

World Hypertension Day

Achieving population level hypertension control in WHO South-East Asia region

21 May 2025 (Wednesday)
11:00 AM – 12:45 PM (IST)



Register in advance for this webinar

https://who.zoom.us/webinar/register/WN_gjDvrQ-WSvajcdGuyF8EZw

After registering, you will receive a confirmation email containing information about joining the webinar.



Who should attend

- NCD programme managers
- Health care professionals
- Professional organizations
- Academic and research institutes
- Civil society organizations
- Any interested personnel

Topics

- Voice of people living with hypertension
- SEAHEARTS milestones achievements and what next
- Realistic drug quantification for implementing national hypertension management protocols
- Use of validated, automated blood pressure monitors for accurate and reliable blood pressure measurements
- Could home-based self-monitoring of blood pressure improve hypertension control rates?
- Implementing HEARTS package for better population level hypertension control: an experience from implementation research in Thailand



Webinar to commemorate
World Hypertension Day



**Achieving population level hypertension
control in WHO South-East Asia Region**

21 May 2025 (Wednesday)

Time (IST)	Agenda item	Speakers/moderators	 World Health Organization South-East Asia Region
11:00 HRS-11:05 HRS	Welcome remarks	Mr Rasheed Hussain, Director (HPN) WHO South-East Asia Regional Office (WHO SEARO)	
11:05 HRS-11:10 HRS	Voices of people living with hypertension	Parsa Municipality, Nepal	
11:10 HRS-11:20 HRS	SEAHEARTS milestones achievements and what next	Dr Pradeep Joshi, Technical Officer (NCD), WHO SEARO	
11:20 HRS-11:35 HRS	Ensuring the supply of medicines for implementing hypertension management protocols	Mrs Shyamala K, State Nodal Officer NCD, Govt of Andhra Pradesh, India	
11:35 HRS-11:50 HRS	Validated digital blood pressure measuring devices: A key to unlocking global hypertensin control	Dr Bolanle Banigbe, Global Technical Director Hypertension Control, Resolve to Save Lives	
11:50 HRS-12:05 HRS	Effectiveness of home-based self-monitoring of blood pressure in a primary care	Professor Rohit Bhatia, Professor, Department of Neurology, All India Institute of Medical Science, India	
12:05 HRS-12:20 HRS	Implementation research- improving hypertension control rates	Professor Chaisiri Angkurawaranon, Director, WHO Collaborating Centre on Prevention and Control of Cardiovascular Diseases in Primary Care, Chiang Mai University, Thailand	
12:20 HRS-12.45 HRS	Open forum for discussion and reflection	Moderated by Dr Nalika Gunawardena, Regional Adviser (NCD), WHO SEARO	

Welcome remarks

Mr Rasheed Hussain,

Director (Healthier Population and NCDs),
WHO South-East Asia Regional Office (WHO SEARO)

Voices of people living with hypertension



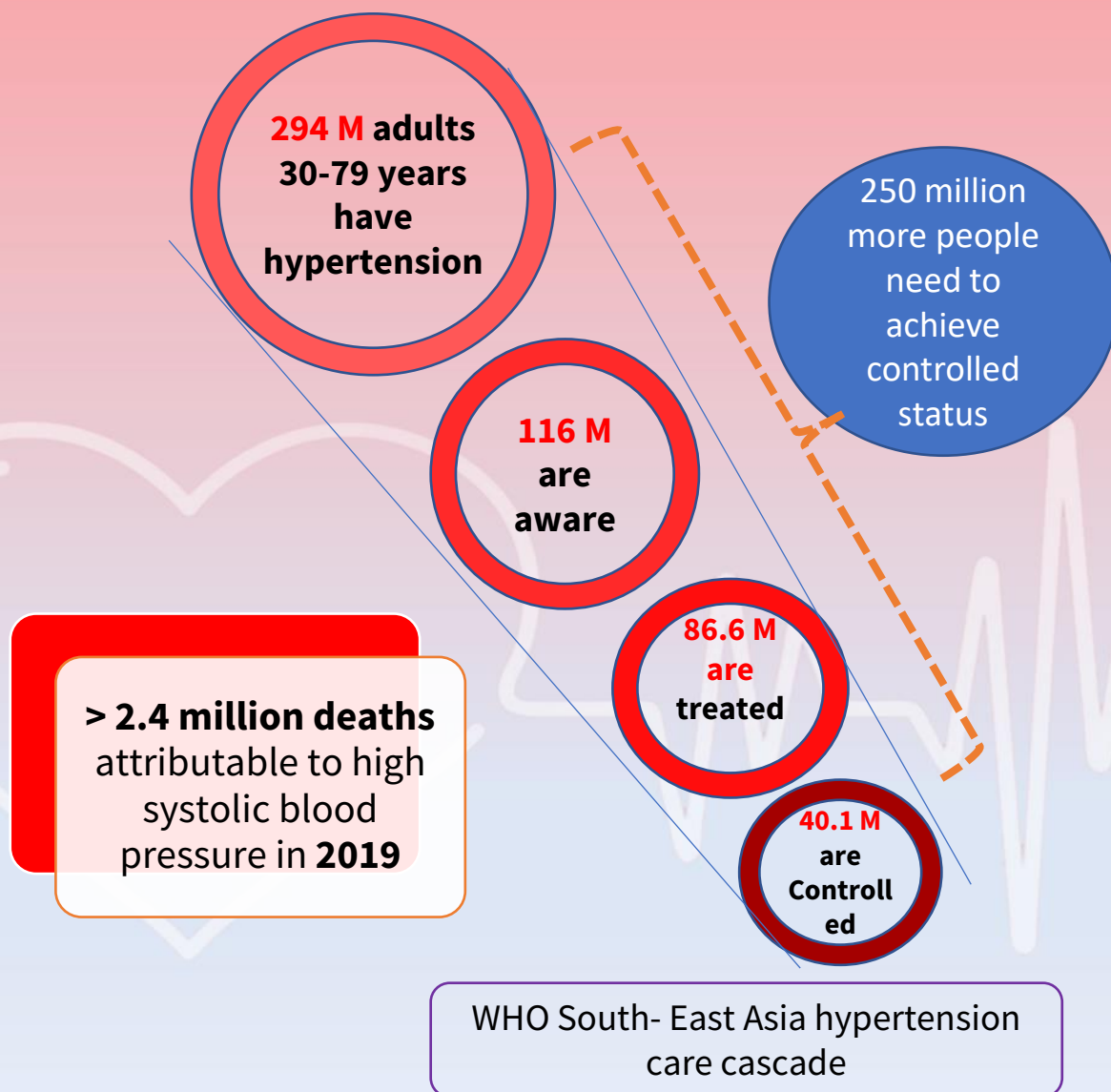
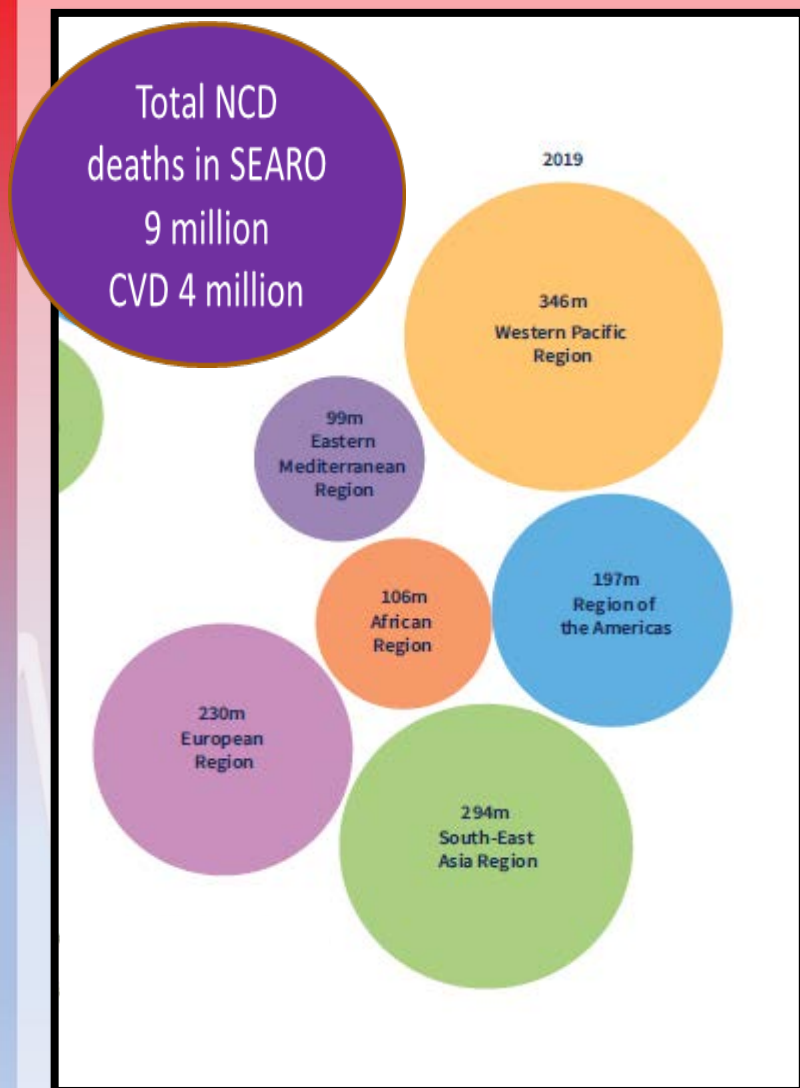
Nepal



SEAHEARTS milestones achievements so far and what next?

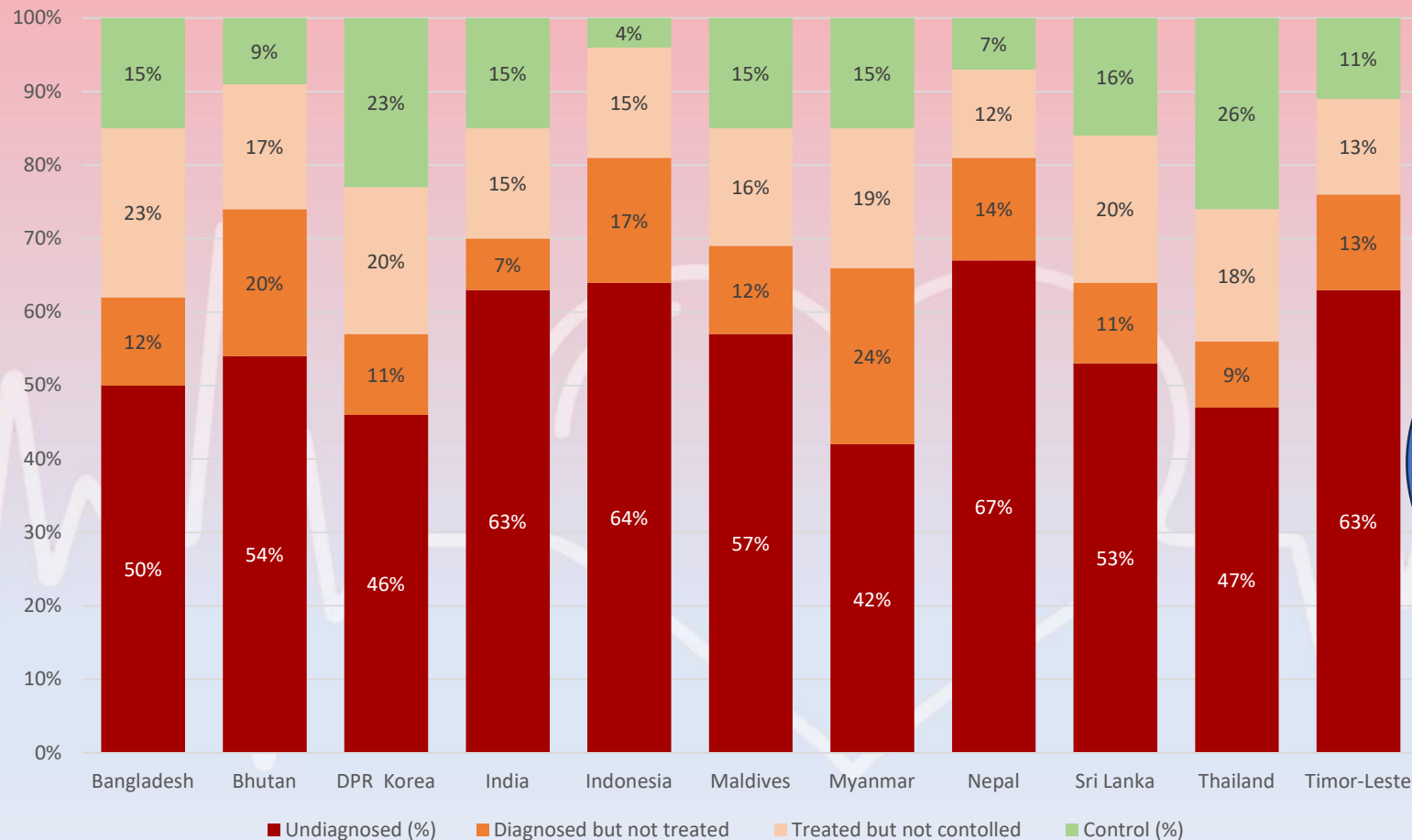
Dr Pradeep Joshi, Technical Officer (NCD), WHO SEARO

Burden of hypertension- WHO SE Asia Region



Hypertension care cascade - WHO SE Asia Region

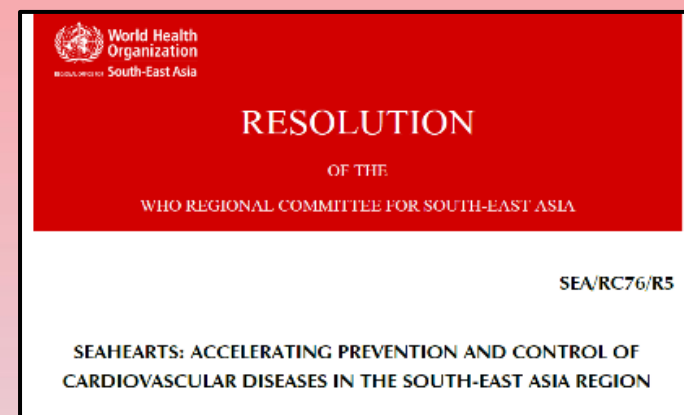
Hypertension care cascade, WHO South-East Asia Region, 2019 (age 30-70 years, both sexes)



Almost 70%
either
undiagnosed
or untreated!

Source: Global report on hypertension: the race against a silent killer. Geneva: World Health Organization; 2023.

SEAHEARTS – An initiative to reduce CVD burden in the WHO South-East Asia Region



One BILLION

people are covered by at least three WHO MPOWER measures for tobacco control by 2025



One BILLION

people are covered with at least one of the WHO SHAKE package measures for reducing salt intake by 2025



Two BILLION

people are protected from the harmful effects of *trans*-fatty acids through best practice or complementary policy measures of the WHO REPLACE package by 2025



100 MILLION

people with hypertension or diabetes are placed on protocol-based management by 2025

Collective milestones to be achieved in the region by 2025

Status of country commitments

8 out of 11 countries in the region set-up national targets accounting for more than 90 million people to place on protocol-based management



2023

Bangladesh

3 million

protocol-based care by 2025

Bhutan

50000

at least protocol-based management by 2025

India

75 million

protocol-based standard care by 2025

Nepal

1.5 million

protocol-based treatment by 2025

Timor-leste

50,000

protocol-based standard care by 2025

Thailand

+ 60%

improving control rate through innovation

2024

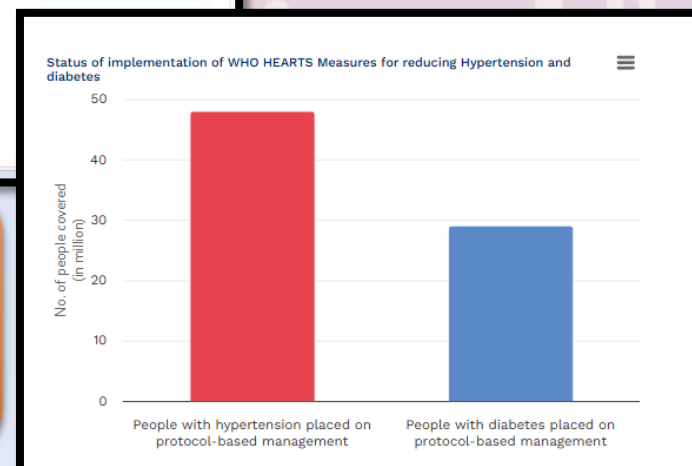
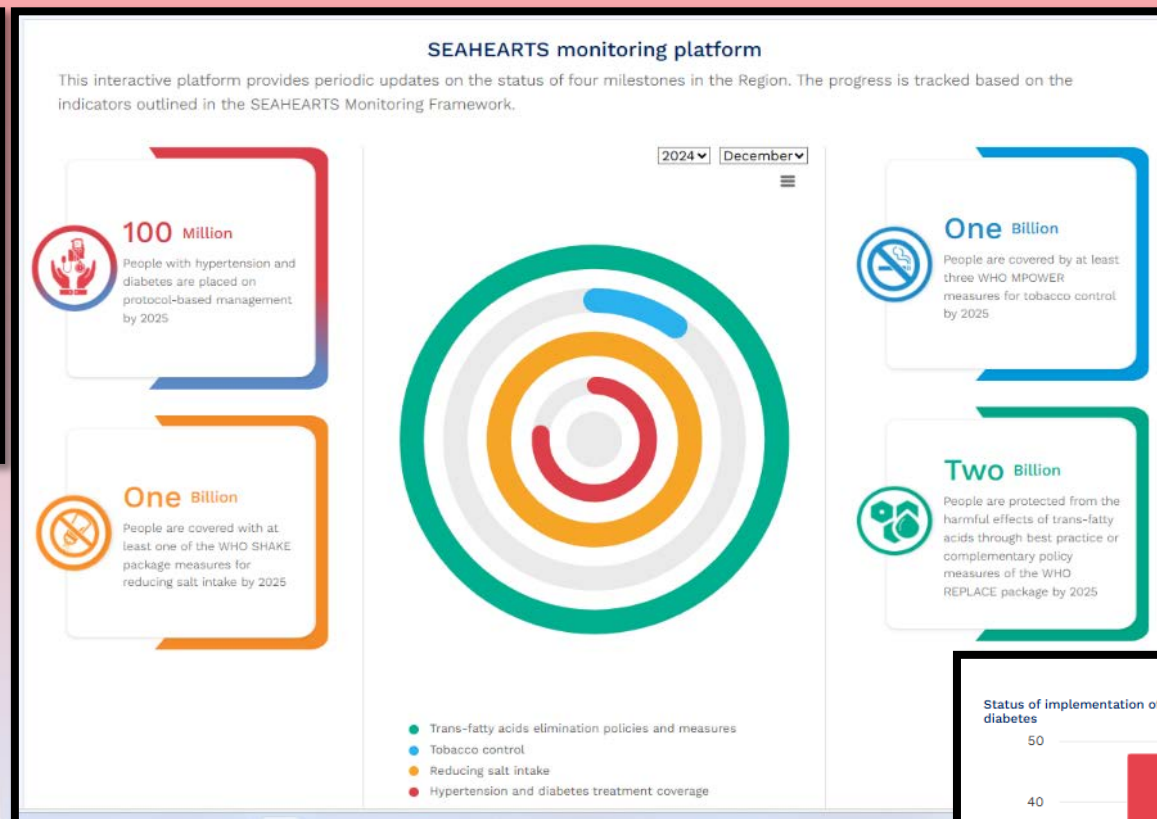
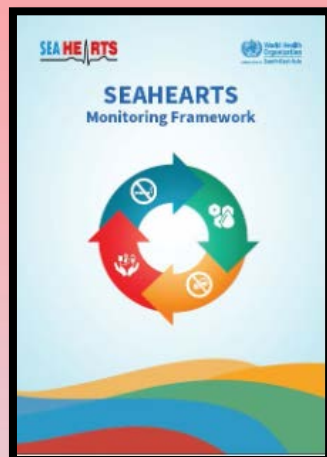
Sri Lanka

1 million on protocol-based management by 2025

Maldives

25,000 on protocol-based management by 2025

SEAHEARTS Monitoring Platform (Dec 2024)



77 million* people with hypertension and diabetes are place on protocol-based management (Dec 2024)

48 million people with hypertension

*Based on unique ID and has provision to avoid multiple counts of single person

Implementation status – hypertension treatment coverage and control (1)

Pointers for progress	Country response	WHO assistance
(H) Healthy lifestyle counselling (include brief intervention approach to reduce risk factors) in primary health care	All countries provide healthy lifestyle counselling. 5 countries (Indonesia, Maldives, Myanmar, Thailand, Timor-Leste) have dedicated personnel for counselling.	WHO app to Quit Tobacco
(E) Evidence- based national protocol (drug and dose specific) for HTN and DM implemented in primary health care	10 countries (except Maldives) Six countries updated after 2021	
(A) Availability of core medicines in primary health care*	All countries have anti hypertensive medicines mentioned in protocol in national essential medicine list	Drug Forecasting tool
Availability of core diagnostics in primary health care*	Total cholesterol testing available in 6 countries at primary and secondary health care	Landscape analysis of point of care devices

*‘generally available’ (available in 50% or more in the health care facilities) in primary health care facilities of the public health sectors
Medicines- Anti hypertensive (CCB, ACE, thiazides), / Diagnostics- Blood pressure measurement devise, total cholesterol testing)

Source: WHO NCD Country Capacity Survey, 2023

Acronyms (WHO SE Asia Countries): BGD – Bangladesh, BTN- Bhutan, PRK- DPR Korea, IND- India, IDN- Indonesia, MDV- Maldives, MMR- Myanmar, NPL- Nepal, LKR – Sri Lanka, THA- Thailand, TLS- Timor-Leste



Implementation status – hypertension management (2)

Pointers for progress	Country response	WHO assistance
(R) Use of CVD risk stratification approach in primary health care	All countries perform CVD risk assessment at primary health care 9 countries have guidelines to provide statin to people with high CVD score Three countries (MDV and LKA) use lab-based CVD risk assessment	Online courses and application develop to support countries
(S) Facility –based information system capable of longitudinal monitoring using unique ID's (digital or manual)	7 countries used mixed method (paper based and electronic), 3 countries uses complete electronic system Implemented in more than 75% of primary health care facilities in BTN, IND, THA, PRK	Facility based monitoring guidance E-tracker that can be linked with DHIS-2 health information system
Information system capable for generating control rates for hypertension and diabetes	Five countries (BGD, IND, MDV, LKA, THA) in the region has capacity to report on hypertension control (national/ subnational)	SEAHEARTS Monitoring Framework to guide countries



HEARTS approach is implemented in 17,360 facilities (Dec 2024)**

** Excludes data from PRK, IND, THA

Need of the hour to accelerate hypertension control

Fourth High-level meeting of UNGA on NCDs (Sep 2025)

Zero draft

Political declaration of the fourth high-level meeting of the General Assembly on the prevention and control of noncommunicable diseases and the promotion of mental health and well-being

Equity and integration: transforming lives and livelihoods through leadership and action on noncommunicable diseases and the promotion of mental health and well-being

We therefore commit with utmost urgency to:

25. Fast-track progress on noncommunicable diseases and mental health over the next five years, focusing on tobacco control, preventing and scaling up effective treatment of hypertension and improving mental health care, with the aim to achieve the following global targets: by 2030, 150 million less people are using tobacco, 150 million more people have hypertension under control, and 150 million more people have access to mental health care;



80% of people with diabetes are diagnosed



80% of people with diagnosed diabetes have good control of glycaemia



80% of people with diagnosed diabetes have good control of blood pressure



60% of people with diabetes of 40 years or older receive statins



100% of people with type 1 diabetes have access to affordable insulin treatment and blood glucose self-monitoring

Global Diabetes Coverage targets adopted at 74th World Health Assembly

Impact of achieving population level hypertension control

nature
medicine

ARTICLES

<https://doi.org/10.1038/s41591-022-01890-4>

 Check for updates

OPEN

Modeling global 80-80-80 blood pressure targets and cardiovascular outcomes

Sarah J. Pickersgill¹, William T. Msemburi², Laura Cobb³, Nicole Ide³, Andrew E. Moran^{3,4}, Yanfang Su¹, Xinpeng Xu⁵ and David A. Watkins^{1,6}  

$80\% * 80\% * 80\% = 52\%$

If countries scale up treatment to achieve 50 % control rate in the region, **> 7.2 million deaths** can be averted by **2040**

- Cardiovascular risk declines by **20%** for every 10-mmHg reduction in systolic blood pressure
- Every **1% increase** in hypertension control results in **average 2-3 % reduction** in mortality due to ischemic heart disease and stroke

Population hypertension control

Proxy of the overall performance of the programme

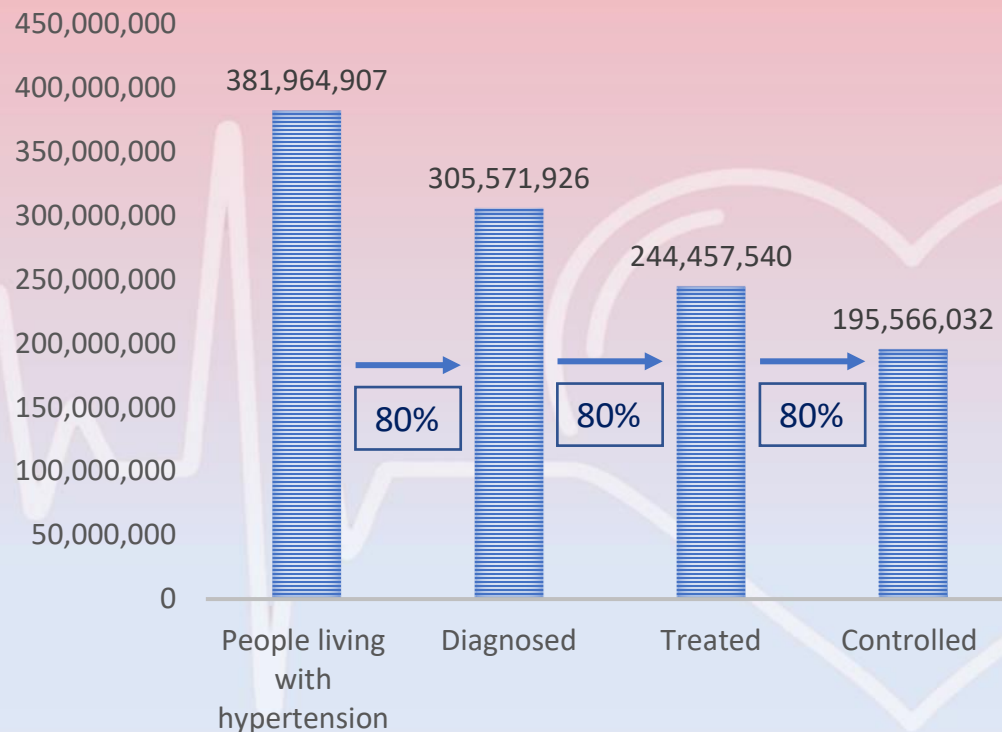
Composite indicator to inform on **access** and **quality care**

Sources: Ettehad D, et al. Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis. Lancet. 2016;387(10022):957-67.

Martinez R, et al. Association between population hypertension control and ischemic heart disease and stroke mortality in 36 countries of the Americas, 1990–2019: an ecological study. y. Rev Panam Salud Publica. 2022;46:e143

What it entails to achieve 80-80-80 in the regional context

80-80-80 TARGET PROJECTION FOR WHO SOUTH-EAST ASIA REGION



1.149 billion will be total adult population (aged 30-79 years) in 2030

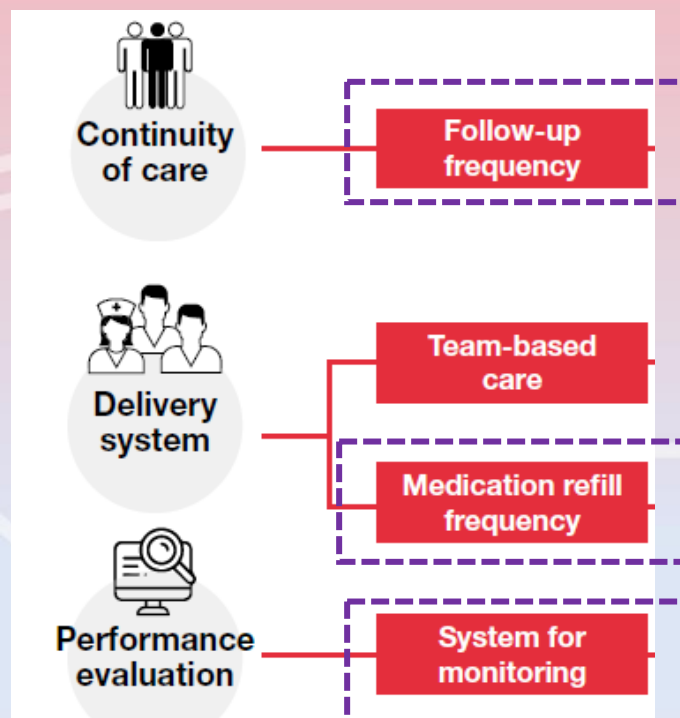
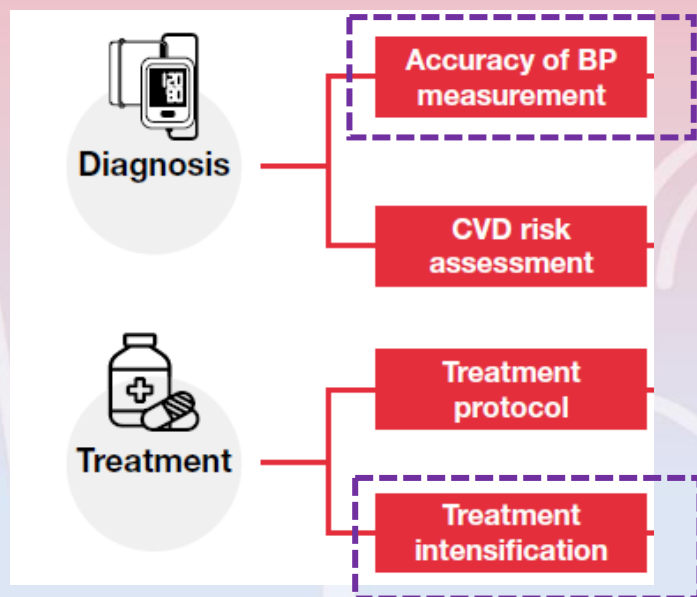
33% Projected prevalence of hypertension among aged 30-79 years in 2030 (considering the current trend)

To achieve a goal of 50% population hypertension control, an **additional 155 million** people with hypertension would need effective treatment by 2030

What need to be done

5 Areas

8 Drivers



Source: HEARTS in the Americas. Quality Improvement for Primary Health Care Centers, 2024

Leveraging SEAHEARTS achievements

- **48 million people** enrolled in protocol-based hypertension management to **achieve control status (higher control rates)**
- **Standardized treatment protocols** to be implemented across **246,000+ primary health care facilities** in the region
- **Clinically validated**, automated blood pressure devices to be deployed in all facilities;
- **Standardized training** for all care providers and programme managers; Over **3.5 million nurses and midwives** need to be oriented on accurate BP measurement
- **Opportunistic BP screening** at health facilities to close the gap in **undiagnosed hypertension**
- **Essential medicines to be made available** at both primary and secondary public health facilities for all enrolled individuals, with **30-day drug dispensing** aligned to national protocols
 - Medicine **quantification tools** used, alongside government advocacy for efficient procurement and supply chains (**minimum 1.4 billion pills every month**)
- **Immediate treatment initiation** upon diagnosis to reduce delay in care.
- Provision of **community health workers** to track readings of person taking treatment from private clinics—supported by **incentives**
 - Integration with electronic health records in private health facilities to ensure continuity of care
- **Monthly follow-ups** for individuals on protocol-based treatment; **successful community-level models** being identified for scale-up
- **Use of statins and aspirin** based on individual **CVD risk assessment and clinical history**

Need to integrate scoring system into existing Health Quality Assurance/ Quality Improvement initiatives: Implementation maturity index of a health facility

Use of automated and clinically validated BP measurement devices

Use of standardized drug and dose specific protocol

Medication refill for 30 days

Monthly follow-up to reach the BP control

Non physician community health workers measure BP

Intensify treatment until reaching BP control

Use statins and aspirin according to risk level and history of CVD

Monitoring and evaluation system with monthly feedback

Scorecard parameters

Use of evidence-based simple scores matrix on key domains primarily to gauge the readiness of health facility to improve treatment outcomes

Uniform matrix across all countries and to be used as part of primary health care quality improvement

Outcome measures to access quality of primary health care services

HEARTS performance index

Level of performance, goal, and scores	POOR (<50%)	INCIPIENT (≥ 50%)	ON TRACK (≥60%)	HIGH (≥70%)	EXCELLENT (≥80%)
Coverage ^a	0	1	2	3	4
Control (<140/90 mmHg) among all hypertensives treated	0	1	2	3	4
Control (SBP <130 mmHg SBP) among all hypertensives-high CVD risk	0	1	2	3	4

HEARTS Performance Index: Poor: Below <0.8, Incipient: 0.9 – 1.6; On Track 1.7 – 2.4; High 2.5 – 3.2; Excellent 3.3 – 4.0

^a Coverage: Proportion of people in the catchment area (clinical facility) who have been registered as hypertensive out of the best estimate of expected prevalence in the catchment area or larger geographical unit in a specific period of time.



South-East Asia Region NCD impact simulation tool

Introduction Dashboard Custom Results Methods

Select location:

SEARO

Select intersectoral policies to include: 1

- ☐ Alcohol intersectoral policies
- ☐ Alcohol tax
- ☐ Tobacco intersectoral policies
- ☐ Tobacco tax
- ☐ Trans fat elimination
- ☐ Sodium reduction

Set annual absolute coverage increase for clinical interventions (%): 1



Primary care clinical interventions

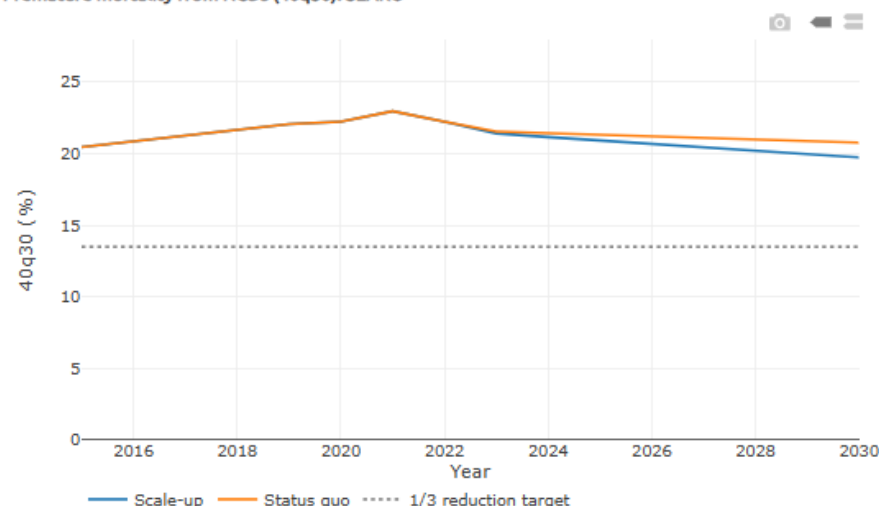
- ☐ Aspirin for suspected ACS
- ☐ Asthma/COPD acute treatment
- ☐ Asthma/COPD chronic treatment
- ☐ Cervical cancer screening and precancerous treatment
- ☒ Treatment of hypertension
- ☐ Treatment of hyperlipidemia

This web tool is designed to allow users to visualize the impact that a select package of NCD clinical interventions and int target 3.4: *Reduce premature mortality (40q30) by 30% by the year 2030.*

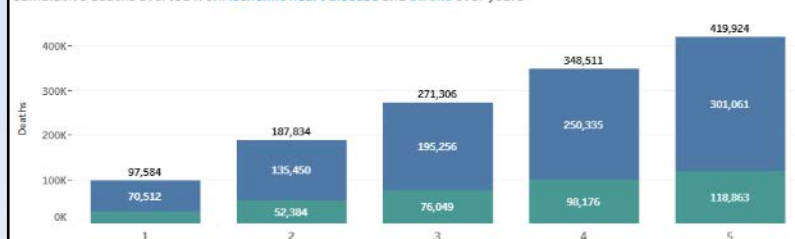
At the left, select your country and program specifications to generate results below. For a more advanced set of options information about the interventions or other model parameters, please see the 'Methods' tab.

You can download the data and report for this analysis using the buttons below. You can also save specific graphs by click each plot-window. This feature is recommended if you are using this app on a mobile device as the legend may obscure th

Premature mortality from NCDs (40q30): SEARO



Cumulative deaths averted from ischemic heart disease and stroke over years



Summary of results

SE Asia Impact simulation tool has potential to include baseline and targets to guide countries

Use the selectors below to set specific scenarios

1.- Location or population group

Location name
REGION OF THE AMERICAS

Total population

1,031,377,044

2.- Programmatic intervention

Scale up population hypertension control (%)

from baseline: 36.4 to target: 50.4

by scaling up:

Diagnosis (Awareness) among people with hypertension (%)

from baseline: 69.8 to target: 80.0

Treatment among those aware of the condition (%)

from baseline: 86.4 to target: 90.0

Hypertension control among those treated (%)

from baseline: 60.4 to target: 70.0

Hypertension treatment cascade indicator targets

Interaction: hover over the chart to update results



3.- Number of years to reach the target?

5

Thank you



› + +
Ensuring the supply of
medicines for implementing
hypertension management
protocols in India



Mrs Shyamala K,
State Nodal Officer NCD and HWC,
Govt of Andhra Pradesh, India





The urgent need to ensure medicine supply

Prevent Stock-Outs

- Maintain uninterrupted availability of essential hypertension drugs

Resource Optimization

Allocate budgets and logistics based on actual disease burden with alternative sources

Improve Adherence

Continuous drug access supports patient treatment compliance.

Monitoring & Evaluation

- Track drug usage patterns and outcomes to improve program performance.

Scale NCD Programs

- Expand protocols to other common NCDs

Realistic drug quantification

Development of Protocol

- ❖ State-specific standard treatment protocol developed for primary care providers
- ❖ Basis for accurate and need-based drug quantification

Pilot Implementation

- ❖ Initiated in 2 districts as pilot sites
- ❖ Feasibility, effectiveness, and supply-demand mapping tested

Statewide Rollout

- ❖ Scaled up to all districts after 2 years
- ❖ Informed by positive pilot outcomes

Andhra Pradesh

Hypertension Protocol



Measure blood pressure of **all adults over 30 years**

High BP: **SBP $\geq$ 140 or DBP $\geq$ 90 mmHg**

Check for compliance at each visit before titration of dose or addition of drugs

- Step 1** If BP is high:
Prescribe Amlodipine 5mg
- Step 2** After 30 days measure BP again. If still high:
Increase to Amlodipine 10mg
- Step 3** After 30 days measure BP again. If still high:
Add Telmisartan 40mg
- Step 4** After 30 days measure BP again. If still high:
Increase to Telmisartan 80mg
- Step 5** After 30 days measure BP again. If still high:
Add Hydrochlorothiazide 12.5mg
- Step 6** After 30 days measure BP again. If still high:
Increase to Hydrochlorothiazide 25mg
- ... After 30 days measure BP again. If still high:
Check if the patient has been taking medications regularly and correctly. If yes, refer to a specialist.

Pregnant women and women who may become pregnant

- ▲ DO NOT give Telmisartan or Chlorothalidone.
- Statins, ACE-inhibitors, angiotensin receptor blockers (ARBs), and thiazide/thiazide-like diuretics should not be given to pregnant women or to women of childbearing age not on effective contraception.
- Calcium channel blocker (CCB) can be used. If not controlled with intensification dose, refer to a specialist.

Diabetic patients

- Treat diabetes according to protocol.
- Aim for a BP target of $< 140/90$ mmHg.

Heart attack in last 3 years

- Add beta blocker to Amlodipine with initial treatment.

Heart attack or stroke, ever

- Begin low-dose aspirin (75mg) and statin.

Chronic kidney disease

- ACEI or ARB preferred if close clinical and biochemical monitoring is possible.

- If SBP > 180 or DBP > 110 , refer patient to a specialist after starting treatment.
- If SBP 160-179 or DBP 100-109, start treatment on the same day.
- If SBP 140-159 or DBP 90-99, check on a different day and if still elevated, start treatment.
- Recommended investigations at initiation of therapy: Haemoglobin, blood sugar, urine analysis for proteinuria, serum creatinine.

Lifestyle advice for all patients



Avoid tobacco and alcohol



Exercise 2.5 hours/week



Reduce weight, if overweight



Reduce salt, under 1 tsp/day



Eat less fried foods

- Eat 5 servings of fruits and vegetables per day.
- Avoid papads, chips, dattapays, dips, pickles etc.
- Use healthy oils like sunflower, safflower, groundnut, etc.
- Limit consumption of foods containing high amounts of saturated fats (cheese, ice-cream, fatty meats).

- Reduce fat intake by changing how you cook:
 - Remove the fatty part of meat
 - Use vegetable oil
 - Boil, steam, or bake instead of fry
 - Limit reuse of oil for frying
- Avoid processed foods containing trans fats.
- Avoid excess sugar, carbonated/packaged drinks.

IHCI India Hypertension Control Initiative

- Dispense drugs for 30 days and give appointment after 4 weeks
- Medications should be taken at the same time each day



Supply chain process

01.

Requirement Estimations

Drug requirements are calculated based on morbidity data and current stock position at health facilities at state level in alignment with the developed protocols

02.

Planning and Procurement

Annual drug procurement is done centrally to ensure uniform supply across the state through the corporation (APMSIDC)

03.

Scheduled Drug Distribution

Medicines are dispatched quarterly to Central drug stores at district for systematic distribution.

04.

Intra-District Redistribution

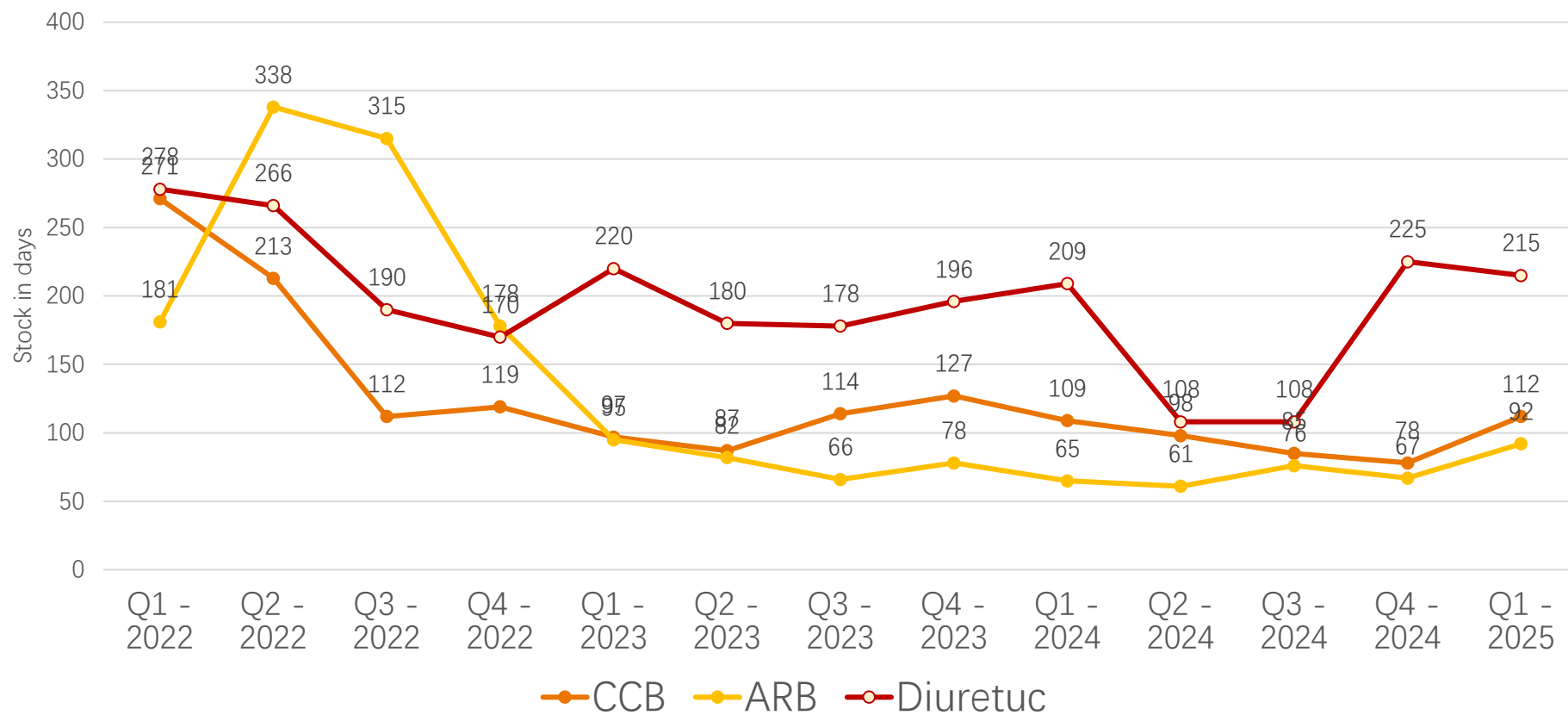
Monthly tracking to identify shortages or surpluses, enabling redistribution within the district health facilities..

05.

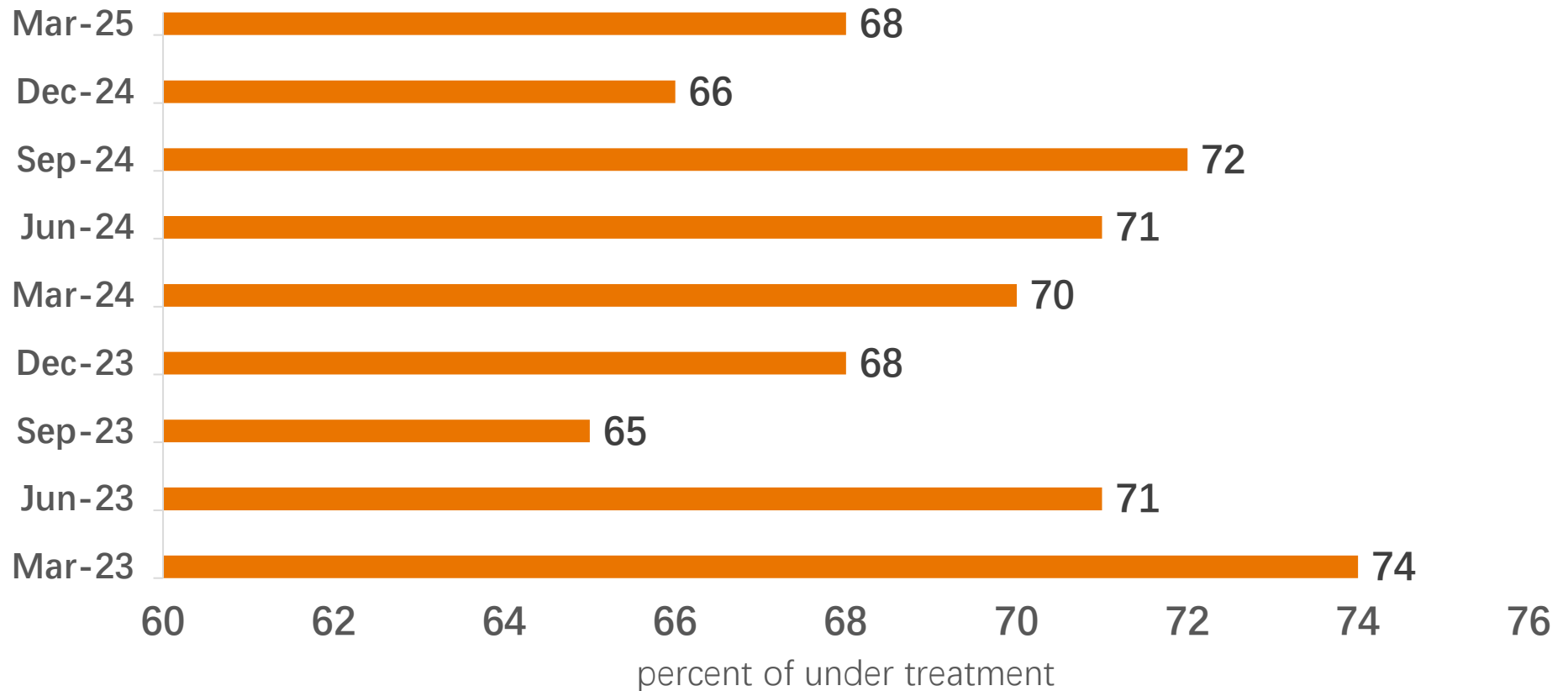
Digital Platforms for Real-Time Tracking

Systems like e-Aushadhi and CHO portal provide visibility into stock availability and consumption.

Quarterly Stock in Days of Antihypertensive Drugs (2022–2025)

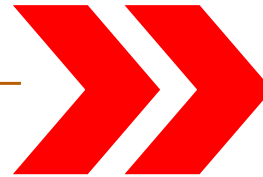


Quarterly follow-up of all the patients 2023–2025



Revision of hypertension treatment protocol

Step 1	Tab Amlodipine 5mg
Step 2	Tab Amlodipine 10 mg
Step 3	Tab Telmisartan 40 mg
Step 4	Tab Telmisartan 80 mg
Step 5	Tab HCTZ 12.5 mg
Step 6	Tab HCTZ 25 mg



**Fixed Drug Dose
Combination**

Tab Amlodipine 5 mg +
Tab Telmisartan 40 mg

Tab Telmisartan 40 mg +
Tab HCTZ 12.5 mg



Key enablers

- ❖ **The State Technical Committee** provided oversight and technical guidance on a single drug to fix the dose combination of anti-hypertensive medications.
- ❖ **WHO – IHCI Technical** supported strategic and technical assistance
- ❖ **NHM – Effective Fund Utilisation** Ensures complete utilisation of allocated funds for drugs under NHM.
- ❖ Policy Reforms
 - **Drug Categorisation:** Anti-hypertensive drugs, including second- and third-line medications, are available at every healthcare level.
 - **Institutionalising Drug Procurement:** Establishes drug procurement as a regular and routine process.

Challenges



- **Limited Real-Time Tracking:** Inadequate digital tools hinder timely monitoring of drug stock levels and consumption trends.
- **Distribution Inefficiencies:** Delays and mismatches in supply due to weak coordination between procurement, warehousing, and last-mile delivery.



Impact on programme

No Drug Stock-outs Since 2021

Ensured continuous availability of hypertensive medications across health facilities.

01



02



Increased Public Trust in the Health System

More patients shifted from private to public care; healthcare providers gained confidence in service delivery

03



Improved Treatment Adherence and Follow-up

Reliable drug supply led to higher monthly follow-ups and better patient compliance

04



Greater Operational Efficiency

Optimized procurement cycles reduced emergency purchases and improved resource planning.

05



Better outcomes

Evident of increased control rates and

06



Scalability to Other NCD Programs

Success extended to include quantification and supply of diabetes s

Lessons learned



- **Standardized Protocols Ensure Consistency:**
State-specific treatment and quantification guidelines promoted uniform practices across all districts.
- **Pilot Testing Enhances Implementation**
Trial runs in selected districts allowed for fine-tuning before a full-scale rollout, minimizing risks.
- **Centralized and Digital Systems Boost Efficiency**
Central procurement and platforms like e-Aushadhi ensured timely delivery, transparency, and accountability.
- **Collaboration Strengthens Outcomes**
Active involvement of stakeholders such as WHO-IHCL, NHM, and local bodies provided critical technical and operational support..
- **System Integration Ensures Long-Term Impact:**
Embedding procurement processes and drug categorization into health policy improved sustainability and benefitted other NCD programs.

Scaling and Sustainability Plans

Strengthening Digital Monitoring

e-Aushadhi Enablement (2025):

- Full implementation across all HWCs, AAMs, MMUs, and PHC/UPHC facilities.

Monitoring Dashboards – In Progress

- Real-time dashboards under development to support data visibility from state to AAM level.
- Aimed at improving tracking, responsiveness, and drug availability monitoring.



Thank you



Validated Digital Blood Pressure Measuring Devices: a Key to Unlocking Global Hypertension Control

Dr Bolanle Banigbe,

Global Technical Director Hypertension Control,

Resolve to Save Lives

Bolanle Banigbe MBBS, MPH, DrPH

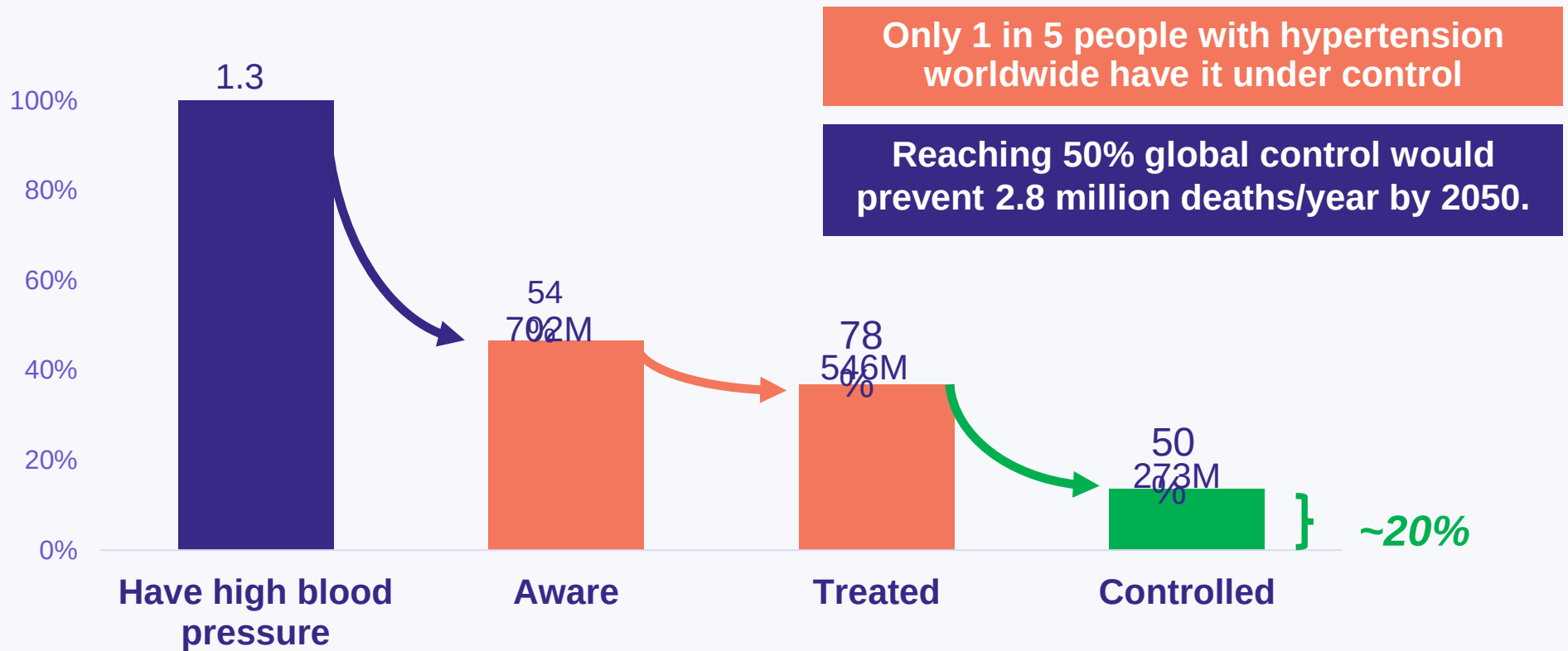


**High Blood pressure is the world's
leading killer responsible for more than 10
million deaths each year**

—

**58% of stroke deaths and 52% of heart attack
deaths are attributed to high systolic blood
pressure**

MOST PEOPLE WITH HYPERTENSION DO NOT HAVE IT UNDER CONTROL



World Health Organization, Global Hypertension Report (2023)



Accurate and reproducible BP measurement is the foundation for hypertension diagnosis and control

Reasons for missed opportunities to diagnose hypertension

- Clinic overload and inefficient patient flow
- Inadequate health care worker (HCW) staffing
- Complex BP measurement algorithms
- Lack of hypertension diagnosis when BP is elevated (diagnostic inertia)
- Lack of functional and reliable BP measuring devices (BPMs)
- Inaccurate readings missed diagnosis

BP measuring devices are KEY

WHO Recommends Validated Digital BP Measuring Devices in Primary Care Settings.

An Easy Way to Promote Task Sharing

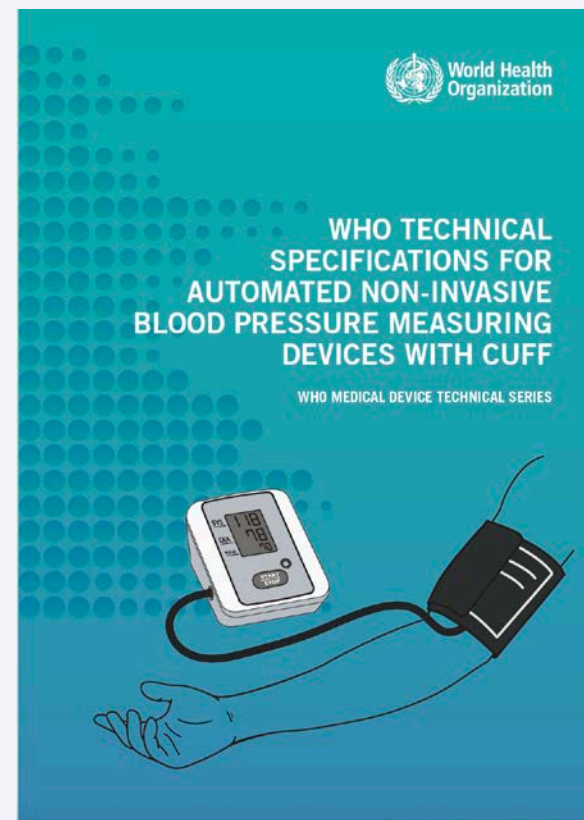
- ✓ Manual BP devices require significant training, and even experienced health workers can make mistakes.

With an Automated Digital BP Monitor:

- ✓ Health workers can focus on positioning the patient, improving accuracy.
- ✓ Health workers with less experience and training can take accurate measurements.
- ✓ Health workers can be confident in the results.



 MANUAL BP DEVICES Complex measurement process with significant opportunity for human error	 AUTOMATED DIGITAL BP DEVICES Simplified, expedited measurement process
✗ Incorrect cuff pressure ✗ Health worker hand fatigue from pumping up the cuff repeatedly ✗ Incorrect deflation rate ✗ Difficulty hearing Korotkoff sounds in a busy, noisy clinic ✗ Misreading or misremembering BP measurement value on the meter or column ✗ Rounding the observed values (terminal digit preference) ✗ Miscalibration	✓ Cuff automatically inflates to correct pressure ✓ No health worker hand fatigue ✓ Cuff automatically deflates at the correct rate ✓ Listening is not required ✓ Digital display of values on an easy-to-read screen eliminates misinterpretation ✓ Values stay on the screen until the device is reset or turned off; no need to rely on health worker memory ✓ Does not require calibration





VALIDATED DIGITAL BP MEASURING DEVICES

- Manual BP measurement devices present technical challenges, are more difficult to use in busy clinics and are susceptible to errors such as digit preference, observer bias etc.¹
- Current estimates indicate that 75–80% of digital BPMDs marketed globally do not have evidence of being adequately clinically validated for accuracy²
- Validation is rigorous accuracy testing against a gold standard to ensure that the device produces accurate measurements.
- Validated BP devices blood pressure within a certain level of accuracy of, usually 5-8mmHg.

WHY VALIDATED DIGITAL BP MEASURING DEVICES?

The consequences of errors in measurement of BP are huge at the individual and population levels.

- Health care worker mistrust of inconsistent BP reading → diagnostic inertia, therapeutic inertia, "correcting for errors"
- Overestimation of blood pressure by 10/5 mm Hg can create a marked increase in perceived hypertension prevalence (22% vs. 53%) together with a large drop in perceived hypertension control (21% vs. 4%).³

Validated BP devices are more durable and may generate cost savings



HOW TO VALIDATE BP DEVICES

- Devices should be validated by an independent entity (not affiliated with the manufacturer) using an accepted validation protocol.
- The cost of validation should be borne by the manufacturer
- Validation standards include:
 - American National Standards Institute/AAMI/ISO
 - AAMI/European Society of Hypertension (ESH)/ISO
 - European Committee for Standardization
 - International Organization for Standardization (ISO)



WHERE TO FIND VALIDATED DIGITAL BP DEVICES

There are free online resources that administrators, physicians, and care teams can use to identify BPMDs that have been validated for clinical accuracy. These include:

- <https://medaval.ie/>
- www.stridebp.org
- ValidateBP.org
- Regional Registries like [Hypertension Canada website](#), [The British and Irish Hypertension Society website](#) etc.



HOW TO INCREASE ACCESS TO VALIDATED DIGITAL BP DEVICES

- **Education and awareness raising**
 - Create demand by educating providers and procurement administrators on the importance of validation
- **Modifying procurement processes**
 - Ensure national medical device catalogues list only validated digital BP devices
 - Make validated BP devices easier to recognize in the procurement catalogues
 - Specify validation as a criterion in device purchase RFPs



PURSUE POLICY OR REGULATORY OPTIONS

- **Regulatory loopholes around BP devices exist in many countries**
- **Existing regulations tend to focus on safety rather than accuracy of digital BP devices**
- **Policy/ regulatory options include:**
 - Mandating sales of only validated digital BP devices in a country
 - Mandating use of only validated digital BP devices in primary care settings/public facilities
 - Requiring that government resources can only be used to purchase validated digital BP devices

EXAMPLES OF APPROACHES TO IMPROVE ACCESS TO VALIDATED AUTOMATED AT THE COUNTRY LEVEL BRAZIL AND CUBA³

Country	Focus	Strengths and challenges	Lessons to other countries
Brazil	Regulations	Strength: Strong regulatory system, with high technical capacity. Challenges: Compliance and enforcement. Approval of non-validated automated BPMDs of approved by authorities of IMDRF participating countries. Key action: Inclusion of ISO 81060-2:2018 and other accuracy validation standards on automated BPMDs marketing registration requirements.	Regulate acceptance of approval by other countries, including those belonging to the IMDRF. Enforce regulations, including the use of post-market surveillance
Cuba	Regulations Clinical validation studies	Strength: Domestic manufacturing and technical support to perform accuracy validation studies. Challenge: Budgetary limitations. Regulatory bottleneck. Key action: Performing accuracy validation study of a domestically produced automated BPMD.	Streamline regulatory processes. Obtain technical cooperation to build capacity to perform accuracy validation studies

Different approaches to improve access to validated automated BPMDs have been taken by governments of each country, based on their priorities, regulatory systems, political and economic characteristics.



SUMMARY

- **Accurate and reproducible BP measurement is the foundation for hypertension diagnosis and control**
- **Validated, digital BP measuring devices make this possible, especially in primary care settings**
- **Closing the policy and regulatory loopholes that allow unvalidated BP devices into countries and regions is the fastest way to make validated devices available**
- **SEARO and countries can learn from PAHO's regional approach**



CITATIONS

1. Sharman, J.E. et al. Automated ‘oscillometric’ blood pressure measuring devices: how they work and what they measure. *J Hum Hypertens* 37, 93–100 (2023). <https://doi.org/10.1038/s41371-022-00693-x>
2. Sharman, J.E., Ordunez, P., Brady, T. et al. The urgency to regulate validation of automated blood pressure measuring devices: a policy statement and call to action from the world hypertension league. *J Hum Hypertens* **37**, 155–159 (2023). <https://doi.org/10.1038/s41371-022-00747-0>
3. Lombardi, C. et al. Country experiences on the path to exclusive use of validated automated blood pressure measuring devices within the HEARTS in the Americas Initiative. *J Hum Hypertens* **37**, 120–125 (2023). <https://doi.org/10.1038/s41371-022-00706-9>

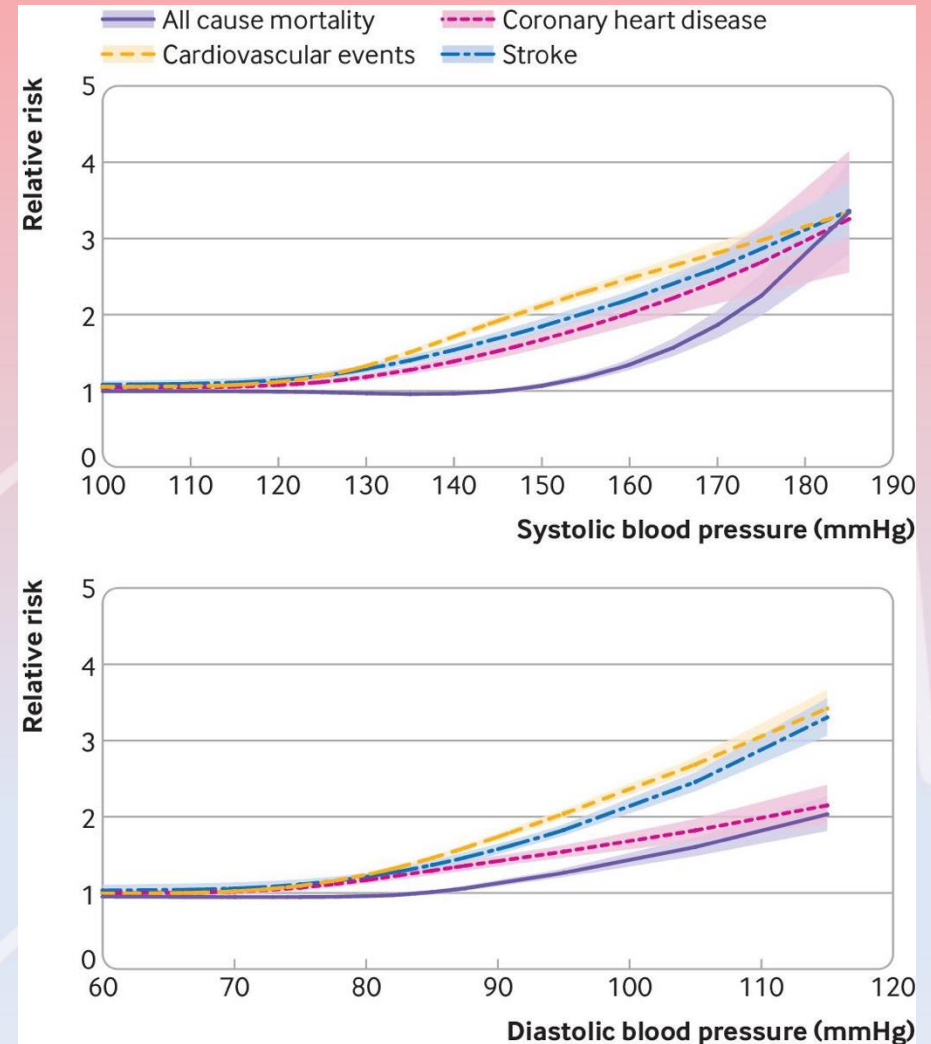
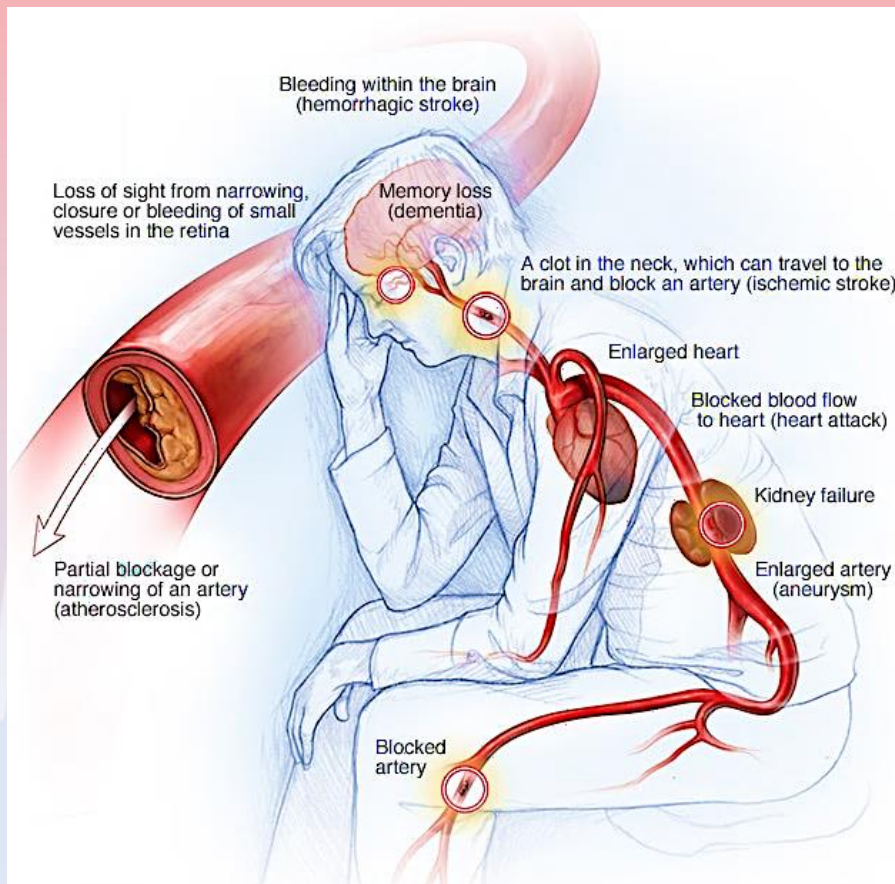
Effectiveness of Home-based Self-monitoring of Blood Pressure in a Primary Care

Dr. Rohit Bhatia

Professor, Department of Neurology
All India Institute of Medical Science, India



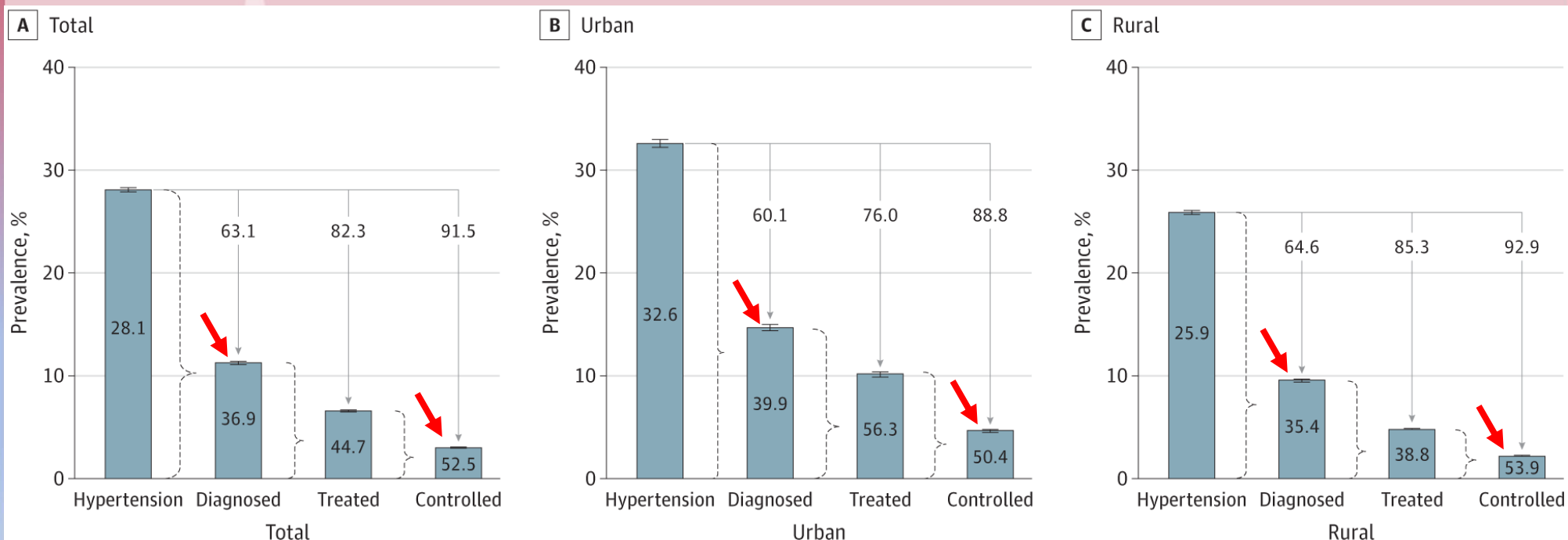
High Blood Pressure: “*The Silent Killer*”



Luo et al. BMJ 2020; 370. Meta-analysis

“Know Your Numbers” – But What if You Have Never Measured?

- In the National NCD Monitoring Survey 2017–2018, **47.6%** (95% CI: 45.2–50.0) reported having their BP measured **ever in their lifetime**



Diagnose. Treat. Control? But Gaps.....

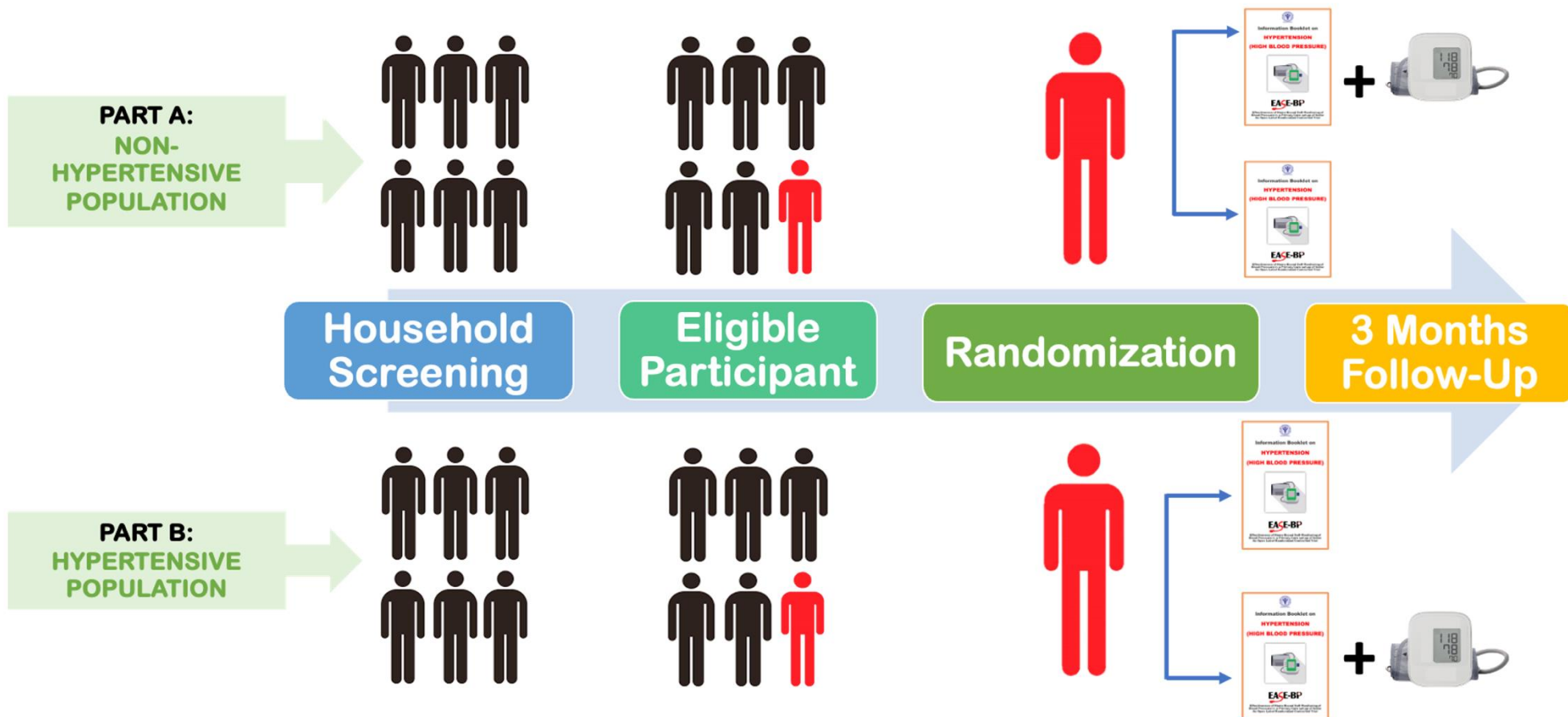
Challenges in Diagnosis

- Poor knowledge
- Asymptomatic = “*No illness*”
(*especially among young*)
- Limited access to screening
- Hypertension screening among adults >30 years once a year ≠ followed?

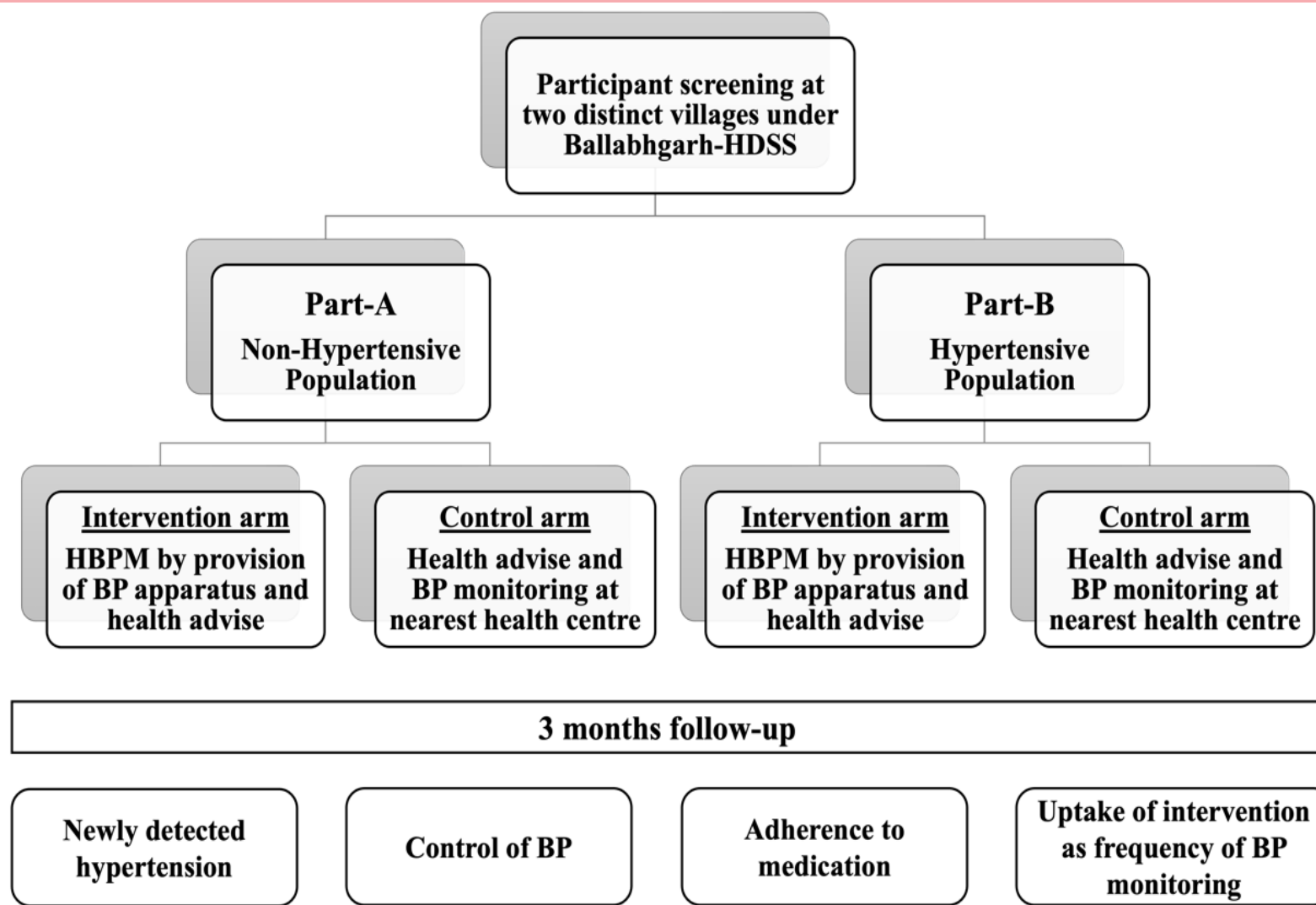
Challenges in Monitoring

- Inconsistent Follow-Up and Tracking
- High patient load and limited resources at health centers
- Lack of patient awareness
- Limited access to monitoring devices

The EASE-BP Trial



Study Flow



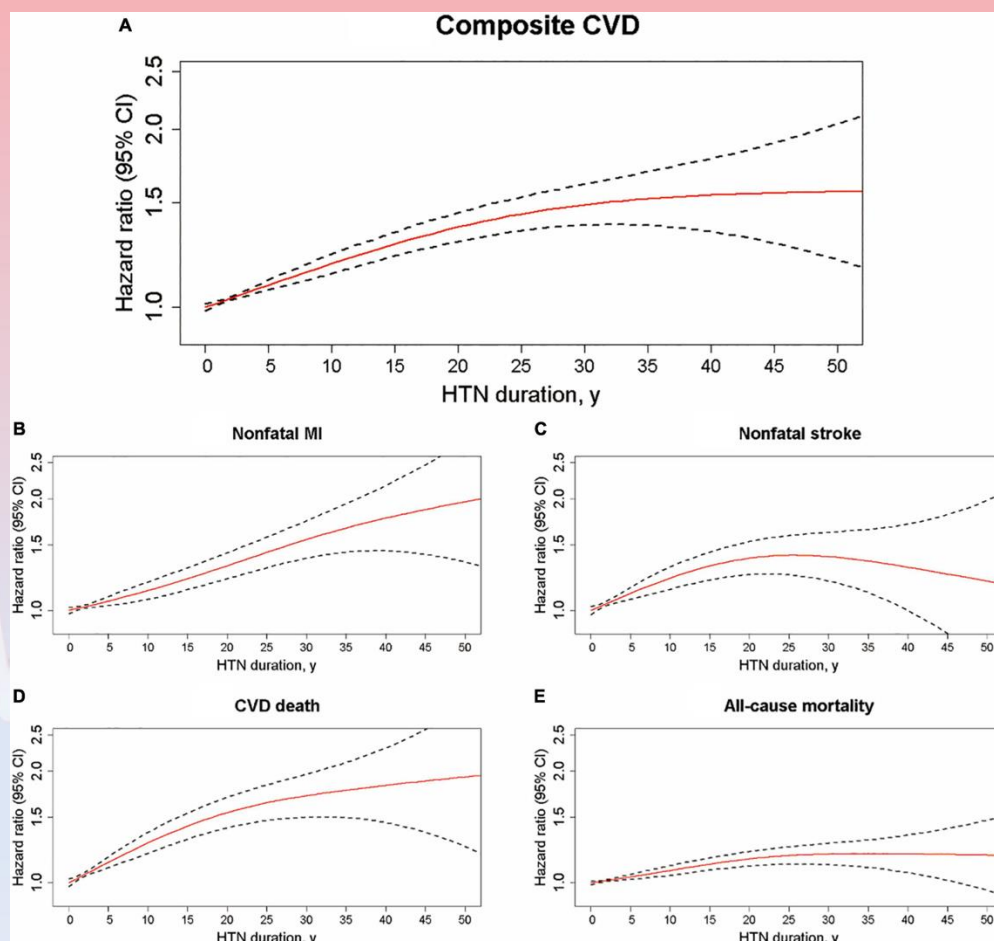
Effectiveness of Home-based SMBP Intervention in EASE-BP Trial

Uptake of the intervention as assessed by frequency of BP monitoring was significantly higher in the intervention group compared to control group among both participants and their family members

EASE-BP study intervention was effective in detecting hypertension compared to BP screening at health centres, among both participants and their family members

EASE-BP study intervention was effective in reducing blood pressure from baseline to 3-months follow-up. However, the delta mean change between intervention and control was not statistically significant

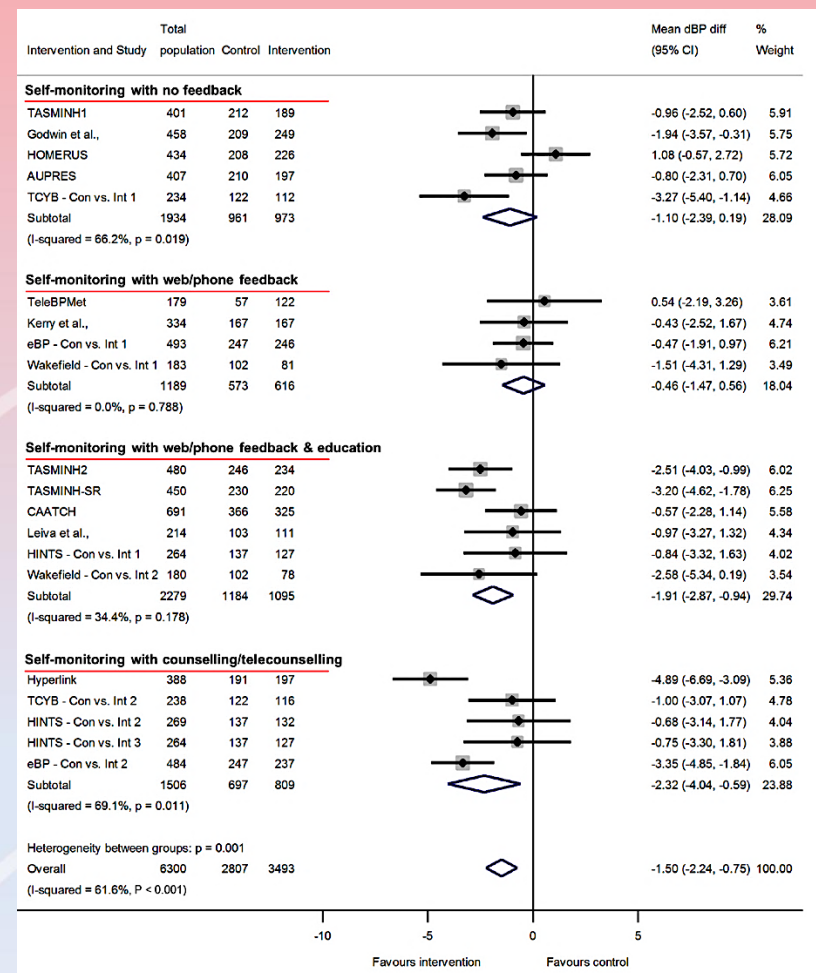
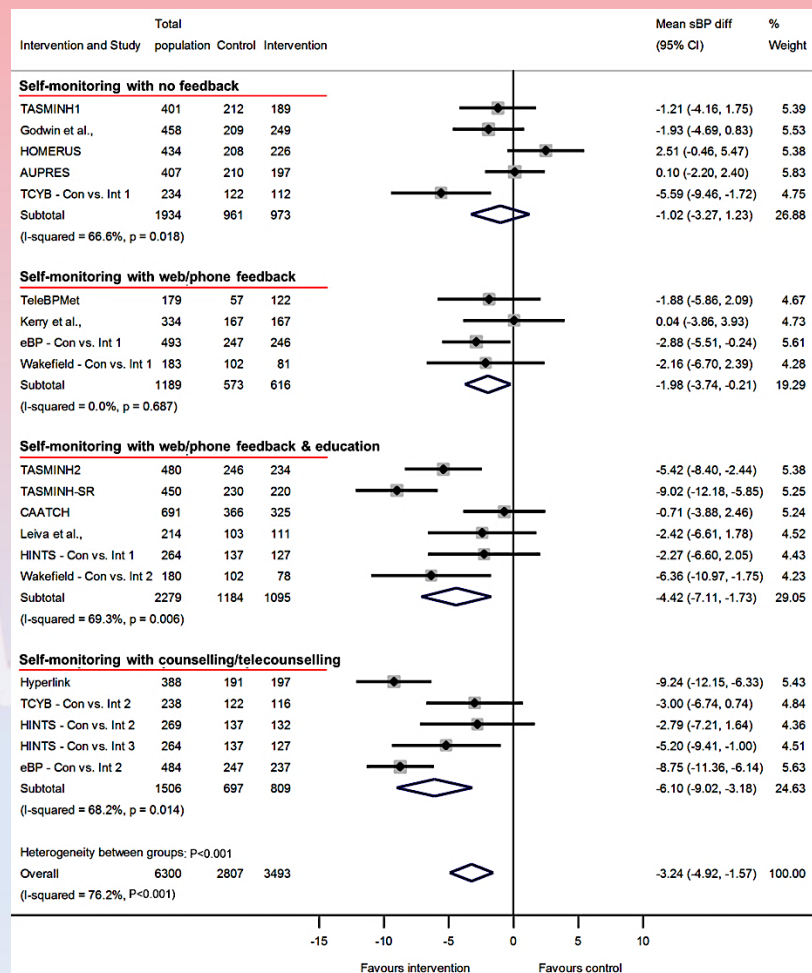
Blood Pressure Blind Spots: What We're Missing in Detection and Care



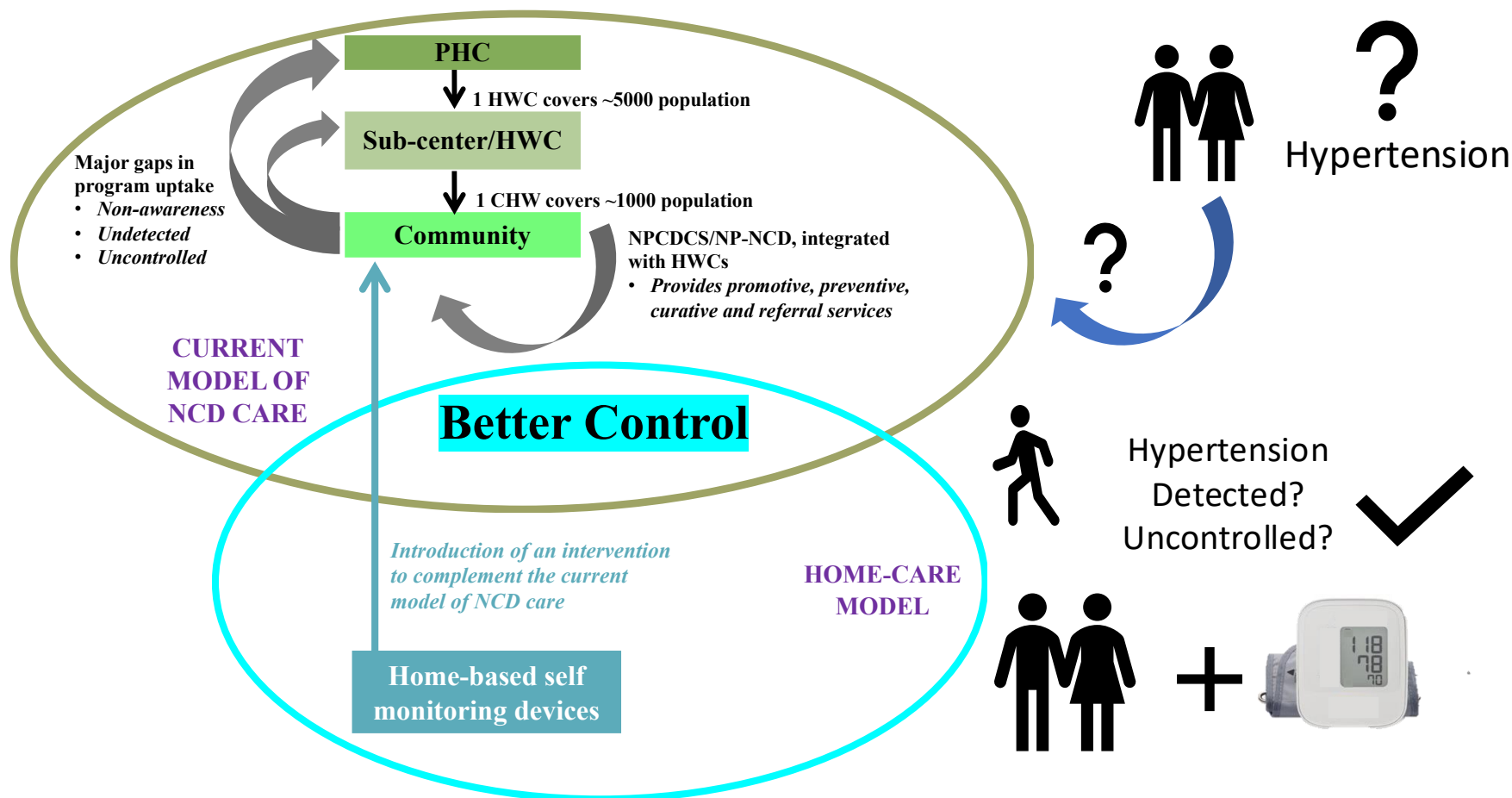
Longstanding hypertension (undetected or uncontrolled) leads to increased risk of Cardiovascular and Stroke morbidities

- Home-based SMBP as a potential strategy to detect hypertension and BP monitoring
- Integration into community practice of care
- Downstream care and management at patient level → *individual empowerment*

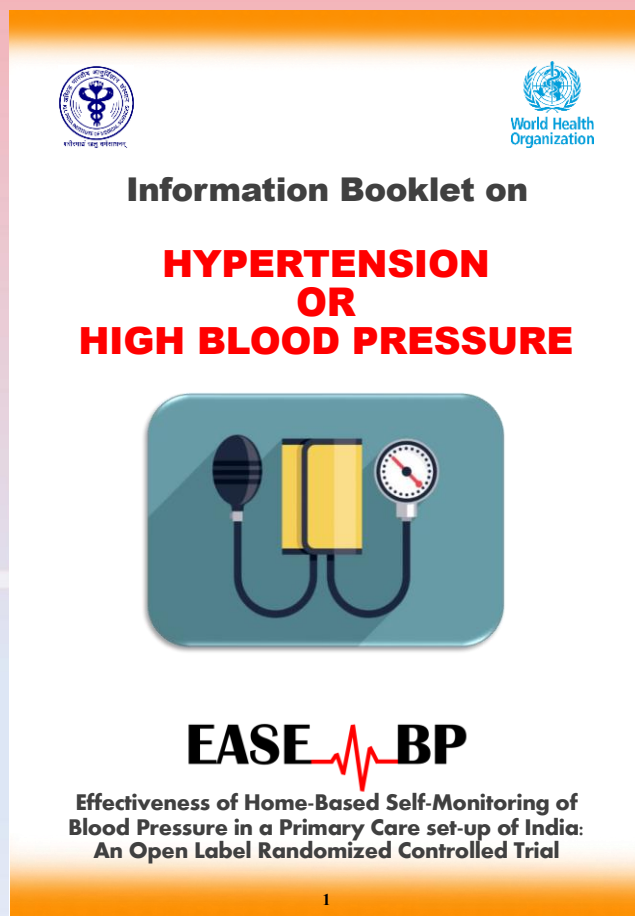
Blood Pressure Blind Spots: What We're Missing in Detection and Care



Accelerating Hypertension Detection and Control Rates: *Beyond NP-NCD and ICHI*



Thank you!



Implementation research- improving hypertension control rates

Chaisiri Angkurawaranon, MD, PhD

Department of Family Medicine, Faculty of Medicine

WHO CC Prevention and Control of CVD in Primary Care

Chiang Mai University, Thailand

Outline:

Using simple treatment hypertension protocol to improve HT control rates

Thailand

Hypertension Protocol




Step 1 Blood pressure $\geq 140/90$ mmHg:
Amlodipine (2.5) mg once daily
Consider initiation with step 2 if SBP ≥ 150 mmHg during 1st visit

Step 2 If BP remains $\geq 140/90$ mmHg:
Amlodipine (2.5) mg + losartan (50) mg once daily

Step 3 If BP remains $\geq 140/90$ mmHg:
Amlodipine (5) mg + losartan (50) mg once daily

Step 4 If BP remains $\geq 140/90$ mmHg:
Amlodipine (5) mg, losartan (50) mg, and HCTZ (12.5) mg once daily

Step 5 If BP remains $\geq 140/90$ mmHg:
Refer to regional secondary/tertiary care center for further adjustments

- **Monthly follow-up** for evaluation and titration until BP control is achieved

- **Once BP control is achieved**, 2-to-3-month interval visits are recommended for evaluation and re-medication

- **If BP at a visit is $\geq 160/100$ mmHg**, consider 2-week follow-up visit instead

- **If BP at a visit is $\geq 180/110$ mmHg**, consider referral to the nearest emergency department

- **In pregnant individuals**, refer to a gynecologist

- **In females during reproductive age without contraception**, avoid prescription of losartan



Project overview

Simple protocol
Development
Training and capacity
building



Results: Process Evaluation Framework



Economic impact of Scaling



Next phase: The Learning Health System

Protocol Development

SIMPLE PROTOCOL DEVELOPMENT

Figure 1 Interviews and consultation with local experts



Dr. Apichard and Dr. Supattra

Director of Hang Dong Hospital



Dr. Moran and Dr. Salam

Director of Hgao Hospital

Thailand

Hypertension Protocol



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Training



- Health Professionals

1. Hypertension management
2. Simple protocol
3. Facility indicators
4. Quality improvement
5. Personal Data Protection Act (PDPA)

- Village Health Volunteers

1. BASICBasic hypertension knowledge and guide for HMBP
2. Brief intervention
3. Evaluation and advice for medication adherence
4. Personal Data protection act (PDPA)

Results: Process Evaluation

RE-AIM FRAMEWORK

R

Reach

E

Effectiveness

A

Adoption

I

Implementation

M

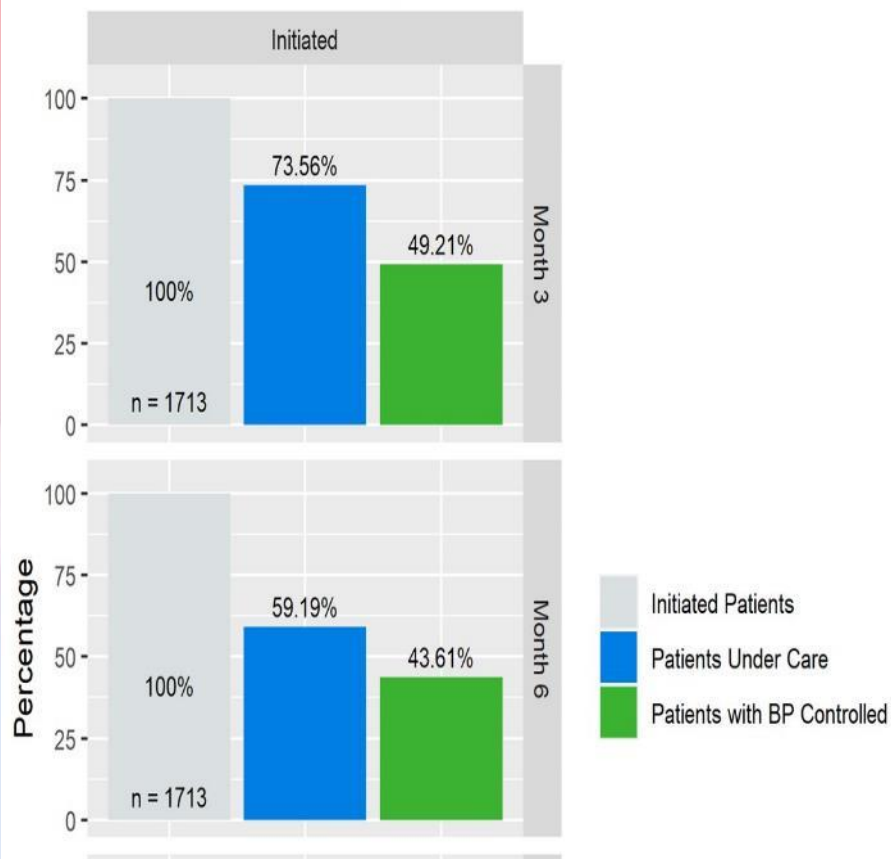
Maintenance

Reach: 14% of new cases of newly diagnosed patients were initiated on the protocol

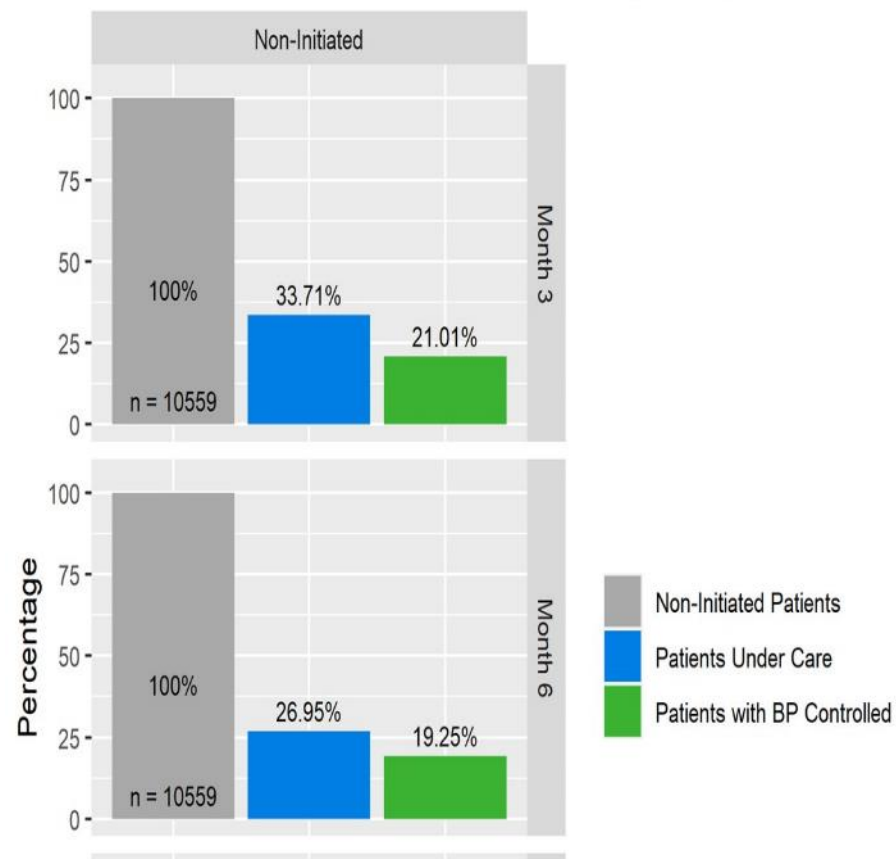
	Initiators (n=1,713)	Non-initiators (n=10,559)
Female	54.6	47.6
Education		
not educated	7.7	8.7
up to secondary school	46.9	48.5
Bachelors and above	3.3	3.8
unknown	40.1	34.1
Diabetes	15.1	19.7
Dyslipidemia	18.3	11.8

Effectiveness: 3 months and 6 months control rate

Initiated Cascade Group Bar Chart (Whole)



Non-Initiated Cascade Group Bar Chart (Whole)



Effectiveness: Broader outcomes

New CVD Events (new ICD 10) within 12 months

	Initiated	non-initiated
Type of CVD		
Stroke	0.9	2.0
Coronary heart disease	0.6	0.9
Other CVD	1.8	4.0
Any CVD	3.2	6.9

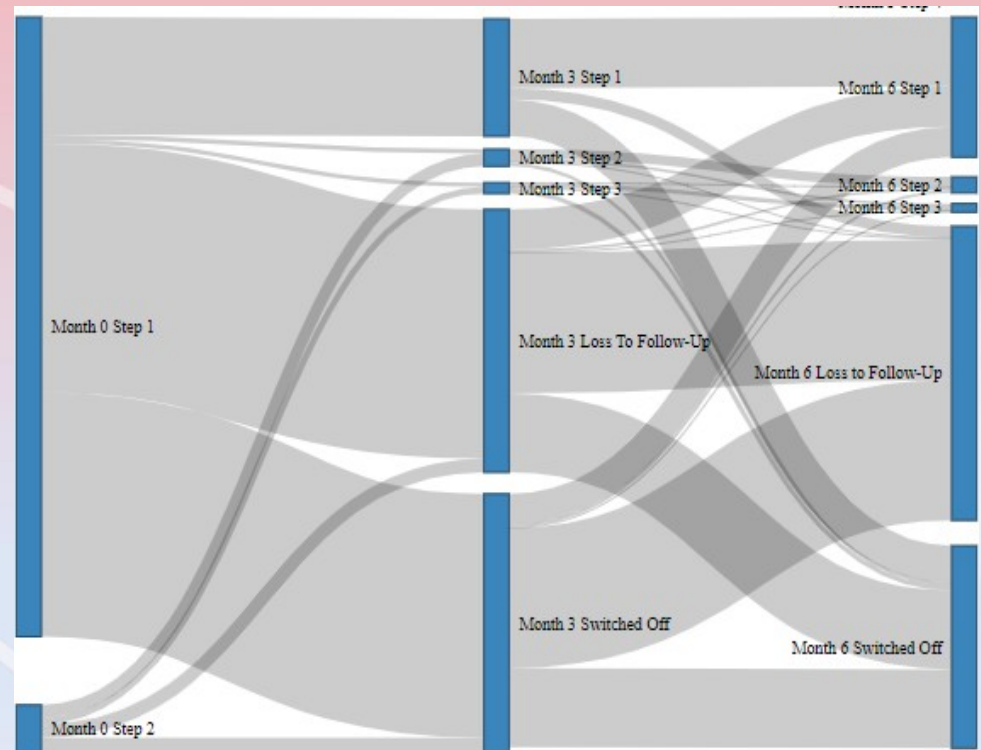
Approach (Adoption)

- 161 Prescribing Units (PCU+F2+M2+A) : **85.1%** of units had patients initiated on the protocol
- PCU 129/150 = **86.0%**
- F2 : 30-90 beds (10/10) = **100%**
- M2 : 120-180 beds (2/2) = **100%**
- A : >800 beds(1/2) = **50%**

	Initiators (n=1,713)	Non-initiators (n=10,559)
Initiated Hospital		
PCU (รพสต)	49.0	51.0
F2 level (30-90 beds)	25.7	20.9
M2 level (120-180 beds)	8.9	8.9
A (>800 beds)	16.4	19.2

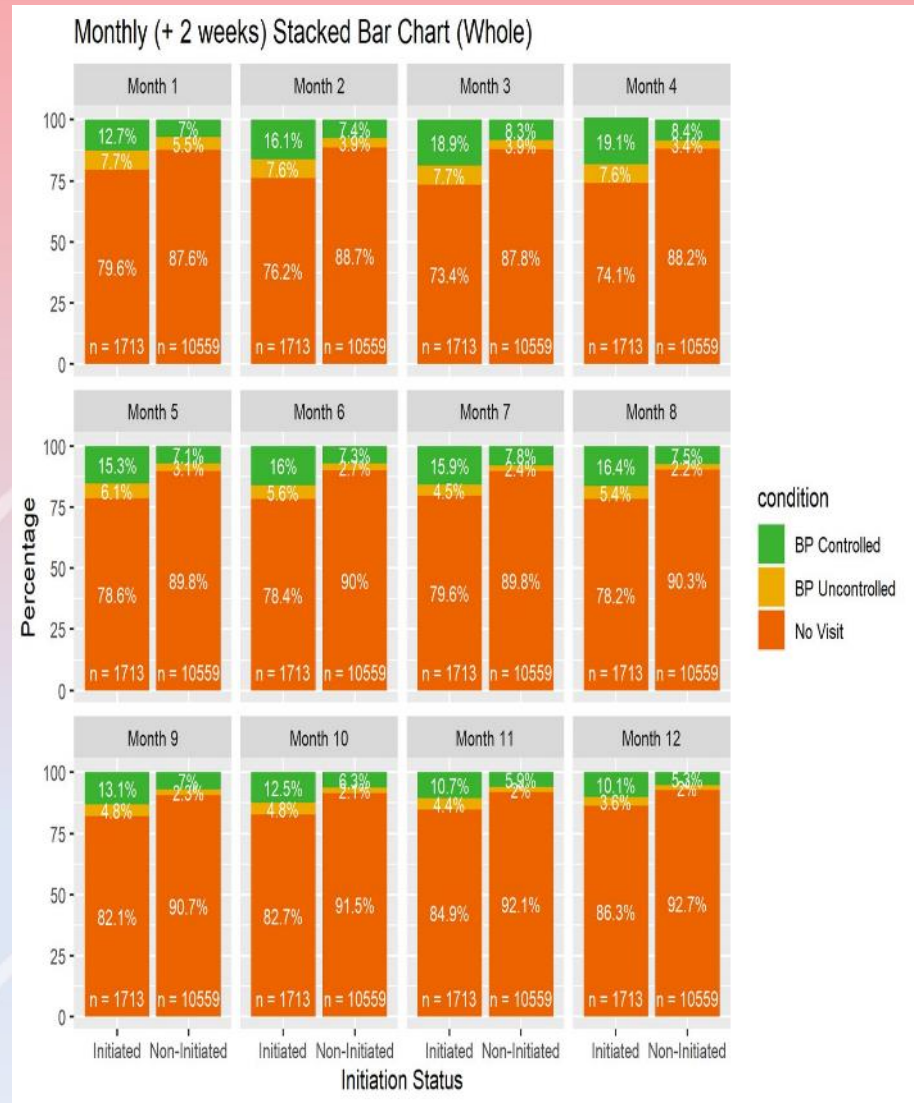
Implementation of simple protocol

- $1490/1713 = 87.0\%$ stayed on the medication list of the simple protocol
- However, pattern is complex



Maintenance

- proportion with readings and control rate remains remains twice as high in the initiated group compared to the non-initiated group throughout 12 months
- Evaluation period ended May 2022, number of units still prescribing 2.5 mg amlodipine from Jan 2023 is 72% (116/161)



Economic Impact and Scaling

RESEARCH

Open Access

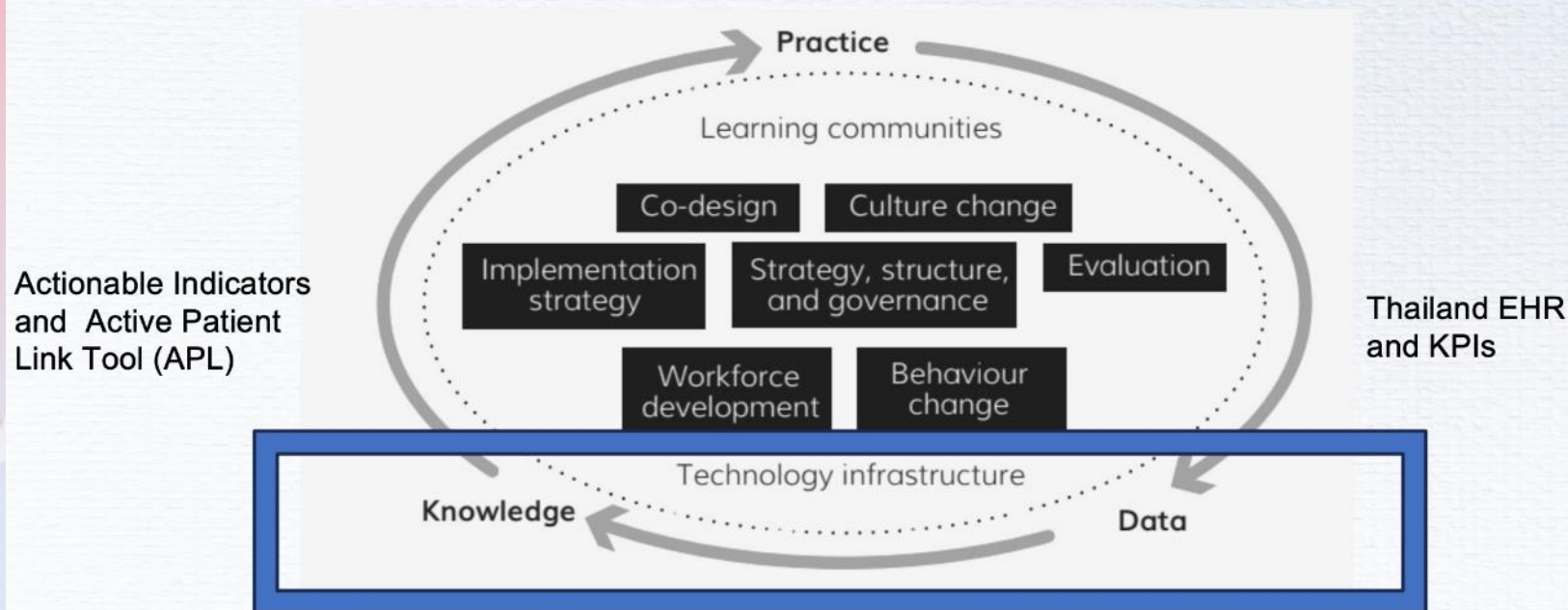


Costs of the HEARTS hypertension program in primary care in Lampang province, Thailand

- Cost of Training to consider
- Lower medication costs than usual care
- Optimizing diagnostic test and purchasing lower price of combination pills are key areas of scale up

Next phase: Learning Health system

Learning Health System



Active Patient Link Tool using routine EHR

Actional Indicators to Active Patient Link Tool

- The number (and names) of people who have high CVD risk and not prescribed statins
- The number (and names) of people with BP uncontrol ($>160/100$) in the past 3 months (or will be coming in the next month)
- The number (and names) of people who HT and CKD not on ACEI/ARB

Query Tool

LEARNING HEALTH SYSTEM THAILAND

REPORT

Active Patient Link

123 Indicators

Loss Follow Up

Saved Presets

Result: 23 row

HIDE FILTERS

รหัสสถานบริการ (Hospcode)
รหัสสถานบริการ (Hospcode)
10000, 20000, 3...

พื้นที่ของผู้ป่วย
Type Area

Medication

ACEI
CCB
การรับยาเบาหวาน
Biguanide
Insulin
การรับยา Aspirin
Aspirin
การรับยา DLP
Statin
ARB
Diuretics
Sulfonyl
Beta Blocker
Alpha Blocker
TZD
Fibrate

Dates for query

วันที่ผู้ป่วยมารับบริการ
20/04/2025
20/04/2025

ข้อมูลพื้นฐานของผู้ป่วย

เพศ
อายุ
BMI

Demographic and risk factors

ประวัติการรักษา
ประวัติการเป็นโรคหัวใจ
โรคประจำตัว NCDs
Thai CV Risk
ประวัติความดันสูงในค.ฯ

ระดับการควบคุมโรค

การควบคุมความดันโลหิต
การควบคุมระดับน้ำตาล
การควบคุมระดับไขมัน
Level of control

Laboratory results

ประวัติการตรวจ Lab
การคัดกรองโรคไต
การควบคุมระดับไขมัน
การตรวจของ eGFR

Dates of appointments

20/04/2025
20/04/2025

Patient Lists

Patient Review

Treatment History			
Date	BP	Treatment	Control Status
2023-07-12	116/76	Hospital C	Controlled
2021-08-04	128/103	Hospital C	Uncontrolled 2
2021-01-09	128/78	Hospital B	Controlled
2020-07-24	162/92	Hospital B	Uncontrolled 2

Cholesterol		
Date	Result	Source
2023-08-15	137	HDC
2021-08-17	219	HDC

HBAIC		
Date	Result	Source
2023-07-15	6	HDC
2020-12-20	6	HDC

Microalbumin		
Date	Result	Source

LDL		
Date	Result	Source
2023-10-03	121	HDC
2023-07-07	141	HDC
2023-04-17	80	HDC
2021-08-06	178	HDC
2020-09-31	250	HDC

FBS		
Date	Result	Source
2024-10-22	162	HDC
2024-10-07	139	HDC
2024-10-25	74	HDC
2024-10-15	167	HDC
2021-08-18	148	HDC

HDL		
Date	Result	Source
2021-05-29	51	HDC
2020-12-23	44	HDC

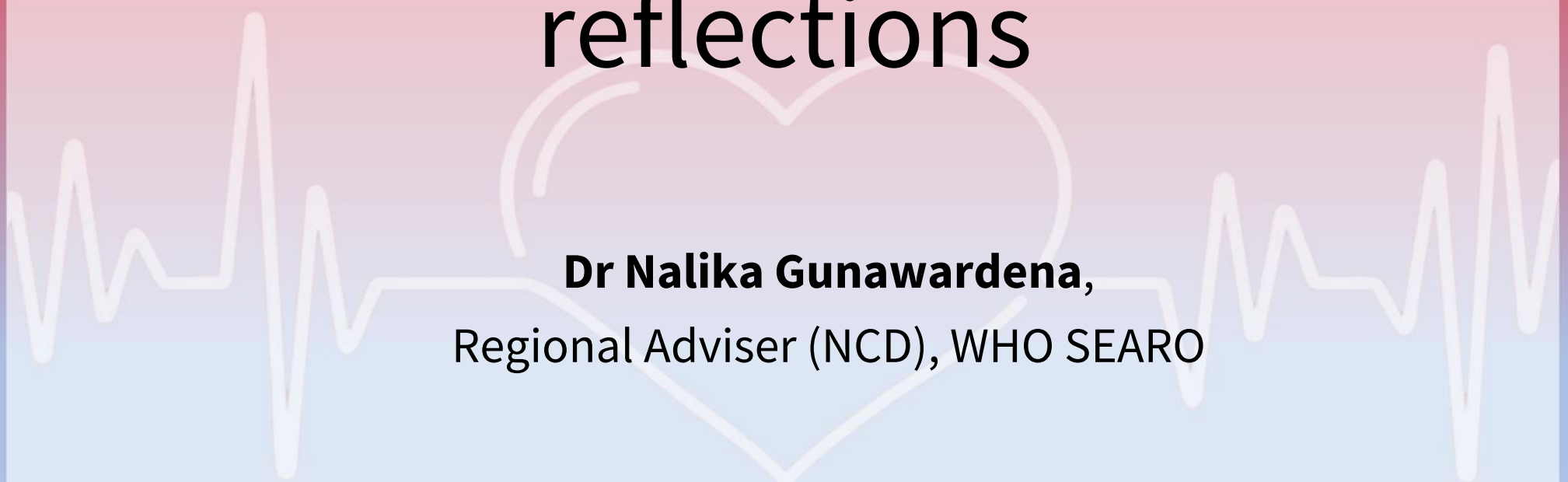
eGFR		
Date	Result	Source
2024-04-09	80	HDC
2022-06-29	44	HDC
2022-02-24	63	HDC

Clinical Decision support (HT protocol)

Thank you



Open forum for discussion and reflections



Dr Nalika Gunawardena,
Regional Adviser (NCD), WHO SEARO