SPEAKER:  
You are listening to Everyday Evidence presented by the American Occupational Therapy Association, helping the occupational therapy practitioner apply evidence to practice. Here's your host, Matt Brandenburg.

MATT BRANDENBURG:  
Alright. Today we are joined by Ganesh Babulal and Sarah BRZESZKIEWICZ. Thank you both so much for sharing your time and being on the show today.

SARAH BRZESZKIEWICZ:  
Thank you for having us.

MATT BRANDENBURG:  
Yes, it's my pleasure. I've been really looking forward to this conversation. You both are AI experts and recently presented a webinar titled Integrating Artificial Intelligence into OT Practice, which outlined how to use artificial intelligence to enhance occupational therapy services for clients. You both bring a really unique perspective to artificial intelligence and machine learning, and specifically how it can be applied to older adults. So, to start off, could you kind of tell us about your background and occupational therapy and what motivates you both to investigate the use of artificial intelligence?

SARAH BRZESZKIEWICZ:  
Before I jump into my OT journey, because I kind of need to start a little before that to get to where I am with AI, but I found occupational therapy through the realm of in-home caregiving. I was an in-home caregiver for adults and loved supporting my clients in their ADL routine. And that's how I was introduced to occupational therapy services. So, when I dove into my clinical career, I found myself in inpatient rehab supporting older adults who'd had brain injuries and strokes with their ADL routines and beyond. And it's really through that work that I became confronted with how vulnerable this population is within our health system. I saw mismanagement of chronic conditions that led to hospitalizations, people with limited support systems that had fallen and were left on the floor unattended for hours and just overall gaps in post-discharge care. So, when I transitioned out of clinical practice and found myself working in health technology the company I work for now as a clinical advisor, since the AI is really using artificial intelligence audio technology to address those gaps that I just mentioned.

So, help with self-management, you know, there's a fall detection component to it as well, and just really improve quality of life. So, that's kind of how I came from traditional OT to working in artificial intelligence in this way.

MATT BRANDENBURG:  
That's fascinating, and I love how you identified those gaps in care that direct providers, like occupational therapies can't always be there to help with self-management and fall prevention. And it's amazing how technology can be applied to fill that gap. Ganesh, how about you?

GANESH BABULAL:  
Well, I had a bit of a circuitous route myself, so well over a decade ago I went into practice and I was a director of rehabilitation for a skilled nursing facility. And so we did a lot of outpatient, hips, knees just your normal ortho route. And then throughout the course of that employment, I was able to work with a locked memory care unit. That's where I saw the impact of neurodegenerative diseases, specifically Alzheimer's impacting our aging population. And that motivated me to get back to school. And so went back, picked up a couple of additional degrees and now I'm in the Department of Neurology here at Washington University School of Medicine. And the way that we're approaching AI in at at least the OT realm is looking at measuring, driving more specifically daily driving behavior. And it's a complex problem to solve because we know that the traditional ways of assessing driving performance is using a road test or a driving simulator. And those are fantastic routes of examining essentially performance deficits and looking at its impact on fitness to drive.

But we over the past eight years have been working on modifying a commercial off the shelf data logger to plug into our participant's vehicle, and we're able to then sample that data every single time they drive in their own environment within their own vehicle. And over the course of this longitudinal follow up, we're able to collect that large volume of data and to try to make sense of it, we have to employ specific AI techniques to extract variables that essentially put them at risk for needing to go in to see a clinician or if they're at risk for a crash. And then we're able to also work on figuring out time points for intervening.

MATT BRANDENBURG:  
Another fascinating application of occupational therapy and artificial intelligence. I love how both of your projects and the work that you both do really highlights how technology can be used to increase the scope of occupational therapy and increase the impact that occupational therapy practitioners and interventions can have to overall wellbeing and increase performance. So, I think it's important to mention that, you know, artificial intelligence isn't, you know, being used to try and replace roles of occupational therapy, but really to support and strengthen the influence that the field can make. Could you both kind of introduce us to what artificial intelligence is? How has it evolved to the point where it can be beneficial and be used in within occupational therapy?

GANESH BABULAL:  
AI is really the future when it comes to our integration with technology. I think it seamlessly blends into everything that we do, but this is more so the case with medicine and healthcare. And when we're thinking about AI or artificial intelligence, it really is just simulated intelligence that's built on code algorithms and very complex mathematical formulas. But underneath it, there, there are ways in which we're able to achieve AI. And one method is machine learning, where essentially it's learning from the data through multiple different iterations to make predictions about something. And it's able to run analysis on hundreds of different permutations on preselected data. On the flip side of machine learning is deep learning, which is really patterned off the brain, and this is reflected in some of the names of the methodologies, like convolutional neural network or long short-term memory networks, where they have multiple layers that handle large volumes of raw data, but also high dimensional data like images and sounds.

And I know that was a lot of specific jargon into really what is AI under the hood, but it's, I think, immensely beneficial for occupational therapy practitioners and practitioner. One immediate example that jumps to mind is some of the work that we're doing, which is looking at remote monitoring systems that have AI to track overall just movement progress. And thinking about our client's progress either at home or in the community, it can serve as an early detection system or warning system for our therapists to indicate changes are occurring. Is there further evaluation needed or do we need to implement some type of intervention? So, it's an early detection system, at least the way that we've been approaching it.

MATT BRANDENBURG:  
And that sounds so valuable and beneficial to practitioners especially that early detection piece. And Sarah, you mentioned that as part of your work with Sensei AI as well, could you introduce us to your position there and how AI programs can be implemented in those ways?

SARAH BRZESZKIEWICZ:  
One thing before I dive into that, I just wanna say I love how Ganesh explains artificial intelligence in that world, even with all of the jargon in it, because I think he does such a wonderful job of taking this very large, ominous technology and really making it easily understandable for the everyday person. So, he is the best person to provide (LAUGHS) that explanation for sure. For me, since the AI, you know, when it comes to early detection, we're really kind of honing in on the individual. And I think similar to what Ganesh said, the beauty of these remote monitoring systems is you're able to do that within the person's naturally occurring environment. So, my company partners with in-home care agencies who install our system and platform into the homes of their clients, and through that, they're able to identify both health and wellbeing related issues, whether it be pain or respiratory function cognitive and emotional issues whether it be memory or maybe some emotional regulation disturbances.

And from that look at patterns and trends so that they can detect and see when the person who maybe has chronic you know, COPD when their breathing issues are now morphing into an exacerbation. Or, you know, conversely when maybe client who didn't, wasn't known to have any con, you know, active condition starts to show signals of maybe memory decline or, or other concerns. So, through that lens, the in-home care provider can now connect the individual to resources, whether it be their primary care physician or if it's more of a physical and ADL issue, home health therapy services to just ensure that continuity of care and keep them in their home.

MATT BRANDENBURG:  
I love that. That's such a wonderful application and it really sounds like AI is being integrated in a way that supports and supplements clinicians' own clinical reasoning and clinical problem solving to identify those patterns and trends that might have gone unnoticed as we are trained as OT providers to focus on the individual and provide client-centered care. So, this is really fascinating to me. I'm excited to continue learning from you both. Ganesh, can you talk to us a little bit more about how you're using machine learning to facilitate your research and specifically the identification of digital biomarkers related to those neurodegenerative disorders that you mentioned?

GANESH BABULAL:  
Happy to, and Sarah, thank you very much for your very kind comments. I also really appreciate the work that Sensei AI is doing, just as a shout out quickly in terms of thinking about what I believe is usually, you know, second or even tertiary outcomes, you know, wellbeing, quality of life, and even emotions. And the fact that AI has the ability to start detecting and incorporating that into our everyday care is just phenomenal. And it really is taking a multimodal assessment. When we're looking at the aging population, and I'll just quickly throw some stats out here. So, we know with the aging population here in the United States by mid-century or 2050 the population of older adults, those are aged 80, sorry, 65 and older, they're gonna double to about 88 million. And as a result, there are a complex cadre of needs that our aging population has to live with. And one of those is really you know, driving itself particularly in the context of neurodegenerative diseases like Alzheimer's and related forms of dementia.

And there is a bit of a public health concern here, primarily because we only have roughly about a thousand certified driving rehabilitation specialists between the United States and Canada. And comparing that thousand to, you know, roughly 88 million older adults, it's certainly not enough to figure out who's safe on the road, when they should come off, when we might need to start thinking about care planning. And so it's really a massive need to be able to think about how do we address those, but in a client centered way. And so the specific methodology that we developed, which is under the Drives project is we plug a data logger into their vehicle, we collect that data every time they drive, and we build a unique profile for each driver taken into account, again, their vehicle and their home environment, but also their health conditions. And essentially the goal of this program is to figure out who's at that highest risk of decline, what decline looks like for that participant, and then can we predict decline before it starts, and the whole goal is really preventative medicine, which is if we can predict it, then we can identify, we can get them in, we can get services on board to ensure their needs are being addressed.

Because for us, the most important thing is to ensure our clients can age in place, and we know that there's a significant burden when it comes to taking away the keys and having them transition into institutional care. So, there's an important precedence for us to ensure that we're measuring thing within their own environment where working with their own data as they're living to inform not just their ability to perform, but participate.

MATT BRANDENBURG:  
That is so fascinating and touches on some really important points of integrating AI and machine learning into occupational therapy. You know, like you mentioned, you're able to collect all this data within an occupation like driving in this case that typically practitioners wouldn't be able to assess. You know, sometimes there's time limits and, you know, there's frequency limits on how long a clinician can spend with a client. And to be able to see data that they're gathering, you know, 24/7 throughout a week can really help to inform care and, and help to improve health outcomes. I think. What would you both say are some of the most common ways that OT professionals who work with older adults can or maybe should be interfacing with artificial intelligence?

SARAH BRZESZKIEWICZ:  
I think there are a number of different ways that an OT can apply it today. I think one of the easiest ones, and that comes to mind most readily is just through wearable technology because more and more older adults you're finding are having smart watches or other types of monitoring systems that they can either wear or have on the phone and go with them. So, I think that's an easy barrier to entry in terms of or a low barrier to entry, I should say, in terms of helping to use the information collected by those devices to inform the individual you're working with about risk factors or monitoring certain vitals, for example, for indicators of health condition. And really allow them to be empowered to identify those early precursors and warning signs so that they can then act on it. Smart home technology also often includes a lot of artificial intelligence components. So, if someone has, you know, Amazon Alexa is a really big name out there there are ways that you can use those tools to really unlock new ways of independence within your home, whether it be controlling different functions throughout the house that may be historically that person struggles to do for themselves or using some of the voice prompt options to again just improve that level of function and participation inside the home.

So, I think those are really good ways to start, especially if you're with a client that already has some, something like that.

GANESH BABULAL:  
And I think on the other end with OT practitioners working in, you know, fixed settings like hospitals or clinics there's a treasure trove of data from electronic health records that is just really sitting there waiting to be tapped into. And I think a lot of AI algorithms can analyze large volumes of our client's data to track outcomes over time and progress over time. And I think by monitoring progress, we can identify trends in order to adjust our treatments as needed to measure the effectiveness of some of those treatments for our older adults, adults. But we can also leverage this data to examine the efficacy and effectiveness of treatments in certain populations to improve evidence-based care. I think, you know, in the line of everyday practitioners, we're always looking for what's the best evidence-based care, and then is the supported by, you know, the literature itself. But then we can sort of flip that paradigm to say, let's use the data that we're collecting in the clinic to guide some of those evidence.

MATT BRANDENBURG:  
I love that. I love all those examples of application of how this technology can promote evidence-based care and better outcomes. What are some tips you would give to a clinician who, you know, maybe is listening to you describe these approaches and wants to apply them, but doesn't really know where to start? What would you recommend to someone if they're considering how to incorporate wearable tech or smart home tech or even some of this larger scale electronic health record kind of analysis, what would you say clinician, who wants to begin with some of that?

SARAH BRZESZKIEWICZ:  
I would say you first start with your needs assessment, like you would with any other intervention and try to identify what is the goal or the problem that I'm trying to solve. And then from there, that should be guiding the, you know, does artificial intelligence play a role or is there a role that I can fold that into, into addressing that problem? And oftentimes you'll find that it doesn't need to be reinventing the wheel to make it work, but if you found your why, then the way to integrate it kind of naturally follows. Another thing I was thinking in terms of applications of AI is maybe you just start with an educational resource you're trying to provide someone and can you use you know, like a conversational AI or a chatGPT of sorts to just help translate the information you wanna provide into more layman's terms or frame it in a way that can just be more easily understood and digested by your client. That could be an easy way to start just incorporating it into your practice today.

MATT BRANDENBURG:  
I love that. And any additional tips from you Ganesh?

GANESH BABULAL:  
That was a great suggestions from Sarah. I think you know, to dovetail off of one of Sarah's prior points is there's a lot of applications when we're thinking about outside the clinic and looking at, for example, if you want to examine fall risk among older adults you can implement wearables to be able to detect that information. And there are a lot of algorithms that are already existing that have been been developed to analyze gait patterns, balance other factors associated with fall risk among our aging population. And I think some of those pieces that are already present could be modified and used in a different way to guide practice to guide our day to day. But there's so much information outside available and I like the suggestion that Sarah mentioned about utilizing chatGPT or other natural language processing algorithms to query them, ask them questions, and they will come back with solutions or suggestions.

MATT BRANDENBURG:  
I love that. Those are excellent recommendations. And I really like Sarah, how you mentioned sometimes it may be more appropriate to start from a more educational approach. I know even today AI's been around for a little bit, it's really popular, you hear about it in the news a lot but I still think there are people who hear someone talk about artificial intelligence and their mind goes to Skynet or, you know, they're kind of confused, maybe a little bit afraid about it. What should practitioners especially understand about artificial intelligence, machine learning and deep learning? As you mentioned before, Ganesh, prior to incorporating it into their practice?

GANESH BABULAL:  
My head still goes to Skynet, so it forever will (LAUGHTER) just as one of those. All I think about is Terminator, but it can certainly be scary, right?

SARAH BRZESZKIEWICZ:  
Yes.

GANESH BABULAL:  
When you're thinking about it, there's such an onus to it, right? About technology essentially growing and becoming sentient. But to sort of, you know, lessen the onus that we're putting on it, or at least overestimating it, AI really requires right now at least continuous monitoring, updating and refinement to maintain the performance. And I know I briefly mentioned sort of the differences between AI machine learning and deep learning. And really these are just all algorithms and there are humans behind these algorithms that are consistently developing and refining them. But many of these programs are still in their learning phase, and the coding is often done by computer scientists, engineers, and software programmers. I think in healthcare settings, the decisions themselves have a significant impact and implication for our clients, not just their health and their wellbeing, but then also their community at large. And so I think it's critical for OT practitioners to keep their training and expertise in hand to ensure that the recommendations that are being provided by some of these algorithms, that they make sense from a clinical perspective, that it is realistic for our clients.

And that clinical interpretation itself is still being guided and is required really by our therapist. And so that itself, I think cannot be corrupted, cannot be provided or replaced by AI.

SARAH BRZESZKIEWICZ:  
It's part of my role at the moment as a clinical advisor is I am helping to support not only the agencies that are using this technology on the ground, but also the teams that are behind the scenes doing that fine tuning process or streamlining process to make sure that what we're putting out there truly is doing what we intended to do and in the most authentic and accurate way. And even beyond that, we have clinical teams on the backend working with the data scientists and engineers for the creation of a lot of those processes. So, it really is a collaborative effort both by the physical person on the front and the back end in tandem with the technology itself.

MATT BRANDENBURG:  
A wonderful summary. I love the importance of that clinical interpretation piece. And Sarah, would you say that as a part of your job, are you helping to incorporate kind of the OT lens into some of those AI algorithms that are being built with those teams?

SARAH BRZESZKIEWICZ:  
Almost definitely. I mean, again, I just think OTs are some of the best talents when it comes to looking at the whole person. And even beyond the individual, what factors interplay with that? And so particularly when you're diving into the things outside the physical realm, like we talk about cognition and emotions and even human interactions, that's so complex and nuanced. And so you really, I think I benefit greatly from being an occupational therapist and helping our backend teams understand the interplays of that to physical health and other realms in addition to how they can stand on their own in terms of impacting outcomes. So, I definitely feel like I'm using my OT lens in every way, shape, and form. (LAUGHS)

MATT BRANDENBURG:  
I love that. And that's such an important work that you're doing. And, you know, I can't help but get an image in my mind of Arnold Schwarzenegger's Terminator coming back, but as an OT and telling someone like, I'm here to help you perform your meaningful tasks. (LAUGHS)

SARAH BRZESZKIEWICZ:  
Now that is a sequel prequel, whatever, it may be worth watching for sure.

MATT BRANDENBURG:  
Are there additional considerations or recommendations for incorporating artificial intelligence into care provision when it comes to populations who may not be experienced or familiar with technology in general, and specifically artificial intelligence as well?

SARAH BRZESZKIEWICZ:  
Well, when you mentioned Skynet, I think part of why people's brain jumps to that is because of privacy concerns. You know, when we're talking about monitoring, there's can be a fear amongst any people of any age, but particularly I would say in the older adult community as well about, you know, I don't want someone invading my privacy or knowing everything about me. So, I think as a clinician, when you are selecting an AI tool to use with a person or a population, it's important to be aware of how that information's collected, how the information is stored, the specificity with which the application or tool is collecting, what's intending to collect, you know, are there any outliers that are also being gathered in that process? And communicating that with confidence to your client too, because we want to maintain the privacy of all data, especially if it's related to health. And so I would say that is, you know, that's why people, I think, have that concern. But at the same point, just being up as a clinician on how is this tool going through that process, I think can help you then enact that tool with confidence.

GANESH BABULAL:  
That's a great point, and I've got two additional points. Well, one to dovetail off of Sarah's discussion about privacy, because I think that as an ethical factor, it's so critical. And I wanna emphasize that right now there's a lot of discussion that's occurring when it comes to our data that's being collected. Either, you know, from the private industry or commercial devices that we might be used or smartwatches that you might have right now. All that is data that's being collected and sent back to the manufacturer or the service provider who owns that data and how they're using that data to train, test, and validate their models is really a wild west Right now. There's not a lot of guidelines. But I think the first, and probably the most important point with regards to concerns about privacy, confidentiality and data security, is we need to build trust and confidence among the users, but then also in terms of our therapists who are in a position of authority because these privacy implications have or could have an important impact in terms of thinking about care, how care is delivered and who has access to care.

And so we need to invest in safeguards, you know, encryption protocols and an anonymous procedures to protect sensitive health information. I'll give one great example of something that I didn't anticipate I'd have to deal with. But a few years ago we had a participant in our study who had their vehicle stolen. They went to pump gas at the gas station, went inside, had left their keys in the ignition, and some very observant sticky fingered thieves made off with the vehicle. And unfortunately for them, they didn't know that it was being tracked. And so we had connected with the participant who let us know that the vehicle was stolen, and so wanted to know if we're still tracking it. So, of course, I jumped online, was able to locate it in real time. And over the course of the next few days, we were able to coordinate with the police department here to actually retrieve the vehicle. But in the course of that interaction because it was a crime that was being committed, they wanted to gain access to our systems and to essentially the data, and I said, no, you can't, because it is protected by our research protocol.

And we actually received a certificate of confidentiality from our funder, the National Institute of Health. And so it was really important for us to know what we can share, what the limitations were but then more importantly, I think for our participants to be able to retrieve their vehicle that was really a highlight of this work in an unintended benefit. The second point that I sort of wanna make that's aligned the along the lines of the ethics is there's been an overall shift to medicine, you know, towards inclusion. And I think that's just a natural extension for us to think about cultural differences, language preferences and literacy when thinking about designing AI applications for diverse population, and that's both technological literacy, but also actual literacy. And part of this discussion as practitioners we need to think about is how do we ensure that client-centered component that we value as OTs and that we try to embody within our daily practice is continue to be accessible and inclusive with implementing AI in our practice.

And I think this could be operationalized in a few ways. Like, you know, providing language support ensuring that the content of that specific technology is incorporating culturally relevant pieces but then also incorporating visuals, for example, to accommodate our users from different cultural backgrounds, but also if physiological changes are occurring. And, you know, we may not be able to see as clearly as we did 20 years ago. And so we also need to be mindful, and I'm also guilty of this, but of using jargon, technical terminology or perceived insensitive language that might limit engagement or actually foster disengagement with technology. And I think all of that pulls into these are some of these considerations that we need to start paying attention to, both in terms of practitioners, but, and also in terms of the leaders within the field as we're incorporating AI into our practice.

SARAH BRZESZKIEWICZ:  
Yeah, and the one thing I wanna add to that is, you know, there are so many things that even within my own company, we are working to solve and improve upon. And being an audio based technology, I currently, we only operate with an English today. That's the only language that we can, you know, accurately analyze. So, there's so many older adults out there being serviced by our agencies that speak a multitude of languages that just won't benefit from this just yet. So, it's a real point that companies, clinicians whose ever developing and using these products needs to keep in mind and continue to do the work to identify the gaps that exist today, both in the way the algorithms and models are trained and used, and also how the products can be applied to make sure that it truly is accessible and in an equitable way for all. And I'd say cost is another barrier too in that some of these tools and products can come with a steep cost, which then again, narrows the scope of who can utilize it.

SPEAKER:  
We'll get back to our interview right after this quick message. You all know we really try to make research more consumable and applicable on everyday evidence, but did you know that just one minute of your time could help us to improve the show, improve the resources the American Occupational Therapy Association provides for practitioners and improve the application of evidence to practice within our whole field? Please take our one minute survey. It's only three questions, and you can find the link in this and every episode's description and support the AOTA in continued efforts to improve our podcast and to improve the translation of research to practice. Now, back to the interview.

MATT BRANDENBURG:  
There truly is so much depth and and breadth of, of artificial intelligence so much material even. What would you kind of recommend to practitioners about how to prepare to use it? Like, are there trainings, are there education courses or other things that practitioners can be doing to learn more about AI before they incorporate it?

SARAH BRZESZKIEWICZ:  
You know, I, I think looking at literature is helpful. While I will say that we're really in the early phases of having strong, robust literature about the therapeutic application of AI, it still doesn't hurt to dive into what's been studied today and understanding just even the basics, whether that be through a research article or even just an online learning platform of how does machine learning, artificial intelligence and in deep learning work just to inform yourself. So, again, you feel confident in just the basics of how these tools operate. And additionally, I would say it's also good to just kind of investigate things adjacent to AI. So, the topic could be smart home technology or it could be wearables, which can incorporate AI components. So, it doesn't always have to be artificial intelligence and bold, but I think the concepts that are still more readily studied for smart home technology and other forms of tech can be applied to how certain groups can benefit from artificial intelligence as well.

GANESH BABULAL:  
That's a great point, Sarah. And myself, speaking from my experience I've sort of stumbled into this world by just reading as much as I can out there and learning as much as I can. And it's a bit archaic, but I google everything you know and I can also use AI to learn about AI. So, if I'm wondering about, well, what is this new model mean, and so I'll go to chatGPT and type it in or another natural language processing to figure out is there, you know, additional information or other things that I can read up on. But I think where we're at right now in terms of a field and a profession is that there is really this massive arms race where the technology is being developed as quickly as we're learning about it and writing about it. And so there is this sort of lock step in, alright, do we know enough? And then if we do, can we replicate it? And so oftentimes that'll change. And so new algorithms are coming out daily different ways in which we can tune certain things are coming out daily.

And so, but I think for the day-to-day practitioner there's a lot of great material available online. A lot of videos available. And hopefully this podcast might be helpful in helping to bring a little bit more information about AI and its implications for OT.

MATT BRANDENBURG:  
Absolutely. And thank you both for sharing all your knowledge. This is a very new topic for me and already I'm feeling, you know, encouraged and inspired to learn more and, and explore what some of these applications can be. And I'd love to discuss with you both what some of these therapeutic applications can look like and how AI could be implemented to improve care and outcomes for older adults. So, if we could start talking about how AI could be used to identify performance areas affected by cognitive or physical health decline and then kind of go through some of the applications from there.

GANESH BABULAL:  
Yeah, I'm happy to start off with this I think in the context of our day-to-day treatment RPM or remote patient monitoring is this massive burgeoning area that's quickly developing, but essentially it's to monitor physiological functions, symptoms, but also cognitive functions to look at how the person is changing in their own environment or at least in the clinic. And so this could really be accomplished through a number of different ways. So, for example putting on a smart wearable device, you know, like a smartwatch or a type of monitor to track changes over the course of the day and to identify whether or not there are peaks and valleys that are related to other things that might be occurring. The same methodology applies to looking at cognitive function or even mood. You can push notifications to a smart, you know, smartphone where the client is able to complete a task and then collect that in a burst algorithm where it's gone through randomly over the course of let's say a week or two weeks.

And that way you're able to establish this sort of baseline and then you can continue to track them over time to see are there changes that we need to be mindful of? Is this indicative of either improvements or, you know, plateau or even a deficit? And I think remote patient monitoring is also very helpful. When we're thinking about populations that are geographically further from urban settings or physical settings like those in rural areas they can really help to monitor chronic conditions and those that at the greatest risk for decline. The other end, I think clinical decision support systems are also gonna be really big in terms of our day-to-day functioning, but collaboration with other allied health professionals and the larger medical community we can look at real-time guidance and alerts recommendations from their electronic health data and also to see, hey, if all of these different treatments are on board, is this helping with this goal that we've established? Right? And if not, it allows for multiple members of the team to monitor essentially this patient dashboard or client dashboard to see is there additional improvements and if their discharge does improvement occur.

So, there's a lot of integrations, I think with OF practice that we're just starting to touch the tip of the ice iceberg right now.

SARAH BRZESZKIEWICZ:  
What I love about what Ganesh said was not only detecting the issue or the decline, but also providing feedback about improvement too, and being able to see if I do an intervention or a strategy, did I actually, you know, cash in on what we sought to accomplish? Am I seeing the improvement that I expect to help give you that feedback? So, I'm glad you said that.

MATT BRANDENBURG:  
I love that these applications sound so wonderful and it's, you know, it honestly revolutionary to me to hear how AI specifically and technology can be used to promote collaboration interprofessionally as a care team and really promote increased connection between practitioners and providers and also patients. So, it sounds like really wonderful advances and potential applications. We've mentioned a couple times, and I believe Sarah Sensei AI works with AI to enable 24/7 care as part of that remote patient monitoring. Could you walk us through an application of how that takes place with Sensei?

SARAH BRZESZKIEWICZ:  
Yeah, so I do wanna give the disclaimer that when we say 24/7 care, this is not meant to replace in-person care. The many of these AI technologies can't do the physical work that an in-person care provider can. But what it's more, you know, alluding to is a component of that monitoring that Ganesh was talking about. When you now have a system that can monitor you know, components of a person 24/7, then you get feedback and information that can help you you know, give that safety net support. Let's say when it comes to fall detection, you know, there are, you know, things like Sensei AI, which is audio, there are motion sensor technologies and others that can capture falls no matter when they occur. And that's that piece that gives that 24/7 support system by being able to put the information in the hands of someone that can take action on it at any hour or day. So, that's what I think of when we say 24/7 care. The other component to that when it comes to non-emergency events like falls is now that you will be gathering information about a person's health and wellbeing, you know, during care hours, outside of care hours or when a provider's there when they're not there, then you really can be more targeted with, OK, where do I now place that in person support if I have access to it?

If I see that Mr. Jones is really struggling with mobility at night, but the care providers only there during the day, I might now come back and revisit that care plan to make a more informed decision about when I put my boots on the ground in the home. Or are there different strategies that now we can teach Mr. Jones during those hours when someone's not there to set him up for more success, whether that be with managing medications or other issues that he might be encountering. So, I think it's just an extension of our recommendations to now involve a more 24/7 comprehensive understanding of the individual.

MATT BRANDENBURG:  
Thank you. There's truly so many applications that can benefit so many different people. I know caregiver burden is something that older adults and caregivers for older adults really experience. How would you envision that artificial intelligence could enhance caregiver retention and help to kind of alleviate some of that caregiver burden that so many people experience?

SARAH BRZESZKIEWICZ:  
But you know, so there's two forms of caregivers that I intersect with. One is the family caregiver. And so I think systems, you know, related to platforms like Sensei using audio have been able to identify early signs of burnout both for family members or in-person care providers through an agency. And so it's being able to either in tone of voice or in the way that certain care experience plays out, you know, identify that, hey, this person might need extra support, and now you have the opportunity to provide that just right in time support or talk to your in-person, caregiver and maybe find out more with your questions of what's going on and what they are they experiencing to set them up for success. But also the client or the senior that's at the receiving end of that support. And, you know, we talked about earlier, our population is aging rapidly. The number of caregivers to support that population isn't rising at the same rate. So, there is going to be a gap of coverage and, you know, when you get a in-home caregiver, you really want to keep them.

And again, mitigating burnout, detecting those signs of burnout, but also uncovering the root cause of it can be the difference between just finding someone who maybe needs a little more coaching or a little extra support and training to, to keep them with you longer. And then also celebrating those care team members who are doing a fantastic job but just maybe don't always get recognition. I see a lot of times caregivers working with clients with dementia and the client can't readily tell the agency how great the caregiver is doing, but our Sensei AI system can, because now you can hear how they really handled an episode ofagitation really well, and you can celebrate that person because of It.

GANESH BABULAL:  
And I wanted to comment both in terms of caregiver burden, but an also something you mentioned about doing this comprehensive assessment. You know, OT wouldn't be OT if we didn't take into account the environment. And that's some of the work that we're looking at. Place matters. Where you go matters and how you are engaging with your community is also really quite critical and important. And so there's a lot of ways in which you can look at that look incorporating latitude and longitude or at least location based data. You can look at it with your smart device if you have it on you and it's transmitting. And one of the things that we're doing with driving is, you know, we know where all of our participants go, but then we can also look at their caregivers and you can look at a 3D map based on where they live, where they're going in terms of their community, how long they're spending at some of these places, are they going to the spa or are they going to the hospital a lot more? Is there a diversity of unique destinations throughout their community and is there change occurring over time?

And so some of the things that we're finding is that as our older adults are aging with more chronic conditions and a lot less social support, their literal life circle in terms of how much they're engaging with their community outside of their home starts to shrink. And we know that social isolation is one of the biggest risk factor for a plethora of different comorbidities, but also other forms of dementia. And so by using AI with even something just as passive as plugging a chip into the OBD two port of a vehicle, you can still develop new novel metrics that look at community engagements types and potentially the quality. But then I think that itself is a nice circuit marker to see is there anything else occurring and is there a change in what they were doing beforehand?

MATT BRANDENBURG:  
Thank you. Ganesh and Sarah. There are truly so many applications of artificial intelligence to be able to promote health and wellbeing and every single factor of health and wellbeing whether it be on a personal level with a family and caregivers and even the environment. What AI specific supports, in addition to the ones you've mentioned like wearable tech, smart home tech, remote patient monitoring tools, what other supports would you recommend practitioners explore to enhance their direct and indirect patient care?

SARAH BRZESZKIEWICZ:  
Something I came across recently just in kind of preparing for this podcast was there are a number of applications that can be used to kind of tap into that caregiver burnout like we were just talking about. I found a conversational AI tool I think called Amicus Brain, perhaps that is a conversational AI platform to allow caregivers to ask questions and learn more about diagnoses or issues and get recommendations on what they can do as a family caregiver to better support their loved one. And I just thought that was really powerful to me because I know that so many family caregivers exist that, you know, you leave the hospital or maybe your home health services end, and then you don't really know who to ask the daily questions to anymore. And so finding resources like that that can put the power of AI in the hands of families in addition to your clients to just help them feel like they can be proactive and seeking answers and getting ideas of of places to start.

GANESH BABULAL:  
Yeah. The other recommendation I think would have is perhaps for practitioners listening to this podcast is to start having conversations with either other colleagues within your either profession or outside of the profession to learn from them and in terms of what they're doing, because perhaps they're likely encountering the same, you know, not necessarily issues, but same questions. And thinking about how to navigate this. And by creating a peer support network, it can help itself to serve through some of these, you know less than stellar guidelines that, that are really non-existent. The other thing I would say is also discussing with your company if you're at a company on how they're planning to integrate AI into either the daily workflow on the EHR or other facets relating to client care. So, that there should be hopefully an OT voice within that conversation in looking at how, you know, realistic would this be from both a therapy perspective, but then also in terms of delivering care for the client.

MATT BRANDENBURG:  
Wonderful. Thank you both so much for those recommendations. Could you share a case study or clinical example of how you or a clinician, you know, has used AI in practice to help older adults achieve increased health and wellbeing?

SARAH BRZESZKIEWICZ:  
Yeah, I'm gonna share a case study from within my own organization, but it's really powerful to me 'cause it was a older couple that was new to receiving in-home care. You know, during the needs assessment, the agency knew that the wife had dementia and the husband had chronic neuropathy and pain. What they didn't know was to what degree that that neuropathy and pain was impacting the husband's daily function. Our system was capturing, you know, his mentions of increased swelling that seemed to be just getting worse overnight. The caregivers were there and also making those observations, but they were coming at different points in time. So, the agency wasn't really knowing the true degree of that without hearing it through our platform. What also was happening outside of care hours was the wife with dementia, would cry out for her husband to help, and you could hear him attempting to get up to go to her in a different room, but he was struggling because of the amount of pain he had in his legs.

And then you would hear overnight the husband expressing these feelings of helplessness and just not knowing what to do about the situation and the wife and her dementia kind of laughing because she just didn't really understand. So, with this information, the agency was able to have a really targeted conversation with the client and their children that lived out of state, and they increased their hours of in-home care support to better give them some nighttime coverage. They also coordinated a doctor visit for the husband so that he could get an updated medication regimen for his pain and his swelling. And then they onboarded home health, physical therapy and nursing to further address some of his chronic needs. And they updated the caregiving team to make sure that they had strategies to not only support the husband and his emotional needs, but also tend even better to the wife and her cognitive decline. And that to me is just such a good example of holistic health, both for two older individuals, aging in place, but roping in other supports within the care continuum to really address that.

MATT BRANDENBURG:  
Such a meaningful example and application. Ganesh is there one that you'd like to share with us too?

GANESH BABULAL:  
I would like to share a recommendation I think for practitioners and this would be sort of my charge and my takeaway. You know, what I sort of wanna impress is that AI is the tip of the iceberg. It's that we're in a new stage of the industrial revolution, and I think this area and space is one place we don't wanna sit idly on. AI is essentially measuring, as Sarah noted with that very poignant example, ADLs and IADLs and how we're living in space and time and continuously aging. There's no other profession in medicine that I'm aware of that I think is better suited to serve as the experts who understand ADLs and IADLs. And I would really encourage every practitioner to start reading and thinking about how this emerging area that is artificial intelligence seems to be quite nebulous, but the very end, it's a simply a tool, but how this can not just help further our profession and our practice, but also the clients that we serve. We are the experts in ADLs and IDLs.

MATT BRANDENBURG:  
I love that. I love that. That's such a wonderful take home message and golden nugget and Sarah, I can't let you leave the call without asking you to share a golden nugget and take home message with us as well. If you could share that one piece of knowledge or recommendation, what would you say?

SARAH BRZESZKIEWICZ:  
I wanna echo kind of how Ganesh left it. I think that this is a unique opportunity for occupational therapists to really rise to the forefront of a new tool to support quality of life and ultimately just in better engagement in meaningful occupations. How often do we talk about the joke of the OT elevator pitch and how many people still have undiscovered or have yet to discover our practice? But I think with the opportunities that artificial intelligence presents, we really are the best suited to infuse the output of these technologies to really support people living their lives with more meaning and to the fullest that they can. So, my message is to not be afraid of change and really find whichever application that resonates most with you and take it upon yourself to try to integrate it into your own life. Because I think the more you understand it for yourself, the easier and smoother you'll be able to incorporate that into a treatment plan or a recommendation for somebody else. So, just find that tool, that method.

We've mentioned a lot of them here, but find one that maybe you want to dive into first and then really own it and infuse that into your practice. Because I think that will help us leverage our profession to really showcase how we are the best at blending the person, the environment, occupation, all of that into improved quality of life.

MATT BRANDENBURG:  
I love that. That is truly an amazing message. I wanna thank you again so much for being on the show today and sharing your experience and your knowledge with all of us.

SARAH BRZESZKIEWICZ:  
Thank you so much, Matt.

SPEAKER:  
Thanks For listening to Everyday Evidence. Tune in next time for more evidence-based practice Insights and applications.