



2021 World Health Organization guideline on pharmacological treatment of hypertension: Policy implications for the region of the Americas

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Summary

Cardiovascular disease (CVD) is the leading cause of death in the Americas and raised blood pressure accounts for over 50% of CVD. In the Americas over a quarter of adult women and four in ten adult men have hypertension and the diagnosis, treatment and control are suboptimal. In 2021, the World Health Organization (WHO) released an updated guideline for the pharmacological treatment of hypertension in adults. This policy paper highlights the facilitating role of the WHO Global HEARTS initiative and the HEARTS in the Americas initiative to catalyze the implementation of this guideline, provides specific policy advice for implementation, and emphasizes that an overarching strategic approach for hypertension control is needed. The authors urge health advocates and policymakers to prioritize the prevention and control of hypertension to improve the health and wellbeing of their populations and to reduce CVD health disparities within and between populations of the Americas.

The Lancet Regional Health - Americas 2022;9: 100219

Published online 4 March 2022

<https://doi.org/10.1016/j.lana.2022.100219>

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Keywords: Hypertension; High blood pressure; Health policy; Clinical guideline; Health services; Public health; Cardiovascular disease

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Editor note: The following translations in Portuguese and Spanish are provided by the authors. Our editorial processes have only been applied to the original article in English, which should serve as reference for this work. <https://iris.paho.org/handle/10665.2/55964> (Portuguese) <https://doi.org/10.26633/RPSP.2022.55>; <https://iris.paho.org/handle/10665.2/55963> (Spanish) <https://doi.org/10.26633/RPSP.2022.54>.

Introduction

In the Americas, cardiovascular diseases (CVD) are the leading cause of death, responsible for 29% of all lives lost (>2 million deaths in 2019).^{1–3} CVD is also the leading cause of disability in the region.¹ High blood pressure (BP), is the most important reversible risk factor for CVD and death, with over 50% of CVD events and 17% of overall deaths being attributed to elevated BP in the Americas.^{1,4}

In the Americas over a quarter of women and four in ten men (aged 30–79 years) have hypertension

(defined as BP $\geq 140/90$ mmHg or taking antihypertensive drugs) and the rates of diagnosis, treatment and control of hypertension are suboptimal.³ Indeed, only 35% of women and 23% of men with hypertension have their BP controlled to an SBP/DBP $<140/90$ mmHg in Latin America and the Caribbean.³ Using the newer World Health Organization recommendations for initiation of antihypertensive pharmacotherapy, the prevalence of adults recommended for antihypertensive drug therapy is much higher, and consequently, the rates for treatment and control are much lower.^{3,5} In most countries in the region, the prevalence of hypertension is increasing with only modest gains in treatment and control rates since 1990.³ Although, hypertension is unlikely to have a causal link it is the most common risk associated with COVID-19 (SARS-CoV-2) infection and death.⁶

Approximately 8% of the region's healthcare spending is attributed to high blood pressure, a wise use of resources as control of hypertension reduces death and disability and is highly cost-effective or cost-saving in most settings.⁷ For example, the effective management of CVD risks, including hypertension, has an estimated return on investment of 3:1 in low and middle-income countries (LMIC).⁸

There is high variability in the prevalence of hypertension and its detection, treatment and control between countries and within important subpopulations within countries.^{1,3} This variability leads to large disparities in cardiovascular death and disability with large economic consequences extending from the personal to the global level.^{1,3,9} In part, some of this variation may be attributed to variations in guidelines and their implementation¹⁰. In the past 5–10 years, important global and regional technical documents have been produced that provide an opportunity to optimize the prevention, treatment and control of the cardiovascular disease. These documents highlight the prevention and control of hypertension.^{11–14}

This health policy manuscript was developed by a group of senior public health, global health, clinical, and hypertension experts primarily to facilitate the implementation and integration of the new WHO pharmacotherapy of hypertension guideline with other global and regional technical documents.^{15,16} The manuscript is also intended to be a resource to those advocating to policymakers. Firstly, we highlight the facilitating role of the Global HEARTS initiative and the HEARTS in the Americas initiative to catalyze the implementation of the WHO guideline on hypertension.^{11,17} Secondly, we provide suggestions for policymakers and health services managers which can also be used in advocacy by health scientists, clinicians, and organizations. Finally, the document emphasizes that beyond the WHO Hypertension guideline, a strategic approach for hypertension control is needed. Although important

in the prevention and control of hypertension, the WHO pharmacotherapy of hypertension guidelines and this manuscript do not address individual lifestyle interventions to control hypertension.

The global HEARTS initiative and the HEARTS in the Americas program: the CVD risk reduction approach through hypertension management

In response to the global health threat from CVD, the World Health Organization (WHO) global HEARTS Initiative supports countries strengthening actions to prevent CVD, such as enhanced tobacco control, dietary salt reduction, increasing physical activity, elimination of industrially-produced dietary trans fat, and management of CVD risks.¹¹ From the health service side, the WHO HEARTS is a technical package that aims to strengthen primary care management of CVD and its risk factors, with hypertension being the most common and therefore main point of entry.^{18,19}

The WHO HEARTS technical package provides support to standardize and optimize 6 essential clinical care areas, including Healthy lifestyle counseling, Evidence-based treatment of hypertension and diabetes using simple directive protocols, Access to high quality long-acting affordable medications and technology (e.g., validated automated BP devices), CVD risk assessment, Team-based care and Systems for monitoring.¹⁸

In the Americas, many asymptomatic adults do not access the health care system. For those who do, many individuals with undiagnosed hypertension are not screened and are thus unaware of their condition.³ Further, not all of those diagnosed with hypertension are treated, and a substantial proportion is undertreated and does not have their BP controlled.³ In response to the unmet need to detect, treat, and control high BP, the Pan American Health Organization (PAHO) with partner organizations and ministries of health have developed the HEARTS in the Americas initiative, a regional adaptation of the WHO HEARTS technical package, to enhance hypertension management and reduce CVD.^{12,13}

HEARTS in the Americas provides technical assistance for developing a strategic systematic public health approach to hypertension control.^{12,20,21} The program is focused on a hypertension treatment cascade approach that seeks to achieve increased awareness, treatment, and control of hypertension to reduce relevant 'care gaps'.^{12,13,22} The pillars of the HEARTS in the Americas initiative are (1) use of standardized diagnostic and treatment protocols, (2) accurate reproducible BP measurement with recently trained and preferably certified observers who use accuracy validated automated BP devices, (3) standardized training for team-based patient-centred care, (4) standardized data collection to

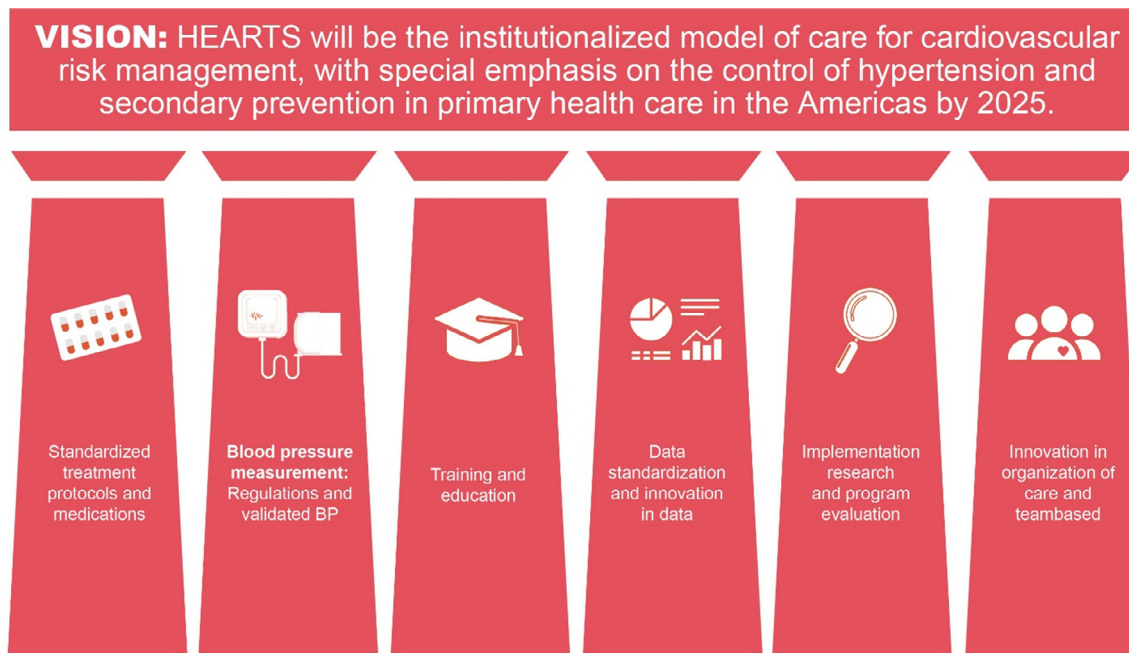


Figure 1. The pillars of the HEARTS in the Americas initiative.

monitor, evaluate and report on the overall program, health regions, clinic and clinician performance, (5) the use of implementation research methods to guide program implementation and evolution and (6) innovation in patient-centred team-based health care (Figure 1).¹² HEARTS in the Americas is currently being implemented in 20 countries and is the major model of care for CVD risk management in this region.¹⁷

Substantial improvements in hypertension control have been documented in preliminary analyses of pilot interventions from the program.^{23,24}

While much of the HEARTS technical package is reflected in the 2021 WHO Guideline for the pharmacological treatment of hypertension in adults, the guideline provides updated and more specific recommendations and is an official WHO normative guideline.^{15,16}

The 2021 WHO hypertension guideline: policy implication

In 2021, the WHO released the updated Guideline for the pharmacological treatment of hypertension in adults (WHO Guidelines).^{15,16} This guideline focuses on specific critical apriori questions related to (1) the BP threshold for initiation of pharmacological treatment, (2) laboratory testing, (3) how and when to use CVD risk assessment to guide the initiation of antihypertensive drugs, (4) drug classes to be used as first-line agents, (5) combinations of antihypertensive drug therapy, (6) target BP, (7) frequency of reassessment, and (8) administration of

treatment by nonphysician healthcare professionals. Systematic reviews, when available, were assessed for each question, and in the absence of systematic reviews, primary research was examined. The GRADE method was used to assess the strength and certainty of recommendations. The Guideline also includes examples of standardized and simple treatment algorithms using specific drugs and doses. Notably, this new Guideline put a considerable emphasis on implementation.

We review each of eight WHO 2021 guideline recommendations (Table 1) and provide specific programmatic and policy recommendations for implementation (Table 2).

During the last several years, non-governmental organizations such as Resolve to Save Lives,³³ World Heart Federation,³⁴ Lancet Commission on Hypertension,³⁵ and the World Hypertension League (WHL)⁴ have also produced position statements and ‘calls to action’ on the clinical management of hypertension at a population level (Table 3). These non-governmental positions complement the new WHO hypertension guideline by helping to identify and address barriers to hypertension control and by aligning health care professionals with the need for systematic public health approaches to control hypertension. However, in addition to the health system change, the introduction of new guidelines requires clinicians to change practice to implement the recommendations and change may be resisted by some. That is why these guidelines were developed by the WHO with stakeholder and expert engagement, including from the Americas, and they are

Hypertension Clinical Pathway

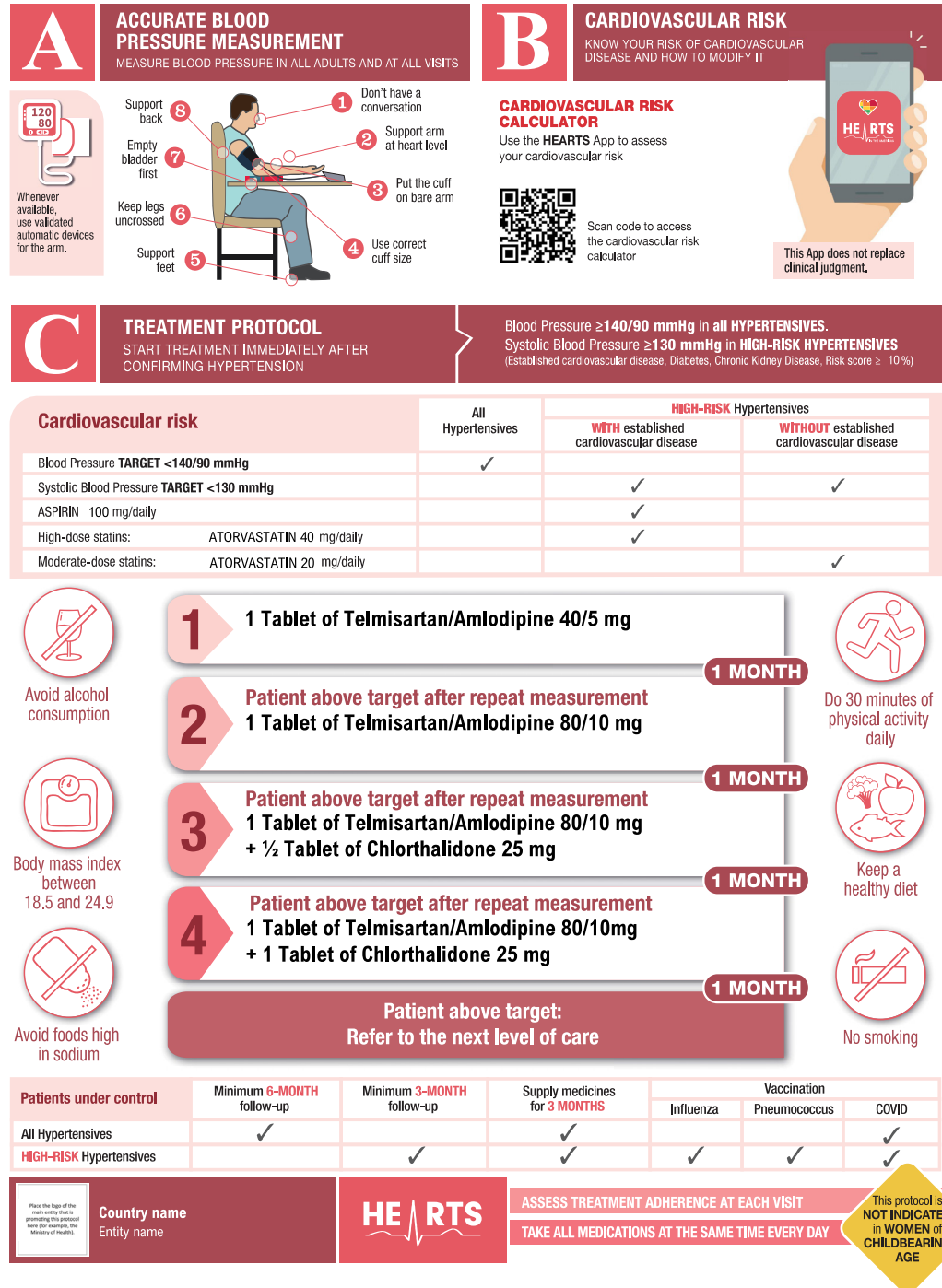


Figure 2. HEARTS in the Americas suggested prototype of an integrated clinical pathway and standardized hypertension treatment algorithm*

*The medications serve as examples and can be replaced with any two medications from any of the three drug classes (ACEis/ ARBs, CCBs or thiazide/thiazide-like diuretics). Start with a single-pill combination (fixed-dose combination) or two individual pills if FDC is not available.

Recommendation	Strength of recommendation/certainty of evidence
Recommendation on Blood Pressure Threshold for Initiation of Pharmacological Treatment	
Initiate pharmacological antihypertensive treatment of individuals with a confirmed diagnosis of hypertension and systolic blood pressure of ≥ 140 mmHg or diastolic blood pressure of ≥ 90 mmHg.	Strong / moderate to high
Initiate pharmacological antihypertensive treatment of individuals with existing cardiovascular disease (CVD) and systolic blood pressure of ≥ 130 mmHg.	Strong / moderate to high
Suggests pharmacological antihypertensive treatment of individuals without CVD but with high CVD risk, diabetes mellitus, or chronic kidney disease, and systolic blood pressure of 130–139 mmHg.	Conditional / low
Recommendation on Laboratory Testing	
Suggests obtaining tests to screen for comorbidities and secondary hypertension when starting pharmacological therapy for hypertension, but only when testing does not delay or impede starting treatment.	Conditional / low
Recommendation on CVD Risk Assessment	
Suggests CVD risk assessment at or after the initiation of pharmacological treatment for hypertension, but only where this is feasible and does not delay treatment.	Conditional / low
Recommendation on Drug Classes to be Used as First-Line Agents	
Use of drugs from any of the following three classes of pharmacological antihypertensive medications as an initial treatment in those requiring pharmacological treatment:	Strong / high
<ol style="list-style-type: none"> 1. thiazide and thiazide-like agents 2. angiotensin-converting enzyme inhibitors (ACEIs)/angiotensin-receptor blockers (ARBs) 3. long acting dihydropyridine calcium channel blockers (CCBs). 	
Recommendation on Combination Therapy	
Suggests combination therapy, preferably with a single-pill combination (to improve adherence and persistence), as an initial treatment for adults with hypertension requiring pharmacological treatment. Antihypertensive medications used in combination therapy should be chosen from the following three drug classes: diuretics (thiazide or thiazide-like), ACEIs/ARBs, and long-acting dihydropyridine calcium channel blockers (CCBs).	Conditional / moderate
Recommendations on Target Blood Pressure	
Recommends a target blood pressure treatment goal of $< 140/90$ mmHg in all patients with hypertension without comorbidities.	Strong / moderate
Recommends a target systolic blood pressure treatment goal of < 130 mmHg in patients with hypertension and known CVD.	Strong / moderate
Suggests a target systolic blood pressure treatment goal of < 130 mmHg in high-risk patients with hypertension (those with high CVD risk, diabetes mellitus, chronic kidney disease).	Conditional / moderate
Recommendations on Frequency of Assessment	
Suggests a monthly follow up after initiation or a change in antihypertensive medications until patients reach target.	Conditional / low
Suggests a follow up every 3–6 months for patients whose blood pressure is under control.	Conditional / low
Recommendation on Treatment by Non-physician Professionals	
Suggests that pharmacological treatment of hypertension can be provided by nonphysician professionals such as pharmacists and nurses, if the following conditions are met: proper training, prescribing authority, specific management protocols and physician oversight.	Conditional / low

Table 1: WHO guideline recommendations for the pharmacological treatment of hypertension in adults.

strongly supported by NGO's that are leading work in this area, including RTSL and the WHL.

Beyond the WHO hypertension guideline, a strategic approach for hypertension control is needed

While the WHO Guidelines focus on drug treatment, the authors recognize the fundamental importance of

universal access to health care and the role of resilient and primary care-oriented health systems for the inclusive and equitable implementation of this Guideline. Thus, for this Guideline to be successfully implemented, it must be integrated into a public health systems approach, such as the HEARTS in Americas initiative. For example, implementation is likely to require policy to change the capacity, accessibility, affordability, and quality of primary care and drug treatments. To facilitate

2021 WHO guideline recommendation category ^{15,16}	HEARTS in the Americas key programmatic and policy recommendations.
1. Blood pressure threshold for initiation of pharmacological treatment	<ul style="list-style-type: none"> • Create, update, improve, and align the existing protocols/algorithms to respond to the new WHO hypertension guideline requirements (e.g., see Fig. 2 for the standardized HEARTS in the Americas template protocol). Adapt the protocols recommended by HEARTS in the Americas initiative based on locally available high quality, long acting, affordable and accessible drugs.²³ • Design a communication campaign and prepare educational materials for health care professionals, health science institutions, people with hypertension and the public to explain the new WHO treatment, target BP and follow-up recommendations. • Increase and improve primary health care capacity (specifically trained healthcare personnel and appropriate equipment) to account for the increased numbers of patients being treated with the changed treatment, and target BP recommendations. • Increase the technical capacity and resources to improve the quality of hypertension diagnosis through staff training and certification on BP measurement and preferably the exclusive use of automatic, accuracy validated blood pressure measuring devices.* • Establish or revise screening programs to: <ol style="list-style-type: none"> 1) include questions of CVD, CVD risk, diabetes mellitus, and chronic kidney disease. 2) Refer people with these diseases/risks for a diagnostic workup if systolic BP ≥ 130 mmHg or diastolic is ≥ 90 mmHg. 3) Refer people with systolic BP of ≥ 140 mmHg or diastolic BP of ≥ 90 mmHg without existing CVD, high CVD risk, diabetes mellitus, or chronic kidney disease for diagnostic work-up. • Use national data to estimate the prevalence of hypertension and the number of people who will need treatment based on the diagnostic and treatment criteria.
2. Laboratory testing	<ul style="list-style-type: none"> • Consider including the ordering of the tests listed below in health care professional, patient and public education programs, and materials and emphasize not delaying treatment if the testing is unavailable or delayed. • If feasible ensure there is laboratory capacity and access for hypertension patients for serum electrolytes and creatinine, lipid panel, HbA1C or fasting glucose, urine dipstick, and electrocardiogram. • If not available create a budget for hypertension control that accounts for the laboratory testing. • Establish quality of care protocols (i.e., specific protocols to assess the adherence of clinics and clinicians in providing specified standards of care) to examine the proportion of those with hypertension who have appropriate tests. • Provide regular (at least quarterly) feedback to the overall program, clinics, and clinicians on performance.
3. CVD risk assessment	<ul style="list-style-type: none"> • Adjust protocols and education programs to initiate pharmacological treatment without delay if CVD risk assessment is not immediately available. • Make risk assessment more feasible through more efficient, affordable, and accessible laboratory testing. • Establish quality of care protocols to examine the proportion of hypertension patients who have a CVD risk assessment. Provide regular feedback (at least quarterly) to the overall program, clinics, and clinicians on performance. • Promote the use of CVD risk calculators (such as the one provided by HEARTS) installed in cell phones, tablets, or electronic health records if available. For example, the Pan American Health Organization (PAHO) has a country-specific CVD risk calculator APP.²⁴ People who already have established CVD are at high risk and should not have these types of general population risk calculation.
4. Drug classes to be used as first-line agents	<ul style="list-style-type: none"> • Forecast, plan, and budget for increased capacity and resources related to drug purchasing to account for the new treatment thresholds (increased number of patients and treatment intensity). • Update the national formulary of medicines and national essential medicines list with a small number of high-quality antihypertensive drugs, aligned with the new WHO Guideline and the corresponding protocol/algorithm. • Provide drug procurement and supply to the facility level to reflect the recommendation that those with controlled BP may be given extended drug refills and only be seen every 3-6 months. Individuals with high CVD risk or comorbidities require closer follow-up. • Establish centralized purchasing mechanisms, such as PAHO Strategic Fund to guarantee quality and reduce drug prices.²⁵
5. Combination therapy	<ul style="list-style-type: none"> • Include high-quality fixed-dose combination medicines in your national formulary and create mechanisms to improve their availability and affordability.
6. Target blood pressure	<ul style="list-style-type: none"> • Implement a plan to address therapeutic inertia, including provider education and training, auditing, clinical decision support tools, and communication and information technologies.

Table 2 (Continued)

2021 WHO guideline recommendation category ^{15,16}	HEARTS in the Americas key programmatic and policy recommendations.
7. Frequency of assessment	<ul style="list-style-type: none"> Establish a quality-of-care system for monitoring to regularly assess the proportion of those with hypertension screened, diagnosed, treated, and controlled at the program, clinic and clinician level. Adjust systems to obtain the required data, and to monitor and report on the population rates of hypertension with new thresholds for diagnosis, treatment, and control. Provide regular feedback (at least quarterly) to the overall program, clinics, and clinicians on performance.
8. Treatment by nonphysician professionals	<ul style="list-style-type: none"> Implement the recommendation that those with controlled BP be given extended (90-120 day) drug refills and only be routinely reassessed every 3-6 months (unless they have comorbidity or high risk). Review regulations for services provided by appropriately trained nonphysician health care providers to include accepted treatment protocols overseen by physicians. Review and revise health care professional education programs and tools to provide standardized, high-quality education and training for nonphysician health care professionals to treat according to accepted treatment protocols.

Table 2: HEARTS in the Americas. Policies and programs recommended to support the WHO guideline recommendations for the pharmacological treatment of hypertension in adults.
 *An accuracy validated automated BP device has passed accepted national or international accuracy standards testing by an independent group of investigators.^{26,27}

WHO Guideline implementation, all countries of the America’s should prioritize implementing the HEARTS in Americas Initiative. Countries that are participating in the HEARTS in Americas initiative should urgently scale access to their full population. A broader societal approach is also needed for hypertension prevention and control, including policy change to improve nutrition, reduce salt intake, eliminate industrially-produced trans fat, facilitate physical activity, and reduce tobacco use.

In keeping with the substantial economic and disease burden of CVD, and with attention to the voluntary World Health Assembly target to reduce uncontrolled BP by 25% by the year 2025, all national governments should have hypertension control as a national health

priority. For example, in the US, the Surgeon General has declared hypertension control a national priority.³⁷ Any such action should have allocated a budget compatible with achieving the population BP control target, a strategic and operational plan, and a governmental - non-governmental technical working group to oversee the implementation.⁹ The monitoring and evaluation framework for hypertension initiatives developed by the PAHO and WHL outlines the key features of a hypertension strategy and operational plan.³⁸ The framework provides detailed qualitative and quantitative indicators that can be used in developing and monitoring initiatives for hypertension control.

A hypertension strategy can be mainly based on the WHO HEARTS technical package. Best practices that are included in the model can be adapted to the national context (health care structure, resources, culture, etc.).^{4,18,34,35,39} The strategy should be iterative when implemented, improving in design as local lessons demonstrate more effective approaches. National and regional capacity building should be continuous and based on implementation research concepts/resources and regular program review. The program should have short-term and long-term targets for hypertension control and focus on enhancing the quality of care provided.

Systematic implementation of the WHO guideline globally would likely reduce the current disparities in death and disability resulting from disparate thresholds for treatment and control in national hypertension programs. However, guidelines need to be adapted by countries when implemented to ensure they meet the specific needs of their populations. WHO Guideline is but one approach to achieve the common goal of preventing and reducing CVD and eliminating health

Initiative	Refs.
Resolve to Save Lives.	28,31
World Heart Federation Roadmap for Hypertension – a 2020 Update.	29
World Hypertension League and partners São Paulo call to action for the prevention and control of high blood pressure.	4
The Lancet Commission on Hypertension call to action and a life course strategy to address the global burden of high blood pressure on current and future generations.	30
Lancet commission on hypertension position statements on the global improvement of accuracy standards for devices that measure blood pressure and optimizing observer performance of clinic blood pressure measurement.	27,32

Table 3: Some international non-governmental organization websites, statements and positions relevant to population hypertension control.

Barrier	Policies and programs to address barrier
Lack of knowledge, behaviors and skills of people with and at risk for hypertension	Programs that enhance public health literacy, skills and behavior change related to hypertension (e.g., the US national plan to improve health literacy). ³⁵
Inequity in access to affordable, high quality, easily accessible care and treatment	Ensure adequate resource allocation to ensure easy access to high quality affordable services for underserved populations and include marginalized populations in the design and implementation of programs. Establish monitoring frameworks that assess and report outcomes on underserved subgroups and modify programs to address inequitable outcomes.
Lack of knowledge, behaviors and skills of health care professionals	Restructure training programs for all health care professionals (undergraduate and continuing health care education) to be competency based and emphasize team-based patient-centered public health approaches with quality-of-care monitoring to screening, diagnosis, treatment, and control of non-communicable diseases, including hypertension. PAHO has a standardized and very successful hypertension education program for the primary health care team. ³⁶
The health system is designed for acute care and is centered around health care professionals	Evolve the health care system and its infrastructure to deliver high-quality primary care that is easily accessible (e.g., home-based care, worksite, community centers) and affordable (preferably free or low cost). ³⁷ Utilize technology to make care more effective and efficient (e.g., smart phones, telemedicine)
Lack of screening for and diagnosis of hypertension	Develop a national hypertension screening program to detect the vast majority of people with hypertension. Screening sites should include community resources and examples include old age care homes, dentist offices, blood donation sites, shopping centers, community centers, fire stations, places of worship and barber shops. Resources are available to aid the development of hypertension screening programs. ^{38,39}
Suboptimal quality of care	Develop a quality-of-care culture using protocols to report performance to the overall program as well as clinics and clinicians. Develop recognition awards for clinics and clinicians with high performance (e.g., Million Hearts Hypertension Control Champions). ⁴⁰
Lack of program monitoring	Build monitoring and evaluation indicators into the hypertension control program. A PAHO-WHL monitoring, and evaluation framework outlines the key indicators. ³³ Regularly report progress to the program and, where appropriate, clinics and clinicians.
Lack of adherence to treatment and clinic visits	In training programs emphasize improving adherence to treatments and visits. Some strategies like ensuring treatment regimes in protocols are affordable and straightforward, use of single pill drug combinations, 90-to-120-day prescriptions when targets are met, blister packs, health care professional monitoring of adherence, follow-up of patients who miss appointments, engagement of families in the treatment plan, provision of standardized information on hypertension with individualized written instruction where appropriate, can help to improve adherence. ⁴¹
Inaccurate BP devices	Develop regulations to only allow the sale of accuracy validated devices for clinical use (including home and ambulatory BP devices)*. ^{26,27}
Inaccurate assessment of BP	Ensure those screening for hypertension and those diagnosing hypertension use an accuracy validated automated BP device and have been trained and certified to use the device. There is a standardized PAHO-WHL online training program ^{42,43} and a list of validated automated blood pressure measuring devices ⁴⁴ at the HEARTS in the Americas webpage. ¹⁷
Lack of identification of people whose blood pressure is high or normal only when outside the clinic setting (e.g., white coat hypertension and masked hypertension)**	Where feasible and affordable, encourage the use of out-of-clinical office BP readings (i.e., community, home or ambulatory) to confirm the diagnosis and monitor BP control. ^{45,46} Ambulatory blood pressure devices are designed to take many blood pressure readings at regular intervals in people who follow their usual daily routines. Home blood pressures are those taken in a home environment, while community blood pressures refer to readings taken outside the home and clinical office (e.g., a pharmacy).

Table 4: Some barriers to and policies that could enhance hypertension control.

*an accuracy validated automated BP device has passed accepted national or international accuracy standards testing by an independent group of investigators.^{26,27}

**white coat hypertension is a clinical condition where a person only has high blood pressure in the clinical office and normal blood pressure outside the clinical office. Masked hypertension is a clinical condition where a person has high blood pressure outside the clinical office and normal blood pressure in the clinical office.

inequities. Other institutions and organizations will have suggestions for implementing these and other guidelines based on national and local contexts. The additional input is welcomed and encouraged to control

this critical public health problem. We also acknowledge that all guidelines, including those of the WHO, need clinicians to consider the context of the specific patient (e.g., drug allergy, indications for other treatments,

patient autonomy, etc.) in implementing recommendations.

Additional policies to address barriers to hypertension control

There are many barriers to hypertension control at the patient, provider, and health systems level.^{34,35} Hence there is a need to reassess the overall policy approach to enhance primary care delivery using a systematic public health patient-centred approach. The preceding sections outlined fundamental programmatic changes essential to implementing the WHO Hypertension Guideline. Additional critical areas for policy change to overcome some of the barriers are listed in [Table 4](#).

Conclusion

The HEARTS in the Americas initiative is aligned with the PAHO Strategy for Universal Access to Health and Universal Health Coverage and the PAHO approach for universal primary health care.^{47,48} HEARTS in the Americas provides a state-of-the-art, systematic public health approach to controlling hypertension with a focus on primary health care. Likewise, the new WHO Guideline provides added value with updated thresholds and approaches for treating and controlling hypertension.¹⁶

There has been significant progress to improve hypertension control in the HEARTS in the Americas interventions. Outside of high-income global regions, Latin America and the Caribbean countries have higher hypertension control rates than other global regions.^{3,12,24} However, success is still largely within national pilot programs and in many countries, hypertension control is not yet a health system priority and it remains underfunded, despite all clinical interventions, antihypertensive drug therapy has arguably the most substantial evidence that it reduces death and disability and has a favourable return on investment. So, the opportunities are now more promising than ever to utilize hypertension control to enhance population health and eliminate related health inequities. Countries can take advantage of these opportunities by setting a high priority to control hypertension as a model for other NCD management and implement transformative policies.

The authors urge health policymakers to reexamine and upgrade the priority for the prevention and control of hypertension to improve the health and wellbeing of their populations and to reduce health disparities within and between populations of the Americas. We further urge health advocates and health organizations to utilize the opportunities provided by the recently released World Health Organization hypertension pharmacological treatment guideline and the HEARTS in the Americas Initiative to activate policymakers and to create the political will to improve the control of the top global and regional risk for death, uncontrolled blood pressure.

Contributors

PO conceived the idea and guided the document development. NRCC drafted the first draft manuscript. All authors reviewed and revised the manuscript and approved the final version.

Declaration of interests

NRCC reports personal fees from Resolve to Save Lives (RTSL), the Pan American Health Organization, and the World Bank outside the submitted work; and support for attending meetings from Resolve to Save Lives (RTSL), the Pan American Health Organization, and World Health Organization. He is also an unpaid advisor to the board of the World Hypertension League. The following authors declare no financial COI. PO, MPB, AR, VI, SYA,JC, ER, PKW, JWB, MGJ PO is a staff member of the Pan American Health Organization. AR and NRCC are international consultants in the same organization. However, authors alone are responsible for the views expressed in this publication, and they do not necessarily represent those of the Pan American Health Organization.

References

- 1 Institute for Health Metrics and Evaluation. GBD compare/Viz Hub. 2022; published online. <http://vizhub.healthdata.org/gbd-compare/>. Accessed 26 Feb 2022.
- 2 Martinez R, Soliz P, Mujica OJ, et al. The slowdown in the reduction rate of premature mortality from cardiovascular diseases puts the Americas at risk of achieving SDG 3.4: a population trend analysis of 37 countries from 1990 to 2017. *J Clin Hypertens*. 2020;22:1296–1309.
- 3 Zhou B, Carrillo-Larco RM, Danaei G, et al. Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: a pooled analysis of 1201 population-representative studies with 104 million participants. *Lancet*. 2021;398:957–980.
- 4 Campbell NRC, Schutte AE, Varghese CV, et al. São Paulo call to action for the prevention and control of high blood pressure: 2020. *J Clin Hypertens*. 2019;21(12):1744–1752.
- 5 Fan WG, Xie F, Wan YR, Campbell NRC, Su H. The impact of changes in population blood pressure on hypertension prevalence and control in China. *J Clin Hypertens*. 2020;22:150–156.
- 6 Ferat LR, Forrest R, Sehmi K, et al. Preventing the next pandemic: the case for investing in circulatory health—a global coalition for circulatory health position paper. *Glob Heart*. 2021;16(1):66.
- 7 Gaziano TA, Bitton A, Anand S, Weinstein MC. The global cost of nonoptimal blood pressure. *J Hypertens*. 2009;27(7):1472–1477.
- 8 World Health Organization. *Saving Lives, Spending Less: a Strategic Response to Noncommunicable Diseases*. Geneva, Switzerland: World Health Organization; 2018. (WHO/NMH/NVI/18.8). Licence: CC BY-NC-SA 3.0 IGO.
- 9 World Health Organization. *Global Status Report on Noncommunicable Disease 2014*. Geneva, Switzerland: World Health Organization; 2014.
- 10 Sudharsanan N, Theilmann M, Kirschbaum TK, et al. Variation in the proportion of adults in need of BP-lowering medications by hypertension care guideline in low- and middle-income countries: a cross-sectional study of 1,037,215 individuals from 50 nationally representative surveys. *Circulation*. 2021;143:991–1001.
- 11 World Health Organization. *Global Hearts Initiative, Working Together to Promote Cardiovascular Health*. Geneva: World Health Organization; 2016.
- 12 Campbell NRC, Ordunez P, Giraldo G, et al. WHO HEARTS: a global program to reduce cardiovascular disease burden:

- Experience implementing in the Americas and opportunities in Canada. *Can J Cardiol*. 2021;37(5):744-755.
- 13 Ordunez P, Martinez R, Niebyski ML, Campbell NR. Hypertension prevention and control in Latin America and the Caribbean. *J Clin Hypertens*. 2015;17(7):499-502.
 - 14 Ordunez P, Campbell N. Global health metrics and non-communicable diseases: the case of hypertension. *Lancet Diabetes Endocrinol*. 2015;3(10):763.
 - 15 World Health Organization. *Guideline for the Pharmacological Treatment of Hypertension in Adults*. Geneva: World Health Organization; 2021.
 - 16 Al-Makki A, DiPette D, Whelton PK, et al. Hypertension pharmacological treatment recommendations in adults. A World Health Organization guidelines executive summary. *Hypertension*. 2022;79:293-301.
 - 17 Pan American Health Organization. *HEARTS in the Americas*. Pan American Health Organization; 2021. <https://www.paho.org/en/health-americas> (accessed Oct 4 2021).
 - 18 World Health Organization. *HEARTS: Technical Package for Cardiovascular Disease Management in Primary Health Care*. Geneva: World Health Organization; 2016.
 - 19 Kessner DM, Kalk CE, Singer J. Assessing health quality-the case for tracers. *NEJM*. 1973;288(4):189-194.
 - 20 Ordunez P, Luciani S, Barojas A, Fitzgerald J, Hennis AJ. A public health approach to hypertension. *Lancet*. 2015;385(9980):1833.
 - 21 DiPette DJ, Goughnour K, Zuniga E, et al. Standardized treatment to improve hypertension control in primary health care: the HEARTS in the Americas initiative. *J Clin Hypertens*. 2020;22:2285-2295.
 - 22 Patel P, Ordunez P, DiPette D, et al. Improved blood pressure control to reduce cardiovascular disease morbidity and mortality: the standardized hypertension treatment and prevention project. *J Clin Hypertens*. 2016;18:1284-1294.
 - 23 Valdés González Y, Campbell NRC, Pons Barrera E, et al. Implementation of a community-based hypertension control program in Matanzas, Cuba. *J Clin Hypertens*. 2020;22(2):142-149.
 - 24 World Health Organization. *Improving Hypertension Control in 3 Million People: Country Experiences of Programme Development and Implementation*. Geneva: World Health Organization; 2020.
 - 25 Pan American Health Organization. *HEARTS in the Americas: protocols and medications*. *HEARTS in the Americas: Protocols and Medications*. Pan American Health Organization; 2020. <https://www.paho.org/en/health-americas/health-americas-protocols-and-medications>. Accessed 18 Aug 2020.
 - 26 Resolve to Save Lives, Links Community. LINKS is a global community for cardiovascular health. 2022; published online. <https://resolve.to.savelives.org/cardiovascular-health/links>. Accessed 25 Sept 2021.
 - 27 World Health Organization. *HEARTS Technical Package for Cardiovascular Disease Management in Primary Health Care: Evidence-Based Treatment Protocols*. Geneva: World Health Organization; 2017:1-30.
 - 28 World Health Organization. *HEARTS Technical Package for Cardiovascular Disease Management in Primary Health Care: Implementation Guide*. Geneva: World Health Organization; 2018:1-30.
 - 29 Sánchez RA, Boggia J, Peñaherrera E, et al. Ambulatory blood pressure monitoring over 24 h: a Latin American Society of Hypertension position paper-accessibility, clinical use and cost effectiveness of ABPM in Latin America in year 2020. *J Clin Hypertens*. 2020;22(4):527-543.
 - 30 Pan American Health Organization. *How to Optimize the Use of CVD Risk Evaluation*. Pan American Health Organization; 2021. <https://www.paho.org/cardioapp/web/#/optimizerisk>. Accessed 4 Oct 2021.
 - 31 Pan American Health Organization. *PAHO Strategic Fund*. Pan American Health Organization; 2021. <https://www.paho.org/en/paho-strategic-fund>. Accessed 4 Oct 2021.
 - 32 World Health Organization. *WHO Technical Specifications for Automated Non-Invasive Blood Pressure Measuring Devices with Cuff*. Geneva: World Health Organization; 2020:1-68.
 - 33 Resolve to save lives. Resolve to save lives. 2022; published online 2022. <https://www.resolve.to.savelives.org/>. Accessed 4 Oct 2017.
 - 34 Jeemon P, Severin T, Balanbanova D, et al. World heart federation roadmap for hypertension-a 2020 update. *Glob Heart*. 2021;16(1):63. <http://doi.org/10.5334/gh.10666>.
 - 35 Olsen MH, Angell SY, Asma S, et al. A call to action and a life-course strategy to address the global burden of raised blood pressure on current and future generations: the Lancet Commission on Hypertension. *Lancet*. 2016;388(10060):2665-2712.
 - 36 Padwal R, Campbell NRC, Schutte AE, et al. Optimizing observer performance of clinic blood pressure measurement: a position statement from the lancet commission on hypertension group. *J Hypertens*. 2019;37:1737-1745.
 - 37 U.S. Department of Health and Human Services. *The Surgeon General's Call to Action to Control Hypertension*. Washington, DC: U.S. Department of Health and Human Services; 2020:1-48.
 - 38 Campbell NRC, Ordunez P, DiPette DJ, et al. Monitoring and evaluation framework for hypertension programs. A collaboration between the Pan American Health Organization and World Hypertension League. *J Clin Hypertens*. 2018;20:984-990.
 - 39 Campbell NRC, Niebyski M. Prevention and control of hypertension: developing a global agenda. *Current Opinion in Cardiology*. 2014;29(4):324-330.
 - 40 US. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. National action plan to improve health literacy. 2010; published online 2010. <https://health.gov/our-work/national-health-initiatives/health-literacy/national-action-plan-improve-health-literacy>. Accessed 26 Feb 2022.
 - 41 Pan American Health Organization. *HEARTS in the Americas: Virtual Courses*. Pan American Health Organization; 2020. <https://www.paho.org/en/health-americas/health-americas-virtual-courses>. Accessed 18 Aug 2020.
 - 42 World Health Organization. *Primary Health Care*. World Health Organization; 2021. https://www.who.int/health-topics/primary-health-care#tab=tab_1 (accessed Oct 4, 2021).
 - 43 Mangat BK, Campbell N, Mohan S, et al. Resources for blood pressure screening programs in low resource settings: A guide from the world hypertension league. *J Clin Hypertens*. 2015;17(6):418-420.
 - 44 Beaney T, Burrell LM, Castillo RR, et al. May measurement month 2018: a pragmatic global screening campaign to raise awareness of blood pressure by the international society of hypertension. *Eur Heart J*. 2019;40:2006-2027.
 - 45 Barbosa ECD, Ramirez A, Beaney T, et al. May measurement month 2017: Latin America. *J Hypertens*. 2020;38(6):1183-1188.
 - 46 Centers for Disease Control and Prevention, Million Hearts. Hypertension control champions. 2021; published online March 23. <https://millionhearts.hhs.gov/partners-progress/champions/index.html>. Accessed 4 Oct 2021.
 - 47 53rd Directing council, 66th session of the regional committee of WHO for the Americas. Strategy for universal access to health and universal health coverage. 2014; published online Oct 2. <https://www.paho.org/hq/dmdocuments/2014/CD53-R14-e.pdf>. Accessed 4 Oct 2021.
 - 48 57th Directing Council, 71st Session of the regional committee of WHO for the AMERICAS. Primary health care for universal health. 2019; published online July 19. <https://iris.paho.org/bitstream/handle/10665.2/51630/CD57-INF-5-e.pdf?sequence=1&isAllowed=y>. Accessed 4 Oct 2021.