization of indicators, inclusion of additional indicators, subgroup analyses, conduct of subnational surveys and application of digital technologies to address limitations of HEARTS-S indicators.

With consideration of clinical information needs, desirable qualities of indicators and existing patient and programme monitoring capacities, participants gave specific recommendation for the improvement of hypertension indicators and inclusion of additional feasible, practical and statistically sound indicators for monitoring quality and coverage of

services. General recommendations on monitoring included harmonization of hypertension, diabetes and other NCD comorbidity monitoring frameworks, development of simple tools for digital data entry and calculation of indicators, adoption of unique health identifiers for longitudinal monitoring, and implementation of clinical audits and supportive supervision. The group proposed a revision of HEARTS-S hypertension indicators and development of additional indicators to address the following:

1. Inclusion of equity measures such as socio-demographic dimensions of the population with hypertension.
2. Alignment with country-specific clinical protocols and targets.
3. Estimation of the population with hypertension along the cascade of care.
4. Assessment of comorbidities and complications.
5. Long-term tracking of patients, minimizing losses to follow-up.
6. Continuous improvement of quality of clinical programme.



# 1.

# INTRODUCTION

## 1.1 MEETING ORGANIZATION

On 1-2 March 2021, the Technical Meeting on Hypertension Indicators for Improving Quality and Coverage of Services was hosted virtually by the World Health Organization (WHO) as part of its commitment to support Member States in using strategic information for improving quality and coverage of noncommunicable diseases (NCDs) including hypertension management services in primary health care settings. The meeting gathered country HEARTS implementers, along with internal and external hypertension experts, to review existing hypertension indicators and recommend additions.

The meeting included an orientation on programme monitoring and HEARTS technical package with a focus on HEARTS System for Monitoring module (HEARTS-S), presentations from countries on status of HEARTS implementation, hypertension indicators, patient-level and programme monitoring systems and challenges in monitoring, as well as presentations of experts' opinion on HEARTS-S and quality and adequacy of clinical indicators. Group discussions were held to review HEARTS-S indicators and recommend concrete revisions and additional indicators to enhance monitoring of quality and coverage of services.

## 1.2 MEETING SCOPE AND PURPOSE

The HEARTS technical package was developed by the World Health Organization (WHO) and partners, and provides a strategic approach to improve cardiovascular health including hypertension management in primary health care settings, that aligns with the WHO Package of Essential NCD Interventions (PEN). It recommends a core set of hypertension indicators for monitoring quality and coverage of services and for forecasting of medicines.

Currently, WHO is developing an NCD health facility data analysis guide and a standard NCD metadata package to guide data recording and reporting for PEN, including HEARTS-S hypertension indicators. As these indicators were identified before HEARTS had been integrated by countries into their primary care systems, a review of indicators is timely to ensure inclusion of additional relevant indicators that can be accurately, reliably and feasibly collected based on country experiences.

The objectives of the meeting were:

1. To update on implementation of HEARTS in countries, with a focus on reporting of hypertension indicators from patient and programme monitoring systems
2. To review hypertension indicators and identify additional indicators for improving quality and coverage of services

# 2.

# PROCEEDINGS

## 2.1 OPENING AND BACKGROUND

The opening and background sessions of the meeting set the context for improving hypertension indicators, starting with the opening address given by the Director of the Department of Noncommunicable Diseases at WHO headquarters, followed by an overview on monitoring and HEARTS technical package including HEARTS-S module and presentation of meeting objectives and programme.

Dr Bente Mikkelsen warmly welcomed representatives of Member States, experts, partners and WHO colleagues. She underscored the need to improve access to quality hypertension treatment to decrease the burden of hypertension, which is a major cause of cardiovascular deaths and premature mortality, especially during COVID-19 pandemic where more than 50 countries have reported through WHO pulse survey, partial to full disruption of hypertension management services. She asserted each participant's role in country preparedness for COVID-19 and working towards achievement of SDG 3.4 target on reducing premature noncommunicable disease mortality by using effective, affordable and scalable interventions such as HEARTS technical package which has been implemented in over 20 countries. She elaborated on enhancing HEARTS-S indicators by reviewing country experiences in patient and programme monitoring and taking into account the opinions of experts on quality and coverage indicators for hypertension

services. She encouraged all participants to share monitoring experiences and propose a strategic set of standardized indicators for national, subnational and facility level reporting to support evidence-informed policies and decisions at all levels.

A background on monitoring for hypertension and HEARTS technical package was provided. In monitoring, relevant outcomes should be clearly defined to track performance and achievement of programme targets at different levels from facility to subnational and national level. Patient-level data from registers and clinical audits are used at facility level. On the other hand, aggregate facility reports and community-level surveys provide data to assess subnational performance over time, while population survey may be needed for national level monitoring. The indicators and data sources across levels change as needs for monitoring vary.

HEARTS technical package is a primary care approach for managing cardiovascular diseases particularly hypertension and diabetes. The HEARTS-S has addressed the gap in NCD clinical outcome indicators collection and reporting at health facility, subnational and population levels. At health facility level, six-monthly control of blood pressure among people treated for hypertension, a cohort type of indicator, is a core indicator and can be sourced from treatment cards and facility registers that countries have adapted to their facility data collection systems. At subnational

level, two important indicators, namely, the control of blood pressure among people with hypertension and availability of core CVD drugs in a given geographical area are estimated from facility reports. Data from population-based surveys such as the WHO STEPwise Approach to NCD Risk Factor Surveillance (STEPS) can be used to estimate blood pressure control rate as well as proportion of eligible persons receiving drug therapy and counseling which is linked to the NCD global target. HEARTS-S module provides supervision and clinical audit checklist to help facilities assess quality of care and data.

## 2.2 COUNTRY EXPERIENCES IN PATIENT AND PROGRAMME MONITORING SYSTEMS FOR HYPERTENSION MANAGEMENT AT PRIMARY CARE LEVEL

Representatives from Chile, India, the Islamic Republic of Iran, Nigeria, Tajikistan and Viet Nam presented hypertension burden in their respective countries as well as their implementation experiences in adapting HEARTS technical package including hypertension indicators and patient and programme monitoring systems.

### Hypertension prevalence and population with hypertension across cascade of care

Hypertension prevalence estimates in the six countries ranged from 20% to 45%. One country who reported estimates by residence and by sex, noted higher rates among urban residents compared to rural residents and among males compared to females. One country acknowledged the lack of nationally representative data to estimate hypertension prevalence.

In two countries, less than one-third of the population with hypertension were aware of their disease status. Based on latest population-based surveys, treatment and control rates vary across two countries from 20% to 60% and from 10% to 30%, respectively. In one country, the existence of a policy that recognizes hypertension as a national public health priority and

guarantees timely access to quality care and financial protection to all diagnosed patients was considered instrumental in improving awareness, treatment and control rates. One country attributed the observed 11% decline in hypertension control rates from 2019 to 2020 to the disruptive impact of COVID-19 pandemic on health systems.

### HEARTS implementation

Countries are at different phases of HEARTS implementation. One country has just pilot tested in a few primary health care (PHC) centres and has recently started to develop national guidelines, while others are starting to scale up implementation to more PHC sites, with support from WHO and Resolve to Save Lives. Countries have either set up a HEARTS programme or integrated HEARTS into national NCD programs such as their programme on WHO Package of Essential NCD interventions, by including some components of HEARTS into their guidelines. Countries continue to rollout HEARTS in primary health care centres more widely, albeit slowly due to COVID-19 pandemic.

Existing comprehensive NCD programs have adapted HEARTS components to their country health care models. In one country, screening for hypertension is incorporated in community and home-based services as clinicians do not carry out hypertension screening in health facilities to decongest high-volume facilities. Recommended target age groups for screening may differ from recommended risk-based target age group in HEARTS.

### Discussion

- In one country, the national protocol recommends screening from 18 years old to enable diagnosis of hypertension at early stages, based on anecdotal reports of cases observed in younger age groups. Risk-based screening may be considered for greater efficiency, ensuring that the system reached more individuals needing care given the constrained resources.

## HEARTS-S module and hypertension indicators

Countries found the HEARTS-S module helpful for designing forms and for implementing standardized indicators that are useful for clinical management. The module underscores the importance of monitoring the achievement of programme goals.

Most hypertension indicators in HEARTS are being implemented by countries with some adjustments in age and other socio-demographic disaggregation, blood pressure targets, time period and frequency of reporting of indicators based on country protocols and identified information needs.

Age, gender, education, urban-rural residence and geographic regions are some dimensions used by some of the countries to disaggregate population level indicators. Age categorization varies across countries. One country highlighted that the use of open-ended age interval such as 65 years old and above would not allow studying variation in rates among elderly groups. Assessment of indicator by age group would be ideal especially among those with a different target blood pressure.

Some countries use more frequent measures of hypertension control such as monthly or three-monthly instead of six-monthly control of hypertension, to facilitate early identification and recall of patients who missed scheduled appointments and to trigger programme quality improvement actions.

The indicator availability of core drugs is reported on a monthly basis instead of the recommended quarterly reporting in one country. In another country, this indicator was slightly modified to assess availability of three essential types of hypertension medicine. One country does not report drug stock-outs in facilities regularly but requires facilities to report when they experience drug stock-outs, which is a rare occurrence.

## Discussion

- Disaggregated indicators may be prone to random variation effect with short-range age categorization such as 5-year age groups that tend to generate small number of cases. Robust age-group specific estimates may be produced if a larger population of cases is observed.
- For monthly and three-monthly control rates, ascertainment of the status of patients with relatively stable conditions who do not have to be seen by clinicians every month or every three months will be difficult.

## Other hypertension indicators

The six countries also use other hypertension indicators for national, subnational and health facility level reporting.

### National level/subnational level

- Proportion of individuals aged 18 years and over in a given geographical area and year whose blood pressure was measured by health staff at least once a year
- Proportion of individuals with hypertension among the population with hypertension (diagnosed and undiagnosed) in a given area
- Proportion of individuals under treatment receiving medication in the last 3 months among the population with hypertension (diagnosed and undiagnosed) in a given area.
- Proportion of adult patients served by this clinic who are entered in the hypertension register, quarterly
- Blood pressure control at last month's visit among all enrolled patients taking blood pressure measurement at last month's visit
- People with blood pressure of  $\geq 160/100$  mmHg within the programme

- People with hypertension who had albumin-to-creatinine ratio (ACR) measurement during the last year within the programme

### Health Facility level

- Screening and diagnosis
  - Proportion of individuals aged 18 years and over who were screened for hypertension during their visit to the facility in the last six months
  - Proportion of patients with hypertension with all risk factors required for calculation according to the WHO PEN risk prediction chart
  - Proportion of patients with hypertension who have a risk assessment based on the WHO PEN risk chart
  - Percentage of patients with hypertension and diabetes who achieved glycaemic control as determined by recent measurements, quarterly
  - Percentage of patients with hypertension and diabetes among persons screened
  - Percentage of patients with hypertension who use tobacco among persons screened in country PEN
  - Prevalence of hypertension among people registered in country PEN
- Enrolment and treatment
  - Enrolment rate or enrolled patients among newly diagnosed excluding referrals
  - Proportion of individuals aged 18 years and over with elevated blood pressure started on anti-hypertensive treatment within the previous six months
  - Proportion of patients with ongoing CVD who are prescribed statins, quarterly
- Control/treatment outcomes
  - Proportion of patients with ongoing CVD who are prescribed statins, aspirin, and BP-lowering therapy, quarterly
  - Proportion of patients prescribed statins based on calculated risk, quarterly
  - Percentage of people with a history of high blood pressure who take a blood pressure lowering medication
  - Blood pressure control at last quarter's visit among all enrolled patients in the programme, reported quarterly and annually
  - Proportion of patients with hypertension who have  $\geq 30\%$  risk according to the WHO PEN chart and whose blood pressure is controlled, quarterly
  - Proportion of patients with hypertension whose risk is  $<30\%$  according to the WHO PEN chart and whose blood pressure is controlled, quarterly
  - Percentage of patients with diabetes with the last blood pressure reading (measured in the preceding 12 months) is 140/80 mmHg or less
  - Percentage of good blood pressure control in people with hypertension
  - Percentage of poor blood pressure control in people with hypertension
- Missed appointments and loss to follow-up
  - Three monthly patients who missed visits who were enrolled in previous quarter
  - Loss to follow-up - patient who did not visit even once in the last year
  - Loss to follow-up - patient who did not visit for 6 months continuously and with unknown treatment status

- Clinical protocol compliance and availability of equipment
  - Difference in health care worker’s knowledge scores between pre-and post-training evaluation
  - Blood pressure screening methods and hypertension medication prescribed as stipulated in desk guide (supportive supervision)
  - Availability of core commodities such blood pressure measuring device (health facility assessments)
  - Percentage of people with hypertension who received care in accordance with country PEN guidelines

### **Patient and programme monitoring systems**

Patient and service data flow is generally unidirectional from patient records and facility registers in health facilities, with some indicators aggregated as submitted to upper levels such as districts to province/ states then finally to central level for national-level reporting.

Countries vary in their application of digital technologies in collecting, storing and managing clinical data, ranging from non-adoption or fully paper-based system or a hybrid system of paper records and digital tools, to a fully digitalized information system in majority of primary health care facilities. In one country, the use of unique identifier number has facilitated extraction of patient data from electronic health records. Programme officers with the assistance of statisticians can get reports from patient records.

### **Discussion**

- Private service provider data are not collected for monitoring hypertension programme. For countries where a big portion of the population are serviced by the private sector, this produces incomplete picture of hypertension service coverage. One country has started planning for inclusion of private sector data.

## **Unmet indicator needs and challenges**

### **Unmet indicator needs**

Countries identified important indicators which their information systems are not able to generate. These include hypertension prevalence particularly differences between older age groups (65 and above), hypertension control rates for older ages using higher blood pressure target of 150mmHg, hypertension complications and hypertension-related chronic disease mortality and quality of devices.

### **Challenges in longitudinally monitoring of patients across service cascade and facilities**

Countries identified patient visits to multiple facilities, patient drop-out from treatment, information technology limitations, and low monitoring capacities of health staff as key challenges to longitudinal patient monitoring. Patients seek care from different service providers or health facilities. Due to the lack of a mechanism for linking patient records from hospitals and primary care centres or clinics in both public and private sector especially for paper-based recording systems, data cannot be shared easily between facilities to facilitate longitudinal tracking of patients along continuum of care. In some instances, patients do not adhere to treatment plan and miss appointments, leading to losses to follow-up.

Longitudinal monitoring of patients is very challenging for countries or facilities without effective digital patient tracking tools for data recording and reporting. Despite the transition to digital systems, at least three countries reported challenges in data exchange between facilities or hypertension programmes due to the use of multiple parallel electronic health record systems and other patient monitoring apps that do not use standardized data and are not designed to communicate with other systems. In one country, plans are underway to allow interoperability between systems. Unfortunately, in another country, the collected data and the systems or software being used are owned by an outsourced software development company, making it difficult



and quite costly for the country to make any system changes.

Health staff have low capacity for monitoring. In one country, clinicians are unwilling to complete patient records electronically. Regular tracking of patients according to protocol is not carried out by health staff. Additionally, the burden of tracking patients is quite heavy given the large number of patients with hypertension. In one country, employee salaries are based on completion of patient electronic records, which may influence accuracy of data.

### **Challenges in monitoring outcomes, quality and coverage of services**

Countries reported lack of NCD indicators in routine health information systems, regular monitoring protocols, ineffective incentive mechanisms for target goals and completion of electronic records, low monitoring capacities of health staff as challenges in monitoring patient outcomes, quality and coverage of service. NCD indicators, including hypertension indicators, are not part of the routine facility data reporting system and there is no protocol requiring regular monitoring of programme. The HEARTS-S has contributed to the development of monitoring protocols in countries.

In countries with incentive mechanisms for achieving hypertension goals, great importance is placed on reporting outcomes to central level. The value of monitoring is not well understood by health staff or clinicians who are already burdened by high patient loads. In one country, programme managers are not well-trained in the use of digital extraction tools and thus they wait for statisticians to produce reports, leading to delayed reporting and use of data. Furthermore, data validation of indicators is not carried out.

Countries also cited the disruptive impact of COVID-19 pandemic on monitoring systems.

### **Discussion**

- Clinicians understand importance of monitoring but need to be incentivized. A well-designed incentivized monitoring

system must be established to promote the use of data for monitoring at facility level for improvement of patient outcomes and services instead of simply meeting reporting requirements.

## **2.3 EXPERT OPINION ON HEARTS-S MODULE AND HYPERTENSION INDICATORS**

Norman Campbell, Edward Gregg and Prabhdeep Kaur presented their opinions on HEARTS-S module and hypertension indicators. They also discussed desirable qualities of clinical indicators and common challenges and recommendation for implementing hypertension indicators.

### **Assessment of HEARTS-S module including hypertension indicators**

Experts agreed that the HEARTS-S module provides a simple, focused and practical framework for monitoring at health facility, subnational and national levels in resource-constrained settings. The module is anchored in the HEARTS technical package of balanced, multi-avenue approach to reduce hypertension, spanning health promotion, health systems improvement, health care access and population monitoring. It includes highly useful tools for recording and reporting that can be easily adapted by countries and a set of standardized indicators that track achievement of major goals of the hypertension programme, with one specific outcome indicator, six-monthly control of blood pressure, that is responsive to change. Indicators provide both short-term and long-term perspective on program functioning.

All HEARTS-S indicators are considered relevant but lack socio-economic attributes to reveal inequalities in health care access, specifically among vulnerable populations. Indicators do not encompass the different areas of service delivery such as screening, diagnosis and drug treatment, and treatment intensification and thus fail to identify critical gaps along the cascade of care that should be overcome in order to optimize patient outcomes.

## Desirable qualities of clinical indicators

Experts described desirable qualities of clinical indicators for selecting a priority set of indicators for monitoring programmes. Indicators should be simple, easy to understand and interpret. Indicators should be highly relevant, predictive of long-term outcomes and should reflect disparities in health care access and outcomes. Indicators should be actionable, providing clear guidance on clinical and public health interventions to implement in order to improve health system performance, ultimately, patient outcomes.

In addition to the desirable qualities outlined above, an ideal set of priority clinical indicators was defined as having a balance of comprehensiveness, flexibility and adequate focus on the cascade of care. Indicators with a strong global reach and an acceptable level of standardization across settings to allow consistent measurement, interpretation and comparisons should be included. The set of indicators should be feasible to collect based on current practice and available tools and technology.

## Common challenges in implementing hypertension indicators

Experts identified challenges in implementing hypertension indicators such as inconsistent indicator definitions, low quality data sources, problems with data availability and access, analysis and use. There is a lack of agreement on indicators. Countries, for example, use different blood pressure targets and measurement time frames when estimating blood pressure control rate. Variable specification of denominators for hypertension control indicators including use of prevalent cases instead of incident cases, use of routine data collection as opposed to cross-sectional surveys, and use of primary care registry compared to medication and pharmacy. Variation in measurement may lead to erroneous interpretation and distorted comparisons.

Data sources for estimating indicators may be of poor quality. Falsification of data can

occur in settings where only good results are acceptable. Some surveys may not be representative of target populations, especially in countries with very diverse geographies and ethnic groups. Population-based surveys are generally of national scale and cannot provide reliable data to produce subnational or district level indicators. Inaccessible data from paper records and the lack of supportive open data policies further restrict easy data sharing, leading to delayed access, analysis and use of available data.

## Recommendation to improve HEARTS-S and hypertension indicators

Experts recommended the following actions:

1. Standardization of indicator definitions and reporting, to produce metrics that are less influenced by variability and biases from data sources.
2. Inclusion of additional indicators.
  - a. Indicators that identify population with hypertension; unscreened population and undiagnosed population with hypertension; untreated diagnosed population with hypertension; patients treated but with uncontrolled blood pressure.
  - b. Indicator on control rates, using percentage out of control divided by total population or what proportion of the population has high blood pressure from a population-based survey, to resolve bias from estimation of denominator of diagnosed and treated population with hypertension.
  - c. Indicators that address health promotion and lifestyle approaches in high risk populations; context-specific barriers to care at either system or health care access level; implementation of recommended structural approaches, such as team-based care and decision support approaches; sentinel short-term outcomes such as stroke and myocardial infarction and



long-term outcomes such as renal disease and dementia.

- d. Indicators that provide short-term and long-term view of system functioning, and at the same time are feasible to collect compared to survey-based indicators, including opportunistic indicators such as drug use, and billing information.
3. Appropriate data analysis by clinic population and by catchment area including subgroup analyses to characterize clinical gaps in terms of age, gender, ethnicity, socio-economic status, residence type (rural/urban), employment status, insurance coverage type, etc.)
4. Implementation of subnational or district-level surveys while electronic routine facility data collection systems including patient monitoring systems and disease registries are still nascent or developing with low levels of coverage.
5. Application of digital technologies to support data collection, access, analysis and use.

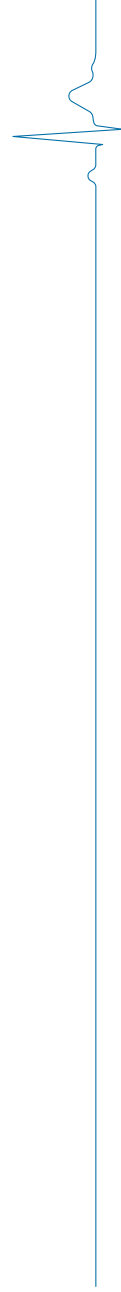
## 2.4 REVIEW AND REVISION OF HEARTS INDICATORS

On Day 2, a recap of previous sessions was

provided to give context to the review and revision of indicators. The participants were divided into three groups to review each of the hypertension indicators in HEARTS-S module guided by the following questions:

- Are the indicators defined to allow for gender- and human rights- based analyses? Are relevant dimensions such as sex, age, socio-economic status, education, ethnicity and place of residence, included?
- Are the indicators clearly defined to allow consistent assessments? Are the indicators feasible to collect and report accurately, consistently and timely?
- Are the indicators sensitive to change and can discriminate changes in quality of services? Are the indicators useful in identifying critical bottlenecks /gaps in service delivery?
- Are the indicators relevant for informing decisions routinely at specific levels: health facility, district/subnational, nationally?
- Is the set of indicators sufficient to accurately assess the performance of health system along cascade of care?
- Are there indicators for tracking short-, medium- and long-term targets for quality and coverage of services?

After the group work, rapporteurs from each group presented the feedback from their discussions. A plenary discussion followed to summarize the recommendation. A summary of comments and recommended actions to improve each HEARTS indicator is provided below.



**TABLE 1.**  
**Six monthly control of blood pressure among people treated for hypertension**

<b>DEFINITION</b>	Proportion of patients registered for hypertensive treatment at the health facility whose blood pressure is controlled 6 months after treatment initiation
<b>PURPOSE</b>	To measure the effectiveness of clinical services in the programme to control blood pressure among cohorts of treated patient
<b>METHOD OF CALCULATION</b>	<p>A = Number of patients with controlled blood pressure (SBP &lt;140 and DBP &lt;90 mmHg) at the last clinical visit in the most recent quarter (just before the reporting quarter) out of B</p> <p>B = Number of patients registered for treatment of hypertension during the quarter that ended 6 months previously; Calculation: <math>A \div B</math></p>
<b>SOURCE OF DATA</b>	Health facility register for hypertension
<b>RECOMMENDED TARGET</b>	Fix a target as per the local context
<b>KEY DATA ELEMENTS</b>	Date of registration, date of last visit, systolic blood pressure, diastolic blood pressure
<b>FREQUENCY OF REPORTING</b>	Quarterly
<b>USERS OF DATA</b>	<p>Facility managers: to understand what proportion of patients at their facility are achieving the blood pressure goal</p> <p>District-level manager: to assess the overall quality of hypertension treatment services, to identify poorly performing facilities and rectify problems at an early stage</p>
<b>DATA COLLECTION TOOL EXAMPLE</b>	Facility register for hypertension

Source: HEARTS Technical package for cardiovascular diseases: systems for monitoring. Geneva: World Health Organization; 2018 (<http://apps.who.int/iris/bitstream/10665/260423/1/WHO-NMH-NVI-18.5-eng.pdf?ua=1>; accessed 10 March 2020).

## Discussion

- This indicator is sensitive to program performance at initial phase of treatment but may not be useful for assessing long-term control and retention of patient in the program.
  - The cohort-based approach of this indicator makes it quite complex and very difficult to explain to users. Furthermore, the numerator limits the indicator to assessing only the patients who visit the facility and disregards different modes of care such as community-based outreach for monitoring patients and validity of self-monitoring data.
  - This is difficult to estimate using paper-based records but may be feasible with electronic health records.
- Recommended revisions include
    - Flexible time frame according to country protocol such as three-monthly control whenever feasible, or longer-term control, at least one year. However, it was highlighted that three-monthly, six-monthly and annual control rates will not represent the same level of control and thus, will not be comparable.
    - Country-specific control criteria for subpopulations such as elderly and those with comorbidities or other high-risk factors.
    - Clinical audit as source of data for countries that use paper-records.

**TABLE 2.**  
**Control of blood pressure among people with hypertension within the programme**

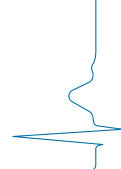
<b>DEFINITION</b>	The proportion of people with hypertension at health facilities in a given geographical area, such as a district, province, or state, with controlled blood pressure
<b>PURPOSE</b>	To measure the increase in coverage of the programme to treat and control hypertension in a given geographical area, such as a district, province, or state
<b>METHOD OF CALCULATION</b>	<p>A = Cumulative number of registered patients with controlled blood pressure (SBP &lt;140 and DBP &lt;90) in the most recent quarter at all health facilities in a given geographical area, such as a district, province, or state</p> <p>B = Estimated number of people with hypertension at the subnational level</p> <p>Calculation: <math>A \div B</math></p>
<b>SOURCE OF DATA</b>	<p>Numerator: registers from health facilities reporting in the given geographical area such as a district, province, or state</p> <p>Denominator: Prevalence of hypertension from population-based survey (STEPS or similar survey)</p>
<b>DISAGGREGATED BY</b>	Health facility
<b>RECOMMENDED TARGET</b>	Fix a target as per local context
<b>KEY DATA ELEMENTS</b>	Date of last visit, systolic blood pressure, diastolic blood pressure
<b>FREQUENCY OF REPORTING</b>	Annual
<b>USERS OF DATA</b>	<p>District, province, or state programme managers to monitor increase in programme coverage of hypertension services within a geographical area</p> <p>National programme managers to monitor progress towards universal health coverage</p>
<b>DATA COLLECTION TOOL EXAMPLES</b>	<p>Health facility register for hypertension</p> <p>Health facility report</p>

Source: HEARTS Technical package for cardiovascular diseases: systems for monitoring. Geneva: World Health Organization; 2018 (<http://apps.who.int/iris/bitstream/10665/260423/1/WHO-NMH-NVI-18.5-eng.pdf?ua=1>; accessed 10 March 2020).

### Discussion

- This indicator is quite complex and not actionable at health facility level.
- This cannot be used to measure coverage in a geographical area if not all facilities

are reporting. Estimates may not be reliable due to underreporting or non-reporting of private sector data. Moreover, patients may alternately seek care in both public and private sector. It will be a struggle to calculate the denominator.



- Private sector presence is an important factor and may be hard to define since patients may seek care in both public and private sectors.
- The estimate of denominator may not be reliable with low survey response rates.
- The use of different data sources can pose measurement issues related to movement of patients across geographical areas to seek care. It would be difficult to avoid duplicate counting for countries that do not implement national unique identifier numbers.
- It was noted that there is an equivalent indicator in STEPS that estimates the indicator, both numerator and denominator. This should be reflected in the indicator definitions.
- Countries use different targets for different age groups.
- Recommended revisions include
  - Disaggregation of data by private and public sector
  - Disaggregation by socio-economic stratifiers
  - Explicitly and clearly defined denominators to ensure the same catchment area for both denominator and numerator
  - Age-group specific targets for control as defined by countries
  - Clinical audits as alternative source of information

**TABLE 3.**  
**Availability of core cardiovascular disease/ diabetes drugs**

<b>DEFINITION</b>	The proportion of facilities in a given geographical area that have core CVD/ diabetes drugs available (see list of drugs below) <sup>1</sup>
<b>PURPOSE</b>	To ensure uninterrupted supply of essential drugs and thereby improve patient treatment adherence
<b>METHOD OF CALCULATION</b>	A = number of health facilities in the programme reporting “no stock-out” of core CVD/diabetes drugs in the last quarter B = Number of health facilities participating in the programme Calculation: A ÷ B
<b>SOURCE OF DATA</b>	Aggregated health-facility drug stock register; health facility report
<b>DISAGGREGATED BY</b>	Health facility
<b>RECOMMENDED TARGET</b>	No stock-out
<b>KEY DATA ELEMENTS</b>	Count of number of facilities reporting “no drug stock-out” in the last quarter; number of days of drug stock-out of selected medicine at each health facility
<b>FREQUENCY OF REPORTING</b>	Quarterly
<b>USERS OF DATA</b>	District- and province-level managers to focus supervision on health facilities reporting drug stock-outs, prevent drug stock-out situations and strengthen health systems to ensure uninterrupted drug supply
<b>DATA COLLECTION TOOL EXAMPLE</b>	Health facility report

1 thiazide or thiazide-like diuretic, calcium channel blocker (CCB) (long acting) (amlodipine), angiotensin converting enzyme inhibitor (ACE-I) (long acting) and angiotensin receptor blocker (ARB), statin, insulin, metformin, glibenclamide, beta-blocker, aspirin.

Source: HEARTS Technical package for cardiovascular diseases: systems for monitoring. Geneva: World Health Organization; 2018 (<http://apps.who.int/iris/bitstream/10665/260423/1/WHO-NMH-NVI-18.5-eng.pdf?ua=1>; accessed 10 March 2020).

### Discussion

- The list of core drugs defined for this indicator is not the same as the list of drugs used in local programmes.
- In some areas, drugs are not dispensed by health facilities but by community pharmacy. The indicator needs to account for variations in drug dispensing models. The WHO Essential Medicines and Health Products Price

and Availability Monitoring Mobile Application (WHO EMP MEDMON) may be useful for generating drug availability indicator.

- Recommended revisions include
  - Stipulation that drugs are based on treatment protocol
  - WHO EMP MEDMON as source for indicator estimation

**TABLE 4.**  
**Hypertension control in the population**

<b>DEFINITION</b>	Proportion of all people with hypertension with controlled blood pressure in the population
<b>PURPOSE</b>	To measure population-level hypertension control, including trends over time
<b>METHOD OF CALCULATION</b>	<p><b>A</b> = Number of respondents with SBP &lt;140 and DBP &lt;90 who are EITHER being currently treated with medications for hypertension OR have been diagnosed with hypertension</p> <p><b>B</b> = Number of survey respondents with SBP ≥140 or DBP ≥90 OR who are currently treated with medicines for hypertension</p> <p>Calculation: <math>A \div B</math></p>
<b>SOURCE/METHODOLOGY</b>	Population-based sample survey (national or subnational health survey)
<b>DISAGGREGATED BY</b>	Age, sex, socio-economic status
<b>FREQUENCY OF REPORTING</b>	Once in 3–5 years
<b>USERS OF DATA</b>	<p>National policy makers to measure progress toward universal health coverage, formulate national health policies, allocate programmatic budget</p> <p>Global policy makers to compare progress in UHC across countries</p>
<b>DATA COLLECTION TOOL EXAMPLE</b>	WHO STEPS ( <a href="https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps">https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps</a> )

Source: HEARTS Technical package for cardiovascular diseases: systems for monitoring. Geneva: World Health Organization; 2018 (<http://apps.who.int/iris/bitstream/10665/260423/1/WHO-NMH-NVI-18.5-eng.pdf?ua=1>; accessed 10 March 2020).

### Discussion

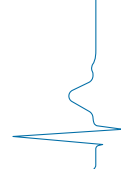
- This is considered a good quality population-based indicator for hypertension monitoring.
- The method of calculation needs to be reviewed. The denominator does not
  - include all groups measured in the numerator.
  - Recommended revision includes
    - Consistent definition of population groups observed for generating numerator and denominator values

**TABLE 5.**  
**Proportion of eligible persons receiving drug therapy and counselling**  
**(including glycaemic control) to prevent heart attacks and stroke**

<b>DEFINITION</b>	Percentage of eligible persons (defined as aged 40 years and older with a 10-year cardiovascular disease (CVD) risk $\geq 30\%$ , including those with existing CVD) receiving drug therapy and counselling <sup>1</sup> (including glycaemic control) to prevent heart attacks and strokes
<b>PURPOSE</b>	To measure change in population-level CVD-risk management
<b>METHOD OF CALCULATION</b>	A = Number of eligible survey participants who are receiving drug therapy and counselling <sup>2</sup> B = Total number of eligible survey participants. (defined as aged 40 years and older with a 10-year cardiovascular risk $\geq 30\%$ , including those with existing cardiovascular disease) Calculation: $A \div B$
<b>SOURCE/METHODOLOGY</b>	This is generated from population-based surveys such as a population-based sample survey (STEPS or similar survey)
<b>DISAGGREGATED BY</b>	Age, sex, socio-economic status
<b>RECOMMENDED TARGET</b>	5% increase every year
<b>FREQUENCY OF REPORTING</b>	Once in 5 years
<b>USERS OF DATA</b>	National policy makers to measure progress towards NCD global action plan targets Global policy makers to compare progress in NCD global action plan targets across countries
<b>DATA COLLECTION TOOL EXAMPLE</b>	WHO STEPS ( <a href="https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps">https://www.who.int/teams/noncommunicable-diseases/surveillance/systems-tools/steps</a> )

1 Feasible in settings that have a comprehensive population-based survey with behavioural parameters along with physical and biochemical measurements.  
 2 Use of the term “eligible persons” does not imply that others should not receive treatment. Countries may wish to consider analyses that include persons at high risk as defined by the national guidelines.

Source: HEARTS Technical package for cardiovascular diseases: systems for monitoring. Geneva: World Health Organization; 2018 (<http://apps.who.int/iris/bitstream/10665/260423/1/WHO-NMH-NVI-18.5-eng.pdf?ua=1>; accessed 10 March 2020).



## Discussion

- This is a good indicator for coverage of services. It is part of the WHO Global Monitoring Framework and should be reported to monitor achievement of targets. Use of different risk criteria in countries decreases comparability of this indicator.
- The impact of treatment and counseling interventions is not accounted for in the measurement of this indicator. Patients that move to lower risk groups are excluded from denominator, and thus may distort the metric, which is only measured once in five years.
- Countries lack timely data to estimate this indicator. Population-based surveys such as STEPS in some countries may only be implemented every 10 years. National surveys may not include specific questions to measure this indicator.
- Furthermore, the quality of surveys that use self-reports may affect the reliability of this indicator. Pharmacy-based data for assessing treatment may be used to complement self-reports.
- District level of this indicator would be useful but unfortunately there are no available district surveys. Frequent reporting of this indicator would be feasible at the facility level.
- Recommended revision includes
  - Use of alternative sources - health facility, pharmacy data



## ADDITIONAL/OPTIONAL INDICATORS

In addition to the suggested HEARTS-S indicator revisions outlined above, participants recommended development of additional specific indicators as well as conceptual indicators to supplement current HEARTS-S indicators. Countries with a strong technical capacity for clinical monitoring and a robust health information system infrastructure and strong technical capacities for clinical monitoring may collect and report these additional indicators based on their information needs across various levels of the system. Countries with nascent/limited monitoring capacities, on the other hand, may focus their efforts on collecting HEARTS-S indicators and as their health information systems improve, may consider reporting additional indicators.

## FACILITY-BASED INDICATORS

### 1. Screening and diagnosis

- Proportion of screened eligible patients who presented to the outpatient department
- Screening for risk factors for cardiovascular diseases using WHO CVD risk assessment or other assessments
- Screening among high risk groups
- Screening for complications such as target organ damage, through ACR, glomerular filtration rate (GFR), eye examination
- Blood pressure at time of diagnosis in intervals of blood pressure reading of 10mmHg or 140 mmHg versus 160 mmHg
- Hypertension detected from screening

### Discussion

- An indicator to measure success of opportunistic screening is needed.
- Blood pressure at time of diagnosis can demonstrate the delay in time of diagnosis.

- Measurement of risk factors for cardiovascular diseases is being carried out in facilities and it would be useful to have an indicator that reports on this.
- Adequate focus on screening specifically of high-risk groups and those with already existing comorbid conditions such as diabetes and stroke is needed.
- In some countries, ACR and GFR testing services are rarely offered at primary health care level facilities. It may be difficult to generate this indicator as data would need to come from secondary levels.

### 2. Treatment and control

- Number of patients controlled within the last 3 months/total number of patients registered
- Proportion of eligible individuals receiving drug therapy and counseling
- Proportion of patients with treatment intensified for uncontrolled blood pressure
- Control rate among patients with comorbidities
- Incidence of strokes/heart attacks/heart failure

### Discussion

- An indicator that measures control among cumulative registered patients provides long-term perspective, which is relevant to management of a chronic, life-long disease.
- Eligible individuals receiving drug therapy and counselling can be monitored more frequently than once in five years (from surveys), using facility data.
- Enough emphasis should be given to the treatment of people with hypertension suffering from

comorbidities and complications. Furthermore, blood pressure control target for patients with hypertension and diabetes may be higher than normal.

### 3. Patient adherence

- Patient medication adherence among registered patients
- Proportion of patients retained in care—loss to follow-up rate

#### Discussion

- Patient adherence plays a major role in the management of hypertension. It may be used as a metric of success of the programme. However, the use of self-reported questionnaires may be subjective and produce unreliable metric. Loss to follow-up rate may be explored as potential objective indicator.
- Alternative sources such as billing and pharmacy may be considered depending on reliability of data from these sources in countries.

### 4. Clinician compliance to protocol

- Overall compliance to protocol
- Use of recommended treatment protocol such as proportion of patients with medication started according to standard treatment protocol
- Standardized blood pressure measurement
- Facilities with supervision visit
- Completeness and timeliness of reporting of health facilities

#### Discussion

- Compliance to protocol or standards can be used as a metric for programme quality.

- Clinical audit and supportive supervision are important processes for improving quality of care.

### 5. Equipment and medicine

- Patient days with available medication
- Availability of equipment and technology used for blood pressure measurement

#### Discussion

- Patient days with available medicines would be useful to assess level of unavailability of medicines in facilities in addition to the related subnational indicator on number of facilities reporting no stock-outs.

### POPULATION-BASED INDICATORS

- Proportion of the population screened or whose blood pressure was measured by a health care worker
- Proportion of the population with hypertension, undiagnosed
- Proportion of the population with hypertension, diagnosed but untreated
- Proportion of the population with hypertension, treated but uncontrolled
- Premature mortality from NCDs
- Annual change in mean BP
- Cost of treatment and out-of-pocket expenditure

#### Discussion

- Population-based metrics should cover the cascade of care to reveal specific gaps in service delivery.
- Programmes that report higher mean blood pressure must work more to improve effectiveness of services to lower mean blood pressure in the population.

- Medicines may be available but not affordable to patients, leading to nonadherence to treatment. It is important to measure cost of treatment and out-of-pocket expenditures for hypertension drugs.

### **Discussion nonspecific to indicators**

- Having a common monitoring framework for hypertension and other NCD comorbidity disease programmes, such as diabetes, with indicators and assessments aligned wherever possible, will make it easier for facilities to understand indicators and implement monitoring.
- Clinical audit on a sample of patient records and supportive supervision are important processes not only for validating data but also for improving quality of care. The process involves providing feedback to clinicians and health staff and working with them to improve the programme. There are tools available for clinical audit and supportive supervision that countries can adapt to their context. It would be useful for countries to also share their experience in supportive supervision.
- Self-monitoring should be leveraged as data source for indicators related to patient management of hypertension.
- Countries are interested in adopting unique patient identifiers to facilitate longitudinal patient monitoring especially for management of life-long diseases.
- Development of simple tools that will aid health facility staff in entering data and computing indicators would help countries that have not yet transitioned to digital recording and reporting systems.



# 3.

# CONCLUSION AND RECOMMENDATION

Country experiences with HEARTS implementation including adaptation of HEARTS-S module with a focus on indicators for tracking HEARTS and hypertension programme goals, as well as opinions from hypertension monitoring experts, provided invaluable insight into the review of HEARTS-S module and hypertension indicators. Considering clinical information needs, desirable qualities of indicators and existing patient and programme monitoring capacities, participants gave specific recommendation for the improvement of HEARTS-S module, refinement of hypertension indicators and inclusion of additional feasible, practical and statistically sound indicators for monitoring quality and coverage of services. General recommendation on monitoring included harmonization of hypertension, diabetes other NCD comorbidity monitoring frameworks, development of simple tools for digital data entry and calculation of indicators, adoption of unique health identifiers for longitudinal monitoring and implementation of clinical audits and supportive supervision. HEARTS hypertension indicators shall be revised, and additional indicators developed to address the following:

1. Inclusion of equity measures such as socio-demographic dimensions of the population with hypertension.
2. Alignment with country-specific clinical protocols and targets.
3. Estimation of the population with hypertension along the cascade of care.
4. Assessment of comorbidities and complications.
5. Long-term tracking of patients, minimizing losses to follow-up.
6. Continuous improvement of quality of clinical programme.

# ANNEX 1.

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# ANNEX 2.

## Programme

### DAY 1: MONDAY 1 MARCH 2021

TIME	ITEMS	SPEAKER/MODERATOR
13:00 - 13:05	Procedures and setup	Leanne Riley
13:05 - 13:10	Welcoming remarks	Bente Mikkelsen
13:10 - 13:15	Introduction of participants	Leanne Riley
13:15 - 13:25	Background and objectives of the meeting <ul style="list-style-type: none"> <li>• HEARTS-S module and hypertension indicators</li> <li>• Objectives of the meeting</li> </ul>	Taskeen Khan
13:25- 14:55	Country presentations: patient and programme monitoring systems for hypertension management at primary care level <ul style="list-style-type: none"> <li>• Malau Mangai Toma - Nigeria</li> <li>• Leimapokpam Swasticharan - India</li> <li>• Melanie Paccot - Chile</li> <li>• Alireza Mahdavi Herzaveh - Iran (Islamic Republic of)</li> <li>• Bunafsha Jonova - Tajikistan</li> <li>• Tran Quoc Bao - Viet Nam</li> </ul>	Leanne Riley
14:55 - 15:25	Expert presentation: HEARTS-S module and hypertension clinical indicators <ul style="list-style-type: none"> <li>• Norm Campbell - University of Calgary</li> <li>• Edward Gregg - Imperial College of London</li> <li>• Prabhdeep Kaur - India Council of Medical Research</li> </ul>	Taskeen Khan
15:25 - 15:30	Summary and reminders for tomorrow's session	Arlene Quiambao

## DAY 2: TUESDAY 02 MARCH 2021

TIME	ITEMS	SPEAKER/MODERATOR
13:00 – 13:05	Recap of previous day's sessions	Andrew Moran
13:05 – 13:10	Introduction to group work: <ul style="list-style-type: none"><li>• Review of existing indicators</li><li>• Recommended revisions or additional indicators</li></ul>	Arlene Quiambao
13:10 – 14:10	Breakout groups	Facilitators/rapporteurs
14:10 – 14:50	Report back	Taskeen Khan
14:50 – 15:25	Recommended revision to hypertension indicators	Leanne Riley
15:25 – 15:30	Next steps and concluding remarks	Bente Mikkelsen



