

# Lab 4 Heart Rate & Blood Pressure

## I. Attendance – Cards

## II. Heart Rate?

What? # beats per min

< 60 (slow)  
bradycardia



60-100  
normal

Wide range!

> 100 (fast)  
tachycardia



Where? heart or peripheral arteries

How? palpation *to feel* vs. auscultation *to hear* vs. EKG...

Why? vital sign "Vital signs are vital!" Pilar Bradshaw, MD

## III. Blood Pressure?

What? force exerted by blood on large systemic arteries

Where? peripheral/systemic, large arteries

How? direct (cannula) vs. indirect (external cuff, P meter = sphygmomanometer + stethoscope/sensor)

Why? vital sign + CVD risk indicator low < 120/<80 mm Hg  
Hypertension  $\geq 140/90$  mm Hg. See LLM pp 4-5, 4-6

## IV. Practice Tests

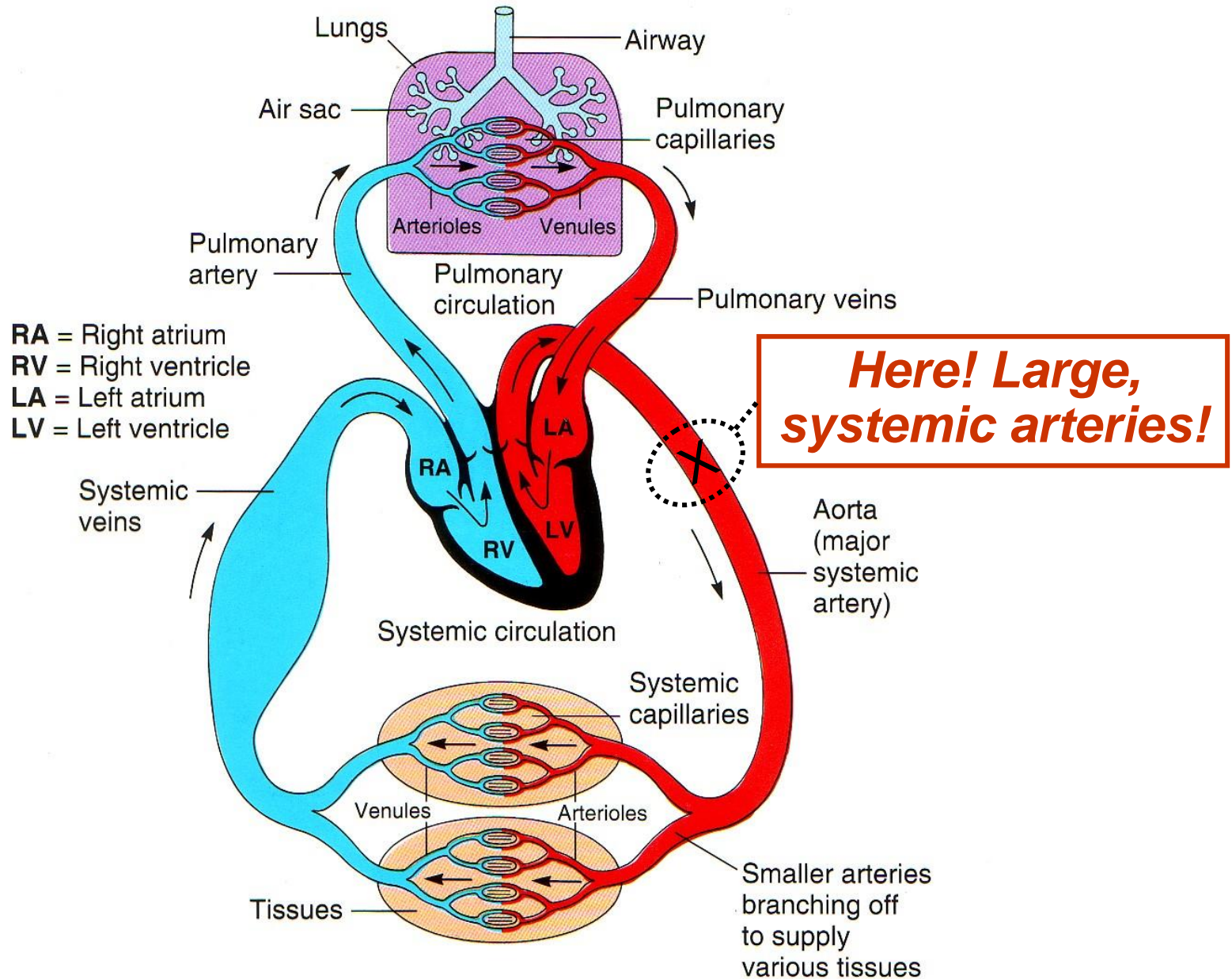
## V. Old vs. New High Blood Pressure Guidelines

# ***Factors that Influence Heart Rate (HR, b/min) & Blood Pressure (BP, mm Hg)***

Short list of individual, exercise & environmental variables (superimposed upon genetics) that alter HR & BP:

1. **arousal state** (asleep, awake, drowsy,unconscious...BI 121 lecture!)
2. **bladder and/or bowel distention** (if > semi-filled, higher BP!)
3. **exercise** (mode, frequency, intensity, duration, distribution)
4. **illness** (type, current, past...)
5. **menstrual phase** (follicular, ovulatory, luteal)
6. **nutritional status** (alcohol, caffeine, H<sub>2</sub>O, meal composition & time)
7. **pets** (on lap? may lower BP!)
8. **posture** (supine, seated, standing)
9. **sleep** (less elevates!)
10. **smoking status** (# & time)
11. **temperature** (ambient & body)
12. **white-coat effect or white-coat syndrome,...**

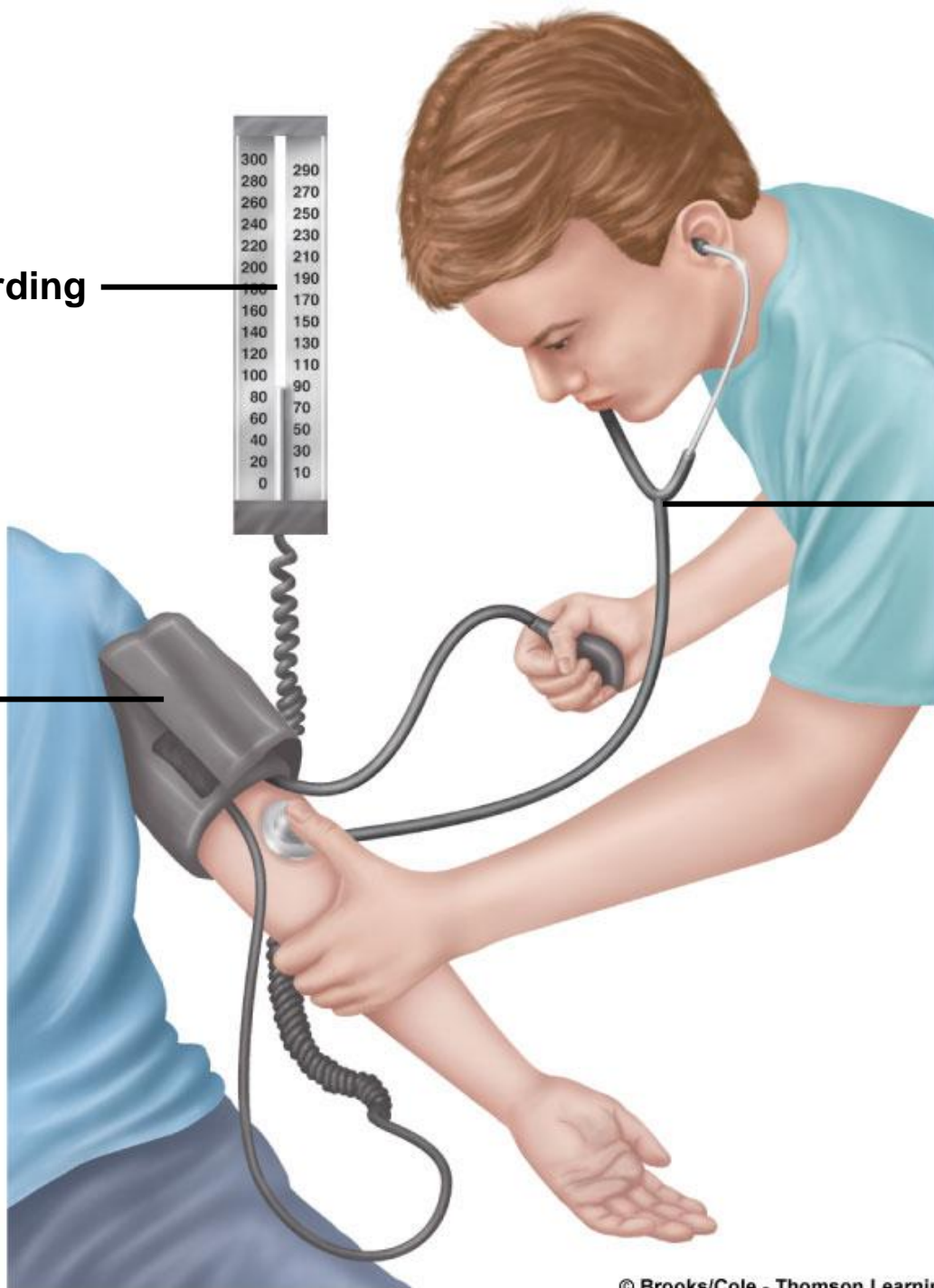
# Where is BP measured?



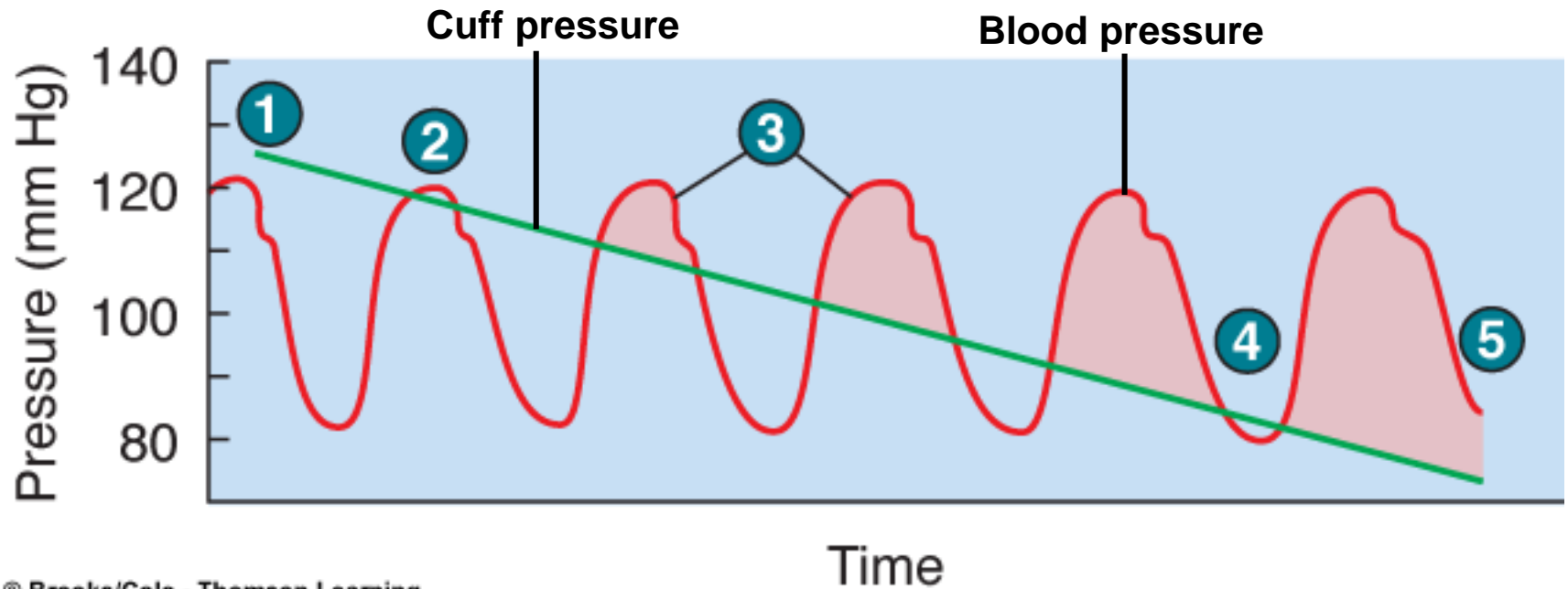
**Pressure-recording device**

**Inflatable cuff**

**Stethoscope**

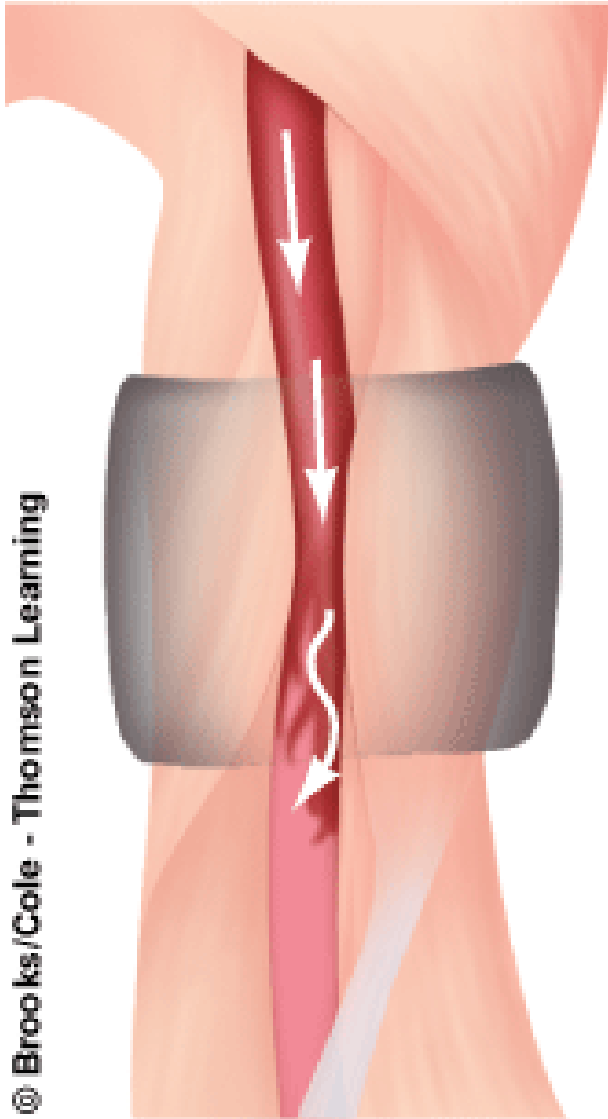


**LS 2006 fig 10-7a p 282.**



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***Sounds are heard only when blood jets through a partially occluded artery.***



**When cuff pressure is between 120 and 80 mm Hg:**

**Blood flow through the vessel is turbulent whenever blood pressure exceeds cuff pressure.**

**Intermittent sounds are heard as blood pressure fluctuates throughout the cardiac cycle.**



# Personal Measurements

Heart Rate (HR): Record on p 4-3, Q 1.

6-sec → add 0 to end or multiply by 10

15-sec → multiply by 4

60-sec → record as is; seated resting HR

Each of you place stethoscope over your heart to detect *lub-dup, lub-dup...*

Blood Pressure (BP): Record on p 4-3, Q 2.

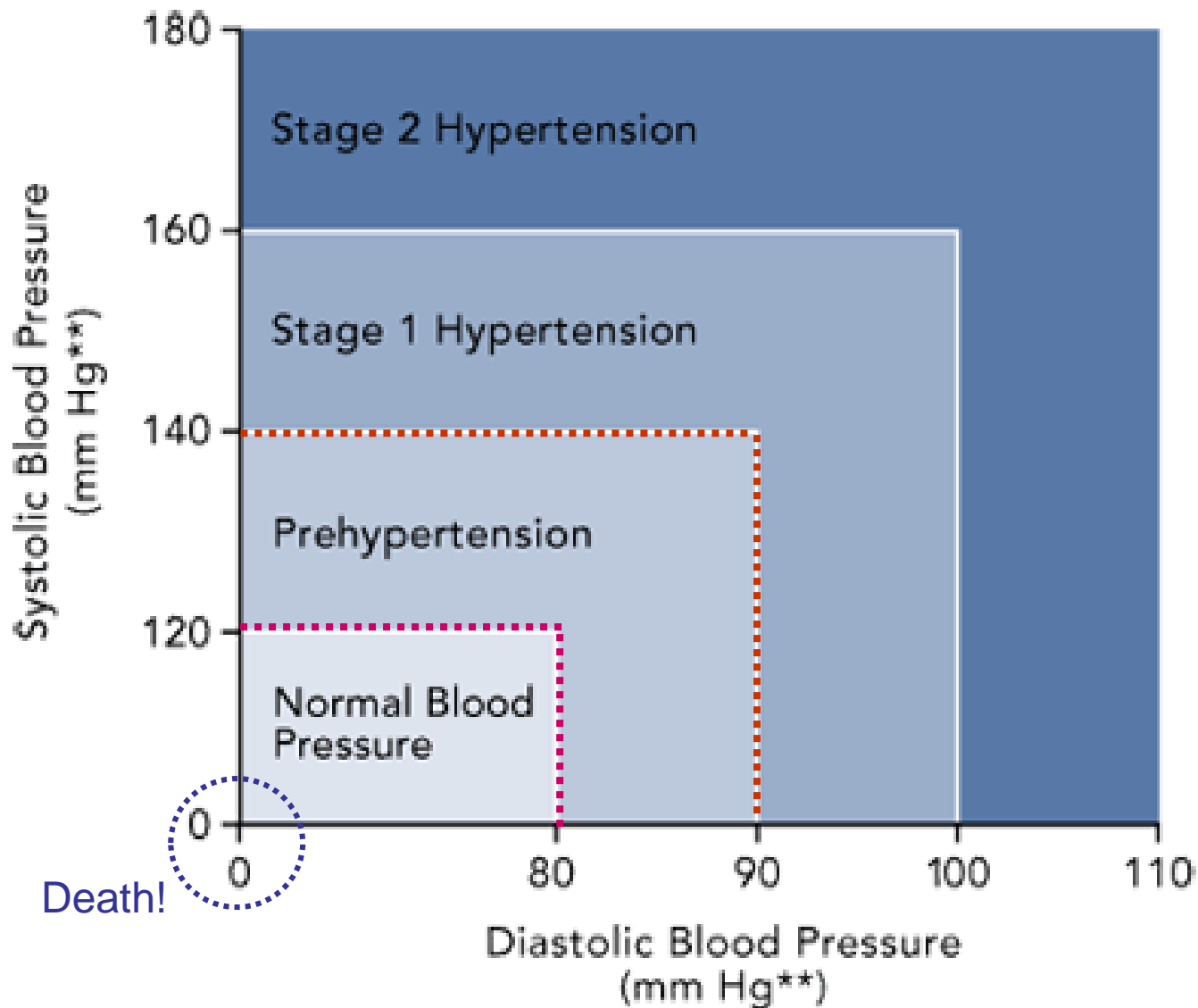
R arm x 2 → SBP/DBP & HR

L arm x 2 → SBP/DBP & HR

Try to detect Korotkoff sounds w/stethoscope during a few automated BP measurements.

Evaluate values & answer Q 3, p 4-3 @ later time.

# Where Does Your Pressure Fall? Previous Guidelines < Nov 2017





# Blood Pressure Categories



BLOOD PRESSURE CATEGORY	SYSTOLIC mm Hg (upper number)		DIASTOLIC mm Hg (lower number)
<b>NORMAL</b>	<b>LESS THAN 120</b>	<b>and</b>	<b>LESS THAN 80</b>
<b>ELEVATED</b>	<b>120 – 129</b>	<b>and</b>	<b>LESS THAN 80</b>
<b>HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 1</b>	<b>130 – 139</b>	<b>or</b>	<b>80 – 89</b>
<b>HIGH BLOOD PRESSURE (HYPERTENSION) STAGE 2</b>	<b>140 OR HIGHER</b>	<b>or</b>	<b>90 OR HIGHER</b>
<b>HYPERTENSIVE CRISIS (consult your doctor immediately)</b>	<b>HIGHER THAN 180</b>	<b>and/or</b>	<b>HIGHER THAN 120</b>

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[http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/GettheFactsAboutHighBloodPressure/How-High-Blood-Pressure-is-Diagnosed\\_UCM\\_301873\\_Article.jsp#.W0P-VbgnaUk](http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/GettheFactsAboutHighBloodPressure/How-High-Blood-Pressure-is-Diagnosed_UCM_301873_Article.jsp#.W0P-VbgnaUk)  
<https://www.health.harvard.edu/heart-health/reading-the-new-blood-pressure-guidelines>

# **What can I do if I have prehypertension or hypertension?**

1. See your doctor & have your BP checked regularly.  
Also, see if it's safe to start an exercise program.
2. Exercise, exercise, exercise!  
20-60 min of aerobic exercise on most days.
3. Lose weight, if overweight.  
Exercise, exercise, exercise!
4. Add spice to your life, not salt.  
Garlic, cilantro, oregano, pepper & onion instead of salt!
5. Do the *DASH*, don't overdo it!  
[\*Dietary Approaches to Stop Hypertension\*](#), plant-based Mediterranean diet w/plenty of vegetables, fruits, whole grains & non-/low-fat dairy to ensure much  $\text{Ca}^{2+}$ ,  $\text{K}^{+}$  &  $\text{Mg}^{2+}$  intake.
6. Limit alcohol intake.  
No more than 1-2 drinks/d for ♀, 2-3 drinks/day for ♂.

# Resources that may be helpful...



<https://newsroom.heart.org/news/high-blood-pressure-redefined-for-first-time-in-14-years-130-is-the-new-high>

<https://www.khanacademy.org/science/health-and-medicine/circulatory-system/blood-pressure-ddp/v/what-is-blood-pressure-1>

<https://www.youtube.com/watch?v=o3UA-bTbWDc>

<https://www.youtube.com/watch?v=sOwBDmu1Y0c>

<https://www.youtube.com/watch?v=JA0Wb3gc4mE>