Project Development Phase

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Team ID	**PNT2022TMID22030**
Project Name	**Visualizing and Predicting Heart Disease with an Interactive Dashboard**

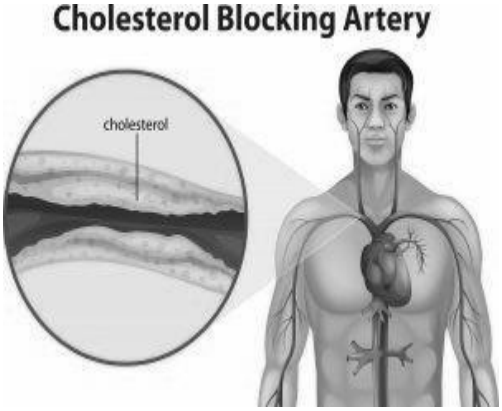
SPRINT 1: CHOLESTEROL LEVEL

INTRODUCTION:

Researches have documented that **high cholesterol levels could lead to heart disease**. “Cholesterol is necessary for the body to function. However, too much ‘bad’ cholesterol, which is also called low-density lipoprotein, can clog the arteries with a fatty buildup, increasing the risk of heart attack, stroke, or peripheral artery disease. “High-density lipoprotein is ‘good’ cholesterol and helps to sweep LDL from the arteries back to the liver, which removes it from the body,” the researchers wrote.

CHOLESTEROL RELATED TO HEART DISEASE:

Cardiovascular disease is the most common cause of death in adult population in the world. The disease includes numerous problems, many of which are related to a process called atherosclerosis. Atherosclerosis is a condition that develops when a substance called plaque builds up in the walls of the arteries. This plaque narrows the arteries, making it harder for blood to flow through. If a blood clot forms, it can stop the blood flow. This can cause a heart attack or stroke. There are many risk factors associated with cardio vascular disease (CVD). Research makes it clear that abnormal blood lipid (fat) levels have a strong correlation with the risk of coronary artery disease, heart attack and coronary death. Cholesterol plays detrimental roles in the pathogenesis of atherosclerosis and CVD.



PROCESS OF HOW CHOLESTEROL LEADS TO HEART DISEASE:

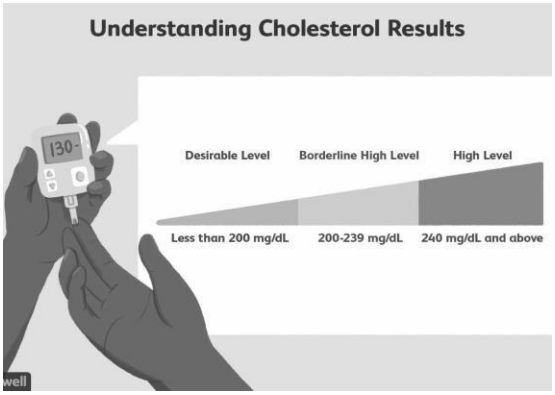
Cholesterol can be a risk factor of heart disease. This process will show you how cholesterol leads to heart disease. Cholesterol is a fatty substance in our blood stream. First, the first cause is eating unhealthy foods. Since it affects inactive people, you have to exercise. Second, when the fat build up in artery walls, that will cause narrowing of arteries while arteries become stiffening. Then artery walls start to damage. Next, as soon as the blood flow restricted, the heart tissue will weaken because lack of oxygen supply. Meanwhile, it will form of fatty streaks in artery. Then fatty streaks crack. After that a clot will be formed around the crack. Since the heart muscle lack of oxygen, the blood clot becomes blocked. Finally, this will cause a heart attack or stroke. To sum up, you have to eat healthy food and exercise because that will help you avoid the risk of cholesterol.

TYPES OF CHOLESTEROL:

A fatlike substance, travels around in your bloodstream in high-density lipoproteins (HDL) and low-density lipoproteins (LDL):

- HDL is known as “good cholesterol” because it picks up cholesterol and takes it back to the liver for disposal.
- LDL carries cholesterol to the parts of your body that need it. It’s sometimes referred to as “bad cholesterol” because if you have too much of it in your bloodstream, it can cling to the walls of your arteries, eventually clogging them In general, high levels of HDL and low levels of LDL help reduce the risk of heart disease.

The association between cholesterol and heart disease:



Specifically limited dietary cholesterol to no more than 300 milligrams per day. While the 2015-2020 Dietary Guidelines for Americans doesn't include a specific limit, it still strongly recommends eating as little dietary cholesterol as possible. It mentions studies and trials that have produced strong evidence that healthy eating patterns that are low in dietary cholesterol can reduce the risk of heart disease in adults.

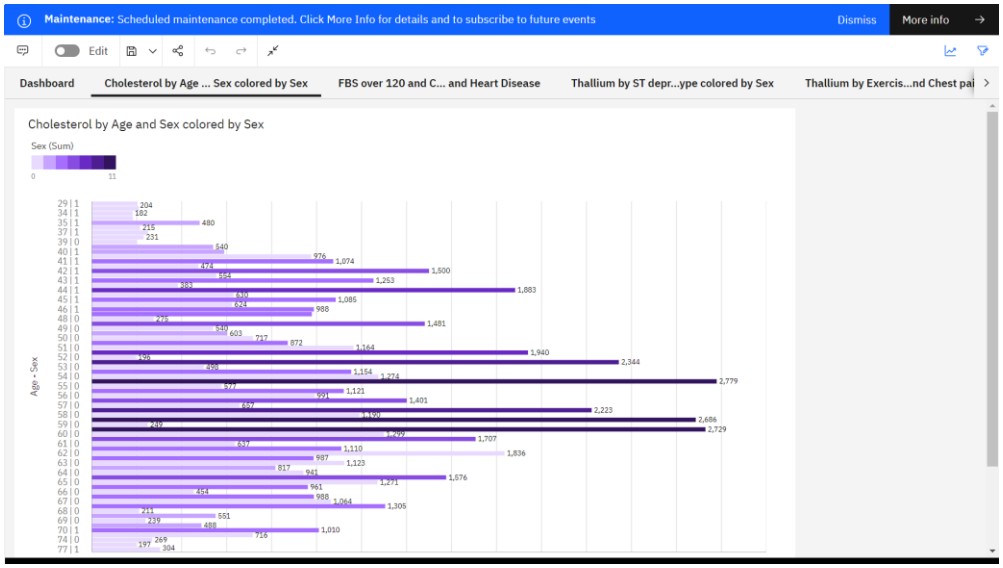
An eight-week study published in 2016 stated that elevated LDL is an established risk factor for heart disease and that dietary fatty acids play a significant role in the development of heart disease. The researchers found that making minor dietary changes (in this case, replacing a few regularly eaten foods with better fat-quality alternatives) reduced cholesterol and could potentially reduce future risk of heart disease.

Sources of cholesterol in your diet:

More research on cholesterol, particularly dietary cholesterol, needs to be done. Even so, it's clear that diet plays an important role in heart health and overall health.

Age by Cholesterol:

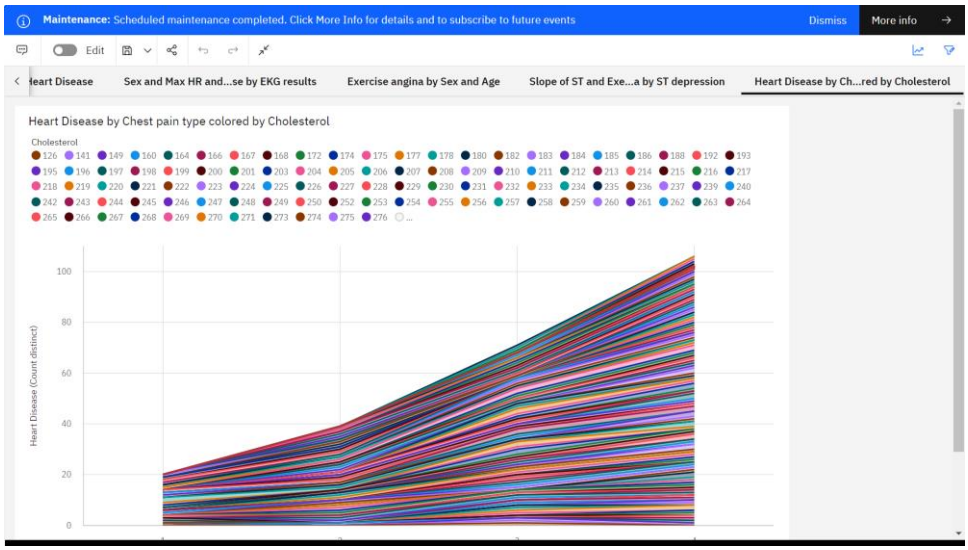
Normal cholesterol levels vary by age. Cholesterol levels tend to rise as people get older, particularly after menopause.For example, people who have gone through menopause may have higher LDL and lower HDL cholesterol levels.



Cholesterol levels tend to increase with age. Taking steps to reach or maintain healthy levels earlier in life may prevent them from becoming dangerously high over time. Years of unmanaged cholesterol levels can be challenging to treat.

Research indicates that cholesterol levels increase with age during young adulthood and middle age and decline with age later. This is attributed to changes in diet, body composition ,medication use,physical activity and hormone levels.

Heart Disease by Chest pain type colored by Cholesterol:



Male vs Female: Sex hormones and cholesterol levels:

Sex hormones like estrogens and androgens affect cholesterol levels differently in men and women. Your body needs cholesterol to make important steroid hormones like estrogen and progesterone as well as vitamin D.In general, between the ages of 20 and 55 years, men tend to have higher LDL and lower HDL cholesterol levels than women. However, after the age of 55,

women's HDL cholesterol levels decrease rapidly, and LDL levels rise. This is due to menopause.

Sex hormones and cholesterol in men:

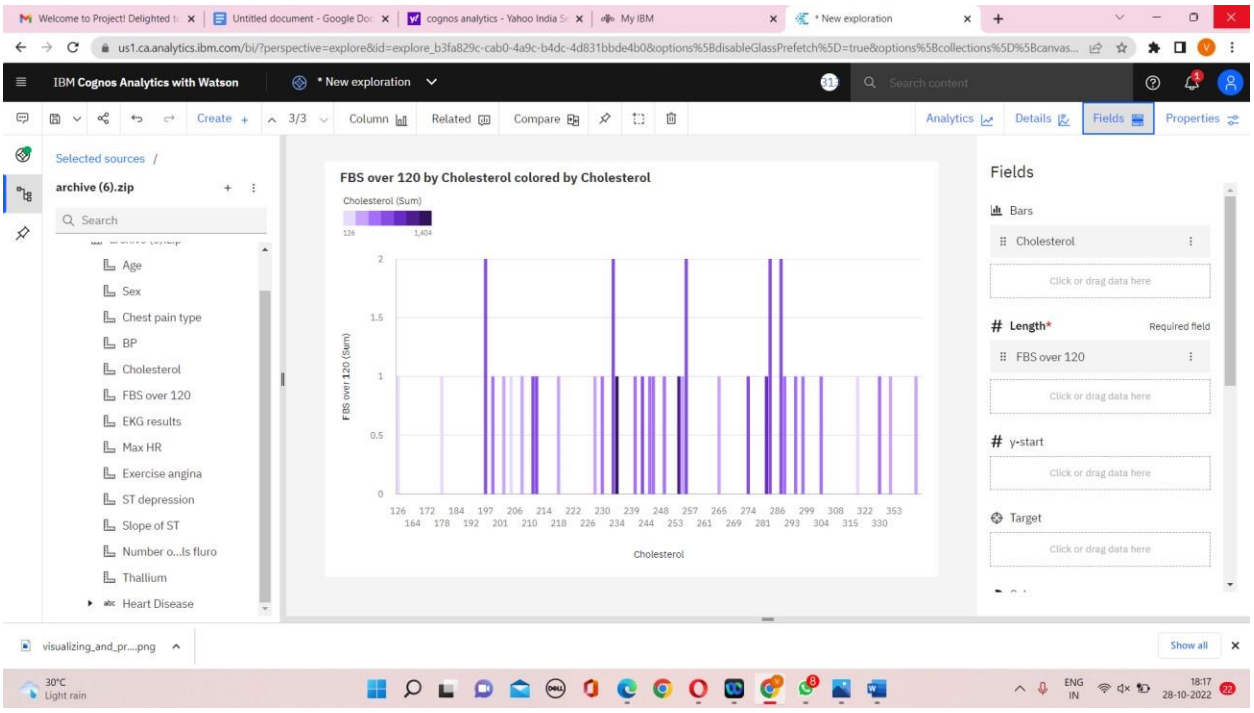
Testosterone, the male sex hormone, may have an impact on cholesterol levels in men. Although the effects of testosterone on cholesterol aren't completely clear, the risk of cardiovascular disease increases in men as their testosterone levels decrease with age. However, testosterone replacement therapy doesn't appear to reduce the risk—in fact, it may increase the risk for heart disease in men.

In a study of young men, researchers found that estradiol was associated with higher total cholesterol and lower "good" HDL cholesterol, and estrone was associated with higher total cholesterol and higher "bad" LDL cholesterol. Men who have high levels of these estrogen hormones at a young age may have a significantly elevated risk of high cholesterol and related heart diseases when they get older.

Sex hormones and cholesterol in women:

In women, the very same estrogen sex hormones that increase men's heart disease risk are considered a factor that may lower the risk for high cholesterol and heart disease in women. Estrogen in women causes higher levels of "good" HDL cholesterol. When women's estrogen levels rise during their monthly cycle, their HDL also rises, peaking during ovulation, and their LDL declines, reaching a low point just before menstruation.

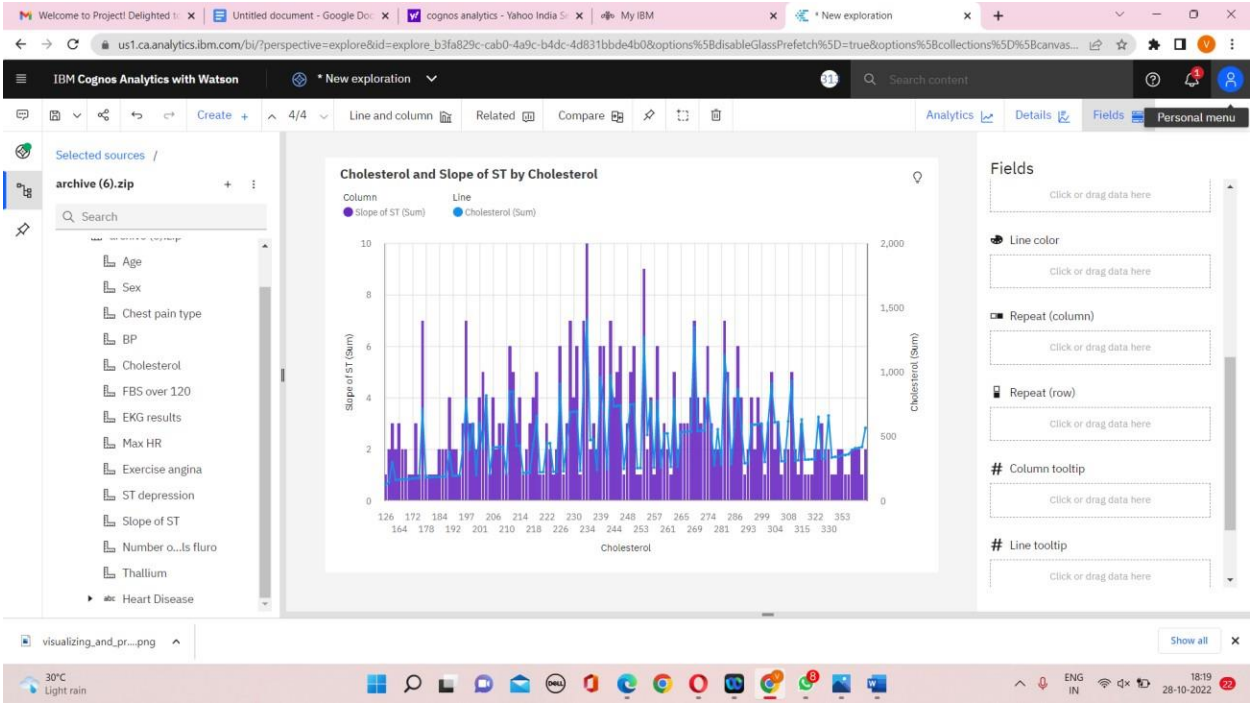
FBS By Cholesterol:



If you have type 2 diabetes, you might have high cholesterol levels, too. With type 2 diabetes, your body doesn't regulate or use glucose (sugar) the way it should. That can lead to too-high levels of glucose in your blood.High glucose levels can contribute to other health cinditions, including high cholesterol. But even people with type 2 diabetes who have well-controlled blood sugar may have cholesterol problems.

FBS, the most common serum in cell culture, contains very high levels of lipids. For example, FBS contains approximately 300 Rg/mL cholesterol and 30 Rg/mL oleic acid.Continued fasting for up to 21 days resulted in lowering of both cholesterol and triglycerides to pre-fast levels. During fasting, LDL levels go down about 25%,

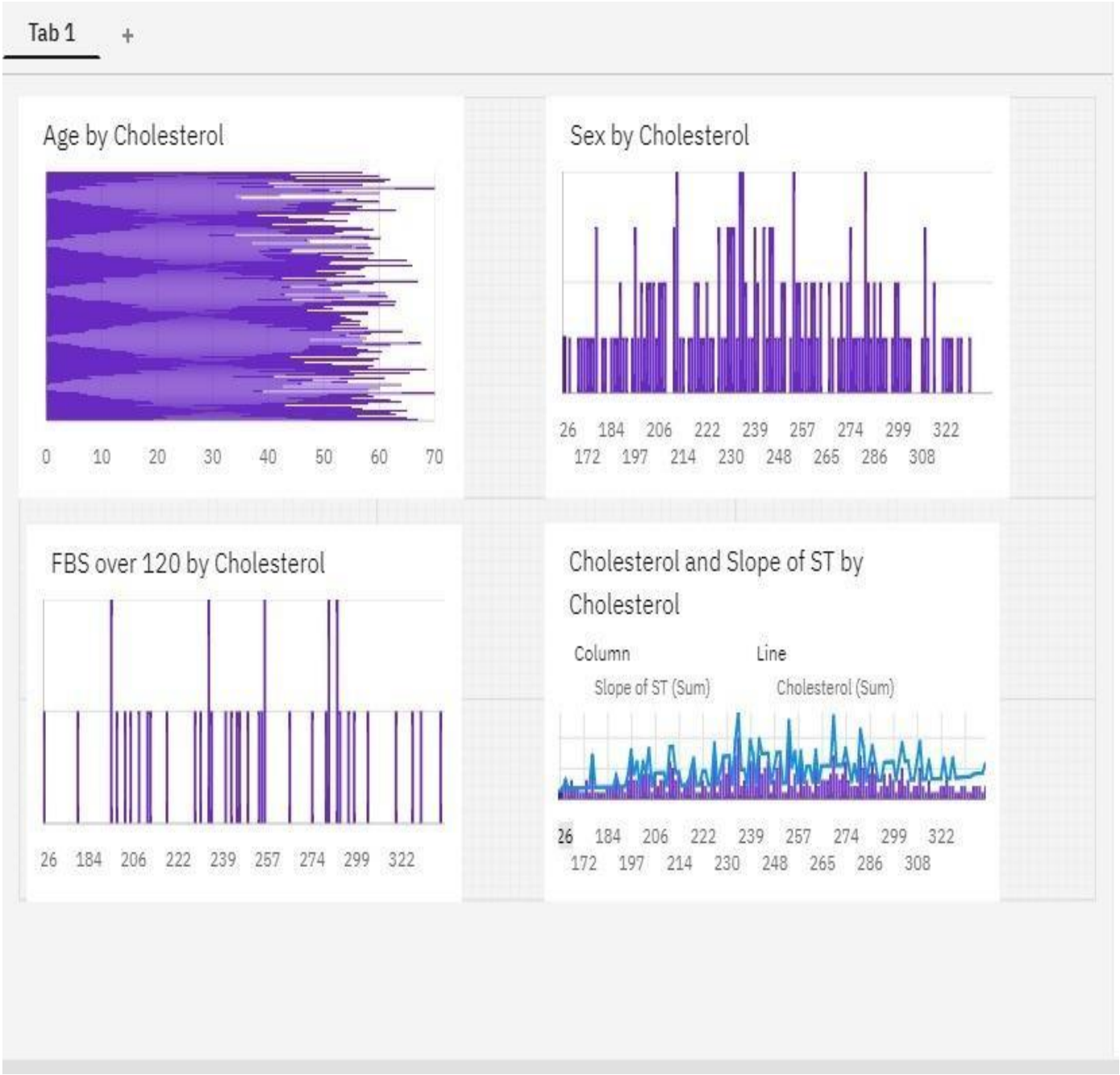
ST By Cholestrol:



Depression appears to be associated with an inability to lower cholesterol levels after myocardial infarction (MI).To enhance lipid lowering in patients with depression after MI, clinicians should aggressively treat depression and maintain a focus on helping the patient adhere to recommendations for lipid lowering (eg, diet, exercise, and medication adherence).

Several underlying conditions and other factors can cause an ST segment depression.These includeTrusted Source-**Hypokalemia**: Hypokalemia occurs when a person's body excretes an excessive amountTrusted Source of potassium.**Left bundle branch block**: When this condition occurs, the electrical impulses to the heart's left ventricle slow, which can make it harderTrusted Source for the heart to pump blood efficiently through the body.

Final Dashboard Of Cholestrol:



Healthier Habit:

Fiber Intake FRUIT		
Raspberries	1 cup	8.0g
Pear, with skin	1 medium	5.5g
Apple, with skin	1 medium	4.4g

Fiber Intake GRAINS		
Spaghetti, whole-wheat, cooked	1 cup	6.2g
Bran flakes	3/4 cup	5.3g
Brown rice, cooked	1 cup	3.5g

- Eat heart-healthy foo
- Exercise on most days of the week and increase your physical activity
- Quit smoking
- Lose weight