MINISTRY OF HEALTH & WELLNESS

GUIDELINES FOR
THE CLINICAL MANAGEMENT OF HYPERTENSION IN JAMAICA

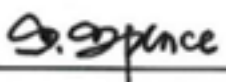
ISSUED: OCTOBER 2024

MINISTRY OF HEALTH & WELLNESS

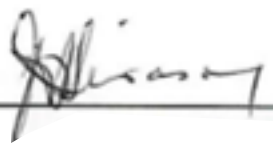
GUIDELINES FOR THE CLINICAL MANAGEMENT OF HYPERTENSION IN JAMAICA

OCTOBER 2024
Approved by:

Dr Tamu Davidson I Director, Disease Prevention and Control



Dr Simone Spence I Director, Health Promotion and Protection Branch



Dr Jacquiline Bisasor McKenzie I Chief Medical Officer

ACKNOWLEDGEMENTS

Authors/Writing Team:

Trevor Ferguson, Keri Morgan, Nadia Bennett, Janel Phillips, Racquel Lowe-Jones, Lisa Hurlock, Simon Anderson.

Guideline Development Group:

Trevor Ferguson, Simon Anderson, Lisa Hurlock, Racquel Lowe-Jones, Nadia Bennett, Colette Cunningham-Myrie, Deborah Chen, Twila Mae Logan, Michele Douglas Shaw, Heather Henry-McGrath, Johnathan Hemmings, Joanne Smith.

Guideline Oversight Committee Members:

Trevor Ferguson, Marshall Tulloch-Reid, Jennifer Knight-Madden, Georgiana Gordon-Strachan, Monika Parshad-Asnani, Lesley King, Simon Anderson, Lisa Hurlock, Racquel Lowe-Jones, Patrice Francis Emmanuel, Jacqueline Duncan, Terry Baker, Cherie-Ann Small.

Ministry of Health and Wellness Coordinators:

Julia Rowe-Porter, Nicola Skyers, Tamu Davidson.

External Peer Reviewers:

Paul Whelton (USA), Kenneth Connell (Barbados), Camille Christian (Jamaica).

Other contributors:

Damel Spooner (research assistant), Rebecca Thomas Chen (paediatric nephrologist for section on hypertension in children), Lenroy Bryan (obstetrician for section on hypertension in pregnancy).

Participants in Stakeholder Consultation: See Appendix 1

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

AAP	American Academy of Paediatrics
ABPM	Ambulatory Blood Pressure Monitoring
ACC	American College of Cardiology
ACEI	Angiotensin-converting Enzyme Inhibitor
AHA	American Heart Association
ARB	Angiotensin Receptor Blockers
ARR	Aldosterone to Renin Activity Ratio
AF	Atrial Fibrillation
BB	Beta Blockers
BP	Blood Pressure
BMI	Body Mass Index
Ca	Calcium
CCB	Calcium Channel Blockers
CDC	Centers for Disease Control and Prevention
CKD	Chronic Kidney Disease
CO2	Carbon Dioxide
COVID-19	Coronavirus Disease 2019
CT	Computed Tomography
CVD	Cardiovascular Disease
DASH	Dietary Approaches to Stop Hypertension
DBP	Diastolic Blood Pressure
DM	Diabetes Mellitus
ECG	Electrocardiogram
e.g.	for example
eGFR	Estimated Glomerular Filtration Rate
EHR	Electronic health record
ESC	European Society of Cardiology
ESH	European Society of Hypertension
g/BSA	grams/Body Surface Area

GDG	Guideline Development Group
GFR	Glomerular Filtration Rate
GRADE	Grading of Recommendations Assessment, Development and Evaluation
HbA1C	haemoglobin A1c
HBPM	Home Blood Pressure Monitoring
HCPs	Healthcare Professionals
HCW	Health Care Worker
HDL-C	High-Density Lipoprotein Cholesterol
HELLP	Haemolysis, Elevated Liver Enzymes, Low Platelets
HFrEF	Heart Failure with Reduced Ejection Fraction
HFpEF	Heart Failure with Preserved Ejection Fraction
HMOD	Hypertension Mediated Organ Damage
hr	hour
HR	Heart rate
HTN	Hypertension
i.e.	that is
IHD	Ischaemic Heart Disease
ISH	International Society of Hypertension
JNC	Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure
K	Potassium
KAS	Key Action Statements
LDL-C	Low-Density Lipoprotein Cholesterol
LMIC	Low- and Middle-Income Countries
LV	Left Ventricular
LVH	Left Ventricular Hypertrophy
MAP	Mean Arterial Pressure
MI	Myocardial Infarction

mm Hg	Millimetre of mercury
mmol/l	Millimoles per litre
MoHW	Ministry of Health and Wellness
Na	Sodium
NB	Note Well
NCD	Noncommunicable Diseases
NICE	National Institute for Health and Care Excellence
OBPM	Office Blood Pressure Measurement
PAHO	Pan American Health Organization
PICO	Population, Intervention, Comparison and Outcomes
PT	Prothrombin Time
PTT	Partial Thromboplastin Time
SBP	Systolic Blood Pressure
SLE	Systemic Lupus Erythematosus
T1DM	Type 1 Diabetes Mellitus
T2DM	Type 2 Diabetes Mellitus
TC	Total Cholesterol
TG	Triglycerides
TIA	Transient ischemic attack
UACR	Urine Albumin to Creatinine Ratio
USPSTF	U.S. Preventive Services Task Force
VMA	Vanillylmandelic Acid
WHO	World Health Organization

INTRODUCTION

High blood pressure, or hypertension, is the sustained non-physiologic elevation of systemic blood pressure (1). Elevated blood pressure damages the blood vessels and critical organs, including the heart, brain, and kidneys, resulting in significant morbidity and mortality (1). Complications of hypertension include ischaemic heart disease, hypertensive heart disease, cerebrovascular disease, retinopathy, chronic kidney disease (CKD), and peripheral vascular disease (1, 2).

Globally, hypertension affects approximately 1.3 billion persons, 30 to 79 years, two thirds of whom live in low and middle income countries (LMIC) (2). Hypertension, being often asymptomatic, may not present clinically until significant end organ damage has occurred. Almost a half of persons with hypertension are unaware of their condition (2). Regular screening for hypertension and appropriate management after the diagnosis is confirmed is critical to reduce the risk of developing complications from hypertension mediated organ damage.

In Jamaica, hypertension is a leading cause of morbidity and mortality. According to the 2023 Vitals NCD Report (3), hypertension was ranked as the third leading cause of death among Jamaicans in 2020 and accounted for 1697 deaths in that year. This represented a significant increase compared to 2010 when hypertension was ranked as the fourth leading cause of death with 1082 deaths. With regards to the prevalence of hypertension, data from the most recent Jamaica Health and Lifestyle Survey, completed in 2017, showed that the prevalence of hypertension among persons 15 years or older was 34%, with another 34% having prehypertension (4, 5). The prevalence of hypertension has increased from 20% in 2001 to 25% in 2008 (4-6). In the 2017 survey, there were also low levels of awareness (59%), treatment (70%), and control (31%) (4, 5). These data emphasize the importance of recognition and appropriate treatment of hypertension in Jamaica.

The Ministry of Health and Wellness (MOHW) in Jamaica has sought to improve the care of patients with hypertension through the provision of local treatment guidelines. The most recent guidelines were published in 2007 and 2014 (7, 8). These guidelines are now outdated given several new developments in the management of hypertension. In 2020, the MOHW published an interim guideline for use in primary care (9), but this guideline was limited in its scope and did not employ all the currently accepted standards for guideline development. In an effort to provide more compressive evidence-based guidelines using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach (10), the MOHW commissioned this guideline for use in Jamaica.

This guideline was developed under a consultancy led by clinician-researchers from the Caribbean Institute for Health Research, at The University of the West Indies. The guideline

provides evidence-based, up-to-date clinical practice recommendations for the management of hypertension in Jamaica. The guideline is intended to be used as a comprehensive tool for the management of patients with hypertension by primary care providers in both the public and private sectors. Information on diagnosis, appropriate screening, prevention and management in primary care settings, and an overview of the management of acute emergency situations are included.
Topics covered in this guideline include the following:

- Diagnosis of hypertension
- Definition and classification of hypertension
- Evaluation of patient with hypertension
- Treatment of hypertension (lifestyle modification and pharmacological treatments)
- Indications for referral to specialist
- Home monitoring of blood pressure
- Screening for hypertension
- CVD risk assessment
- Monitoring for complications of hypertension
- Management of hypertension in special circumstances (diabetes, CKD, older patients)
- Telehealth
- Single pill combinations
- Frequency of follow-up
- Treatment of secondary hypertension
- Treatment of hypertension in pregnancy
- Management of hypertension in children
- Management of hypertensive urgencies and emergencies
- Role of complementary, alternative, and herbal medicine

Some areas such as prevention of hypertension and management of patients with elevated blood pressure are not covered in detail. However, lifestyle management recommendations in section 3.6 (including healthy diet, physical activity, maintaining healthy weight, reduced sodium intake and avoiding harmful use of alcohol) are also useful for preventing hypertension and managing persons with elevated blood pressure. These lifestyle modifications are also recommended for the general population as part of the population approach to prevention and should be part of national public health programmes.

METHODS

The guideline was developed by a Guideline Development Group (GDG) led by the Caribbean Institute for Health Research. The GDG included subject specific experts (cardiology, nephrology, internal medicine), primary care physicians and other relevant members of the primary care team, epidemiologists, public health specialists, a pharmacist, a nurse, a patient, a patient advocate group representative, and a member of the public. The guideline development process used the Grading of Recommendations, Assessment, Development, and Evaluation (GRADE) methodology (11, 12). All members of the GDG were trained in the GRADE methodology for producing guidelines.

Selecting Source Guidelines

Given that recent guidelines for hypertension were available, we chose to use the GRADE-ADOLOPMENT process for the creation of these guidelines (13). In brief, the process involves identification of recent appropriate guidelines on the subject, adopting, adapting or de novo creation of recommendations using the GRADE Evidence to Decision framework. Using this process, we conducted a literature search to identify guidelines relevant to hypertension to serve as source guidelines. Additionally, local guidelines including the 2007 MOHW Hypertension Guidelines, 2014 MOHW Hypertension Guidelines, 2020 Interim Hypertension Guidelines, and 2020 National Screening Guidelines were reviewed.

The WHO 2021 Guidelines (14) was chosen as the primary source guideline. This guideline used the full GRADE process, had available evidence reviews and was very recent. However, the WHO guideline was limited in focus, addressing only the pharmacological treatment of hypertension in adults. In order to find supporting recommendations for other topic areas, we chose the NICE Guideline (15) as this was a very recent guideline (2019, with updates up to 2022), followed a process similar to GRADE and had available evidence reviews for some topics. We also used the Canadian 2020 guidelines (16) for some areas, since these followed the GRADE process, however evidence reviews were not available. The 2018 ESC/ESH Guidelines (17), 2017 ACC/AHA Guidelines (18) and 2020 International Society of Hypertension Guidelines (19) were used primarily as resource material since these did not use the GRADE approach. Where we had questions not adequately covered in a recent guideline, we identified relevant systematic reviews and summarised the available evidence.

Topic Selection, Evidence Reviews and Recommendations

The GDG members reviewed potential topics and voted on the ones to be included in the guideline. For each topic selected we identified specific questions using the PICO format (population, intervention, comparison, outcome) and prepared evidence summaries for the selected PICO questions. Evidence summaries were developed from existing evidence reports from the WHO or NICE Guidelines where available. When previously prepared evidence summaries were not available, we summarized evidence from existing guidelines or

from recent systematic reviews.

Evidence summaries for each topic were presented at the GDG meetings. After presentation of the evidence summaries, there was general discussion of the topics followed by a specific evaluation of questions for which recommendations were to be made, using the GRADE Evidence to Decision framework (20). The GDG used the twelve questions from the GRADE Evidence to Decision framework to assess the strength of the evidence for each guideline question in order to make a detailed judgment. The GDG members then voted for or against the recommendation based on the ratings from the discussion held.

For this user manual we use the terms ‘should’ and ‘may’ to indicate the strength of the recommendation, where ‘should’ indicates as strong recommendation for which there is a clear body of evidence supporting the treatment, practice, or intervention and ‘may’ indicates recommendations where there is some uncertainty regarding the overall net benefit of the treatment, practice, or intervention.

External Review and Revision of Guideline

The draft guideline was sent to selected local, regional, and international experts for external review. The draft guideline was also presented at a stakeholder conference for feedback. The writing team reviewed the recommendations from the stakeholder consultation and the external peer reviewers and revised the guideline accordingly.

DEFINITION AND CLASSIFICATION OF HYPERTENSION

Hypertension should be defined as office/clinic systolic blood pressure (SBP) ≥140 mm Hg or office/clinic diastolic blood pressure (DBP) ≥ 90 mm Hg. Normal blood pressure is defined as SBP <120 mm Hg and DBP <80 mm Hg. SBP of 120 -139 mm Hg or DBP of 80-89 mm Hg is termed elevated blood pressure. The recommended classification is shown in Table 1.

Table1. Classification of Blood Pressure (Adults Ages 18 Years and Older) using Office Blood Pressure Measurements

Blood Pressure Classification	*Systolic Blood Pressure (mm Hg)	*Diastolic Blood Pressure (mm Hg)
Normal	<120	<80
Elevated blood pressure	120–139	80–89
Stage 1 Hypertension	140–159	90–99
Stage 2 Hypertension	≥160	≥ 100

*Individual is classified according to the higher blood pressure (diastolic or systolic) category

When using home blood pressure monitoring (HBPM) hypertension is defined as an average SBP value of ≥ 135 mm Hg or average DBP of ≥85 mm Hg as shown in Table 3.2.

For 24-hour ambulatory blood pressure monitoring, hypertension is defined as an average 24-hour SBP value of ≥ 130 mm Hg or average 24-hour DBP of ≥80 mm Hg. This is shown in Table 3.2.

Table 2. Cut points for Diagnosis of Hypertension using Home Blood Pressure and Ambulatory Blood Pressures Measurements*

	HBPM	24-hour ABPM
SBP	135	130
DBP	85	80

*Persons are classified as hypertensive if either the SBP or DBP threshold is reached.
ABPM indicates ambulatory blood pressure monitoring; BP, blood pressure; DBP, diastolic blood pressure; HBPM, home blood pressure monitoring; and SBP, systolic blood pressure.

Rationale

In the population, blood pressure follows an approximately normal distribution with a skew at the upper end; as such, there is no clearly defined inflection point that differentiates normal

from high blood pressure. As a result, the choice of the thresholds to define hypertension is determined by experts based on the risk of adverse outcomes, particularly death from ischaemic heart disease and stroke using information provided by epidemiologic studies (21, 22). Thresholds will also depend on the mode of measurement used, whether office/clinic blood pressure measurement, HBPM or ABPM. Several organisations have published definitions and categorisation for blood pressure over the last two decades (15, 17-19, 23). Most of the current guidelines agree that individuals with a systolic blood pressure (SBP) ≥ 140 mm Hg or diastolic blood pressure (DBP) ≥ 90 mm Hg have hypertension (17, 19, 23). They also agree that those with a SBP < 120 mm Hg and DBP < 80 mm Hg have "normal" blood pressure. However, SBP between 120-139 mm Hg and DBP between 80-89 mm Hg is a grey area and there isn't consensus on how individuals who fall within this range should be classified. The designations assigned by various include pre-hypertension, elevated blood pressure or high-normal blood pressure.

For these guidelines, the GDG decided to continue to use the definition and classification of hypertension posited in the JNC-7 as was recommended by the 2020 Interim Guidelines Panel. However, given that some persons with "pre-hypertension" may revert to normal blood pressure (24), the GDG agreed that the term "elevated blood pressure" be used instead of prehypertension. The new classification is shown in Table 3.1. With regards to home blood pressure monitoring (HBPM) and ambulatory blood pressure monitoring (ABPM), given that there was general agreement between the various guidelines for the ABPM and HBPM cut-off values corresponding to an office BP of 140/90 mm Hg the GDG adopted values of ≥ 135/85 mm Hg for HBPM and ≥130/80 mm Hg for 24 hour ABPM as the local cut points for diagnosis of hypertension using out of office BP measurements as shown in Table 3.2.

DIAGNOSIS OF HYPERTENSION

Adults with suspected hypertension (i.e. clinic blood pressure 140/90 to 180/120 mmHg) should have either ambulatory blood pressure monitoring (ABPM), home blood pressure monitoring (HBPM) or repeat clinic blood pressure measurement on a separate day for confirmation of diagnosis prior to the initiation of treatment .

Points to Note:

- Blood pressure should be measured using an appropriate standardised protocol (see https://www.paho.org/en/hearts-americas/hearts-americas-blood-pressure-measurement).
- If ABPM is unavailable, or the person is unable to tolerate it, offer HBPM to confirm the diagnosis of hypertension.
- When using HBPM to confirm a diagnosis of hypertension, ensure that for each blood pressure recording, two consecutive measurements are taken. These should be done at least one minute apart and with the person seated. The blood pressure should be recorded twice daily, ideally in the morning and evening and blood pressure recording should continue for a minimum of 4 days and ideally up to 7 days. Discard the measurements taken on the first day and use the average value of all the remaining measurements to confirm a diagnosis of hypertension (see box 2).
- Confirm diagnosis of hypertension in people with a clinic blood pressure of 140/90 mm Hg or higher if 24-hour ABPM average is 130/80 mmHg or higher or HBPM average of 135/85 mmHg or higher.
- If neither ABPM nor HBPM is available and it is not practical to obtain either of these, treat as hypertension if clinic blood pressure is greater than 140/90 mmHg on at least two separate clinic visits.
- Confirmation of the diagnosis of hypertension should be made within four weeks, or maximum of six weeks.
- Patients should be provided with clear instructions including pictures on how to perform HBPM.

Points to Note regarding Measuring Blood Pressure [2]

- Because automated devices may not measure blood pressure accurately if there is pulse irregularity (for example, due to atrial fibrillation), palpate the radial or brachial pulse before measuring blood pressure. If pulse irregularity is present, consider measuring blood pressure manually using direct auscultation over the brachial artery. (NB: The recent 2023 European Guidelines suggest that the oscillatory method will satisfactorily measure SBP and only slightly overestimate DBP.)
- Healthcare providers must ensure that devices for measuring blood pressure are properly validated, maintained, and regularly recalibrated according to manufacturers' instructions.
- When measuring blood pressure in the clinic or in the home, ensure that the environment is appropriate. Provide a relaxed, temperate setting, with the person quiet and seated for five minutes with feet flat on the ground, and their arm outstretched and

1. Blood pressure should be measured using an appropriate standardized protocol (see https://www.paho.org/en/hearts-americas/hearts-americas-blood-pressure-measurement).
2. Adapted from the NICE Hypertension Guidelines

supported. Ensure that no caffeine was ingested at least 30 minutes before the measurement.

- Use an appropriate cuff size for the person's arm. Bladder width should be close to 40% of arm circumference and bladder length should cover 80 – 100% of arm circumference. Select the cuff size as recommended by its manufacturer.
- In people with symptoms of postural hypotension (e.g., falls or postural dizziness), measure blood pressure with the person either supine or seated; then measure blood pressure again with the person standing for at least 1 minute before measurement. If the systolic blood pressure falls by 20 mm Hg or more when the person is standing, review medication and measure subsequent blood pressures with the person standing; consider referral to specialist care if symptoms of postural hypotension persist.
- When considering a diagnosis of hypertension, measure blood pressure in both arms. If the difference in readings between arms is more than 15 mm Hg, repeat the measurements. If the difference in readings between arms remains more than 15 mm Hg on the second measurement, measure subsequent blood pressures in the arm with the higher reading.
- If blood pressure measured in the clinic is 140/90 mm Hg or higher, take a second measurement during the consultation. If the second measurement is substantially different from the first, take a third measurement. Record the average of the last 2 measurements as the clinic blood pressure. Ensure that all three readings are documented.

SCREENING FOR HYPERTENSION

All adults, 18 years and older, should be screened for hypertension using office blood pressure measurement. Persons whose office blood pressure is ≥140/90 mmHg should have confirmatory out-of-office blood pressure measurement using either home blood pressure monitoring or ambulatory blood pressure monitoring. If home or ambulatory blood pressure monitoring is not available, diagnosis may be confirmed with repeat office blood pressure measurement on a separate day.

Points to Note:

- Screening is recommended for all adults 18 years and older
- Initial screening should be done using office blood pressure measurement at routine health care visits; initial screening may also be conducted at health fairs or other outreach activities.
- Diagnosis of hypertension should be confirmed with out of office BP measurement using either 24-hour ABPM or HBPM. If home or ambulatory blood pressure monitoring is not available, diagnosis may be confirmed with repeat office blood pressure measurement on a separate day.
- Yearly screening is recommended for all adults for adults 18 years and older.
- Please refer to the MoHW National Screening Guidelines for Priority Non-communicable Diseases (NCDs) in Primary Health Care Chapter 2, for further guidance and details (25).

EVALUATION OF PERSONS WITH HYPERTENSION

Upon diagnosis of hypertension, tests should be obtained to screen for comorbidities and secondary hypertension, but such testing should not delay or impede starting treatment.
Points to Note

- Recommended tests to be done for all patients with hypertension are listed in Box 1
- While testing should not delay the initiation of treatment, tests should be ordered at diagnosis and reviewed as soon as possible thereafter.
- Patients should be given follow-up appointments to ensure review of test results and where necessary adjustments to treatment and/or appropriate referrals made.
- Where delays in obtaining test results are anticipated, consider initiation of treatment with a dihydropyridine calcium-channel blocker, given that there are fewer contraindications for the use of this class of antihypertensive medications.
- Some tests should be repeated at least annually to monitor for complications.

Box 1: Routine laboratory tests that are recommended prior to initiation of therapy
Complete blood count

Blood chemistry: serum creatinine, blood urea nitrogen, potassium, sodium, lipid profile (total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C) and triglycerides (TGs)), calcium and estimated glomerular filtration rate (eGFR)

Blood sugar: fasting and 2-hour post challenge glucose for all patients initially and annually (for screening for Diabetes Mellitus). Alternatively, fasting glucose and haemoglobin A1c (HbA1c) can be done, with 2-hour post challenge glucose performed for persons with abnormal HbA1c.

Urinalysis and microscopy: urinary protein, blood, abnormal urinary sediments. Test for albuminuria / proteinuria: particularly if the patient has diabetes or chronic kidney disease (CKD). Request albumin / creatinine ratio on spot urine sample to quantify urine albumin excretion.

Electrocardiography: 12-lead electrocardiogram (ECG) can identify ischemic heart disease or LVH which are indicators of target organ damage

Young patients, those with severe hypertension or resistant hypertension should be evaluated for secondary hypertension as outlined in Section 3.14

CARDIOVASCULAR DISEASE RISK ASSESSMENT

Cardiovascular risk assessment should be done at or after the initiation of pharmacological treatment for hypertension but should not delay treatment.
Points to Note

- Validated tools should be used to evaluate cardiovascular risk.
- Resources available include mobile or online risk calculators such as the AHA/ACC risk tool, PAHO CVD risk app; alternatively, the WHO CVD Risk charts may be used.
- If information needed to calculate CVD risk is not available, it is advisable to delay the risk calculation and incorporate it into the follow-up care plan.

Rationale

Cardiovascular disease (CVD) risk assessment is used to assess how likely it is that someone will have a major cardiovascular disease event such as heart attack or stroke or to die from cardiovascular disease within a given period, usually ten years (10-year CVD risk) or for the rest of their lives (lifetime risk) (26). This total CVD risk approach takes into consideration blood pressure and other cardiovascular disease risk factors such as age, sex, diabetes, cholesterol levels, smoking history, race (or region), and previous history of CVD. Various risk calculators are available either as smart phone apps, online programmes, or risk charts. Some useful links are given below:

- PAHO CVD Risk Calculator:
  https://www.paho.org/en/hearts-americas/cardiovascular-risk-calculator-app
- AHA PREVENT CVD Risk Calculator:
  https://professional.heart.org/en/guidelines-and-statements/prevent-calculator

The PAHO risk calculator is the preferred risk calculator for Jamaica as it is specifically adjusted for the Caribbean region and can be calculated with or without cholesterol levels. High CVD risk is 10% or higher.

Assessment of CVD risk can be used to guide whether pharmacological treatment should be started for persons with hypertension, as well as the level of blood pressure to be used as treatment target and whether to offer cholesterol lowering medications or aspirin as prophylaxis.

LIFESTYLE MODIFICATION FOR TREATMENT OF HYPERTENSION

Lifestyle modification and other non-pharmacological interventions are critical components of the management. These interventions have the capacity to modestly reduce blood pressure and can serve to prevent the onset of hypertension as well as reduce blood pressure in persons who are hypertensive. This section includes guidance related to dietary practices, physical activity, weight reduction, alcohol consumption and other non-pharmacological approaches to reduce blood pressure. Table 3 summarizes the expected blood pressure reduction associated with various lifestyle interventions.

Physical Activity

Persons with hypertension should be advised to engage in 30-60 minutes of moderate-intensity dynamic exercise (e.g., walking, jogging, cycling, or swimming) on 4-7 days per week in addition to the routine activities of daily living to reduce blood pressure.

Points to Note

- Persons with severe hypertension, target organ damage, or other conditions that limit ability to engage in physical activity should be advised to consult their doctors for guidance before initiating an exercise programme.
- In addition to aerobic type exercises, resistance exercises and stretching exercises are also beneficial.
- Sedentary time should also be reduced by spending less time sitting.

Weight Reduction

Persons with hypertension should maintain a healthy body weight (usually body mass index 18.5-24.9) to reduce BP.

Overweight and obese hypertensive individuals should be advised to lose weight.

Points to Note

- Healthy body weight as defined by the WHO is a BMI of 18.5 – 24.9 kg/m2; BMI 25.0-29.9 kg/m2 is considered overweight and BMI ≥30 kg/m2 is considered obese.
- Practitioners may also consider that some guidelines, including the NICE Obesity Guidelines, suggest lower BMI threshold for overweight and obesity for some ethic groups including African-Caribbean, South Asian and Chinese. For these ethnic groups overweight may be classified as BMI 23.0 – 27.5 kg/m2 and obese as ≥ 27.5 kg/m2 (27).
- Where feasible waist circumference and waist-to-hip ratio can also be used to assess central adiposity.
- Patients should be counselled regarding strategies to maintain healthy weight or to lose weight and provided with instructions.

- Persons requiring significant weight loss (e.g., those with BMI ≥30 kg/m2) should be referred to a dietitian / nutritionist for specific dietary guidance, and where appropriate, for obesity specific treatment.

Alcohol Consumption

Persons with hypertension should limit alcohol intake to two drinks[3] per day or less, to reduce blood pressure.

Points to Note

- One unit of alcohol is represented by one can of beer (12 oz / 340 ml), glass of wine (5 oz / 142 ml) or a single measure of spirits (1.5 oz / 43 ml); (see Alcohol effects on health https://www.niaaa.nih.gov/alcohols-effects-health/overview-alcohol-consumption/what-standard-drink).
- Some authorities including the Dietary Guidelines for Americans recommend that women should limit their intake of alcohol to no more than one standard drink per day, while men should limit their intake to no more than two drinks per day (28).
- Patients should be advised of the adverse effects associated with harmful use of alcohol as opposed to potential benefits to light to moderate alcohol consumption.
- Non-drinkers should not be advised to commence drinking.

Diet

Persons with hypertension should consume a diet that emphasizes fruits, vegetables, low-fat dairy products, whole grain foods rich in dietary fibre, and protein from plant sources that is reduced in saturated fat and cholesterol (similar to the Dietary Approaches to Stop Hypertension [DASH] diet).

Points to Note

- Patients and providers can make use of resources included in MoHW products such as the Food Based Dietary Guidelines for Jamaica (https://www.moh.gov.jm/programmes-policies/food-based-dietary-guidelines/) and the Protocol for Nutritional Management of Non-Communicable diseases in Jamaica (https://www.moh.gov.jm/wp-content/uploads/2020/05/Protocol-for-the-Nutritional- Management-of-Non-communicable-Diseases-in-Jamaica.pdf).
- Patients should also be referred for nutrition consultation to provide more specific advice and guidance on meal planning where feasible.

Salt Consumption

Persons with hypertension should reduce sodium intake to <2000 mg (equivalent to 5 g of

3. See definition of 'drinks' in the Points to Note

salt[4] or 87 mmol of sodium) per day to reduce blood pressure and risk of cardiovascular disease.

Points to Note

- Patients should be provided with information of foods which are usually high in sodium and be taught how to read nutrition facts panel on packaged foods.

Potassium Consumption

Persons with hypertension who are not at risk of hyperkalaemia[5] , may increase dietary potassium intake to reduce BP.

Points to Note

- Patients at risk for hyperkalaemia include those with chronic kidney disease or kidney failure, diabetes mellitus, sickle cell disease, patients on potassium sparing diuretics, ACE inhibitors or ARBs, and digoxin. Caution with regards to potassium intake should be advised in these patients.
- Patients should be provided with information on foods high in potassium and how these can be incorporated in their usual diets.
- Patients should be encouraged to seek dietary sources of potassium and caution advised in the use of potassium supplements, unless specifically recommended by a doctor.
- Baseline serum potassium and kidney function should be assessed before making recommendations regarding increasing potassium intake.

4. 1 teaspoon of salt contains 2300 mg sodium; intake should therefore be less than 1 teaspoon of salt.
5. See section 3.6 for details on persons at risk for hyperkalemia

Table 3. Lifestyle Modifications in Hypertension Management

Modification	Recommendation	Approximate BP Reduction
Reduce weight	Maintain normal body weight (BMI 18.5–24.9 kg/m2)	5–20 mm Hg/10 kg
Adopt DASH eating plan	Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated and total fat	8–14 mm Hg
Lower sodium Intake	Consume no more than 2,000 mg of sodium/day	2–8 mm Hg
Physical activity	Engage in regular aerobic physical activity such as brisk walking (at least 30 min per day, most days of the week)	4–9 mm Hg
Moderation of alcohol consumption	Limit consumption to no more than 2 drinks (e.g., 24 oz beer, 10 oz wine, or 3 oz 80-proof whiskey) per day in most men, and to no more than 1 drink per day in women and lighter weight persons	2–4 mm Hg

Source: Modified from AHA/ACC/CDC Science Advisory: An Effective Approach to High Blood Pressure Control. Hypertension. 2013; doi:10.1161/HYP.0000000000000003

PHARMACOLOGICAL TREATMENT OF HYPERTENSION

Pharmacological treatment is a very important component of hypertension treatment. While a subset of patients will achieve blood pressure control with lifestyle modifications only, most patients will need pharmacological treatment, usually requiring one to three drugs. There are now many classes of antihypertensive medications with varying effectiveness, particularly with regards to the reduction in mortality, preventing cardiovascular disease, and varying adverse effects. Physicians and other health care practitioners must be able to choose the most effective therapies with the least side effects as first line therapies. It is also important to decide on the levels of blood pressure at which treatment should be initiated and the blood pressure targets that should be achieved. This section we present recommendations for practice adapted from the WHO 2021 Hypertension Guidelines (14) with regards to threshold for starting treatment, preferred first line agents, best initial combination therapies, and the use of single pill combinations.

Threshold for Initiation of Pharmacological Treatment

Pharmacological antihypertensive treatment should be initiated for individuals with a confirmed diagnosis of hypertension and systolic blood pressure of ≥140 mm Hg or diastolic blood pressure of ≥90 mm Hg.

Pharmacological antihypertensive treatment may be initiated for individuals with existing cardiovascular disease and systolic blood pressure of 130–139 mm Hg.

Pharmacological antihypertensive treatment may be initiated for individuals without cardiovascular disease but with high cardiovascular risk, diabetes mellitus, or chronic kidney disease, and systolic blood pressure of 130–139 mm Hg.

Points to Note

- Once hypertension has been diagnosed, pharmacological therapy should be commenced within the subsequent 4 weeks.

- There should be no delay in initiating antihypertensives for patients whose blood pressure is very high (for example, systolic ≥160 mm Hg or diastolic ≥100 mm Hg) or where there is evidence of end organ damage.

First Line Antihypertensive Agents

For adults with hypertension requiring pharmacological treatment, drugs from any of the following three classes of pharmacological antihypertensive medications should be used as initial treatment: (1) thiazide or thiazide-like diuretics, (2) angiotensin-converting enzyme inhibitors (ACEIs) or angiotensin-receptor blockers (ARBs), and (3) long-acting dihydropyridine calcium channel blockers (CCBs).

Points to Note

- Long acting anti-hypertensives should be used as preferred agents to ensure full 24-hour BP control.

- Some agents may be preferred in patients with specific conditions such as ACEIs /ARBs in patients with severe proteinuria, diabetes mellitus, heart failure or kidney disease and diuretics or CCBs in patients over 65 years, and beta-blockers in ischaemic heart disease.

Combination and Single Pill Therapy

For adults with hypertension requiring pharmacological treatment, combination therapy, preferably with a single-pill combination (to improve adherence and persistence), may be used as initial treatment. Antihypertensive medications used in combination therapy should be chosen from the following three drug classes: diuretics (thiazide or thiazide-like), angiotensin-converting enzyme inhibitors (ACEIs)/angiotensin-receptor blockers (ARBs), and long-acting dihydropyridine calcium channel blockers (CCBs).

Points to Note

- Combination medication therapy may be especially valuable when the baseline BP is ≥20/10 mm Hg higher than the target blood pressure. Combination therapy is better tolerated, reaches higher BP control rates, and has fewer side effects than monotherapy.
- Single-pill combination therapy (with two or three antihypertensive medications) improves medication-taking adherence and persistence and BP control and should be used whenever feasible.
- Single-pill combination therapy can be initiated with low dose single pill combination tablets and gradually titrated up to achieve target blood pressure.

Blood Pressure Targets for Persons on Treatment

For adults with hypertension requiring pharmacological treatment, the target blood pressure treatment goal should be <140/90 mm Hg in all patients with hypertension without comorbidities.

For adults with hypertension and high CVD risk, diabetes mellitus, or chronic kidney disease, the target systolic blood pressure treatment goal should be <130 mm Hg if this can be achieved without serious adverse effects.

For adults with hypertension and known cardiovascular disease, a target systolic blood pressure treatment goal should be <130 mm Hg if this can be achieved without serious adverse effects.

Points to Note

Recommended drugs for use in the management of hypertension are illustrated in Table 4. Initial treatment should begin with a non-dihydropyridine calcium channel blocker, ACE inhibitor or ARB, or a thiazide-like or thiazide diuretic. The GDG suggests starting with a low dose single pill combination as initial therapy. If the patient's BP is not controlled, move to a full dose single pill combination of two drugs and then to a three-drug single pill combination. If the patient is not controlled on three drugs consider resistant hypertension and refer to hypertension specialist, cardiologist or internist for further evaluation and management. A detailed algorithm for treatment is presented in at the end of the manual.

Table 4: Recommended Drugs for Management of Hypertension*

Therapy Class	Drug Class	Examples
Preferred Drugs for initial therapy	Calcium channel blocker (non-dihydropyridine)	amlodipine nifedipine retard
	Thiazide-like or thiazide diuretic	Indapamide chlorthalidone hydrochlorothiazide
	ACE inhibitor or ARB	lisinopril, ramipril valsartan, losartan, telmisartan, candesartan, irbesartan
Second line or for special indications	Beta blockers	carvedilol, atenolol, bisoprolol
Resistant hypertension	Aldosterone antagonist	Spironolactone
	Direct vasodilators	Hydralazine
Others	Centrally acting agents	methyldopa

*NB: Drugs should be initiated as preferably as single pill combinations as in the algorithm in Figure 3.

INDICATIONS FOR REFERRAL TO SPECIALIST

Patients should be referred for same-day specialist review and/or emergency evaluation if SBP ≥180 mm Hg, or DBP ≥120 mm Hg in combination with signs of acute target organ damage or if there is suspected phaeochromocytoma with labile hypertension. Signs of acute target organ damage include retinal haemorrhage or papilloedema, new onset confusion, new or evolving neurological signs, chest pain, signs of heart failure, or acute kidney injury.
Patients with SBP ≥180 mm Hg or DBP ≥ 120 mm Hg with no symptoms or signs and no evidence for acute target organ damage should be referred for specialist evaluation for urgent care (to be seen within one week) or should be reviewed in primary care within one week.

Patients with clinical suspicion of secondary hypertension, resistant hypertension or significant target organ damage (e.g., ischaemic heart disease, heart failure, chronic kidney disease) should be referred for specialist evaluation to be seen within 1-2 months after these conditions were diagnosed.

Points to Note

- Patients should be referred initially to the hospital emergency department and should be evaluated by the internal medicine specialist at the emergency department.
- Decisions regarding in-patient evaluation and further testing should be made by the internal medicine team.
- For patients with no signs of target organ damage who are scheduled for review in one week, out of office blood pressure measurements should be done in that week, if feasible.

MONITORING FOR COMPLICATIONS OF HYPERTENSION

For all people with hypertension the following tests should be done annually to screen for target organ damage:

- Measure fasting glucose, glycated haemoglobin (HbA1c), electrolytes, creatinine, estimated glomerular filtration rate, and lipid profile (total cholesterol, HDL, LDL, and triglycerides).
- Test for the presence of protein in the urine by sending a urine sample to the laboratory for estimation of the albumin/creatinine ratio and test for haematuria using a reagent strip or urine microscopy.
- Examine the fundi for the presence of hypertensive retinopathy.

A 12-lead electrocardiogram should be done where ischaemic heart disease or hypertensive heart disease is suspected. An echocardiogram for assessment of left ventricular hypertrophy is useful in selected cases to help define the future risk of cardiovascular events.

Echocardiographic assessment of left ventricular mass, as well as of systolic and diastolic left ventricular function should be considered for hypertensive patients suspected to have left ventricular dysfunction, heart failure or coronary artery disease.

Rationale

Most patients with hypertension are asymptomatic, but untreated hypertension is associated with several serious complications and is associated with high morbidity and mortality. The major complications affect the cardiovascular system and kidneys. These include hypertensive heart disease, heart failure, ischaemic heart disease, stroke, chronic kidney disease and renal failure. Other important complications include hypertensive retinopathy, peripheral arterial disease, abdominal aortic aneurysm, and sexual dysfunction. Many of these complications do not show symptoms until the damage is far advanced. It is therefore important that persons with hypertension undergo regular screening for complications, so that interventions may be made to prevent or reduce the effect of these complications.

MANAGEMENT OF HYPERTENSION IN SPECIAL CIRCUMSTANCES

Hypertension is associated with various complications and treatment reduces cardiovascular, renal and cerebrovascular outcomes for all patients. Trial data however suggests that some populations or groups may benefit more than others from specific drug interventions, hence justifying specific approaches for some populations. The special populations addressed in this section include diabetic patients, patients with vascular complications, pregnant patients, and the elderly.

Diabetes Mellitus

For hypertensive patients with diabetes mellitus, the following should be instituted:

- Threshold for initiating antihypertensive treatment should be at BPs of ≥ 130/80 mm Hg.[6]
- BP targets for patients on treatment should be < 130/80 mm Hg.
- ACE inhibitors or ARBs should be used as preferred agents, especially those with albuminuria.

Chronic Kidney Disease

For hypertensive patients with chronic kidney disease, the following should be instituted:

- Threshold for initiating antihypertensive treatment should be at BPs of ≥ 130/80 mm Hg.
- BP targets for patients on treatment should be < 130/80 mm Hg.
- ACE inhibitors or ARBs should be used as preferred agents, especially those with albuminuria.

Ischaemic Heart Disease

For hypertensive patients with ischaemic heart disease, the following should be instituted:

- BP targets for patients on treatment should be <130/80 mm Hg.
- ACE inhibitors or ARB should be considered as preferred agents.
- Treatment should be based on compelling indications, such as beta blockers, ACE inhibitors, or ARBs for patients with previous myocardial infarction or stable angina pectoris; other agents (e.g., dihydropyridine CCBs, thiazide or thiazide-like diuretics, and/or mineralocorticoid receptor antagonists) may be added as required to reach targets for BP control.
- Caution should be exercised when the DBP is ≤ 60 mm Hg because of concerns that myocardial ischemia might be exacerbated.

6. Note that the evidence for a diastolic threshold of 80 mm Hg for initiation pharmacological treatment and DBP of <80 mm Hg is less robust than the evidence for SBP thresholds and targets; these thresholds are adopted for special populations as they are consistent with most guidelines.

Older patients

For older patients with hypertension, the following should be instituted:

- For adults 60-79 years a standard BP target should be < 140/90 mm Hg; patients 60-79 years with comorbidities increasing CVD risk (DM, CKD and IHD) and can tolerate lower BP targets should be offered treatment aimed at achieving BP targets of 130/80 mm Hg.
- For persons 80 years and older, treatment targets should however be individualized based on patients' overall health, presence of co-morbidity, frailty, and patient's current and past experience with medication related adverse effects. Except when limited by frailty or of comorbid illness, treatment targets should be the same as younger patients.

Points to Note

- Consideration should be given to overall health status when choosing target blood pressure targets for older patients. Relatively healthy older patients may be treated to lower targets so as to obtain optimal benefits, whereas frail elderly patients should have higher treatment targets to reduce adverse effects.

Rationale

Diabetes mellitus is a frequent comorbidity in patients with hypertension and is associated with a higher risk of cardiovascular events compared to patients with hypertension and no other comorbidity. Considering this, guidelines frequently recommended lower thresholds for initiating blood pressure treatment and lower blood pressure targets in patients with diabetes. Chronic kidney disease is also a frequent complication of hypertension and a cause for secondary hypertension. As seen with diabetes mellitus, chronic kidney disease is associated with a higher risk of adverse cardiovascular events and therefore guidelines usually recommend lower blood pressure thresholds for initiation of treatment and lower targets for treated patients. Lower thresholds are also recommended for patients with pre-existing cardiovascular disease and high ten-year cardiovascular disease risk. Elderly patients may experience higher levels of complications from antihypertensive medications, including increased risk for orthostatic hypotension and syncope. Given the higher risk of complications, some guidelines recommend higher blood pressure targets for older patients.

FREQUENCY OF FOLLOW UP

There should be monthly follow up after initiation or a change in antihypertensive medications until patients reach BP targets and follow up every 3–6 months for patients whose blood pressure is under control.

Points to Note

- This recommendation refers to stable patients only. Please see the section on the management of hypertensive urgencies and emergencies for the management in these situations.
- Ensure that patients receive a definite follow-up appointment, regardless of whether the patient is being seen in the public health sector or private health facilities.
- In some situations, in-person follow time may need to be adjusted in line with practical considerations and staff limitations, but providers should seek to review patients who are not at goal within six weeks.
- Where early in-person physician follow up is not possible or challenging, alternative approaches such home blood pressure monitoring and telehealth follow up may be considered (see section on telehealth for more details)

HOME MONITORING OF BLOOD PRESSURE

Home blood pressure monitoring with appropriate feedback should be included as part of the management of hypertension to facilitate improved blood pressure control and cardiovascular disease outcomes.

Points to Note

- Patients should be advised to purchase and use only home BP monitoring devices that are appropriate for the individual and have met international or local standards.
- Automated validated devices should be used and should be checked regularly to ensure all components (cuffs, etc.) are functioning properly. Auscultatory devices are not recommended as patients rarely master the technique.
- Patients should be encouraged to use devices with data recording capabilities or automatic data transmission to increase the reliability of reported home BP monitoring.
- Information on the procedures from home BP monitoring can be found at: https://www.paho.org/en/hearts-americas/hearts-americas-blood-pressure-measurement.
- Health care professionals should ensure that patients who measure their BP at home have adequate training and, if necessary, repeat training in measuring their BP. Patients should be observed to determine that they measure BP correctly and should be given adequate information about interpreting these readings. Patients should also be advised to record BP from the arm with higher BP after initial reading in both arms.
- Patients should be encouraged to record their blood pressure reading in an appropriate log (print or electronic) and to bring their BP logs to their appointments.
- Patients should also be advised what constitutes normal and high blood pressure, their specific blood pressure targets and when to contact their health care provider or seek emergency care.
- When using HBPM to monitor the response to treatment use the average BP level taken during the usual waking hours. Reduce and maintain BP at <135/85 mmHg for adults with target office BP of <140/90 mmHg.

Rationale

The availability of automatic oscillometric blood pressure monitors have made home blood pressure monitoring (HBPM) a feasible strategy as part of hypertension management. Some guidelines now recommend that HBPM be adopted as an intervention to improve blood pressure control. Out-of-office measurement of BP can be helpful for confirmation and management of hypertension. Although ambulatory blood pressure monitoring (ABPM) is the best out-of-office measurement method, home blood pressure monitoring (HBPM) is often a more practical approach in clinical practice. HBPM can be used to confirm the diagnosis of hypertension, assess white coat effect for persons with elevated clinic blood pressures and can assist with the titration of BP-lowering medication in conjunction with telehealth counselling or clinical interventions.

RESISTANT HYPERTENSION[7]

The American College of Cardiology/American Heart Association (ACC/AHA) defines hypertension as resistant when a patient takes three or more antihypertensive medications with complementary mechanisms of action (including a diuretic) but does not achieve blood pressure (BP) control, or when BP control is achieved but requires 4 or more medications (18). Similarly, the 2019 NICE Guidelines define hypertension as resistant when blood pressure is not controlled in adults taking the optimal tolerated doses of an ACE inhibitor or an ARB in addition to a CCB and a thiazide-like diuretic (15). Resistant hypertension increases the risk of hypertension mediated organ damage (HMOD), premature cardiovascular events, and chronic kidney disease (17). The prevalence is 13% according to ACC/AHA and less than 10% according to the ESC/ESH Guidelines (17, 18). The practice recommendations below were developed based on consensus by the Guideline Development group after review of current guidelines.

Patients whose blood pressures have not been controlled to the target level despite taking the optimal tolerated doses of an ACE inhibitor or an ARB plus a CCB and a thiazide or thiazide-like diuretic should be assessed as having resistant hypertension.
For patients with suspected resistant hypertension, elevated clinic blood pressure measurements should be confirmed using ambulatory or home blood pressure recordings before making a definite diagnosis of resistant hypertension. Adherence to medications should also be assessed before confirming the diagnosis.

Patients with resistant hypertension should be referred to a specialist [8] with expertise in hypertension management for diagnostic evaluation and guidance on therapeutic choices.
Patients with resistant hypertension should be evaluated for secondary causes of hypertension.

Low-dose spironolactone should be used as the fourth antihypertensive agent for adults with resistant hypertension who have a blood potassium level of 4.5 mmol/l or less unless there is compelling reason for another class (e.g., beta blockers in patients with ischaemic heart disease). Spironolactone should be used with caution in people with a reduced estimated glomerular filtration rate (12.5 mg daily for eGFR 30-50; and avoided in those with eGFR <30) due to an increased risk of hyperkalaemia. Eplerenone may be considered as an alternative to spironolactone. Amiloride can also be considered as an alternative.

When using further diuretic therapy for treatment of resistant hypertension, monitor sodium and potassium levels, and renal function within one month of starting treatment and repeat as needed thereafter.

---

7. Adapted from NICE Guidelines, Canadian 2020 Guidelines, and International Society of Hypertension 2020 Guidelines
8. Specialist clinic in our setting would include – hypertension clinic (University Hospital), cardiologists / cardiology clinic, nephrology clinic, endocrine clinic (if endocrine cause suspected), internal medicine specialist / medical out-patient clinics at hospitals.

Consider an alpha-blocker or beta-blocker for adults with resistant hypertension who have a blood potassium level of more than 4.5 mmol/l.

Loop diuretics should be considered for patients with low eGFR (<30 mm/min/1.73 m2); other antihypertensive agents that may be considered include hydralazine or minoxidil (direct vasodilators) and centrally acting agents such as clonidine or alpha methyldopa if clonidine is not available.

For patients with resistant hypertension, review and reiterate healthy lifestyle measures (reduce sodium intake, increase potassium intake, stress reduction, adequate exercise, avoid excess use of alcohol). When possible, eliminate drugs and substances that cause higher blood pressure, such as nonsteroidal anti-inflammatory drugs, cocaine, amphetamines, oral contraceptive agents, sympathomimetics, and corticosteroids.

SECONDARY HYPERTENSION [9]

Secondary hypertension may be defined as "hypertension due to an identifiable cause, which may be treatable with an intervention specific to the cause" (17). Secondary hypertension has a prevalence of between 5-15% among persons with hypertension (17-19). Given that these conditions may be curable in some cases, clinicians should assess the possibility of secondary hypertension in all patients with hypertension and obtain the necessary history, physical examination, and laboratory test to identify secondary hypertension when present. The guidance below was developed based on consensus by the Guideline Development group after review of current guidelines.

The possibility of secondary hypertension should be considered in all persons diagnosed with hypertension.

Targeted screening for secondary hypertension should be conducted in patients with history or clinical features suggestive of secondary hypertension. The specific clinical features to be considered are presented in Table 5.

Targeted screening for secondary hypertension should be conducted in persons confirmed to have resistant hypertension.

Patients suspected of having secondary hypertension should be referred to an appropriate specialist[10] for further evaluation, confirmatory test and appropriate treatment where indicated.

Table 5. Identifiable Causes of Secondary Hypertension with Basic Clinical Features and Recommended Screening Tests

Condition	Clinical Characteristics	Screening Test
Chronic kidney disease	Family history of chronic kidney disease Past history of kidney disease or urinary tract abnormality. History of condition with risk of renal involvement (e.g., systemic lupus erythematosus)	Serum creatinine Estimated GFR (eGFR) Urine albumin excretion or urine albumin/creatinine ratio
Coarctation of the aorta	Delayed or absent femoral pulses Different BP (≥ 20/10 mm Hg) between upper–lower extremities and/or between right–left arm, Low ankle brachial index, Inter-scapular ejection murmur, Rib notching on chest X-ray	Computed tomography angiography
Cushing's syndrome and other states of glucocorticoid excess e.g., chronic steroid therapy	Central obesity, Moon facies, Purple striae, Facial rubor, Signs of skin atrophy, Easy bruising Dorsal and supraclavicular fat pad Proximal muscle weakness	24-hour urine free cortisol Low dose dexamethasone suppression test

9. Adapted from the ACC/AHA Guidelines, NICE Guidelines, and ISH 2020 Guidelines
10. Specialist referrals may be to a hypertension specialist, cardiologist, endocrinologist, nephrologist, or internal medicine specialist.

Condition	Clinical Characteristics	Screening Test
	Easy bruising Dorsal and supraclavicular fat pad Proximal muscle weakness	
Phaeochromocytoma	Episodic symptoms (the 5 'Ps'): Paroxysmal hypertension; Pounding headache; Perspiration; Palpitations; Pallor, Labile hypertension BP surges precipitated by drugs (e.g. beta-blockers, metoclopramide, sympathomimetics, opioids, and tricyclic antidepressants)	24-hour urine vanillylmandelic acid (VMA) initially 24- hour urine metanephrines if VMA positive
Primary aldosteronism, other states of mineralocorticoid excess	Spontaneous or diuretic induced hypokalaemia Rarely, muscle weakness	Plasma aldosterone to renin activity ratio (ARR). If abnormal refer for further evaluation such as saline suppression test.
Renovascular hypertension	Abdominal bruit Bruits over other arteries (i.e., carotid, and femoral arteries) Drop in estimated GFR >30% after exposure to ACE-inhibitors/ARBs, History of flash pulmonary oedema or history of atherosclerotic disease or presence of cardiovascular risk factors For suspected fibromuscular dysplasia, young women with onset of hypertension <30 years	Doppler flow ultrasonography Magnetic resonance angiography Computed tomography angiography
Sleep apnoea	Increased BMI, Snoring Daytime sleepiness, Gasping or choking at night Witnessed apnoea's during sleep, Nocturia	Sleep study with oxygen saturation (screening would include a validated sleep scale such as the Epworth Sleepiness Scale)
Thyroid/parathyroid disease	Symptoms of hyperthyroidism: heat intolerance, weight loss, tremor, palpitations Symptoms of hypothyroidism: cold intolerance, weight gain, dry brittle hair	Thyroid stimulating hormone level Serum parathyroid hormone level

HYPERTENSION AND TELEHEALTH

Telehealth modalities may be considered as adjuncts to treatment and control of hypertension, where feasible. Such telehealth interventions should be evaluated to determine levels of effectiveness in the local context.

Points to Note

- There is limited evidence on the efficacy of specific technological modalities, so if they are to be implemented in patient care, it is useful to assess these tools as part of implementation.
- Telehealth may also serve as an alternative approach to delivering hypertension care when standard delivery methods are unavailable.
- Given that some facilities will lack the required infrastructure for telehealth services, each facility or health region will assess its infrastructure needs and implement necessary changes where feasible.

Rationale

Telehealth has been defined as “the provision of health care remotely by means of a variety of telecommunication tools, including telephones, smartphones, and mobile wireless devices, with or without a video connection” (29). Telehealth has been shown to improve access to care particularly in more remote or difficult to reach locations, but in recent years telehealth has also been applied to reduce inconvenience and costs associated with health care. The COVID-19 pandemic has resulted in greatly increased knowledge, acceptability, and availability of telehealth services. Some of these services are now widely available in the private sector. Within the public health services adjustments were made to facilitate telehealth services for some aspects of chronic disease care.

See Appendix 2 for additional information on the use of Telehealth in clinical practice.

TREATMENT OF HYPERTENSION IN PREGNANCY [11]

Screening for preeclampsia should be performed in all pregnant women with blood pressure measurements throughout pregnancy.

Women with hypertension who become pregnant, or are planning to become pregnant, should be transitioned to methyldopa, nifedipine, and/or labetalol during pregnancy.

Women with hypertension who become pregnant should NOT be treated with ACE inhibitors, ARBs, or direct renin inhibitors.

Preconception counselling is recommended for women with pre-pregnancy hypertension to advise on individualized antihypertensive medication management during pregnancy.

Consider discontinuing ACE inhibitors and ARBs in women planning pregnancy.

For women with of non-severe hypertension (BP 140-159/90-109 mm Hg) in pregnancy

- Antihypertensive therapy should be instituted if average SBP measurements greater than 140 mm Hg or DBP measurements greater than 90 mm Hg in pregnant women with chronic hypertension, gestational hypertension, or preeclampsia.
- Initial antihypertensive therapy should be monotherapy from the following first-line drugs: oral labetalol, oral methyldopa, long-acting oral nifedipine, or other oral beta-blockers (acebutolol, metoprolol, pindolol, and propranolol). [*NB: WHO recommends that oral alpha-agonist (methyldopa) and beta-blockers should be considered as effective treatment options for non-severe hypertension during pregnancy, citing concerns for proteinuria with calcium channel blockers. Some studies suggest that amlodipine may also be safe for use in pregnancy, but this has not been included in current guidelines.]*
- Other antihypertensive drugs can be considered as second-line drugs: clonidine, hydralazine, and thiazide diuretics.
- A DBP of 85 mm Hg should be targeted for pregnant women receiving antihypertensive therapy with chronic hypertension or gestational hypertension. A similar target could be considered for pregnant women with preeclampsia.
- Additional antihypertensive drugs should be used if target BP levels are not achieved with standard-dose monotherapy. Add-on drugs should be from a different drug class chosen from first-line or second-line options.

Women with severe hypertension in pregnancy or postpartum (SBP ≥160 mm Hg or DBP ≥ 110 mm Hg) require urgent antihypertensive therapy because it is considered an obstetrical emergency.

For women with hypertension in the postpartum period (up to 6 weeks postpartum),

11. Adapted from USPSTF Guideline for screening for hypertension in pregnancy; ACC/AHA Guidelines; Canadian Guidelines and WHO Guidelines for treatment of Hypertension in Pregnancy

antihypertensive drugs used in breastfeeding women include: labetalol, methyldopa, long acting nifedipine, enalapril, or captopril. *(NB: Ensure that there is close monitoring in the postpartum period, especially in the first 3-5 days*

Women with non-severe hypertension during pregnancy should be offered antihypertensive drug treatment in the context of good quality antenatal care follow-up.

Women with hypertension in pregnancy should be referred to a high-risk antenatal clinic or obstetrician and should not be managed in regular primary care.

Women with severe hypertension in pregnancy (SBP ≥160 mm Hg or DBP ≥ 110 mm Hg) should be considered an obstetric emergency and should be admitted to hospital for treatment.

The following investigations are essential for patients with hypertension in pregnancy:

- Urine analysis,
- Full blood count, liver enzymes, albumin, haematocrit, serum creatinine and serum uric acid
- Test for proteinuria (in early pregnancy and second half of pregnancy. A dipstick test >1+ should be followed up with urine albumin to creatinine ratio (UACR) in a single spot urine; UACR <30 mg/g excludes proteinuria
- PT, PTT

Rationale

During pregnancy, hypertension is defined as systolic blood pressure ≥140 mm Hg and/or diastolic blood pressure ≥90 mm Hg. Hypertensive disorders of pregnancy include the following syndromes as defined by the ISH 2020 Guidelines (19):

- **Chronic (preexisting) hypertension:** This condition begins before pregnancy or before the 20th week of gestation and continues for more than six weeks after childbirth, accompanied by proteinuria.

- **Gestational hypertension:** Onset occurs after the 20th week of gestation and lasts for less than six weeks after delivery.

- **Pre-eclampsia:** This condition is characterized by hypertension along with proteinuria (exceeding 300 mg/24 hours or an albumin-to-creatinine ratio above 30 mg/mmol [265 mg/g]). Factors which increase the risk of pre-eclampsia include pre-existing hypertension, hypertensive disorders in previous pregnancies, diabetes, renal disease, first-time or multiple pregnancies, and autoimmune diseases like systemic lupus erythematosus (SLE). Risks associated with pre-eclampsia include foetal growth restriction and preterm birth.

- **Pre-eclampsia superimposed on chronic hypertension:** This refers to the development of pre-eclampsia in a woman with preexisting chronic hypertension.
- **Eclampsia:** Eclampsia involves hypertension during pregnancy accompanied by seizures, severe headaches, visual disturbances, abdominal pain, nausea, vomiting, and reduced urine output. Immediate treatment and delivery are necessary in such cases.
- **HELLP syndrome (haemolysis, elevated liver enzymes, low platelets):** This syndrome requires immediate treatment and delivery. It is characterized by haemolysis, elevated liver enzymes, and low platelet levels.

Preeclampsia poses a significant risk to both the pregnant woman and the foetus, with a prevalence of 3.8% among pregnancies. In the United States, preeclampsia and eclampsia contribute to approximately 9% of maternal fatalities, highlighting their importance as leading causes of maternal death (18). Preeclampsia is linked to a higher probability of preterm birth, intrauterine growth restriction, placental abruption, and perinatal death (18).

Managing blood pressure during pregnancy is a complex task due to the limitation that several commonly prescribed antihypertensive medications, such as ACE inhibitors and ARBs, are not recommended during pregnancy because they can harm the foetus. The objective of controlling blood pressure during pregnancy is to prevent severe hypertension and increase the duration of gestation to provide the foetus with more time to develop before delivery.

HYPERTENSION IN CHILDREN

Levels of blood pressure in childhood tracks into adulthood so that children with higher blood pressures are more likely to have hypertension as adults (30, 31). Hypertension is also an important health concern in children and adolescents. Data from the United States estimates that approximately 3.5% of American children and adolescents have hypertension, while another 2.5-3.5% have persistently elevated blood pressure (previously termed prehypertension) (32). Data on the prevalence of hypertension in children and adolescents in Jamaica are limited. Estimates among adolescents 15-19 years old show that prevalence of prehypertension defined as systolic blood pressure 120-139 mm Hg or diastolic blood pressure 80-89 mm Hg) was 29% (33). Given these data, it is important that hypertension guidelines for Jamaica address hypertension in children. In this section we provide guidance for the management of hypertension in children adapted primarily from the 2020 Canadian Guidelines (16) and the 2017 American Academy of Pediatrics Guidelines [AAP] (32). Cut points for the diagnosis of hypertension using the AAP Guidelines are shown in Table 6.

Screening

BP should be measured annually in children and adolescents ≥3 y of age.

BP should be checked in all children and adolescents ≥3 years of age at every health care encounter if they have obesity, are taking medications known to increase BP, have renal disease, a history of aortic arch obstruction or coarctation, or diabetes.

Points to Note

- BP should also be monitored earlier in children <3 years of age with risk factors for hypertension (these children should have BP measurements taken at each health care visit). See Box 2 for risk factors that would require BP measurements in children younger than 3 years.
- BP varies with age, sex, and height in children and, therefore, BP values should be compared with norms for age, sex, and height using standard tables (See Appendix 4)

Diagnosis

Trained health care professionals in the office setting should make a diagnosis of hypertension if a child or adolescent has auscultatory-confirmed BP readings ≥95th percentile at 3 different visits.

Oscillometric devices may be used for BP screening in children and adolescents. When doing so, providers should use a device that has been validated in the paediatric age group. If elevated BP is suspected on the basis of oscillometric readings, confirmatory measurements should be obtained by auscultation.

ABPM should be performed for confirmation of hypertension in children and adolescents with office BP measurements in the elevated BP category for 1 year or more or with stage 1 hypertension over 3 clinic visits.

ABPM should be performed by using a standardized approach with monitors that have been validated in a paediatric population, and studies should be interpreted by using paediatric normative data.

Children and adolescents with suspected white coat hypertension should undergo ABPM. Diagnosis is based on the presence of mean SBP and DBP <95th percentile and SBP and DBP load <25%.

Children and adolescents ≥6 y of age do not require extensive evaluation for secondary causes of hypertension if they have a positive family history of hypertension, are overweight or obese, and/or do not have history or physical examination findings suggestive of a secondary cause of hypertension.

In children and adolescents being evaluated for high BP, the provider should obtain a perinatal history, appropriate nutritional history, physical activity history, psychosocial history, and family history and perform a physical examination to identify findings suggestive of secondary causes of hypertension.

Role of echocardiography

i. Echocardiography should be performed to assess for cardiac target organ damage (left ventricular [LV] mass, geometry, and function) at the time of consideration of pharmacologic treatment of hypertension.

ii. Left ventricular hypertrophy (LVH) should be defined as LV mass >51 g/m (boys and girls) for children and adolescents older than age 8 y and defined by LV mass >115 g/BSA for boys and LV mass >95 g/BSA for girls.

iii. Repeat echocardiography may be performed to monitor improvement or progression of target organ damage at 6- to 12-mo intervals. Indications to repeat echocardiography include persistent hypertension despite treatment, concentric LV hypertrophy, or reduced LV ejection fraction.

iv. In patients without LV target organ injury at initial echocardiographic assessment, repeat echocardiography at yearly intervals may be considered in those with stage 2 hypertension, secondary hypertension, or chronic stage 1 hypertension incompletely treated (noncompliance or drug resistance) to assess for the development of worsening LV target organ injury.

Treatment

In children and adolescents diagnosed with hypertension, the treatment goal with

non-pharmacologic and pharmacologic therapy should be a reduction in SBP and DBP to <90th percentile and <130/80 mm Hg in adolescents ≥ 13 years old.

At the time of diagnosis of elevated BP or hypertension in a child or adolescent, clinicians should provide advice on the DASH diet and recommend moderate to vigorous physical activity at least 3 to 5 days per week (30–60 min per session) to help reduce BP.
In hypertensive children and adolescents who have failed lifestyle modifications (particularly those who have LV hypertrophy on echocardiography, symptomatic hypertension, or stage 2 hypertension without a clearly modifiable factor [e.g., obesity]), clinicians should initiate pharmacologic treatment with an ACE inhibitor, ARB, long-acting calcium channel blocker, or thiazide diuretic.

Points to Note

- Pharmacological therapy should be initiated when patients have:
    - o Symptomatic hypertension
    - o Hypertensive target organ damage
    - o Stage 2 hypertension
    - o BP at or above the 90th percentile associated with diabetes mellitus type 1 or 2, chronic kidney disease, or heart failure.
    - o Stage 1 hypertension without target organ damage that persists (6 months) despite a trial of non-pharmacologic therapy.
- In children with proven secondary hypertension, specific treatment of the underlying disease must be initiated by an expert in paediatric hypertension.

ABPM may be used to assess treatment effectiveness in children and adolescents with hypertension, especially when clinic and/or home BP measurements indicate insufficient BP response to treatment.

For children with chronic kidney disease the following should apply:

i. Children and adolescents with CKD should be evaluated for hypertension at each medical encounter.

ii. Children or adolescents with both CKD and hypertension should be treated to lower 24-hr MAP <50th percentile by ABPM.

iii. Regardless of apparent control of BP with office measures, children and adolescents with CKD and a history of hypertension should have BP assessed by ABPM at least yearly to screen for masked hypertension.

Children and adolescents with T1DM or T2DM should be evaluated for HTN at each medical

encounter and treated if BP ≥95th percentile or >130/80 mm Hg in adolescents ≥13 y of age.

Cardiovascular Risk Factor Assessment

Cardiovascular risk factors should be assessed in hypertensive children

Laboratory Tests

Laboratory tests for the investigation of children with hypertension

1. Routine tests that should be performed for the investigation of all children with hypertension include:
    i. Blood chemistry (sodium, potassium, chloride, total CO2, and creatinine
    ii. Urinalysis
    iii. Renal ultrasound

2. Routine laboratory tests that should be performed for the assessment of cardiovascular risk in all children with hypertension include the following:
    i. Appropriate diabetes screening (e.g., fasting glucose, etc.)
    ii. Serum total cholesterol and HDL cholesterol, low density lipoprotein cholesterol, non-HDL cholesterol, and triglycerides.

3. Routine tests that should be performed for the assessment of target organ damage in all children with hypertension include:
    i. Echocardiogram
    ii. Retinal examination
    iii. Protein/creatinine ratio or albumin/creatinine ratio (first morning void)

Points to Note

- Early subspecialty (nephrology / cardiology) referral is recommended to guide investigations, given the limited data on secondary hypertension in our local paediatric population.

Health behaviour management

i. Height and weight should be measured, and body mass index calculated for all children at routine health visits. (NB These should be plotted on CDC/WHO growth charts for age and gender)

ii. Achieving a healthy body weight (body mass index percentile < 85%) is recommended for non-hypertensive individuals to prevent hypertension and for hypertensive children to reduce BP.

iii. A comprehensive approach should include dietary education and increased physical activity.

Table 6. AAP 2017 Blood Pressure Classification

For Children Aged 1 - 13 y	For Children Aged >13 y
Normal BP <90th percentile	Normal BP < 120/<80 mmHg
Elevated BP: 90th percentile to <95th percentile or 120/80 mmHg to <95th percentile (whichever is lower)	Elevated BP: 120/<80 mmHg to 129/<80 mmHg
Stage 1 HTN: ≥ 95th percentile to <95th percentile + 12 mmHg, or 130/80 to 139/89 mmHg (whichever is lower)	Stage 1 HTN: 130/80 to 139/89 mmHg
Stage 2 HTN: ≥ 95th percentile + 12 mmHg, or 140/90 mmHg (whichever is lower)	Stage 2 HTN: ≥ 140/90 mmHg

Adopted from AAP 2017 Guidelines (32)

Box 2: Clinical Conditions Requiring Blood Pressure Monitoring in Children <3 Years Old.

- History of prematurity <32 week's gestation or small for gestational age, very low birth weight, other neonatal complications requiring intensive care, umbilical artery line
- Congenital heart disease (repaired or unrepaired)
- Recurrent urinary tract infections, haematuria, or proteinuria
- Known renal disease or urologic malformations
- Family history of congenital renal disease
- Solid-organ transplant
- Malignancy or bone marrow transplant
- Treatment with drugs known to raise blood pressure
- Systemic illnesses associated with hypertension (e.g. neurofibromatosis, tuberous sclerosis, sickle cell disease)
- Evidence of elevated intracranial pressure

Adopted from AAP 2017 Guidelines (32)

MANAGEMENT OF HYPERTENSIVE CRISES [12]

Adults with a hypertensive emergency should be treated in a setting with continuous monitoring of BP with parenteral administration of an appropriate agent. Treatment may be initiated in a primary care setting prior to transfer, if clinically considered in the best interest of the patient.

Treatment for hypertensive emergencies should be with an intravenous agent (labetalol, esmolol, nitroglycerin, hydralazine, sodium nitroprusside), depending on availability and the clinical situation. (NB: use of sodium nitroprusside requires intra-arterial blood monitoring, and considerations re cyanide toxicity.)

For adults with hypertensive emergency with a compelling condition (i.e., aortic dissection, haemorrhagic stroke, severe preeclampsia, or eclampsia, or pheochromocytoma crisis), SBP should be reduced to less than 140 mm Hg during the first hour and to less than 120 mm Hg in aortic dissection.

For adults with hypertensive emergency without a compelling condition, SBP should be reduced by no more than 25% within the first hour; then, if stable, to 160/100 mmHg within the next 2 to 6 hours; and then cautiously to normal during the following 24 to 48 hours.
NB: Threshold for initiation of blood pressure lowering in acute ischaemic stroke is BP > 220/120 mm Hg.

If a person has severe hypertension (clinic blood pressure of 180/120 mm Hg or higher), but no symptoms or signs of acute target organ damage (hypertensive urgency), carry out investigations for target organ damage as soon as possible. Signs of acute target organ damage include retinal haemorrhage or papilloedema, new onset confusion, chest pain, signs of heart failure, or acute kidney injury.

- If target organ damage is identified, antihypertensive drug treatment should be started immediately, without waiting for the results of ABPM or HBPM. ABPM or HBPM can be done afterwards to assess for white coat effect.
- If no target organ damage is identified, and the patient is presenting for the first time, recheck blood pressure on the same day after one hour and start pharmacological treatment if blood pressure remains severely elevated. These patients should be reassessed with repeat clinic blood pressure measurement within 7 days, or (b) using ABPM (or HBPM if ABPM is not suitable or not tolerated) and ensuring a clinical review within 7 days. *(NB: In some cases, review is preferable within 24 to 48 hours).*
- If no target organ damage is identified, and the patient is known to have hypertension, reinstitute or adjust blood pressure medications and ensure a clinical review within 7 days. *(In some cases, review is preferable within 24 to 48 hours).* Consider using ABPM (or HBPM if ABPM is not suitable or not tolerated), to assess for white coat effect.

12. Adapted from NICE Guideline and ACC/AHA Guidelines

Patients with suspected phaeochromocytoma crisis should be referred to a hospital for specialist care and treated in collaboration with an endocrinologist. Symptoms suggestive of pheochromocytoma include labile or postural hypotension, headache, palpitations, pallor, abdominal pain, or diaphoresis. Hypertensive crises in patients with phaeochromocytoma may be treated with sodium nitroprusside, phentolamine or nicardipine. Perioperative management requires oral alpha blockade with phenoxybenzamine, prazosin or doxazosin. Oral beta blockers should be added only after adequate alpha blockade.

Rationale

Hypertensive emergencies are characterized by severe elevations in blood pressure (180/120 mm Hg) associated with evidence of new or worsening target organ damage/dysfunction (15, 18). Signs and symptoms of hypertension mediated organ damage (HMOD) include headaches, visual disturbances, focal neurologic deficits, seizures, dizziness, chest pain and dyspnoea. The syndrome associated with these severe elevations in BP will help identify the end-organ affected and may help guide management. The International Society of Hypertension (ISH) describes four categories of hypertensive emergencies (19):

1. Malignant hypertension refers to a serious increase in blood pressure (typically over 200/120 mm Hg) that is linked with advanced bilateral retinopathy (characterized by bleeding, cotton wool spots, and swelling of the optic nerve [papilledema]).
2. Hypertensive encephalopathy is a condition where severe blood pressure elevation leads to symptoms such as drowsiness, seizures, blindness, and coma when no other cause is apparent.
3. Hypertensive thrombotic microangiopathy occurs when severe blood pressure elevation causes haemolysis (destruction of red blood cells) and thrombocytopenia (low platelet count) without any other underlying cause and responds to BP-lowering therapy.
4. Other forms of hypertensive emergencies include severe blood pressure elevation linked with cerebral haemorrhage, acute stroke, acute coronary syndrome, acute left ventricular failure with pulmonary oedema, aortic aneurysm or dissection, acute kidney failure and severe preeclampsia and eclampsia.

Hypertensive urgencies as defined by the ACC/AHA Guidelines refer to “situations associated with severe BP elevation in otherwise stable patients without acute or impending change in target organ damage or dysfunction”. Given the high prevalence of hypertension, many cases of hypertensives urgencies and emergencies will be seen both in primary care and hospital emergency rooms. Appropriate management of these syndromes will reduce associated morbidity and mortality. Timelines for achieving blood pressure targets in hypertensive crises are summarized in Table 7.

associated morbidity and mortality. Timelines for achieving blood pressure targets in hypertensive crises are summarized in Table 7.

Table 7. Time to Blood Pressure Reduction and Targeted Blood Pressure Reduction in Hypertensive Emergencies

Clinical Presentation	Timeline and Target BP
Malignant hypertension with or without thrombotic microangiopathy or acute renal failure	Several hours, MAP –20% to –25%
Hypertensive encephalopathy	Immediate, MAP –20% to –25%
Acute ischaemic stroke and SBP >220 mmHg or DBP >120 mmHg	1 hour, MAP –15%
Acute ischaemic stroke with indication for thrombolytic therapy and SBP >185 mmHg or DBP >110 mmHg	1 hour, MAP –15%
Acute haemorrhagic stroke and SBP >180 mmHg	Immediate, 130<SBP<180 mmHg
Acute coronary event	Immediate, SBP <140 mmHg
Acute cardiogenic pulmonary oedema	Immediate, SBP <140 mmHg
Acute aortic disease	Immediate, SBP <120 mmHg and heart rate <60 bpm
Eclampsia and severe preeclampsia/ HELLP	Immediate, SBP <160 mmHg and DBP <105 mmHg

Adapted from ISH 2020 Guidelines (19)

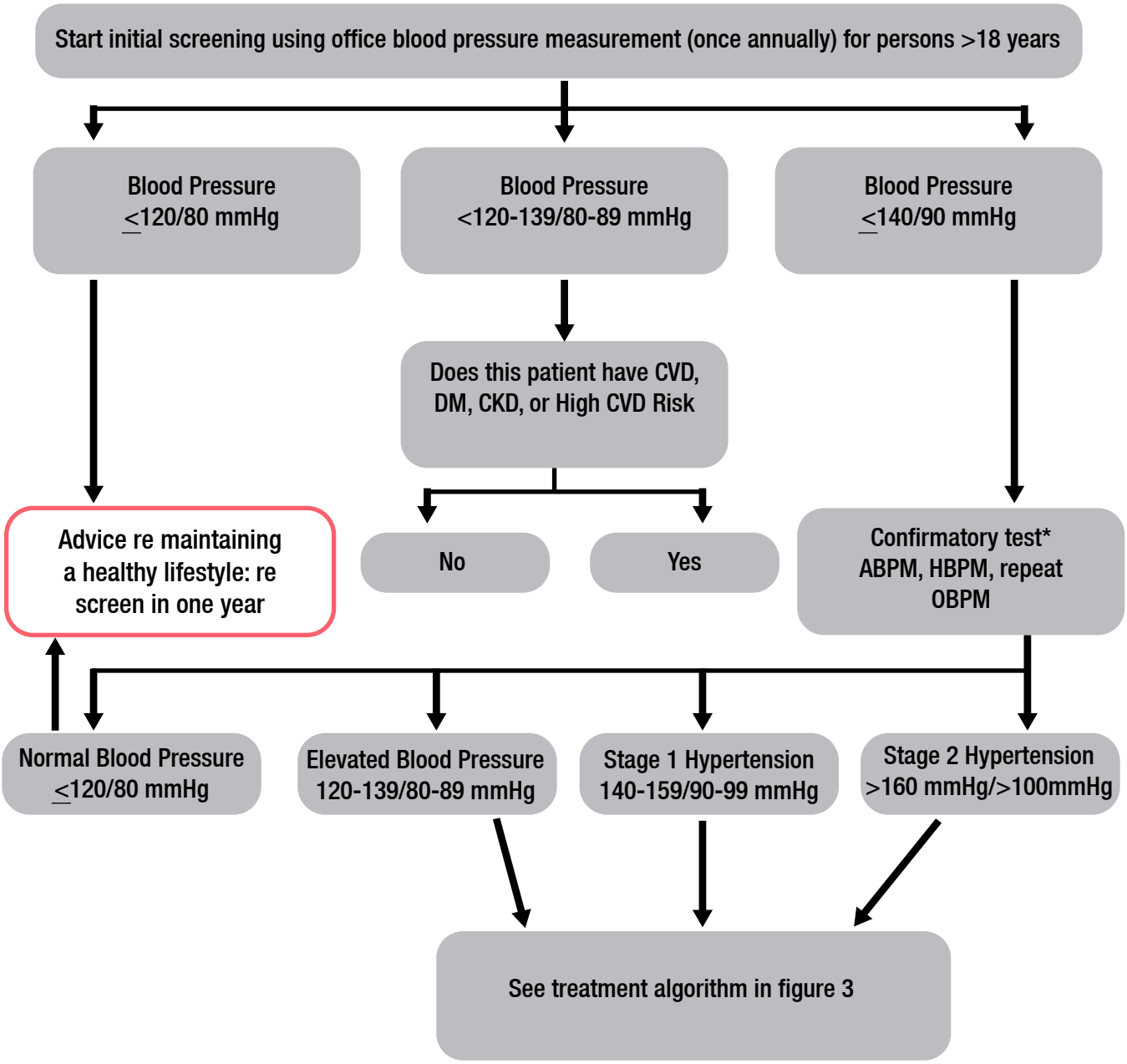
ROLE OF COMPLEMENTARY, ALTERNATIVE AND HERBAL MEDICINE

Complementary and alternative medicines are commonly used in the management of hypertension and other medical conditions, but this is often not addressed in clinical practice guidelines. The guideline GDG reviewed the findings from four local studies and two systematic reviews in order to make a broad evaluation of the role of complementary and alternative medicines for the management of hypertension in the Jamaican context. The GDG concluded that more research and evidence review was necessary before a recommendation could be made.

ALGORITHMS

Algorithms for adults and children and shown in Figures 1 to 3 and Checklist 1.

Figure 1: Algorithm for the Screening and Classification of Blood Pressure in Adults



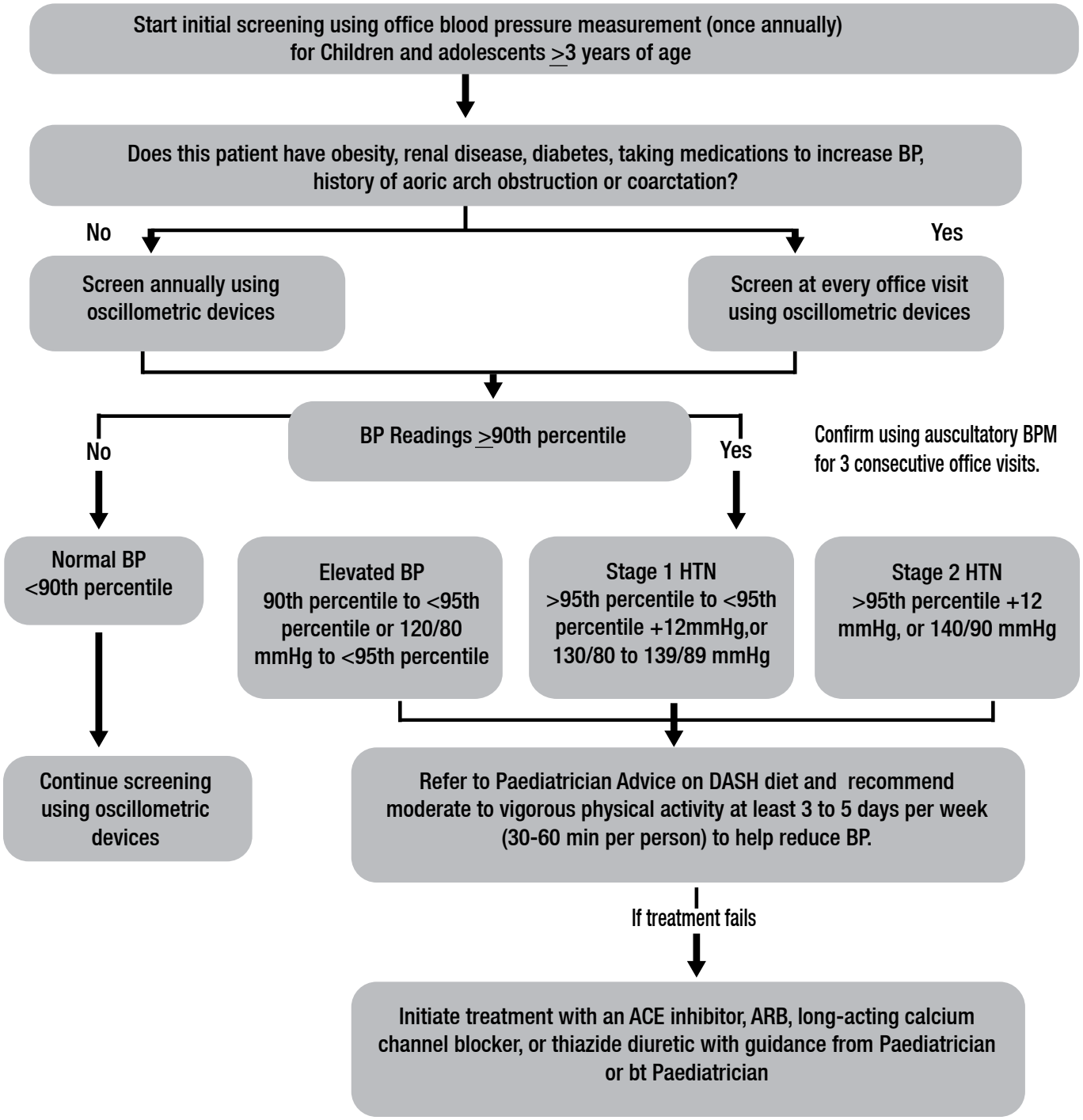
Abbreviations

CVD: Cardiovascular Disease
DM: Diabetes Mellitus
CKD: Chronic Kidney Disease
ABPM: Ambulatory Blood Pressure Monitoring
HBPM: Home Blood Pressure Monitoring
OBPM: Office Blood Pressure Monitoring

*If ABPM is unavailable, or the person is unable to tolerate it, offer HBPM to confirm the diagnosis of hypertension

Health care workers should check for the following risk factors in all patients and provide advise regarding maintaining a healthy lifstyle.
- high-salt diet; physically inactivity; harmful use of alcohol; diabetes; CKD; overweight or obesity; family history of CVD

Figure 1: Algorithm for the Screening and Classification of Blood Pressure in Adults



Abbreviations

ACE: Angiotensin-Converting Anzyme
BP: Blood Pressure
BPM: Blood Pressure Monitor
DASH: Dietary Approaches to Stop Hypertension

- Children and adolescents >6 years of age do not require extensive evaluation for secondary causes of HTN if they have a positive family history of hypertension, are overweight or obese, and/or do not have history or physical examination findings suggestive of a secondary cause of hypertension.
- In children and adolescents being evaluated for high BP, the provider should obtain a perinatal history, appropriate nutritional history, physical activity history, psychosocial history, and family history and perform a physical examination to identify findings suggestive of secondary causes of hyertension.

* Particularly those who have LV hypertrophy or echocardiography, symptomatic HTN, or stage 2 HTN without a clearly modifiable factor (e.g., obesity)

Figure 3: Algorithm for Pharmacological Treatment with Single Pill Combinations

Pharmacological Treatment of Hypertension in dults Initiation of Therapy with Single-Pill Combination Therapy SBP> 140 mmHg or DBP > 90 mmHg for patients without DM, CVD, or CKD SBP > 130 mmHg or DBP > 80 mmHg for patients with DM, CVD, or CKD

Step 1 → Prescribe thiazide/thiazide-like diuretic combination with ACE/ARB or CCB or CCB combined with ACE/ARB at starting dose

Review after 1 month

Step 2 → If not at goal, INCREASE to full dose of the same single pill combination

Review after 1 month

Step 3 → If not at goal, ADD third agent from class not included in the original single pill combination

Review after 1 month

Step 4 → If not at goal, REFER to specialist (primary care specialist clinic or medical outpatient clinic)

DRUGS AND DOSES

Class	Medication	Starting Dose	Full Dose
Thiazide /Thiazide-like Diuretic + CCB	Indapamide SR + amlodipine	1.5 mg / 5 mg	1.5 mg / 10 mg
Antigiotensin converting enzyme (ACE) inhibitor +diuretic	Lisinopril HCT	20 mg / 12.5 mg	40 mg / 25 mg
	Perindopril + Indapamide	5 mg / 1.25 mg	10 mg / 2.5 mg
	Valsartan +HCTZ	160 mg / 12.5 mg	320 mg / 25 mg
Angiotensin receptor blocker (ARB) +diuretic	Telmisartan +HCTZ	40 mg / 12.5 mg	80 mg / 25 mg
ACE/ARB + calcium channel blacker (CCB)	Amlodipine + Valsartan	5 mg / 160 mg	10 mg / 320 mg
	Ramipril Amlodipine	5 mg / 5 mg	10 mg / 10 mg

The target blood pressure treatment goal should be <140/90 mmHg in all patients with without or comorbidities and <130/80 mmHg for patients with DM, CKD, or CVD

Lifestyle modification should be initiated in all patients: heart healthy diet; reduced sodium consumption, 150 minutes moderate physical activity; limit alcohol to 1-2 units per day; maintain healthy body weight

Assess adherence in all patients especially those not meeting BP goals

DM = diabetes mellitus, CDK = chronic kidney disase; CVD = cardiovalcular disease

Checklist 1. Laboratory Test to be Done at Diagnosis and Annually for Patients with Hypertension

Routine laboratory tests that are recommended prior to initiation of therapy		
Check	**Test**	**Details**
☐	Complete Blood Count	Haemoglobin, haematocrit, white blood cell count, platelets
☐	Blood Chemistry	Serum creatinine, blood urea nitrogen, potassium, sodium, calcium and estimated glomerular filtration rate (eGFR) Electrolytes and creatinine should be rechecked in 4 weeks in high-risk patient such as elderly on thiazides, after initiation or titration of ACEI/ARBs, diuretics or MRAs (e.g., Spironolactone).
☐	Lipid Profile	Total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C) and triglycerides (TGs)
☐	Blood Sugar	Fasting and 2-hour post challenge glucose for all patients initially (for screening for Diabetes Mellitus). Alternatively, fasting glucose and haemoglobin A1c (HbA1c) can be done, with 2-hour post challenge glucose performed for persons with abnormal HbA1c.
☐	Urinalysis and Microscopy	Urinary protein, blood, abnormal urinary sediments.
☐	Test for Albuminuria / Proteinuria	Request albumin / creatinine ratio on spot urine sample to quantify urine albumin excretion.
☐	Electrocardiography	12-lead electrocardiogram (ECG) can identify ischemic heart disease or LVH which are indicators of target organ damage
Annual laboratory tests that are recommended to screen for complications		
☐	Blood chemistry	Serum creatinine, blood urea nitrogen, potassium, sodium, calcium and estimated glomerular filtration rate (eGFR)
☐	Lipid profile	Total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C) and triglycerides (TGs)
☐	Blood sugar	Fasting and 2-hour post challenge glucose for all patients initially (for screening for Diabetes Mellitus). Alternatively, fasting glucose and haemoglobin A1c (HbA1c) can be done, with 2-hour post challenge glucose performed for persons with abnormal HbA1c.
☐	Test for albuminuria / proteinuria	Request albumin / creatinine ratio on spot urine sample to quantify urine albumin excretion.
☐	Fundoscopy	Examine the fundi for the presence of hypertensive retinopathy

REFERENCES

1. Lloyd-Jones DM. General Population and Global Cardiovascular Risk Prediction. In: Bakris GL, Sorrentino MJ, editors. Hypertension: A Companion to Braunwald's Heart Disease (Third Edition). Philadelphia, PA: Elsevier; 2018. p. 1-14.
2. World Health Organization. Hypertension Key Facts World Health Organization,; 2023 [updated March 16, 2023. Available from: https://www.who.int/news-room/fact-sheets/detail/hypertension.
3. Ministry of Health and Wellness (Jamaica). Vitals: Non-Communicable Diseases Edition. Kingston; 2023.
4. Jamaica Health and Lifestyle Survey III Investigators. Jamaica Health and Lifestyle Survey III (2016-2017) Preliminary Key Findings. 2018.
5. The Jamaica Health and Lifestyle Survey Writing Team. The Jamaica Health and Lifestyle Survey III (2016 – 2017). Kingston: Ministry of Health and Wellness, Jamaica and The Caribbean Institute of Health Research, The University of the West Indies.; 2024. Contract No.: ISBN 9789768266956 (pbk).
6. Ferguson TS, Francis DK, Tulloch-Reid MK, Younger NO, McFarlane SR, Wilks RJ. An update on the burden of cardiovascular disease risk factors in Jamaica: findings from the Jamaica Health and Lifestyle Survey 2007-2008. The West Indian medical journal. 2011;60(4):422-8.
7. Ministry of Health Jamaica. Guidelines for the Management of Hypertension. Kingston: Ministry of Health; 2007. Contract No.: MOH-DOC-6000-1-II.
8. Ministry of Health Jamaica. Guidelines for the Management of Hypertension. Kingston: Ministry of Health; 2014. Contract No.: MOH-DOC-6000-1-2.
9. Ministry of Health Jamaica. Interim Guidelines for the Management of Hypertension in Jamaica. Kingston: Ministry of Health and Wellness; 2020.
10. Schünemann HJ, Wiercioch W, Etxeandia I, Falavigna M, Santesso N, Mustafa R, et al. Guidelines 2.0: systematic development of a comprehensive checklist for a successful guideline enterprise. CMAJ. 2014;186(3):E123-42.
11. Guyatt G, Oxman AD, Akl EA, Kunz R, Vist G, Brozek J, et al. GRADE guidelines: 1. Introduction-GRADE evidence profiles and summary of findings tables. J Clin Epidemiol. 2011;64(4):383-94.
12. Guyatt GH, Oxman AD, Vist GE, Kunz R, Falck-Ytter Y, Alonso-Coello P, et al. GRADE: an emerging consensus on rating quality of evidence and strength of recommendations. BMJ. 2008;336(7650):924-6.
13. Schünemann HJ, Wiercioch W, Brozek J, Etxeandia-Ikobaltzeta I, Mustafa RA, Manja V, et al. GRADE Evidence to Decision (EtD) frameworks for adoption, adaptation, and de novo development of trustworthy recommendations: GRADE-ADOLOPMENT. J Clin Epidemiol. 2017;81:101-10.

14. World Health Organization. Guideline for the pharmacological treatment of hypertension in adults. Geneva: World Health Organization; 2021.

15. National Institute for Health Care and Excellence (NICE). Hypertension in adults: diagnosis and management. National Institute for Health Care and Excellence (NICE); 2019. Contract No.: NG136.

16. Rabi DM, McBrien KA, Sapir-Pichhadze R, Nakhla M, Ahmed SB, Dumanski SM, et al. Hypertension Canada's 2020 Comprehensive Guidelines for the Prevention, Diagnosis, Risk Assessment, and Treatment of Hypertension in Adults and Children. Can J Cardiol. 2020;36(5):596-624.

17. Williams B, Mancia G, Spiering W, Agabiti Rosei E, Azizi M, Burnier M, et al. 2018 ESC/ESH Guidelines for the management of arterial hypertension. Eur Heart J. 2018;39(33):3021-104.

18. Whelton PK, Carey RM, Aronow WS, Casey DE, Collins KJ, Dennison Himmelfarb C, et al. 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults. Hypertension. 2018;71:e12-e115.

19. Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, et al. 2020 International Society of Hypertension Global Hypertension Practice Guidelines. Hypertension. 2020;75(6):1334-57.

20. Alonso-Coello P, Schünemann HJ, Moberg J, Brignardello-Petersen R, Akl EA, Davoli M, et al. GRADE Evidence to Decision (EtD) frameworks: a systematic and transparent approach to making well informed healthcare choices. 1: Introduction. BMJ. 2016:i2016.

21. Poulter NR, Prabhakaran D, Caulfield M. Hypertension. Lancet. 2015;386(9995):801-12.

22. Whincup PH, Cook DG, Geleijnse JH. A life course approach to blood pressure. In: Kuh D, Ben-Shlomo Y, editors. A life course approach to chronic disease epidemiology. New York: Oxford University Press; 2004. p. 218-39.

23. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL, Jr., et al. The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure: the JNC 7 report. JAMA. 2003;289(19):2560-72.

24. Ferguson TS, Younger N, Tulloch-Reid MK, Lawrence-Wright MB, Forrester TE, Cooper RS, et al. Progression from prehypertension to hypertension in a Jamaican cohort: incident hypertension and its predictors. The West Indian medical journal. 2010;59(5):486-93.

25. Ministry of Health and Wellness (Jamaica). National Screening Guidelines for Priority Non-communicable Diseases (NCDs) in Primary Health Care 2024. Kingston; 2024.

26. Zhao D, Liu J, Xie W, Qi Y. Cardiovascular risk assessment: a global perspective. Nat Rev Cardiol. 2015;12(5):301-11.

27. National Institute for Health Care and Excellence (NICE). Obesity: identification, assessment and management. London; 2014.

28. U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2020-2025. United States; 2020.

29. Dorsey ER, Topol EJ. State of Telehealth. N Engl J Med. 2016;375(2):154-61.

30. Bao W, Threefoot SA, Srinivasan SR, Berenson GS. Essential hypertension predicted by tracking of elevated blood pressure from childhood to adulthood: the Bogalusa Heart Study. Am J Hypertens. 1995;8(7):657-65.

31. Chen X, Wang Y. Tracking of Blood Pressure From Childhood to Adulthood: A Systematic Review and Meta–Regression Analysis. Circulation. 2008;117(25):3171-80.

32. Flynn JT, Kaelber DC, Baker-Smith CM, Blowey D, Carroll AE, Daniels SR, et al. Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. Pediatrics. 2017;140(3).

33. Ferguson TS, Tulloch-Reid MK, Younger NO, McFarlane SR, Francis DK, Wilks RJ. Prehypertension in Jamaica: a review of data from recent studies. The West Indian medical journal. 2011;60(4):429-33.

APPENDIX 1: PARTICIPANTS IN STAKEHOLDER CONSULTATION

Title	Last name	First Name	Affiliation
Dr	Wilks	Rohan	KPH / ACPJ / Cardiologist
Dr	Fisher	Lori-Ann	UHWI, Nephrologist
Dr	Johnson-Campbell	Marcia	WRHA, Regional NCD Programme Coordinator
Mrs.	Chen	Deborah	Executive Director, Heart Foundation of Jamaica
Dr	Davidson	Tamu	Director NCD and Injury Prevention
Dr	Spence	Simone	Director HPPD
Dr	Headley	Cleston	Actg. Director Pharmacy Services NHF
Mrs.	Mason Quarrie	Jillian	Deputy Chief Nurse - Nursing and Midwifery Services Unit
Dr	Campbell	Micas	Regional NCD Coordinator NERHA
Dr	Hanna	Yasine	Regional NCD Coordinator SRHA
Dr	Dunkley	Kimberly	Regional NCD Coordinator SERHA
Prof	Ferguson	Trevor	Hypertension Guideline Team Lead
Dr	King	Lesley-Gaye	Oversight Committee Member
Prof	Asnani	Monika	Oversight Committee Member
Dr	Bennett	Nadia	Hypertension GDG Member
Dr	Hurlock	Lisa	Hypertension GDG Member
Prof	Anderson	Simon	Hypertension GDG Member
Rev	Hemmings	Johnathan	Hypertension GDG Member

APPENDIX 2: ALGORITHM FOR PHARMACOLOGICAL TREATMENT WITH SINGLE AGENTS

Pharmacological Treatment of Hypertension in dults Initiation of Therapy with Single-Pill Combination Therapy SBP> 140 mmHg or DBP > 90 mmHg for patients without DM, CVD, or CKD SBP > 130 mmHg or DBP > 80 mmHg for patients with DM, CVD, or CKD

Step 1 → Prescribe thiazide/thiazide-like diuretic CCB or ACE/ARB at starting or half maximal dose

Review after 1 month

Step 2 → If not at goal, ADD to full dose of second agent (thiazide or thiazide-like diuretic, CCB or ACE/ARB)

Review after 1 month

Step 3 → If not at goal, INCREASE starting dose of two agents (thiazide or thiazide-like diuretic, CCB or ACE/ARB)

Review after 1 month

Step 4 → If not at goal, ADD starting dose of third agent from (thiazide or thiazide-like diuretic, CCB or ACE/ARB)

Review after 1 month

Step 5 → If not at goal, INCREASE to full dose of three agents (thiazide or thiazide-like diuretic, CCB or ACE/ARB)

Review after 1 month

Step 6 → If not at goal, REFER to specialist (primary care specialist clinic or medical outpatient clinic)

DRUGS AND DOSES

Class	Medication	Starting Dose	Full Dose
Thiazide /Thiazide-like Diuretic + CCB	Indapamide SR	1.5 mg	1.5 mg
	HCTZ	12.5 mg	25 mg
	Chlorthalidone	12.5 mg	25 mg
Antigiotensin converting enzyme (ACE) inhibitor +diuretic	Lisinopril	20 mg	40 mg
	Ramipril	5 mg	10 mg
	Perindopril	5 mg	10 mg
Angiotensin receptor blocker (ARB) +diuretic	Losartan	50 mg	100 mg
	Valsartan	160 mg	320 mg
	Telmisartan	40 mg	80 mg
ACE/ARB + calcium channel blacker (CCB)	Amlodipine	5 mg	10 mg
	Nifedipine XL	30 mg	60-90 mg

The target blood pressure treatment goal should be <140/90 mmHg in all patients with without or comorbidities and <130/80 mmHg for patients with DM, CKD, or CVD

Lifestyle modification should be initiated in all patients: heart healthy diet; reduced sodium consumption, 150 minutes moderate physical activity; limit alcohol to 1-2 units per day; maintain healthy body weight

Assess adherence in all patients especially those not meeting BP goals

APPENDIX 3: USING TELEHEALTH IN PRACTICE

Telehealth has multiple applications and can be used for different services including wireless tools, email, two-way video, smartphones and other methods of telecommunication technology.

Commonly used telehealth technologies include:

1. Wired “landline” telephone
2. Wireless smartphone applications
3. Internet-based website via computers and handheld devices
4. Text messaging
5. Email messaging
6. Social networking and social media websites/applications
7. Wireless BP measurement devices
8. Electronic pill dispensers/counters

General considerations in transitioning to a telehealth practice include the following:

1. Liability/Indemnity considerations:
    - Be sure that medical indemnity insurance allows for remote visits.
    - Verify where the encounter is considered to have taken place i.e. the patient’s physical location or the health care provider’s, particularly if the patient is in a remote location.
    - Ensure that the health care provider has the technical skills and competence to do telemedicine consultations.
    - Determine whether the health care provider will see new patients as well as known patients.

2. IT considerations:
    - Use Telehealth providers that allow for data security consistent with Jamaica’s Data Protection Act.
    - Encourage video-consultations; this improves contact with the patient and is important for identification purposes.
    - Secure internet access and virtual private networks are required.
    - Ensure that devices used are protected with strong passwords and encryption for patient information security. Safe secure networks should be used.

How to proceed:

1. Identify appropriate patients in the practice. Choose known regular patients for routine follow-up, and for whom medical records are available. Telephone triage

should be performed to determine if a remote consultation can be done. If yes, continue on telephone or do videoconferencing. Explain to the patient why remote consultation is being used. Let patients know that face-to-face consultations are normal. The patient needs to give consent and understand what can and cannot be done during a remote consultation. If someone is too ill, breathless while speaking or unstable, direct them to a face-to-face or urgent/emergent visit.

Reasons to convert to a face-to-face visit include:

i) Unknown patient/no records/no referral letter

ii) Concerns about safeguarding data

iii) Physical examination required

iv) Technical limitations

v) Potential confidentiality breach possible e.g. related to location of patient or HCP

2. Use an existing scheduling system to schedule virtual or telephone visits. Create an encounter and document the phone visit. Use standard templates or a narrative note. Document as you would during an in-person visit. You may e-prescribe and place orders although diagnostics e.g. ECG or stress test will require an in-person visit.
3. Whether using a makeshift video tool or a formal telehealth platform, once set up, interaction can proceed. A scheduled visit in the EHR will tell the HCP and the patient the time at which to launch the application. Unmute the microphone, raise the volume, allow video connection and alert the patient to do the same. The patient may use a smartphone, tablet, laptop or desktop computer. Look at the camera, not the screen in order to maintain eye contact.
4. The Telehealth team may be just the HCP and the patient, but an effective structure is to have an administrative/medical assistant call the patient in advance to ensure they have the setup for the visit, confirm insurance details for billing and review past medical history, medications, allergies and enter any vital signs obtained at home.
5. Lead the visit as if the patient is in the room. Find out who else is in the room and ask to be introduced to them. A history should be taken as usual but only limited physical examination, if any, can be done. For example, the patient can show scars, abdominal swelling or may be able to push on their skin to demonstrate oedema. Your clinical skills will tell you if they look ill or sound breathless, for example. Eventually, patients may buy blood pressure cuffs, weight scales, HR and O2 saturation monitors and share their readings over the patient portal or during the visit or upload to the EHR, but to start with, take a history, answer questions, review medication, provide advice and reassurance, make a plan. Education and counselling are also important. You may also e-prescribe but avoid controlled substances without legal advice. Orders for diagnostics may be placed.

6. If referral or a face-to-face visit is required after the remote consultation:
    a. document rationale for why face-to-face visit is needed
    b. determine which is the most appropriate clinician to see patient
    c. determine how urgently examination must take place

New Patients:

New patients may be “seen” through remote consultations though they will be more suitable for face-to-face visits. Telephone triage such as for known patients should be performed.

Considerations particular to new patients include:

1. Are medical records available?
2. Is the referring physician contactable?
3. Is there a referral letter/Are you able to verify the history or medical examination findings?
4. Is it safe for the patient?

Documentation:

Documentation requirements for a telehealth service are the same as for a face-to-face encounter. The information of the visit, history, review of systems, consultative notes, any examination or observations or any information used to make a medical decision about the patient should be documented. Advice provided should be recorded. A statement that the service was provided through telehealth should be included. The HCP must have patient consent to record the video or telephone conversation, and any such recording must form part of the patient record.

APPENDIX 4: AGE AND SEX SPECIFIC BLOOD PRESSURE CUT-OFF VALUES INDICATING NEED FOR FURTHER EVALUATION IN CHILDREN

Age (years)	Male		Female	
	Systolic	Diastolic	Systolic	Diastolic
3	100	59	100	61
4	102	62	101	64
5	104	65	103	66
6	105	68	104	68
7	106	70	106	69
8	107	71	108	71
9	109	72	110	72
10	111	73	112	73
11	113	74	114	74
12	115	74	116	75
13	117	75	117	76
14	120	75	119	77
15	120	76	120	78
16	120	78	120	78
17	120	80	120	78
≥18	120	80	120	80

Cut off values here represent the lower limits for abnormal blood pressure, according to age and sex. Blood pressure values equal to or higher than these values represent blood pressures in the pre-hypertensive, stage 1 hypertensive, or stage 2 hypertensive range and require be further evaluation to confirm whether the child has hypertension.

Values taken from Kaelber DC, Pickett F. Simple Table to Identify Children and Adolescents Needing Further Evaluation of Blood Pressure. Pediatrics. 2009;123(6): e972-e4.

Age-specific cut-points with height percentiles can be obtained from the 2017 AAP Guidelines
Flynn JT, Kaelber DC, Baker-Smith CM, Blowey D, Carroll AE, Daniels SR, de Ferranti SD, Dionne JM, Falkner B, Flinn SK, Gidding SS, Goodwin C, Leu MG, Powers ME, Rea C, Samuels J, Simasek M, Thaker VV, Urbina EM. Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. Pediatrics. 2017;140(3).

Non-communicable Disease
and Injury Prevention Unit
52-60 Grenada Crescent,, Kingston 5
Website: https://ncdip.moh.gov.jm