Lab 4 Heart Rate & Blood Pressure

I. Attendance – Cards

II. Heart Rate?

What? # beats per min

< 60 (slow) 60-100 normal > 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 ≥ 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, H₂O, 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?

Here! Large, systemic arteries!

RA = Right atrium
RV = Right ventricle
LA = Left atrium
LV = Left ventricle

LS 1991 fig 8-2 p 225.
Pressure-recording device

Inflatable cuff

Stethoscope

LS 2006 fig 10-7a p 282.
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

- Stage 2 Hypertension
- Stage 1 Hypertension
- Prehypertension
- Normal Blood Pressure

Death!
# Blood Pressure Categories

<table>
<thead>
<tr>
<th>BLOOD PRESSURE CATEGORY</th>
<th>SYSTOLIC mm Hg (upper number)</th>
<th>DIASTOLIC mm Hg (lower number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>LESS THAN 120</td>
<td>LESS THAN 80</td>
</tr>
<tr>
<td>Elevated</td>
<td>120 – 129</td>
<td>LESS THAN 80</td>
</tr>
<tr>
<td>High Blood Pressure (Hypertension) Stage 1</td>
<td>130 – 139</td>
<td>or</td>
</tr>
<tr>
<td>High Blood Pressure (Hypertension) Stage 2</td>
<td>140 OR HIGHER</td>
<td>or</td>
</tr>
<tr>
<td>Hypertensive Crisis</td>
<td>HIGHER THAN 180</td>
<td>and/or</td>
</tr>
</tbody>
</table>

Published November 13, 2017

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 overindulge! Dietary Approaches to Stop Hypertension, plant-based Mediterranean diet w/plenty of vegetables, fruits, whole grains & non-/low-fat dairy to ensure much Ca^{2+}, K^{+} & 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