**INTRODUCTION**

***Cardiovascular disease****(CVD) is a class of diseases that involve the heart or blood vessels. CVD includes coronary artery diseases (CAD) such as angina and myocardial infarction (commonly known as a heart attack).*

There are a number of risks factors for coronary heart disease (CHD), including high blood pressure, diabetes, and family history of CHD, smoking, high cholesterol levels, high triglyceride levels, obesity, and inactivity. **Heart disease** is common in people with diabetes. In general, the risk of heart disease death or stroke is more than twice as high in people with diabetes. While all people with diabetes have an increased chance of developing heart disease, the condition is more common in those with Type 2 diabetes. In fact, it is number one cause of death among people with Type 2 diabetes. Dangerous overnight blood sugar levels often go undetected and cause prolonged periods of heart rhythm disturbances in older patients with Type 2 diabetes and associated heart problems.

**TERMINOLOGIES**

***Input Attributes***

1. **Age:** It is the age of the individual in years.
2. **Sex (1: male; 0: Female):** It defines the gender of the person.
3. **Chest Pain Type (1: typical type 1 angina, 2: typical type angina, 3: non-angina pain, 4: asymptomatic):** *Angina* is a symptom of coronary heart disease (CHD). It is a type of chest pain caused by reduced blood flow to the heart.

1. **Trest Blood Pressure (mm Hg on admission to the hospital): Optimal Blood Pressure** typically is defined as 120 mm Hg systolic which is the pressure as your heart beats - over 80 mm Hg diastolic which is the pressure as your heart relaxes. For resting heart rate, the target is between 60 and 100 beats per minute (BPM).

**High Blood Pressure** can damage your arteries by making them less elastic, which decreases the flow of blood and oxygen to your heart and leads to heart disease. In addition, decreased blood flow to the heart can cause chest pain, also called Angina

1. **Serum Cholesterol (mg/dl):** A serum cholesterol level is measurement of certain elements in the blood, including the amount of high - and low - density lipoprotein cholesterol (HDL and LDL) in person’s blood. Your body needs cholesterol to build healthy cells, but high level of cholesterol can increase your risk of heart disease. With high cholesterol, you can develop fatty deposits in your blood vessels. Eventually, these deposits grow, making it difficult for enough blood to flow through your arteries.
2. **Fasting Blood Sugar (1: >120 mg/dl; 0: < 120 mg/dl):** A fasting blood sugar level less than 100 mg/Dl is **normal**.

When it lies from 100 -125 mg/Dl, it is considered as **pre-diabetes**. If it is 126 mg/Dl or higher on it means the patient has **diabetes**. Fasting glucose levels more than 70 mg/Dl were associated with increased risk of all strokes in men and women. Also, low blood sugar levels lead to heart rhythm disturbances and even life- threatening heart attacks. So, both low and impaired fasting glucose should be considered as predictors of risk for stroke and coronary heart disease. A **heart attack** occurs when an artery that provides blood to the heart is blocked. High blood sugar at the time of heart attack could make this blockage more severe by causing the artery to contract, resulting in a higher risk of complications.

1. **Resting electrographic results (Restecg) (0: Normal; 1: ST-T wave abnormal; 2: probable or definite left ventricular hypertrophy):** An ECG (electrocardiogram) records the electrical activity of your heart at rest. It provides information about your heart and rhythm, and shows if there is enlargement of the heart due to high blood pressure (hypertension) or evidence of a previous heart attack (myocardial infraction).

***Left Ventricular hypertrophy (LVH)*** *is thickening of the heart muscle of the left ventricle of the heart. It occurs naturally as a reaction to aerobic exercise and strength training. It is usually a marker for disease involving the heart.*

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1. **Thalach** (maximum heart rate achieved): Maximum heart rate is the maximum number of beats made by your heart in one minute of effort. When walking quickly, you will be in an endurance zone, with a heart rate of between 60% to 75% of your maximum heart rate (MHR).While it is true that some areas of cardiac muscle will start to die during a heart attack because of a lack of blood, a person’s pulse may become slower (bradycardic) or faster (tachycardic), depending on the type of heart attack they are experiencing. A normal heart rate lies between 60 to 100 beats per minute.
2. **Exercise induced angina (Exang) (1: yes; 0: no):** When you increase the demand for oxygen, such as when you exercise, angina can result. Stable angina is usually triggered by physical activity. When you climb stairs, exercise or walk, your heart demands more blood, but narrowed arteries slow down blood flow.
3. **Old Peak:** ST depression induced by exercise relative to rest beats per minute.
4. **Slope – the slope of peak exercise ST segment (1: upwardsloping; 2: flat; 3: downward sloping)**: The standard criterion for an abnormal ST segment response is horizontal (planar) or downsloping depression of greater than 1mm. The normal ST segment slopes sharply upwards.
5. **CA:** number of major vessels colored by fluoroscopy (value 0-3):

***Fluoroscopy*** *is a type of medical imaging that shows a continuous X-ray image on a monitor, much like X-ray movie. During a fluoroscopy procedure, an X-ray beam is passed through the body. The image is transmitted to a monitor so the movement of a body part or of an instrument or contrast agent (“X-ray dye”) through the body can be seen in detail.*

1. **Thalassemia (thal) (1: normal; 2: fixed defect; 3: reversible defect):** is an inherited blood disorder that causes your body to have less hemoglobin than normal. Thalassemia can cause anemia, leaving you fatigued. If you have mild thalassemia, you might not need treatment. But more severe forms might require regular blood transfusions.
2. **Target:** It defines whether the individual or person suffers from cardiovascular disease or not.