Cardiovascular Diseases (CVDs): A Ready Reckoner

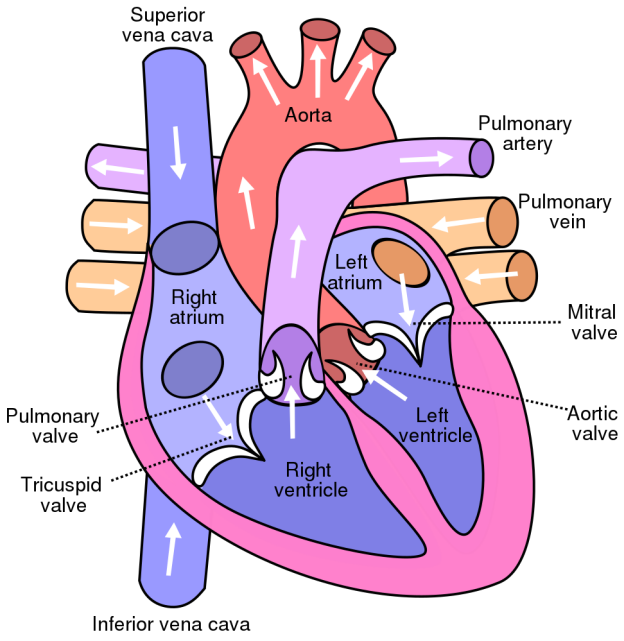
What are Cardio-Vascular Diseases (CVDs)?

Commonly referred to as heart diseases, cardiovascular diseases (CVDs) are a class of diseases that involve the heart and blood vessels, i.e., the vascular system.
Some common CVDs are :

- **Coronary Artery Disease causing symptoms such as heart pain, namely angina and myocardial infarction (MI) commonly known as heart attack**
- **Stroke**
- **Arrythmia (abnormal heart rhythms)**
- **Congenital Heart Defects, namely heart defects at birth**
- **Cardiomyopathy, or diseases of the heart muscles**
- **Heart Infection**
- **Valvular Heart Disease**

How does the heart work?

The heart is at the centre of our circulatory system, a network of blood vessels that delivers blood to every part of our body. Blood carries oxygen and other important nutrients that all body organs need to stay healthy and to work properly. The heart is a muscle whose job is to pump blood throughout the circulatory system.



The heart is divided into two separate pumping systems, the right side and the left side.

- The right side of the heart receives carbon dioxide-rich blood from our veins and pumps it to our lungs, where we breathe it out. Tiny blood vessels called capillaries pick up oxygen from the fresh air we inhale into the lungs.
- The left side of the heart receives this oxygen-rich blood from our lungs and pumps it through our arteries to the rest of the body.

Four chambers of the heart

The heart has four separate chambers that pump blood, two on the right side and two on the left. The four chambers of your heart are made of special type of muscle called myocardium. The myocardium does the main pumping work: It relaxes to fill with blood and then squeezes (contracts) to pump the blood.

Four valves within the heart

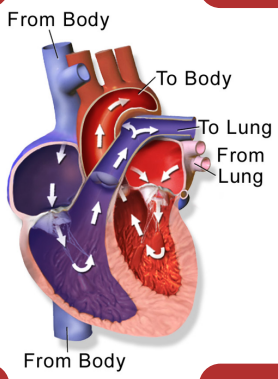
The heart also has four valves, one for each chamber. These valves keep blood moving in the correct manner by opening only one way and only when they need to. To function properly, the valve **must be formed properly, must open all the way and must close tightly so there's no leakage**. The four valves are:

- Tricuspid (so named because it has three flaps)
- Mitral
- Pulmonary
- Aortic

Your heart and lungs work like this:

The right atrium receives oxygen-poor blood from the body and pumps it to the right ventricle through the tricuspid valve.

The right ventricle pumps the oxygen-poor blood to the lungs through the pulmonary valve



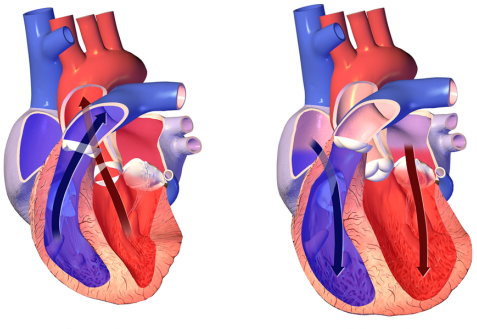
The left atrium receives oxygen-rich blood from the lungs and pumps it to the left ventricle through the mitral valve.

The left ventricle pumps the oxygen-rich blood through the aortic valve out to the rest of the body.

What happens when the heart beats?

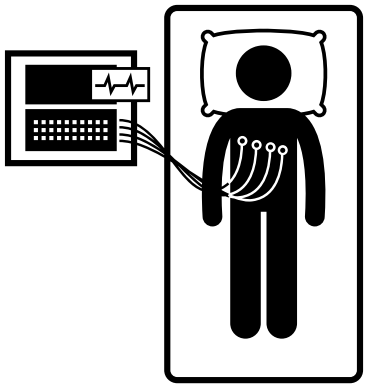
The beating heart contracts and relaxes in a continuous cycle.

- During contraction (systole), your ventricles contract, forcing blood into the vessels to your lungs and body.
- During relaxation (diastole), the ventricles are filled with blood coming from the upper chambers (left and right atria).



Systole *(pumping)*

Diastole *(filling)*



You can see these electrical impulses on an ecocardiogram (ECG)

The heart has its own electrical system that coordinates the work of the heart chambers (heart rhythm) and also controls the frequency of beats (heart rate).

- Electrical impulses begin high in the right atrium and travel through specialized pathways to the ventricles, delivering the signal for the heart to pump.
- The conduction system keeps your heart beating in a coordinated and normal rhythm, which keeps blood circulating.

What are the risk factors of CVDs?

Age: Aging increases the risk of damaged and narrowed arteries and weakened or thickened heart muscle.

Sex: Men are generally at greater risk of heart disease. However, women's risk increases after menopause.

Genetics: A family history of heart disease increases a person's risk of coronary artery disease, especially if a parent developed it at an early age (before age 55 for a male relative, such as a brother or father, and 65 for a female relative, such as mother or sister).

High blood pressure: Uncontrolled high blood pressure or hypertension can result in hardening and thickening of your arteries, narrowing the vessels through which blood flows.

High blood cholesterol levels: High levels of cholesterol in the blood can increase the risk of formation of plaques and atherosclerosis.

Diabetes: Diabetes increases the risk of heart disease. Both conditions share similar risk factors, such as obesity and high blood pressure.

Obesity: Excess weight typically worsens other risk factors.

Chemotherapy drugs and radiation therapy for cancer: Some chemotherapy drugs and radiation therapies may increase the risk of cardiovascular disease.

Poor diet: A diet that's high in fat, salt, sugar and cholesterol can contribute to the development of heart disease.

Smoking: Nicotine constricts your blood vessels, and carbon monoxide can damage their inner lining, making them more prone to buildup of fats, cholesterol and other substances in and on your artery walls (also known as atherosclerosis), which can restrict blood flow. Heart attacks are more common in smokers than in non-smokers.

Physical inactivity: Lack of exercise also is associated with many forms of heart disease and some of its other risk factors, as well.

Stress: Unrelieved stress may damage the arteries and worsen other risk factors for heart disease.

Poor hygiene: Not regularly washing your hands and not following other habits that can help prevent viral or bacterial infections can put you at risk of heart infections, especially if you already have an underlying heart condition. Poor dental health also may contribute to heart disease.

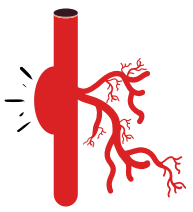
Indoor air pollution: There is growing medical evidence to suggest that indoor air pollution from burning kerosene and diesel, as well as use of solid fuel, is linked to cardiovascular disease.

What are the complications of CVDs?

Heart Failure: One of the most common complications of heart disease, heart failure occurs when your heart can't pump enough blood to meet your body's needs. Heart failure can result from many forms of heart disease, including heart defects, cardiovascular disease, valvular heart disease, heart infections or cardiomyopathy.

Stroke: The risk factors that lead to cardiovascular disease also can lead to an ischemic stroke, which happens when the arteries to your brain are narrowed or blocked so that too little blood reaches your brain. A stroke is a medical emergency — brain tissue begins to die within just a few minutes of a stroke.

Aneurysm: A serious complication that can occur anywhere in your body, an aneurysm is a ballooning outward of the wall of arteries, caused by the loss of elasticity in the arterial wall. If an aneurysm bursts, it could cause life-threatening internal bleeding.



Peripheral artery disease: Atherosclerosis also can lead to peripheral artery disease. When you develop peripheral artery disease, your extremities — usually your legs — don't receive enough blood flow. This causes symptoms, most notably leg pain when walking (claudication).

Sudden cardiac arrest: Sudden cardiac arrest is the sudden, unexpected loss of heart function, breathing and consciousness, often caused by an irregular heart beat. Sudden cardiac arrest is a medical emergency. If not treated immediately, it can be fatal.

Can we prevent cardiovascular diseases?

Heart diseases can be prevented but not be completely cured. Certain types of heart disease, such as heart defects, can't be prevented. However, many other types of heart disease can be prevented by making lifestyle changes:

- Quit smoking
- Control other health conditions, such as high blood pressure, high cholesterol and diabetes
- Exercise at least 30 minutes a day on most days of the week
- Eat a diet that's low in salt and saturated fat
- Maintain a healthy weight
- Reduce and manage stress
- Practice good hygiene

CVDs: A leading cause of mortality in India

One fourth of all mortality is attributable to CVDs

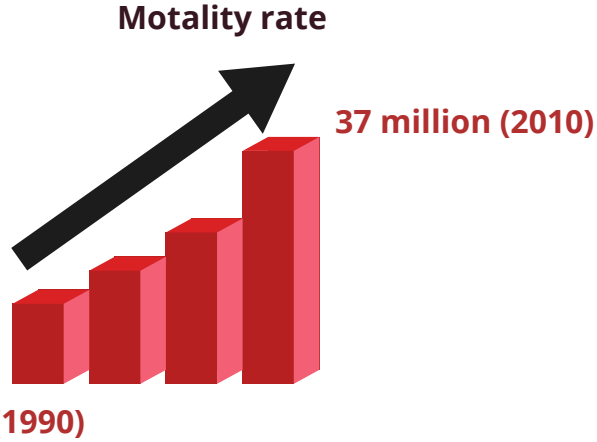
Ischemic heart disease and stroke are the predominant causes and are responsible for >80% of CVD deaths.

In the latest Global Burden of Diseases study (2016), the age-standardized CVD death rate in India was estimated to be 272 per 100,000 population, which is higher than the global average (235 per 100,000 population)

Three things are of special concern for India are:

- Rapid rise in CVDs
- Early age of disease onset in the population
- High case fatality rate

Premature mortality in terms of years of life lost because of CVD in India increased by 59% between 1990 and 2010.



Where's my story?

1. CVDs have emerged as the leading cause of death in all parts of India, across socioeconomic strata and in rural areas. The rise in CVDs is linked to tobacco use, low fruit and vegetable, consumption of processed food, sedentary lifestyles among among others. Individuals from lower socioeconomic backgrounds frequently do not receive optimal therapy, leading to poorer health outcomes. Reporting on risk factors and social determinants of CVDs in key.

2. Countering the rise in CVDs requires strategies such as evidence-based policies, strong health systems, and the implementation of prevention, early detection, and treatment with the use of both conventional and innovative techniques.

3. According to the National Family Health Survey – 4, the infant mortality rate stands at 34 per 1000 live births. About 10% of infant deaths can be attributed to congenital heart diseases. A campaign for formulating a national policy on making Critical Congenital Heart Diseases (CCHD) screening mandatory in all healthcare establishments in India was launched in 2018. It was said that the screening required only three to four minutes per baby and could be carried out by ASHA workers. What has been the progress in the area? Is CCHD screening carried out in your area? How has this benefitted other countries in reducing infant mortality rates?

4. There are early reports of people with COVID-19 returning to the hospital with mild to moderate symptoms of myocarditis (inflammation of the heart tissue). SARS CoV2 also seems to affect the right side of the heart more than the left. What are the various ways in which COVID-19 affects the cardiovascular system and what are the emerging patterns of evidence? You can analyse Out-patient data in your region too.

Cardiovascular Disease (CVD): A Ready Reckoner
A REACH publication (September 2020)
This resource was developed by REACH as part of our efforts to help improve the quality and frequency of media reporting on NCDs. The development of this resource is supported by a United Way Worldwide grant on behalf of the generosity of Eli Lilly and Company Foundation

If you have any questions, please write to us at rashmika.reach@gmail.com