

**CAROLYN S.**

Hi, everybody. I know you're still eating lunch and that's fine. I'm Carol Lacey. I'm a

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cardiologist. I started here about 15, 16 months ago. Before I got here, I was in the military for 11 years. I was at Travis for five years as a cardiologist. And I went to medical school at Drexel University. I did my residency training at Travis Air Force Base in [INAUDIBLE] and then [INAUDIBLE] cardiology.

I'm talking today about heart disease in women because February is heart month. So we're gonna talk about the number one killer in women.

I just want to ask everybody if they have questions to just leave them for the end and then we'll try to repeat anything so that our webinar audience are able to hear the question. Anybody from the webinar, they can ask questions as well.

OK, So when we talk about heart disease in women, just to let you know what I'm gonna talk about, just to give you a little overview. We'll talk about some epidemiology trends. We'll talk about a review of what heart disease in women actually looks like, and then how to treat patients. A lot of questions that I get asked very commonly are really about primordial prevention. And honestly, a lot of times, by the time they get to me, primordial prevention has already gone out the window. So as internists and family medicine doctors, you guys are the ones that are really important in sort of implementing or getting patients to implement primordial prevention.

So some good news about heart disease in women. So in 2007, when you compared 2007 to 1980, the death rate from ischemic heart disease in women was a third of what it was at that time. So in 25, 27 years, we made tremendous strides. And we think that about half of that decrease was related to preventing coronary disease from happening in the first place because we were treating risk factors, being more aggressive with hypertension and cholesterol. We think that the other half was related to secondary prevention measures. So after patients have already been diagnosed with ischemic heart disease, now they're being treated more effectively for secondary measures.

And what you can see with trends in acute MI over the last-- and this is really over just five years, 2002 to 2007, there is over a 20% decrease in the rate of hospitalizations in Medicare population of patients, which is a huge decrease in a really short period of time. And what they also found is that within African American men and women, there was a lower rate of that

decline compared to Caucasian men and women. And then we started questioning, is this really a real finding? Are there really 25% less admissions for acute MI in just a five-year period?

And at first, we thought, well, maybe it's really due to changes in our coding, the way the way we bill and code. But then when you look at it, and the age, sex, and race composition stayed pretty stable. As time has gone on, our troponin assays, so the troponin that we measure in the hospital has become more accurate. We're using lower and lower cutoff points for finding troponin in the blood. And so this might actually be a real finding that we've had such a decrease in this time. We've also found that there's decreased rate in prehospital sudden death.

And so this line is probably on every slide that has ever been in like, any talk on heart disease and women. And so, just to kind of go through it. These are women. The red line is women. The blue line are men. And then right around here in the mid-'90s is probably about the time we started really introducing statin therapy. And what you can see is starting in the early '80s, late '70s, that more men were dying from coronary disease than women were but somewhere in the '80s here, that line crossed. And even though the decline in both women and men has been very, very sharp and severe, more women than men are dying from ischemic heart disease. So that is a trend that we need to try to even out.

So that's-- some bad news-- so we talked about the good news. Let's talk about the bad news. So ischemic disease is still causing, like, a death per minute. And that's more than cancer, chronic lung disease, Alzheimer's disease, and accidents combined. One death per minute in women every year. And the scary population is the young cohort of patients. So even though in our older population of patients, they're doing much better and having less acute MI, in the younger population, those rates haven't changed. So we're not making as broad of an impact there as we need to. And what we're also finding is that women are much less likely to be treated with guideline directed medical therapy, aspirin, statin, beta blockers, ACE inhibitors, a lot.

Women are less likely to receive coronary angiography and they're less likely to have timely reperfusion therapy. So if they're not going in a cath lab, they're not getting [INAUDIBLE] stent in a timely manner, if they need a stent or bypass.

And so just to sort of sum up more of the bad news, when a woman presents with acute MI,

she is more likely to die within a year compared to a man with the same risk factors, same age and within five years, more likely to die or have heart failure or stroke compared to men.

Women, when they get hospitalized for acute MI, their length of stay is longer, they'll have higher rates of in-hospital mortality. They have more bleeding complications, and they have 30% more readmissions in 30 days than men do.

So to sort of back up a little bit, we talked about how in the Medicare populations, things have gotten better but in the younger population of patients, things are staying the same, if not getting a little bit worse. And so this is from 2014. They looked at over 230,000 admissions and this was a young population, 30 to 54 years old. And women were about 25% of those admissions.

And what they found in that population of patients is that the younger patients are sicker nowadays than they ever used to be. They're much more likely to have heart failure, high blood pressure, renal failure, COPD, and diabetes. And what they found in the hospitalization rates is that there was really no change in the rate of hospitalization, maybe even a little bit of an increase in the absolute rates of hospitalization. And again, consistently finding that women have higher in-hospital mortality than men. Even though the mortality has gone down overall for both men and women, women still have a higher mortality than men do.

So these are just graphical representations. All of these are risk factors, right, high blood pressure, diabetes, renal failure, stroke heart failure, and what you see is that as time marches on-- these are Black women, White women, Black men, White men-- as time marches on, there's a much higher prevalence of hypertension as time has gone on, higher incidence of diabetes as time has gone on, even renal failure, much worse in renal failure than what we used to see as time has gone on. And really, what you can see here in these, these are looking at the rates of acute within a young population of patients.

The amount, the absolute numbers of acute MI, they're low, but when we have them, we're not making any impact in this population here. That's what you can see here. In men, it's gotten a little better, but in women it stayed exactly the same. The line is flat.

So you know, like we talk about women, more likely to have more comorbidity. They're less likely to be hospitalized than men, but when they are hospitalized, they're gonna have a longer length of stay. They're gonna have an increased risk of in-hospital mortality. And it's really because risk factors are more prevalent nowadays and the comorbidities have increased for

both men and women, especially in the younger population of patients. And I think one of the driving forces of that is when you look at women over the age of 20, two out of three are overweight or obese. So that's leading to over 12 million women in the United States with diabetes, and patients with diabetes have three time higher risk of death compared to non-diabetics, and they have a higher risk of death compared to-- women diabetics have a higher risk of death related to ischemic disease than male diabetics do.

So this is another graphic that's shown at every-- probably every talk, not just cardiac talk. But you know, I think this is scary. So in 1991-- and it's not a political slide-- in 1991, there's a lot of blue. So blue on the screen means that there's a very low prevalence of obesity within that state, and then you get to 2008, and there's, you know, multiple states that have over 30% prevalence of obesity within the state, very, very, very few states that have a low prevalence, less than 20% anymore. So obesity is a real problem, and we need to try and combat that, at least, where we can.

So we already talked about women who have ischemic heart disease. So we already know that there's a higher mortality rate than men. The other difficulty in treating women with ischemic heart disease, is that they're more likely to have persistent symptoms. They're more likely to be hospitalized and overall, when you, like, look at these quality of life support here, their general rates of well-being are gonna be lower compared to men.

And I think one of the problems is that when we take women to the cath lab, what we find is that their coronary disease is different. It's less extensive and less severe obstructive disease than what men might have. And so 10% to 25% of the population coming to the cath lab who are having acute coronary syndrome, they're gonna have non-obstructive disease. You take them to the lab and we say, let's fix something but there's nothing really to fix. But even though if we don't find obstructive disease, they still have a 2% risk of death or recurrent MI at 30 days post-MI and their five-year event rate is up to 16%. Huge.

You know, we all know what our traditional risk factors for ischemic heart disease are, and when you look at women, as time goes on, over 80% of women will have one or more risk factors by the time they've reached midlife. And so one of the issues is cholesterol goes up, usually around the fifth decade of life and that's related to menopause. There's more obesity, and there's more diabetes.

And then when you look at there are more novel factors that we don't know how to

[INAUDIBLE]. It's never been studied. And it's related to hormonal changes and it's related to pregnancy. And so there's ovulation dysfunction, polycystic ovarian syndrome, complications during pregnancy like preeclampsia, gestational diabetes, and gestational hypertension are important.

And there was even just an abstract that came out in one of the stroke-- there was a conference somewhere, some stroke conference. I just got an email about it last week about women of advanced maternal age. And so we're talking about 40s. I mean, you all know that that's advanced maternal age. I mean, I got told that all the time. You're of advanced maternal age. What's that mean? But women who are having babies over the age of 40, they had a huge increased risk of having hemorrhagic stroke, and we didn't really know that before. And we're gonna see that more and more and more as women are delaying childbirth until their 40s.

Breast cancer therapies can be very, very devastating on ischemic heart disease. I mean, you have a patient that had radiation to the left chest years and years ago and they just got radiated, they're much more likely to have coronary disease develop, especially in the [INAUDIBLE]. And those patients are living longer than they used to.

And then the systemic autoimmune inflammatory diseases like rheumatoid, lupus, those are becoming much more prevalent, plus, we're also finding that these patients are at much higher risk of developing coronary disease and women have a higher prevalence of these diseases than men do to start out with.

One thing that always happens is that-- I have patients ask me this all the time. They, say, yeah, but Doc, my symptoms are different. I have different symptoms. And I ask patients all the time, you know, I talk to them about their symptoms. What were you feeling when you had your heart attack? Even I found the same thing.

So when we talk about typical angina. I have terrible chest pain that comes on when I'm exerting myself or I'm stressed and it gets better with rest and nitroglycerine. That's your typical angina. And that definition has been based largely on a male population. But when you put 74 studies together-- this is now a meta analysis of 74 studies-- what they found is that when you really question women, women had similar or higher rates of angina than compared to men.

And then when you look at another 69 studies, a different meta analysis, women who were

coming in with acute coronary syndrome, the majority of the women had some typical symptoms, some sort of chest discomfort, came on with stress or exertion, went away with rest or nitroglycerine. So this whole thing that women don't have chest pains, that's not true. Women have chest pain but you sort of have to-- gosh, it's not really pain. It's pressure. You know, you get that all the time. No, I'm not having pain. It's pressure. Ah, that word.

And when you start treating women for this, you'll find that a lot of them will just keep having chest pain symptoms or chest symptoms. And they'll go to the cath lab and they have normal coronaries, and you're, like, well, what do we do now? What do we do?

So you know, what we've said is that there's less anatomical epicardial obstructive coronary disease and women tend to have more preserved LV function, so their ejection fraction tends to be normal. We also find that women have more adverse coronary reactivity. There's more microvascular dysfunction, which is hard to quantify. And then also, there is still coronary disease but usually more often in women compared to men, what we'll find is that they're more likely to have plaque erosions. So usually what we think of is plaque ruptures open, you get thrombin, the vessel doesn't flow. There's no blood flow beyond the vessel. But sometimes in women, the plaque just sort of erode and it will sort of shoot and shower down into the microcirculation, which leads to at least acute coronary syndrome but it doesn't look the same as CAD.

When we take patients in the cath lab for coronary angiography, heart catheterization. These edges here are sort of normal coronary arteries. They're nice and smooth. Here's the [INAUDIBLE]. Here's the LAD coming out here. And when we're taking patients to the lab, this is what we're looking for. So here's a vessel that LAD is supposed to be coming along here and then, oops, it stops. It gets real narrow. We say, oh, look, let's put a wire down that and open that up with a stent, which is very reasonable. This is what we're looking for.

And the problem is that women, you don't really see that in any of these vessels. These are not healthy looking vessels. They're sort of shaggy. Might not be [INAUDIBLE] through here, but they're sort of shaggy. They're irregular, but there's no light out of the artery that says, look, there's a blockage. We need to put a stent in it and fix it. But there is disease. These vessels are diseased, no doubt. There's atherosclerosis in these vessels.

And this is what we're finding, and this is where patients and people get confused about well, why are you treating me like this? I don't have a blockage.

And so the problem is actually down the road in the microcirculation. And what we're finding is that there is a lot of microvascular dysfunction. We're not going to be able to see that on cath. You just can't. The vessels are too small. You just see contrast flush into the myocardium and it just gives you this little blush but you don't see the individual vessels. And so it's not allowing blood flow normally. We think that estrogen is a huge part of the reason that women have more microvascular dysfunction as time goes on, or I should say, lack thereof.

So with estrogen, what you get is increased vasodilation. Estrogen inhibits smooth muscle proliferation and it regulates prostaglandins within the microcirculation. But then when you deplete estrogen, women going through menopause, and they have ovarian failure, that increases the endothelial dysfunction and allows more lipid deposition within the vasculature. And the problem is is that we try to treat this, right? So we try to give women hormones. Here, take the estrogen. That's the problem. You don't have any more estrogen. We're gonna give you estrogen.

And what we found is that doesn't make the vasodilation better. It doesn't improve the microcirculation. Definitely most commonly-- we know it's not a useful therapy for preventing or treating ischemic heart disease, especially in an older population of women, who have gone through menopause and they've been off of it for a while. So you wouldn't start on HRT just for prevention or treatment of coronary disease. And it's questionable in the women who are just starting to go through menopause or having symptoms. And we don't know the benefit of exogenous estrogen in the microcirculation in that population of patients.

And when we treat patients who come in with an ischemic event, when they come in with acute coronary syndrome, the optimal medical therapy for women is the same as it is for men. It is exactly the same. And there are some sex differences in treatments for acute coronary syndrome, but when you get down to it, the treatment afterward is the same. So, you know, women who have obstructive disease and they come in with acute coronary syndrome, you want to get them to the cath lab because you need to see if you actually have obstructive disease or not. And the time you have when they go to cath depends on the cath lab's schedule [INAUDIBLE]. I'm just kidding. That's not true, exactly.

But use something like low molecular weight heparin-- you know, using heparin when patients come in with an acute coronary syndrome, I find myself saying, well, did you anticoagulate the patient? I find myself saying that a lot. And you forget that. It's like, oh, we should go to the

cath lab, but anticoagulating the patient before they go to the lab is important.

Use of IIb/IIIa, so when I was a Fellow, we did a lot of talk back and forth and we would debate back and forth and make the Fellows do presentations all the time on the use or the non-use of the IIb/IIIa inhibitor. And we don't use them as much anymore as we used to, and I think part of it is because our Plavix, ticagrelor, and prasugrel, have gotten so good. We're taking patients to the lab so much more quickly. But if you using a IIb/IIIa inhibitor on a [INAUDIBLE] patient is pretty reasonable and probably has more benefit in women than it does does so in men.

And then you get them to the cath lab, and you say, oh, gosh I don't have anything to fix. Why am I gonna put a stent in? And then you're, like, well, now what do I do? They don't have obstructive disease but they still have disease and so they need to be treated the same. So even without obstructive disease, you can get symptom improvement or improvement in vascular function with the medications that we use all the time. Aspirin, statins-- love statins-- beta blockers, ACE inhibitors, you need to use them all because the patient's had an acute coronary syndrome. Now, we shift our focus and we have to make sure they don't have another one.

And exercise training is extremely important, really in all patients coming in with acute coronary syndrome but definitely in women. Because what we find is that women who are presenting with acute coronary syndrome, their functional status at baseline isn't very good. Women just don't have as robust a functional status on a whole. Compared to men, they're just not as active. We need to get them exercising, because that also helps improve the vascular function.

So I don't know about you guys, but I always have to defend my Lipitor. Like, you know, I don't have a problem with cholesterol. You've had a tri-vessel bypass. I understand your LDL looks good but you have coronary disease. We need to keep those grafts healthy. So statin drugs are great, right? Find a cardiologist that doesn't say that statin drugs are great and I'm gonna find you someone who, like, should not be a cardiologist because they work.

And so we know that after a patient has acute coronary syndrome, statins reduce mortality and may reduce recurrent MI, and they do it in women, too. So these are just a couple of trials that came out. There are new guidelines that are being published in circulation. And it's like a scientific statement. So one trial that they talk about is the CARE trial. And what they found--



they looked at patients for years-- but what they found is that, in six to 12 months there was a 43% less risk of death and a 57% reduction in recurrent MI. At six to 12 months, that's phenomenal. We don't see that in anything anymore.

And then PROVE-IT TIMI 22, which is another older study, looked at women, and when they compared women compared to men, there was a 25% reduction in the primary endpoint. The cardiology trials-- the primary endpoint is always one of those, like, major adverse cardiac events, like death, death from MI, stroke, or recurrent MI. And so women actually had a much more robust reduction using statin therapy compared to men. So we need to be pushing statins on patients. All this bad stuff I read on the internet. OK, OK, I know. You still need to be on it.

So that's after they come to me, right? And so I, you know, say, you need to be on statin. You need to be on-- yes, I know. I know. I know. You don't want to take this, right? Right, don't we all do this all the time? I don't want to take that. But if you want to prevent that and so this is where they come to you because we've got to prevent them from having acute coronary syndrome. So there actually are guidelines that came out in 2011. They came out before they were updated in 2011. So they talk about prevention of cardiovascular disease.

So they classified the risk of having cardiovascular disease. And so when you get down to it, your lifetime risk for developing ischemic heart disease is about 50%. So if you don't want to have ischemic heart disease, you need to treat those risk factors and be aggressive at [INAUDIBLE] point. And so when you look at the trial evidence, it looked at women who would have been considered high risk or they had a large spectrum of risk factors and so they want to get their treatment guidelines aligned with the evidence.

And you have to appreciate there are limitations to our risk stratification model. So Framingham, for instance, does not take into account family history. So that's a null limitation on the Framingham risk report. And when they're looking at event rates, they're looking at heart attack. They're looking at ischemic heart disease, death, or stroke, so again, more of the combined endpoint.

And so our high risk patients-- you have a patient that comes into you, and they're considered at high risk for having an ischemic event. They've had known disease, they've had known stroke, they have known peripheral disease or AAA. They're chronic kidney patients, or they're dialysis patients, diabetes, or after you've put in all their stuff into Framingham, they have a

10-year predictive risk of greater than 10%. And this is one in ten in the population. It's a fairly large amount of the population that we have right now. And over a 10-year period, their event rate is going to reach nearly 20%. You have to be very aggressive in this population of patients.

This is probably where we're gonna find most of the patients. So this is the at risk population. So smokers, maybe they're blood pressure's not that great or they have some risk factors, family history, metabolic syndrome. Evidence of advanced subclinical atherosclerosis. So this is the CAT scan that you get back of the chest for whatever reason you've done a CAT scan and it says there's atherosclerosis in the coronary artery. Or if they, you know, do a carotid INT, those are the patients that have advanced subclinical atherosclerosis.

And then poor exercise capacity on a treadmill test. So this is your 55-year-old woman that you sent for a treadmill test and she can barely go four minutes without having to stop because she's just so tired and can't go anymore, even if the EKG is completely normal.

And then you also have your cardiovascular diseases and your pregnancy complications, which these are sort of new, coming to the table about how important these risk factors are. This is the majority of our population of patients, and they're gonna still have an event rate. It's less. It's less than 6% over a 10-year period but we want to try to impact in this area here.

Then you have the optimal risk patients. And I don't know. I don't really-- I don't fall into this either. So this is only 4% of the population overall. They have perfect cholesterol. They have perfect blood pressure, not treated. And all these things are untreated. Their glucose is normal. Body mass index is normal. They don't smoke. They exercise a lot, more than me. And they have a healthy diet. What did we have for lunch today? Right, I mean, I had sandwiches with food that was upstairs. So I am not, like, it's not like my diet is any better. And they have the lowest rate of event rate, these patients at optimal risk. This is hard to get to, to have all of these factors to be considered optimal.

And isn't this a long slide? On how you go through. You go through, you calculate your risk, and how to talk to the patient about calculating risk.

And then they also talk about what not to use. So we talk about hormone therapy. You know, start hormone therapy for the prevention or the treatment of ischemic heart disease. Patients don't really ask me this anymore. They used to. But they'd ask about vitamin C and vitamin E. I don't have a lot of patients asking me about it anymore. You don't use it to prevent coronary

disease. You don't use it as secondary treatment for coronary disease. Same with folic acid.

And aspirin used to prevent MI in women less than 65. So aspirin is coming into question, and we're starting to really question how we use aspirin nowadays. And just routinely giving aspirin to every woman under the age of 65 probably isn't reasonable. I do it on a more case by case basis.

And after they get over the age of 65, the task force recommendation is you can use a baby aspirin, but it's really more to prevent a stroke, more so than it is to prevent ischemic heart disease.

So in patients who've had an infarct before their secondary prevention, and also, I'd argue the subclinical atherosclerosis that you find on the CT scan, I consider that secondary prevention in [INAUDIBLE] that's establishing [INAUDIBLE]. So in those patients, I will put them on aspirin. And so if you've had an infarct, you probably should be on one.

And so what guidelines recommend-- the guidelines here that I just went through from 2011 recommend women over the age of 65 to prevent stroke. The USPSTF talks about women 55 to 79 years of age to prevent ischemic heart disease. And the FDA doesn't support it. So the FDA is like, no, we don't know, no general use. But we'll see. I think that there are some studies that are ongoing. It will take time before they ever come out. This is where we're at right now.

But all this comes down to pills, right? You're pushing pills on patient. And I saw this-- this came out last year. And I was-- the more I think about it, the angrier it makes me, knowing that 30% of people would actually rather die than take daily meds. So this is a survey that came out. And the more I think about it, I'm like, let's actually put the patient in that situation. Really? You'd rather die than take a medication every day? Really? So I'm not sure that this is real, but this is what people said. If they had to take pills, they would rather die early and it's like one or two years. So it's not like you're saying, oh, you're gonna die tomorrow and you're gonna lose 20 years. They say, OK, I'll take a year. I'll go a year earlier. I mean, you all know about this, too. I'm very healthy. I don't want to take any pills.

OK, so if you want to stay very healthy, there's work that goes into it, right? And does the work actually pay off? That's the other question, too, because sometimes it doesn't.

This is a paper that came out last year and they looked at primordial prevention of

cardiovascular diseases. So primordial prevention is preventing the development of our traditional risk factors-- hypertension, dyslipidemia, and diabetes. And so if you can maintain a healthy lifestyle during young adulthood-- and so this is when patients are starting to come to us, right? We're starting to get the late 20s, early 30s, mid-30s, coming to see us, to establish [INAUDIBLE] and this is where we need to impact. So if you can maintain a healthy lifestyle, it's not going to be associated with a low risk profile when our risk goes up, after menopause, usually around mid-50s.

And so they looked at the patients in the Nurse's Health Study. It started in 1991. They sent them out questionnaires about their food frequency and they looked at almost 70,000 women who were younger. They were starting around the age of 37. And they came up with optimal lifestyle factors. So obviously, not smoking. Smoking's bad. Diet-- and so this population, or these investigators, they came up with this index and they looked at the top 40 and it's all arbitrary how they came up with the index. But they have what they consider their optimal lifestyle dietary index.

Then they looked at physical activity. How much are we exercising? So 2 and 1/2 hours a week of moderate to vigorous intensity exercise. That's probably about 30 minutes a day, six or seven times a week. And then television watching, less than seven hours a week. That's not very much TV at all. Television watching is the bane of our existence.

BMI, make sure BMI is normal. And then they looked at alcohol consumption. and they considered healthy alcohol consumption no more than a drink a day, or approximately one drink a day, could be less but it couldn't be more.

And so their endpoint, this time-- They looked at women for a really long time because they started in 1991. The paper just came out last year. They looked at incident ischemic heart disease, nonfatal MI and fatal CHD. And it was a low-- you know, you're starting out with 70,000 women but they found 500 women who had documented ischemic heart disease in 20 years and their mean age was about 50. So that's young, that's a lot younger than we ever used to think. We used to think a woman in her 50s was [INAUDIBLE] but that's not what they found here.

And then they also wanted to see how many risk factors had developed by that time, as well. So you know, you have a low incidence of ischemic heart disease in a young population of patients but then, when they're starting to get to this age of 46 to 50s, you have at least one of

three risk factors, whether that be diabetes, hypertension or dyslipidemia and that's like half the population of patients. So there's a lot of ischemic heart disease reported diagnosis with one or more risk factors.

And so when they looked at the optimal category, when the patients were optimal, so they had all these things that were good, the hazard ratio for developing ischemic heart disease was low, 0.08. In the presence of having one or more risk factors, the likelihood of having-- the hazard ratio for having one or more risk factors was also less than one, 0.3. Those are pretty good numbers. We don't see a lot of those numbers.

And so when you look at this slide, when you see the hazard ratio of patients who have no clinical risk factors or have one or more clinical risk factors, but they don't have any of these lifestyle factors, their hazard ratio of having an event is really high but if they've got four or more, their hazard ratio is very low. So that suggests that if you can maintain a healthy lifestyle and maintain all of those good parameters, that your risk of developing ischemic heart disease, or even a risk factor is low.

This just shows the same thing in different ways. So if your body mass index is good, you're good physical activity, diet, reducing your alcohol intake, not smoking, not watching TV-- if you have all six of those ratios, your hazard ratio for developing one of the risk factors-- hypertension, diabetes, dyslipidemia-- is really low. Same thing for ischemic disease. If you had all of these good factors, your hazard ratio is also very low for developing ischemic heart disease.

So to put it in the other numbers, if you had six of those healthy lifestyles, those women had a 19% decreased risk of ischemic heart disease, and there was a 66% decreased risk, two thirds decreased risk for developing a risk factor. That's amazing. There's nothing that we do that early on that really has made that much of an impact.

And so what the authors hypothesized from this, is that 70% of ischemic heart disease and half the risk factor diagnoses may very well have been prevented if we started early on. So when we're starting to see some of these patients coming to us, we need to start counseling them on their lifestyle choices. Of course, these are women that had to do it. You can counsel all you want but if the patient doesn't actually do it, then, well, it is what it is.

So when you're talking about lifestyle modifications, the way I tell patients is don't smoke. If they're coming to me and they're smoking, they just get a look like, smoking? Really? They're

like, yeah, yeah, I'm like, you know that's bad for you, right? And they're, like, yeah, I know. It's bad. It's like, OK, OK, well, you should quit.

Modification number two is they need to exercise. They need to move. It doesn't matter how we move. We need to do something to move because when we don't exercise, you get atherosclerosis, and you get it either through inflammation, dyslipidemia you develop hypertension, you get all these things that physical activity makes worse and then that impacts the risk of having atherosclerosis. And it's a big, bad cycle.

And so this is also from the Nurse's Health Study. This slide, I think, is sort of difficult how it came across because you've got two groups that have an increased risk and one group that has a reduction in risk. When you look at these two groups that have increased risk, increased risk of obesity and increased risk of diabetes-- so for every two hours a day that you spend watching TV, you increase your risk of obesity and you've increased your risk of diabetes. That's TV. Gosh, the *X Files* was my favorite. I miss it, too.

If you're just spending two hours a day sitting at work, you still have an increased risk of obesity and increased risk of diabetes. But then, you can flip that around and if you spend an hour a day walking briskly, look how much of an impact you've made. This is a reduction in your risk of diabetes and a reduction in the risk of obesity. Just moving is important.

Same thing whether it's vigorous exercise, however you want to define it, aerobics, dancing, diving, tennis, swimming, that's considered vigorous exercise and walking. Both of them, the more you do, the more risk reduction you're gonna have. Just walking-- patients come and I think that's something that patients come in and they're like, oh I gotta start jogging. No, you don't but you gotta go out and walk. That's all you have to do is walk and be sort of brisk about it.

And then you get the question-- you know, so that's the young population of patients-- but then, you know, women who come in, that are maybe a little bit older. Maybe they're in their 50s, 60s, and then they say, well, it's too late for me. I'm too old. Well, that not true. So it's never too late to start. So this is a group out of the UK. They were 50 to 64 years old. They followed them for nine years and they were looking for hospital records or deaths from heart disease, stroke, or thromboembolism. And they were surveying patients, how much do you exercise? What kind do you do? How strenuous are you?

They asked about their frequency. They sort of put the type of exercise into housework,

gardening, walking, cycling, or any work or exercise that caused sweating or a fast heart beat. I don't know. I don't know how much-- like gardening and housework are good. I don't know how good it actually is but they used that. And so their mean age was 56 year old women. Their BMI was a little bit on the high side or the BMI was abnormal. It was 26.

And so what they found is that, with increasing frequency at baseline of strenuous exercise or any physical activity, there is a progressive decrease in weight, BMI, and a proportion that was treated for hypertension. So a lot of those, just even a modest amount of weight really improved their treatment for hypertension or made it easier to treat their hypertension. But any physical activity reduced the risk of heart disease, stroke, or thromboembolism. You've just gotta get up. You just have to get up and move around.

And the group that had the biggest benefit were really in the leaner women and it was based on stroke and heart disease, risk of having stroke or heart disease. And what they also found is that the more active you were, the less medication you needed because you could control the high blood pressure with maybe 12 and 1/2 or 25 of hydrochlorothiazide instead of needing to be on four drugs to keep your blood pressure under control.

Then you get to lifestyle modification number three. You have to eat a healthy diet. That's important. And so when we're talking about healthy diet for everybody, but really these are out of our guidelines for women in preventing heart disease. You need to have a diet that has a lot of fruits and vegetables. You want whole grain, high fiber foods. Stay away from the white rice, white flour. You want to consume fish, the oily fish at least twice a week. So that's a lot of salmon, cod. Canned tuna fish counts, if people like canned tuna fish. They can't drown it in mayonnaise, but if you're eating canned tuna fish and maybe putting some olive oil on it, that counts.

You gotta limit the intake of saturated fats. Limit the alcohol intake to no more than one drink per day. Sodium intake is 2.3 grams a day. And so 75% of the sodium that's in our diet is coming from processed packaged foods. So very little of it actually comes from what we actually shake on with a salt shaker or use in our cooking. It's really in the cans, in processed foods. I tell patients they need to start more and more unprocessed, and then they can add salt from there. And trans fatty acids, those are fairly well gone at this point, I think, from our diet, based on the FDA, but you have to avoid those as well.

And so does it actually impact? If you make some dietary changes, will it impact? So this is the

DASH diet from the Dietary Approaches to Stop Hypertension. The green is bad. The red is good, OK? It seems like it should be the opposite direction but that's the way this slide came across. So green is bad.

So patients who are eating a very good diet, lots of fruits and vegetables, low fat, low cholesterol, they had a reduction in their systolic blood pressure, same in their diastolic blood pressure. But patients who have the normal Western diet, low fruits, low vegetables, not many dairy products, their blood pressure stayed about the same or didn't change.

Fruits and vegetables-- here's more evidence that you should eat your fruits and vegetables-- the more that you eat a day-- this is eight servings of fruits and vegetables a day, you'll be eating all day long to get eight servings, that's the group that has the most decreased risk of having adverse cardiovascular outcome. So the more fruits and vegetables you eat, the better your risk of an adverse cardiovascular outcome.

Same thing with whole grains and fibers so the more fiber you eat-- and I know they cross once. I know that the confidence intervals cross once. But it looks like the trend is the more fiber that you have in your diet, it decreases your cardiovascular risk. So we should be eating a high fiber diet, which we don't do a very good job of in the United States.

And so then we get into the Mediterranean diet, and so this is from Lyon, from France. It's the Lyon Diet Heart Study. And they looked at 605 patients who had had an infarct. And they randomized them for the Mediterranean style diet, which is high in polyunsaturated fats, like olive oil and high fiber, and then the Western diet, high in saturated fat, low in fiber. And so what they found is that this is freedom from cardiovascular death or repeat myocardial infarction. So this is bad. The green diet is bad. Again, it seems like they should switch the green light, red light, lines but the Western diet is bad. It has more events. Your likelihood of having no events was higher, was smaller if you followed the Western diet. And if you followed the Mediterranean type diet, your event rate was lower. So dietary changes make an impact. And going to a Mediterranean style diet reduces the cardiovascular outcome.

So this is just more, lots of fruits and vegetables, a couple times a week of having fish. And one thing that the guidelines recommend, is a lot of people still take fish oil supplements because they think it helps. But if you're not using it to treat hypertriglyceridemia, they're just using fish oil just to take fish oil three-- fish twice a week. You don't need to spend your money on fish oil tables. It doesn't add anything. We went through this great-- we thought fish oil was



great and we'd throw it at patients all the time and now, the data just hasn't really panned out to be fantastic for it, other than in hypertriglyceridemia So I tell patients if they're eating it twice a week, they don't need to take fish oil tablets, or if they don't have another reason to take it.

Lots of fiber, whole grains, sugar, we know is the devil. Sugar is in everything, everything that tastes good, but it's bad and you want to try and stay away from it. Eating nuts and legumes and seeds is good for you. Those fats are polyunsaturated fats. They're healthy fats. And then trying to decrease your saturated fat, minimize-- low cholesterol, that dietary condition hasn't changed from the FDA. Minimizing alcohol and then staying away from sodium or cutting out sodium when we're eating healthy. The vitamin D-- I don't know what to say about vitamin D. I mean, we probably all need to take vitamin D supplementation. Like me, I need it.

So we made the whirlwind and so this is for a sum up-- you know, when it comes to women with ischemic heart disease, we're making a difference and that's important. We just needed to tweak a little bit. And so our mortality from ischemic heart disease has been decreasing over the last three decades, which is fantastic.

And the other thing that we need to sort of open our minds to is that they might have similar symptomatology. They may have different symptomatology. They're gonna have more dyspnea but they're still gonna have chest symptoms. And even though the symptoms may be the same, the pathology may end up being very different. It's not an obstructive lesion. It might be sort of this non-obstructive yuckiness that just sort of lines the vessels and showers down into the microvessels.

And optimal medical therapy for patients with ischemic heart disease is the same-- aspirin, statins, ACE inhibitors, beta blockers. And if they want to avoid taking all of those medications, they've gotta start early with aggressive lifestyle modifications. Helps if you start early in life. You may not be able to come off these medications and if they've had an event, it doesn't make any difference to me. You know, really, if they've had an event, I don't care how good everything else looks, I'm probably not gonna stop their statins. I might stop their beta blocker down the road, but you know, they're probably gonna stay on a statin, probably gonna stay on an ACE inhibitor and an aspirin, probably for the duration, and tell them to think of it as prevention medication.

But if they want to have decreased medications, they need to start doing something to avoid it.

So February is heart month for the American Heart Association. They have this National Go

Red for Women Day and so it's like wear red for women. It's always the first Friday of February.

I send a lot of my patients to the American Heart Association website-- women and men, it doesn't matter. They've got this thing called the Life Simple Seven. And so it goes through all of these things that we've already talked about. It sort of generalizes it for both women and men. And they have a quiz on there. I tell patients to take the quiz. And I've taken the quiz myself, too. And I tell them, I'm like, you've just got to be honest with yourself. You're the only person that looks at this quiz.

We also sort of give them a dashboard of how well they're doing. And it asks questions like, how much are you exercising? How well are you doing? How much alcohol are you using? You know, are you on medication for blood pressure and things like that? All of those things, it asks all those questions, you know, sort of give them a, hey, here's where you're doing well. Here's where you need to fix. And then after you get through that, and you keep clicking through, it takes you into their website and it's just got a plethora of information. There's so much information. You can spend hours on the website just, like, clicking on more and more stuff. So I give that to patients all the time. [INAUDIBLE]

**AUDIENCE:** Can you speak to any specific recommendations for statin therapy versus systemic autoimmune patients? Are there any, like, sort of, outlying sort of pathways or is it just a risk factor to consider?

**CAROLYN S. LACEY:** I think that we're gonna need some more data on that as time moves on. I think that we'll find is that-- I think that the systemic inflammatory diseases will soon be part of the traditional risk factors and you'll just have that. Because, you know, we're finding more and more that patients with lupus and [INAUDIBLE] arthritis are at much higher risk for developing coronary disease.

So it's one of those things-- so the way I would use it is if I'm on the fence or if you're on the fence about starting a statin in one of those patients and they're close. You know, they're like maybe right around like the 10% range and they have one of those diseases, that might be the turning point, you say, OK, we should give this a shot. Does that help?

**AUDIENCE:** Thank you.

**AUDIENCE:** Is there any role for screening with them rheumatological diseases for coronary heart disease

if they don't have any symptoms?

**CAROLYN S.**

So when you say screening, do you mean, like, just doing a stress test? OK, so the question was for women with rheumatological disease, is there any role for screening?

**LACEY:**

And so I would sort of generalize it all patients. So there are very few patients that I screen, OK? And when I think of screening, I think more of looking-- I think of a calcium score as a screen, more so than a stress test. And the reason is, the stress test tells you what things look like at that point in time. And it gives you a risk. You know, it will say your risk is lower. Your risk over a 10-year period of dying from a heart attack is low or not or whatever. But if they're not having any symptoms, I'm probably not gonna screen them with a stress test. But I may be more inclined to looking at a calcium score or a CRP, but CRP's gonna be harder in the highly [INAUDIBLE] group. And that's gonna be harder in [INAUDIBLE] that may be elevated. But I'm much more likely to look for a calcium score.

Calcium scores have a hard time getting paid for, unfortunately, so if they're getting a CAT scan for any reason, I'll look at that. And I'll say, oh, you've got atherosclerosis. Calcium only forms in arteries, in coronary arteries, that have atherosclerosis. So if you have a patient that's had a CAT scan, they've got calcification down their coronary artery, they have atherosclerosis, and I think that patient should be treated more aggressively.

So that's how I would screen more so than the stress test. An example of the stress test is, does anybody remember Tim Russert? [INAUDIBLE]

Right, he was a news reporter. He was, you know, a famous news reporter. And I probably only remember it because I was in Washington, DC when it happened. So I think he was sort of based out of Washington, DC. And so he died a sudden death like a month after having a stress test that was OK. And when they did an autopsy on him, he had horrible coronary disease, even though the stress test just a month before was fine. So I tell patients that when they come in asking for a stress test. I just want to get checked out. I'll probably cave and order the stress test, but I tell them, you know, this is probably not gonna help. This is not as good as you think it's gonna be down the road, if you're not having any symptoms. Symptoms are a completely different ballgame.

**AUDIENCE:**

Thank you very much.

[SIDE CONVERSATION]

