INTRODUCTION TO PHYSICAL EXAMINATION OF THE HEART

1. INSPECTION (looking)

1. Jugular venous pulse (JVP):
   - ACxVy
   - A: Atria contract; blood flows back briefly into the vena cava
   - C: Closure of tricuspid valve stops forward flow of blood
   - x: Downslope as atria begin to fill
   - V: Volume of atria increases with filling, causing increased pressure in vena cava
   - y: Downslope as tricuspid valve opens and ventricles begin to fill

   Location: near (superficial JV) and under (deep JV) the sternocleidomastoid muscle

   Measure: patient at 30 to 45 degrees; in cm. above sternal angle (angle of Louis)

   Abdominojugular reflux (also called hepatojugular reflux - HJR): pressure on epigastrium briefly increases JVP. Accentuated in right heart failure.

2. Heart: easily visible heart pulsation is unusual; visible pulsation in multiple rib interspaces is abnormal.

3. Exam from this point on: warm hands, patient supine, examiner on patient’s right.

2. PALPATION (touching)

1. Location of heart:
   - Right ventricle: anterior
   - Left ventricle: left heart border
   - Right atrium: right heart border
   - Left atrium: posterior

2. PMI - Point of Maximum Impulse: palpable contraction of left ventricle (LV)
   - Location: around 5th intercostal space in midclavicular line; lower and more medial in slender patients or patients with emphysema
   - Size: one interspace; approximately dime-size
   - Duration: brief (longer is “sustained”)
   - Intensity: not strong (if intense, a “lift” or “heave”)
   - Not always palpable: about 75% of people have palpable PMI

3. Palpation of parasternal area and base:
**Lifts:** in parasternal area (left sternal border) may mean right ventricular hypertrophy (thickening)

**Thrills:** palpable heart murmur (murmurs are graded I/VI to VI/VI; thrill = IV/VI)

3. **PERCUSSION:** estimates heart size. Adds little to PMI

4. **AUSCULTATION:** (listening)

Use both bell (low pitched sounds such as S3 and S4 gallops) and diaphragm (high pitched sounds, including S1, S2 and most murmurs). LIGHT touch with bell.

**Locations:** at least four:

- **Aortic or RSB:** right 2nd intercostal space (just under and right of angle of Louis)
- **Pulmonic or LUSB:** left second intercostal space, just left of sternum
- **Tricuspid or LLSB:** left fourth intercostal space
- **Mitral or Apex:** 5th intercostal space in midclavicular line

Optional: left 3rd intercostal space

**Location notes:**
1. Valves are not always noisiest in their assigned areas
2. Loud murmurs may be in several areas and difficult to localize
3. Named area is direction of flow, not location of valve

**Sounds:** lub-dub = S1-S2

- **S1:** Mitral and tricuspid (atrioventricular or AV) valves closing
  - Loudest at apex
  - Usually single

- **S2:** Aortic and pulmonic valves (semilunar) closing
  - Loudest at base (top of heart is base)
  - Usually splits with inspiration this is audible only in pulmonic area
  - Combines sounds of closing Aortic (A2) and Pulmonic (P2) valves
  - Aortic is louder; can distinguish Pulmonic (P2) at LUSB - its area
  - Pulmonic closes later than aortic in inspiration - thus split then

**Rhythm:** should be regular, but often normal **sinus arrhythmia:** slower in expiration
A few sounds that are often abnormal (but may be heard in healthy people): S3 and S4
(Both occur in diastole and are heard at the apex)

S3: Rapid ventricular filling just after aortic valve closes and mitral valve opens,
i.e. just after S2; low pitched (hear with bell)
May be a sign of a flaccid ventricle, e.g. congestive heart failure

S4: Atrial contraction fills ventricle rapidly just before mitral valve closes,
i.e. just before S1; low pitched (hear with bell)
Heard if left ventricle is stiff: from high blood pressure, heart attack, etc.

Murmurs: How to describe them

1. Timing:

   Systolic: Between S1 and S2
   If unsure: check carotid pulse and/or palpate PMI. Both of these occur
during systole.
   Most common murmurs occur in systole
   Can be early systolic, late systolic or holosystolic (all of systole)

   Diastolic: After S2

2. Intensity (Loudness):

   I/VI: Need quiet room and trained ear to hear

   II/VI: Audible to anyone who listens attentively

   III/VI: Loud, but not palpable

   IV/VI: Like III, but with a palpable thrill

   V/VI: Audible with stethoscope placed perpendicular to chest wall

   VI/VI: Audible without a stethoscope

3. Quality:
“shape” of murmur: Diamond-shaped, constant intensity
Can be musical, blowing, harsh

4. Location (see above)

A FEW COMMON MURMURS:

SYSTOLIC:

Innocent (flow) murmur:
II/VI or softer, blowing, diamond-shaped, at pulmonic area

Mitral insufficiency/ regurgitation (leaky valve)
Holosystolic, blowing, constant intensity
Loudest at apex; often radiates to axilla

Aortic stenosis:
Diamond-shaped; somewhat harsher quality
Usually loudest at aortic area (though sometimes in tricuspid area)
If worse, may have S4, too

Mitral valve prolapse:
Classically preceded by one or more clicks in midsystole
Murmur (if present) follows – is late systolic
Heard at apex
Common in slender young women – usually benign

DIASTOLIC

Aortic insufficiency/regurgitation:
Blowing
Loudest in aortic or tricuspid areas
Louder if patient squats or clenches hands

RUB:

Leathery sound made by pericardial friction
Often has 3 components
Sometimes louder with position change (e.g. sitting up)