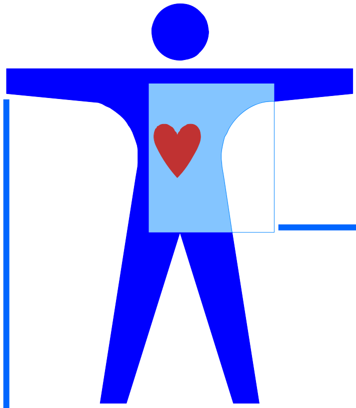
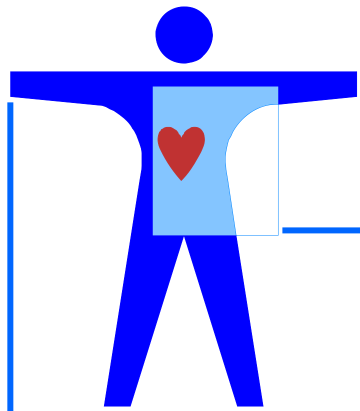


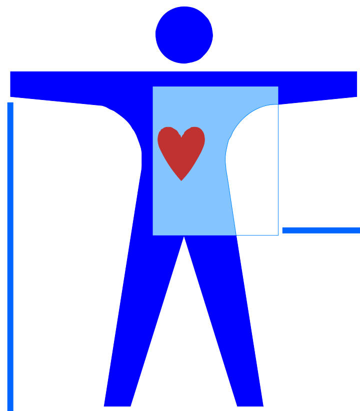
Coronary Artery Disease

Presenter: Cam Cook



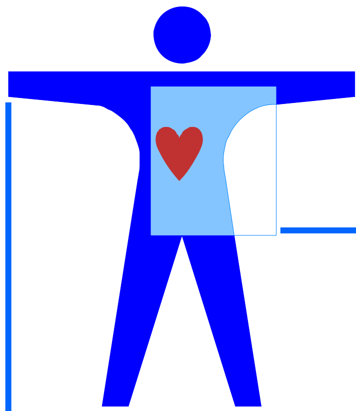
Coronary Artery Disease

Coronary
Artery
Anatomy



Coronary Artery Disease

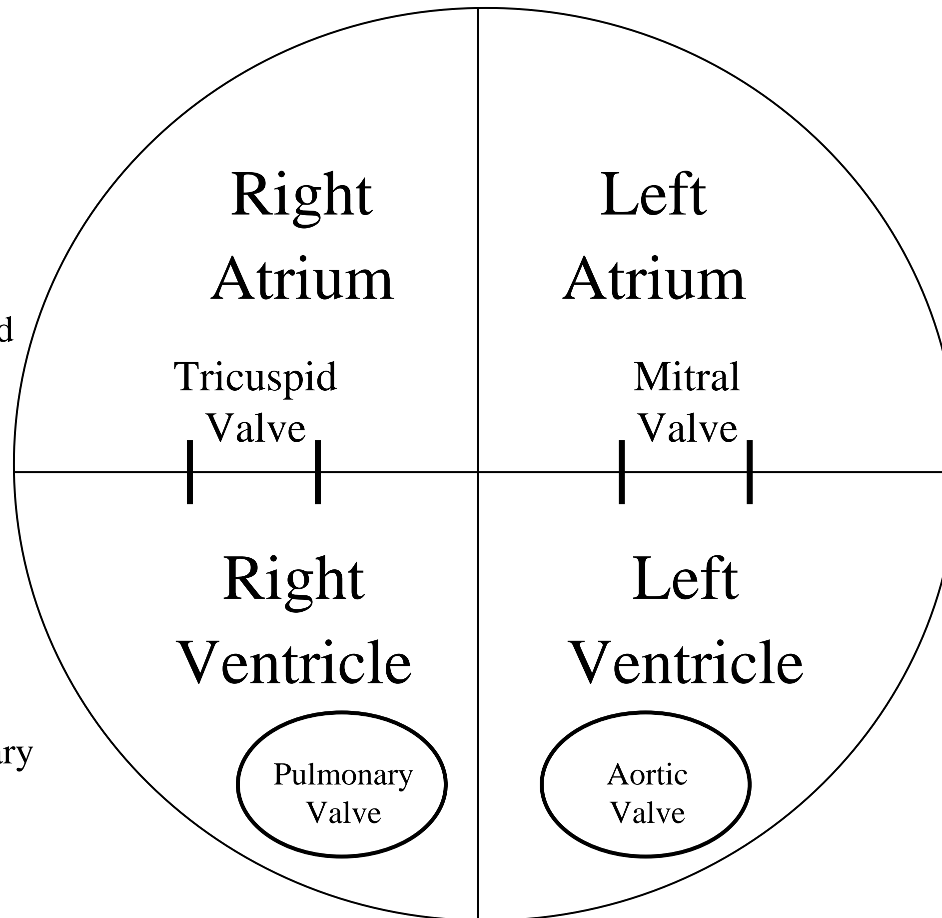
- The heart is a pump!
- The arteries are the gas supply!
- Without gas, the pump fails!



The Heart is a 4-Chamber Pump

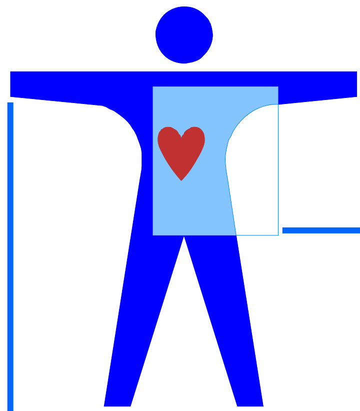
Oxygen depleted blood comes in from the body into the right atrium and then enters the right ventricle via the tricuspid valve

Oxygen enriched blood returns from lungs into the left atrium then enters the left ventricle via the mitral valve



Oxygen depleted blood is pumped by the right ventricle, to the lungs, exiting via the pulmonary valve

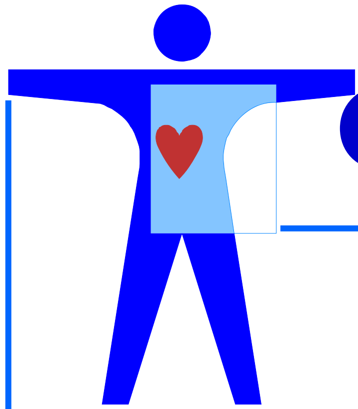
Oxygen enriched blood is pumped to the body by the left ventricle, exiting via the aortic valve into the aorta



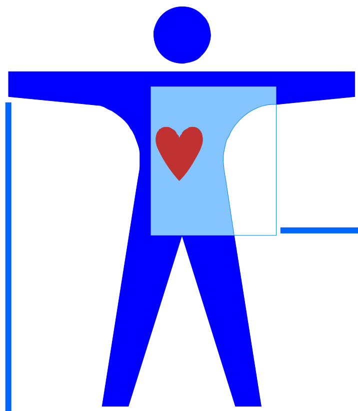
Coronary Artery Disease

Cardiac Blood Supply

- The heart has two coronary arteries
- The left and the right
- The left main divides into the:
  - left anterior descending
  - left circumflex
- Collateral blood flow can sometimes provide supply from one artery to an area normally covered by another artery via “branches”



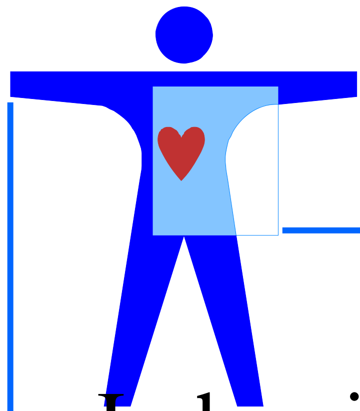
Coronary Artery Anatomy



Coronary Artery Disease

What is CAD?

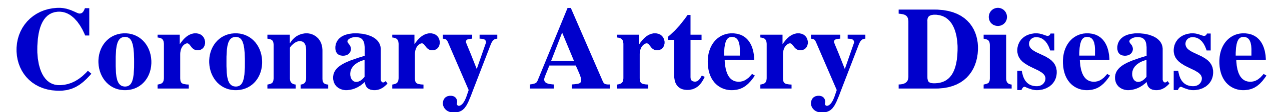
- The temporary or permanent occlusion (blockage) of the coronary arteries depriving the heart of oxygen
- The longer the occlusion lasts, the greater the amount of cell death - *myocardial infarction*



Coronary Artery Disease

Ischemia has varying significance depending on:

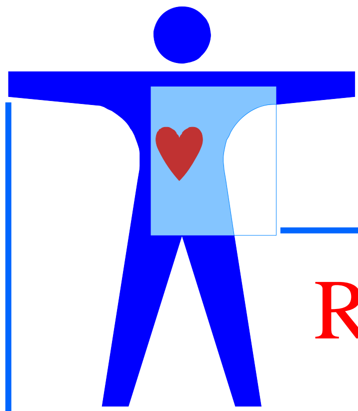
1. The extent of the disease
   - how many arteries?
   - which arteries?
   - how blocked are they?
   - where are the blockages?
2. Left ventricular function
   - how much heart damage has been done?



Coronary Artery Disease

The morbidity and mortality increases as:

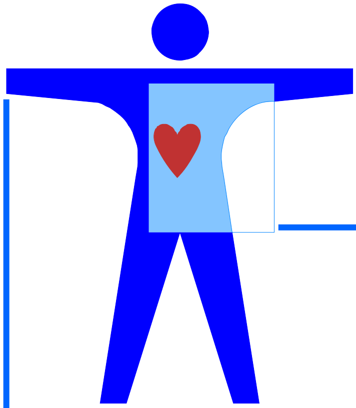
1. The degree LV function decreases
2. The number of diseased vessels increases
3. The degree of blockage increases
4. The occluded area lengthens
5. The proximity to the beginning of the artery shortens
6. Other coronary risk factors and/or co-morbidities increase



Coronary Artery Disease

Risk Factors (Similar to CVA/TIA)

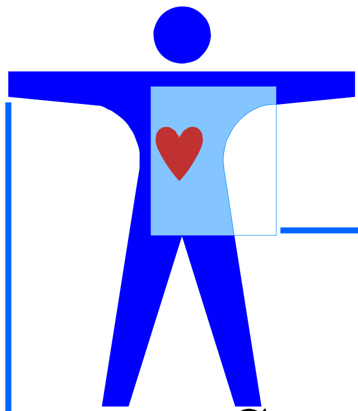
- Age
- Sex
- Family History
- Tobacco Use
- Build
- Blood Pressure
- Cholesterol
- Exercise Patterns
- Other CV Diseases
- Diabetes
- Arrhythmia
- LVH or Aneurysm



CAD also greatly

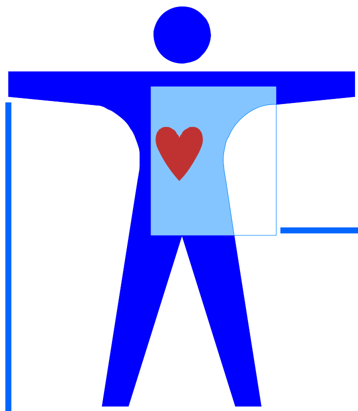
INCREASES the risk of

STROKE



Coronary Artery Disease

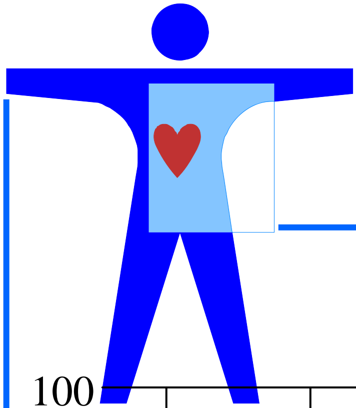
- Symptoms
  - angina/chest pain
  - cause of symptoms
  - relief of symptoms
- Tests
  - Stress EKG (electrical changes/functional capacity)
  - Thallium (distribution or flow patterns)
  - Echocardiogram (mechanical function)
  - Catheterization (flow and function)



Coronary Artery Disease

Testing Problems

- Probability (false positive or negative)
- Technical problems
- Individual anomalies
- Technician interpretation



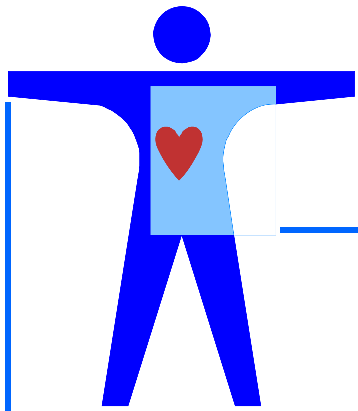
Coronary Artery Disease

Probability Chart

Coronary Artery Disease

Stress Testing Factors

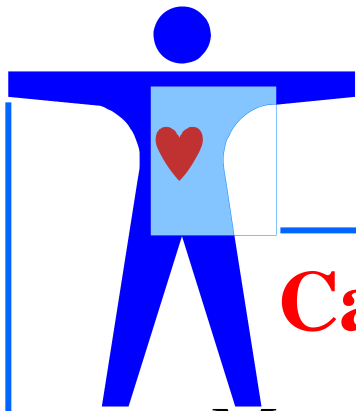
- ST depression (≥1.0 mm increases probability of disease)
- The lower the heart rate at which ST depression occurs, the worse the disease
- Blood pressure of heart rate decreases while workload increases correlates with more severe disease
- The longer after "recovery" to return to baseline, the worse the disease
- Low functional capacity (METS, Double Product) correlates with more severe disease



Coronary Artery Disease

Thallium Tests

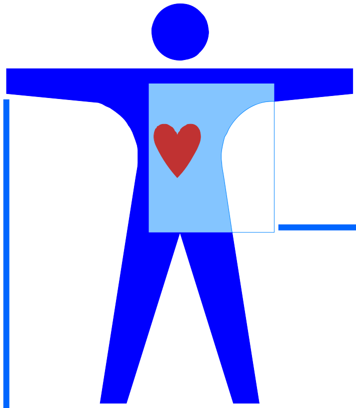
- More accurate than stress EKG
- The greater the "defect(s)" the worse the disease
- Ventricular dilation or aneurysm increases risk
- A negative thallium reduces but does not eliminate the possibility of CAD (laws of probability apply)



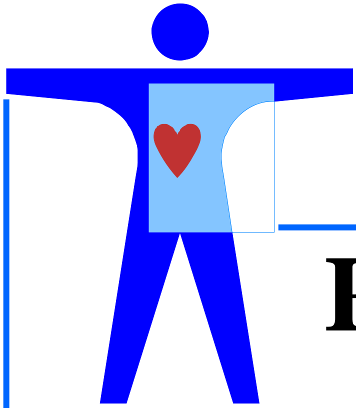
Coronary Artery Disease

Cardiac Catheterization (gold standard)

- Measures both flow and function
  - estimates degree of artery blockage
  - estimates ventricular function (E.F. and LVEDP)
  - regional/global wall motion
- Worse to best (in terms of mortality) artery blockage
  - left main, LAD then RCA or CIR
- LV function:
  - The lower the E.F., the worse
  - The higher the LVEDP, the worse
  - Fall of E.F. while exercising is very bad
- Wall motion
  - The greater the reduction in wall motion, the worse the risk



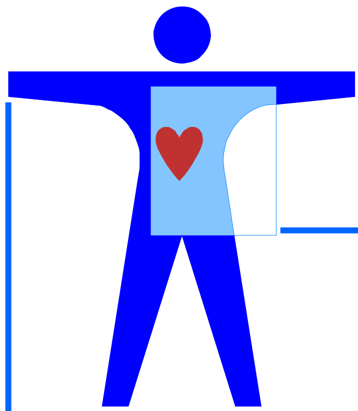
“Generic” Diagnosis / Evaluation of C.A.D.



Primary goal is to CLASSIFY risks according to the PROBABILITY of LIFE ENDING AND/OR DISABILITY EVENTS

or

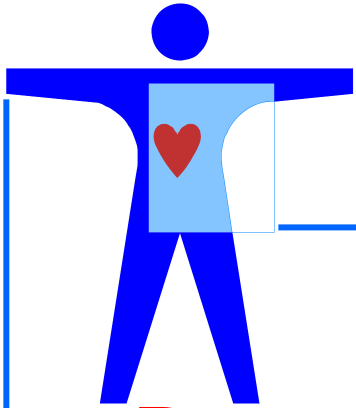
Increased co-morbidities such as STROKE or REDUCED MENTAL CAPACITY



Basic CAD Classification

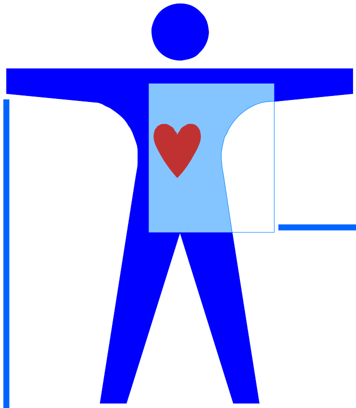
Step I - Classify

Step II - Debit/Credit



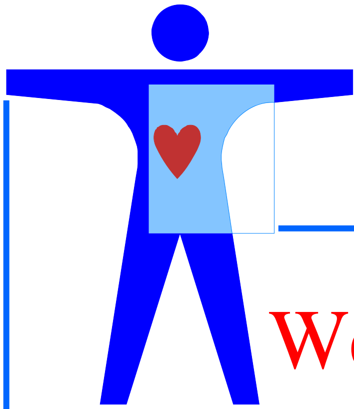
Recap, in Diagnosis you can:

1. First, put an applicant into the basic *functional class*
2. Second, up them into an age and *Vessel category*
3. Third, *credit* or *debit* according to outcome determinants (risk factors)



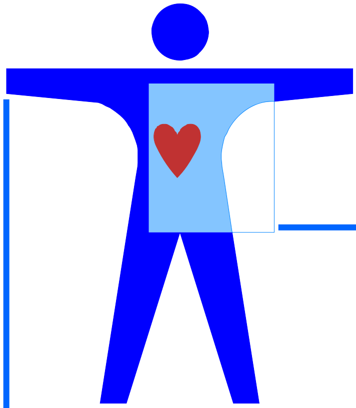
PROBLEM

We don't always have all information needed to classify accurately!

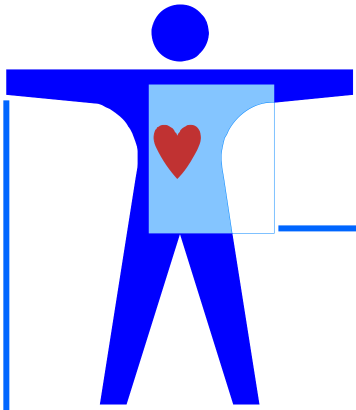


We tend to find out cases fall into one of three categories:

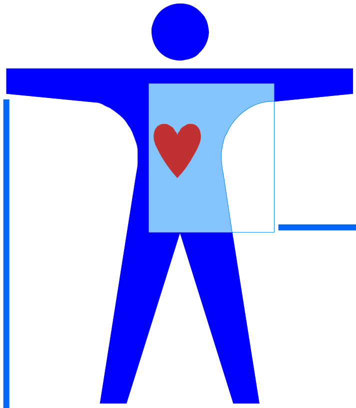
1. Full information including sophisticated testing (well insured, city, middle or upper social/economic class, etc.)
2. Partial information (history, EKG) tend to be middle class, middle age, small town, limited insurance, etc.
3. **Very limited information** (female, older ages, lower social/economic class)



How do you classify an applicant where you cannot get detailed information or where the person has not had the sophisticated testing?



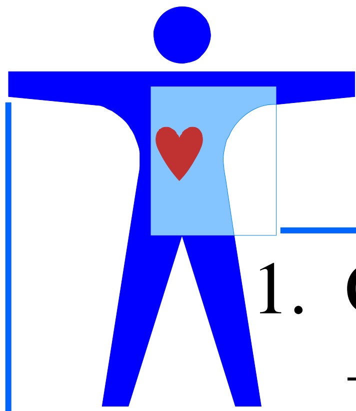
1. Go back to the NYHA and CCS classification systems or work off of symptoms and functional capacity.
2. If you have EKG's, supplement by looking at the EKG leads where ischemic changes are present and resting EKG instruction for each angina, CAD, or surgery section.



Handout

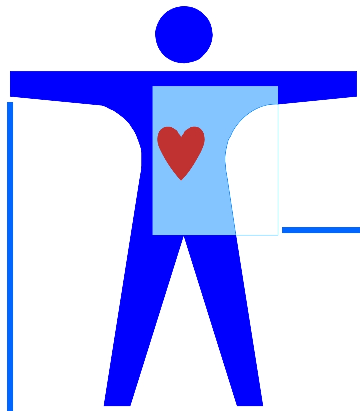
CLASSIFICATION SYSTEMS

for CAD



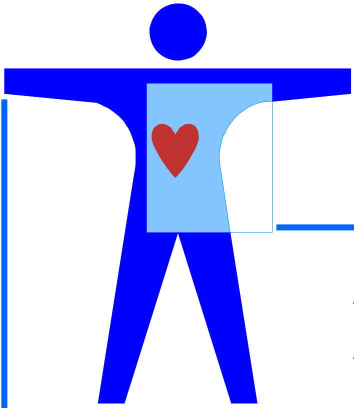
For CAD, Risks Can Be Classified By:

1. Class or severity (Functional Capacity)
   – E.F. $\geq$ 55% / LVEDP $\leq$ 12
   – MET Level / NYHA Activities
   – Vessels (which, how many, nature of lesions)
2. Time/Stability
   – Time since recovery
   – Progression (recent tests and symptoms)
3. Co-Morbidities or Risk Factors
   - Tobacco
   - Arrhythmia's
   - Diabetes
   - Blood Pressure & Build
   - Medications
   - Lung Disease
   - Cognition
   - Activity
   - PVD or CVA Risk



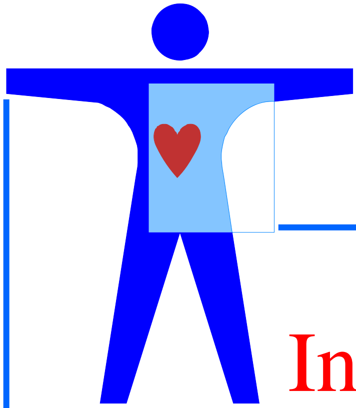
Cardiac class is largely determined by FUNCTIONAL CAPACITY:

- How well is the pump working?
- How much damage has been done to the muscle?
- How much oxygen is getting to the muscle?
- What are the Symptoms/Capabilities?



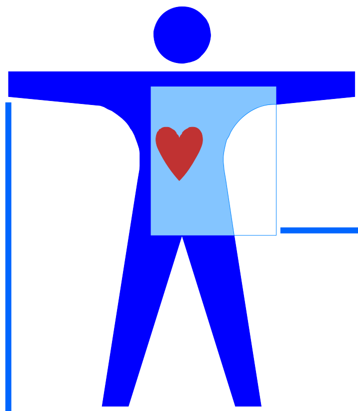
Number of Vessels Classification is done by attempting to determine the nature of the occlusions:

- Number of occluded vessels?
- Which vessels are occluded?
- The nature of the occlusions?
  - proximal vs. distal
  - length of lesion
  - nature of lesion



In order to properly determine risk, we also factor in outcome determinants such as:

- Smoking and exercise patterns
- Blood Pressure, cholesterol, build
- Presence of DM or other CV disease
- Quality of medical care



Diagnosis Recap

- Determine category/class
  - by test results (cath, thallium, etc., as available)
  - by symptoms (NYHA and CCS) if tests unavailable
- Factor in other impairments/co-morbidities
- Factor in credits or debits

Diagnosis Recap

Use this information to help shape both your questioning and your decision-making!

Follow the Underwriting Manual as written.

When in doubt, ask your Underwriting Manager, Chief Underwriter or Underwriting Vice President.