

# 07| Driving Assessment and Management in Older Adults with Cognitive Impairments – With Dr. Jennifer Davis

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**Speakers:** Jennifer Davis, John Bellone, Ryan Van Patten



**Intro Music** 00:00



**John Bellone** 00:17

Welcome, everyone, to Navigating Neuropsychology: A voyage into the depths of the brain and behavior. I'm John Bellone...

**Ryan Van Patten** 00:23



...and I'm Ryan Van Patten. Today we have Dr. Jennifer Davis on the show. We talk with Jen about important issues in the domain of neuropsychology and driving in older adults. We decided to release this episode in one shot. So this one is not broken up into two parts like the last two episodes were. Jen is a board certified clinical neuropsychologist with affiliations at Brown University and Rhode Island Hospital. She has expertise in many areas. Relevant to our discussion today, a large proportion of her clinical work has been done in older adults who have neurodegenerative disorders and one thread of her research is in driving in older adults with cognitive impairment. We probably don't need to say too much in order to sell the real importance of this topic to you guys. Neuropsychologists working with older adults very frequently discuss driving safety with their patients. Driving can be thought of as one of many instrumental activities of daily living that is really integral to people's quality of life and well being. But, unfortunately, the skills necessary for competent driving are also quite susceptible to changes that come with cognitive decline and impairment. So John and I hope that you get as much out of listening to this episode as we got out of putting it together. And now without further ado here is Jen Davis.



**Transition Music** 01:47



**Ryan Van Patten** 01:57

We're here with Jen Davis today. Jen, thanks for coming on the podcast.



**Jennifer Davis** 02:00

Thanks so much for having me. Appreciate it.



**Ryan Van Patten** 02:03

Yeah, no problem. We'll just jump right in. So if you could tell us a little bit about your work in the field of geriatrics and then in particular driving in older adults. What sparked your interest in this niche area? And maybe tell us about a couple of the projects you've been involved with, the research projects in driving and older adults.



**Jennifer Davis** 02:22

Yeah, sure. So I ended up developing more of a specialty in geriatrics during my internship and fellowship at Brown and after remaining on faculty here. And really, my interest in driving came out of pure convenience. So one of my colleagues, Dr.

Brian Ott, who's the director of the Alzheimer's Disease and Memory Disorder Center here, ended up fortuitously moving his practice to Rhode Island Hospital, and needed a neuropsychologist to help collaborate with him. He reached out to me and I was very excited to take the opportunity. It's really been a very interesting sort of 10 years, basically, now of working on understanding driving and risk and predicting risk in older adults with mild cognitive impairment and even mild dementia. We've had the opportunity to really follow people over time because that wasn't really well understood. So if someone was diagnosed with MCI or dementia, how long could they really safely drive? Longitudinally, we followed them over three years, and that led to really trying to understand them more in the naturalistic setting. So we took a leap of faith and decided to put cameras in people's cars and follow them out in their natural environment, which carries with it all kinds of ethical questions and risks and challenges which have been hard to work out but very informative. All the way to more recently, which we're really working on identifying errors that they're making while they're actually driving through cameras that are event based recording cameras in the car. So [we] identify errors as they're happening, and then later give them feedback on some of the issues that we're picking up on. It's definitely an area that I didn't think I was going to be but I'm very happy that I've had the opportunity to be doing it.



**Ryan Van Patten** 04:15

It's very relevant to neuropsychology. I love the naturalistic driving stuff. We'll definitely get into some of that in a little bit.



**John Bellone** 04:23

Maybe to start us off, would you mind telling us what evidence there is about whether demographic factors affect driving safety? I mean, we think of age as being the probably the major factor, but years of education and other demographics. Does that make a difference in driving safety?



**Jennifer Davis** 04:43

Well, older age, you're right, is going to be your biggest risk factor. As people get older, and as their bodies change, and as they are more at risk for diseases that are going to affect their vision and their own mobility and reaction time, that's going to be the biggest risk factor for them. But, honestly, men tend to be a little bit riskier drivers than women. So there is a gender factor. That's in young age and older age. But really things like education don't relate. Some of that may really be because I think there's this idea in neuropsychology, we're so set on correcting everything, approaching performance based on our age and education, but when it comes to a

skill, a daily skill, a function out in the real world, it's really about actual performance. Just an objective measure, not corrected for anything. So things like education don't seem to relate. I think the bigger demographic factor that's more important to consider is something that I would like to think of as driving reserve. So kind of like cognitive reserve where people have a buffer through education and exposure. People who are in driving careers have a lot of driving reserve, and so they're able to drive much longer than people who may not have a career in driving. I had one person in one of my studies who was a professional driver and he was able to drive safely on the road well into his dementia. He was in the moderate dementia range and was perfectly safe to drive and was passing road tests, where other people I don't think would be able to do that.

**Ryan Van Patten** 06:21



Not surprisingly, of course, certain classes of medications can impact driving ability. Specifically I'm thinking about benzodiazepines or anticholinergics, which can attenuate cognition to some extent. On the other hand, though, medications can improve symptoms and therefore can improve driving ability. So how do you think about a patient's medication profile? When you're considering whether or not they may be capable to drive from a cognitive perspective?

**Jennifer Davis** 06:52



Right. Absolutely. You want to review the medications that they come with just like anything else in neuropsychology. Medications are going to be important in how they impact cognition. But very important, we think about sedating medications. So sometimes it can be [unintelligible]. Patients are having trouble driving because they are somnolent around a certain medication, and that can be changed, the time of day can be changed. We've certainly seen that in our naturalistic driving where people look drowsy. When we probe that further and are able to make some changes, they've been fine. So they weren't really making errors related to their disease, but errors related to the medications. It's nice to be able to think about some of these evaluations in terms of identifying factors that you can tweak and improve, rather than jumping to every problem with driving could be related to their dementia or their cognitive disorder.

**Ryan Van Patten** 07:46



Right. In that same vein, maybe a little more broadly, what are some of the typical non-cognitive medical conditions or symptoms that may interfere with driving that we, as neuropsychologists, should be thinking about?



**Jennifer Davis** 07:59

Well, I think one of the major ones is movement because I think we forget to think about the rest of the body. We're so focused on the neck and up. [laughs]



**Ryan Van Patten** 08:06

[laughs]



**Jennifer Davis** 08:08

But, in reality, as we get older, one of the major issues is our mobility and our flexibility. A lot of driving errors can happen just simply because someone isn't able to turn their neck around far enough to be able to really scan or check their blind spots. And that's easily fixed. There's rear view mirrors that can be bigger. There are different ways cars can be rigged to make sure that person can drive better. But also peripheral things like peripheral neuropathy, so reduced sensation. Someone's got diabetes, how is their sensation in their feet and their gait that might impact their driving? Again, those are things that can be fixed and won't necessarily progress and inevitably end up making someone unable to drive.



**John Bellone** 08:53

Do you think that things like arthritis or essential tremor, do you think those have an effect as well?



**Jennifer Davis** 09:00

They certainly can. But, again, a lot of these things are things that people can compensate for. Certainly someone who has Parkinson's disease or tremors is going to have on and off times for their medications. So we can also make recommendations to drive around certain times of the day where they might be feeling better, or avoid driving when they're feeling [like] they're having an off day or [are] off their medication window effect. Things like that. But, certainly, vision, visual acuity, all of the senses, we need to be thinking about when we're making recommendations about driving.



**John Bellone** 09:34

Yeah, definitely. There's also some people who experience pretty significant anxiety around driving. I was wondering, are there good data speaking to the impact of anxiety on driving safety, particularly in older adults?

**Jennifer Davis** 09:50

It's a great question because a lot of people, I think, come in and they talk about being very anxious about driving and that's a new thing. And then actually some of their cognitive impairment - they're feeling anxious because they actually are struggling. But the flip is also true that there's anxiety that's leading to driving errors. There really is not as much out there as you think about that particular topic. We touched on it a little bit in one of our studies where we looked at people's self-reported mood states before they engaged in a road test with a driving instructor and then afterwards. It was interesting because most people with MCI or early AD and even healthy controls reported some level of anxiety before they went out on a road test into an unfamiliar environment. But those who were safe on the road, their anxiety tended to drop down. So as they realize they were doing fine, as they got through the road test just fine, they seem to feel better. But those who were unsafe, those who were struggling continue to have higher levels of anxiety. So I think it's like many things that we see with patients with mild memory loss, that anxiety is very closely intertwined with the symptoms they're experiencing. [It] interferes, potentially. It's an additive effect that may add to some trouble with driving. So it's definitely a factor.



That led us to trying to study driving more naturalistically. Because we thought, "Well, we're just stressing everybody out by giving them a road test." Say you're concerned about driving and we send people for a road test. Are we just destining them to fail the road test when they're actually safe to drive? A lot of our naturalistic work showed that it's not just anxiety, obviously, but people do do better in their natural environment. But it's still unclear if that's the best way to measure driving safety because it is possible that the road test is actually a good stress test and that you do need to stress people. Sort of like a neuropsych eval where you have to stress them a little bit to show the deficits. That may be a better predictor of potential crash risk. So it's a little bit of a complex question.

**Ryan Van Patten** 11:56

Right. It reminds me a little bit of anxiety around falls in older adults. I imagine there are a lot of different but similar phenomena where, as we age and we lose our ability to do something that we used to be able to do, and we see that our performance is suffering, we develop anxiety around it - be it ambulating or driving or other things. It's these late-onset anxieties. I imagine we can use similar treatments to help folks with the anxiety. But then again, we are also concerned, obviously, with the safety of driving as well.



**Jennifer Davis** 12:35



Right. I think, to some degree, the anxiety can work in our favor because oftentimes people who are experiencing some anxiety around driving end up self-limiting themselves. They're putting protections in place that actually keep them safe. So they're avoiding driving in those high traffic, high volume times of day because they don't feel comfortable with it. They're actually keeping themselves safe by limiting their environment on their own.

**John Bellone** 13:00



Do you think that antidepressant medications or psychotherapy specifically targeting that anxiety might help some of that?

**Jennifer Davis** 13:10



Yeah, I think so. I think that there's a lot of benefit to helping individuals with mild memory loss manage anxiety around how they're experiencing many of their symptoms and how it's affecting their day to day. I think there's real value in that. Absolutely.

**John Bellone** 13:26



Yeah. Another condition that I think of sometimes regarding driving safety is epilepsy. It's a disorder with a pretty bimodal prevalence distribution. It's much more common in children and older adults. Given that seizures can interfere with alertness and responsivity, I wonder how you think about epilepsy and driving together?

**Jennifer Davis** 13:50



Epilepsy is a little bit easier in the sense that there's an event, usually, that triggers questions about driving. So they have a seizure and then there's the response of, "Well, can this person get back into their daily activities? Can they return to driving?" Most states, and they do vary from state to state, but most states have very specific guidelines. From the time that you had your last seizure, you need to have X number of months seizure-free before you can get back on the road. So usually somewhere in the range of 3 to 6 months of someone being seizure-free. So with a little less gray than someone with a potentially progressive illness and you're trying to find that exact time point when someone might be unsafe to continue on the road. I mean, certainly there's cognitive impairment that can go along with epilepsy that could interfere with driving ability in a static way. But

certainly in terms of the event like a seizure, there are much clearer guidelines around that then there are around dementia and mild cognitive impairment.

**Ryan Van Patten** 14:52



Speaking of which, let's move on a little bit. I'm curious specifically about neurodegenerative disorders here. So, of course, cognitive decline that comes with neurodegeneration can impact driving. People with dementia tend to make more driving errors than those without. At least some evidence suggests that people with dementia have at least a two fold greater risk of motor vehicle accidents than those without. We'll get into more MCI dementia, those sorts of things in a few minutes, but for right now, I'm curious, the different dementia etiologies AD, Lewy body FTD, etc. how do you think about those in terms of driving? They have different symptom profiles, I can imagine some of those might impact driving in different ways compared to others.

**Jennifer Davis** 15:43



Absolutely. In terms of just the general ability to drive, so the procedures of driving [and] engaging in that procedure, primary memory impairment doesn't do much. You can drive really safely and be completely amnesic. You may lose your way and get disoriented in terms of getting from point A to B, but memory per se does not confer a huge risk to the actual driving ability. Rather, it's things that you would think about - attention, visual scanning, processing speed aspects of executive functioning, especially multitasking with a time component. So if the person is experiencing more deficits in those areas, they're going to have a heightened sense of potential risk with something like driving. But someone with an amnesic MCI will probably be at lower risk than, say, someone with sort of early Lewy body disease where they're going to have more executive impairment, visual spatial problems certainly, maybe some visual hallucinations. So I actually, in one of our research studies, had a woman with Lewy body disease and she was routinely hallucinating while she was in the car. We could see her while we had the video running and she would be having conversations with the children in the backseat, who were not in the backseat. It was certainly a concern, but her procedural functions were fine in terms of driving and she didn't make a lot of errors. She wasn't responding to things outside of the car, which I was concerned about.

**Ryan Van Patten** 17:19



That would be the problem, right? If she has visual hallucinations of other cars that aren't actually there. [laughs]



**Jennifer Davis** 17:24

Exactly. Because I have had patients talk about hallucinations of things in the road or debris in the road and things like that. They'd be swerving around. Now that's obviously a major situation.



**John Bellone** 17:39

You threw out several different cognitive abilities that could impact driving ability, like processing speed or different types of memory, working memory, fluid reasoning, those kinds of things. I'm curious, not just in someone with a neurocognitive disorder but also just in healthy adults, do you have a sense of which cognitive abilities are most relevant to safe and consistent driving ability?



**Jennifer Davis** 18:07

Yeah, I mean, it really seems that processing speed, speeded aspects of executive functioning and visual processing, useful field of view, those kinds of skills most closely relate to driving in most studies. But again, the studies on the neuropsychology of driving are - they're okay. They're not huge relationships. So it's not like there's one test that comes out as "if you fail this, then you can't drive". I mean, there's really no evidence to suggest that we should be making decisions about driving safety solely on the basis of cognitive testing. It's a much more complex picture that involves taking into account other data from collateral [sources and] from history about their driving. Are there scratches on the car? They had near misses? Are there events happening? Have they gotten tickets? Is the family concerned? Are they showing cognitive impairment? Things like that. So multiple things that we should put in place to really evaluate their safety.



**John Bellone** 19:13

Awesome. That's a really good point. We're going to talk a little bit more about some of those signs in a little bit. There's some evidence that people who are at risk regarding their driving safety, tend to self-regulate their driving behavior to some extent, at least. Where an older individual and other individuals with severe cognitive impairment, they tend to drive less often and maybe more frequently limit their driving to familiar locations. They don't drive at night. How do you tend to think about those kinds of people who are limiting their driving? Are those usually good compensatory strategies?

**Jennifer Davis** 19:54



You know, you always get that story when you're asking about daily functioning in the clinical interview, and there's often the response, "Well, she's driving. It's fine. She only goes a couple miles away from home. Just the grocery store, just the post office." For a long time, I always felt uncomfortable with that because most accidents happen within a couple miles of your home, right? So how does that really help? But when we look at some of our naturalistic driving data, and we look at the natural behavior of what people are doing and the number of trips they make, and the number of routine trips or the repeated routes that they take, and the kinds of activities they're engaging in, there's not a lot of difference between the safety behaviors between healthy elderly and someone with mild cognitive changes. It's just that, again, those individuals are reducing what they do, staying in more routine environments and, by doing that, they seem to be making less errors, less safety errors. But the concern becomes when you get someone who is not willing to limit what they're doing and to restrict what they're doing. That's when there becomes more of a concern.

**John Bellone** 21:02



Or similarly when people have a lack of awareness of their deficits. I see a lot of people with what I would call anosognosia about their driving. They have really limited insight. How do you consider that? We'll talk in a little bit about how to deal with that with families, but I wasn't sure if you had any thoughts about that right now?

**Jennifer Davis** 21:26



I think that that's just another one of those things that goes into your increased risk category. You're thinking about, "What am I doing with this patient?" So if you have a patient - if you have two patients who have equal levels of cognitive impairment, one with insight and one without, that lack of insight is going to be an extra risk factor that you're going to be considering in terms of, "How am I going to handle driving?" Because, in addition to the lack of awareness, there's also this lack of actual objective memory about events that happen. They may not even recall that they've been beeped at more or they may not even recall that they have a big scratch on their car and they don't know where that came from. So that becomes a big issue, and certainly makes the feedback about restricting driving or even coming off the road far more difficult in the clinical setting.



**John Bellone** 22:12

Yeah, we've all experienced that. [laughs]



**Jennifer Davis** 22:13

Yeah, exactly. [laughs]

**Ryan Van Patten** 22:16

Let's transition and talk a little bit about methods for assessing driving ability. We've touched on this a little bit, but we can dive into a bit more depth. A few different methods in this regard are office based tests, which we are intimately familiar with - neuropsych tests but then neurologists have brief screening batteries that may include some cognition and vision, motor, walking, things like that. That might be one category. There are driving simulators, which to my knowledge are primarily used in research, but are available. There are road tests. I know your group with Brian Ott used the Rhode Island Road Test. I believe Washington University in St. Louis has a similar road test that they use. This is what we might think about in terms of Driver's Ed, someone in the car with a patient. Then you had also briefly touched on the naturalistic assessment - video cameras on the dashboard recording someone driving on a daily basis. With those categories in mind, can you maybe compare and contrast strengths and weaknesses of each of them?



**Jennifer Davis** 23:29

Right, sure. The office based tests have been kind of the Holy Grail. People have been trying to find [out] what's the best screener that we can do to say definitely "on or off the road". We know that they're just not sensitive enough, but they have utility. I think the neurologist or the primary care physician who's doing a little bit more cognitive assessment can certainly raise the flag and say, "Okay, this person needs more workup because they're having trouble doing the Trail Making Test", for example. Trail Making has been one of those tasks that's been well accepted. The clock drawing task, people have looked at that in relation to driving and there is some predictive utility in those. There's definitely a role for screeners in putting forward further evaluation and that may include a full neuropsych eval. But, again, as I said before, even after completing a neuropsych eval, it's unlikely that you would be making a definitive recommendation about absolutely coming off the road unless somebody was so clearly in that more mild, maybe into the moderate range of dementia where you don't need more evaluation. There's enough supporting data based on what you get in your actual testing and working with family members.



But, for a lot of people, we're dealing with people who are in that gray area. So it seems like there could be a safety concern, but what do we do? What's the best information that we can then get? And the road test is still viewed as the gold standard assessment for driving safety. We use that in research we developed, road tests that have a very specific number of maneuvers and ways of evaluating how they're doing. But, in general, there are driving instructors who you can send a patient to that take the patient out on the road, in a car where the instructor has their own break, and they take them around in their own environment, or sometimes on a closed course, and make some evaluation of what their skills are and if there's a risk staying on the road. That's still considered the gold standard. So if a family is really concerned, and a clinician is very concerned, then usually that's going to give them the best answer, at least in terms of the current state of things.

Simulators are becoming more available in the clinical setting. Often, occupational therapists are now using simulators as part of their clinical evaluation. There is some relationship between how you do on a driving simulator and actual on the road errors. But, again, it's only a relationship. It's, again, not perfect predictive validity. One of the major issues with simulators is that older adults are very, very, very susceptible to simulator sickness. So the number of patients who can't make it through is quite, quite high. That can be challenging as well, just being comfortable with that kind of technology.

Then naturalistic assessment is really not very available at all in terms of clinical utility at this point. It's really used in a research setting, although we have been using a technology that's in CAT in car camera technology through drive cam. That is a technology that's used in professional drivers. So you know, next time you're being picked up at the airport by a taxi or some other driving group, they often have them in the car. They monitor people's behaviors in the car and give them feedback on how they're doing. So, at least in the professional driving setting, that's available. I think it would be a fantastic service to offer patients with mild memory loss as a way to monitor them and follow them over time. But we're just not there yet.

**Ryan Van Patten** 27:15



Right. You mentioned road tests as being the gold standard. There's also a naturalistic assessment you just spoke about, but that's expensive and not widely available. I think there's one paper that compares those two methods. They're measuring similar but slightly different things. If naturalistic assessment was

available to everyone, could that be better than road tests? Or do you think road tests ultimately have the highest predictive value?

**Jennifer Davis** 27:42



I still think the naturalistic assessment is better because I think it's really hard to get a really definitive answer in a snapshot especially with these illnesses, where people have good and bad days. There's often fluctuations in some of their symptoms. I think you just get better, more stable data over multiple days and time points. It's so face valid to people because they're like, "This is me driving in my car in my setting." It's hard to argue against it when they see themselves in what they do every day. I think that there's more pushback when they're doing a road test.

**John Bellone** 28:21



That's a good point. Also, there's not as much anxiety. I'm sure they forget about the cameras.

**Jennifer Davis** 28:25



Oh, they totally forget it. Definitely. We've seen enough behaviors to know that they're definitely not remembering cameras are in the car. [laughs]

**John Bellone** 28:36



[laughs]

**Ryan Van Patten** 28:36



We want to ask you about all the behaviors you've seen. [laughs] But you can keep those to yourself.

**Jennifer Davis** 28:41



[laughs]

**John Bellone** 28:43



Well, now I'm curious. [laughs]

**Jennifer Davis** 28:46



Just think about yourself and... [laughs]



**Ryan Van Patten** 28:47

No, no, no. [laughs]



**John Bellone** 28:50

What's the craziest thing you've seen?



**Jennifer Davis** 28:52

Well, you know, we saw somebody just get out of the car and actually just go urinate in a parking lot and then just get back in the car. [laughs]



**John Bellone** 29:01

I'm so glad I asked you. [laughs] That's pretty awesome.



**Jennifer Davis** 29:06

Yeah. [laughs]



**John Bellone** 29:08

Let's talk a little bit more about the road tests because they are the most common and gold standard right now. Typically, it's driving rehabilitation specialists that conduct those evals. You mentioned they're usually occupational therapists, I saw sometimes kinesiotherapists also sometimes conduct those. I'm curious if you have a sense of how those professionals are trained. If you broke down their assessment, what does it look like?



**Jennifer Davis** 29:36

There's a really big range, I think, of what you get. There are people who are very much specifically trained in occupational therapy specific to driving. So they include a little mini cognitive evaluation with maybe some simulator and then some actual observation of what they're doing on the road. That's probably the best, most comprehensive program that you can get. I feel very confident in the results that you get from something like that. When you start looking at driving schools, there really is a range of products that you're going to get. Many times it's a very brief amount of time in the car, very brief evaluation, not a lot of good information. In my experience, I feel like there's just people who kind of pass everybody or fail everybody. There's very poor, I feel, poor evaluation and feedback on people who are in that gray area and in the middle. So I think when people are thinking about who they want to go to, it is good to try to find someone with credentials in

occupational therapy. I think it's a little more standardized and a little more clinically oriented. They're not always covered by insurance, [and] they're not inexpensive. So these are evaluations that you want to feel like you're comfortable getting good information with.



**John Bellone** 30:55

They do the paper and pencil tests first?



**Jennifer Davis** 31:00

They usually do. So not a lot. I mean, Trail Making, clock drawing, some basic attention tasks are often included in the evaluation. But it's not extensive cognitive testing, usually.



**John Bellone** 31:13

My understanding is they don't progress to the on the road part of the test unless they first are successful at the written and visual acuity tests that they receive.



**Jennifer Davis** 31:28

Right. Or simulator. Sometimes there's a stop point at a simulator performance, too.



**John Bellone** 31:34

Do you know what the consequences are to failing that formal assessment? Are they reported to DMV, or the State Department of Public Safety? Do they get a chance to take it again?



**Jennifer Davis** 31:50

It's really state based. Not all states, and actually, very few states have required reporting. In Rhode Island, in this situation, it would be a report that would be sent to the primary care physician with recommendations. But they would not be obligated to report that person to the DMV. So there's not a lot of consequences in terms of reporting. People worry about that a lot, engaging in neuropsych testing or engaging in any kind of driving evaluation. So, again, it's important for the clinician to understand your state requirements because there are very few states where there's mandated reporting. In California, for example, physicians are required to report to DMV if an individual does have a diagnosis of Alzheimer's disease or related dementia. There is an automatic removal of licenses if people are considered in that moderate to severe range. Whereas other states are a little more flexible in terms of when that happens.



**John Bellone** 32:51

But that's not a requirement of us, as neuropsychologists. That's the medical doctor.



**Jennifer Davis** 32:57

Exactly, exactly.



**John Bellone** 32:58

But we should probably be telling our patients, if we're giving them a major neurocognitive disorder or dementia, that the referring clinician who's going to get a copy of the report is likely to report them. What do you think about that?



**Jennifer Davis** 33:12

I think it depends. It depends on the state. So, if you're in California, then you definitely want to be really upfront with that. You just want to know what your state requirements are and what might happen because that's the question you're going to get anyway, if you're a neuropsychologist that's probably going to be addressing driving frequently in their recommendations. I'm sure you're going to get that question routinely, "Well, what happens now? Will my doctor get this? What will this doctor do?" You know, blah, blah, blah. So just knowing your state laws, I think, is what's really important.



**John Bellone** 33:41

Yeah. I practice in California and what I like to do is, before I even start the evaluation, as part of my informed consent procedure, I tell them that there really aren't many risks involved in in the testing, I'm not going to take your blood or put you through an MRI or anything, but I might diagnose something that could impact your driving, or I might recommend that you limit or stop driving, and it's possible that if your physician gets a copy of the report, they could report you to the DMV. So I like to do that upfront so that there's no surprises later on.



**Jennifer Davis** 34:17

Yeah, I think that's very reasonable, especially in a state where the requirements are so strict. Yeah. Absolutely.



**Ryan Van Patten** 34:24

Can I follow up? We were talking about these driving rehabilitation specialists, OTs and kinesiotherapists, etc. Is there a good rehabilitation portion of what they do? As

in, if a patient goes through their evaluation and then fails, what steps would be taken to potentially rehabilitate that person such that they can pass next time and be a safe driver?

**Jennifer Davis** 34:50



I think if they determine that the types of errors they are making on the exam are remediable, then they would definitely recommend some lessons and working with that person over time. I think that is a very interesting question in the area of potential degenerative illnesses. How remediable are they? It's different when we're thinking about stroke and bringing skills back on board. But in Alzheimer's disease and other degenerative conditions, potentially with some anosognosia and with memory loss, it's been questioned, can we actually work with them in lessons and show improvement? In terms of the occupational therapist that I've worked with, I think there is some optimism that that can happen if you catch someone early on in the disease. Also from some of the work that I've done in research, we have been able to show that through this in-car camera monitoring and giving feedback to individuals with mild cognitive impairment and early dementia, that their behavior changes. The number of errors that they make goes down over time as they become more aware of the types of problems that they're having and by providing them with some replacements and strategies to compensate for some of those behaviors. I think it's a nice way to frame it in the feedback session that, yes, we would like you to have an evaluation, we want you to go out on the road. There is the possibility that we would be able to make you a safer driver through recommendations. So it becomes more of a productive discussion.

**Ryan Van Patten** 36:25



That's impressive. I would not have guessed that we would really be able to remediate or improve the driving of people with degenerative illnesses. Obviously, all this is happening in the face of slow but steady cognitive decline.

**Jennifer Davis** 36:37



Right. Exactly.

**Ryan Van Patten** 36:39



It sounds a bit like you're increasing that driving reserve that you spoke about earlier through these strategies.

**Jennifer Davis** 36:45



Yeah, that's the hope. That's definitely the hope because I think that the whole model for mild cognitive impairment, Alzheimer's disease, is really living with this disease now, instead of being doomed by this illness. We want to figure out a way to increase autonomy, maintain safety in many domains, that includes driving.

**John Bellone** 37:05



Quick question. Does insurance usually cover the driving tests?

**Jennifer Davis** 37:12



It usually does not. If you're just going for an on road test, they don't. If you're going through an occupational therapist within, say, a hospital setting or a clinic setting, sometimes they will but often not the whole thing.

**John Bellone** 37:27



Okay, yeah, just curious. Sorry. [unintelligible] Do you know how much those cost? I never looked into it, but I'm just curious.

**Jennifer Davis** 37:37



A few hundred dollars. Somewhere between like \$150 to \$350, typically are the prices that I hear. But that's not including lessons, obviously. So if someone's going to go and follow up later and do lessons, that would be an additional cost. But, if you think about all the costs associated with not being able to drive and having to find alternative transportation and costs around that, I think it's well worth the investment.

**John Bellone** 38:01



Sure, yeah.

**Ryan Van Patten** 38:04



Let's transition now and start talking a little more explicitly about when someone's, an older adult's, driving may be impaired, specifically in the context of mild cognitive impairment and dementia. I can imagine trainees wondering, is there a diagnostic cut off? Is it the case that if my patient has MCI, then they can drive. But if they have dementia, well, then they can't. But clearly, it's not that simple, right? There's a lot of factors that go into this, rather than simply only a dichotomous diagnostic decision. So, with all that in mind, can you talk about how you think about whether or not your patient can drive safely based on a neuropsych eval?

**Jennifer Davis** 38:50

Right. Like you said, there's no definitive level of impairment that says yes or no. I mean, at the extremes, of course there is. If you have someone who's in the clinical dementia rating of a 2, and they're globally cognitively impaired, they're really needing a lot of help, that's not the person that we're struggling with. But these 0.5 to 1 clinical dementia ratings are the ones that are challenging. I think that there are a number of factors that you want to consider. So certainly you have the cognitive evaluation, and then you're going to be looking at skills that may be more likely to impact driving. So, again, speeded attention, divided attention, visual spatial skills - how bad are those? Then you're going to want to dovetail that with collateral reports. Talking to a family member, have they been in the car with the person? Have they ridden as a passenger? Have they looked at the outside of the car? Have they seen them park? I also really like to use a survey. So the American Academy of Neurology has published a survey that can be administered to family members as well as the patient. I don't really administer to the patient typically because of the poor insight that people have into their own driving, but it can be informative to get the caregivers report on a number of dimensions of driving and their level of concern about that and other factors, other illnesses, other medications. Like we talked before, you may know other medical illnesses or their medication effects are. What is the whole risk profile? Then making a decision about their safety. Just keeping in from our longitudinal study, we found that patients with mild cognitive impairment basically drove safely, so they were passing road tests, over an average of 605 days. That's a couple years, basically. Those with mild dementia were starting to have trouble passing a road test about a year after their baseline. So there certainly is time within both the mild dementia and MCI range for people to be safe. But, again, it really is looking at it as a picture of multiple factors, where you're considering that driving reserve in relation to all of these other factors.



**John Bellone** 41:06

We'll definitely link to that survey that you mentioned in our show notes because I think that would be a good resource for a lot of people. Or if it's proprietary, then we'll just have the information there.



**Jennifer Davis** 41:18

No, it's published in the American Academy of Neurology's recommendations for their practice parameter for driving and dementia. It's in that article, so it's available.



**John Bellone** 41:30



Awesome, we'll definitely link to that. So when you're conducting a neuropsych eval and driving safety starts to seem like it's an issue, can you talk us through what type of information you look for in the record review and in your interview? I know you mentioned the survey, obviously, but in terms of what the patient reports, behavioral observations that you make, test data, can you just walk us through your thought process through the evaluation?

**Jennifer Davis** 42:02



Right. Certainly, with the record review [you're] looking for, are there any ER visits for car accidents, or any injury that they're sustaining that can't be explained. I think, like anybody, you look at the person as they come in, are there bruises on their body, or do they seem to fall, or how are their senses, you know, hearing, seeing movement, all of those things? Are they unusually frail? Because we have to remember that older adults are more likely to die in car accidents simply because of frailty, not necessarily because they're making more errors like a healthy adult with no cognitive disorder. So frailty plays a role. But always getting a collateral report in conjunction with the patient report. Asking very detailed questions about driving I think is very important. It's one of our major activities of daily living. So good detailed questions about what time of day you're driving, how many times a day you're driving? How many trips a week are you taking? Where do you drive? What kind of setting are you driving in typically? Are you going on the highway or are you staying on those back roads? I think that just getting a very good, thorough understanding of what's going on with that behavior. But certainly, the collateral report will also be important. You want to make sure it's somebody who's actually driving with them and spending some time with them in the car. I always love the collateral who says, "Well, I wouldn't get in the car with them." [laughs] So that's a good piece of data, right? But, behaviorally, do they seem disinhibited? Are they bumping into things? Are they not navigating their own environment very well? Are they getting confused coming back from the bathroom to where the clinic room is, you know, to go back to the test room? Things like that. Then, as we've talked about, weighing cognitive data that relates to driving a little more heavily. So, again, those executive and visual spatial tasks that are going to have the most weight in terms of how someone is typically going to be doing and driving.

**John Bellone** 43:57



It was interesting what you said about frailty in an accident. Even if an older person is completely cognitively intact, you're right, that even if it's a relatively minor

accident, it might cause significant problems physically. That's an interesting thought.



**Jennifer Davis** 44:14

Right. Yeah. Exactly.



**John Bellone** 44:16

In terms of the test data, we talked a little bit about Trails B. What exactly Are you looking at specifically?

**Jennifer Davis** 44:25

So Trails B has had a lot of work on that. In the neurology setting, there's been recommendations about cut offs - you know, if they're over 180 seconds, that's going to be a driving problem. Within any data set, you're going to develop cut offs based on your own data set. Maybe we'll be lucky enough to validate it in another data set, but it's really difficult to establish good clear cut offs on any one measure even though Trails B is pretty much the favorite in terms of that being the best one to relate to driving. So just because someone can't do Trail B [I'm] certainly not going to recommend that they not drive. Certainly not. Again, really looking at that whole picture. Things like the NAB driving scenes, there's some work that shows that those are related. That's a nice face valid test. We're getting a visual attention measure, but, again, nothing is so strong a relationship that I would base my recommendation on any one test. I think neuropsychologists need to be really careful about that. Just because someone can't draw the Rey Complex Figure doesn't mean they can't drive or they can't park.



**Ryan Van Patten** 45:35

It's not a one to one relationship.



**Jennifer Davis** 45:36

Not at all. It's just such a complicated relationship between cognition and driving.



**Ryan Van Patten** 45:43

So, to summarize the relationship between cognitive data and driving, Trails, specifically Trails B has a good amount of support. Of course, we are saying all of this with the caveat that the variance shared between neuropsych tests and driving is relatively modest. But Trails, visual spatial tests. There was a 2004 meta analysis

that concluded that visual spatial, visual constructional tests you've mentioned, clock drawing, Rey Complex Figure, block design, things like that tend to correlate at least pretty well with driving performance, and it's pretty intuitive. Another test or set of tests I've seen in a couple papers is Mazes. Would you say Mazes are similar to Trails B and visual spatial tests in terms of their predictive ability?



**Jennifer Davis** 46:33

Yeah, definitely.



**Ryan Van Patten** 46:34

Is there anything else? Anything else we've left out?



**Jennifer Davis** 46:38

No, those are the typical ones. Definitely. I think, when we think about these data, it's often they're relating it to driving errors, either in a simulator or driving errors on a road test. We have to remember that just because someone makes driving errors, again, it doesn't necessarily make them an unsafe driver. That becomes a very difficult, predictive model. How many errors are bad enough to be unsafe? Is it a bunch of little errors that are mild? Or is it one big error? It's hard to develop, like, what is the truth? Because the truth is, someone gets in an accident and dies. That's what we want to predict, but we can't study that because we don't want people to die. [laughs] So it's difficult, we're always approximating and really approximating risk, and that's never going to be a perfect model.



**Ryan Van Patten** 47:25

Yeah. Just for the sake of thoroughness, what about a brief cognitive screener, like the MMSE? How well does that do in predicting driving?



**Jennifer Davis** 47:33

Terrible.



**Ryan Van Patten** 47:34

Yeah. Thanks.



**Jennifer Davis** 47:35

[laughs]



**Ryan Van Patten** 47:35

That's all you need to say. [laughs]



**Jennifer Davis** 47:37

Terrible. I mean, unless you're so low, right? Unless you're at that tail where it's a no brainer kind of thing. But in terms of the people that we're dealing with? Not much. Yeah.



**John Bellone** 47:48

I want to dive down a little further into cutoff scores and, and how useful they might be because this is such a difficult topic for us, neuropsychologists, for every practitioner really. There was a 2015 paper that you were a co-author on, actually, we did our homework [laughs] and you had found that a Trails A score greater than 48 seconds or a Trails B score greater than 108 seconds might suggest an unsafe driver. And like we've been talking about, it's not a one to one, but I am curious if your ears perk up when you hear scores like that, and if you weigh those more heavily when you are making that recommendation about driving?



**Jennifer Davis** 48:41

I do look at those measures because I know that they've been so strongly related to driving. But I wouldn't say that I look at those numbers and say up that cut off, you know, I'm going to definitely recommend a road test. It's, again, that whole picture where I'm getting more data from the whole clinical experience that I really weigh my recommendations on. I feel like I often address driving if someone has a mild cognitive impairment diagnosis. I may say, "I don't have strong concerns about driving at this point, but this is potentially degenerative, potentially may change over time. There were performances in some areas that could relate to driving. Casual monitoring should be put in place." You know, that kind of thing. So we'll just keep our eyes on it. But I don't hang my hat on cut offs, even though I was, yes, a co-author on that paper. [laughs]



**John Bellone** 49:38

We won't hold it against you. [laughs] I think that's a really good point that there are levels of recommendations and that should correspond with the test data and behavioral observations and all the pieces put together.



**Ryan Van Patten** 49:56

We might think about it like a soft cut off instead of a hard cut, right? If you see numbers roughly above this number, then maybe you start to have some concern, but don't interpret anything in a vacuum.



**Jennifer Davis** 50:09

Exactly. Yep. I think it's also, we normally correct these scores for age and education and gender in many cases. That's kind of meaningless to some degree. So, yes, they may or may be normatively doing okay compared to other 92 year olds, but what does that mean in terms of the actual kind of skill of driving?



**Ryan Van Patten** 50:33

That's a really, really good point. Yeah.



**John Bellone** 50:35

When you are explicitly thinking about driving, do you tend to look at the non-corrected scores or take that into account? Like the raw scores?



**Jennifer Davis** 50:49

I do think about that. Absolutely. I do think about the level of confusion or the derailing or can they do it or not? Just not able to engage in the task, that kind of thing? I definitely do. Yep.



**Ryan Van Patten** 51:01

I think we've covered cognitive testing pretty well [and] given listeners an overview. Let's move forward, move past that a little bit, and imagine that we've done our neuropsych assessment and it suggested some concern with respect to safe driving ability. What do you see as our role as neuropsychologists in terms of patient care? How should we think about consulting with a referring provider? How can we be beneficial to them and the patient?



**Jennifer Davis** 51:29

I think you want to communicate your sense of concern, if you have that, within the recommendations. Speaking with the primary care physician, but also making sure the family understands that as well. I think the more people that understand it, and discuss it, the better the better goes. Definitely. So communication.

**John Bellone** 51:54



Something that I've thought about before, do you ever have concerns about letting someone drive home after the evaluation? If they've had profound deficits cognitively or in vision? I think, as a side note, I think it seems odd sometimes that older adults, who often or many times are quite imperative for coming to see us, they sometimes have to drive pretty long distances for these neuropsych assessments. I think it's just interesting, but then driving home afterwards I am sometimes concerned about people. I don't know if you've thought about that.

**Jennifer Davis** 52:33



It is rare, but I have on occasion called a family member with the permission of the patient to ask them to come and meet the patient and drive them home. But I think, as with many of us and our practices, we're [seeing] people who are in a much milder range of cognitive impairment than I think I saw in the past. But yeah, I think it's a good point. If you're going to make a recommendation that this person should not continue driving, they probably shouldn't leave your appointment. [laughs]

**John Bellone** 52:58



Yeah. I had a story from a colleague of mine who had had someone evaluated and vision was clearly a problem. He couldn't see the stimuli. And this clinician asked how he was getting home. How he was driving, he drove to the evaluation. He said, "Oh, well, I can't read the signs or anything. But I know by the color of the building when I need to get off the freeway." [laughs]

**Jennifer Davis** 53:31



Oh, geez. Yeah.

**John Bellone** 53:34



Oh, man. Just a nightmare. She didn't let him drive home. She made sure he had another ride.

**Jennifer Davis** 53:41



Exactly. Yep. You can easily get a taxi or family member to help out.

**John Bellone** 53:46



Yeah, or an Uber nowadays.



**Jennifer Davis** 53:49

Well, actually, I've had a few patients who were fairly advanced in their impairment, but they didn't have a family member to come to the appointment. And they had Uber. They had the instructions to get the Uber on the way home and it worked out well. Worked out great.



**Ryan Van Patten** 54:04

For sure. Along these lines, broadly speaking, what's your thought process when writing up recommendations pertaining to unsafe driving?



**Jennifer Davis** 54:12

So, unless it's a straightforward case where you think absolutely this person cannot drive, kind of like what we talked about, I think what we need to do is think about gradations of recommendations. Of course, really thinking about gradual cessation if that looks like we're headed in that direction. I think that families need to appreciate the absolute extreme autonomy that comes with driving and when someone has a diagnosis of early AD or mild cognitive impairment, there's already so much loss that's surrounding that diagnosis potentially. The family and the patients themselves have to really make a plan for, "What would it look like for me to not be driving?" There needs to be a plan in place. What are all alternative strategies and what are the barriers to putting those strategies in place? It's very rare that I would recommend, because it's usually unsuccessful, just ripping the band aid off. "No, you can't drive." Really a gradual approach is much more successful.



**John Bellone** 55:17

How about other specific recommendations? Like having a co-pilot with you, or limiting driving to familiar places or safe environments and good weather?



**Jennifer Davis** 55:33

Yeah, definitely. I love the co-pilot. That was something that was so informative with following these individuals around naturalistically. There are some people who really would not be safe, I don't think, if they didn't have someone in the car. We were able to look at that. When someone was in the car with them, they did okay, they weren't lost or making errors. I think if that is something that a caregiver is comfortable with, and they can be that co-pilot for the spouse, usually is what happens, then absolutely, I think that can be a very powerful recommendation and can last for a long time in many patients. Definitely limiting driving. That's definitely

borne out in our naturalistic research is that if someone can limit to the familiar environment in a less chaotic situation in good weather, they can stay safer longer and drive. Simplifying the environment, they do better with that. Thinking also, then, are there other contributors that could be impacting their safety that can be fixed? New eyeglasses or changing their medication to a different time of day to minimize drowsiness. Try to tweak them up medically. Medically optimize them to be the safest drivers that they can be.



**Ryan Van Patten** 56:46

What about a restricted license? Is that something that you ever find useful to recommend?



**Jennifer Davis** 56:52

You know, I have not engaged in that. I've not recommended that or really gone down that path before. I'm not sure what that would be. What did you have in mind with that? Like in what kind of situation?



**Ryan Van Patten** 57:06

I think some states allow for a restricted license, which just sets the boundaries on where and when to drive. But it sounds like you're doing that. We don't need to have the state involved necessarily. We can have a more personal interaction and specifically recommend that the person make their own decision to limit their driving.



**Jennifer Davis** 57:30

It's so state specific. I don't even think Rhode Island has something like that. I mean, they'd have restrictions, I think, based on vision and things like that, but I'm not aware of any specific guidelines for cognition.



**John Bellone** 57:40

I don't remember where I saw this or heard this but I saw somewhere that limiting driving could potentially make it actually more unsafe because the person is not as practiced at driving. If the person's only going to the supermarket once a week, some of their skills might get a little rusty, whereas the person who's driving more frequently might be more practiced. I'm not sure, again, I could be misremembering that, but just throwing it out there.

**Jennifer Davis** 58:13



Yeah, I mean, it kind of makes sense. You want them to drive enough so that they keep their skills up. And frequently enough because we do know that there is a cut off in the distribution, that some limiting of their driving and limiting the distances they are going and the complexity of their driving is safe. But then there is a point at which situational avoidance indicates that they're not safe. So if someone is really down to driving one to two miles once a week because they can't or feel unsafe doing anything more than that, that's probably a sign that they are unsafe. So there is a point where that logic falls off. You can't self-protect through limiting. So that's a good point when you're interviewing a patient is if they're getting so limited and hardly driving at all, that's a sign that's a potential risk sign.

**John Bellone** 59:10



I'm curious, when do you recommend a formal driving evaluation? What's that threshold for you?

**Jennifer Davis** 59:15



The threshold for me is usually in the mild dementia range. I'm seeing a lot of moderate to severe impairment on those types of tasks that we were talking about, those visual and executive kind of tasks. There's just some breakdown in that basic ADLs that they're showing. So they're kind of advanced MCI, a mild dementia kind of range where I'll give them those recommendations. The Hartford puts out a nice driving questionnaire about how you can look at your family members driving and what you should be paying attention to. And can they can fill out a little self check and that can help provide some additional data about, "Well, I'm observing these types of errors, and I'm seeing this on the clinical eval, and I think that a road test is necessary at this time."

**Ryan Van Patten** 1:00:09



Right, that's helpful. For our listeners, in the show notes, we'll link to the American OT Association which has some resources for driving rehab specialists, as does the Association for Driver Rehabilitation Specialists. So go to the show notes, if you want more resources around this. But for our purposes now, we can transition into feedback a little bit. As I'm sure everyone can imagine, these feedback sessions can be quite challenging. So say we've gone through a full assessment and there's evidence that this person is no longer a safe driver. They're still driving and we need to start to open this dialogue and have a conversation about scaling back, or at least addressing some medical issues, if not, in the case of Alzheimer's disease, starting to prepare for eventual cessation of driving. Do you have general strategies

or clinical pearls that you use when providing the sort of feedback that often may not be well received or people don't really want to hear when talking to the patient and their families?

**Jennifer Davis** 1:01:21



There's no question that's challenging. Absolutely. It's very important, I think, to acknowledge right up front that this is hard and this is a sign of changes and in taking away autonomy and being empathetic about that. It's a huge sense of loss of independence. And it's sad. So I think being empathetic about that right up front is important. I think a lot of what we bring to neuropsychology is a little different approach in the feedback where we may not be so directive, and "you have to do this, this and this", but we can explore recommendations with the patient. So this is what we're recommending, get their reaction to that, identify some barriers that are maybe in place to them not getting on board with you. It's a big challenge. It's a big challenge. But I think, again, that scaled approach where you're doing gradual cessation, you're planning about this, identifying resources, addressing barriers within either the patient's mind or with a family. So the family is there. "What is your plan to help dad get to the senior center? It's really important to him. He wants to get out and exercise every week, how can that happen?" So we're not just having this perception that they have to stop everything. I think it's also really important to get something in place that's routine. Patients hate it when they have to say, "Well, I don't want to call somebody and ask for a ride [if] I have to get out of the house." So you want to get in place people who can fill in the gaps. So there's always somebody who does the grocery shopping with them. There's always that partner who goes and exercises with them. They're not asking for a ride every time they want to go do something. Little things like that can be really important. But then I also think about the road test, making that recommendation. This is not just me, this is some evidence, this is some information I'm concerned about. But we really need to get you out on the road and see how you're doing. Then once we have both pieces of information, we can make a decision. So trying to work that way.

**John Bellone** 1:03:29



I think that's a great approach. In the case of a patient who is staunchly opposed to scaling back or relinquishing driving, I have a couple tactics. One of them is the one you just said, that we're going to recommend a formal driving evaluation. Pose it as a way for them to prove that they're safe. "There's some questions, your family's concerned, but this is your chance. Show them that you're safe." That sometimes diffuses the situation. The other thing that sometimes works is making the potential financial liability absolutely clear and appropriately scary. The worst thing that could

happen is that they hurt themselves or someone else in a car accident. Not only hurt somebody, but they could potentially be sued. Maybe we should talk just very quickly about the actual financial liability. I'm not sure if you know what the legal liability is. I've sometimes been asked by patients and family members whether having a dementia diagnosis automatically leaves them open to a lawsuit in the case of an accident. It's a hard question.

**Jennifer Davis** 1:04:55



It's a really hard question and certainly not like an area of my expertise. But, I mean, if we think about it, most states having a diagnosis of dementia does not mean that you have to give up your license. So there's nothing illegal about driving with a diagnosis of dementia. That being said, certainly, if something did happen, that person might be considered more at fault, potentially, I suppose, if they have cognitive impairment and documented diagnosis. But I don't know about case history or precedent for that. At least for family members, they know that it's not illegal to drive with a diagnosis of dementia.

**John Bellone** 1:05:38



Right, but potentially a greater risk, though, definitely. I wonder how you feel about family members who take a more authoritarian approach, like hiding the keys or disabling or selling the vehicle, taking someone's driver's license away, something like that? Under what circumstances would you support those measures?

**Jennifer Davis** 1:05:59



I think at some point, sometimes those measures have to be taken. They're usually a last resort, but there are situations where that person is just not safe, they're not really making appropriate decisions, their capacity is starting to be affected. The only way to do that is to really take those extreme measures. It happens. I think a little less extreme measure that I found helpful is to have myself or their primary doctor write a prescription to not drive and be able to post that up on the door. Your doctor [is saying] it's not safe to drive or the doctor is not allowing you to drive. It's just a reminder, and it's literally a prescription not to drive. Sometimes that has helped because it's hard to put the caregiver in the bad guy seat all the time too. But, at some point, you're going to have to potentially make that decision and take the keys away.

**Ryan Van Patten** 1:06:51



Right. I think it could be helpful for us to think about the other perspective, or at least give voice to potential negative consequences of a patient, a person stopping driving. I'm thinking of losing autonomy, social isolation, things that can increase depression, anxiety, self deprecation, and negative health outcomes. That doesn't mean that we should be conservative necessarily with recommending that people stop driving if it's unsafe. Do you have ideas for ways that we can proactively mitigate some of these negative consequences, psychological consequences, for the individual?

**Jennifer Davis** 1:07:37



I think a lot of it is getting that plan in place. Having the family on board, having an open discussion and having repeated discussions about it. To make sure a plan is in place for what happens after someone stops driving. There has to be some way to maintain their autonomy for all the reasons that you just said. Not being able to get out of your house and being isolated will accelerate the memory decline, physical decline, and emotional decline. I really like to just get a plan in place and really have a good conversation with the family in the feedback session where we really hammer out some of these things. Absolutely.

**John Bellone** 1:08:13



We're getting close to the end here. This has been great. I have a potentially controversial question for you, though.

**Jennifer Davis** 1:08:23



Uh oh.

**John Bellone** 1:08:23



I mean, I can anticipate your answer. But do you think that there should be an upper age limit for driving?

**Jennifer Davis** 1:08:30



No, absolutely not. Because we age in such independent ways. We know that you can have a 90-year-old who's perfectly healthy compared to some 60-year-olds who are not healthy at all. We know that even though increasing age is a primary risk factor for some driving problems, it's not the only one. I think it's less informative than that absolute skill. What can that person do? It doesn't necessarily have to be age corrected in any way. I think with that in mind, you have to keep in

mind renewals of licenses and DMVs. There are some states that are increasing the frequency that you have to show up in and pass examinations and things as you get older. I think that's reasonable, just simply because people as they get older are going to be more at risk. But, no, I don't think there should be an absolute cutoff.

**John Bellone** 1:09:21



So, Ryan and I were having a discussion, a debate, when we were coming up with some of these questions. I would ask, "Why is there a lower limit?" I know, Jen, your time is...

**Jennifer Davis** 1:09:37



No, that's okay.

**John Bellone** 1:09:39



...running short. I was arguing that well - I agree that there shouldn't be an upper limit, but then why is there a lower limit? If we're setting a minimum criteria that someone needs to drive, then if a 6-year-old can meet those criteria, then they should be able to drive in the same way that a 110-year-old should be able to drive.

**Jennifer Davis** 1:10:03



Well, so...[laughs]

**Ryan Van Patten** 1:10:04



Jen, can you please help me out here? Put this to rest?

**Jennifer Davis** 1:10:07



That's crazy.

**Ryan Van Patten** 1:10:07



Yes, thank you.

**Jennifer Davis** 1:10:08



Because developmentally their frontal lobes are not connected. [laughs] I would argue that we should increase the age limit, you know? [laughs]



**John Bellone** 1:10:20

I agree with you, but [laughs] you can see those cognitive aptitude graphs just plummet over the lifespan. I would argue that the degree of atrophy that's just normal age-related. I don't know, I see it being the same argument for an upper age limit as a lower age limit. I don't know.



**Jennifer Davis** 1:10:48

Well, there's a period of time where older adults drive really well. I mean, they don't make as many errors and are not as distracted as younger adults. If you look at the very old, they are similar, very similar to teenage boys. That's that. [laughs]



**John Bellone** 1:11:05

Oh, that's interesting. In what way are they similar?



**Jennifer Davis** 1:11:11

Impulsive. Making bad decisions. Getting into more accidents.



**John Bellone** 1:11:19

So it should just be the older men that should have the upper age limit?



**Jennifer Davis** 1:11:24

That's right. That's right. [laughs]



**John Bellone** 1:11:28

Fair enough. [laughs]



**Ryan Van Patten** 1:11:31

We just have a couple more questions. Thanks so much Jen, for coming on the podcast again. I think we've covered a lot of really useful material. At the same time, I wonder if any of these questions and this content around driving in older adults will actually be relevant in 10 or 15 years. Specifically, there's a lot of technological improvement in self-driving cars that's coming along. It's hard to predict when it will really come online, but I've heard estimates that within the next 10 to 20 years self-driving cars will potentially start making a regular appearance in people's driveways. I do have a question here. [laughs] I'm getting to it. I'm thinking about older adults, people who are cognitively impaired, and I see two sides to this. On the one hand, they would be those people who would benefit the most from

self-driving cars. This could potentially solve the problem of loss of autonomy that's associated with losing the capacity to drive. It could be a great thing. At the same time, older adults tend to have some trouble making major life changes, right? It's hard when you've done something the same way, it may be really scary to adapt to self-driving vehicles. I know you don't necessarily have any expertise in self-driving cars, but just curious about your thoughts off the cuff on how they may help our patients.

**Jennifer Davis** 1:13:02

Right. I think it's such an interesting question. Yes it's maybe 10 to 20 years off, but that's certainly not how grant reviewers review it. So I've certainly had, like, "Why are you doing this research now? It's absolutely a moot point." So that's a little bit, I think, optimistic to think it's right around the corner. I think that there's a couple good points in there that I think that it could be highly beneficial to this population. We have an avenue where people can get out and do things. But I don't know if the development of this kind of technology, if it will be completely self-driving? Completely autonomous? Or is there going to be some kind of semi-autonomous? Because I do think that the degree to which someone with cognitive impairment can interact with technology, not to mention age, but interact with technology is a potentially huge limiting factor. I would have to imagine that there's some manual switch that's going to be in these cars, right? That if something bad happens. So I think it could be a potential challenge. If you bring it back a little bit to real time, I think we are struggling with that right now. We have a lot of technology in cars that pull your car back into lane when you're falling out of a lane or that puts the brakes on for you if you're getting too close to another car or sounds an alarm if you're getting too close to another car. And what we're seeing in some of the naturalistic studies driving is that it does seem to help the person drive more safely, but they have no idea what's happening. They do not know why that alarm went off or if the brake went down. They're confused. But it does seem to prevent some problems. So I think it's a huge area of research, how older adults and cognitively impaired adults may interact with technology. So it's a neat horizon to think about and I don't really know how it's going to go down. That'll be interesting.



**John Bellone** 1:15:05

I think it's going to revolutionize society. And for the better. I think it will really have so many positive applications. I have one last note, and then we'll get to the bonus questions. I just wanted to get this out there because I think it's really important to remember for all of us that driving is a privilege. It's not a right. And my mom told me when I was learning to drive that, "You're operating a weapon, so you better



always be paying attention and driving defensively because there is a real possibility of causing serious harm.” I believe our responsibility of keeping others and ourselves safe, trumps our driving privileges if our abilities are sufficiently impaired. That goes for any of us at any age. And really, I think a large portion of people out there on the road probably shouldn't have the privilege of operating a motor vehicle. There's so many people who are just inexcusably reckless and impatient and inattentive and aggressive, and I think it all too often results in tragic loss of life or disability. So I'm really hoping that those automated vehicles would completely solve this problem in the near future. But I think conversations like these that we're having are really incredibly valuable in the meantime. I just wanted to say that.

**Jennifer Davis** 1:16:34



I completely agree. I think we have to remember that [you can have] driving concerns at any time point in the trajectory of your life, and guard against ageism and assuming that all older drivers are just inherently bad drivers or at risk. You want to be careful about that as well.

**John Bellone** 1:16:53



Yeah, agreed.

**Ryan Van Patten** 1:16:54



To wrap things up, we'll ask you our bonus questions. These are not specific to driving. We ask all of our guests these. Relevant to neuropsych broadly, if you could improve one thing about the field of neuropsychology, what would it be?

**Jennifer Davis** 1:17:09



I want access to good norms. [laughs] Good updated norms. Really I think it's an area that needs a lot more money and funding and development because our culture is rapidly changing and we're behind with that.

**John Bellone** 1:17:26



That would be the one that I would choose if I was asked that question.

**Jennifer Davis** 1:17:29



Yeah.



**John Bellone** 1:17:30

The other bonus question is what is one bit of advice that you wish someone had told you that you would pass along to trainees? Just an actionable step that trainees can take.



**Jennifer Davis** 1:17:42

I think, for me, what comes to mind is really that no path is permanent. We all start out with different training opportunities and exposure to different patient populations or different contexts and doors open, or you make doors open. I never in my mind would have thought this would be a complete focus of what I was doing for the past 10 years, this kind of work at all ever. But little opportunities arise. So I think, early in careers, I think it's really important to say "yes", frequently because opportunities can lead to really exciting further opportunities. So being open to that and not feeling like you're trapped into something with no potential to diverge because there's always that potential.



**Ryan Van Patten** 1:18:26

Great advice. Well, thanks so much, Jen, we really appreciate it.



**Jennifer Davis** 1:18:29

All right. Well, I very much appreciate having the conversation. It was fun.



**John Bellone** 1:18:31

So that was the end of our interview with Jen on driving safety. I feel that we have to devote a couple more minutes to the discussion about whether or not there should be an age limit. I need to defend myself here. [laughs] I agree that there shouldn't be an upper limit because many older adults in their 80s, 90s, 100s, they can drive just fine - at least according to the criteria used by the DMV. But I wanted to stir things up a little bit and point out what I view as a flaw in the logic here.

So, logically, I think that anyone who advocates for a criteria based cut off, not an age limit, on the top end cannot then advocate for a lower limit. So you might say that, well, it's different because there are neurodevelopmental processes that occur, particularly the development of the frontal lobes like Jen mentioned. To which I'd respond that, one, that development isn't complete at age 16, which is the age that many states allow kids to start learning to drive; two, if the definition of safe driving is criteria based, then kids who are neuroanatomically underdeveloped should not pass that test, that shouldn't be a problem; and, three, I would turn the argument

around and emphasize that, like I mentioned in the interview, there are neurodegenerative processes that occur in later life that impact driving. So I think if you take the initial emotional gut reaction out of it, I think the logic is pretty sound there. So just to make it clear, I do not believe that 3-year-olds should be driving. [laughs] I am just questioning the logic about having an aged base line on one side of the spectrum and a criteria base line on the other side.

**Ryan Van Patten** 1:20:41



John, I have to say, I love your willingness to go out on a limb with this argument. [laughs] Because you're really way out on a limb. Just saying. In all seriousness, I do think that we should always think outside the box and challenge the status quo with creative ideas that go against the grain. That said, your argument is balderdash. [laughs]



**John Bellone** 1:21:02

[laughs]

**Ryan Van Patten** 1:21:05



The problem is that we don't have a gold standard test or criterion with which we can measure all aspects of driving safety. What I mean is that older children and adolescents who are cognitively advanced may be able to pass a formal driving test. That is, they can learn the rules of the road and their sensory [and] perceptual abilities may be good enough to pass the test. But their judgment and decision making are not. We cannot expect them to exhibit the required self-control, emotion regulation, and other similar abilities that are necessary to remain safe on the road at all times. Of course, as you mentioned, older adults with neurodegenerative disorders may be disinhibited and dysregulated. But healthy older adults generally retain sufficient self-regulation and they can be trusted to make good decisions while driving. They also have decades of experience to fall back on - driving reserve, as Jen mentioned, whereas children do not. So, consequently, I think that it does make sense to have this lower limit, a developmental level where we just cannot possibly expect an adolescent to have the full range of cognitive and emotional maturity necessary to drive safely on a consistent basis. On the other hand, I think that healthy older adults do have the potential to be safe drivers well into old age.

**John Bellone** 1:22:31



Well, I think your point about how older adults have decades of experience driving before they decline cognitively, for the ones who do decline, I think that's definitely the best counterpoint that I've heard so far. I still don't think that it's enough to justify preventing that precocious mature 15-year-old from driving herself to violin practice. [laughs] But, you know what, we'll leave it at that for now, for the sanity of our listeners.

**Ryan Van Patten** 1:23:02



[laughs]

**John Bellone** 1:23:03



We would love for you, though, our listeners, to weigh in on this discussion. There's got to be at least one person out there who would back me up on this. [laughs] Or, you know, feel free to share your thoughts about anything else brought up in this episode by commenting over at [navneuro.com/07](https://navneuro.com/07). That's also where you can find the show notes and several resources on the topic, including how to find driving evaluation locations in your area and a template for writing up driving recommendations in neuropsych reports. Ryan, before we go, do you want to announce the winner of this month's raffle?

**Ryan Van Patten** 1:23:43



Sure. So the winner of an AACN Oxford Workshop Series book of his choosing is Daniel Bish IV. Congratulations, Daniel. Thanks so much for your very kind review. We also want to add a special shout out to our European listeners from Spain and Norway who reached out to us.

**John Bellone** 1:24:01



We are a full blown international sensation now, Ryan.

**Ryan Van Patten** 1:24:05



I mean, I'd say so.

**John Bellone** 1:24:06



[laughs]



**Ryan Van Patten** 1:24:06

We've got at least two European fans and counting. [laughs] If you'd like to be entered into next month's book drawing, leave us a written review and email us to say what screen name you left the review under. Go to [navneuro.com/itunes](http://navneuro.com/itunes) for easy instructions on how to do this. And remember the odds are very good that you'll be selected. Well, that's it for today. Thanks so much for listening, and join us next time as we continue to navigate the brain and behavior.



**Exit Music** 1:24:35

**End of Audio** 1:24:35

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