What is blood pressure?

It's the blood pressures the pressure exerted by your blood on the walls of the arteries. I should probably back up just a little bit and give a quick overview of the anatomy and physiology of the circulatory system. The circulatory system similar to how you would think of the plumbing in your house. Except that with the plumbing in your house the circuit is actually completed away from your house at a water treatment plan and from some sort of waterworks or reservoir where the water flows in from that ultimately there is a sort of analogy of a complete circuit of where water comes and water goes out. However within the confines of your house there are pipes where water flows in, historically these were usually made out of copper and more recently there made out of polyvinyl, a type of plastic. But these water lines that carry water into your house to all your faucets and your showerheads in your appliances like a washing machine these are relatively thick-walled narrow rigid pipes in the water inside these pipes is under relatively high pressure. Eventually the water gets to its destination when someone opens a faucet flushes the toilet, turns on a washing machine and then it flows through the basin of the sink with the bathtub and down the drainage pipes and ultimately into the sewer or into the septic system. The pipes that carry the water out of the sink or the bathtub or out of the washing machine are of a larger diameter than less stiff because there is very little pressure in these pipes there is basically a trickle of water in comparison to the pipes that bring water in which are completely filled and have pressure exerted in every direction from the inside of the pipe. Your body has similar pipes it has the inlet pipes the pipes that carry blood to the organs which are called arteries. These are thick-walled muscular pipes that unlike the pipes in your house can change in diameter to accommodate more or less blood flow and divert blood flow where it's needed most at certain times. For instance after you eat food the blood vessels to your digestive tract dilate to increase blood flow to your digestive tract, and when you exercise that say recycling the blood vessels to your legs will dilate to bring my blood vessels to your legs and you can think of this in the house analogy like turning on a faucet this will increase water flow to out of that faucet. But the point is that these inlet pipes one in our body what are called arteries carry a relatively high pressure the equivalent of sewage pipes or drain pipes in our body are the veins which compared to the arteries are bigger looser sloppier and carry blood under a much lower pressure. When talking about blood pressure over talking about is the pressure in the arteries. The reason we care much more about the pressure in the arteries than we do in the veins is that just like in your house when you have a leak it's much more likely to be in the pipes that have higher pressure it's the same thing in your body the arteries are the pipes that suffer damage from things like high-pressure and can spring a leak which in the body would be like an aneurysm or can develop obstructions which have different names depending on the organ when it's in the arteries of the heart it's called a heart attack when it's in the arteries of the brain it's called stroke in the arteries of the legs is called peripheral arterial disease when it's in the arteries to the digestive tract it's called mesenteric ischemia. But these all have the same thing in common, it's damage to the high pressure pipes, arteries, over time which can cause obstructions and leaks and these can be catastrophic and cause debilitating disease or even death. So this is were talking about will and low blood pressure, if the pressure in the arteries which are the muscular high pressure vessels that carry blood to the organs.

How do we know how blood pressure is bad?

Well, like I described before some of it is common sense. If you have too much pressure inside of the pipe or an artery, this is likely to cause damage to the lining of the artery over time, can cause the artery to stretch out which is what we call an aneurysm,. If it causes damage to the lining of the artery, unlike in a pipe in your house, arteries in your body will try to repair themselves using different factors from your bloodstream like platelets, white blood cells and monocytes from your immune system, building blocks like college and elastin, an outgrowth of smooth muscle cells to try to strange and strengthen the wall, and lipids and cholesterol from lipoprotein's will also deposit in the wall. Obviously over time if the wall stretches out too much or thickens too much it can either break open causing internal bleeding and damage to the organ in question which affects the brain can be catastrophic and deadly or if it's in the aorta which is the biggest bloodlust blood vessel in the body it can cause deadly bleeding and death through a multitude of mechanisms and if the walls grow too thick they can grow together or a plaque rupture and this obstruction can impede blood flow to the organ again causing debility or death depending on the size and location of the artery. So in some sense it's somewhat common sense that high blood pressure is bad. But we know also from lots of data and medical research that high blood pressure is bad. The idea that high blood pressure is bad became popular sometime in the early to mid 20th century when physicians started paying attention to high blood pressure. Eventually this crossed the radar of actuaries who are underwriting life insurance policies and this led to multiple studies of high blood pressure which found that high blood pressure is associated with higher all cause mortality across a full range of blood pressure starting around 80 or 90 systolic and going all the way up to 180 systolic with people at the high end of the range having almost double the mortality rate within a fixed period of time compared to people at the lower end of the range around this time. There were also major public health efforts to understand the cause of an increased rate of heart attacks and strokes that started occurring in primarily in middle-aged men in the middle of the 20th century. This effort led to the now famous study from Framingham Massachusetts which recorded physiologic parameters of patients over 20 years including things like lipid panels, blood pressure, diet, smoking and other health parameters to try to figure out what the risk factors were for cardiovascular disease. The Framingham study found unequivocally that blood pressure had a major impact on the likelihood of cardiovascular events or rather that it was associated (citation).

Actuarial studies done in the same time. All the way up to the new build and blood pressure study done by the Society of actuaries in 1979 found similar associations. Since that time there have been a multitude of studies, perhaps most recently and famously the S PR INT Sprint study which looked at patients with chronic kidney disease and split the patients into two groups one including a group who had aggressive blood pressure control goals of below normal less than 120 systolic and less than one hour less than 80 diastolic and a second group which had a looser blood pressure control metric with systolic control less than 140 diastolic control less than 90. The first group had such improved mortality (insert numbers) that the study was ceased after three years because it was deemed unethical to continue with the group that had passed blood control.

Another thing we can look at is young and healthy people. What are their average blood pressures? From then the average blood pressure in your teens is roughly 117/70 and for women it's roughly 112/68. This is also based on actuarial data.

We can also look at data from centenarians, people who live to over 100 years old. Based on your bars allies work studying centenarians it's become apparent that these people are typically just genetically better than us and that their genes allow them to live longer and healthier. What are there blood pressures? With her blood pressures are low or normal. The incidence of hypertension in centenarians is only about 60% of that of the general population of people 10 or 20 years younger than them.

  