



Pediatric Hypertension – How to Diagnose, When to Refer



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Disclosures

- I have no relevant financial interests/relationships or conflicts of interest to disclose.

Learning Objectives

- Explain when and how to screen for hypertension in children and adolescents
- Correctly and accurately measure BP
- Recognize elevated BP and diagnose hypertension
- Evaluate a patient with hypertension and know when to refer

Importance of BP measurement – screening and monitoring

- Pediatric hypertension prevalence: 3-4%
 - Overweight/Obesity: 4% - 25%
 - Sleep disorders: 3.6% - 14%
 - Kidney Disease: 50 - 80%
 - Prematurity: 7.3%

SBP CPG percentiles⁵
Low Normal ($<50^{\text{th}}$)
High Normal (50^{th} to $<90^{\text{th}}$)
Pre-hypertension (90^{th} to $<95^{\text{th}}$)
Hypertension ($\geq 95^{\text{th}}$)

Childhood CVD risk -> Adult CV events

• i3C consortium

- 42,324 participants enrolled at 3 to 19 yrs of age
- United States
 - Bogalusa, 1973-1994
 - Muscatine, 1970-1981
 - Minnesota Childhood CV Cohorts, 1978-1996
 - NHLBI Growth and Health Study, 1987-1996
 - Princeton Lipid Research Study, 1973-1978
- Australia
 - Childhood Determinants of Adult Health, 1985
- Finland
 - Cardiovascular Risk in Young Finns Study, 1980-1986

2016 (20-46 yrs later): :

Fatal CV event?

Non-Fatal CV event?

- MI
- CVA
- TIA
- Heart failure
- Angina
- PAD
- Carotid intervention
- AAA
- Coronary revascularization

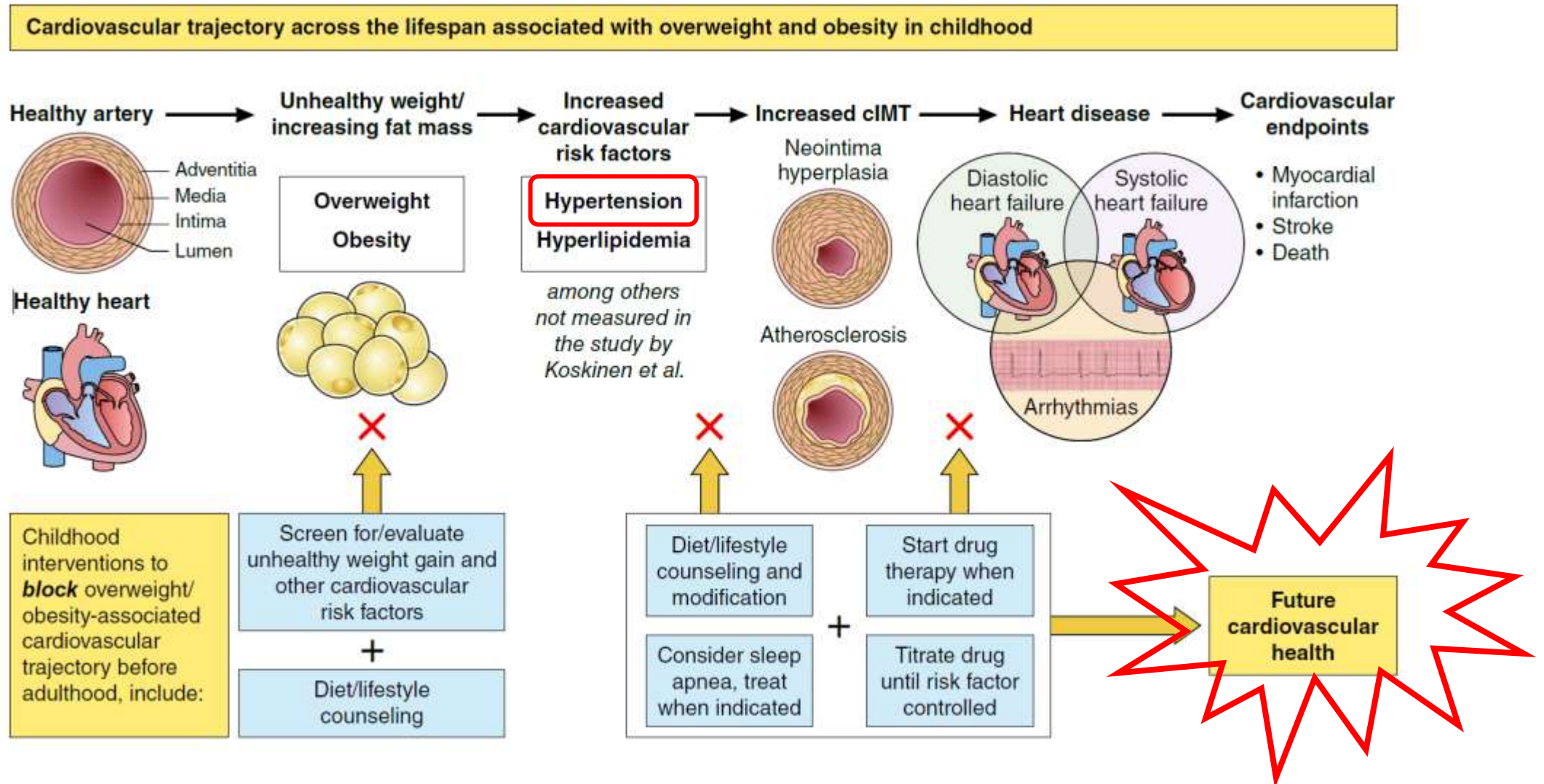
SBP CPG percentiles ⁵
Low Normal (<50 th)
High Normal (50 th to <90 th)
Pre-hypertension (90 th to <95 th)
Hypertension (≥95 th)

ratios for Adult Cardiovascular Events According to Clinical Categories of Childhood Risk-Factor Levels.*

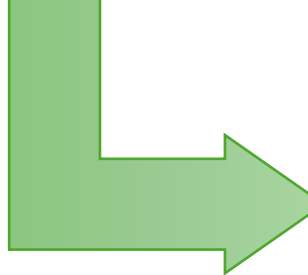
	Fatal Cardiovascular Events			Fatal or Nonfatal Cardiovascular Events		
	Participants	Participants with Event	Hazard Ratio (95% CI) †	Participants	Participants with Event	Hazard Ratio (95% CI) †
	<i>no./total no. (%)</i>			<i>no./total no. (%)</i>		
Low Normal (<50 th)						
High Normal (50 th to <90 th)	15,922/25,471 (62.5)	75/15,922 (0.5)	Reference	12,301/19,520 (63.0)	283/12,301 (2.3)	Reference
	9,549/25,471 (37.5)	82/9,549 (0.9)	1.61 (1.21–2.13)	7,219/19,520 (37.0)	327/7,219 (4.5)	1.70 (1.49–1.93)
Pre-hypertension (90 th to <95 th)	14,857/38,451 (38.6)	96/14,857 (0.6)	Reference	8,048/20,599 (39.1)	237/8,048 (2.9)	Reference
	16,055/38,451 (41.8)	107/16,055 (0.7)	1.01 (0.77–1.33)	8,688/20,599 (42.2)	280/8,688 (3.2)	1.19 (1.01–1.41)
Hypertension (≥95 th)	4,720/38,451 (12.3)	49/4,720 (1.0)	1.61 (1.14–2.27)	2,423/20,599 (11.8)	134/2,423 (5.5)	1.92 (1.62–2.27)
	2,819/38,451 (7.3)	61/2,819 (2.2)	3.34 (2.42–4.60)	1,440/20,599 (7.0)	117/1,440 (8.1)	3.39 (2.73–4.21)

Systolic blood pressure						
Low-normal	17,458/32,339 (54.0)	125/17,458 (0.7)	Reference	8,879/18,288 (48.6)	288/8,879 (3.2)	Reference
High-normal	12,709/32,339 (39.3)	141/12,709 (1.1)	1.59 (1.24–2.04)	7,942/18,288 (43.4)	346/7,942 (4.4)	1.46 (1.26–1.69)
Prehypertension	1,009/32,339 (3.1)	16/1,009 (1.6)	2.24 (1.31–3.35)	666/18,288 (3.6)	67/666 (10.1)	1.99 (1.48–2.67)
Hypertension	1,163/32,339 (3.6)	20/1,163 (1.7)	2.04 (1.24–3.35)	801/18,288 (4.4)	67/801 (8.4)	2.31 (1.74–3.07)
High-density lipoprotein level						
Low-acceptable	6,209/29,221 (21.2)	37/6,209 (0.6)	Reference	3,226/16,674 (19.3)	92/3,226 (2.9)	Reference
High-acceptable	14,045/29,221 (48.1)	127/14,045 (0.9)	1.42 (0.84–2.39)	8,175/16,674 (49.0)	326/8,175 (4.0)	1.34 (1.05–1.70)
Borderline-high	5,680/29,221 (19.4)	67/5,680 (1.2)	1.91 (1.17–3.12)	3,396/16,674 (20.4)	174/3,396 (5.1)	1.69 (1.28–2.24)
High	3,287/29,221 (11.2)	62/3,287 (1.9)	2.75 (1.71–4.42)	1,877/16,674 (11.3)	135/1,877 (7.2)	2.47 (1.89–3.24)
Total cholesterol level						
Low-acceptable	5,413/29,495 (18.4)	55/5,413 (1.0)	Reference	2,888/16,819 (17.2)	130/2,888 (4.5)	Reference
High-acceptable	12,289/29,495 (41.7)	121/12,289 (1.0)	1.12 (0.81–1.54)	6,557/16,819 (39.0)	284/6,557 (4.3)	1.15 (0.94–1.40)
Borderline-high	7,925/29,495 (26.9)	79/7,925 (1.0)	1.43 (1.01–2.03)	4,615/16,819 (27.4)	200/4,615 (4.3)	1.50 (1.23–1.83)
High	3,868/29,495 (13.1)	39/3,868 (1.0)	2.20 (1.44–3.37)	2,759/16,819 (16.4)	114/2,759 (4.1)	2.13 (1.60–2.83)

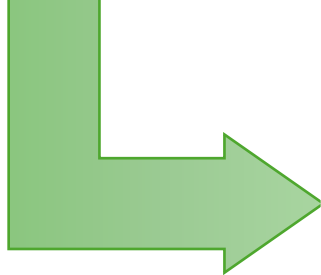
Lifespan Approach to CVD Prevention



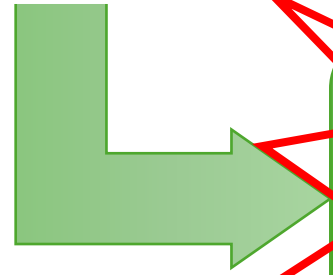
**Preparation
Positioning
Cuff size selection
Technique**



**Accurate BP
Measurement**



**Hypertension
Screening**



**CV Health
Promotion**



**Preparation
Positioning
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**Accurate BP
Measurement**

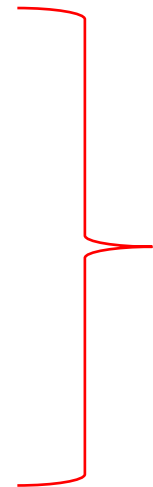
**Hypertension
Screening**

**CV Health
Promotion**



When to Screen for HTN?

- BP screening at preventive visits starting age 3 EXCEPT children with certain conditions:
 - overweight/obesity
 - on meds that increase BP
 - renal disease
 - aortic arch obstruction/coarctation
 - diabetes



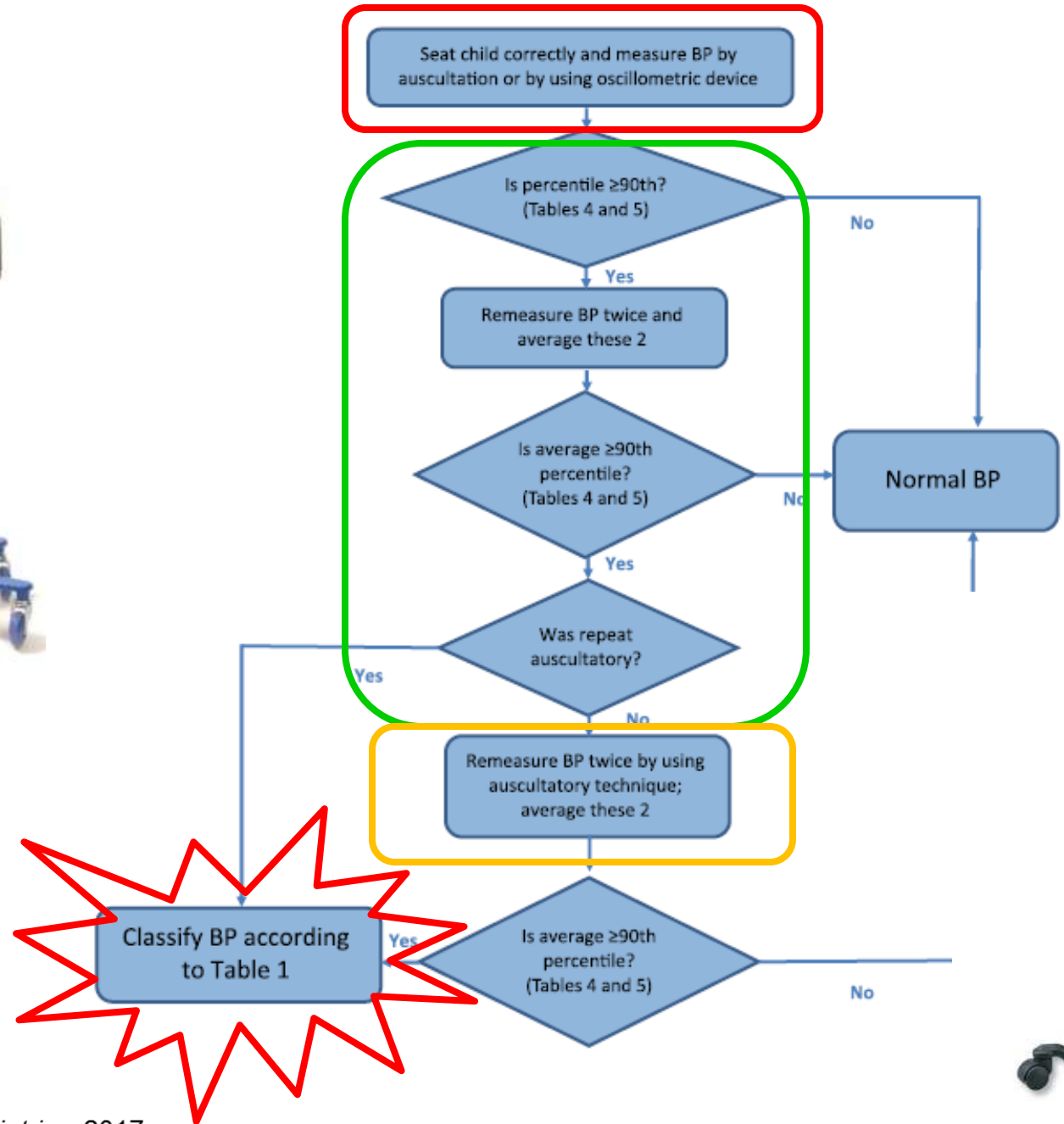
All visits

Hypertension Screening for children < 3 years

- BP should be measured ***at all physician visits***, at least once yearly in children < 3 with the following co-morbid conditions:

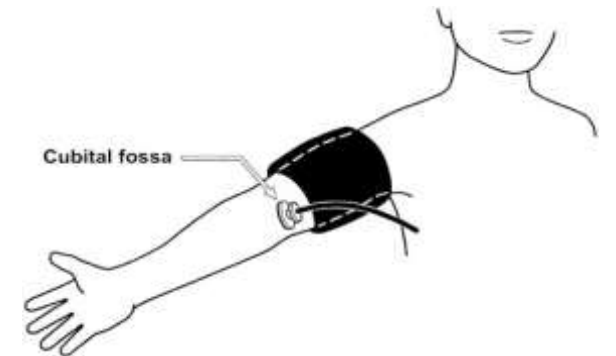
History of prematurity <32 WGA/SGA	Solid organ transplant
History of low birth weight/NICU stay/UAC	Malignancy or BMT
Congenital heart disease	Taking meds known to increase BP
Recurrent UTI, hematuria, proteinuria	Presence of systemic illness associated with HTN
Known renal disease or GU abnormalities	Evidence of increased intracranial pressure
FHx of congenital kidney disease	

Hypertension Screening



Why is manual auscultation preferred?

- BP tables are based on *auscultatory* measurements
- Many automated devices haven't been accuracy tested in children
- **Oscillometric (automated, “Dinamap”)**
 - Reasonable to use as a screen, but its limitations should be kept in mind



How do oscillometric devices estimate BP?

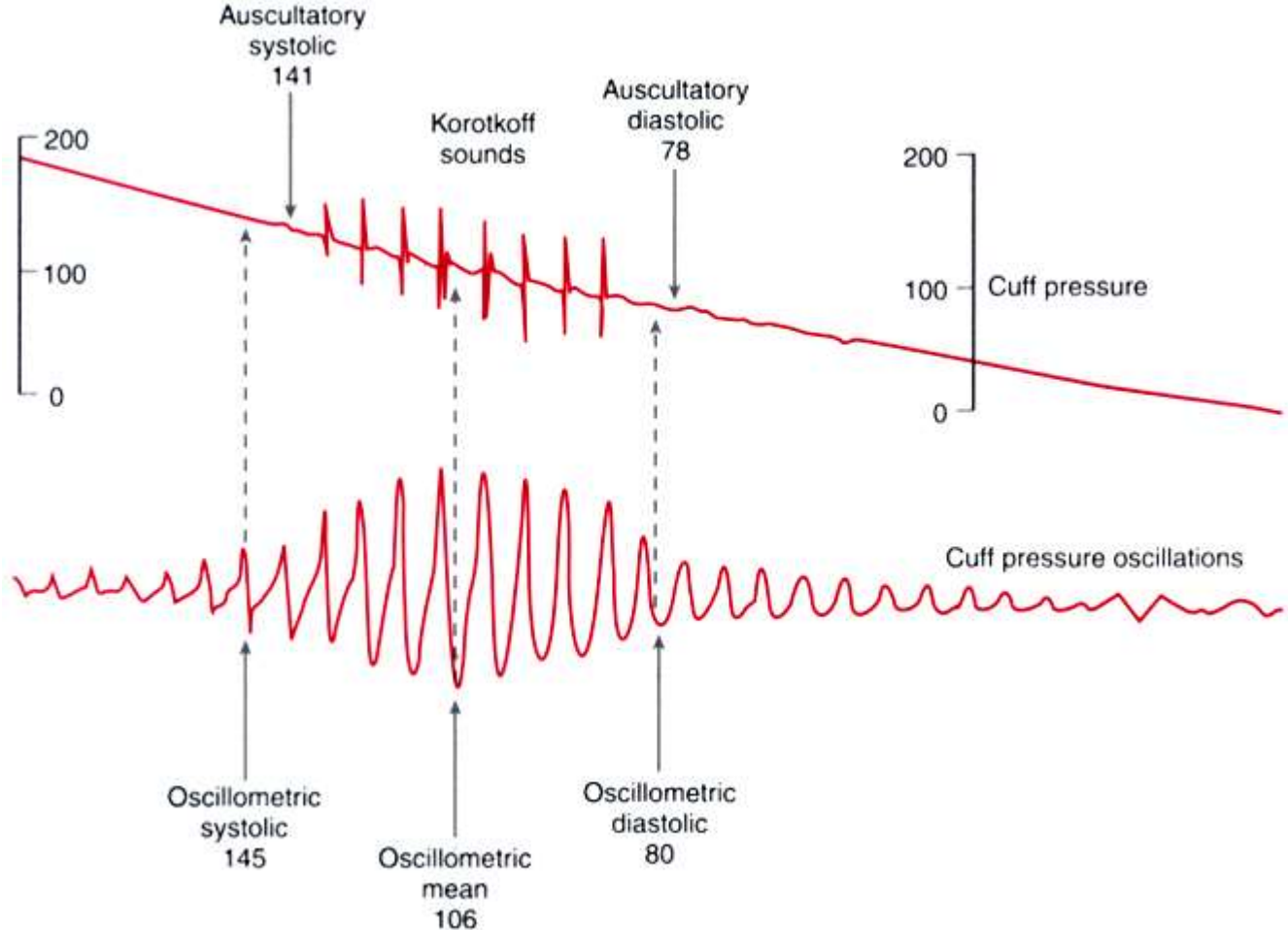


- **Oscillometric devices**

(automated, “Dinamap”)

- ***Estimate*** the SBP and DBP based on the point of maximal oscillation
 - Maximal oscillation = mean intra-arterial pressure
 - Use algorithms that are not available from individual manufacturers and vary from one device to another

Oscillometric vs. Auscultatory Measurements



Oscillometric vs. Auscultatory Measurements

**PREPARING an INDIVIDUAL
for BLOOD PRESSURE
MEASUREMENT**

Required Elements for BP Measurement

1. Proper patient preparation/positioning
2. Individualized cuff selection
3. Mastery of BP measurement

ACCURATE MEASUREMENT
of BLOOD PRESSURE



DIAGNOSIS & MANAGEMENT
of HYPERTENSION

WRONG POSITION
or UNPREPARED



BLOOD PRESSURE
READING can be WRONG



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Patient Preparation

Measurement Technique

TABLE 3 Sources of Inaccuracy in the Measurement of BP in the Clinic Setting

Potential Source of Inaccuracy	Effect on SBP	Effect on DBP
Before measurement		
Acute meal ingestion, mm Hg	-6	-5 to -1.9
Acute alcohol consumption, mm Hg	-23.6 to +24	-14 to +16
Acute caffeine consumption, mm Hg	+3 to +14	+2.1 to +13
Acute nicotine use or exposure, mm Hg	+2.8 to +25	+2 to +18
Bladder distension, mm Hg	+4.2 to +33	+2.8 to +18.5
Cold exposure, mm Hg	+5 to +32	+4 to +23
Insufficient rest period, mm Hg	+4.2 to +11.6	+1.8 to +4.3
Device		
Device not calibrated	0% to 70% > ± 3 mm Hg*	0% to 70% > ± 3 mm Hg*
Patient positioning		
Standing versus sitting, mm Hg	-2.9 to +5.0	+7
Supine versus sitting, mm Hg	-10.7 to +9.5	-13.4 to +6.4
Legs crossed at the knee, mm Hg	+2.5 to +14.9	+1.4 to +10.8
Unsupported back, mm Hg	Not significant effects	+6.5
Unsupported arm, mm Hg	+4.9	+2.7 to +4.8
Arm lower than heart level, mm Hg	+3.7 to +23	+2.8 to +12
Attaching the device to the person		
Paretic arm, mm Hg		
Too small cuff size, mm Hg	+2.1 to +11.2	+1.6 to +6.6
Too large cuff size, mm Hg	-3.7 to -1.5	-4.7 to -1.0
Cuff placed over clothing, mm Hg	Not significant effects	Not significant effects
Stethoscope placed under cuff, mm Hg	+1.0 to +3.1	-10.6 to -3.5
Taking the measurement		
White coat effect, mm Hg	-12.7 to +26.7	-8.2 to +21
Talking during the measurement, mm Hg	+4 to +19	+5 to +14.3
Use of stethoscope bell vs. diaphragm, mm Hg	-3.8 to -1.5	-1.6
Excessive pressure on stethoscope head, mm Hg	Not significant effects	-15 to -9
Fast cuff deflation, mm Hg	-9 to -2.6	+2.1 to +6.3
Observer hearing deficit, mm Hg	-1.6 to -0.1	+1.1 to +4.3
Recording Korotkoff phase IV versus V for DBP, mm Hg	Not applicable	+12.5
Short interval between measurements, mm Hg	Not significant effects	Not significant effects
Interpreting the measurement		
Reliance on a single measurement, mm Hg	+3.3 to +10.4	-2.4 to +0.6
Inter-arm differences, mm Hg	3.3 to 6.3†	2.7 to 5.1†
Terminal digit preference	1% to 79% over-representation of terminal of 0	3% to 79% over-representation of terminal of 0

Cuff Selection

JACC SCIENTIFIC EXPERT PANEL

Blood Pressure Assessment in Adults in Clinical Practice and Clinic-Based Research

JACC Scientific Expert Panel

MISMEASUREMENT OF BLOOD PRESSURE IN THE OFFICE: FINDING THE COMMON MISTAKES

Failure to adhere to the correct blood pressure technique can lead to measurement errors of more than 30 mmHg. Learning to correctly measure blood pressure is key to the diagnosis and management of hypertension.



**Can you find
the common
mistakes in
this picture?**

(Correct Answers on the Back)



Visit [ACC.org/LearnHTN](https://www.acc.org/LearnHTN) to learn more!



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Failure to adhere to the correct blood pressure technique can lead to measurement errors of more than 30 mmHg. Learning to correctly measure blood pressure is key to the diagnosis and management of hypertension.

Can you find the common mistakes in this picture?

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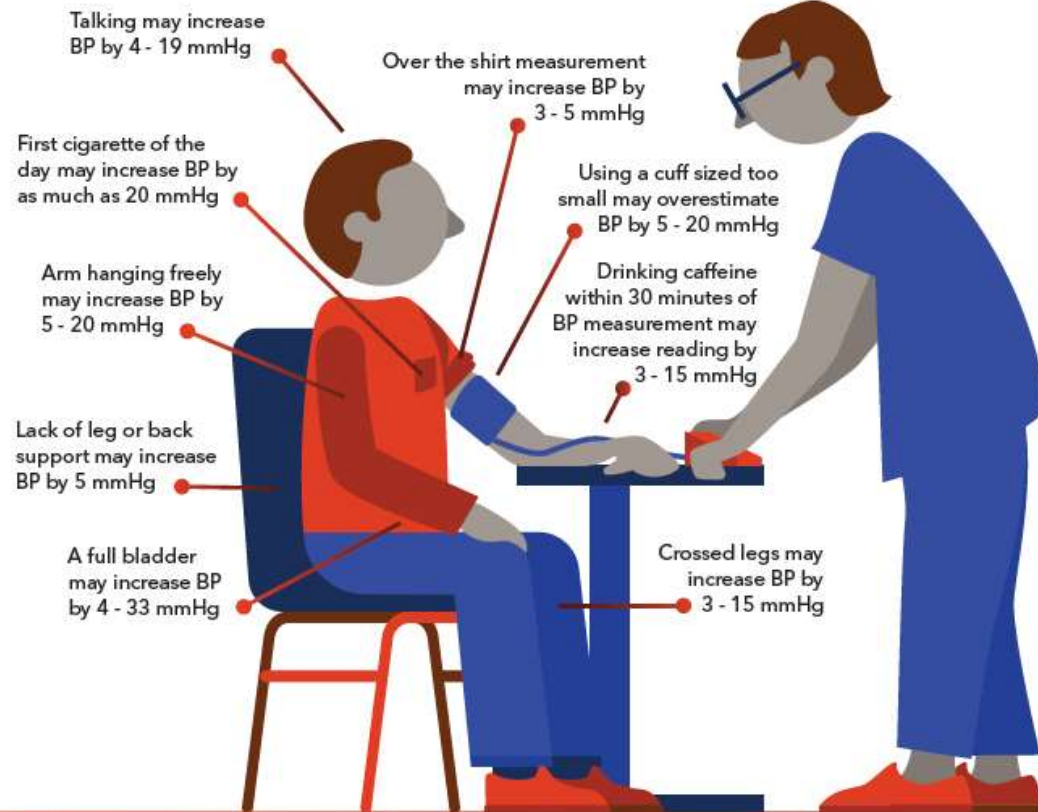
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MISMEASUREMENT OF BLOOD PRESSURE IN THE OFFICE: FINDING THE COMMON MISTAKES



Abbreviations

- BP: blood pressure
- mmHg: millimeters of Mercury (unit of measurement for BP)

Faculty

Yvonne Commodore-Mensah, PhD, MHS, RN
Joseph E. Ebinger, MD
Scott B. Kirkpatrick, MD
Eugene Yang, MD, FACC



View the references

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<https://wapo.st/3Ppoz8Y>



The Washington Post
Democracy Dies in Darkness

Medicare pays millions for remote vital sign monitoring. Is it worth it?

7 min

6/10/2026

22

BP Measurement Preparation

	All (n=159)
Rest 5 min in chair prior to measurement, %	6.9
Legs uncrossed, %	52.2
Feet on floor, %	15.1
Arm supported, %	61.0
Correct cuff size, %	73.6
Cuff over bare arm, %	83.0
No talking, %	57.2
No mobile phone use/reading, %	17.0
Checked in both arms, %	18.2
Noted arm with higher reading, %	15.1
Correctly answered which arm to be used to measure in future, %	13.2
Mean performance score	4.1

- 159 med students were assessed on an 11-element skillset on BP measurement in June 2015 (not inclusive of the actual measurement!)
 - ***Only 1 student was proficient on all 11 skills***

Patient Preparation

Prior to BP measurement, each patient should:

- Refrain from caffeine, smoking, exercise for at least 30 minutes.
- Empty their bladder.
- Rest for 2-5 minutes.

BEFORE MEASURING...



Patient Preparation

Prior to BP measurement, each patient should:

- ~~Refrain from caffeine, smoking, exercise for at least 30 minutes.~~
- Empty their bladder.
- Rest for 2-5 minutes.

Increase BP by 3-25 mmHg!

BEFORE MEASURING...



Patient Preparation

Prior to BP measurement, each patient should:

- Refrain from caffeine, smoking, exercise for at least 30 minutes.
- ~~Empty their bladder.~~
- Rest for 2-5 minutes.

Increase BP by 4-33 mmHg!

BEFORE MEASURING...



Patient Preparation

Prior to BP measurement, each patient should:

- Refrain from caffeine, smoking, exercise for at least 30 minutes.
- Empty their bladder.
- ~~Rest for 2-5 minutes.~~

Increase BP by 4-12 mmHg!

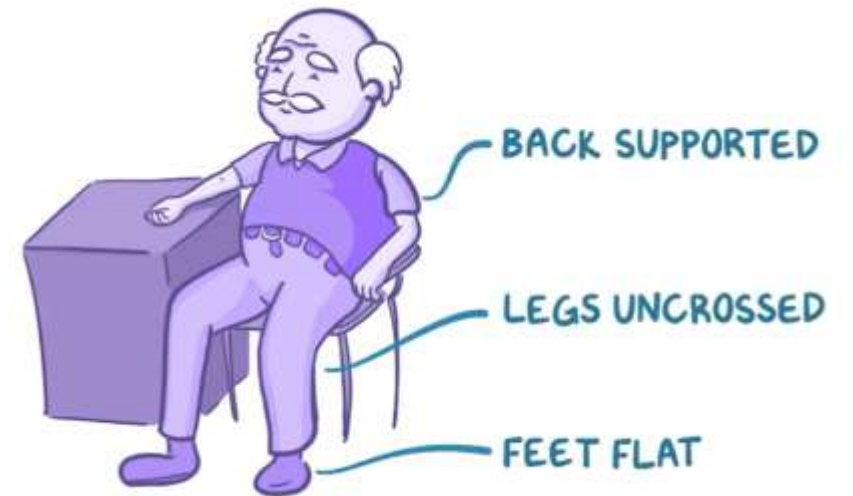
BEFORE MEASURING...



Patient Preparation

During the measurement, they should:

- Be seated with their arm, back and feet supported.
- Keep their legs uncrossed.
- Refrain from talking, reading or using an electronic device such as a smart phone.

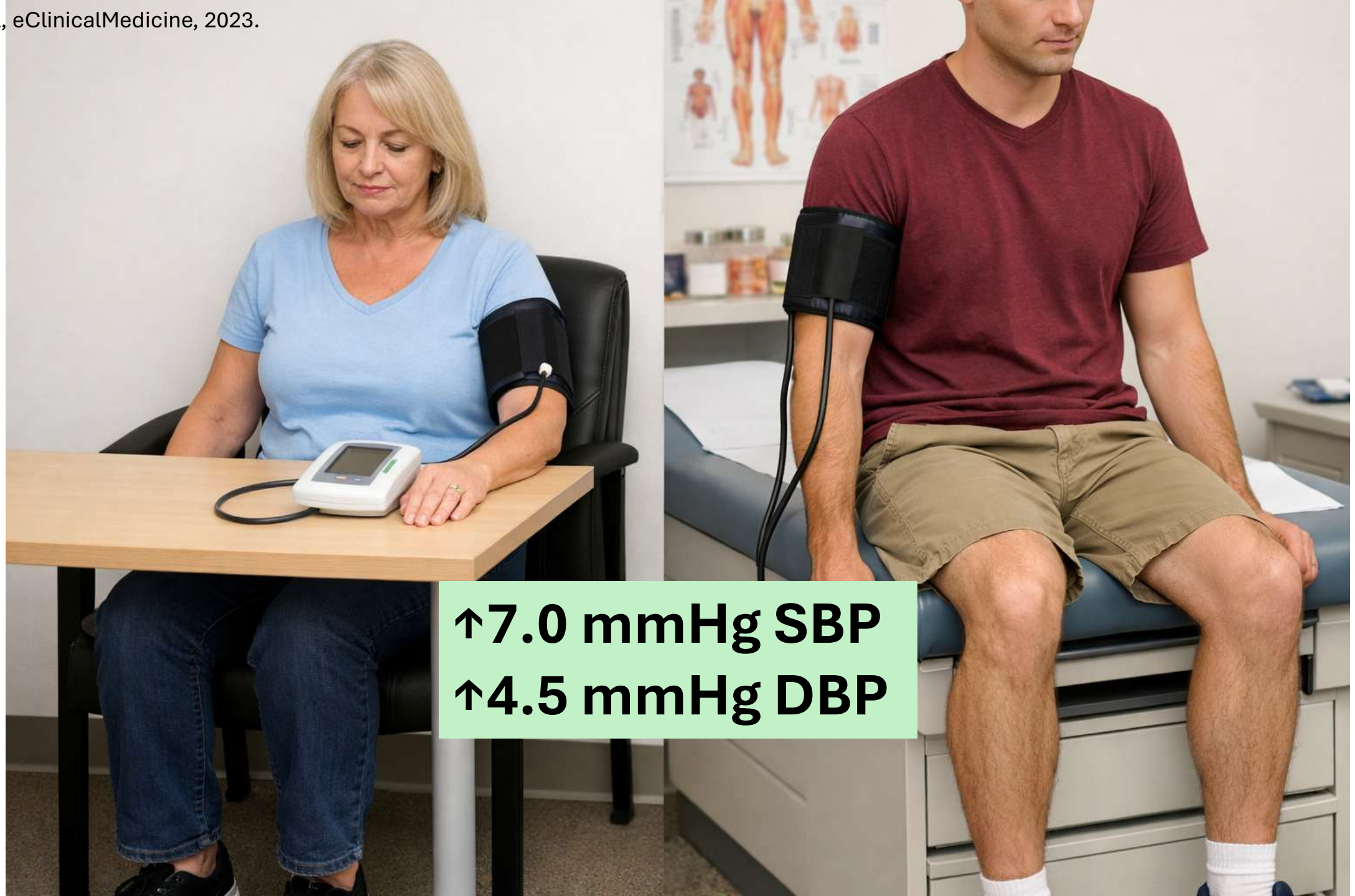






What about
when using
the
examination
table?





Effect of arm position and arm support on indirect blood pressure measurements made in a dental chair

Beck FM, et al. JADA, 1983

Frank M. Beck, DDS, MA
Joel M. Weaver, DDS, PhD

George G. Blozis, DDS, MS
Donald V. Unverferth, MD

As a consequence of the Veterans Administration Study Group^{1,2} that identified the need for antihypertensive emphasis has been placed on hypertension detection and diagnosis. The National High Blood Pressure Program (NHBPEP) in 1972.³ The NHBPEP, through its various programs, has encouraged the detection of all health problems for hypertension.

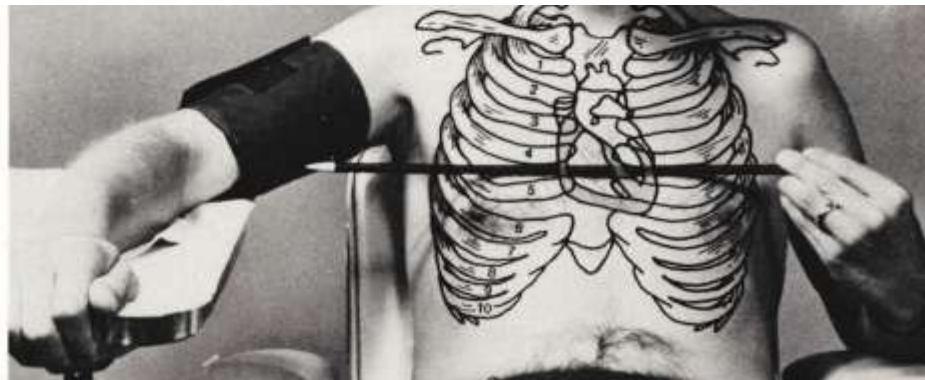
Coincidental with the inauguration of the program, many reports advocating involvement in hypertension screening. These and other efforts in continuing education, school curricular changes, and hypertension screening programs have indicated that hypertension screening programs have been reducing premature hypertension and are better for detection and improved control of hypertensive patients.^{7,8} Dentists have contributed in part to this success and must maintain a commitment to hypertensive screening to ensure continued progress. In addition, by monitoring their patients' blood pressure, dentists can reinforce the importance of adherence to antihypertension therapy.

A concern in a hypertension screening program is the erroneous identification of a patient as falsely normotensive or falsely hypertensive. In the former situation, a patient with disease is not detected.

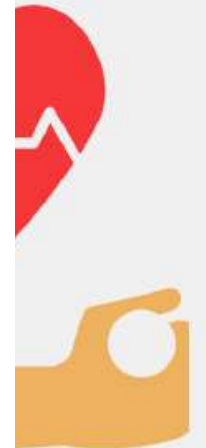
JAMA Internal Medicine | Original Investigation

Arm Position and Blood Pressure Readings The ARMS Crossover Randomized Clinical Trial

Hairong Liu, MHS; Di Zhao, PhD; Ahmed Sabit, MS; Chathurangi H. Pathiravasan, MS, PhD; Junichi Ishigami, MD, MPH; Jeanne Charleston, RN, BSN; Edgar R. Miller III, MD, PhD; Kunihiro Matsushita, MD, PhD; Lawrence J. Appel, MD, MPH; Tammy M. Brady, MD, PhD



ARMS: Arm Rest and Support Study



The ARMS Study



ARMS (Arm Rest and Support) Study

133 participants
Mean age 56 years
78% Black race
52% Female
36% hypertensive SBP



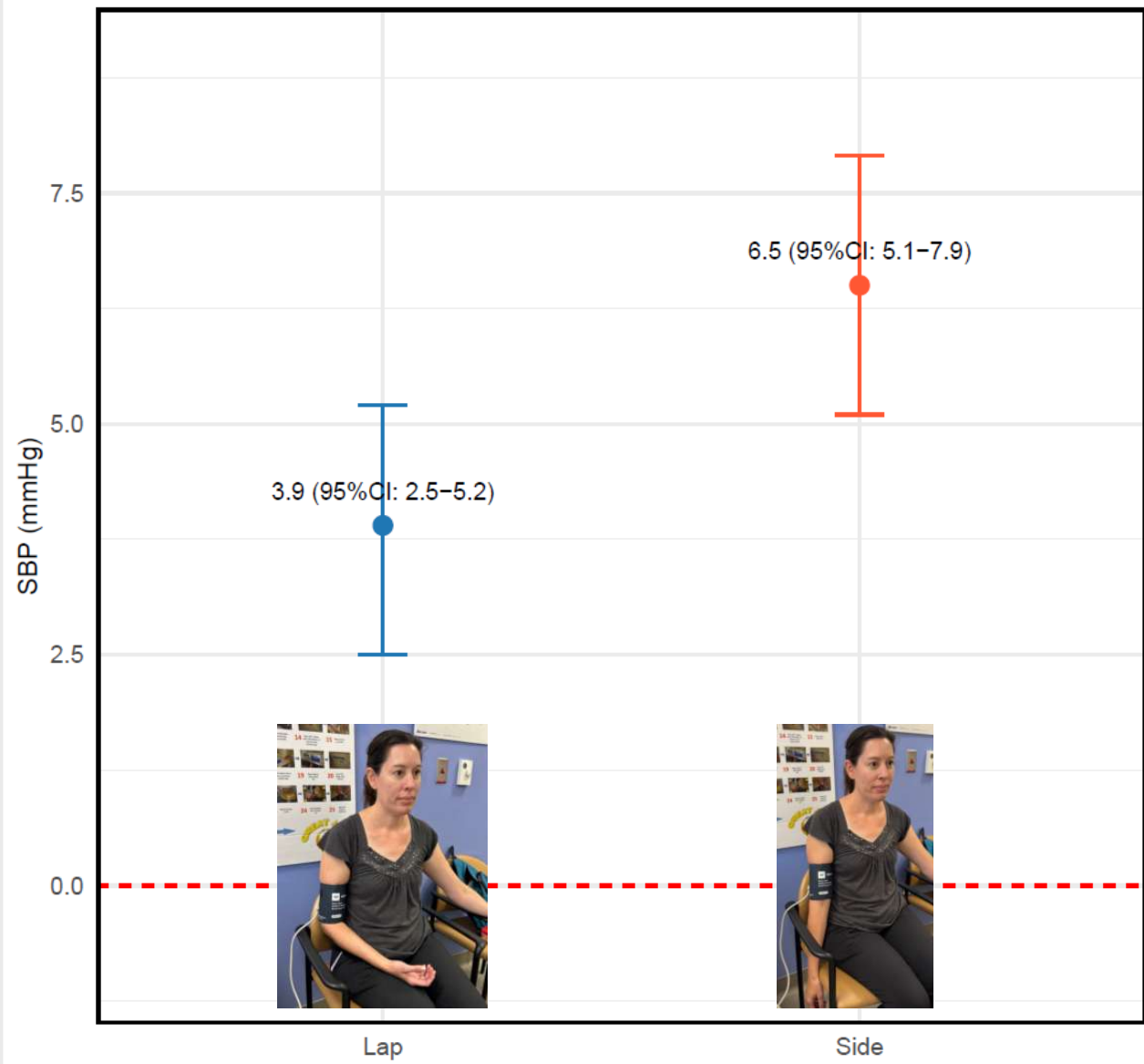
Walk 2 minutes



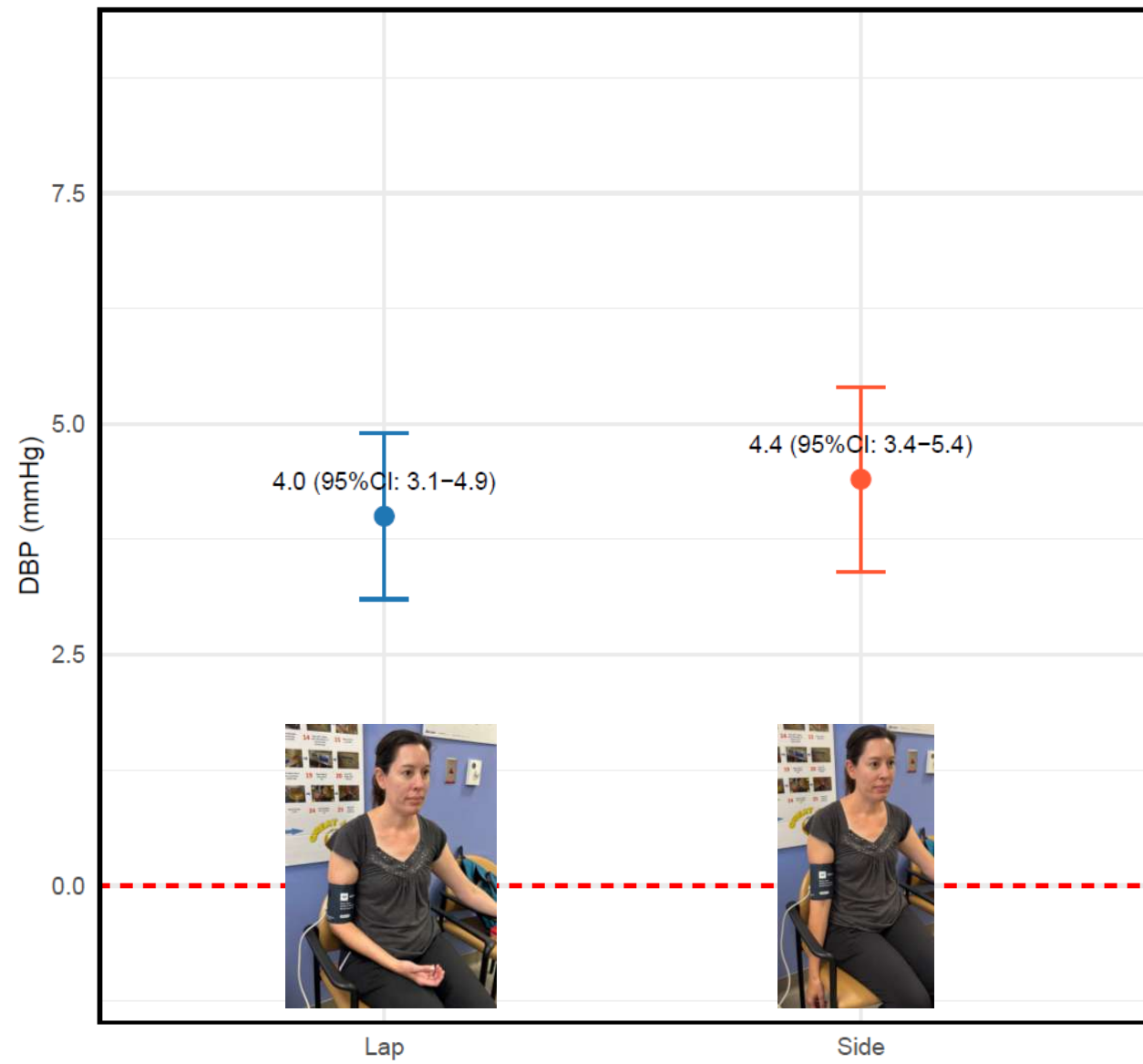
Repeat x 3 for 4 total sets of triplicate measurements



Net SBP Difference



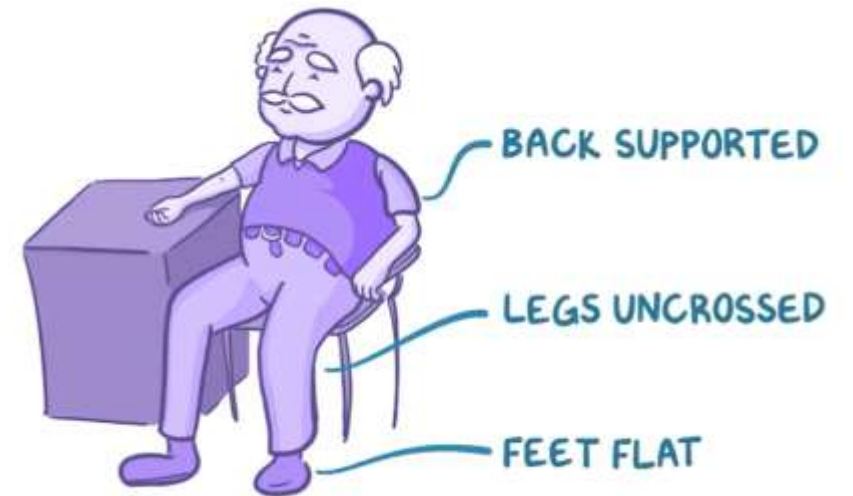
Net DBP Difference



Patient Preparation

During the measurement, they should:

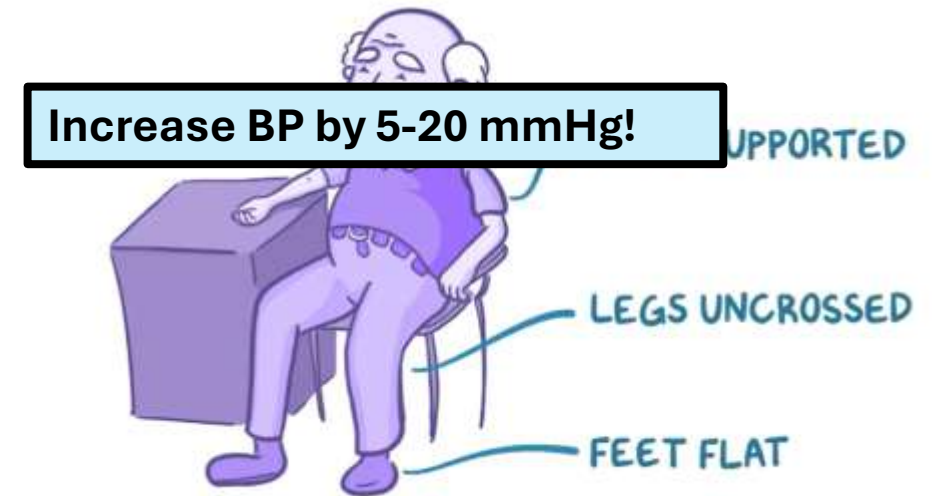
- Be seated with their arm, back and feet supported.
- Keep their legs uncrossed.
- Refrain from talking, reading or using an electronic device such as a smart phone.



Patient Preparation

During the measurement, they should:

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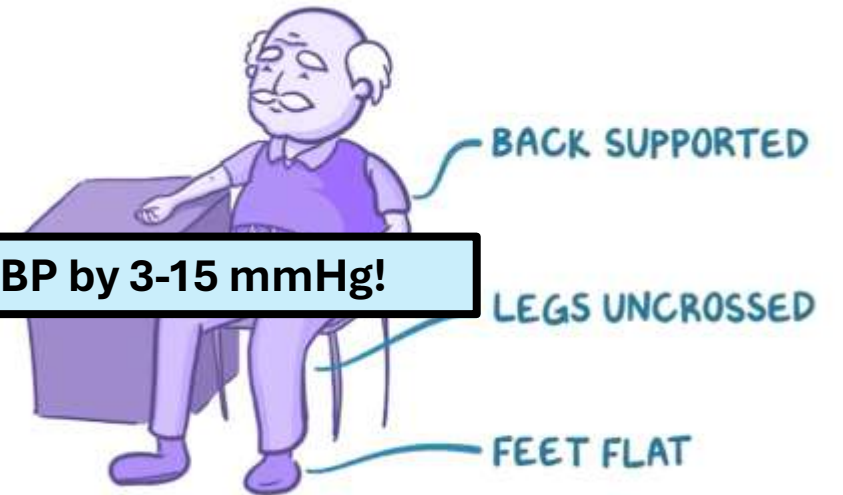


Patient Preparation

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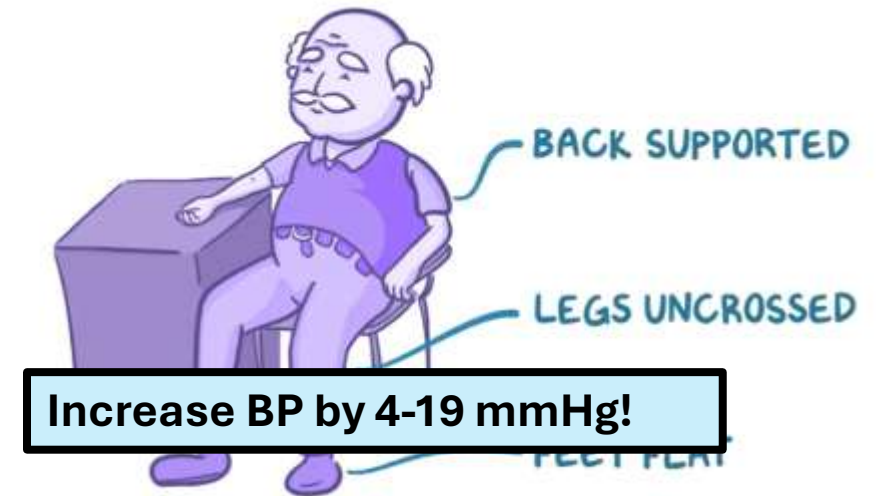
Increase BP by 3-15 mmHg!



Patient Preparation

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Required Elements for BP Measurement

1. Proper patient preparation/positioning
- 2. Individualized cuff selection**
3. Mastery of BP measurement

ACCURATE MEASUREMENT
of BLOOD PRESSURE



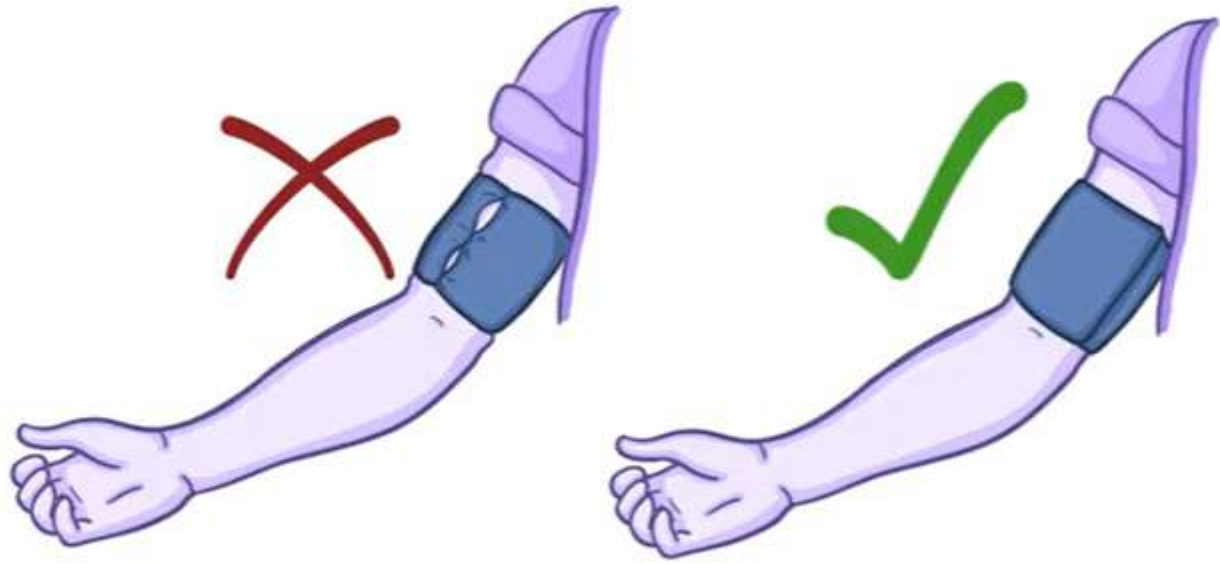
DIAGNOSIS & MANAGEMENT
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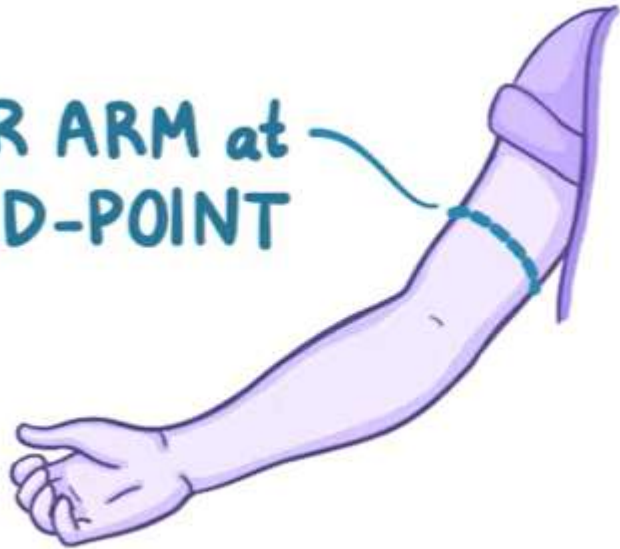
BLOOD PRESSURE
READING can be WRONG



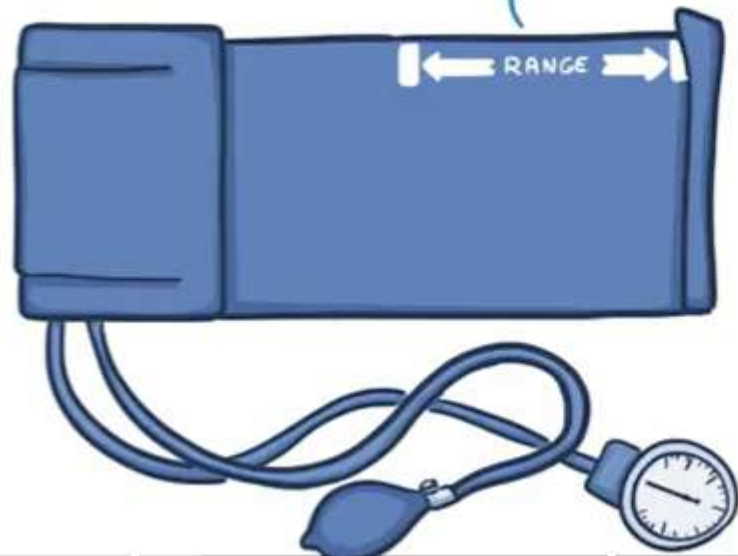


CHOOSE the CORRECT CUFF SIZE

UPPER ARM at MID-POINT



RANGE MARKS



AHA Scientific Statement

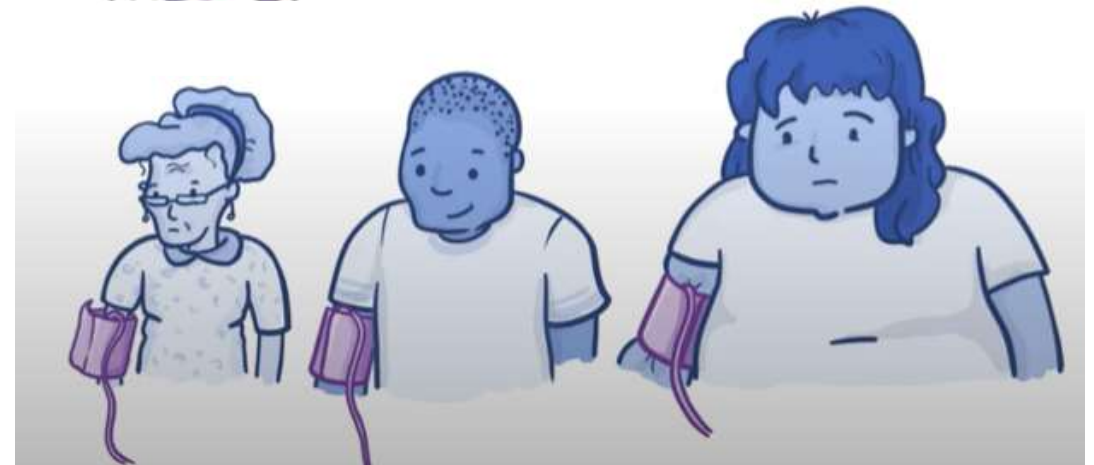
Measurement of Blood Pressure in Humans A Scientific Statement From the American Heart Association

Muntner, et al, *Hypertension*, 2019.

Table 2. Key Points In Selecting Cuff Sizes for BP Measurement

Arm circumference should be measured at the midpoint of the acromion and olecranon.
BP cuff bladder length should be 75%–100% of the patient's measured arm circumference.
BP cuff bladder width should be at 37%–50% of the patient's arm circumference (a length-to-width ratio of 2:1)
BP cuff should be placed on bare skin.
Shirtsleeves should not be rolled up because this may create a tourniquet effect.
The most frequent error in measuring office BP is "miscuffing," with undercuffing large arms accounting for 84% of the miscuffings. ^{18,19}
There is variation in the BP cuff bladder length for adult and large adult cuffs (ie, the bladder size for large cuff may differ between manufacturers).
Individual cuffs should be labeled with the ranges of arm circumferences; lines should be added that show whether the cuff size is appropriate when it is wrapped around the arm.
Information on cuff selection for patients with morbid obesity is provided in the Obese Patients section.

BP indicates blood pressure.



Cuff Selection – Don't be swayed by the labeling!

Table 1 Dimensions of recommended BP cuff sizes for children and adolescents for a range of arm circumferences [1]

BP cuff	Bladder width (cm)	Bladder length (cm)	Arm circumference (cm)
Infant	6	12	11–15
Child	9	18	16–22
Small adult	10	24	23–26
Adult	13	30	27–34
Large adult	16	38	35–44
Thigh	20	42	45–52

BP, blood pressure.



Table 3 Frequency distribution by cuff systems and age groups

Cuff system	Modified mid-arm circumference range	Age groups (%)			
		3–5 years	6–11 years	12–19 years	> 20 years
Baum					
Infant	10 to <18	66.6	15.1	0.1	–
Child/small adult	18 to <25	33.2	64.3	23.1	3.5
Adult	25 to <35	0.2	20.0	63.6	62.0
Large adult	35 to <47	–	0.6	13.0	33.2
Extra-large adult ^a	47–66	–	–	0.2	1.3
Welch Allyn					
Small child	12 to <15	3.5	0.2	–	–
Child	15 to <20	88.2	39.0	1.1	–
Small adult	20 to <25	8.1	40.1	22.1	3.5
Adult	25 to <32	0.2	18.5	51.5	38.7
Large adult	32 to <40	–	2.1	21.7	48.2
Extra-large adult ^a	40–55	–	0.1	3.7	9.5

^aAt times referred to as 'thigh cuff'.

Cuff Subgroup*	BP with Appropriate Cuff, mean (SD) mmHg	BP with Regular Adult Cuff, mean (SD) mmHg	Regular Adult Cuff Size relative to Appropriate Cuff Size	Difference, mean (95%CI)	P-value for difference
Systolic Blood Pressure					
Small Adult (n=35)	119.6 (23.5)	116.0 (23.4)	1 size too large	-3.6 (-5.6 to -1.7)	<0.001
Regular Adult (n=54)	120.9 (21.4)	120.9 (21.4)	Correct cuff size	0 [Reference]	
Large Adult (n=65)	122.7 (14.7)	127.5 (14.9)	1 size too small	4.8 (3.0 to 6.6)	<0.001
Extra Large Adult (n=40)	124.5 (21.8)	144.0 (22.4)	2 sizes too small	19.5 (16.1 to 22.9)	<0.001
Diastolic BP					
Small Adult (n=35)	71.5 (10.4)	70.2 (10.5)	1 size too large	-1.3 (-2.4 to -0.2)	0.023
Regular Adult (n=54)	72.8 (11.5)	72.8 (11.5)	Correct cuff size	0 [Reference]	
Large Adult (n=65)	75.7 (7.0)	77.6 (7.7)	1 size too small	1.8 (1.1 to 2.6)	<0.001
Extra Large Adult (n=40)	79.3 (12.2)	86.7 (14.2)	2 sizes too small	7.4 (5.7 to 9.1)	<0.001

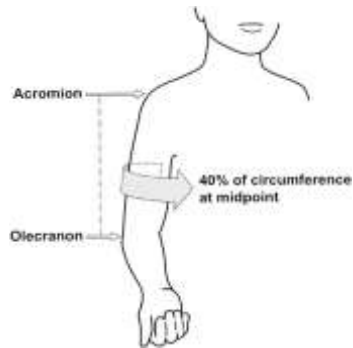
Choosing the Right Cuff Size (Manual Auscultation)

$\geq 80\%$ of the upper mid-arm circumference

$\geq 40\%$ of the
upper mid-arm
circumference



Choosing the Right Cuff Size (Manual Auscultation)



http://images.google.com/imgres?imgurl=http://www.kidney.org/professionals/kdoqi/guidelines_bp/images/figure61l.jpg



Flynn, JT, et al., *Pediatrics*, 2017.



Applying the Cuff

- Fold cuff in half to identify the mid-point of the bladder.
- Palpate the brachial pulse.
- Place cuff 1-2 finger breadths above the brachial pulse
 - Make sure the *mid-point of the bladder is placed directly above the brachial pulse.*
- The cuff should fit snugly on the arm, allowing for *up to 2 fingers to fit underneath* the cuff when secured.

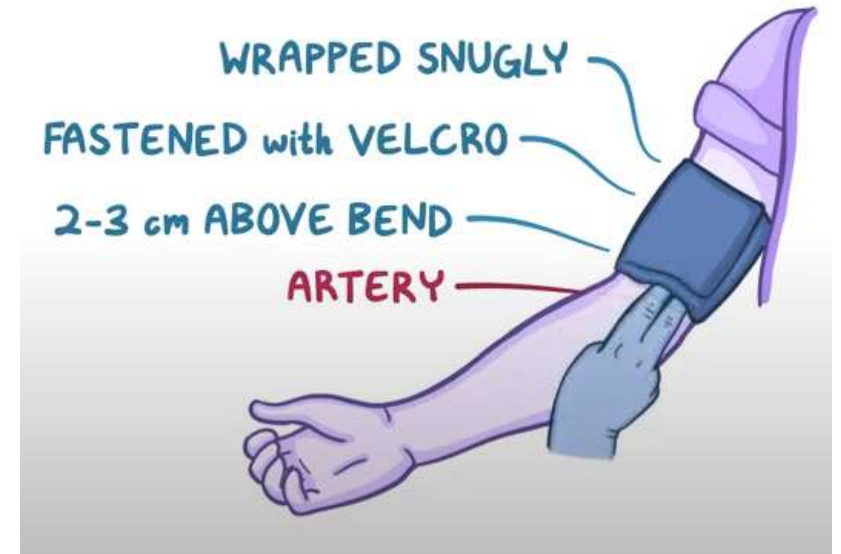
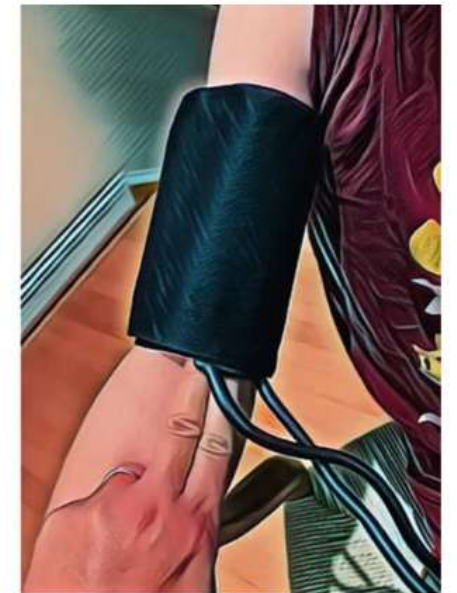
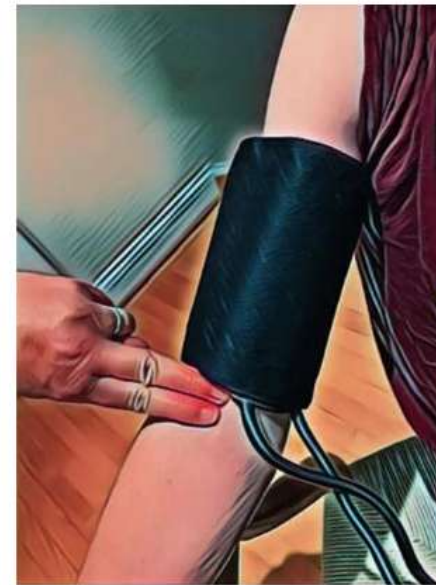


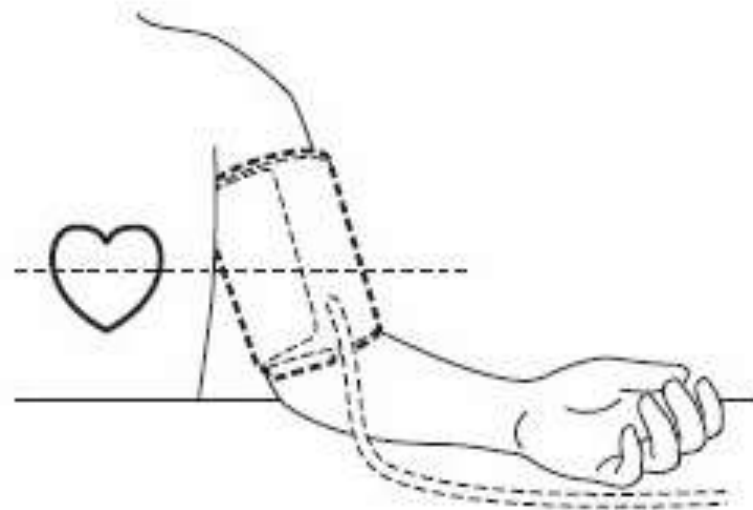
Fig. 2



Applying the Cuff

Once the cuff is placed, make sure:

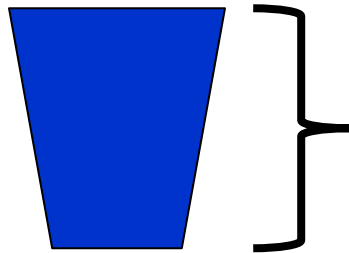
1. The patient's arm is supported.
2. The midpoint of the cuff is at heart level.



BP Measurement in the Patient with Obesity

- Challenges:

- Arm size
 - Cuff size
- Arm shape
 - Conical arm



**Δ arm circumference
(proximal to distal arm):
1 to 20 cm; mean 8.7 cm**

- Arm length
 - Cuff may extend past the elbow



Figure 1 Difficulties in placing a thigh cuff on the arm.



McFarlane, Critical Care Nurse, 2012



<https://www.verywellhealth.com/high-blood-pressure-a2-3520806>



Required Elements for BP Measurement

1. Proper patient preparation/positioning
2. Individualized cuff selection
- 3. Mastery of BP measurement**

ACCURATE MEASUREMENT
of BLOOD PRESSURE



DIAGNOSIS & MANAGEMENT
of HYPERTENSION

WRONG POSITION
or UNPREPARED



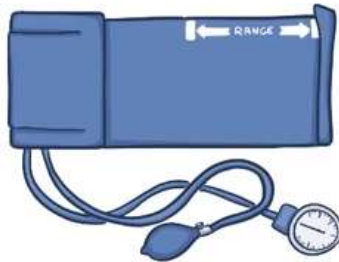
BLOOD PRESSURE
READING can be WRONG



STEP 1: PERSON SHOULD SIT in a CHAIR
~ BACK SUPPORTED
~ LEGS UNCROSSED
~ FEET FLAT



STEP 2: CORRECT CUFF SIZE



STEP 3: CUFF should be in the CORRECT POSITION



STEP 4: ARM SHOULD be SUPPORTED on a FLAT SURFACE
~ MIDDLE of the CUFF LEVEL
with the PERSON'S HEART

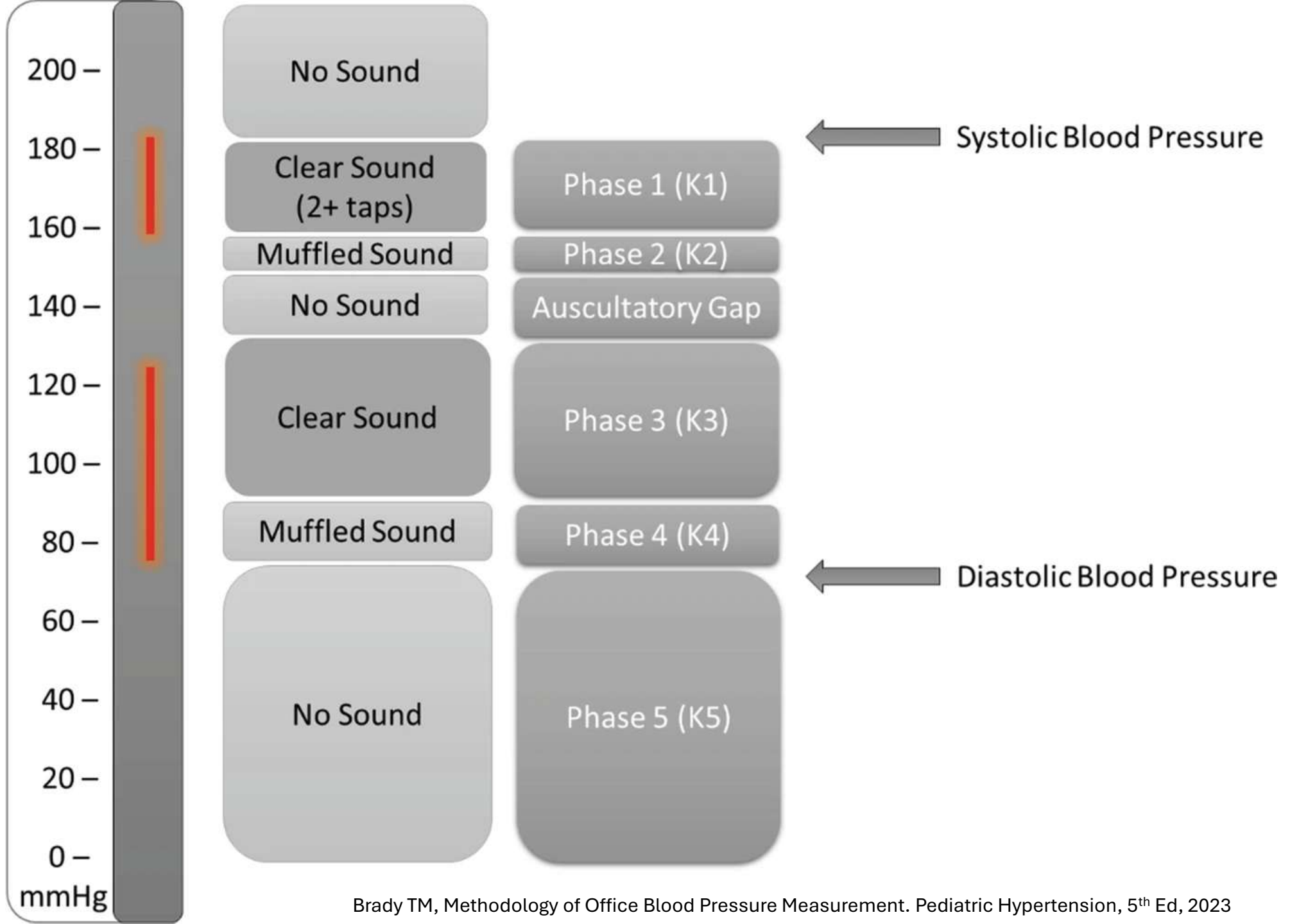


STEP 5: REST QUIETLY for 2-5 MINUTES BEFORE & DURING MEASUREMENT



Manual Auscultation

- Cuff should be applied to **bare arm**
- Locate radial pulse, inflate sphygmomanometer quickly to 60 mmHg and then slowly inflate in increments of 10 mmHg until the pulse disappears.
- The value at which the pulse disappears + 30 mmHg = Peak Inflation Level
- Deflate, wait 30 seconds, inflate to Peak Inflation Level
- Deflate at 2-3 mmHg/second to a level 10 mmHg lower than the level of last Korotkoff sound (K5).
 - SBP = Onset of tapping (K1)
 - DBP = Disappearance of Korotkoff sounds (K5)



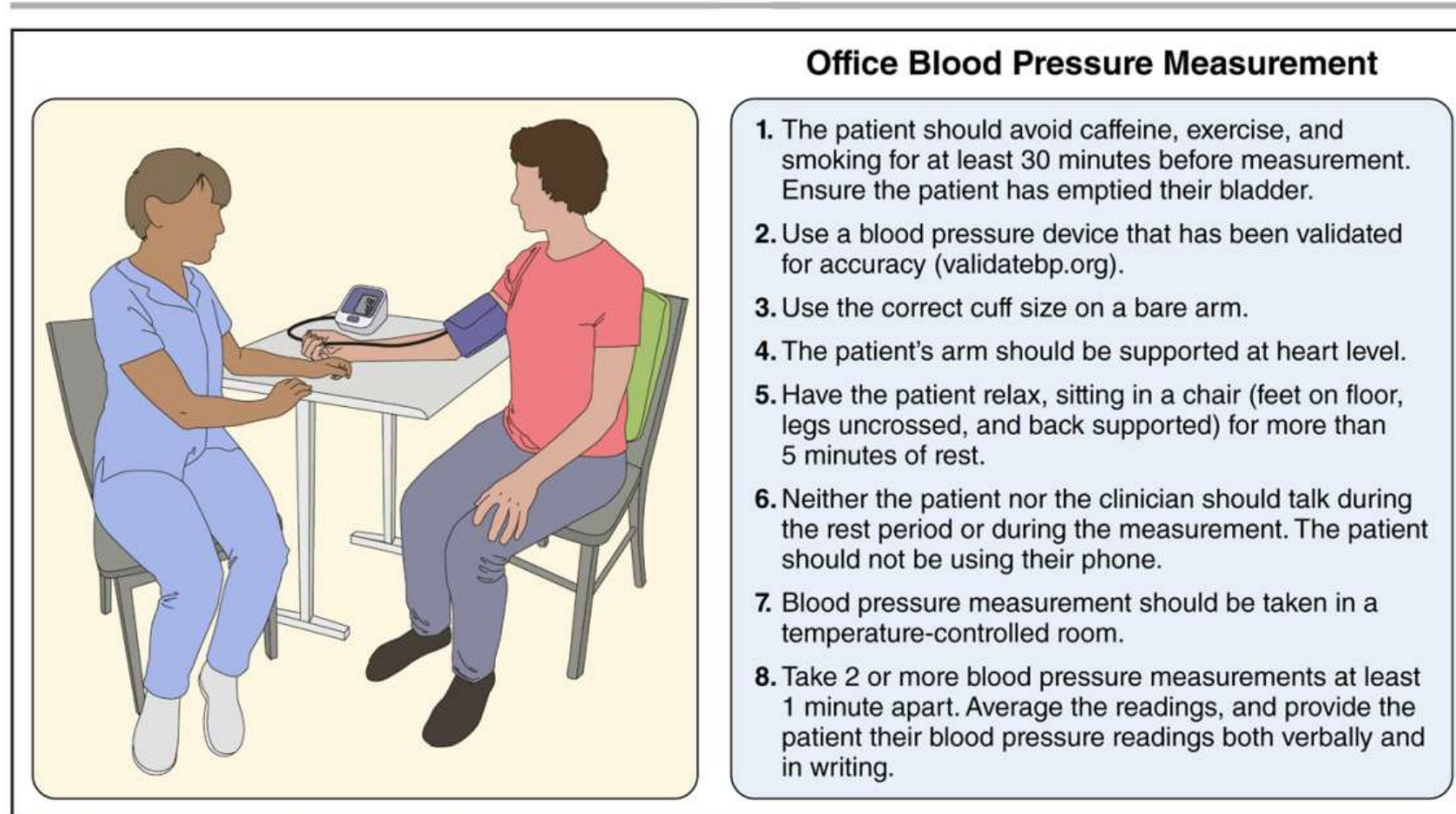


Figure 3. Checklist for Accurate Office Blood Pressure Measurement.

BP indicates blood pressure; DBP, diastolic blood pressure; and SBP, systolic blood pressure. Sourced from Pickering et al.²⁰ Adapted with permission from Whelton et al.²¹ Copyright 2018 American College of Cardiology Foundation and American Heart Association, Inc. Adapted from Mancia et al.²² by permission of Oxford University Press. Copyright 2013 Oxford University Press. Adapted with permission from Weir et al.²³ from *Annals of Internal Medicine*. Copyright 2014 American College of Physicians. All Rights Reserved. Adapted with permission of American College of Physicians. Created by Sceyence Studios.

What is abnormal?

Pediatric Blood Pressure Guidelines: Classification by Age

The 2017 AAP guidelines updated pediatric blood pressure (BP) classifications, replacing “prehypertension” with “elevated blood pressure” and aligning adolescent thresholds with adult standards to improve screening and management.



CHILDREN (1–13 YEARS)

Percentile-Based Standards

BP categories determined by sex, age, and height percentiles.

THE “WHICHEVER IS LOWER” RULE

For Elevated BP and Stage 1/2 HTN, use the lower of the two thresholds.



NORMAL BP

<90th percentile



ELEVATED BP

≥90th to <95th percentile
(or 120/80 to <95th)



STAGE 1 HTN

≥95th to <95th + 12 mmHg
(or 130/80–139/89)



STAGE 2 HTN

≥95th percentile + 12 mmHg
(or ≥140/90)



ADOLESCENTS (≥13 YEARS)

Alignment with Adult Guidelines

Thresholds now match adult AHA/ACC standard mmHg values.

FIXED MMHG THRESHOLDS

Unlike younger children, this group uses absolute values rather than height percentiles.



NORMAL BP

<120/<80 mm Hg



ELEVATED BP

120/<80 to 129/<80 mm Hg



STAGE 1 HTN

130/80 to 139/89 mm Hg



STAGE 2 HTN

≥140/90 mm Hg

What do you do when BP is elevated?

Repeat the BP!

Hypertension is the SUSTAINED elevation of BP

TABLE 11 Patient Evaluation and Management According to BP Level

BP Category (See Table 3)	BP Screening Schedule	Lifestyle Counseling (Weight and Nutrition)	Check Upper and Lower Extremity BP	ABPM ^a	Diagnostic Evaluation ^b	Initiate Treatment ^c	Consider Subspecialty Referral
<u>Normal</u>	Annual	X	—	—	—	—	—
	Elevated BP measurement	Initial	X	—	—	—	—
		Second measurement: repeat in 6 mo	X	X	—	—	—
<u>Stage 1 HTN</u>	Third measurement: repeat in 6 mo	X	—	X	X	—	X
		Initial measurement	X	—	—	—	—
	Second measurement: repeat in 1–2 wk	X	X	—	—	—	—
<u>Stage 2 HTN^d</u>	Third measurement: repeat in 3 mo	X	—	X	X	X	X
		Initial measurement	X	X	—	—	—
	Second measurement: repeat, refer to specialty care within 1 wk	X	—	X	X	X	X

Phase 3: The Time-Pressure Matrix



What do you do when BP is elevated?

TABLE 11 Patient Evaluation and Management According to BP Level

BP Category (See Table 3)	BP Screening Schedule	Lifestyle Counseling (Weight and Nutrition)	Check Upper and Lower Extremity BP	ABPM ^a	Diagnostic Evaluation ^b	Initiate Treatment ^c	Consider Subspecialty Referral
<u>Normal</u>	Annual	X	—	—	—	—	—
	Initial	X	—	—	—	—	—
	Second measurement: repeat in 6 mo	X	X	—	—	—	—
<u>Stage 1 HTN</u>	Third measurement: repeat in 6 mo	X	—	X	X	—	X
	Initial	X	—	—	—	—	—
	Second measurement: repeat in 1–2 wk	X	X	—	—	—	—
<u>Stage 2 HTN^d</u>	Third measurement: repeat in 3 mo	X	—	X	X	X	X
	Initial	X	X	—	—	—	—
	Second measurement: repeat, refer to specialty care within 1 wk	X	—	X	X	X	X

Leg Blood Pressure

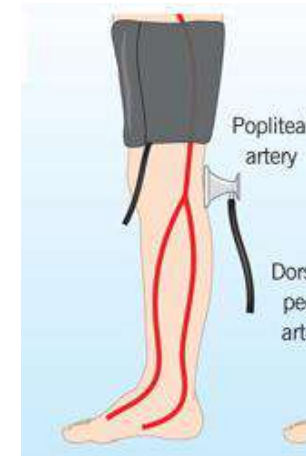


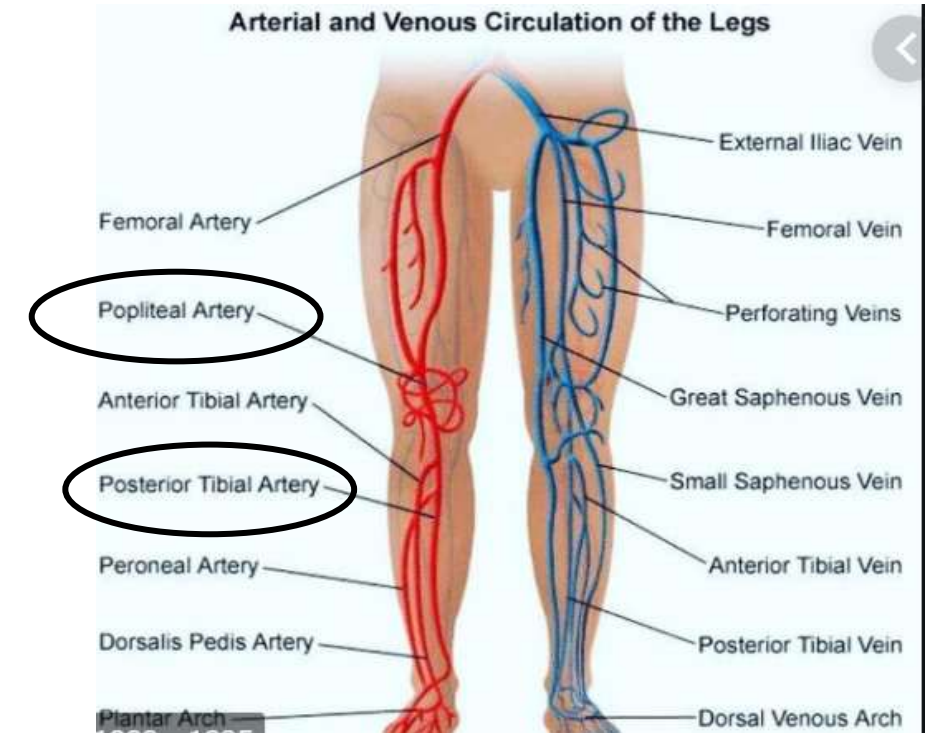
TABLE 7 Best BP Measurement Practices

1. The child should be seated in a quiet room for 3–5 min before measurement, with the back supported and feet uncrossed on the floor.
2. BP should be measured in the right arm for consistency, for comparison with standard tables, and to avoid a falsely low reading from the left arm in the case of coarctation of the aorta. The arm should be at heart level,⁹⁰ supported, and uncovered above the cuff. The patient and observer should not speak while the measurement is being taken.
3. The correct cuff size should be used. The bladder length should be 80%–100% of the circumference of the arm, and the width should be at least 40%.
4. For an auscultatory BP, the bell of the stethoscope should be placed over the brachial artery in the antecubital fossa, and the lower end of the cuff should be 2–3 cm above the antecubital fossa. The cuff should be inflated to 20–30 mm Hg above the point at which the radial pulse disappears. Overinflation should be avoided. The cuff should be deflated at a rate of 2–3 mm Hg per second. The first (phase I Korotkoff) and last (phase V Korotkoff) audible sounds should be taken as SBP and DBP. If the Korotkoff sounds are heard to 0 mm Hg, the point at which the sound is muffled (phase IV Korotkoff) should be taken as the DBP, or the measurement repeated with less pressure applied over the brachial artery. The measurement should be read to the nearest 2 mm Hg.
5. To measure BP in the legs, the patient should be in the prone position, if possible. An appropriately sized cuff should be placed midhigh and the stethoscope placed over the popliteal artery. The SBP in the legs is usually 10%–20% higher than the brachial artery pressure.

Adapted from Pickering TG, Hall JE, Appel LJ, et al. Recommendations for blood pressure measurement in humans and experimental animals: part 1: blood pressure measurement in humans: a statement for professionals from the Subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research. *Circulation*. 2005;111(5):697–716.

3-limb BPs

- Have patient lie supine on the exam table
- Place cuff over mid-thigh or calf
 - Mid-thigh: bladder centered over popliteal artery
 - Mid-calf: bladder centered over the posterior tibial artery.
 - Cuff / limb should be the same level as the heart.



Clinical Guide: Conducting a 3-Limb Blood Pressure Measurement for Coarctation Screening

1. Preparation & Patient State



Measure Mid-Arm Circumference: Measure midpoint between acromion of scapula and olecranon of elbow to select correctly sized BP cuff.



Position Patient Supine: Patient must lie flat on their back on the examination table.



Allow for Proper Rest: Patient must rest quietly for 3–5 minutes before measurements to avoid falsely elevated readings.

2. Limb Positioning



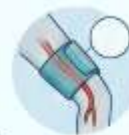
Maintain Heart-Level Alignment: Cuff and limb being measured are consistently positioned at the same level as the patient's heart.



Elevate the Leg for Measurements: Use a pillow or cushion to raise the leg so the cuff reaches heart level while the patient remains supine.



3. Cuff Placement for Leg Measurement



Mid-Thigh Placement: Position the cuff at the mid-thigh and center the bladder over the popliteal artery.



Alternative: Mid-Calf Placement: Alternatively, place the cuff at the mid-calf and center the bladder over the posterior tibial artery.

4. Executing the Measurement

Utilize an Automated Device: Use a validated automated oscillometric device to measure blood pressure in the right arm, left arm, and one leg.

Order of Measurement: Measurements should be taken while the patient is supine to maintain consistency across all three limbs.



5. Interpretation of Results



Normal Finding: Leg SBP > Arm SBP

In a healthy patient, the Systolic Blood Pressure (SBP) in the legs is typically 10%–20% higher than the pressure measured in the arms.



Red Flag: Leg SBP < Arm SBP

If the SBP in the leg is lower than the SBP in the arm, this is a clinical "red flag" that may indicate coarctation of the aorta.

Identifying Aortic Obstruction: A gradient where the upper extremity SBP exceeds the lower extremity SBP by 20 mm Hg or more is highly suggestive of an aortic obstruction.

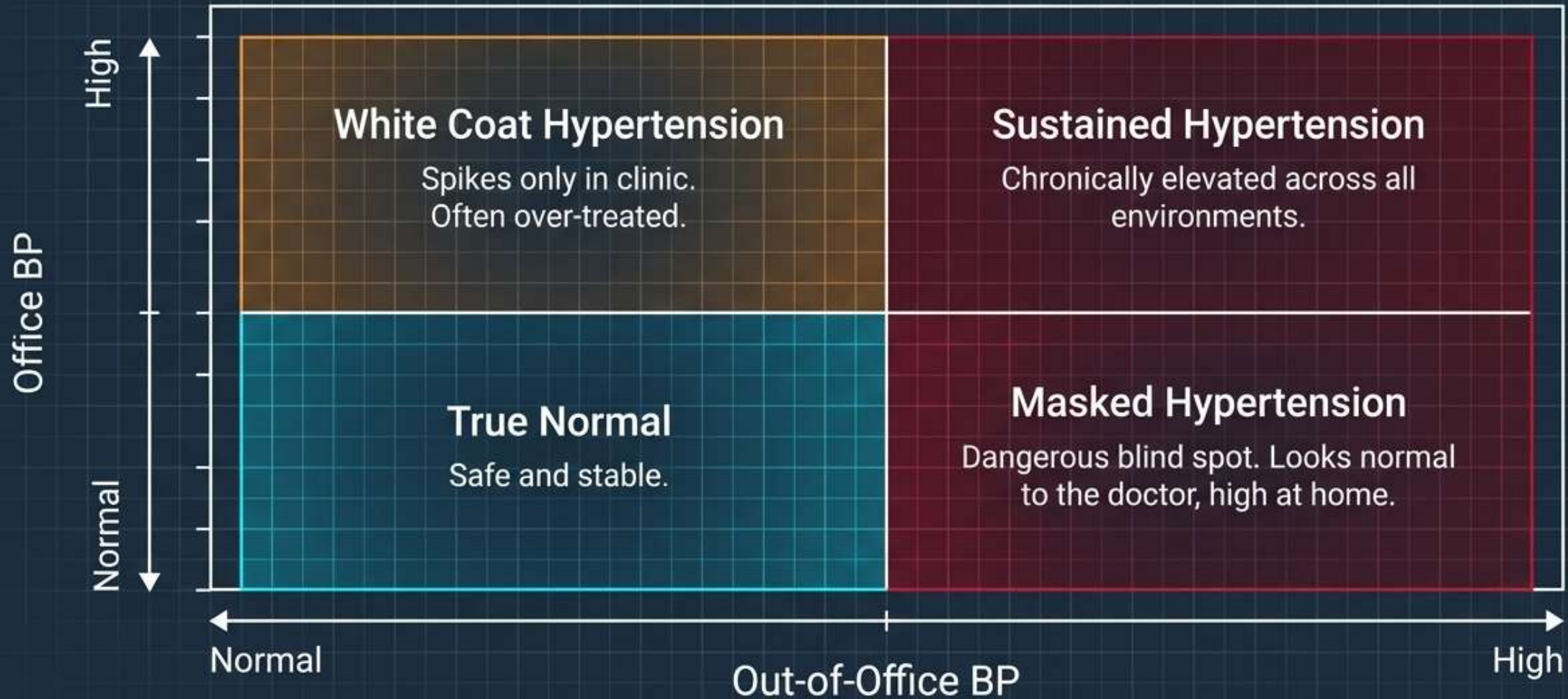
What do you do when BP is elevated?

TABLE 11 Patient Evaluation and Management According to BP Level

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<u>Normal</u>	Annual	X	—	—	—	—	—
	Initial	X	—	—	—	—	—
	Second measurement: repeat in 6 mo	X	X	—	—	—	—
<u>Elevated BP</u>	Third measurement: repeat in 6 mo	X	—	X	X	—	X
	Initial	X	—	—	—	—	—
	Second measurement: repeat in 1–2 wk	X	X	—	—	—	—
<u>Stage 1 HTN</u>	Third measurement: repeat in 3 mo	X	—	X	X	X	X
	Initial	X	X	—	—	—	—
	Second measurement: repeat, refer to specialty care within 1 wk	X	—	X	X	X	X
<u>Stage 2 HTN^d</u>	Initial	X	X	—	—	—	—
	Second measurement: repeat, refer to specialty care within 1 wk	X	—	X	X	X	X

The Diagnostic Matrix

INSIGHT: Blood pressure is dynamic. Relying solely on office measurements creates dangerous diagnostic blind spots. Ambulatory and Home BP monitoring uncover the truth.



Who gets a work up?

TABLE 11 Patient Evaluation and Management According to BP Level

BP Category (See Table 3)	BP Screening Schedule	Lifestyle Counseling (Weight and Nutrition)	Check Upper and Lower Extremity BP	ABPM ^a	Diagnostic Evaluation ^b	Initiate treatment ^c	Consider Subspecialty Referral
Normal Elevated BP	Annual	X	—	—	—	—	—
	Initial measurement	X	—	—	—	—	—
	Second measurement: repeat in 6 mo	X	X	—	—	—	—
Stage 1 HTN	Third measurement: repeat in 6 mo	X	—	X	X	—	X
	Initial measurement	X	—	—	—	—	—
	Second measurement: repeat in 1–2 wk	X	X	—	—	—	—
Stage 2 HTN ^d	Third measurement: repeat in 3 mo	X	—	X	X	X	X
	Initial measurement	X	X	—	—	—	—
	Second measurement: repeat, refer to specialty care within 1 wk	X	—	X	X	X	X

Who gets a work up?

- Primary HTN should be a diagnosis of exclusion.
- Secondary hypertension is more likely the younger the child is and the higher the blood pressure (ie Stage 2 HTN) is at presentation.
-
- Children and adolescents ≥ 6 y of age do not require an extensive evaluation if they have:
 - Family history of HTN
 - Overweight/obesity
 - No history or PE findings suggestive of a secondary cause of HTN.

Where do I start with a work up?

A focused history and physical exam

Important history elements:

- **Symptoms** suggestive of endocrine etiology (wt loss, sweating, flushing, fevers, palpitation, muscle cramps, weakness or constipation)?
- History of **prematurity**? Neonatal course? **UAC/UVC lines**? **Birth Weight**?
- History of **UTIs**?
- **Medications**
 - Steroids
 - Decongestants/cold preparations (?!)
 - OCP's
 - Recent discontinuation of antiHTN?
 - Beta-adrenergic agonists/theophylline
 - Erythropoietin
 - Cyclosporine/tacrolimus
 - ADHD medications
- Nutritional supplements?
- **FHx** of HTN, early CV or cerebrovascular events, ESRD?
- **Diet** (caffeine, salt intake)
- **Smoking/drinking/illicit drugs** (Amphetamines, cocaine, phencyclidine)?
- **Physical activity**
- **Sleep history** (snoring? Witnessed apneas? Daytime somnolence?)

TABLE 14 Examples of Physical Examination Findings and History Suggestive of Secondary HTN or Related to End Organ Damage Secondary to HTN

Body System	Finding, History	Possible Etiology
Vital signs	Tachycardia	Hyperthyroidism PCC Neuroblastoma
	Decreased lower extremity pulses; drop in BP from upper to lower extremities	Coarctation of the aorta
Eyes	Proptosis	Hyperthyroidism
	Retinal changes ^a	Severe HTN, more likely to be associated with secondary HTN
Ear, nose, throat	Adenotonsillar hypertrophy	SDB
Height, weight	History of snoring	Sleep apnea
	Growth retardation	Chronic renal failure
	Obesity (high BMI)	Cushing syndrome
Head, neck	Truncal obesity	Insulin resistance syndrome
	Elfin facies	Williams syndrome
	Moon facies	Cushing syndrome
	Thyromegaly, goiter	Hyperthyroidism
Skin	Webbed neck	Turner syndrome
	Pallor, flushing, diaphoresis	PCC
	Acne, hirsutism, striae	Cushing syndrome
		Anabolic steroid abuse
	Café-au-lait spots	Neurofibromatosis
	Adenoma sebaceum	Tuberous sclerosis
	Malar rash	Systemic lupus
	Acanthosis nigricans	T2DM
Hematologic	Pallor	Renal disease
	Sickle cell anemia	

Chest, cardiac	Chest pain Palpitations Exertional dyspnea Widely spaced nipples Heart murmur Friction rub	Heart disease Turner syndrome Coarctation of the aorta Systemic lupus (pericarditis) Collagen vascular disease
Abdomen	Apical heave ^a Abdominal mass Epigastric, flank bruit Palpable kidneys	LVH Wilms tumor Neuroblastoma PCC RAS Polycystic kidney disease Hydronephrosis Multicystic dysplastic kidney
Genitourinary	Ambiguous or virilized genitalia Urinary tract infection Vesicoureteral reflux Hematuria, edema, fatigue Abdominal trauma	Congenital adrenal hyperplasia Renal disease
Extremities	Joint swelling Muscle weakness	Systemic lupus Collagen vascular disease Hyperaldosteronism Liddle syndrome
Neurologic, metabolic	Hypokalemia, headache, dizziness, polyuria, nocturia Muscle weakness, hypokalemia	Reninoma Monogenic HTN (Liddle syndrome, GRA, AME)

H & P done – now what?

Diagnostic Evaluation

TABLE 10 Screening Tests and Relevant Populations

Flynn, JT, et al., *Pediatrics*, 2017.

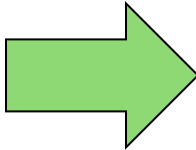
Patient Population	Screening Tests
All patients	Urinalysis Chemistry panel, including electrolytes, blood urea nitrogen, and creatinine Lipid profile (fasting or nonfasting to include high-density lipoproteina and total cholesterol) Renal ultrasonography in those <6 y of age or those with abnormal urinalysis or renal function
In the obese (BMI >95th percentile) child or adolescent, in addition to the above	Hemoglobin A1c (accepted screen for diabetes) Aspartate transaminase and alanine transaminase (screen for fatty liver) Fasting lipid panel (screen for dyslipidemia)
Optional tests to be obtained on the basis of history, physical examination, and initial studies	Fasting serum glucose for those at high risk for diabetes mellitus Thyroid-stimulating hormone Drug screen Sleep study (if loud snoring, daytime sleepiness, or reported history of apnea) Complete blood count, especially in those with growth delay or abnormal renal function

Adapted from Wiesen J, Adkins M, Fortune S, et al. Evaluation of pediatric patients with mild-to-moderate hypertension: yield of diagnostic testing. *Pediatrics*. 2008;122(5). Available at: www.pediatrics.org/cgi/content/full/122/5/e988.

Diagnostic Evaluation

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Patient Population	Screening Tests
All patients	Urinalysis Chemistry panel, including electrolytes, blood urea nitrogen, and creatinine Lipid profile (fasting or nonfasting to include high-density lipoproteina and total cholesterol) Renal ultrasonography in those <6 y of age or those with abnormal <u>urinalysis or renal function</u>
 <u>In the obese</u> (BMI >95th percentile) child or adolescent, in addition to the above	Hemoglobin A1c (accepted screen for diabetes) Aspartate transaminase and alanine transaminase (screen for fatty liver) Fasting lipid panel (screen for dyslipidemia)
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TREATMENT

TABLE 11 Patient Evaluation and Management According to BP Level

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<u>Normal</u>	Annual	X	—	—	—	—	—
<u>Elevated BP</u>	Initial measurement	X	—	—	—	—	—
	Second measurement: repeat in 6 mo	X	X	—	—	—	—
	Third measurement: repeat in 6 mo	X	—	X	X	—	X
<u>Stage 1 HTN</u>	Initial measurement	X	—	—	—	—	—
	Second measurement: repeat in 1–2 wk	X	X	—	—	—	—
	Third measurement: repeat in 3 mo	X	—	X	X	X	X
<u>Stage 2 HTN^d</u>	Initial measurement	X	X	—	—	—	—
	Second measurement: repeat, refer to specialty care within 1 wk	X	—	X	X	X	X

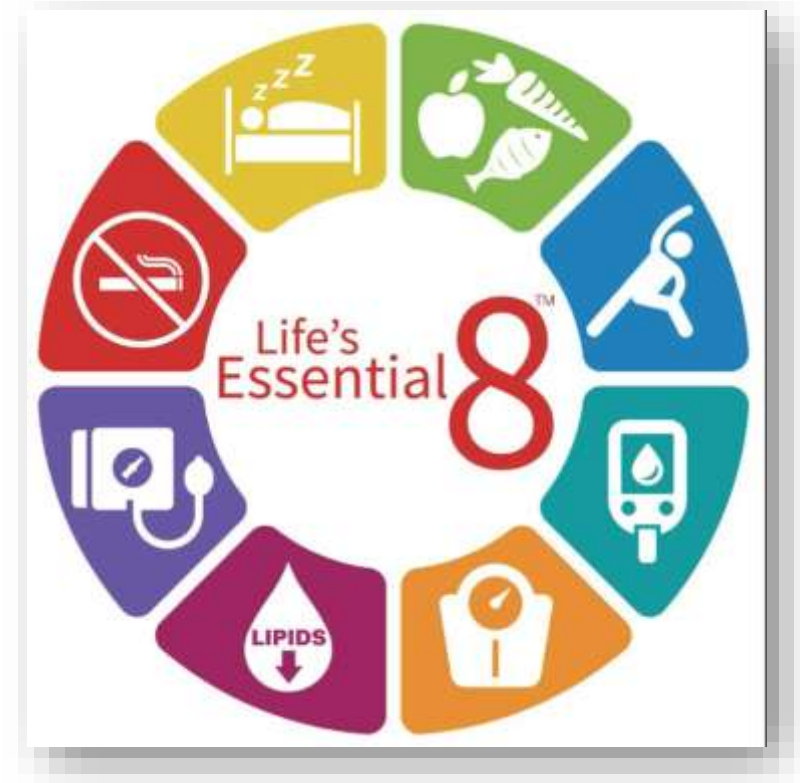
Heart Healthy Lifestyle

- Eat less
- Eat smarter
- Move more
- Don't smoke/vape



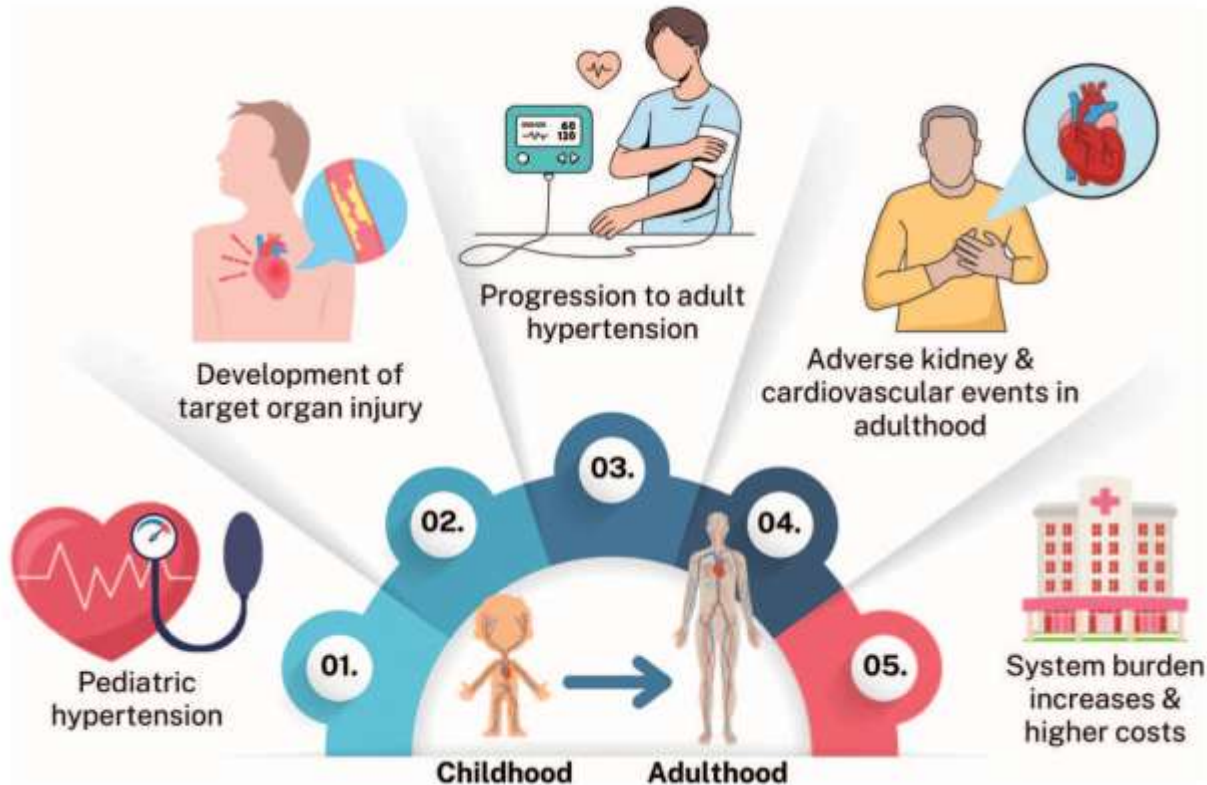
Heart Healthy Lifestyle

- Eat less
- Eat smarter
- Move more
- Don't smoke/vape
- Sleep enough and at night



Practical approach to evaluate and manage hypertension in youth: an International Society of Hypertension position paper

Joseph T. Flynn^{a,*}, Ruan Kruger^{b,c,*}, Tammy M. Brady^d, Rahul Chanchlani^e, Janis Dionne^f, Adriana Iturzaeta^g, Tazeen H. Jafar^h, Erika S.W. Jonesⁱ, Hidehiro Kaneko^j, Anastasios Kollias^k, Nicholas Larkins^l, Jonathan Mynard^{m,n,o}, Peong G. Park^p, Manish D. Sinha^q, Stella Stabouli^r, Andrew Tran^s, Marina Vaccari^t, and George Stergiou^u



Movement and Body Weight

- Maintain healthy weight (BMI-for-age ≤85th percentile; waist-to-height ratio <0.5)
- Moderate to vigorous physical activity at least 3–5 days/week (30–60 min per session)
- Limit sedentary time <2 hours/day recreational screen time




Food and Drink

- Eat 25 servings/day fruits & vegetables
- Whole grains: 3–6 servings/day
- Dairy: 2–3 servings/day (low-fat after age 2)
- Lean proteins (fish, poultry, beans, nuts)
- Limit sodium: <1500 mg/day if BP elevated, <2300 mg/day if BP normal
- Limit added sugars <25 g/day; avoid sugary drinks
- Water as primary beverage




Body and Mind

- Sleep: 9–12 h (6–12 yrs), 8–10 h (13–18 yrs)
- Reduce stress: mindfulness, play, relaxation
- Balanced digital use; avoid screens 1 h before bed



Other

- No tobacco, vaping, or substance use
- Limit exposures: secondhand smoke, air pollution
- Regular paediatric checkups: growth, BP, lipid screening



Hypertension Treatment - Meds

- Pharmacologic Treatment

- Persistent HTN despite a trial of lifestyle modifications
- Symptomatic HTN
- Stage 2 HTN without a clearly modifiable factor (eg, obesity)
- Any stage of HTN associated with CKD or diabetes mellitus therapy

Pharmacologic Interventions

- The particular agent chosen should be aimed at treating the *underlying etiology*, with particular attention being paid to *co-morbid conditions*.
- Ease of administration and side effect profile should also be initial considerations.

Pharmacologic Interventions – 1st Line Medications

- ACE inhibitor
- Angiotensin II Receptor Blocker
- Long-acting calcium channel blocker
- Thiazide diuretic

Pharmacologic Interventions – Special Considerations

- **Diabetes**
 - **Choose:** Angiotensin Converting Enzyme inhibitors (ACEi) and Angiotensin Receptor Blockers (ARB)
 - **Avoid:** Beta-blockers
- **Asthma**
 - **Avoid:** non-cardioselective beta-blockers (atenolol, metoprolol ok)
- **Migraine headaches**
 - **Choose:** Beta-blockers, candesartan
- **High level of physical activity and sports participation**
 - **Avoid:** diuretics and beta-blockers
- **Adolescent females:**
 - **Avoid:** ACEi and ARBs (highly teratogenic as early as in the first trimester)

Pharmacologic Interventions – Children with Obesity

- Obesity Hypertension

- **Choose:** ACEi or ARB therapy
 - Likely mechanism for HTN is increased sodium retention and SNS activation
 - ACEi and ARBs may have beneficial effects on diabetes and dyslipidemia.
- **Avoid:** Diuretics
 - Can worsen insulin resistance and dyslipidemia
 - Can increase SNS and renin activity
- **Avoid:** Beta blockers
 - Can lead to weight gain, increased triglycerides and decreased HDL

Pharmacologic Interventions – Children with Chronic Kidney Disease

• Chronic Kidney Disease

- **Choose:** ACEi or ARB therapy
 - Renoprotective
 - Decreases proteinuria
 - Monitor creatinine and potassium

Phase 4: The Pharmacologic Chessboard

First-line initiation (ACEi, ARB, CCB, Thiazide) mapped against comorbidities.

Special Populations	ACEi	ARB	CCB	Thiazides
Adolescent Females (Pregnancy Risk)	✗	✗	✓	✓
Chronic Kidney Disease (CKD) Target: 24-hr MAP <50th percentile.*	✓	✓	—	—
Diabetes (T1DM/T2DM)	✓	✓	—	—
Asthma Avoid Beta-Blockers	—	—	✓	✓
Migraines	—	—	✓	✓
Athletes / Sports	✓	✓	✓	✓

Obesity Note: Avoid medications that exacerbate weight gain or insulin resistance.

Sports Rule: Patient must be treated to below Stage 2 thresholds before participating.

Clinical Pathway



Phase 4: Manage & Treat

Pharmacologic Intervention: Therapeutic Goals

- BP <90% or <130/80 whichever lower
- Use the least amount of drug necessary to effectively reduce BP
 - Start low, titrate up q 2-4 weeks
- Minimize side effects
- Once maximum dose reached or side effects occur, initiate additional medication (different class) in the same manner
- Discuss/review adherence strategies

CLINICAL PRACTICE GUIDELINE Guidance for the Clinician in Rendering Pediatric Care

American Academy
of Pediatrics



DEDICATED TO THE HEALTH OF ALL CHILDREN™

Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents

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Expert Panel on Integrated Guidelines for Cardiovascular
Health and Risk Reduction in Children and Adolescents:
Summary Report

Circulation

CLINICAL PRACTICE GUIDELINES

2025 AHA/ACC/AANP/AAPA/ABC/ACCP/ ACPM/AGS/AMA/ASPC/NMA/PCNA/ SGIM Guideline for the Prevention, Detection, Evaluation and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines



Developed in Collaboration With and Endorsed by American Academy of Physician Associates; American Association of Nurse Practitioners; American College of Clinical Pharmacy; American College of Preventive Medicine; American Geriatrics Society; American Medical Association; American Society of Preventive Cardiology; Association of Black Cardiologists; National Medical Association; Preventive Cardiovascular Nurses Association; and the Society of General Internal Medicine.

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Links

Information for Parents & Families:

[BMI Calculator](#)
[CDC: How to Reduce Sodium](#)
[CDC: Reducing Sodium in Children's Diets infographic](#)
[High Blood Pressure Health Risk Calculator](#)
[Seattle Children's Hospital: High Blood Pressure \(Hypertension\)](#)
[American Heart Association: High Blood Pressure](#)
[KidsHealth: High Blood Pressure](#)
[Lucille Packard Children's Hospital at Stanford: HBP in Children and Adolescents](#)
[UpToDate: HBP in Children \(Beyond the Basics\)](#)
[WebMD: High Blood Pressure in Kids](#)
[InfoKid.org: Blood Pressure](#)
[InfoKid.org: Hypertension](#)
[NIDDK: High Blood Pressure and Children: What Parents Need to Know](#)
[NHS: Tips for a lower-salt diet](#)

Information for Healthcare Professionals:

[European Society of Hypertension guidelines for Management of HBP in children and adolescents](#)
[American Society of Hypertension](#)
[British Association for Paediatric Nephrology](#)
[FDA – Pediatric Drug Development](#)
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[Pediatric CV Risk Reduction Initiatives](#)
[BP training video by Dr. Carissa Smith on PediaLink \(Login Required\)](#)
[Hypertension Canada's 2016 Canadian Hypertension Education Program Guidelines for Blood Pressure Measurement, Diagnosis, and Assessment of Risk of Pediatric Hypertension](#)

Upcoming Events



IPHA is pleased to endorse the International Congress of Hypertension in Children and Adolescents in Valencia, Spain, February 9th to the 11th, 2017. [Click here for more details.](#)

<http://www.pediatrichypertension.org/>

Hypertension



Hypertension is the main risk factor for developing cardiovascular disease. Each year 1.6 million deaths befall from cardiovascular disease in the region of the Americas, of which about half a million occur in people under age 70, which is considered premature and preventable death. Hypertension affects between 20-40% of the adult population of the region, meaning that in the Americas around 250 million people suffer from high blood pressure. Hypertension is preventable or can be postponed by a group of preventive interventions, among which include the reduction of salt intake, a diet rich in fruits and vegetables, exercise and maintaining a healthy body weight. PAHO promotes policies and projects to impact on public health the prevention of hypertension through policies to reduce salt intake, to promote healthy eating, physical activity and to prevent obesity. Promotes and supports projects that facilitate access to essential medicines for the treatment of hypertension and promotes the development of human resources in health.

Fact sheet

Systolic pressure between 120 and 139 mm Hg or diastolic pressure between 80 and 89 mmHg is considered prehypertension, which also increases the risk of heart attack and stroke. Without lifestyle changes, prehypertension is likely to develop into high blood pressure. Blood pressure below 140/90 is considered normal.

Eating less salt can lower blood pressure. However, most dietary salt comes from consumption of processed foods rather than salt added at the table to home-cooked foods.

Lifestyle changes can prevent high blood pressure. Quitting smoking, avoiding harmful use of alcohol, getting more exercise, and eating less processed food can help prevent high blood pressure. However, for people who develop high blood pressure, medication is generally needed to control it.

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Documents



15 Dec 2020
 Who Technical Specifications For Automated Non-Invasive Blood Pressure Measuring Devices With Cuff



9 Nov 2020
 WHO PACKAGE OF ESSENTIAL NONCOMMUNICABLE (PEN) DISEASE INTERVENTIONS FOR PRIMARY HEALTH CARE



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24 Sep 2020
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