

# Division of Diabetes Treatment and Prevention

## Advancements in Diabetes Seminar Diabetes and Dementia

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Dr. Winchester:

Thanks, so much Jan. I just want to say, it's always an honor to be involved with the Division of Diabetes webinars and so thank you to Jan, thanks Dr. Bullock and also Melanie for your assistance with helping me with this. And I do just want to also give a thanks to Mike Splaine from the Alzheimer's Association. Part of what I'm doing right now is serving on Leadership Committee for creating the next roadmap for Alzheimer's disease as a coordinated effort between CDC and Alzheimer's Association. So, it's a really important public health effort. And if any of you guys are interested in weighing in on what you think is missing in terms of dementia care in Indian Country from a public health perspective, then I encourage you to email me, because there'll be an upcoming webinar, open discussion, where you can help me make sure I'm providing the best materials moving forward.

As mentioned, I'm a practicing geriatrician. I live in where I'm from. I'm an enrolled member of the Eastern Band of Cherokees. In my clinical duties, I serve full-time, I'm a geriatrician and so I have a continuity panel, I also do consults and home visits. And then as you mentioned, I'm the Certified Medical Director of our Tribal skilled nursing facility, where we have a memory care unit. And really working on neurocognitive disorders. Dementia is what my favorite part of what I do, so I'm really excited to talk about this today. This is the picture of my beautiful hospital, where I work, Cherokee Indian Hospital on this screen. We're very proud of this facility.

So some objectives, I want you to be able to talk with your patients about how diabetes affects living with dementia. Talk with patients and caregivers about how diabetes affects the risk of developing cognitive impairment in dementia. And then identify how to include dementia in the holistic care of dementia patients. So, I did a talk last year, but this was just on elders in diabetes in general. So obviously, this talk is a little bit more focused on how diabetes and dementia are linked. I'll provide you increasing data on neurocognitive disorders and diabetes, and there's more emphasis now on the complicated nature of the self-care of diabetes and chronic disease management for those who have neurocognitive disorders.

I have shown this before, it's all about how many people are aging with this silver tsunami I love to talk about. So by 2040, elders will represent 21.7% of the population. And in Tribal communities, we're often including people 59 and a half, depending on what your elder benefits qualify or even 55. So, that number is even going to be much larger. This shows you kind of the progression of the population of older American Indian and Native Alaskans, which is very exciting to me, that over time, that's growing as well. And because we're doing a good job at managing chronic disease and providing more resources, our Native elders are living longer.

So general information on elders and diabetes. I've mentioned this before too, because I think it bears repeating. Older adults with diabetes have the highest rate of major lower extremity amputations, heart attacks, vision problems and end-stage renal disease of any age group. And obviously, the older old have higher rates of complications. What is also very important is that up to one-third of elders with diabetes are unaware or undiagnosed, which is why I will emphasize so much the need to screen and

monitor those people. And then older adults have an approximate 10-year reduction in life expectancy when they have diabetes and two times the mortality rate of those without.

Why does the prevalence increase of diabetes in general? Trends tend to be more obesity, age-related decline in beta cell function and increase in visceral fat and insulin resistance. Sometimes our elders who are less active for a variety of reasons. Sarcopenia is another aspect of this, you're losing that muscle mass, that's a factor, and then higher likelihood of taking meds that increase glucose concentration like antipsychotics.

You've heard me already say the term major neurocognitive disorder or neurocognitive disorder. This is because everyone is moving in the direction of using that to describe dementia. So now, I list up here the DSM-5 criteria for major neurocognitive disorder. So you may want to try to kind of get in the habit of saying that or NCD rather than dementia. Which I think is good because it's a more comprehensive way of describing what's actually going on rather than the roots of dementia, which could be thought of as "losing one's mind," depending on what kind of Latin or whatever interpretation you're looking at for it.

So as you can see here for the criteria, it's evidence of significant cognitive declines from a previous level of performance in one or more of the domains that's listed below. It includes memory of course, language, executive function, which is the ability to multitask, complex attention as being able to pay attention to all those things to be able to complete the tasks that you're doing.

Perceptual motor is all the kind of motor skills essential for you to incorporate yourself in this world, whether it's reacting to things, being able to do common tasks or even more complicated tasks. And then social cognition, which is a recent thing that's been included in this, it's those cues like the ability -- not attributed to any other disorder you may have had, but to recognize cues that people are trying to tell you, to not have an inappropriate affect, those sorts of things.

And these deficits have to interfere with independence in everyday activities on a regular basis. It does give you a helpful tip that at a minimum assistance should be required with complex instrumental activities of daily living, such as paying bills or managing meds. So, this is very important as we move on talking about diabetes management. That the deficits don't occur exclusively in the context of a delirium or explained by another mental disorder.

So under diagnosis of neurocognitive disorders, it's still happening quite a bit. And there has been a study at John Hopkins of all these Medicare beneficiaries, and only 44% of them or their caregivers received that actual diagnosis of dementia. So, even when the providers or whatever staff it is know that that's what's present, they don't say the word. You have vascular dementia, you have what looks like a mixed dementia. You have Alzheimer's, and this has been found in other studies as well. This can be very harmful, because if people aren't aware of their diagnosis, they're more likely to engage in unsafe behaviors for them like driving or trying to manage a very complicated disease like diabetes.

This slide shows the different kinds of dementia. This is not all inclusive, but I just want to point out the main ones we are talking about today are Alzheimer's, problems with memory, language, reasoning, vascular dementia which is a big percentage there, impaired judgment, difficulty with motor skills and balance, heart disease, stroke and diabetes increase likelihood. And then mixed, which is what I see a lot, is that people have a component of Alzheimer's but they also have vascular dementia, and that becomes a mixed dementia. You can see on the right that there are several other ones, but those are the ones that I'll be concentrating on today.

So, what kind of neurocognitive disorders are of concern for diabetics? The term diabetic encephalopathy was first used in 1950. We already know that diabetes is associated with an increased risk of vascular dementia and Alzheimer's disease. And I use this at the very beginning of my conversations of elders I have who get newly diagnosed or of ones that I pick up who've had it for years

and I'll say, "Part of the reason we need to work on this and make sure that we get good control depending on where they're at in their goals are talking about the risk that they may have of developing Alzheimer's or vascular dementia. And many people of which have never thought about that and it really can be very motivating I found to talk about this with people, to motivate them to improve their self-care if they're early on in the dementia and they can still manage that or we can recruit support for them.

The NIH Diabetes Interagency Coordinating Committee has already designated that identifying cognition is one of the priorities for diabetes research. It's why we're getting more information about vascular dementia in general. The ADA has had in their recommendations that you should be performing cognitive screens and or ongoing cognitive assessment in the context of poor control or self-management. And I can't tell you how many consults I get through my facility of very astute providers who noticed that someone is having a lot of difficulty with managing their diabetes and that they want them to be screened or looked at more closely because of that.

A stroke or a history of a TIA increases the risk of neurocognitive disorder up to threefold. So just FYI. I did want to mention there are some other particular terms that go along with vascular neurocognitive disorders. So you'll still hear vascular dementia, multi-infarct dementia. Subcortical vascular dementia is a more recent term, it's more insidious and this is the good days and bad days, kind of to an extreme. And they can have changes in personality, as well as mood behavior and cognition. And then vascular cognitive impairment is the step before you get to dementia. You may be having some deficits that occur, but not on a daily basis and it's not to the degree that it's really affecting you every day and causing problems with those instrumental ADLs or anything like that.

So the vascular dementia and cognitive impairment we're talking about, this is characterized by disturbance of frontal executive functions. It's your working memory, being able to abstract things, reason. It affects your mental flexibility and your fluency. And you would be hard-pressed to find anyone of those areas that aren't necessary in diabetes care. It typically has less verbal memory impairment, so whereas when you're looking at Alzheimer's in patients who will have word-finding difficulties. A lot of times, they'll say "Oh, I can't -- what's that thing, I'm trying to think of what that word is." That tends to not happen as much with vascular dementia and cognitive impairment.

So, people with diabetes have nearly twice the risk of developing neurocognitive disorders, that's huge. Additional risks of developing this are advanced complications in their disease process, having diabetes of long durations and even taking insulin is a risk. So, vascular cognitive impairment and dementia, those are the types that I've mentioned that affect those with diabetes the most.

And the long-term risks and benefits of glucose management and those who have cognitive impairment has not been examined. This is a huge problem, right, because we're always trying to figure out where do we need to be, where is that number? Well, we're doing good with that in general and with elders even in general. But, in terms of looking specifically at people who have cognitive impairment or dementia, we don't have information on that.

So, why is this happening? You know, why do we have this increased risk, why do we have so many people with diabetes who affect this? Well, one is infarcts, getting strokes. That should be for a no pun intended, a no brainer. That makes sense that that's affecting this process. You can also have non-infarct ischemic lesions that affects white matter and that's a problem with your brain function.

If you have chronic hypoperfusion, so you see all those scans of brains for whatever reason, they have had CTs or MRIs and it shows that small vessel ischemic disease. That can build up over time, and so can hemorrhage. And there's a theory that the inflammation that may be associated with this is also contributing to those neurocognitive disorders.

So, this is one of those tables I was telling you about; the percentages of Medicare beneficiaries age 65 and older with Alzheimer's and it's by condition. So what you can see is obviously the top one is high blood pressure, second is coronary artery disease and then stroke and diabetes. So, diabetes is 23% of those with Alzheimer's and the co-existing condition. All of these are really related, so I think it's useful to just look at that as this entire kind of heart -- whatever is one step up from the trifecta. Because there's four of them, but they're all related in high percentages, especially the blood pressure which I'll talk about in a second.

This shows per person payment and if you look at the section of diabetes and that second, where it says with Alzheimer's or without. You can see that if you're trying to sell your CEO or administration on why you should have more support programs of those with diabetes, you can see that the cost is drastically different for those who have Alzheimer's or other dementias. It really goes up and there are a lot of reasons for this that I'll mention to you.

So vascular dementia and other things that you can think of that would be contributing to this. Increasing age alone does it, obviously if you had a history of heart attacks, strokes or mini strokes, then that can be a contributor. And I have some information in the red about links to a specific American Indian and Alaska Native information. Atherosclerosis, high cholesterol and high blood pressure, that diabetes, which is what we're talking about smoking, obesity and atrial fibrillation. All of these thoughts contribute.

So there was a really good study done by Denise Feil. And actually, she's done quite a bit of this research when it comes to diabetes and cognitive issues. And this was looking at challenges and quality of life for caregivers. And we're seeing more and more emphasis on trying to figure out how can we support these caregivers, because we know that at-home care of people who have cognitive problems is going to increase. That we're going to need more of those caregivers and they need to be well educated and they need to be taken care of and not be burned out. What they identified was that memory loss is the first identified cause of self-care neglect that led to the caregivers intervening. They could tell that there was some problem with the person taking their meds or whatever aspect of diabetes care it was, even if it was -- they weren't paying attention to their feet and stepped on something and got an infection or whatever it is.

Behavioral and psychological symptoms of dementia, disrupted daily diabetes care routines, denial of having diabetes or memory loss being the most disruptive. And it doesn't usually matter how many times you try to tell someone that they have something, that doesn't help them to decide, "Oh yes, you're right. I have memory loss" or "I have diabetes." So this can be extremely frustrating for caregivers when they don't know how to address that.

Caregivers reported that caring for both diabetes and dementia was highly burdensome, felt overwhelmed with those behavioral and psychological symptoms, and wanted more support from family and patient's health providers. So the BPSD doesn't included just denying diabetes, it's a huge kind of umbrella of behavioral issues that can happen from wandering, to sundowning, to being verbally aggressive, hallucinating, it includes all kinds of different behaviors.

So this was a National Academies of Sciences, Engineering and Medicine Consensus study report, which I just got hot off the press a couple of months ago. The title of it is "Preventing Cognitive Decline and Dementia: A Way Forward." They did a huge systematic review of evidence on interventions to prevent cognitive decline or progression to dementia. So, what we're trying to look at here is we know that some of those brain changes that are going to lead to cognitive impairment and dementia start years, if not, decades prior to symptoms.

So they were looking at what research exists so far to see if there was anything that they could use to educate people. There is also evidence that the incidence and prevalence of dementia is actually declining in high income countries. And I'll mention something else about that. Unfortunately, this

report didn't identify specific interventions to justify some huge public health campaign. So, while, I'll tell you about findings from this. You're not going to see posters everywhere and saying on general news media about, "Here's the thing that's going to keep you from getting dementia."

They did find three areas, there was enough evidence for it to provide some degree of support for benefit for intervention. And those are cognitive training, blood pressure management with people who have hypertension, and increasing physical activity. Now, this is not some kind of like rocket science here, but it's nice to know there is enough evidence now to provide some degree of support and my whole thing is well you're surely not going to hurt yourself by doing those things. I threw in a picture of our awesome tai chi class that we have at Cherokee that one of our physical therapist, Ellie Schmidtmeyer leads. It's super popular and just evidence of help with balance and physical activity for elders.

What else the consensus report found? When you're talking about cognitive training, it's those aimed at enhancing reasoning, memory and speed of reasoning. So I put some examples here. Learning a new language obviously contributes to that. You are never too old to learn a new skill or to have it provide benefit to your brain. Playing bridge or other games and doing crossword puzzles, all of those are examples of cognitive training. People tell me they read all the time, but reading is a passive activity. And unless you're asking questions about what you're reading, it doesn't count. Even though it's great, I'm glad you're reading, you have to kind of be more engaged. It's about an engaged cognitive activity.

The active trial was a 10-year trial that looked at preserving normal cognition. It tracked these interventions that were aimed at maintaining normal cognition in later life. So it was one of the major studies that supported this recommendation. And it is otherwise evidenced by low to moderate strength of randomized controlled trial. So that's why there was kind of a bit thrown at this.

Blood pressure and activity, supporting those interventions came from observational studies and neurobiological understanding from encouraging the inconclusive evidence. So the cognitive training had more guts behind it, but the blood pressure and activity did have some, based on some studies. And then just basic understanding when you're looking at what's your risks are for dementia, it makes sense that you need to be physically active to keep your brain healthy and to control your blood pressure if you have hypertension.

So, I wanted to mention, we saw before, I told you the consensus report found that in high-income countries, there is some evidence that prevalence or incidence of dementia is declining. Now, we have other data that says one-third of late life dementias are attributable to seven modifiable risk factors. And those risk factors are listed there. They include low education, mid-life high blood pressure, mid-life obesity, diabetes, physical inactivity, smoking and depression.

Now, when you reduce the prevalence of these risk factors by 10% to 20% per decade could reduce the worldwide prevalence of Alzheimer's disease by 8% to 50%. But if you look at some of these modifiable risk factors -- well, if you're looking at low education, then we would have to have a public health targeted effort much earlier to emphasize this. So you can see how this sort of connects that notion that in high-income countries that dementia may be decreasing in prevalence.

So one thing I always mention in general when we're talking about people who have diabetes as well as cognitive problems, you have to think about a lot of different aspects in terms of life expectancy, cognitive status, their preferences, functional status and social support. There is a lot of different barriers to care in all of your different areas. Please consider the caregivers if they're around or you can recruit one. They may not even know that they are needed and quality of life is extremely important.

I mentioned before that instrumental ADL is important in considering those DSM 5 criteria. The ones on the left are just your basic ADLs, you really need to do those on a regular daily basis just to kind of get yourself up and going. That's a way to look at it, because things that are kind of necessary for day-to-day functioning. The ones on the right are those instrumental ones, they are little more complicated, and medications is included there. Managing money, transportation, shopping, telephone and these are the things that I start to see first that are really affected by the dementia. The ADLs eventually get affected too, but that's much later in the disease process.

So being functionally independent, I like to remind people that those people who are living independently, they don't need assistance with the ADLs. They can manage their medication and they may have comorbidities that may affect diabetes. It's important to mention that if you're going to be doing a cognitive assessment on your diabetic patients or those who you see who are at high risk, that you know what you can use, okay?

Now, there are a lot of tools listed here and don't be overwhelmed by that. If you're trying to do a cognitive assessment on someone, if you want a super basic screen, then you can do that, okay? The ones that I have listed here in terms of cognitive assessments are the SLUMS and the MOCA. Now, there is a study that I found that said that the MOCA does the best job when you're looking at vascular dementia in diabetics. I have the MOCA, we use it sometimes and it's mostly for those hilarious elders who sit at home and think about the SLUMS questions I've asked them over and over again, and they've like memorized them. So, then when they come in, I'll do the MOCA on them. But for the most part, I use the modified SLUMS and those are just some examples. There's a bunch of different ones.

There's the Mini-COG, the GPCOG. Obviously, the Mini-COG is the quickest and really is a bare minimum screen. If something shows up on that, then you should do one of these other tests like SLUMS and MOCA. The other ones you see on here, like the TUG (timed up and go) at the top looks at mobility. There's a functional assessment, Katz Index, all those that kind of looking at functions. The PHQ9, you're familiar with, I'm sure. And then, there's the geriatric depression scale which I use because it's better in those who have cognitive impairment or dementia. This MNA-SF is our nutrition screen, a pain assessment is important. If you have somebody even who has severe dementia, you can use what's called a PAIN-AD score to assess pain in them. And then, obviously, using your team is super important if you have one.

I do emphasize that nutrition assessments are important. My points are that you're looking at med times and you want to make sure they coincide with meal times, but you do want to simplify the regimen too. Make sure there aren't any swallowing difficulties or denture problems. Maintaining weight is important even though I talked about how visceral fat will increase that risk for diabetes, when you have someone who's in that 70, 80-year-old age category, if they start trying to lose weight, they're more likely to lose muscle which is dangerous. So, you really want to talk about maintaining weight within a reasonable range but you do want to be doing cardio and resistance training. So, if they're building that muscle or keeping it, it's going to maintain their weight.

And the importance of maintaining fluid intake, especially, when it's hot. I think on a regular basis at least 75% of my patients are dehydrated even in the dead of winter, they're just not drinking enough and it's even worse for those who have cognitive problems because they lose their thirst drive in general and then they don't think they need to drink or they think have been drinking. In terms of exercise, I talked about that muscle mass loss and that happens for all diabetics, so it's even more important for them to exercise and even light activity will be helpful, both for psychosocial well-being and higher self-rated health, this is study supported.

In terms of med reconciliation, it's really important to do this often. I still have people who try to use sliding scale with elders. If you have someone who has cognitive issues, they are likely to have trouble with that. I still have the few elders who are cognitively intact and they're very used to using sliding scale from when they were younger and they have a really, really tough time getting away from that

because they like the structure and they're used to it. I'm talking about people who have evidence of cognitive impairment dementia. It's going to be time to talk about simplifying things, because if they're not having trouble, then they will eventually have trouble with managing that.

Trying the lowest frequency dosing is important. Ask about OTC and herbal meds because we need to know what they're using -- even if they're using traditional medicine, I'll ask people just so I know. I'm never discouraging the use of that. And then, assess the renal and liver function and looking at their weight. These are all kind of big components in terms of meds and overall status for people in monitoring their diabetes and cognitive disorders.

So, some things that may be different to consider when you're thinking about education, self-management, all these stuff. Attitudes in decision making process will come in to this. It's also important to know that these can be affected if they're having lows with their sugar, if they're getting dehydrated and especially if they have the cognitive impairment or if they get sick. That why it's important to have sick-day plans for people especially your elders? The diabetes may not be a priority for them. There are so many things going on in people's lives that I see on a regular basis. And a lot of times, taking care of themselves is really difficult for me to get them motivated to do.

They may prefer to learn from other elders rather than you, which makes it difficult when you're trying to educate. But sometimes it can be helpful to have almost like a diabetes ombudsman or representative in your area who doesn't mind talking to people if they do a good job of managing their diabetes and they know what they're doing. It's the same kind of concept about group visits. But when you don't have group visits and you have a person who goes to the senior center that eats meals there and everybody else can, kind of, ask questions of that person who they respect and they trust their opinion.

People may have declines in short-term memories, trouble with complex motor performance and slower reaction times. So, if you're expected to stick your finger a certain number of times a day, if you're expected to draw up insulin or use a pen to get to a certain number, to know what to do if you feel like your sugar is getting low, you can imagine how complicated all of this stuff gets if you have any memory problems whatsoever.

Everyone should receive education that's suited to him or her. I talked about sick day plans and individual plans. And if they're functionally dependent, then you have to take into account those impairments, their other health problems, and their social situations.

So, some of the barriers to education, I've talked before about this risk and when you have the dementia, it's twice as common in diabetic patients, you may have to tailor the way that you're educating them or working on self-care. They may need more repetition or different cues to help. Sometimes, visual representation or models of some kind can help. So, if you can use that to show people what's going on and what's important for them to remember. Using sequenced visits or seeing those people more often. And no matter how progressive the dementia is, I will speak to the person or if the caregiver is in there, I'll use the term, "We" a lot so that this is a cooperative team that's trying to help take care of this person.

You can have vision and hearing loss as well. So, you have to take that into account. Even aside from how many patients I have rheumatoid arthritis and they have trouble even manipulating all of the devices we have to use in diabetes. There are those who have vision problems or hearing problems. That even puts them at higher risk of developing cognitive issues. One in five older adults with diabetes has visual impairment and hearing impairment is twice as prevalent. So, make sure that you're kind of monitoring that, getting them checked, talk to them about their willingness to use hearing aids, amplification or getting other vision procedures done that may help them.

And this is where we get to asking what the goals are. If I have someone who is just not interested in having any other procedures period, well, they're not going to be very willing to have what somebody

told me the other day is “Cadillac Surgery”. So, even when you talk to them about how relatively straightforward that is, they may not be interested in anything like that. And it’s important to talk to people about why that is and how you can otherwise help them then.

So someone with diabetes who develops neurocognitive disorders, you want to simplify the regimen. I’ve said that, it feels like 100 times. You need to look for support. What are the resources in your community? Do you have great awesome community health and home health workers like we do here? Are there family members willing to look out for them?

You may have to engage the use of reminders like a talking med planner, a clock with day and night, you’re actually lit up on it, so it helps people know what time it is, it helps with sundowning. Having calendars can be very important and putting items in the same location. So, if their med planner is always in the same spot, if their phone can always be in the same spot, it’s important to put things in the same location to try to put that into long-term memory, rather than short-term memory so that they’re misplacing things all the time.

You have to think about shoes, footwear, neuropathy and fall risk for people who have neurocognitive disorders. Check into the diabetic shoes. Make sure that they have footwear that’s comfortable. It may have to be Velcro if they’re still putting their shoes on and they can no longer manipulate the shoelaces. A lot of times, if they have neuropathy, they may not be able to even describe that or know that it’s present. That becomes important in things like driving because they may not be able to feel the gas and brake pedals very well. And then fall risk, of course, is a huge concern. At some point in a neurocognitive disorder, people have more problems engaging with therapy or using an assistive device. So, then you have to have a discussion about, “Okay, how are we going to monitor this to make sure there isn’t that fall risk?”

Caregiver support is so important monitoring for hypoglycemia, because it can be two and a half times higher in people who have dementia or neurocognitive disorders. So, it’s why we have those goals which I talked about last year. Relaxing those goals for older people who have dementia, that automatically makes them more frail and so you shouldn’t be pushing for that A1C to be fixed. They’re more likely to have low sugars and then have a syncople episode or a fall or even death.

You also have to think about this in transitions of care. For the people with diabetes who have dementia who are getting discharged from the hospital or getting discharged from the nursing home, it’s much more important to focus on those issues with transitions of care including their diabetes regimen, what’s going to be different when they go back home, making sure there’s someone there who got all of the instructions at discharge. There are usually a million things they’re going over that they may not be able to remember.

So, for somebody who’s had uncontrolled diabetes or just diabetes for a long time and they don’t have any cognitive disorder at all, I mentioned this at the beginning that I think it’s an excellent time to talk about mind health and risk factors in terms of developing dementia. So, I’ll talk to them about that. And as I mentioned before, I’ve found that that can be super motivating to help people really get involved with their diabetes care because they’re like, “Oh my gosh! I don’t want dementia.” For some reason, it’s like this panic that helps them get on board with making sure that they are making all their vision, dental appointments, participating with our dietitian or a pharmacist, that sort of thing.

And then, screen and monitor. I talked about those cognitive screens you can use and I’ve talked about that in other discussions. I don’t have time to give you a whole lot of just cognitive assessment detail, but I can provide that to you if you contact me directly. Especially if there’s evidence of non-compliance or waves of control versus out of control. If their A1C is going from seven to twelve to nine to twelve. When you look at it, it’s just this way that’s also tends to be a red flag that there may be some cognitive issues.

I have a bunch of sources listed on here and a lot of them are the studies that I've mentioned to you today. So, I know there's a whole lot listed but if you find that you want more information about that Feil study, that's there or looking her up in general. I apologize because there's so many different sources listed. And I also did not put my email at the end here.

So, I can type that in the email box over to the left so that you guys can have that. I think there's been kind of some questions that have built up during this. So, I can look back through those and make sure that I cover those first.

So, there's a question. I'm looking at this mailbox about what's the link between insulin and impaired cognition. I don't -- and if I misspoke, I apologize. I don't want to say that the insulin medication itself leads to impaired cognition. Usually, people who are on insulin may have had diabetes longer or uncontrolled diabetes and I think that's their point in citing that as an increased risk factor. I don't want to say that insulin leads to impaired cognition. That's not the case. So, I apologize if that was unclear.

Let's see what else we have here. If you have hypertension or any other and have it under control, are the numbers lower to get dementia? So yes, if you have hypertension, but you're controlling it well, then it's less likely that you're going to develop this. So, it is important and it's why that national consensus report said, "There was enough data to encourage people to control high blood pressure and people who already have hypertension to prevent the cognitive decline or progression to dementia." So yes, it's important to control it.

Would writing counts as cognitive training, i.e. writing a story? So yes, absolutely writing can help with that because that is an active engagement with your brain. You are creating -- the story, you are writing something, so I encourage people to even journal even if it's not creative writing or that sort of thing. Even if you are sitting down with a journal and you're kind of working on recalling what's been going on with you lately, it can help with that, it can help with overall mindfulness and wellness. So, absolutely writing helps with that.

Somebody asked about jigsaw puzzles. So yes, jigsaw puzzles do require that mind -- that hand to eye coordination and help with engaging your brain. And that's why we use those as an activity even throughout the process of dementia. When people are severe, we have them still working on very simple jigsaw puzzles because that is an engaging activity. Hold on, I want to make sure I don't lose any of these.

So, what age is considered late life in a dementia diagnosis? The way that we basically define these is if you get dementia earlier than the age 65, that's considered an early onset dementia. But after that, after you hit 65, if you get dementia, it's a dementia diagnosis. Now, it's popular to look at the statistics as you get older and that once you hit 85, you have -- depending on where you're looking, a one in two or one in three chance of developing dementia. But it's not really called a late-life dementia diagnosis. We don't really use that. Our important numbers are is it before 65 or is it after 65?

Is there an age when weight loss in obese elders is shown to be less helpful? I've heard that some excess weight can be protective in late ages. So, I can't tell you if there is a particular age when weight loss is shown to be less helpful. But what I say in general is that in my elder's group of 65 and up, and they're not my 55 to 65-year-olds. But in my 65 and older, I do start to talk to them like I mentioned about the importance of cardio and resistance exercise, so resistance being some sort of weight training because I'm not focusing on weight loss for them. I want them to preserve their weight but build muscle. So, I'm really talking to them about, "Don't focus on the scale amount because actually what I become more concerned about is weight loss." So when they have weight loss, I'm thinking, "Oh my goodness! What's going on here? Is there a cancer? Is there a problem with the appetite? Is this depression?" So, I think it's much more helpful to keep weight stable, but encourage that activity that can build what's going to be functional and helpful for them to prevent weight loss, to make them feel

better. For males, if you hold on to that muscle mass, you're less likely to have low testosterone. So, there are a million benefits for exercise and that's really what we should be pushing the most.

What are your thoughts on the Mediterranean-intervention for neurodegenerative delay diet? To be honest, I'll say that my experience in this is limited. This is a question that I would totally -- if I had my fantastic dietitian here, I'll be like, "Hey Jean, tell me about this." Well, I'll tell you that I know about the Mediterranean diet that they had found that some of that may be neuroprotective in some ways. They're emphasizing a healthy diet that involves healthier grains, fish, that sort of thing. It stands the reason because you can think, "Well, if you're eating a healthy diet that's going to be more healthy for your heart which has been shown for blood pressure and heart to be healthier, then it's also going to help your brain." So, I think it stands the reason that that has potential. But I'm just not adept to the studies on that in particular. That's not an area that I'm super familiar with so I apologize if that doesn't answer your question.

I'm trying to see if there's anything else that I might have missed. But so far, anybody else have questions? I think that's all I think.

Jan Frederick:

I think that covers everything, Dr. Winchester. We want to thank you very much for your presentation. You gave us a lot of really helpful and -- well, just helpful information, practical information, I guess, is the word I was looking for. So, thank you so much. I'm going to invite Dr. Ann Bullock, who's the Director of the Division of Diabetes to make any closing remarks that she might like to add if she is on our call. And while she's doing that, I'll get us to the point where I can get you to the evaluation certificates. Dr. Bullock, are you there?

Dr. Ann Bullock:

I am indeed. Thank you, Jan. Thank you, Dr. Winchester. I always appreciate having you do these webinars for us about the relationship between dementia or our other geriatric-related issues. I appreciate your expertise so much. Always very favorable reviews with your webinars, so thank you. We look forward to doing many more of these in the years to come.