Advancements in Diabetes Seminar
Hypertension Guidelines

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Good afternoon and welcome to today's advancement webinar. My name is Dena Wilson. I am the Clinical Consultant for the Division of Diabetes Treatment and Prevention Program and the Chief Clinical Consultant for Cardiology for the Indian Health Service. I'm a board certified cardiologist. I have no financial disclosures. However, I am member of the American College of Cardiology, Board of Governors, representing the United States Public Health Service.

During the next 45 minutes or so, I will be talking about hypertension. The evidence presented today will focus on the diabetic population. I will begin with a broad overview of hypertension followed by an overview of the evidence behind the guidelines. I will briefly introduce the 2017 ACC/AHA Hypertension Guidelines and the 2018 American Diabetes Association Standards of Care for Hypertension. And lastly, we will look at two patient cases that will hopefully bring the information together.

Here's the American Diabetes Association evidence grading system, which is used for the clinical practice recommendation. I like to go over this because after each recommendation you will see the evidence grading system labeled as A, B, C, or E. A represents the best evidence and E is expert opinion or expert consensus.

Here's the evidence grading system for the American College of Cardiology and the American Heart Association Guidelines. Class 1 is the strongest recommendation with the greatest benefit and Class 3 is not recommended due to harm. The level of evidence is broken down into A, B, or C. And once again, A being the highest level of evidence with a strong randomized controlled trial, and C, representing expert opinion.

So, first, let's just talk about the basic statistics about hypertension. According to the CDC, approximately 32% of adults have hypertension and of those, about half of them have their hypertension controlled. The cost of hypertension is approximately 48.6 billion dollars each year. This slide shows the prevalence of hypertension as it increases with age and those over 60 having the highest prevalence of hypertension. Women over the age of 60 have the highest prevalence at 66.8%.

So, what is hypertension or high blood pressure? Oftentimes, we define hypertension by a number, but what is the definition beyond a number? If the patient were to ask, "Doctor, can you describe what blood pressure is and not use a number?" What would you say? Well, blood pressure is the force exerted against the blood vessels as the blood is being pumped

from the heart to the body? Cardiac output times total vascular resistance equals blood pressure.

There are several factors that affect blood pressure such as the amount of blood being pumped out of the heart. So this, obviously, will change with the patient's fluid status or other conditions such as anemia. The strength of which the heart contracts or the ejection fraction of the heart will also affect the force, and the resistance of the blood vessels receiving and carrying the blood.

So, now if we go back to a number as the definition of hypertension, what do they consider normal? What is the number in which the force is considered high given all the factors that affect blood pressure? Is it 150, 140, 130? The answer I believe is based on each individual patient. But, we're going to talk more about this later.

For now, let's talk a little bit about the pathogenesis, as I discussed in the previous slide. The sympathetic nervous system increases the sympathetic tone and provides mutation to endothelial cells which increase vascular resistance and also act on the renal system which increases renin release, sodium retention, water retention. As I said earlier, the fluid status and then, again, the cardiac output. So, all of these function together to define our blood pressure. And like I said earlier, what is considered high? Well, that's something that we are going to have to talk about.

So, which guideline is right? The answer depends on the guideline you choose to follow. This slide is a picture of some of the few that -- of the different guidelines that are available for the management of hypertension. There are several guidelines that I couldn't fit onto the screen, but I just wanted to show how overwhelming this topic is currently.

The difficulty with having so many guidelines is that each guideline is different as to how hypertension is defined as well as the treatment goals. So which one is correct? It depends. I do not know how many of you have seen this dress, but it was quite a phenomenon for a while. Some people look at this dress and saw blue and black while others saw white and gold. The bottom-line is that everyone was looking out the same dress, it was just a matter of their perspective. Some people were able to see blue and black once they were told that it was blue and black or vice versa. And this also can apply to the guidelines and how we interpret the evidence plays on how we interpret the guidelines.

I am going to move on to the guidelines but I'm going to try my hardest not to get boring and caught up in evidence because this is not a journal club and that is not really the point of this talk. I would like to point out how many of the different societies can arrive at different conclusions and to get us to thinking what we should be thinking about when we're treating hypertension in our patients.

So, in order to this, we do have to go through a little bit of the evidence and I am not going to cover it all and I not going to cover it in detail but will hit on a few of the bigger studies and bigger guidelines.

So, this is a summary slide of five guidelines showing the target for systolic and diastolic blood pressures followed by the evidence grade. The last column is a rationale as to why these targets were chosen. As you can see, three out of five had a systolic target of 140, which was

largely based on the ACCORD Blood Pressure Trial and the lack of evidence to treat for goal of less than 140.

We then have the 2017 ACC/AHA guidelines, which were heavily weighted on the results of the SPRINT Trial and has now lowered the threshold for the definition hypertension to 130. Before we move on, I just would like to point out the American Diabetes Association in 2013. Actually, I have two sets of guidelines. 140/90 for most patients but, for those who have higher risk and can be treated successfully without side effects, a recommendation of less than 130/80 with a grade C level of evidence. And so, again, that's not enough evidence to be convincing, but it's more than expert opinion.

So, the release of the 2017 guidelines made headlines in national news and this was the biggest topic covered really was the definition of hypertension was now going to be 130 mmHg or greater with a diastolic of 80 or greater.

So since those guidelines were released, there has been a lot of controversy. And one of the biggest issues was that there is going to be many, many more Americans who are now going to meet criteria for the diagnosis of hypertension. And also, that there are concerns that there will be overtreatment of patients. And another big concern was that the trial, SPRINT was really what these guidelines were based off of, and those guidelines did not include certain patient populations.

So, before we move forward, let's just review the 2017 hypertension guidelines just in case you were not able to review those when they came out. So, there is no longer a pre-hypertension stage. But now, it is broken down into normal, elevated, stage I or stage II.

So, elevated blood pressure is now defined as a systolic blood pressure of 120 to 129 and a diastolic of less than 90. If you have a diastolic blood pressure greater than 80, you will have stage I hypertension despite your systolic blood pressure being 120 as well as vice versa. If you have a normal diastolic, but your systolic is 130 or 135, 139, you are stage I hypertension. Stage II hypertension is a systolic blood pressure greater than or equal to 140 with the diastolic greater or equal to 90.

Also note, in column three and four is the 10-year atherosclerotic cardiovascular risk assessment. The guidelines were heavily weighted on cardiovascular risk and I think that's something that doesn't come up in a quick clinical review but when you read the 276 pages, that were made very clear. And so, patients who are at higher risks for cardiovascular events, it was recommended that they had more aggressive treatment versus those who did not have that high risk.

So, that didn't make the headlines and it also made things a little more complicated for us in terms of treatment of patients because previous guidelines, we didn't have to sit down and use a risk calculator. Patients were either treated or not treated based on the reading of 140/90 or greater.

So, now that I've very briefly introduced the ACC guidelines. Let's just quickly go through some of the data that talks about how we got the numbers we get to. And like I said earlier, we're not going to do a journal club, we're just going to do a quick overview.

So, the ADVANCE Trial, this is a randomized controlled trial of 11,140 patients, type 2 diabetics, ages 30 to 55 years of age with a risk for vascular disease. Well controlled diabetics and those on insulin were excluded from the study. And this study was actually an active drug versus placebo trial. So, their primary outcome did not focus on blood pressure goals and that's the takeaway of the study. What was found was that there was a 9% relative risk reduction in adverse cardiac event and a 14% risk reduction in total mortality.

However, like I said, the patients were randomized to active drug not different blood pressure goals. Although the treatment resulted in a mean blood pressure of 136 versus 140 on placebo, that was not the primary outcome that was being addressed.

The UKPDS trial is a randomized controlled trial with 1,148 patients with hypertension and diabetes, and this was a very long study with an 8.4-year follow-up and patients were randomized to either tight blood pressure control, less than 150/85 or less tight, less than 180/105.

And the outcomes here were diabetes-related death and death from all causes and first clinical endpoint diabetes. What we found here was that the relative risk reduction was 24% in the diabetes-related endpoints, 32% in the diabetes-related death and 44% in stroke and 37% in microvascular disease so that was great.

The problem here is that, as you know, the blood pressure goal is 150 versus 180, so there's huge difference there as well as we're not able to separate systolic and diastolic blood pressure lowering effects with this study. But we do know, based on the study, that blood pressures less than 180 were good.

So, the big study is the ACCORD blood pressure study and the ACCORD Trial was a randomized controlled trial of 4,733 patients with type 2 diabetes with their A1Cs greater or equal to 7.5. Patients were over the age of 40 with cardiovascular disease or over the age of 55 with high risk of cardiovascular disease. These patients were randomized into either intensive therapy with systolic blood pressure less than 120 versus standard therapy less than 140. The outcomes were nonfatal MI, nonfatal stroke or cardiovascular death.

And what ACCORD found was that the outcomes were similar in both groups. Although there was a significant reduction in stroke at 41%, it was balanced against the greater risk of adverse drug event which was 3.3 versus 1.3 in the standard therapy group. The other problem with ACCORD was that it was designed to detect a 20% relative difference in primary outcome and the observed event rate was half of what was expected.

And so, the HOT, Hypertension Optimal Trial, is a randomized controlled trial of 1,500 type 2 diabetic patients with hypertension defined as diastolic blood pressure of 100 to 115 and this is pretty much the diastolic readings are based on this data. Patients were randomized in the trial to diastolic blood pressures greater or equal to 90, greater or equal to 85, or greater or equal to 80. And basically, the findings were that there was a -- diastolic blood pressures less or equal to 80 led to more reduction of CV death. But it was noted that there was a slight increased mortality in the intensively treated diabetic patients with ischemic heart disease. And JNC7 says it cited both UKPDS and the HOT trial as their evidence behind their blood pressure goals of 130/80 or less.

So, now let's talk about SPRINT a little. First of all, of all the previous studies were all in patients with diabetes. SPRINT did not include any diabetic patients. There was a randomized controlled trial of 9,361 patients with systolic blood pressures greater or equal to 130 and the mean follow-up was 3.26 years. The outcomes we're looking at all-cause mortality and they did find that the lower adverse cardiac event in the intensive treatment group was 1.65% versus 2.19% in the standard treatment group. The rates of adverse events not including injurious falls were higher in the intensive treatment group.

The people that were excluded from SPRINT included diabetics, those with past stroke, clinical diagnosis of dementia or being on the dementia medication, people residing in a nursing home, those with substance abuse, active or within the past 12 months, those with symptomatic heart failure within the last six months or a left ventricular ejection fraction of less than 35%, those with a GFR less than 20 or polycystic kidney disease and anyone of significant history of poor compliance with medication or attendance at clinic visits. Well, this is our entire patient population.

So we take that with a grain of salt. The other interesting thing about SPRINT is that when they were obtaining the blood pressure measurements, they had people sit down and rest for five minutes before checking their blood pressure. It was checked three times consecutively using an automated blood pressure cuff and they used the average of those three blood pressure measurements to assess the person's blood pressure and determine whether or not medication should be adjusted for them. This is why the guidelines put so much emphasis on correct blood pressure measurement because this is how blood pressure was measured in these studies. The number needed to treat for -- to prevent a primary outcome event that for any cause of death from cardiovascular causes during the median 3.62 years of the trial were 61, 90 and 172 respectively and that's why that study was stopped early.

So, here is a kind of the table that summarizes what we just went through. The randomized controls trials and the findings. And based on all of this -- American Diabetes Association has showed them to continue with their previous recommendations so they did not change recommendations based on these findings of SPRINT and ACC/AHA recommendations.

So now, let's switch gears a little bit from the evidence to the recommendations. Let's actually take a look at this. We're going to first review the 2018 ADA Standards of Care and then we will go through the 2017 ACC/AHA Hypertension Guidelines and back and forth talking about the definition measurement, lifestyle modification and the pharmacological treatment.

The American College of Cardiology/American Heart Association has defined blood pressure into four categories that we talked about earlier. The Normal, Elevated, Hypertension Stage 1 and Hypertension Stage 2. And the biggest thing is to point out here is the "ands" and the "ors". And so, like I stated earlier, diastolic blood pressure on its own is considered Stage 1 Hypertension.

The blood pressure goal for patients with hypertension for adults with confirmed hypertension and known CVD or a 10-year event risk greater than 10% or higher, their blood pressure target is less than 130/80 mmHg. That's a class 1.

Class 2B for adults with confirmed hypertension without additional markers of increased cardiovascular disease, their target of less than 130 may be reasonable. So, again, it's 2B going back to why is the evidence grading important.

Well, it's a 2B recommendation so what it is saying is we don't have a lot of evidence here. The ADA Guidelines under standards of care treatment goal is that most people with diabetes and hypertension should be treated to a goal of less than 140 systolic and a diastolic less than 90 and this is a level evidence A, so that's pretty strong evidence.

Lower systolic and diastolic blood pressure target such as 130/80 may be appropriate for individuals at risk of cardiovascular disease if they can be achieved without undue treatment burden, and that's a level of evidence C.

In pregnant patients with diabetes and preexisting hypertension who are treated with antihypertensive therapy, blood pressure target of 120-160/80-105 are suggested in the interest of optimizing long term maternal health and minimizing impaired fetal growth, level evidence E expert opinion.

In order to accurately diagnose hypertension, one needs to be confident in obtaining accurate blood pressure readings. And as I stated earlier, there's a lot of focus on making sure patient's blood pressure was obtained accurately and recorded properly. And so, a class 1 recommendation is for the diagnosis and management of high blood pressure proper methods are recommended for accurate measurements and documentation. The patient should be prepared properly with two feet on the ground, proper technique should be used, and proper measurements taken and recorded.

In order to make sure proper measurements are being taken and recorded, it's important to use the correct blood pressure cuff size. And so here, they do give a reference as to the arm circumference and the usual cuff size. I think that we could probably see large adult is more common in adults and I know in my own clinic, I have a hard time finding the large adult cuff. That's something to keep in mind in assessing your patient.

So, moving along to more recommendations, the following recommendations are for the screening and diagnosis of hypertension. And so, the ADA aligns with ACC basically in terms of screening and that patient should be having a blood pressure measured at every routine clinical visit and those that have a high blood pressure should have it confirmed in multiple readings including measurements on separate days to diagnose hypertension. The ADA also recommends hypertensive patients with diabetes should monitor their blood pressure at home and that is in alignment with the American College of Cardiology who also recommends as a class 1 education that out of office blood pressure measurement are recommended to confirm the diagnosis of hypertension and as well as for titration of blood pressure lowering medication. So, I think that this is important especially if you have a patient who you're not sure of what's happening at home, out of office blood pressure monitoring is recommended by both ACC and AHA.

The lifestyle modification, for patients with blood pressure greater than 120/80, lifestyle intervention is recommended and consists of weight loss if they're overweight or obese, dietary approaches such as the DASH diet, moderation of alcohol and increased physical activity as well as reducing sodium and increasing potassium intake. This is the same as the ACC/AHA

recommendations. Although the level of the evidence is much higher on the ACC/AHA guidelines but it's still the same recommendation, so we're going to go through that again. And this is just a continuation of the physical activity as class 1 and decreasing alcohol consumption.

Here is a slide that -- this slide -- actually, I like this slide and I like to have it hanging in this clinic as well because it kind of gives an idea of the impact of changing your lifestyle and how that changes your blood pressure, so weight loss for example. The best goal is ideal body weight but aiming for at least one-kilogram reduction in body weight from most adults who are overweight, one can expect about a one-millimeter decrease in their blood pressure for every one-kilogram reduction in body weight, so that kind of helps patients to see what it will be able to do to change their outcomes. So, I have patients who, "Can I do this without medication?" And this is a good chart to pull up.

Same with the healthy diet or the DASH diet, you can see that there is 11 millimeters of mercury decrease in those who are hypertensive. That is pretty significant, granted it needs to be followed very strictly for those outcomes, so this is something that is encouraging for patients especially those who do not want to take medication. And reduce dietary sodium, you can have five to six millimeters of mercury change as well as for increase of potassium four to five.

And you just note that for the potassium is dietary potassium, so it's not potassium they take by the pill. This is for dietary potassium, what they get in their meals.

And then, for physical activity, patients who exercise can achieve up to an eight-millimeter of mercury decrease in their blood pressure and those who decrease their alcohol intake can decrease their blood pressure by up to four millimeters of mercury as well.

So, now let's quickly review the medications. And just to note, this has not changed much from the prior recommendation. We're still going to use our first line agents that include thiazide diuretics, calcium channel blockers, ACE inhibitors or ARBs. And this as well for the ADA and, again, like I said, no change from previous.

The one change that was made -- the use of mineralocorticoid antagonist is recommended now for patients with resistant hypertension. We will get to that. But that is the only change. Other than that, is starting medication with the first line agent. The American College of Cardiology recommends using two first line agents for those who have Stage Two Hypertension, and this is controversial because patients do not want to go from zero medications to two medications. They are worried about side effects and compliance issues, and this is a recommendation that has been frowned upon.

For the American Diabetes Association, patients who have confirmed office-based blood pressure greater or equal to 140/90 should in addition to lifestyle therapy have prompt initiation and timely titration of pharmacological therapy. That is also in line with the 2017 ACC/AHA guidelines. And again, two drugs if needed or single pill combination is recommended by the ADA and as I stated earlier, it is controversial.

Multiple drug therapy is generally required to achieve blood pressure targets, but the combination of ACE and ARB is -- or combination with direct renin inhibitors should not be

used and this is a class A recommendation from both the Diabetes Association and American College of Cardiology and American Heart Association.

I think we kind of covered this recommendation for the treatment of hypertension in patients with diabetes earlier in the lecture. Those who are at higher risk for cardiovascular disease and can tolerate medication without undue side effects can and should be treated to a blood pressure goal of 130/80 or less.

Again, ACE inhibitors and ARB should be first line in patients who have urinary albumin to creatinine ratio greater or equal to 300 milligrams per gram of creatinine or 30 to 99 milligrams per gram class B. If one class is not tolerated, you can substitute for the other.

Resistant hypertension. So, the first thing to do in patients is to confirm that they actually have resistant hypertension. This was taken from the American College of Cardiology and American Heart Association, so you are going to see that the goal here is greater or equal to 130/80. I would recommend 140/80 and if that patient is on three antihypertensives at optimum doses including a diuretic, it has to include a diuretic, then you would move on and consider this possible resistant hypertension.

Your second step was to exclude pseudo-resistance. Make sure that you're getting accurate readings in the hospital, really assess the patient as to what is going on with their medications at home. And then, again, as we talked about making sure that their blood pressure readings at home are in line with hypertension.

A lot of the patients, they get worked up coming into our clinic and, lo and behold, at home, their blood pressure is normal. So, I think that that is a very important cause. If you find that patients are doing what they are told, and they are still having high blood pressure, that's when you would look for secondary causes of hypertension.

And this is when you would also add the mineralocorticoid receptor antagonist that we talked about earlier, that's spironolactone or Aldactone. And I always caution to be careful with that medication because it can cause hyperkalemia and patients do need to be monitored for that.

So, this is from the American Diabetes Association, patients with hypertension who are not meeting blood pressure targets on three classes of antihypertensive medication including a diuretic should be considered for mineralocorticoid receptor antagonist therapy. Our level of evidence A.

So, now that we have gone through all of that, let's go through a few cases since we have time here. So, we have case one, a 43-year-old female with newly diagnosed diabetes who comes in for routine follow-up. She has no complaints. She did have gestational diabetes and she's had asthma since childhood. She has had an Appy and a C-section. Her father had high blood pressure and heart problem when he died at age 60 and her mother currently has heart problems and diabetes. She works as a cashier. She drinks alcohol on weekends, smokes tobacco when she drinks alcohol, but denies any drug use and she does not do any routine exercise outside of work.

Her medications include metformin 500 milligrams b.i.d., simvastatin 40 milligrams daily and calcium. She is allergic to penicillin. Her BMI is 30 and her blood pressure is 145/89 with a pulse of 82. Her exam is unremarkable.

Her hemoglobin A1C is 6.8, previously on diagnosis was 7.3. Her total cholesterol is 180 with an LDL of 135 and an HDL of 45. All of her other labs are within normal limits. So using the Pooled Cohort Risk Calculator we get her 10-year cardiovascular risk is 7.3%. So, what would you do with this patient?

So, based on guidelines, you would initiate non-pharmacological therapy and medical therapy. You would reassess her in one month and optimize as needed.

So, let's change her findings and let's give her a blood pressure of 135/80 and her cardiovascular risk based on that is now going to be 6.3%. So, what would you do now?

Now, we would just manage her with non-pharmacological therapy and reassess in three to six months. So, the difference with her receiving medication or not really comes down to her blood pressure and this is based on old guidelines as well. So, this has nothing to do with the new 2017 guidelines. Her initial blood pressure was greater than 140, so we would treat that in a diabetic patient based on ADA Standards of Care as well as ACC guidelines.

But if her blood pressure is 135/80, then we have the opportunity to intervene with lifestyle therapies and reassess her blood pressures. And so, that's an important part of the 2017 ACC/AHA guidelines is that her CVD risk is low, and she does have a time period in which lifestyle modification may help decrease her blood pressure without pharmacological therapy.

So now, let's change her scenario a little bit more. So, let's give her a bad lipid profile. Let's raise her LDL to 180 and her HDL and her total cholesterol is now 230, she still has a blood pressure of 135/80, what would we do? Her cardiovascular risk is at 11.8% now.

So, based on what I just said, we would initiate a combination of non-pharmacological therapy and the medical therapy, but this time we are going to follow her up more closely in one month. We are also going to consider an increase in her statin because her LDL is above goal at 180, so that's her treatment.

So, in this patient, her risk factors included she is a cigarette smoking on weekends that she drinks. She has diabetes. She is overweight/obese, and she does not have physical activity, so she has a lot of modifiable risk factors. And so, again, without the bad cholesterol panel, she is a person who you can really focus on her lifestyle modifications.

So, case number two, this is a 59-year-old male with type 2 diabetes, who is presenting for routine evaluation. And overall, he just says he is not feeling good. He has pain in his knees and his arms and just complains about a lot of pain. His past medical history is significant for hypertension, chronic kidney disease stage two and COPD, BPH and osteoarthritis. He has had a total knee replacement times two as well as a hernia repair. His father and mother are both deceased and when I asked what problems, he says they had it all.

He is a retired mechanic and lives alone, but he is near his son and daughter. He stopped smoking at the age of 49 and he walks as much as he can but does not do any routine

exercise. His medications include metformin, glipizide, aspirin, lisinopril, atorvastatin, tamsulosin, tiotropium, albuterol and fluticasone. He is weighing 220 pounds with a BMI of 33. His blood pressure is 137/89 and his pulse is 58. His exam is pretty much unremarkable.

Lab wise, his kidney function is fine and his hemoglobin A1C is 8.9, his LDL is 65. This gentleman's risk based on the Pooled Cohort Equation is 35.8%. So, what do you do for him?

First of all, one of the things that we really want to do is to make sure that we're assessing his blood pressure correctly, and then we are going to confirm that his blood pressure readings are accurate and then exclude white coat hypertension or masked hypertension as well. And then we are going to assess his treatment target options. So, things to consider in patients, so if we were to get him to a target less than 130/140, we would want him to be younger and healthier first of all and have a low risk of hypotension and we want to make sure that his target is achievable without burdensome side effects.

In this patient, I do not believe that that is possible, that he complains about a lot of things. He is not really steady on his feet and he has polypharmacy. So, with him, I am pretty happy with his blood pressure despite the recommendations given the fact that he is high risk that we should treat him to 120/80 or less. I would not do that because of the comorbidities that he has.

And so, for most patients, we want to shoot for 140/90. The latest that we can consider is those who are healthier and have high cardiovascular risk, lower blood pressures, but we do not want to make our patients feel bad and we do not want to put them at risk either, so that's something to consider.

This is the algorithm that is produced by the Division of Diabetes and it is available on the website and we have updated this to reflect the mineralocorticoid antagonist receptor blockers, so you can go and get that off of the website if you do have this hanging in your clinic.

But overall, it has not changed. We are still recommending diuretics, calcium channel blockers and ACE or ARB as first line medication therapy or the combination of one or two or more of those medications.

So, in summary, we need to individualize patient treatment. I don't think that with the guidelines, we can use across the board treatment for everyone. That is just not where we're at nowadays. I think we need to take into consideration their risk profiles as well as their comorbidities and their goals as well and really focus on lifestyle interventions as well. It is also very important to confirm accurate blood pressure measurements, especially if you are going to be starting or changing medications.

I know for myself, I have been very guilty of just giving patient's medications when they are coming in with blood pressures of 160 because it worries me, but when I take the time and really look, and these patients are cruising at 130 or less at home. Clinic is a stressful time, especially if they have to fight parking and weather. So, I think that's one of the points that really want to put across today is that really taking that into consideration when you're going to start or change a medication. And I will also recommend home blood pressure monitoring

when possible. I don't know of any programs that offer free blood pressure cuffs, but when patients are able and willing to do this, I do recommend it.

I always have my patients come in and bring their cuff and check their blood pressure in front of me, so I know they are doing it correctly, and keep a diary so that we can review at each visit. So, those are the biggest take home points today.

I want to say thank you for today's webinar and please feel free to contact me if you have further questions.