

Heart Matters

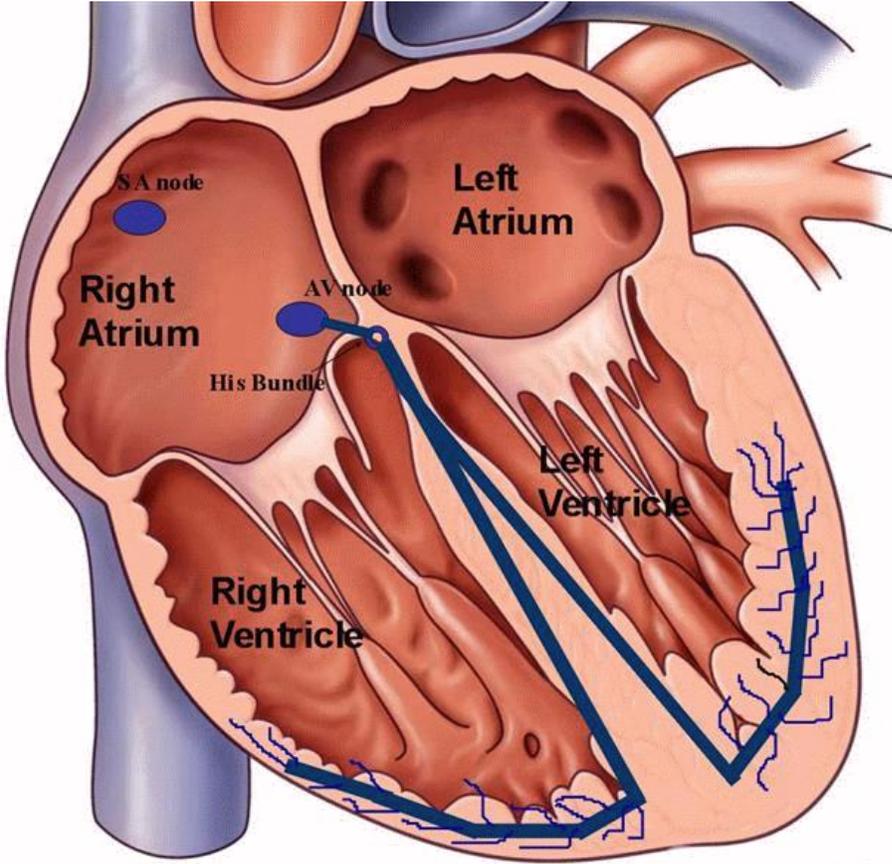
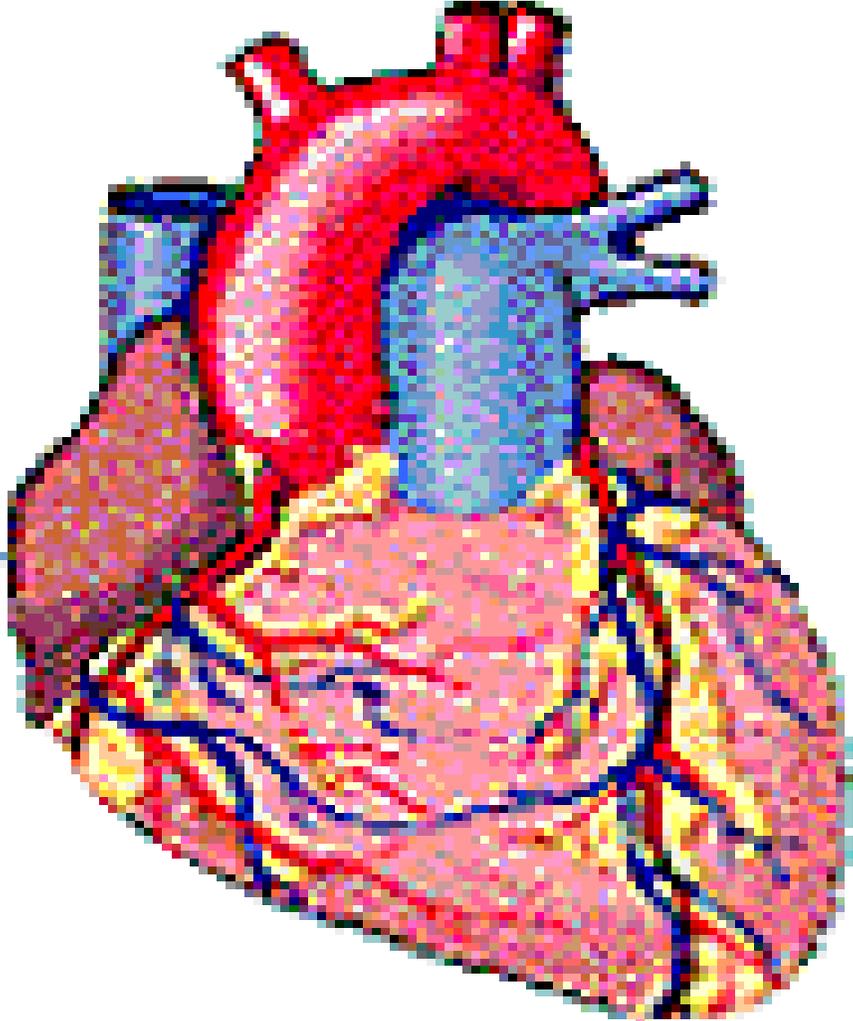
Bibiana Cujec MD, FRCPC



Outline

- Heart structure and function
- Risk factors for heart disease
- Cardiac tests
- Common heart problems
 - Coronary artery disease and heart attacks
 - To be distinguished from stroke and cardiac arrest
 - Heart failure
 - Valve problems
 - Rhythm problems
- Prevention of heart disease

The heart is a pump that beats 60-100 bpm at rest

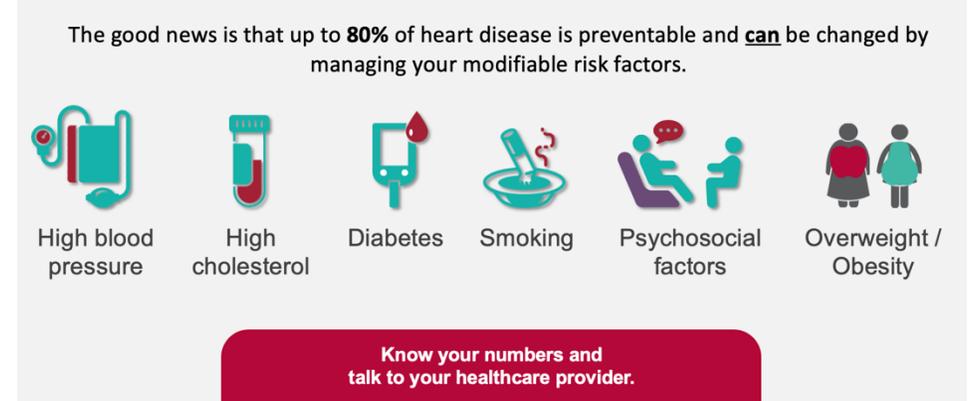


Risk factors for heart disease

- **Increasing age**
- Male sex
- Family history of heart disease <55 years of age (M), <65 years of age (F)
- Congenital heart disease
- Prior chemotherapy or chest radiation

- Hypertension (BP>140/90)
- Diabetes (HbA1c>6.5%)
- High cholesterol (LDL>2.0 mmol/L)
- Smoking
- Toxins such as alcohol, cocaine, methamphetamines

The good news is that up to **80%** of heart disease is preventable and **can** be changed by managing your modifiable risk factors.



The infographic features six icons representing modifiable risk factors: a blood pressure cuff for high blood pressure, a test tube for high cholesterol, a glucose meter for diabetes, a lit cigarette for smoking, two people talking for psychosocial factors, and two stylized figures for overweight/obesity.

High blood pressure High cholesterol Diabetes Smoking Psychosocial factors Overweight / Obesity

Know your numbers and talk to your healthcare provider.

Common heart tests when heart disease is suspected

- ECG
- CXR
- Holter monitor (continuous heart rhythm recording)
- Stress test
- Echocardiogram
- Coronary angiography
- CT scan for coronary artery calcium score
- Cardiac MRI
- Blood tests
 - Troponin—test for heart damage
 - BNP—test for heart failure

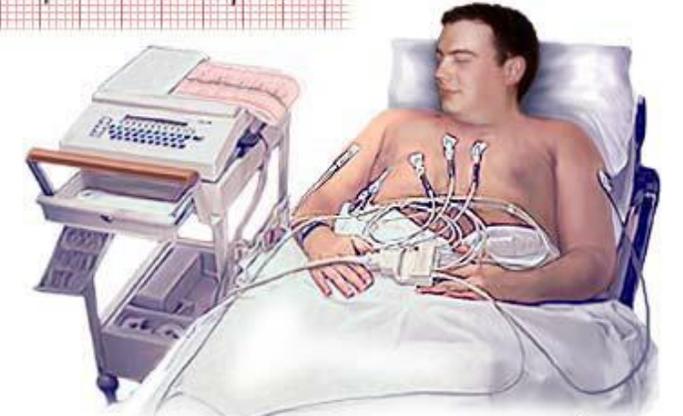
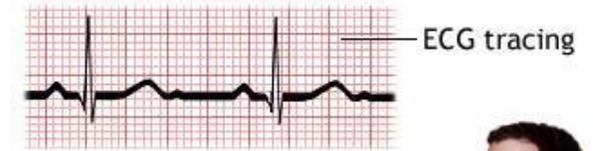
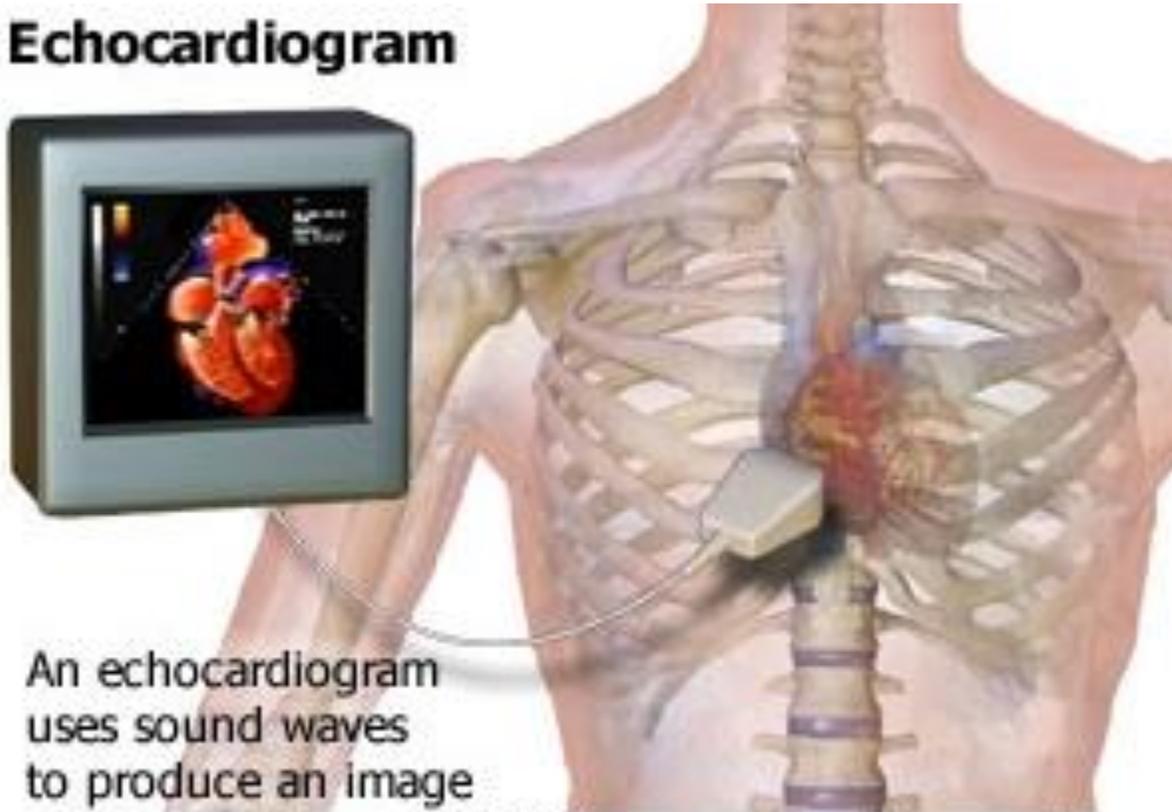


Illustration of a patient getting an ECG. 



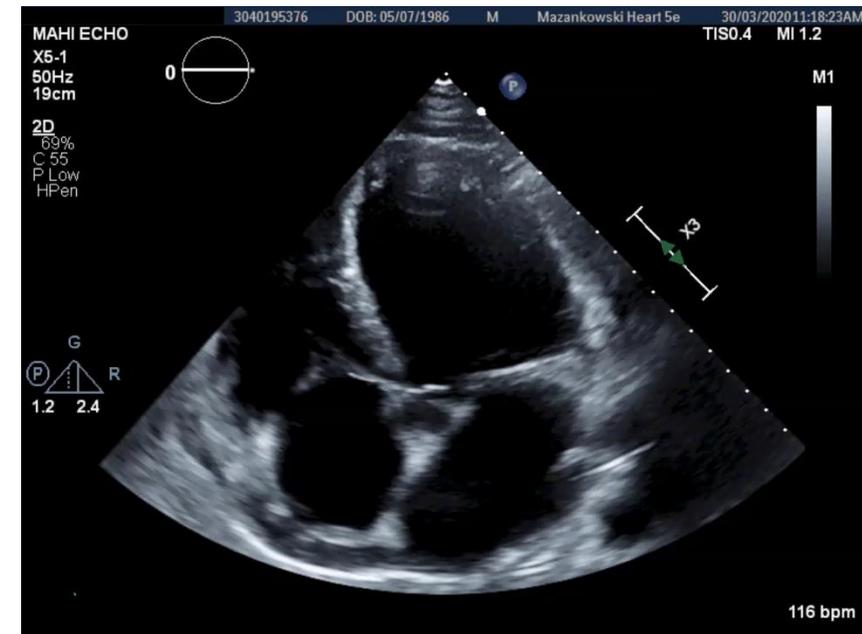
Echocardiogram: Ultrasound to visualize heart structure and function

Echocardiogram



An echocardiogram uses sound waves to produce an image of the heart

© 2004 - HeartCenterOnline.com

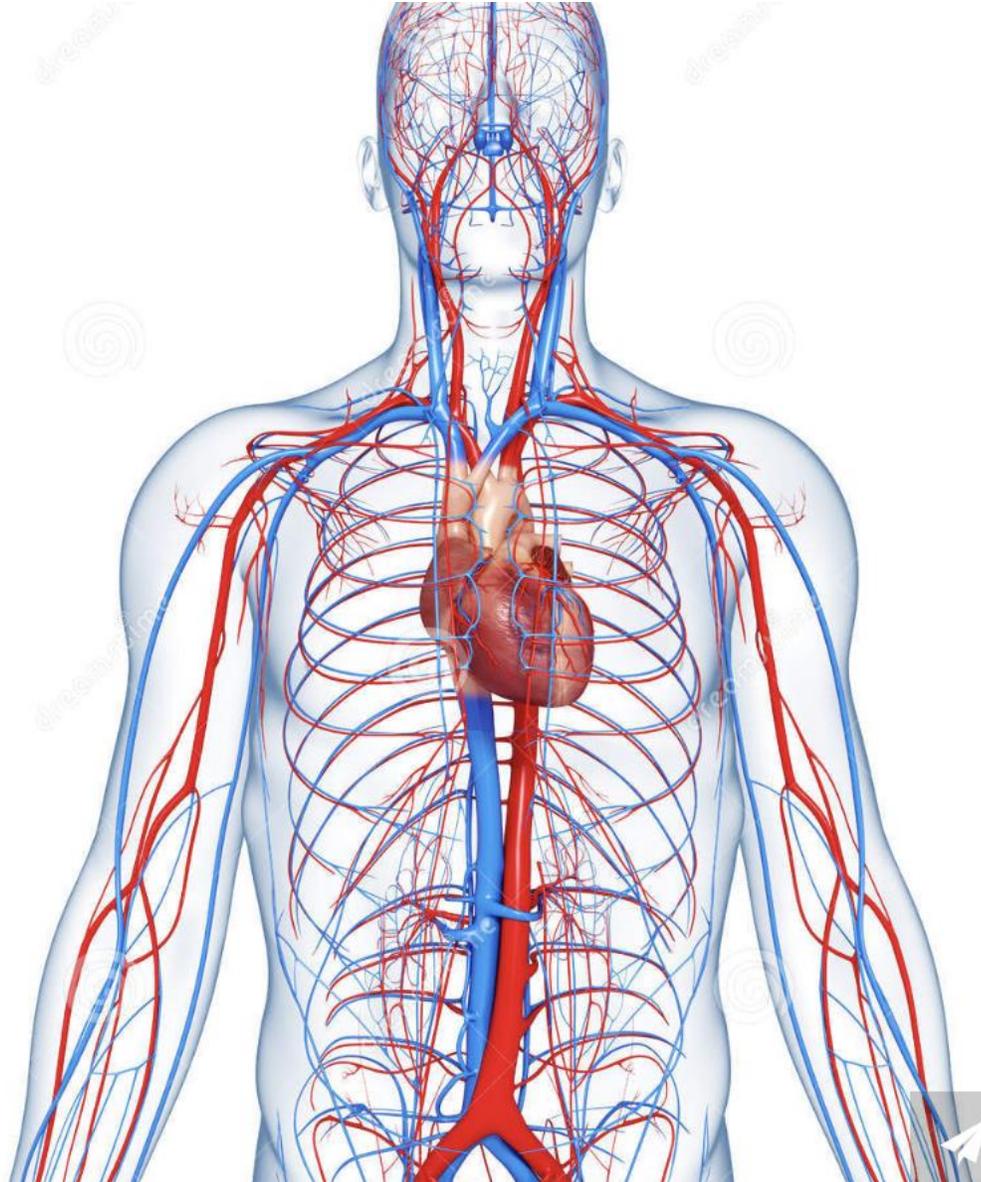


Heart problems



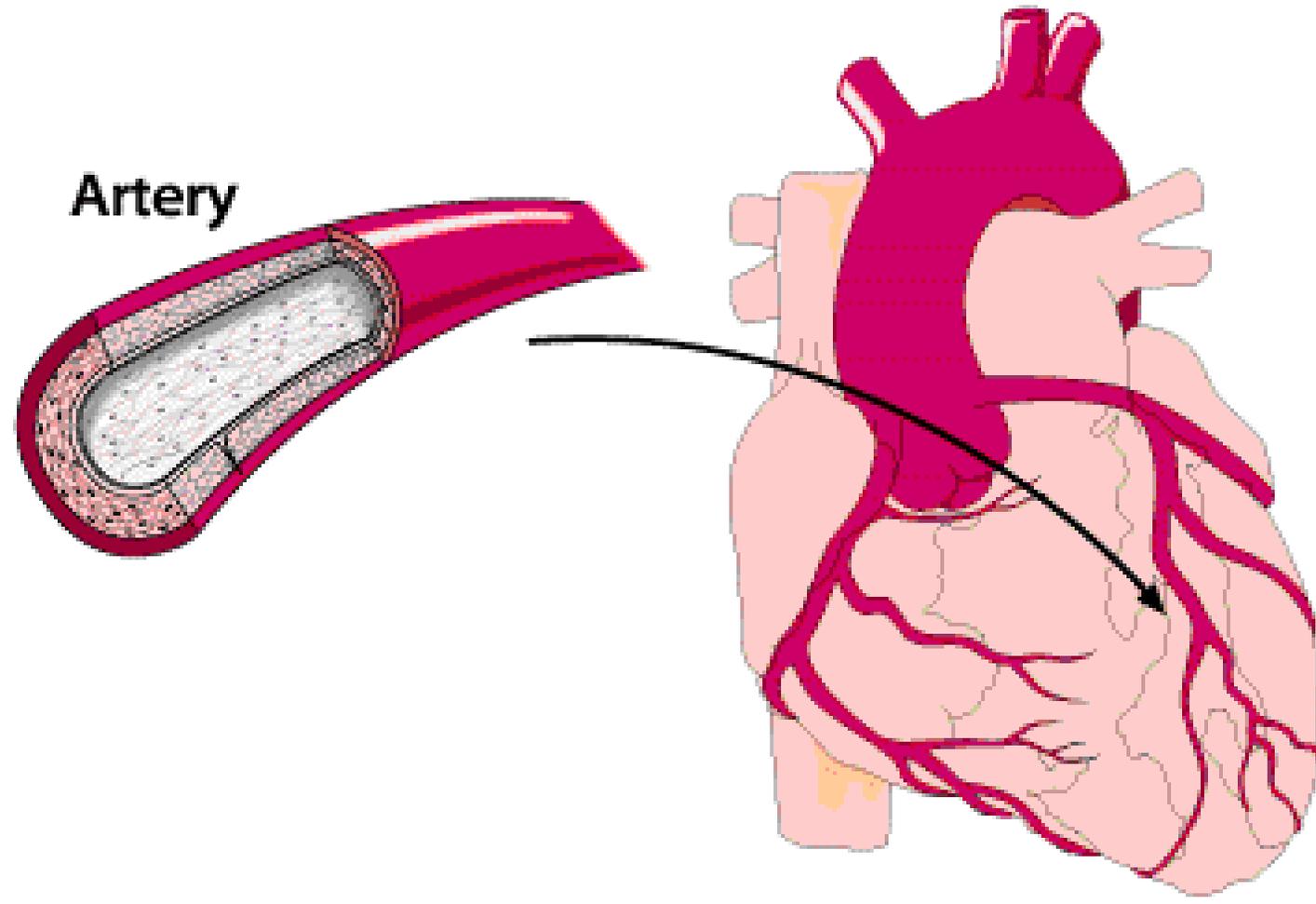
- Poor blood supply (coronary artery disease): Angina and heart attack
 - Chest discomfort
- Poor heart muscle function: Heart failure
 - Shortness of breath
- Poor valve function: Heart murmur
 - Shortness of breath. May also result in chest pain and fainting
- Electrical problems: Irregular heart rhythm or very slow heart rate
 - Palpitations, fainting

Cardiovascular disease results from plaque buildup in arteries

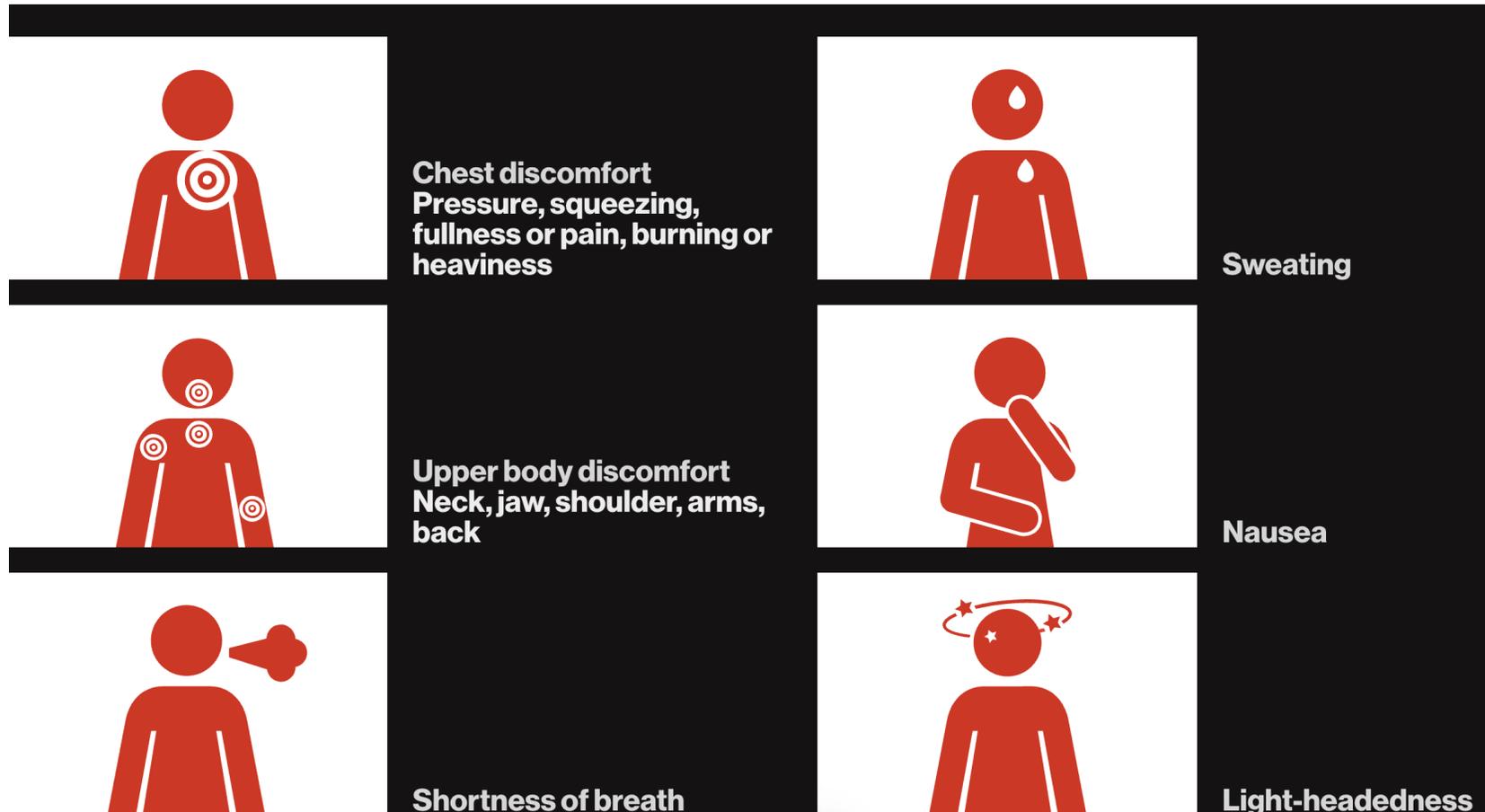


1. Coronary artery disease:
 - Heart attack (myocardial infarction)
 - Angina
 - Sudden cardiac death.Most common cause of heart failure
2. Cerebrovascular disease:
stroke/TIA
3. Peripheral arterial disease
4. Aortic aneurysm

Heart attack: Complete or partial occlusion of a coronary artery by clot in an area of cholesterol plaque



Symptoms of heart attack (myocardial infarction)



What to do if you think you're having a heart attack

1. Call 9-1-1 and shout for an AED

Or call your local emergency number right away. AED's are often in public places. The 9-1-1 operator may be able to tell you where the nearest one is.

3. Take your nitroglycerin

If you take nitroglycerin, take your normal dosage.

5. Rest and wait

Stay calm while waiting for help to arrive.

2. Stop all activity

Sit or lie down, in whatever position is most comfortable.

4. Take ASA (Aspirin)

Chew and swallow ASA (Aspirin), if you are not allergic or intolerant (either one 325 mg tablet or two 81 mg tablets).

6. Keep a list of your medications in your wallet and by the phone.

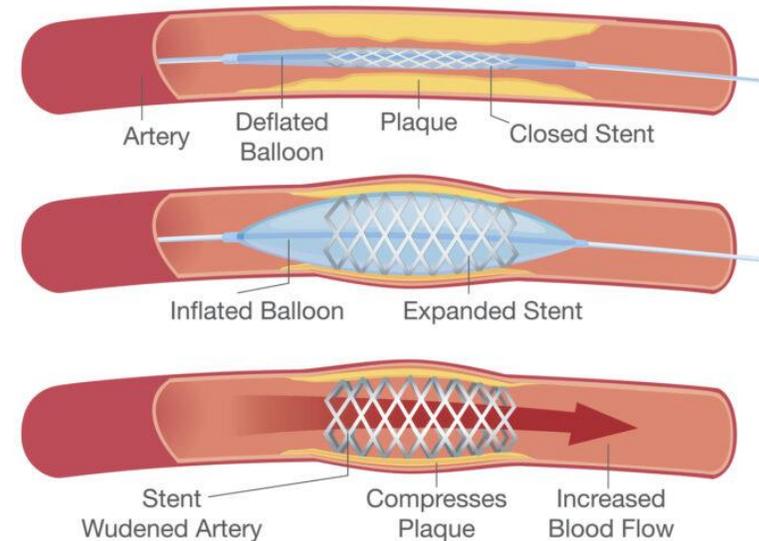
Emergency personnel will want this

Critical to open up the occluded coronary artery as soon as possible with stenting

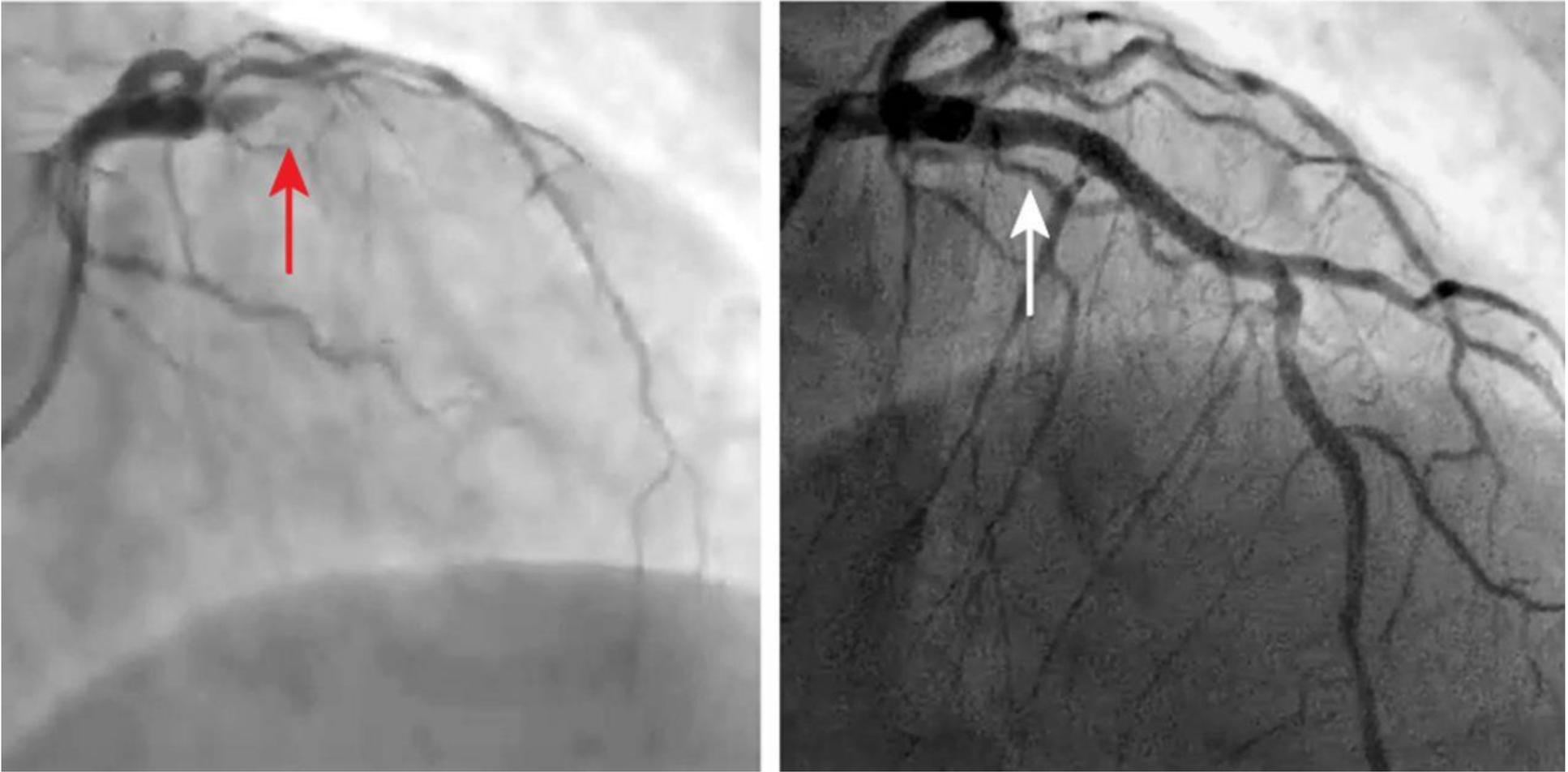
Medications

- Anti-platelet medication
 - ASA and clopidogrel or ticagrelor
- Blood thinners
 - Heparin or enoxaparin
- Fibrinolysis (Clot busters)
 - Single iv injection of TNK (<12 hours of symptom onset)

Balloon Angioplasty and Stents



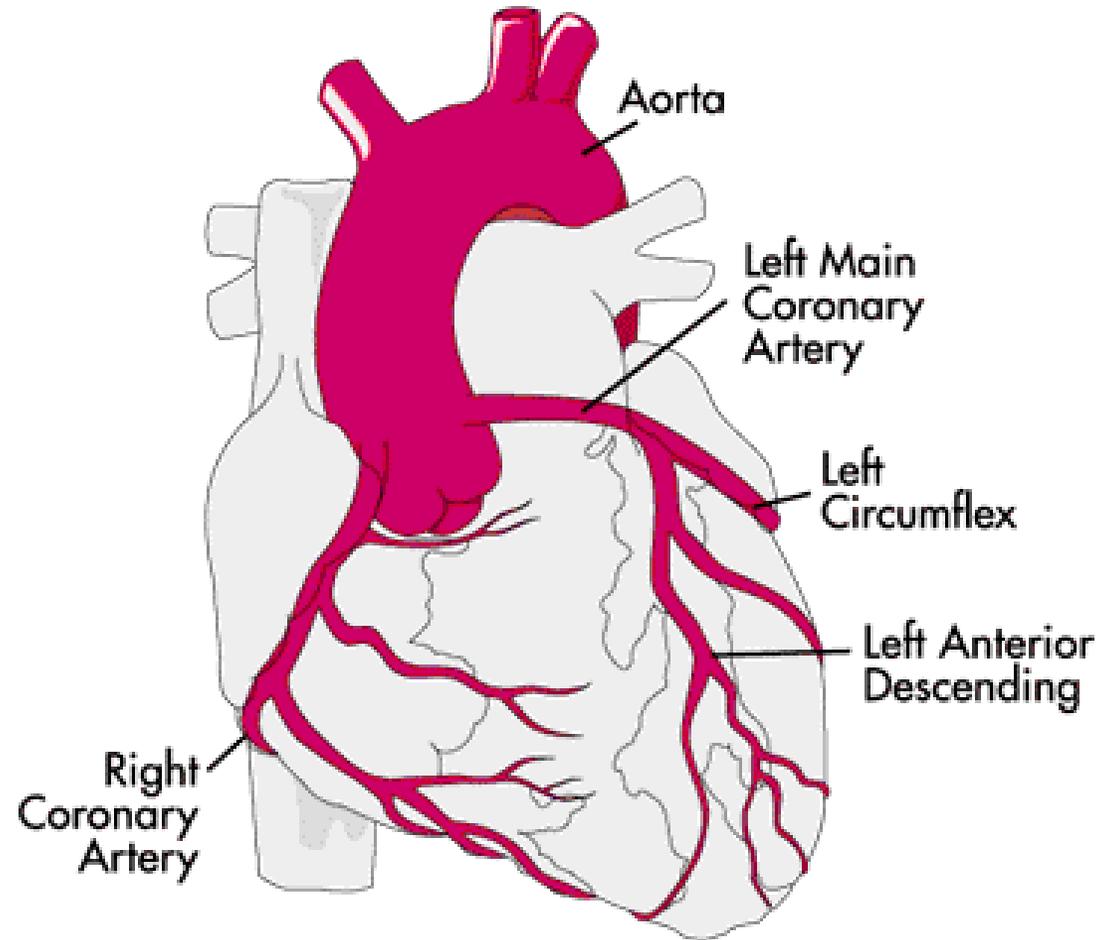
The widow-maker: Before and after stenting



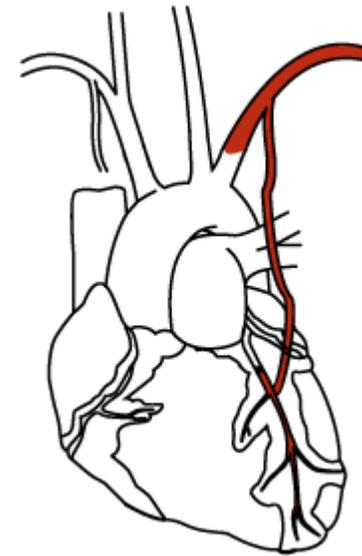
Long term medical treatment of coronary artery disease

- Antiplatelet drug (ASA 81 mg daily)
- High intensity statin (cholesterol lowering)
- Lifestyle changes: diet and exercise
- Other medications may be required
 - Treatment of hypertension and diabetes
 - Treatment of decreased heart function (beta-blocker, ACEi/ARB, aldosterone antagonist)

Coronary artery bypass surgery



Saphenous vein grafts



Excellent long term graft patency with use of LITA

Jan 2026: Lessons from a 65 year old physicist

Sunday morning after doing a spin class at the gym, I was a bit light headed. I have had some issues in the past with low blood pressure, light headedness and fainting, so I did not think a lot of it. I sat for a bit and drank some water and drove home

A short while after I got home, I started to feel some tightness across my chest and in my upper arms, some shortness of breath, and very mild nausea. None of it was very bad, but a quick google of the Mayo Clinic website indicated that these are all symptoms of heart attack. (If I had done upper body weights [which you can tell at a glance is not my style] instead of spin, I could have easily written this off as fatigue from the weights.)

Not so long ago, we had some good friends where the husband had symptoms of heart attack and the wife thought she could get treatment quicker driving him directly to Urgent Care. When she got there, Urgent Care called 911. They learned that, short of the ER, the paramedics are best equipped and trained to handle cardiac emergencies.

I called 911. The operator had me chew four baby aspirin while waiting for the paramedics to arrive. I was taken to the hospital by ambulance (but not with sirens blaring), where I got prompt attention. My treatment there indicated that I had indeed had a heart attack. Yesterday morning I had an angiogram to image my heart and stent inserted into a major coronary artery that was 80% blocked.

This was all a big surprise. I had not had a prior history of heart trouble, my cholesterol has been in the normal range for years (despite my love of butter, eggs, and meat), and there was no history of heart attack for my parents or siblings. I am home now and feeling pretty tired but semi-functional. From what I am being told, I am likely to be mostly back to normal in a few days.

The two take-aways that I hope you will remember from this long story (you may be quizzed later, but I cannot tell you when it will be):

- 1) Don't ignore heart attack symptoms, even if they seem mild or unlikely. We sadly know of another circumstance with friends where the guy lay down just to rest it off and his girlfriend found him dead later.**
- 2) Don't be shy to call 911. It is the fastest way to get treatment and it gets you in the back door with advance notice, not the triage line at the ER.**

RMO Feb 5, 2026: At the Canmore Nordic Center

VOX POPULI

Community works together to save man's life

Editor:

I have just survived a life-changing experience at the Canmore Nordic Centre and don't know where to start with my gratitude and thanks to all involved.

On Jan. 24, I was excited to ski the Rundle trail as there was a light dusting of snow on what had been an icy trail. The conditions were awesome. As I returned toward the lodge on the Banff trail, I felt the most painful crushing chest pain and collapsed in the middle of the trail.

Bystanders immediately came to my aid as I lay groaning in agony. The number of people that knew how to help was overwhelming. A fast looking racer went straight to the lodge and got them to send the quad to get me.

A local physician stayed with me and spoke on the phone to the ambulance. Conservation officers put me in the quad and stayed with me in the first aid room. Somebody knew to give me Aspirin.

The ambulance arrived, put me on the monitor and rushed me to Canmore hospital. Shortly after arriving, I went into cardiac arrest. It was brief and I was quickly revived. Due to the fast response of all involved, I was able to receive the clot-busting drug that alleviated my blocked cardiac artery.

Due to the bad weather, I went by ground ambulance to Foothills hospital.

This was not an easy drive and the paramedics kept me as stable as they could with medications enroute. Only a few hours after my initial attack, I was in the Foothills hospital waiting for an angiogram and stent. Needless to say, I survived and am able to write this letter of thanks.

Canmore is a wonderful community full of wonderful caring people. I owe my life to some of them and will never forget you.

David Percy,
Canmore

Stroke is secondary to an obstruction in an artery to the brain = “Brain Attack”

Learn the
signs of stroke

Face is it drooping?

Arms can you raise both?

Speech is it slurred or jumbled?

Time to call 9-1-1 right away.

Act **F A S T**. Lifesaving treatment
begins the second you call 9-1-1.

© Heart and Stroke Foundation of Canada, 2021.

Cardiac arrest is when the heart stops beating effectively

1 Sudden collapse

2 Loss of consciousness

3 Unresponsiveness to touch or sound

4 Not breathing or not breathing normally



1. Call 9-1-1 *and* shout for an AED

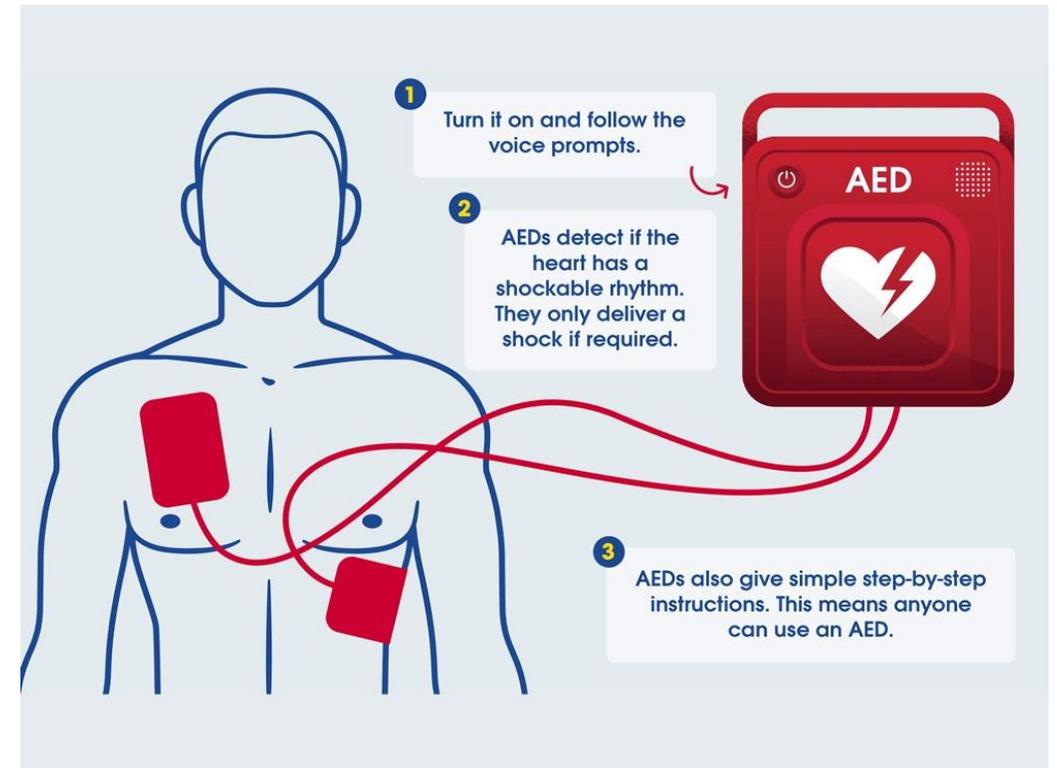
Or call your local emergency number right away. AEDs can be found in many public locations. The 9-1-1 call taker may be able to tell you or another bystander where to find the nearest AED.

3. Use an AED *as soon as one is available*

An AED, or automated external defibrillator, is a portable electronic device that's safe and easy to use.

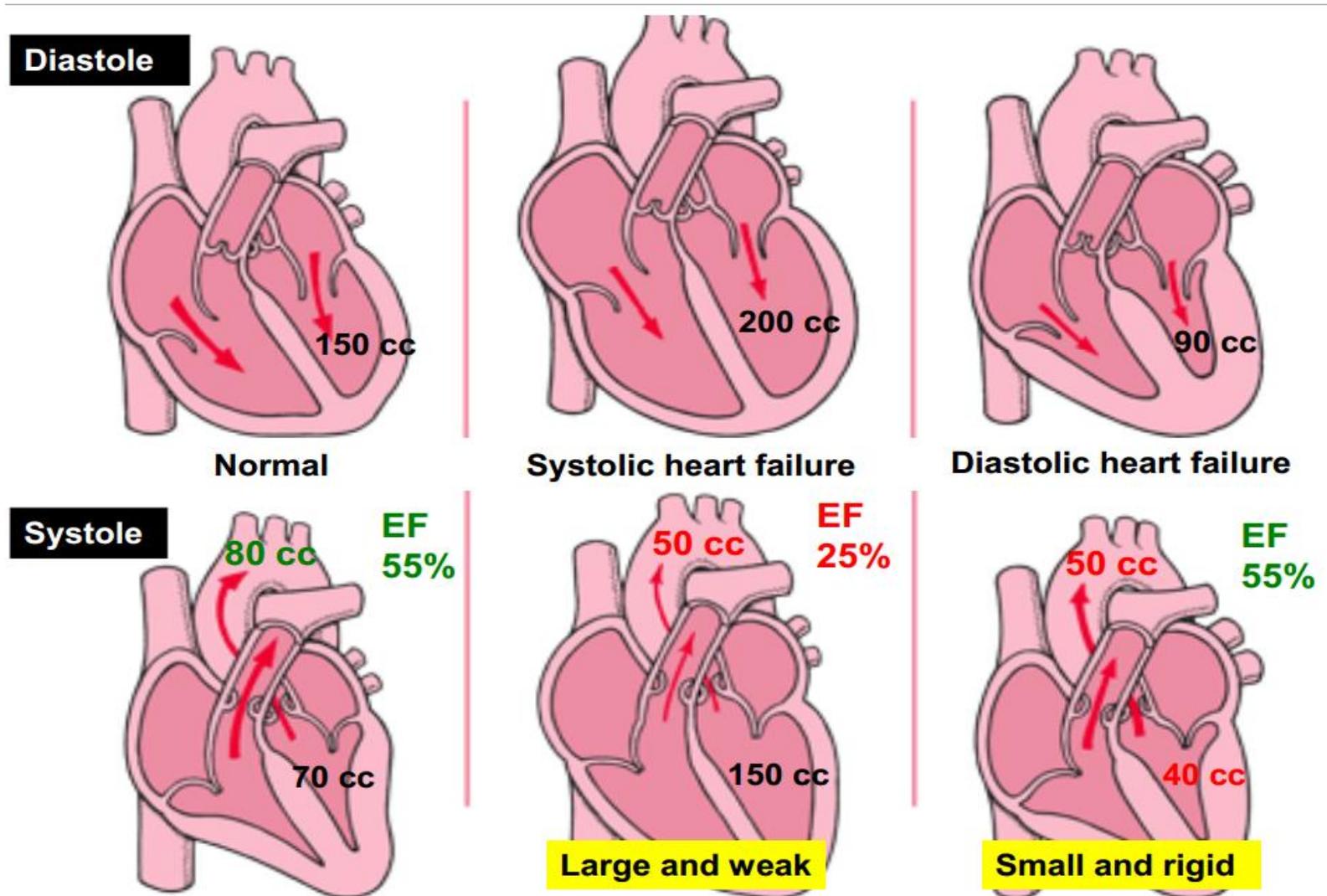
2. Start CPR right away

Push hard and fast in the centre of the chest at about 100 to 120 beats per minute. Give two breaths, if willing, after every 30 compressions, especially in emergencies involving children and infants. Doing CPR immediately, even if it's not perfect, gives the person their best chance of survival. You can't hurt, you can only help.



Who should learn CPR and how to use an AED?
Everyone should learn. Cardiac arrest is a critical medical emergency where every second counts.

Heart failure: when the heart can't pump blood effectively or can't fill properly

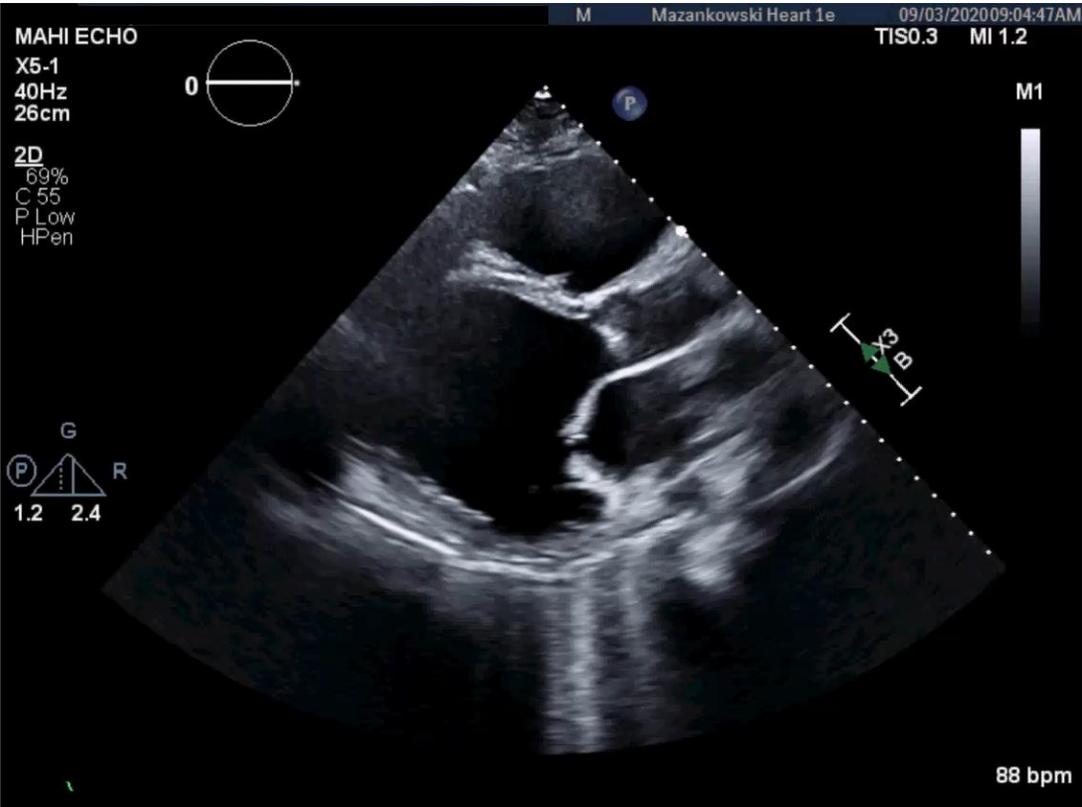


Heart Failure: Symptoms and signs

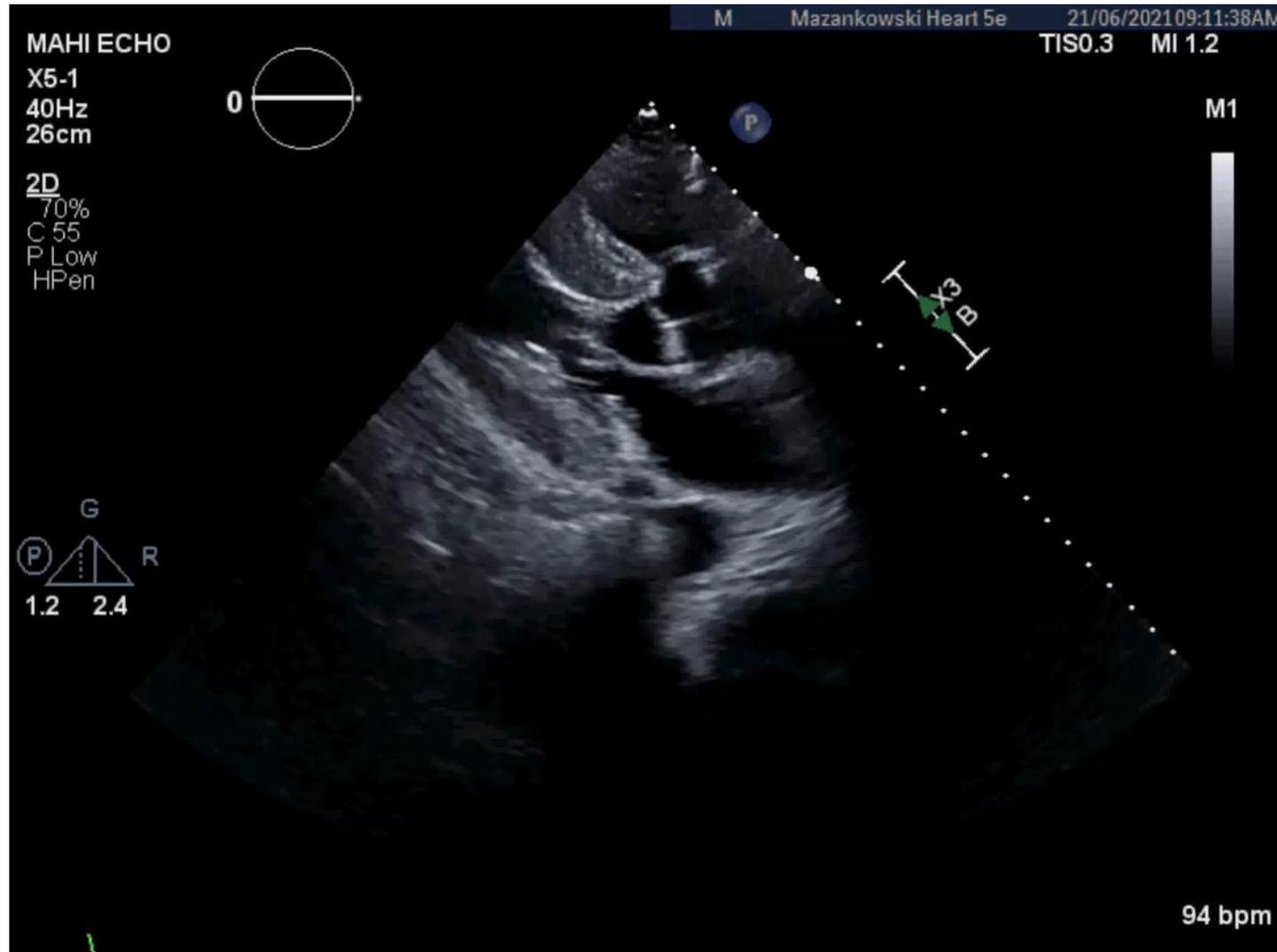
- Shortness of breath, cough
 - With exertion
 - When lying flat, during the night
- Fatigue
- Swelling because of water retention
 - Ankles, legs, generalized swelling
 - Abdominal distension
- Palpitations
- Exertional lightheadedness
- Early satiety, nausea



Heart failure from toxins (methamphetamines)



Heart failure secondary to amyloid deposition



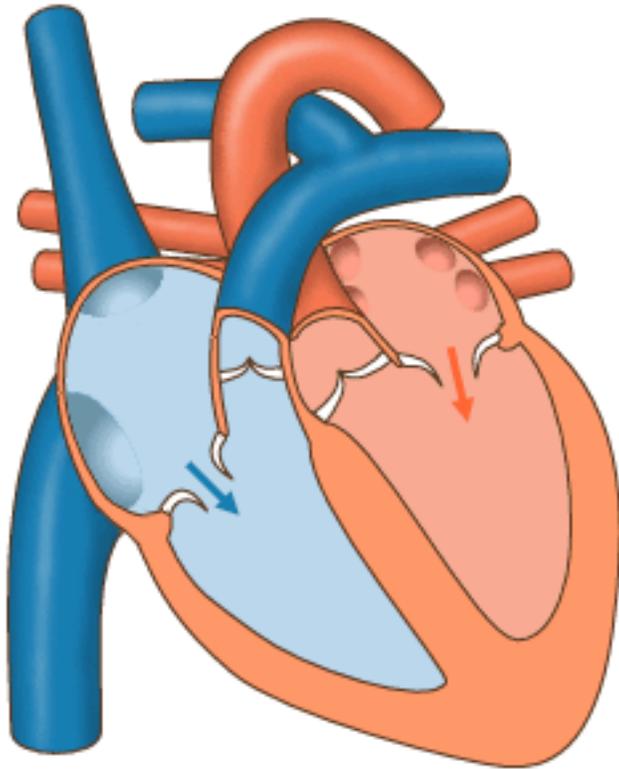
Heart Failure Treatment

Medications improve symptoms, heart function and survival

- Diuretics
- Beta-blockers
- Renin-angiotensin/neprilysin inhibitors
- Aldosterone inhibitors
- SGLT2 inhibitors
- Specialized pacemakers

Heart Valves

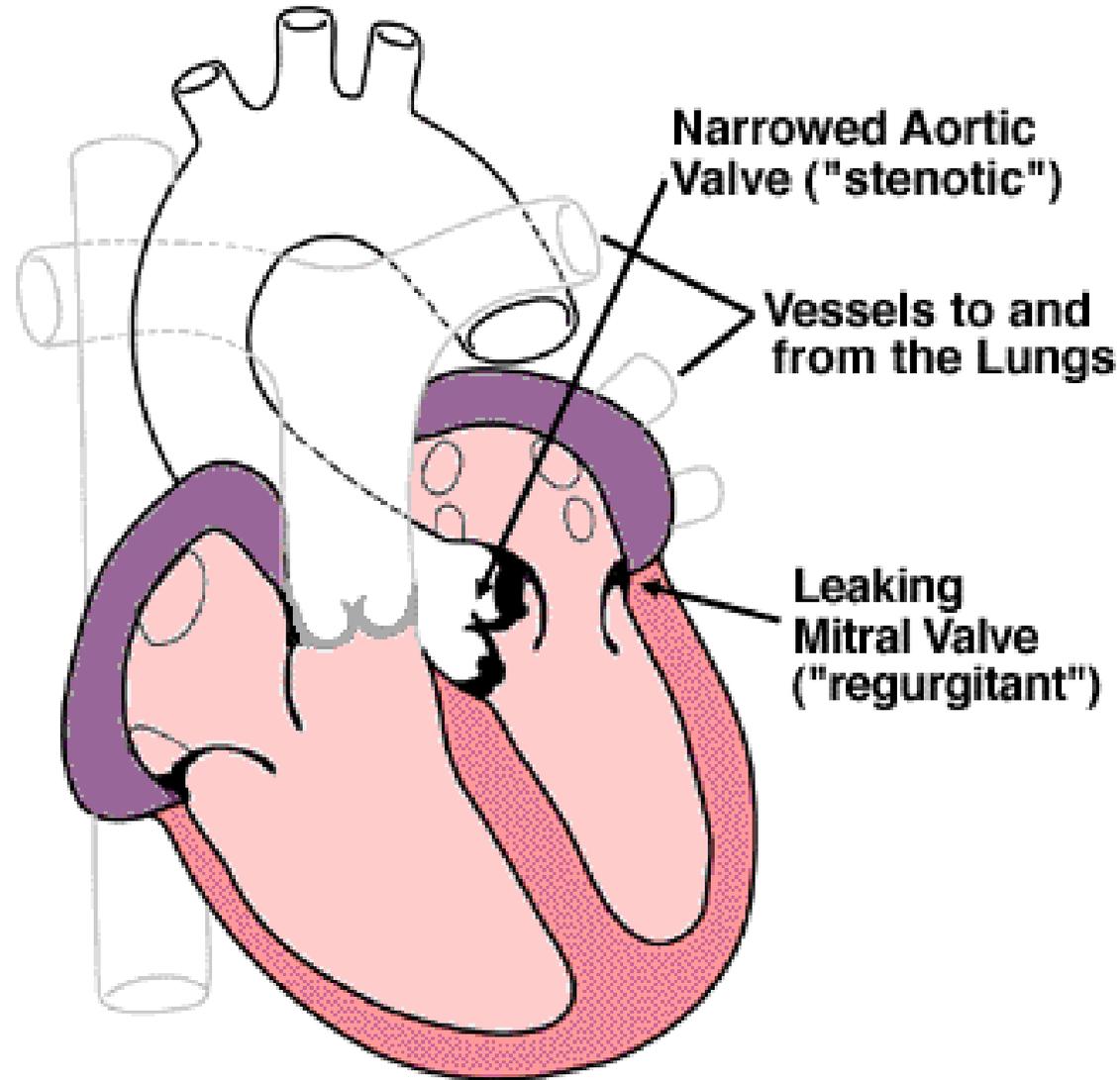
There are four valves between the four chambers of the heart that act as doors so blood flows in one direction



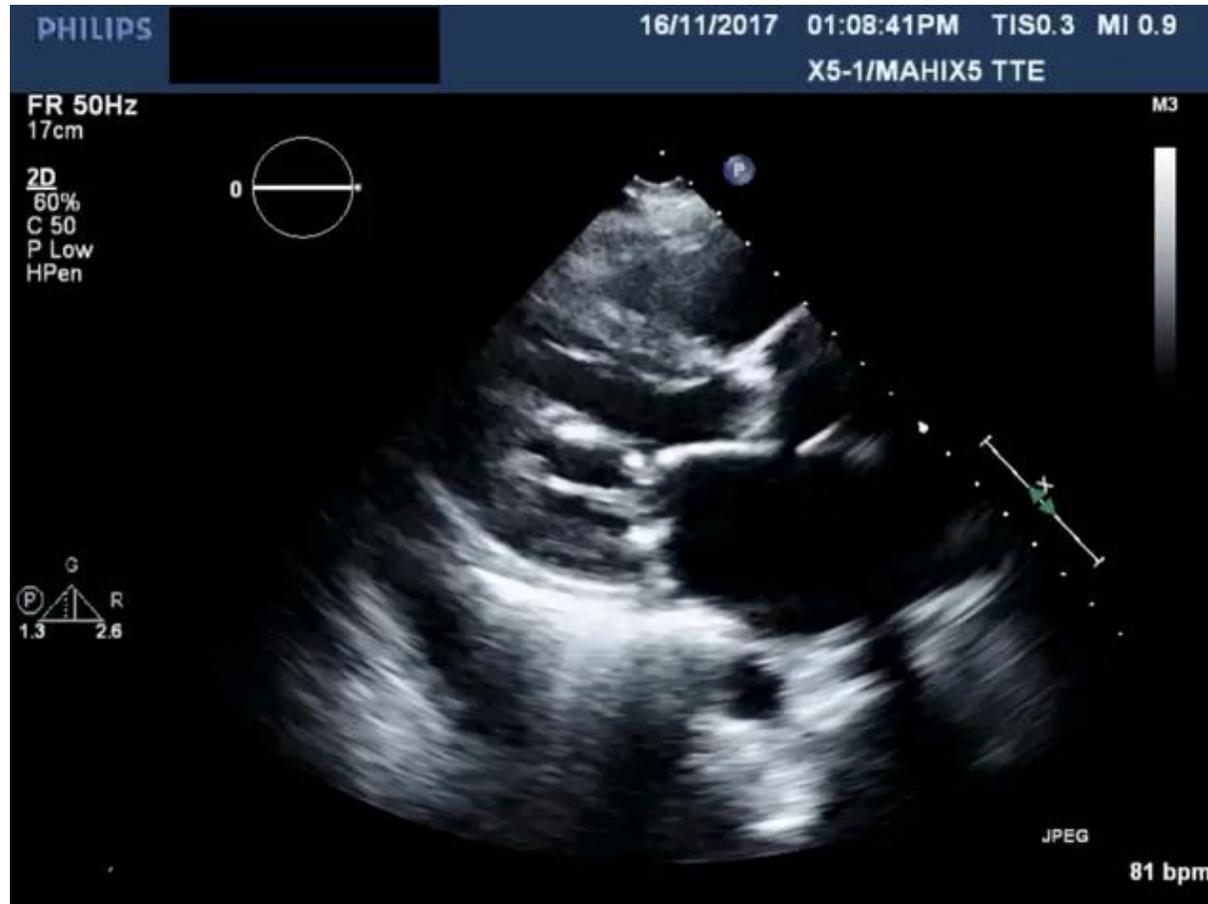
Blood returning to the heart goes through:

1. Tricuspid
2. Pulmonary
3. Mitral
4. Aortic

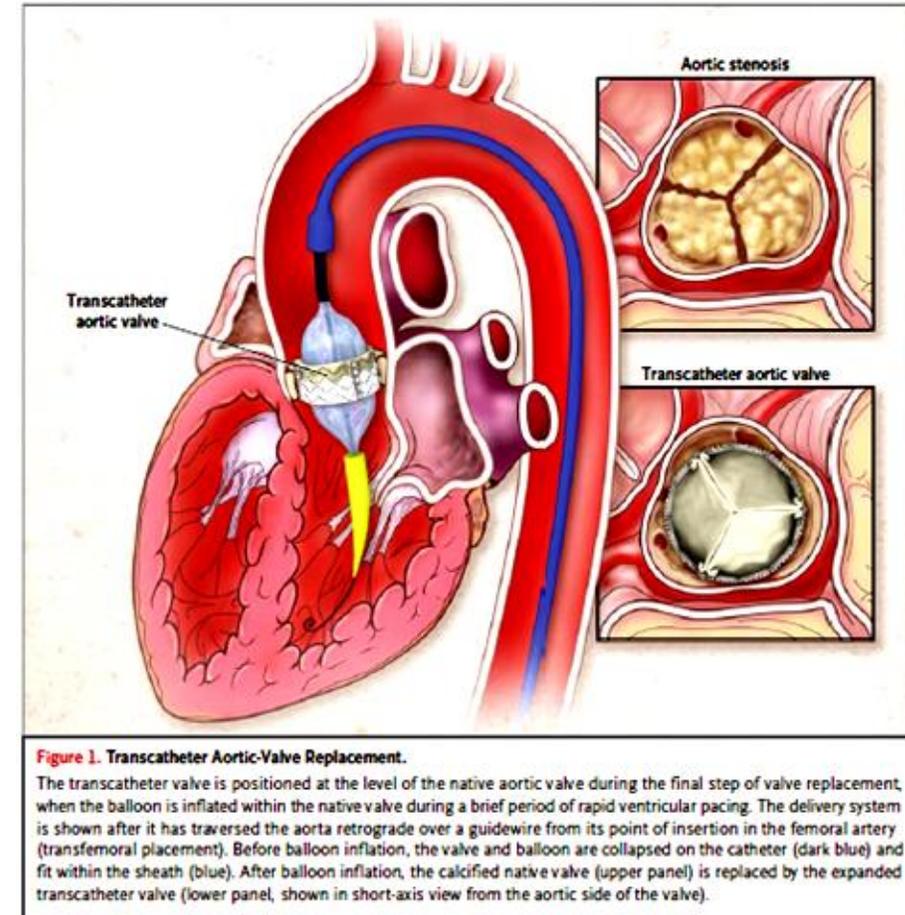
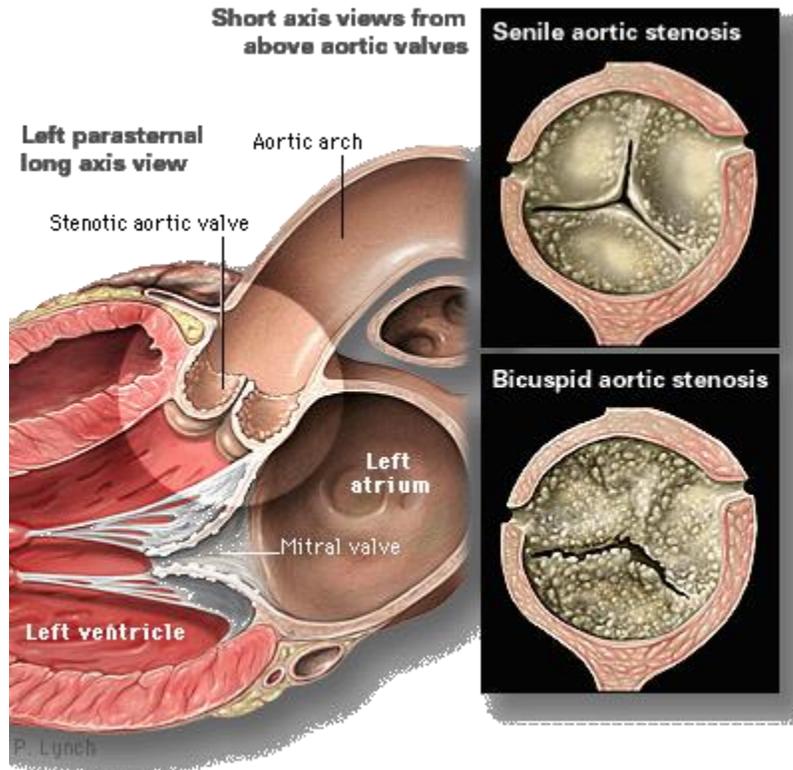
Most common valve problems are aortic stenosis (aortic valve doesn't open fully) and mitral regurgitation (mitral valve doesn't close completely)



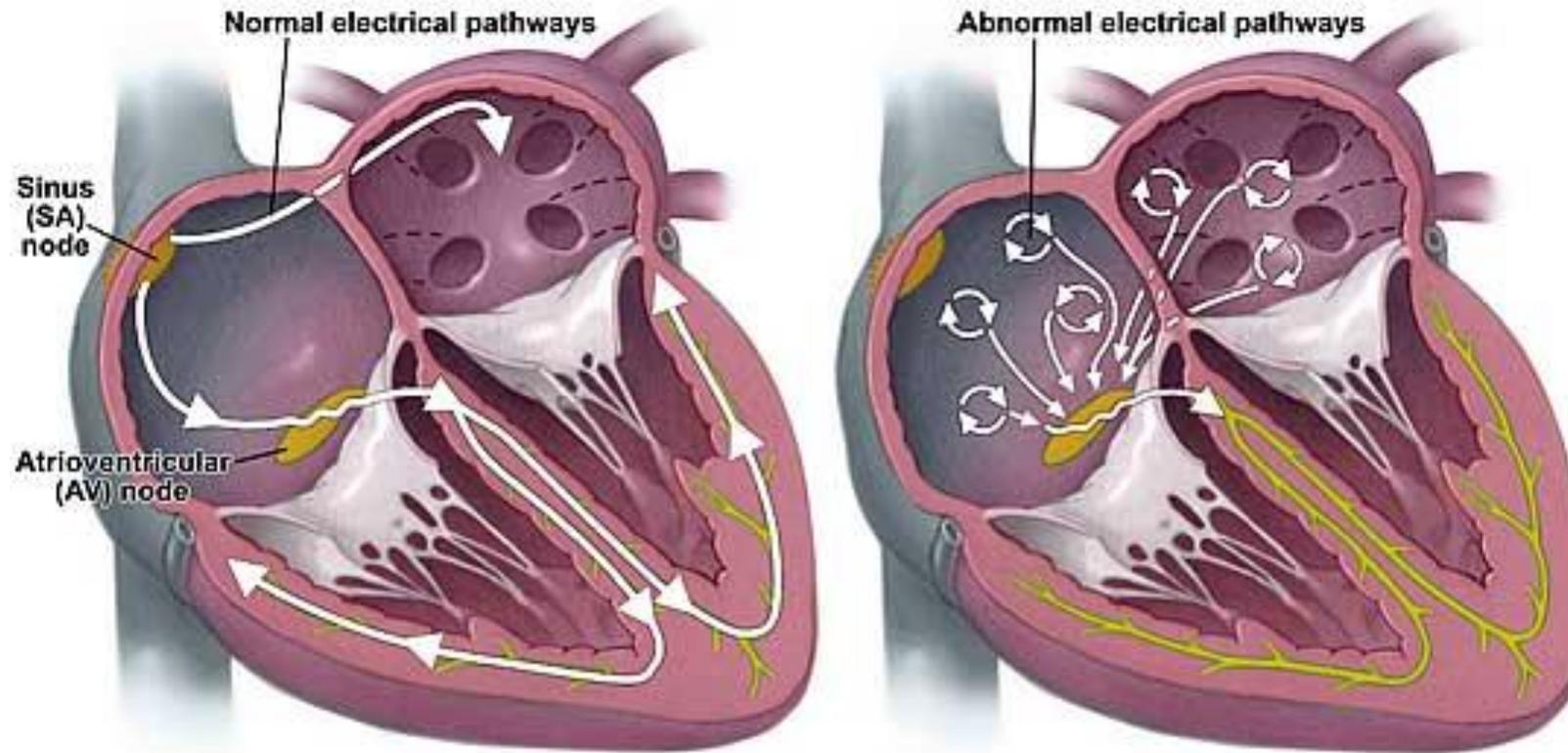
Aortic stenosis



Aortic stenosis and transcatheter aortic valve replacement



Rhythm problems: Fast and irregular heart beat



Normal sinus rhythm

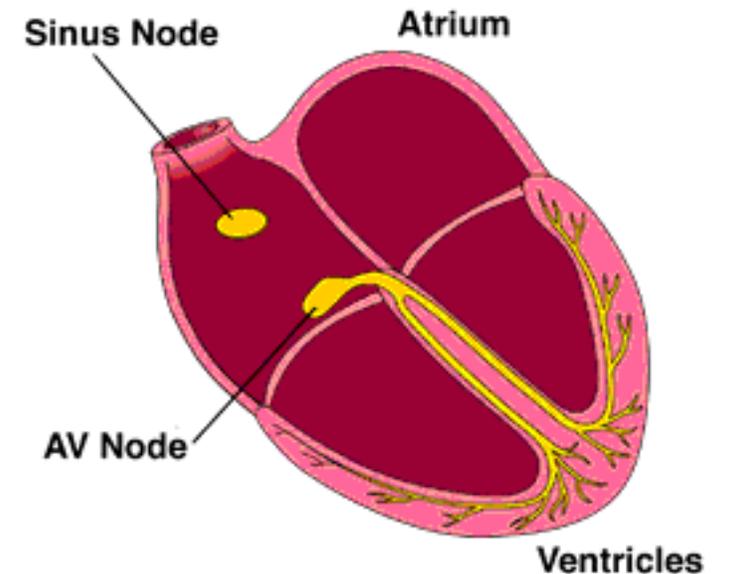


Atrial fibrillation



Atrial fibrillation is important to recognize

- Increased risk of stroke because of blood pooling and clots developing in atria
- Rapid heart rate can lead to heart failure
- Treatment:
 - Blood thinners: warfarin, apixaban (Eliquis) and rivaroxaban (Xarelto)
 - Slow heart rate: beta-blockers, calcium channel blockers
 - Restore sinus rhythm
 - Ablation procedure



CENTRAL ILLUSTRATION: Diagnostic Accuracy of Smartwatches for Atrial Fibrillation Detection Based on 26 Studies Including 17,349 Patients

Diagnostic Accuracy of Smartwatches for Atrial Fibrillation: A Systematic Review and Meta-Analysis



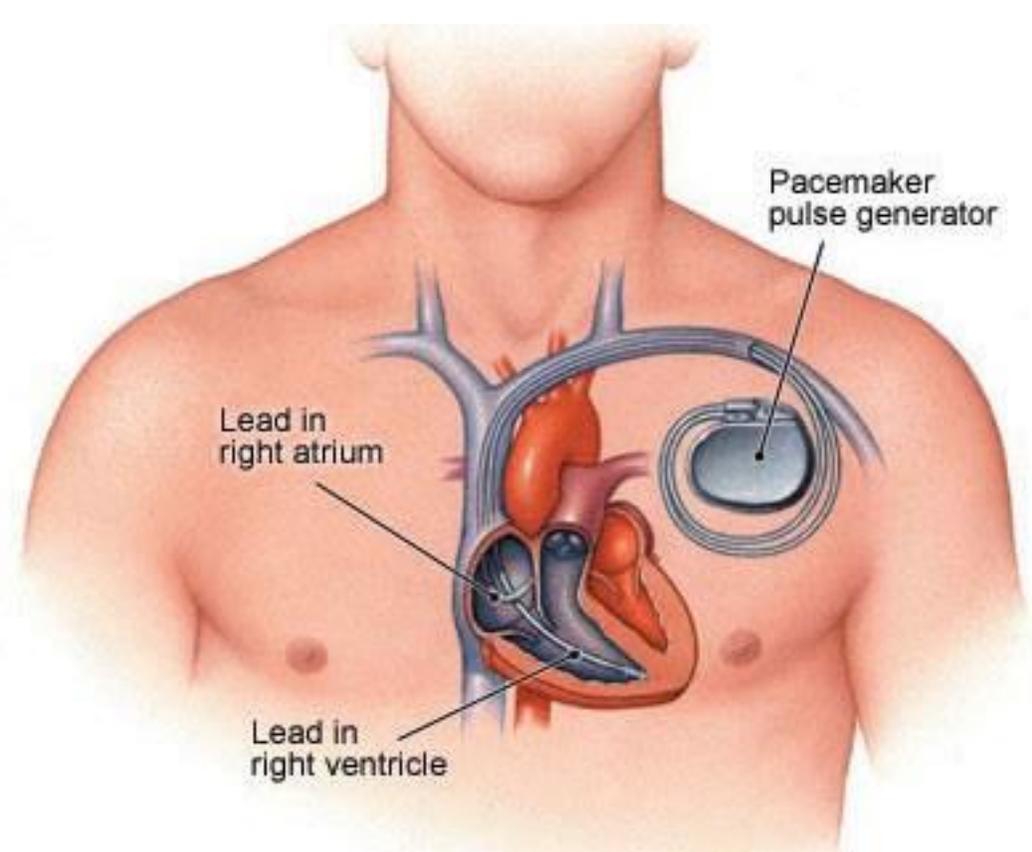
Apple Watch Samsung Fitbit Withings ScanWatch Amazfit Seiko Epson PWM Garmin Forerunner

Sensitivity:	94%	97%	66%	89%	99%	98%	97%
Specificity:	97%	96%	79%	95%	99%	91%	98%

Smartwatches are accurate for AF detection, with variability by device and technology.

Barrera N, et al. JACC Adv. 2025;4(11):102133.

Rhythm problems: Slow heart can cause fainting



Heart disease statistics: Cardiovascular diseases cause ~22% of all deaths in Canada (2023)

- Hypertension: BP \geq 130/80 (since 2017).
 - 1 in 2 Americans.
 - 66% of adults >65 years.
- Diabetes: HbA1c \geq 6.5% or fasting blood glucose >7.0 mmol/L.
 - 14% of US population.
 - Rising prevalence especially among younger adults
- Obesity: BMI >30 kg/m²
 - 40% of US population
- CAD: prevalence increasing
- Heart failure: prevalence increasing

Heart disease prevention

There is a lot we can **all** do to help **reduce the risk**.
Heart disease is largely **preventable**.



Be active,
keep moving



Eat a variety of
healthy foods



Manage
stress



Live free from
commercial tobacco
and vaping



Limit
alcohol

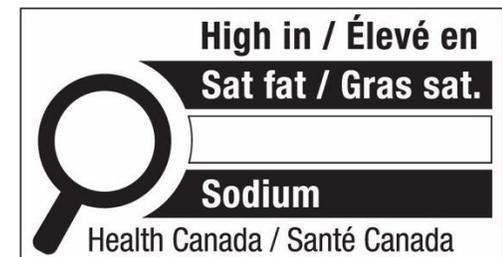


Get regular check ups
(test for blood sugars, blood
pressure and cholesterol)

- Maintain healthy weight (BMI 20-25 kg/m²) and healthy diet
- Exercise (aerobic, weights, flexibility)
- Avoid toxins (smoking, alcohol, pollution)
- Treat hypertension, diabetes, high cholesterol
- Manage stress
- Get vaccinated: Vaccinations (flu, COVID-19, pneumococcal, shingles) decrease risk of heart attacks and worsening of heart failure

Heart disease prevention: Diet

- Eat plenty of fruits and vegetables
 - Eat heart-healthy fats (olive oil, omega-3 fatty acids in salmon, tuna, anchovies and sardines, avocados)
 - Beans, nuts, seeds and whole grains
 - Keep an eye on sodium, added sugars, processed meats, ultraprocessed foods and saturated fats
 - Front of package labeling if normal portion of food exceeds 15% of daily value (DV) in saturated fat, sugar or salt
- (Jan 2026)



Is It Healthy to Take Aspirin Every Day?

Despite his doctors' recommendations, President Trump takes a high dose.

NYTimes Jan 2, 2026



Low dose ASA 81 mg daily is recommended only for people who have documented vascular disease (CAD, heart attack, stroke, PAD) NOT for prevention because risk exceeds benefit

What about supplements? None recommended

- Omega-3 Fatty Acids: Found in fish oil, omega-3 fatty acids have been associated with a reduced risk of heart disease. They can help lower triglyceride levels and may have anti-inflammatory effects. Variable effects on cholesterol
- Coenzyme Q10 (CoQ10): Not recommended
- Fiber Supplements: Soluble fiber, such as psyllium, can help lower cholesterol levels and support heart health as part of a balanced diet.
- Plant Sterols and Stanols (red yeast rice and berberine): Supplements containing these compounds can help lower LDL cholesterol levels.
- Folic Acid (Vitamin B9): May help lower homocysteine levels, which is a risk factor for heart disease. However, the evidence is not definitive.

Heart Matters: Conclusions

- Heart disease is common
- Heart disease can be prevented and treated
- It is important to recognize symptoms of heart disease and seek medical attention: emergent, urgent, primary care
- Follow up and long term management is key
- Advance care planning (GOC should be revisited over time)

GOALS OF CARE DESIGNATIONS		Chest Compressions	Intubation	ICU Admit - Adult	ICU Admit - Pediatric	Surgery	Site Transfer	Symptom Control
R Resuscitative Care	1	✓	✓	✓	✓	✓	✓	✓
	2	X	✓	✓	✓	✓	✓	✓
	3	X	X	✓	✓	✓	✓	✓
M Medical Care	1	X	X	X		✓	✓	✓
	2	X	X	X	Can consider, if required for symptom control		✓	✓
C Comfort Care	1	X	X	X				✓
	2	X	X	X		X	X	✓