


# Monitoring and evaluation framework for hypertension programs. A collaboration between the Pan American Health Organization and World Hypertension League

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The Pan American Health Organization (PAHO)-World Hypertension League (WHL) Hypertension Monitoring and Evaluation Framework is summarized. Standardized indicators are provided for monitoring and evaluating national or subnational hypertension control programs. Five core indicators from the World Health Organization hearts initiative and a single PAHO-WHL core indicator are recommended to be used in all hypertension control programs. In addition, hypertension control programs are encouraged to select from 14 optional qualitative and 33 quantitative indicators to facilitate progress towards enhanced hypertension control. The intention is for hypertension programs to select quantitative indicators based on the current surveillance mechanisms that are available and what is feasible and to use the framework process indicators as a guide to program management. Programs may wish to increase or refine the number of indicators they use over time. With adaptation the indicators can also be implemented at a community or clinic level. The standardized indicators are being pilot tested in Cuba, Colombia, Chile, and Barbados.

Globally, hypertension is a leading risk for death and disability and a major cause of chronic noncommunicable disease.<sup>1-4</sup> Hypertension is preventable, and its treatment is effective in reducing blood-pressure-related diseases, and in most settings, is very cost-effective and can be cost-saving.<sup>5-7</sup> However, despite many efforts and resources invested, in most populations hypertension control rates are low.<sup>8,9</sup> Fortunately, increasing attention is being directed towards hypertension control by global, national, and regional governmental and non-governmental organizations.<sup>2,10,11</sup>

Under the leadership of the World Health Organization with partner organizations including the World Hypertension League, Pan American Health Organization (PAHO), and the US Centers for Disease Control and Prevention, The Global Hearts Initiative with a technical package called HEARTS (healthy lifestyle, evidence-based treatment protocols, access to essential medicines and technology, risk-based management, team care, and task-sharing and systems for monitoring) was recently launched to reduce the risk cardiovascular disease (CVD) through tobacco control and a reduction in dietary salt, and to improve clinical prevention and treatment in primary health care. The primary care intervention uses highly effective, scalable, sustainable, and proven interventions to improve clinical management of cardiovascular risks, where hypertension management has a prominent place.<sup>2</sup> More recently, under the leadership of Dr. T. Frieden, the RESOLVE initiative (to save 100 million lives and prevent epidemics) is a 5-year initiative launched with over 200 million dollars in funding from Bloomberg Philanthropies, the Chan Zuckerberg Initiative, and the Bill & Melinda Gates Foundation to reduce heart disease and stroke.<sup>11,12</sup> RESOLVE aims to improve the control of hypertension, reduce dietary sodium, and eliminate artificial trans fat. These global CVD programs that have a strong component of hypertension control share foci on access to medications and technologies, task sharing or shifting, use of standardized “care algorithms” or “maps,” risk-based management, counseling for a healthy lifestyle, and registries that have performance reporting functions.

A critical aspect of any effort to control hypertension, regardless if it is global in scope or based on a single clinical practice, is monitoring and evaluation.<sup>13-16</sup> Monitoring and evaluation identify the current hypertension control rate, key “gaps” in the clinical management, assess if the program is having a positive impact on hypertension control, and can identify if specific interventions are effective or are not. Monitoring at a clinician and clinic level can provide reports on performance to allow continuous quality improvement.<sup>13,17</sup> Process and structure evaluation can assess if programs have the key components necessary to improve blood pressure control. Hypertension control programs that lack monitoring and evaluation are akin to traveling to a destination without knowing where you are or what direction you should take or even knowing when or if you arrive at your destination.

To monitor and evaluate hypertension control programs, the Global Hearts Initiative, specifically its HEARTS technical package, provides a set of core indicators that address cardiovascular disease at the clinical and at population levels. The breadth of the HEARTS technical package dictates a minimum set of indicators for all major cardiovascular risks, including hypertension that is intended to be

used by all programs designed to improve control and treatment of cardiovascular disease and its risk factors (<http://apps.who.int/iris/bitstream/10665/260423/1/WHO-NMH-NVI-18.5-eng.pdf?ua=1>, accessed March 12, 2018). Five core indicators (1 for health facilities, 2 for sub-national level [eg, district/province], and 2 for population level) are specified in HEARTS for hypertension, and an additional PAHO-WHL indicator for registry coverage (Table 1) are included as the essential core indicators of the PAHO evaluation framework.

PAHO initiated a specific program to reduce cardiovascular risk through hypertension control and secondary prevention, in collaboration with the United States Centers for Disease Control and Prevention (CDC USA), World Hypertension League, and other partners in Barbados, Chile, Colombia, and Cuba.<sup>10</sup> The program was intended to be clinically attractive for patients and providers and action-oriented for the health care organizations and administrators, with the ultimate goal of reducing CVD burden. This was to be achieved through a set of clinical and managerial integrated interventions where hypertension control has a central role, but secondary prevention of CVD is also included. The PAHO approach utilizes hypertension as an entry point to the CVD cascade of care and a potential tracer to evaluate the capacity of the countries to improve the CVD/NCD quality of care.

In April 2017, PAHO in collaboration with the World Hypertension League developed an evaluation framework (structure and process indicators as well as outcome indicators) for the hypertension control initiative in the Americas. Draft indicators were pilot tested by hypertension control programs in Cuba, Colombia, and Chile, and individuals developing core indicators for the HEARTS Program also reviewed these indicators for consistency. The PAHO-WHL hypertension indicators build on previous work of both organizations and are designed to supplement the HEARTS core indicators.<sup>13</sup> Both HEARTS and the PAHO-WHL indicators provide standard definitions that will facilitate comparison of the indicators in different geographical areas and over time. In contrast to the HEARTS core indicators, the PAHO-WHL framework is designed to be used as a “menu of options” with indicators selected based on the resources available and the specific needs and priorities of the individual programs. PAHO – World Hypertension League (WHL) Monitoring and Evaluation Framework for Hypertension Control Programs is available at (<http://iris.paho.org/xmlui/handle/123456789/34877> [English], <http://iris.paho.org/xmlui/handle/123456789/34910> [Spanish], accessed March 22, 2018).

The PAHO-WHL framework includes the 5 core HEARTS hypertension indicators plus an additional core indicator and 14 qualitative indicators to assess if hypertension control programs have key structures and processes needed to optimize hypertension control. Thirty-three quantitative outcome indicators are based on physical measure surveys (including blood pressure measurement), questionnaire surveys, antihypertensive drug prescriptions, clinic registries, and hypertension-related cardiovascular death rates. The 33 quantitative indicators assess the hypertension prevalence, awareness, treatment and control rates, cardiovascular risk, changes

**TABLE 1** Core Hypertension Population Indicators from the HEARTS Technical Package<sup>19\*</sup>

Health facility level indicator				
No	Indicator	Source of data	Reporting frequency	Health system considerations
1	Six-monthly control of blood pressure among people treated for hypertension	Hypertension treatment register in the facility	Once in 3 mo	Feasible in all settings in primary health care and a core indicator for quality of services
Subnational (District/Province/State)-level aggregated indicators from health facilities offering the services within the program				
	Indicator	Source of data	Reporting frequency	Considerations in the interpretation
2	Control of blood pressure among people with hypertension within the program	Aggregated reports from all the health facilities reporting the hypertension indicator in a defined subnational area; estimation of hypertension prevalence	Once in 12 mo	This will give estimated community control rates with the numerator coming from facilities reporting as part of the program (in some instances patients maybe receiving BP meds from private sector or other levels of care within the public system)
3	Availability of core cardiovascular disease/diabetes drugs	Aggregated reports from all the health facilities reporting drug availability indicators in a defined subnational area.	Once in 3 mo	This is for the program quality control and will assist with forecasting of medicines and improvements in supply chain management
Population-level indicators of control of hypertension, diabetes, and CVD risk				
	Indicator	Survey method	Frequency	Other considerations
4	Hypertension control in the population	Population-based sample survey (STEPS or similar survey)	Once in 3-5 y	Population-level survey as part of national survey or a special survey for the program
5	Proportion of eligible persons receiving drug therapy and counseling (including glycaemic control) to prevent heart attacks and stroke.	Population-based sample survey (STEPS or similar survey)	Once in 5 y	Population-based (preferably nationally representative) survey including behavioral parameters with physical and biochemical measurements
1. Six-monthly control of blood pressure among people treated for hypertension				
Definition	Proportion of patients registered for hypertensive treatment at the health facility whose blood pressure is controlled 6 mo after treatment initiation			
Purpose	To measure the effectiveness of clinical services in the program to control blood pressure among cohorts of treated patient			
Method of calculation	A = Number of patients with controlled blood pressure (SBP < 140 and DBP < 90) at the last clinical visit in the most recent quarter (just before the reporting quarter) out of B B = Number of patients registered for treatment of hypertension during the quarter that ended 6 mo previously Calculation: $A \div B$			
Source of data	Health facility register for hypertension			
Recommended target	Fix a target as per the local context			
Key data elements	Date of registration, date of last visit, systolic blood pressure, diastolic blood pressure			
Frequency of reporting	Quarterly			
Users of data	Facility managers: to understand what proportion of patients at their facility are achieving the blood pressure goal District-level manager: to assess the overall quality of hypertension treatment services, to identify poorly performing facilities and rectify problems at an early stage			
Data collection tool	Facility register for hypertension-Annex 2 included in WHO module (Available at <a href="http://www.who.int/cardiovascular_diseases/hearts/en/">http://www.who.int/cardiovascular_diseases/hearts/en/</a> )			

(Continues)

**TABLE 1** (Continued)

<b>2. Control of blood pressure among people with hypertension</b>	
Definition	The proportion of hypertensive people at health facilities in a given geographical area such as a district, province, or state with controlled blood pressure
Purpose	To measure the increase in coverage of the program to treat and control hypertension in a given geographical area such as a district, province, or state
Method of calculation	A = Cumulative number of registered patients with controlled blood pressure (SBP < 140 and DBP < 90) in the most recent quarter at all health facilities in a given geographical area, such as a district, province, or state. B = Estimated number of people with hypertension at the subnational level. Calculation: $A \div B$
Source of data	Numerator: Registers from health facilities reporting in the given geographical area such as a district, province, or state Denominator: Prevalence of hypertension from population- based survey (STEPS or similar survey)
Disaggregated by	Health facility
Recommended target	Fix a target as per local context
Key data elements	Date of last visit, systolic blood pressure, diastolic blood pressure
Frequency of reporting	Annual
Users of data	District, province, or state program managers to monitor increase in program coverage of hypertension services within a geographical area. National program managers to monitor progress towards universal health coverage
Data collection tool example	Health facility register for hypertension Annex 2 WHO Module. Health facility report – Annex 3 included in WHO module (Available at <a href="http://www.who.int/cardiovascular_diseases/hearts/en/">http://www.who.int/cardiovascular_diseases/hearts/en/</a> )
<b>3. Availability of core cardiovascular disease/diabetes drugs</b>	
Definition	The proportion of facilities in a given geographical area that have core CVD/diabetes drugs available (see list of drugs below)
Purpose	To ensure uninterrupted supply of essential CVD drugs and thereby improve patient treatment adherence
Method of calculation	A = number of health facilities in the program reporting “no stock-out” of core CVD/Diabetes Mellitus drugs in the last quarter B = Number of health facilities participating in the program. Calculation: $A \div B$
Source of data	Aggregated health facility drug stock register; health facility report
Disaggregated by	Health facility
Recommended target	No stock-out
Key data elements	Count of number of facilities reporting “no drug stock-out” in the last quarter; number of days of drug stock-out of selected medicine at each health facility
Frequency of reporting	Quarterly
Users of data	District- and province-level managers to focus supervision on health facilities reporting drug stock-outs, prevent drug stock-out situations and strengthen health systems to ensure uninterrupted drug supply
Data collection tool example	Health facility report – Annex 3 included in WHO (Available at <a href="http://www.who.int/cardiovascular_diseases/hearts/en/">http://www.who.int/cardiovascular_diseases/hearts/en/</a> )
Core CVD/DM drugs are thiazide or thiazide-like diuretics, long acting dihydropyridine calcium channel blocker (CCB; eg, amlodipine), long acting angiotensin converting enzyme inhibitor (ACE-I), and angiotensin receptor blocker (ARB), statin, insulin, metformin, glibenclamide, beta-blocker, aspirin.	
<b>4. Hypertension control in the population</b>	
Definition	Proportion of all hypertensive people with controlled blood pressure in the population
Purpose	To measure population-level hypertension control, including trends over time
Method of calculation	A = Number of respondents with SBP < 140 and DBP < 90 who are EITHER (being currently treated with medications for hypertension OR have been diagnosed with hypertension) B = Number of survey respondents with SBP ≥ 140 or DBP ≥ 90 OR who are currently treated with medicines for hypertension OR who report having been diagnosed with hypertension by a health professional Calculation: $A \div B$

(Continues)

**TABLE 1** (Continued)

Source/Methodology	Population-based sample survey (National or subnational health survey.
Disaggregated by	Age, sex, socio-economic status
Frequency of reporting	Once in 3-5 y
Users of data	National policy makers to measure progress toward universal health coverage, formulate national health policies, allocate programmatic budget Global policy makers to compare progress in UHC across countries
Data collection tool example	<a href="http://www.who.int/ncds/surveillance/steps/en/">http://www.who.int/ncds/surveillance/steps/en/</a>
<b>5. Proportion of eligible persons receiving drug therapy and counseling (including glycaemic control) to prevent heart attacks and strokes</b>	
Definition	Percentage of eligible persons (defined as aged 40 y and older with a 10 y cardiovascular disease (CVD) risk $\geq 30\%$ , including those with existing CVD) receiving drug therapy and counseling (including glycaemic control) to prevent heart attacks and strokes
Purpose	To measure change in population-level CVD-risk management
Method of calculation <sup>a</sup>	A = Number of eligible survey participants who are receiving drug therapy and counseling <sup>b</sup> B = Total number of eligible survey participants. (Defined as aged 40 y and older with a 10-y cardiovascular risk $\geq 30\%$ , including those with existing cardiovascular disease) Calculation: $A \div B$
Source/methodology	This is generated from population-based surveys such as a population-based sample survey (STEPS or similar survey)
Disaggregated by	Age, sex, socio-economic status
Recommended target	5% increase every year
Frequency of reporting	Once in 5 y
Users of data	National policy makers to measure progress towards NCD global action plan targets Global policy makers to compare progress in NCD global action plan targets across countries
Data collection tool example	<a href="http://www.who.int/ncds/surveillance/steps/en/">http://www.who.int/ncds/surveillance/steps/en/</a>
Users of data	National policy makers to measure progress towards NCD global action plan targets Global policy makers to compare progress in NCD global action plan targets across countries
Data collection tool example	<a href="http://www.who.int/ncds/surveillance/steps/en/">http://www.who.int/ncds/surveillance/steps/en/</a>
<b>6. Proportion of people with hypertension who are registered</b>	
Definition	Proportion of people in the catchment area (clinical facility, municipality, district) who have been registered as hypertensive based on the best estimate of expected prevalence in the catchment area or larger geographical unit in a specific period of time (month, quarter, year)
Purpose	To measure the capacity and effectiveness of the program to recruit/diagnose and register all people with hypertension
Method of calculation	A = Number of adult patients who have been registered as diagnosed with hypertension ( $>140$ mm Hg and $>90$ mm Hg or taking medications) in the catchment area in a specific period of time (month, quarter, year) B = Expected number of adults with hypertension based on best estimate of age-adjusted prevalence of hypertension (based on physical measures surveys) in the catchment area in a specific period of time (month, quarter, year) Calculation: $A \div B * 100$
Source of data	Health facility register for hypertension AND physical measures surveys
Key data elements	For numerator: Date of registration, number of people registered as hypertensive, sex, age group, (other demographic and socio-economic dimensions, if available), period of time (month, quarter, year) For denominator: age adjusted number of people with hypertension in the region in a specified period of time

in antihypertensive drug use, and changes in main hypertension-related cardiovascular death rates. Thus, the quantitative indicators assess if programs are achieving their goal of improving hypertension control and reducing cardiovascular disease. The framework layout provides a basis for tracking changes in process and structure indicators qualitatively in 4 categories over time. Outcomes indicators are tracked quantitatively over time. Initial experience indicated

that the framework could be used at a community or national level and with modification at a clinic level. It is anticipated that hypertension control programs in Cuba, Colombia, and Chile will report using the PAHO-WHL Monitoring and Evaluation Framework for Hypertension Control Programs.

There are plans to revise the Framework based on 1-2 years of field experience from hypertension control programs in the Americas.

**TABLE 1** (Continued)

Frequency of reporting	Month, Quarterly, Year
Users of data	<p>Facility managers: to understand what proportion of patients with hypertension based on the best estimate of expected prevalence at their facility are being recruited and registered</p> <p>District-level manager: to assess the overall quality of hypertension programs and services, to identify poorly performing facilities and rectify problems at an early stage</p> <p>Registry coverage is well aligned with at least 2 important concepts: 1. Territoriality or geographically based coverage as an important organizational characteristic of a health system based on primary health care, and 2. universal health care, both in access and coverage. Therefore, registry coverage is an actionable indicator to guide program implementation, as it is critical to improve control at population level and to reduce the burden of CVD.</p>
Data collection tool	Hypertension facility registry – Annex 2 included in WHO module (Available at <a href="http://www.who.int/cardiovascular_diseases/hearts/en/">http://www.who.int/cardiovascular_diseases/hearts/en/</a> )

\*The tables are identical to those in the HEARTS Module except for indicator 6, which is a PAHO-WHL core indicator.

<sup>a</sup>Feasible in settings that have a comprehensive population-based survey with behavioral parameters along with physical and biochemical measurements.

<sup>b</sup>More information on the indicator is available at [http://www.who.int/nmh/ncd-tools/indicators/GMF\\_Indicator\\_Definitions\\_Version\\_NOV2014.pdf](http://www.who.int/nmh/ncd-tools/indicators/GMF_Indicator_Definitions_Version_NOV2014.pdf). Use of the term “eligible persons” does not imply that others should not receive treatment. Jurisdictions may wish to consider analyses, which include persons at high risk as defined by the jurisdiction, and analyzing control of, rather than taking medicine for hypertension.

Patient-centered indicators for hypertension are currently being developed by the International Consortium for Health Outcomes Measurement.<sup>18</sup> The next version of the PAHO-WHL Monitoring and Evaluation Framework for Hypertension Control Programs will consider the patient-centered indicators as well as any updates to the HEARTS core indicators.

It is critical that all hypertension control programs include the 5 core indicators as outlined in the HEARTS technical package (<http://apps.who.int/iris/bitstream/10665/260423/1/WHO-NMH-NVI-18.5-eng.pdf?ua=1>, accessed March 12, 2018) and the PAHO-WHL core indicator (<http://iris.paho.org/xmlui/handle/123456789/34877>, accessed March 22, 2018). PAHO-WHL indicators for process and structure are also recommended for all initiatives that aim to improve hypertension management and can be used in assessing sustainability and impact.

#### CONFLICT OF INTEREST

PO, DJD, DL, RM, SYA, MPB, MJS, YV have no conflicts of interest to disclose. NRCC in 2016-2017 was a paid consultant to the Novartis Foundation to support their program to improve hypertension control in low to middle-income countries which includes travel support for site visits and a contract to develop a survey. NRCC has provided paid consultative advice on accurate blood pressure assessment to Midway Corporation (2017) and is an unpaid member of World Action on Salt and Health (WASH). MGJ is a shareholder and senior physician of The Permanente Medical Group, South San Francisco, California.

#### DISCLAIMER

The findings and conclusions in this report are the sole responsibility of the authors and do not necessarily represent the official position of the Pan American Health Organization or any of the authors' affiliated institutions.

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