

Talking Sleep Season 4

Episode 16

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Dr. Andrew Tubbs, Guest

Episode Transcript

DR. SEEMA KHOSLA: Thank you for joining us for Talking Sleep, a podcast of the American Academy of Sleep Medicine. I'm your host, Dr. Seema Khosla, medical director of the North Dakota Center for Sleep in Fargo.

Before we begin this episode, we want to take a moment to let you know that a large part of our discussion today is about suicide and suicidal ideation. This may be troubling to some of our listeners. If you or someone you know is having suicidal thoughts at any time of the day or night, call 988 to reach the Suicide and Crisis Lifeline.

Many studies have examined the impact of poor sleep on next day functioning. But today we're going to talk about behavior and cognitive changes that occur when someone is awake during the night.

Our guest today is Dr. Andrew Tubbs, a researcher in the Sleep and Health Research Program in the department of psychiatry at the University of Arizona to talk about his "Mind After Midnight" hypothesis. Thank you for joining us today, Dr. Tubbs.

DR. ANDREW TUBBS: Thank you. It's great to be here.

DR. KHOSLA: So tell me, what was this paper about?

DR. TUBBS: So I've seen some people thinking that it's a single study and I want to put that to bed right away. It's a review paper. And really, it came out of this idea. We kept seeing the same finding over and over again that there was a disproportionately increased risk for suicide in the middle of the night. And when we adjust for population wakefulness, and I can get into the detail of that a little bit later, but we kept seeing this finding over and over again and we thought, okay, what are the potential cognitive or neural mechanisms that are happening in the middle of the night that are sleep and circadian related, that may be changing behavioral risk in the middle of the night. And that's sort of where the paper came from.

DR. KHOSLA: Oh, so that's interesting. So I understand that you have kind of surrounded yourself with these really smart people and mentors that helped you decide on this topic. So you mentioned that you had seen this pattern. So what kind of made you hone in on this? Like, why did you decide to look at all those papers?

DR. TUBBS: Yeah. So I absolutely want to thank the wonderful team of people who are working with me on this, because at first it was just Michael Perlis at University of Pennsylvania and Michael Grandner in Arizona. And then I came on board with Fabian Fernandez, who's in the Department of Psychology here, and most recently we've been joined by Beth Klerman at Harvard.

And it really started with a study in 2016 that Michael Perlis and Michael Grandner published, showing that if you just look at the raw distribution of suicides over the course of a day and the time a fatal injury, most of those suicides happen at noon. But that that's really misleading because most people are awake at noon. Right. So you have a you have a kind of a denominator problem, which is you have more eligible people who could commit suicide at noon. And, of course, your raw numbers are going to be higher. So when they what they did was they took a comparison data set. Again, the suicides were nationally, not nationally representative, but drawn from across the United States. And the comparison dataset was from something called the American Time Use Survey, which is a Bureau of Labor and Statistics data set, so everyone's already asleep now because I mentioned a federal bureau, but it's a data set that for 24 hours asks respondent to say, What are you doing each hour? And one option is sleep. And so from that data set, we could get a population estimate of when people say they're asleep or for our purposes, or more importantly, when they say they're awake.

And so when we adjusted, we said, okay, well, how many suicides do we expect to see given how many people are awake? And when they adjusted the suicide counts on the basis of population wakefulness, even though most suicides happen around noon, the risk for suicide was way higher at night, way more suicides were observed between two and three in the morning than you would have guessed based on how many people are awake. And that was the genesis of this idea. So, you know, when I said there were multiple studies looking at this, I came along as a grad student. Michael Grandner was like, hey, we did this paper. Why don't you do a quick follow up, you know, looking at whether this effect varies by month or method of suicide.

So I did that and I published that paper and I published a paper looking at suicidal ideation, as do people who have suicidal ideation, are they more awake in the middle of the night? And the answer is yes, in both a community sample and a nationally representative sample. And then finally, you know, we came together and we said, okay, there's clearly something here. What evidence is there for what's happening in the middle of the night with biologically or neurologically speaking? And that that led us to kind of write up the paper.

DR. KHOSLA: So what does this then tell us about suicide risk? I mean, is this all sleep deprivation? Right. Like people just up late and then making bad decisions? Or is there something more?

DR. TUBBS: I think there are several important levels to kind of what's going on. And I first want to acknowledge that a lot of the work that has been done looking at sleep and suicide has focused on daytime risk or daytime dysfunction. Right. This is very classic because most of the things that people care about with insomnia or nightmares is how they feel during the daytime. You know, it's the daytime dysfunction that brings people into the clinic.

So a lot of the suicide stuff is similar. It's, you know, the meta analyzes, the evaluations all say, you know, you don't sleep well and then the next day you're more likely to be suicidal or think about suicide. And we said, well, no, no what happens if it's in the middle of the night? I mean, if people are having insomnia by definition, they're awake when they're not supposed to be. So do they have an increased risk for making terrible decisions? And it's not just one thing. I'm going to

say that right off the bat, suicide is one of the most multifactorial phenomena we study and medicine or psychiatry. It's truly complex. And so I'm really focused on the sleep and circadian components of that. And it really boils down to two things. One is if you're awake at 2 to 3 in the morning, you're awake at a time when you haven't slept enough, so you haven't recovered. So then your brain isn't functioning properly. If we go off of the synaptic homeostasis hypothesis and similarly you have circadian rhythms and circadian rhythms help us to be awake during the day and also to be asleep at night. Right. There's a reason why if you get a bad night of sleep, you still function the next day when the sun is up. It's because you have this circadian system propping you up because it expects that you're supposed to be awake at this time. And that's helpful. But when it's night and you're awake now, that circadian system is working against you because it's saying, no, no, you need to be asleep.

And it's impairing your cognition because you shouldn't be cognating at all. You should be unconscious. And so it's really trying to shut all of that down so that you can go to sleep. But if you're still awake and your critical logic centers or emotion regulation are offline, yeah, you're going to start doing terrible things. And suicide is just one of the outcomes that we think are a risk here.

DR. KHOSLA: So did you factor in then, people who have an atypical sleep-wake cycle?

DR. TUBBS: Yeah. So I think people got a little on their back feet about this because after midnight I wake up at two in the morning and I'm super productive and I, you know, amazing art. And that's great. You know, look, I want to emphasize that this is a very relative thing, right? Because 2 a.m. in the United States is like, what, 2 p.m. in China. So clearly it's not it's not related to clock hour. It's just fun to have a name that, you know, rolls off the tongue, mind after midnight. But it's it's really about being awake when an individual is not prepared to be awake.

So let's take the example of teenagers. Right. Teenagers are all delayed sleep phase. Most of them, I should say. So they go to bed late and they expect to sleep in late, even though we don't let them. Well, what is the consequence for them? Well, maybe their risk zone is not 2 to 3 in the morning because that's like their bedtime. You know, depending on how delayed they are, maybe their risk zone is like five, six, seven in the morning because that's when they haven't had enough recovery sleep and also their circadian rhythm is at its nadir, at its lowest point. So it's really that that bringing those two things together at the intersection of not enough sleep and circadian deprivation that causes the risk and that just totally depends on the individual. Night shift workers for example, if they've been on a night shift long enough and consistently enough, their rhythm may expect them to be awake at night and is actually promoting them being awake at night. Well, that just means that, you know, the risk for them is 2 to 3 in the afternoon when they haven't had enough sleep and their rhythm expects them to be asleep.

DR. KHOSLA: So you had mentioned, you know, when we were chatting before that this is not just like you're mentioned, it's not a clock time thing. It's not based on circadian rhythm alone. There are other factors, right? Like the bars close at two in the morning. You know. So tell me about how these other factors impacted this.

DR. TUBBS: Yeah, it was it was really remarkable because we saw that if you look at the hour by hour risks, which we were, we're going to have an upcoming study looking at this. The risk peak truly is 2 p.m. ... 2 a.m. excuse me, on a population level. And when you think we'll see what happens at 2 a.m. everywhere in the United States, all the bars close, all the bars close to you. So you go, okay, right there. We have a confound. We have drunk people trying to make their way home and they're really sad because now all their friends are gone. But just expand outward from that.

DR. KHOSLA: Right.

DR. TUBBS: So it's a very simple example of the multifactorial levels. You have substance use, right? And you have people who are probably using more substances in the middle of the night. And there are some reasons for that. Maybe they're using them unsafely. But and I'll actually get into that a little bit. But you have substance use. People are more likely to be intoxicated in the evening, at night. You know, most people don't drink alcohol at ten in the morning. If you do, they're professionals that can help you with that. But you also have social gathering, right? You know, it's cheers. Everybody's at the bar until two. And then you go home and you're alone right. And so this idea of social isolation, of there's a suicide concept of thwarted belongingness, it's not just that you're alone, but that you want to be with others and can't be right. And at a base level, nighttime is a perfect example of this. You want to be around friends and loved ones. Oh, what are all your friends and loved ones doing? They're asleep.

DR. KHOSLA: Right.

DR. TUBBS: You can't actually be with them because they're unconscious or about to be. So social isolation is one component, I would argue social media is a huge component in this is kudos to Dr. Fernandes. I think he emphasizes the role of social media in this phenomena a lot more than the rest of us give credit for, because I try to avoid social media as much as possible.

But, you know, if you if you're awake at night and you get on Facebook and you comment on someone's post, are they going to comment back to you? No, because they're asleep. So you've now made a literal gesture of trying to connect with another person. And you're not going to get a response for eight, 10 hours. You know, whatever it is, that can be very isolating. Not to mention, you just go on Facebook and they're like, oh, my ex is now dating some other guy or some other girl. That's kind of isolating. That's kind of defeating, you know, like imagine all the things, all the ways that people can make themselves miserable by being on social media. And now it's happening in the middle of the night when they can't do anything about it. Yeah. So things like that, that's it really is multifactorial. We focused a lot on the neurophysiology and I'm happy to walk through that.

DR. KHOSLA: Yeah. Tell me about that.

DR. TUBBS: Sure. So we aped a lot of research off of other other very enterprising people. Brant Hasler at Pittsburgh, I think has done a lot and in terms of circadian rhythms in adolescence and there are some other folks who have been asking important questions about when a substance is most likely to happen, what happens in the brain. So we reviewed this

literature. Basically, any study that had time of day as a potential or variable for their outcome or their effect. And we came up with sort of three mechanisms that we hypothesize are driving behavioral dysregulation in the middle of the night. The first is emotionality. So there's some evidence that as the night goes on, as you extend wakefulness beyond when you're supposed to be awake, your amygdala goes into overdrive and the amygdala does lots of important things. It's not just fear, but I really think of it as an emotional salience center. It's trying to decide what's emotionally irrelevant. Right? This pen on my desk, it gets no activity from my amygdala because my amygdala has no cares about the emotional impact of a pen. Right.

But you know, you see, here's a classic example of amygdala function. You see a snake, right? And right off the bat, you see a snake that's pretty threatening in Arizona, that's like a death sentence. You see a snake, you're like, I better run the other way, man, because it's probably going to bite me. Yeah. And then your prefrontal cortex steps in and goes, hey, wait a minute, that snake is behind glass. All right, so. So even though the scenario is it's a snake in somebody's pet cage, glass cage or whatever, right? You know, your amygdala I mean, it goes snake. Big deal, guys. Big deal. And then your prefrontal cortex steps in and goes, No, no, it's okay, it's okay. It's behind glass. It's also probably a garden snake. I wouldn't worry that much about it. Right. It's not it's not a python. It's not anaconda.

So at night, your amygdala starts driving that conversation. It's really assigning salience to everything. Right? Again, you go on social media, you see something that might not have triggered you during the day. Right. And then it really triggers you at night. I could make a political reference here. I'm not going to do that. But I think we all know that person. Yeah. Who as they post later in the evening on Facebook, it becomes more and more virulently like political. And that's exactly the phenomena I'm talking about. Everything is very affective.

DR. KHOSLA: So the toddler is driving and not the babysitter?

DR. TUBBS: 100%. Yes. And again, you can see some people have more resilient prefrontal cortices, you know, more patient caregivers, as it were, for their toddler amygdala. But but you can see how that dynamic plays out. It's like you just get worn down. You can't shut down your amygdala all day long because it has a never ending stream of energy to just say everything is a mess. And more importantly, you focus on the negative. You start only seeing the negative, right? It's not just because it's not just, you know, rainbows and sunshine. You're not assigning happiness to everything. It's really more negative emotion. That's why we think about the amygdala more as a fear center, even though its function is a little broader. So that was one element, just one.

The second is a reward. And I'll try to be a little briefer about this. We think that based on the few studies we've seen looking at time of day and reward, late night and in the middle of the night, people are more predisposed to take big risks, even if the cost of that risk is a lot higher. So they only see the potential big reward that they could get. They don't see the potential downfall. They don't opt for smaller reward, smaller risk that tends to, over time, pay out more. There are various neurocognitive games you can play that to assess this effect but people in the

middle of the night. They go for what they think they could get. They could win big all at once. And then but, you know, on a statistical average, they end up losing.

And also, there's some evidence that the anterior insula, which should be monitoring sort of your internal state and telling you when you did a bad thing. It's the Catholic nun of the brain, one might argue, is saying, yeah, you did a bad thing and you should feel ashamed about it. It's kind of offline too. So you take a big risk, it doesn't pay off and then you don't get the negative feedback that should be telling you don't try that again. You know? So you're like, you're more willing to just, well, I'll just risk it again, you know, I wasn't that bad. I'll try it again because I didn't get the negative feedback. So that's second area. We have emotionality. Everything is hyper emotional. Saying amazing is reward processing. You're taking big risks that you wouldn't ordinarily take. And the third thing is executive function. Can I stop myself from doing stupid things?

I think the great triumph of the brain is that its whole job is to stop us from behaving right, that, if you if you believe in evolution, we've evolved hundreds of thousands of years to create an organ that stops us from doing things that I guess all our big brained ideas, they're usually creative and they come from the limbic system. It's the prefrontal cortex that says, Now, let's not do that. Let's not do that. It spends most of our time inhibiting our behavior. And as the night goes on, the prefrontal cortex is the most vulnerable to sleep deprivation. Here, I think, is the strongest sort of available basic science evidence. We know that delta sleep builds up faster than the prefrontal cortex. We know that it preferentially affects cognitive functions when there's higher delta sleep. The prefrontal cortex is the most vulnerable to this concept of being deprived at night, and there's probably circadian elements, too. We know, for example, that when you wake up abruptly in the morning, there's a phenomenon called sleep inertia. You know, it takes you five, 10 minutes before your brain kind of boots up.

That effect is like 100 is much worse in the middle of the night. You're much more you have a face, much more inertia when you wake up abruptly in the middle of the night. And so we think there's both circadian and sleep deprivation effects that are really impacting your prefrontal cortex's ability to stop you from doing stupid things.

So then you put all that together. All right, we're talking about suicide risk, but I'm going to I'm going to segway. We're going to use substances for a second. Yeah. You go to the bar at ten, you get a drink, you're not planning to go to sleep yet. Everything's kind of negative and emotional. And you have an internal sense that alcohol makes you feel good. So you get another drink. Your risk of getting drunk and not being able to drive home or doing something stupid is there. But the reward of compensating for your negative internal emotional state, that that sense of reward is very high. So what the heck? I'll have a third shot. Not a big deal. I'm really trying to cover myself here. And then again, your prefrontal cortex is like, Hey, maybe this isn't a good idea. Let's not get another drink. And your emotions are running the, the show. You're trying to compensate for this negative internal state that only alcohol can satisfy in your mind. You're narrowed in on this one thing. And now I'm going to have another drink and another and another.

And suddenly you're blacked out on the floor. You're being arrested. Whatever. You could do it with other substances, right? That first shot of heroin in the middle of the night. Not as rewarding as you expected it to be because your brain isn't expecting the reward in the middle of the night. Well, I'll just have another one. And now I've overdosed.

Suicide again. Like I'm going to have a drink now I'm really emotionally dysregulated. What the heck? I'll just get the gun. I'll just pull the gun out of my closet, see how it feels in my hand. And now it's so imminent. You're so. And I know if people have ever had this experience where they're, like, edging towards something they know they ought not to do. And the closer they get, the more it feels just inevitable. It's just. It's just going to happen. There's no other way. It couldn't happen. And I think that could be a this. This comes up in the suicide field, too. It's a like Acute suicide syndrome is one of the names for it. This concept, there's like a imminent phenomena that leads up to people committing suicide that maybe lasts 30 minutes to an hour, but it's really driving them forward because they don't see the world in any other way possible than it's an acute crisis and suicide is my only solution.

DR. KHOSLA: Wow, that's pretty powerful.

DR. TUBBS: It's a lot of different things and so, yeah, I think I find this a tremendous opportunity. We it's like we've really were because a were describing something that people intrinsically already feel is true. I think most people, apart from the ones who have, you know, big brain thoughts in the middle of the night and they have great art or whatever. Most people feel like, yeah, I don't do my best thinking act in the middle of the night when I'm should be asleep. And then we're providing the back up to say we think this is how it works. And then it's just shocking that people have not done enough research on this stuff in the middle of the night. Again, all the data that I'm citing, the very limited amount of data that there is that drives our hypothesis, it's based on studies that compared like seven in the morning to seven in the evening because because we don't I mean, who has proposed a study where it's like, yeah, we're going to wake people up at two, three in the morning and see what happens, right? Like nobody's done that work and we're like, we have an entire open field for research to figure out if this is true or for whom it's true.

Right. Again.

DR. KHOSLA: But that's but that's something that comes up, though, right? When you hear about somebody who has completed suicide, the first thought is, oh, why didn't they call someone?

DR. TUBBS: Mm hmm. Yeah, it's just for some people, that really could be the risk zone, right? And in the middle of the night, it's like, who am I going to call? I call the crisis the suicide crisis hotline, which is fantastic, by the way. It's a great service, but maybe that's not the way they feel comfortable. They'd really want to call grandma, but grandma's asleep, grandma can't help you right now. I want to call my ex-wife, you know, which could probably be a problem in of itself, right? You know, just all all this kind of stuff. So that risk in the middle of the night and we think these are the mechanisms that are happening. Yeah, but who looks in the middle of the night?

You look at these studies, I would love to know and maybe someone, some enterprising individual has already done this or will do this, like what are the call times? What are the call rates hour by hour to the suicide crisis hotline? You know, and how are those adjusted by population wakefulness? Is it in fact that people times zone by times on call more in the middle of the night, you know, interesting thoughts.

DR. KHOSLA: And maybe harder to staff and maybe more calls go unanswered.

DR. TUBBS: Absolutely. I think the suicide prevention hotline is pretty good. I haven't looked into it too much myself, but my understanding people speak very highly of it and I certainly recommend anyone who's feeling suicidal to utilize it.

DR. KHOSLA: Right. Let's take a short break. When we come back, we'll talk more about the mind after midnight. You're listening to Talking Sleep from the American Academy of Sleep Medicine.

AD BREAK: Prepare for your board exams or review your general sleep knowledge at Sleep Medicine Essentials. Attend virtually September 15-18 or watch recordings at your leisure. For details and to register visit aasm.org/sme.

DR. KHOSLA: Welcome back to Talking Sleep. We are talking to Dr. Tubbs about his paper, The Mind After Midnight and the increased risk for suicide in the middle of the night. So you mentioned that you tend to avoid social media, but you cause a little bit of of a maelstrom on Twitter. So tell me about the feedback you got from the AASM had posted a link to your paper on Twitter and it went a little bit viral.

DR. TUBBS: I really didn't expect the paper to get kind of the reaction that I got, but I think there are several things that keyed people into it where it felt real. One is, again, this is a phenomena that we all kind of implicitly understand is true. I think, in marital counseling, not that I've done marital counseling, but you could make a really good argument that, you know what, if you're having an argument and it's 10 p.m. at night, maybe shelve it and come back to it in the morning because neither of you are really prepared to address it. Right? It's just this phenomena, we all go, you know what, nothing's getting done. It's 10 p.m., 11 p.m., 1 a.m.. We really need to come back to this after a good night of sleep when our brains are prepared to think about it better. So right off the bat, we had the benefit of explaining something that people intrinsically feel is true.

The second thing, and I'm a little embarrassed about this, I'm not sure that I should be, but I am. There seem to be a Sonic meme that was going around on Twitter. I don't think there was it was reposted, I don't know, like 500 times retweeting the AASM post and it's the Sonic character who's golden I thought Sonic was blue saying new rule, don't trust your thoughts after 9 p.m. And so you have all these people on Twitter who are like re tweeting this meme to each other and then our our paper comes out and it gets posted by a firm and people are like, oh my gosh, science proved sonic, correct. I'm like, oh, this is really this is the 21st century isn't it.

DR. KHOSLA: Yeah. But the other one too though, that meme from How I Met Your Mother, where one of the characters is saying nothing good happens at two in the morning, like when

you're out and you're trying to figure out where to go next after the bar is closed, like just go home.

DR. TUBBS: Yeah, I full confession. I haven't seen How I Met Your Mother, but.

DR. KHOSLA: Oh, you're missing out.

DR. TUBBS: I only have so much room in my life for television. And now that I have a son, it's all G-rated. But yeah, again, it's a cultural concept. There are people in the world who they say this and it rings true. You know, just go home. You're not going to find any fun after 2 a.m. and people go, Yeah, that's true. That's true for me. And we're just here to say, we really think this is true. It's not just a psychological or sociological phenomena. It's a sleep and circadian phenomena. It's a broad phenomena and it has a broad impact on human health. Again, I focus a lot on the suicide piece, but the implications range. I've mentioned substance use. I think you can easily extend it to eating right? People, nobody gets up in the middle of the night and goes to the fridge and gets a salad, right? I mean, that's that's just heresy. You get ice cream, you get you get some fatty carbohydrate laden snack. And there are half a dozen great sleep researchers who have studied this effect. You know, who who look at how food choice after 8 p.m. or 10 p.m. just goes directly into the dumpster and we're saying, yeah, we think our effect is driving part of that.

So you got food choice. We have violent crime. We have some data showing that homicides are disproportionately increased in the same risk window in the middle of the night for again, the same reasons. People are impulsive, they're emotional, and they're evaluating reward over risk. They they do stupid things, you know, play stupid games, win stupid prizes and that's kind of the outcome.

So this this phenomenon, I think everybody implicitly understands, has some truth to it, not for everybody, and not in every case, but it has a ring of truth to it. And we're here to say, yeah, we think it's true. We think here the mechanisms driving it and we think these are the litany of behaviors that it applies to.

DR. KHOSLA: So there is a study that landed in my inbox maybe a week or two or three ago, and it was about glutamate accumulation. And so tell me about this.

DR. TUBBS: Yes, shout out to the AASM. I think it's the Smart Brief email thing that they send out because.

DR. KHOSLA: It's really good.

DR. TUBBS: Yeah, they don't even send out papers from just JCSM, although I love JCSM. They send it from all over the place. So this particular paper was I forget it, it was published in Cell or one of the big sort of basic science papers or journals. But it was looking at how glutamate and I apologize to the authors if I'm misrepresenting that case. It seemed like, my read of it was glutamate increases in proportion to the cognitive exertion that a person leverages. So if you're doing simple tasks all day, you're not building up a lot of glutamate in your prefrontal cortex. But if you're doing really complex, high level, high IQ math stuff, right, you're just integrating calculus all day long, that glutamate builds up a lot faster.

And what they were arguing is that the levels of glutamate based on fMRI data seemed to correlate with decreasing function in the prefrontal cortex. So sort of as glutamate accumulates excessively in the prefrontal cortex, it impairs cognition. So I read this and I go, Hey, there's another mechanism for my mind after midnight, right? It's like, again, you have a you have a literal molecule that may be driving. Why people don't think good in the middle of the night, you know, pardon my grammar but it's the you have too much glutamate and and so then the question becomes like, okay, well how quickly can you clear that glutamate out, right? You know, because you can argue that delta sleep most of your delta sleep for delta sleep pressure has been eliminated after about two thirds of the sleep period.

You know, certainly a lot of it goes down exponentially, right? So if Delta sleep was the mechanism for cognitive impairment, that would be resolved before you're done sleeping. But how long does it take glutamate to clear out? How long does it take any number of other chemicals to clear out. Right? Adenosine, you know the the the pop culture effect driving a delta sleep. I think it's a little more complicated than just adenosine but how quickly does adenosine clear? Does it take all night, you know, that sort of thing.

DR. KHOSLA: So it kind of fits nicely then with your hypothesis.

DR. TUBBS: It does. And I think the the and I think there's more to be fleshed out. And that's why we call it a hypothesis, is that we don't know all the mechanisms and are we purporting to know all the mechanisms. We're just arguing there's an effect here and we're trying to find mechanisms. So as more people publish more interesting science and they say, oh, you know, this chemical increases in the middle of the night, or we did a study and we found that EEG functional connectivity between different regions goes directly into the dumpster in the middle of the night we just add that to our list of biological mechanisms that might be driving this effect.

DR. KHOSLA: So how do you measure impulsivity?

DR. TUBBS: Yes, I don't claim to be an expert in this. I usually I usually defer to my neuropsychology colleagues for measuring this. There are a couple of ways, though, that you can do so. The least useful measures are questionnaires, I think. And you want to use validated ones, of course. And those will give you sort of how impulsive is this person as a person, sort of what do they call it? I think it's a trait measure, impulsivity, which isn't terribly useful because, you know, I think of myself as not being very impulsive. But there are certain times of day when I'm very impulsive, maybe in the middle of the night, I don't know. But so you can use questionnaires, better are specific tasks. So the classic one that we use in the hospital, Go, no, go. So I see speech therapy doing this frequently. They'll, they'll say, I'm going to list off a bunch of sounds and I want you to tap your hand when I say a particular sound. So you have to focus. So it's an attention task. You have to focus and inhibit yourself when it's the wrong sound and then tap when you hear the right sound. And I think they're doing it to ensure that people are sort of cognitively aware before we pull an endotracheal tube out or something. But, you know, you only hear it, do it only slap your hand when you hear s and so you have to stop yourself when it's not an s and then slap when you hear an s. So that's one task there.

There are other tasks like the balloon analog risk task where people tap a button on an iPad and it slowly inflates a balloon. And the goal is to get the balloon as maximally inflated as possible without popping it. And so you see how close to people. It's more of a risk reward, but impulsivity is part of it. You try to see how close do they get to the actual threshold of the balloon popping without going over? So there are different tests like that that can assess impulsivity and whether people are able to restrain themselves.

DR. KHOSLA: So, you know, you had mentioned, you know, we kind of chatted a little bit about delayed sleep phase and night shift workers. How many people actually have sort of an atypical sleep schedule? Is it, you know, like 25% of people? Is it, you know, what does that look like?

DR. TUBBS: That's an interesting question. It's a little outside my scope, actually. I don't know how many shift workers there all are, although I work in a hospital and I would say at least half of our staff seems to be working in the middle of the night. There's a lot of people that work overnight. You got nurses, I mean, just in the health care profession alone, right? You have nurses and doctors and residents who are also doctors. You have techs and and, you know, custodial staff, lots of custodial staff work overnight. Right. You have lots and lots of people. This is not an insignificant chunk of the population that has night shift or worse yet, irregular shift. My goodness. You know, people who are like, well, days, you're going to work overnights and then you go directly to days. And you know, this happens to residents a lot. You know, for those physicians who are on the podcast and ever had to do a week of nights and then get ready because you're back on service day after next for day shift. Like that's like flying to China and back, right? Yeah, that's just terrible. So that shift alone throws everything out the window.

We were you know, I live in Arizona. We have lots of mines. Those mines run 24/7. So you've got shift workers down there in the mines. And of course. Right. What better place to establish day and night than in a mine or the sun? So there's a lot of that going on. But, you know, shift working is is a very prominent feature of our economy. It's not going anywhere. Right. We can rail about how terrible shift work is, but I think the best thing we can do is really help people accommodate that, knowing that the middle of the night or the middle of the, you know, nocturnal wakefulness awake when you're not predisposed to be awake, that's a risk factor. So how do we help people to be predisposed to be awake?

DR. KHOSLA: Right, I mean, you know, we've always talked about how we're a little bit hypercritical, hypocritical in our field. Right, that we really talk a good game about. You need to get enough sleep, right? And it needs to be of the proper duration and the proper timing. And then we're like, okay, but we want our sleep techs to stay up all night and take care of our patients.

DR. TUBBS: Oh, for sure. Yeah.

DR. KHOSLA: So I think it's funny.

DR. TUBBS: Yeah. I was talking to my medical student colleagues this week about insomniac has a lot of them that are just, you know, third year medical students. They don't have any

training in insomnia. So I'm telling them a little bit about insomnia and they go, Well, how much sleep do you get? And I go, Well, I get three cups of coffee every day. That's my answer, right? It's the same thing. Yeah. Huge hypocrite. It's terrible. I know I should get more. I don't. But what do you do?

DR. KHOSLA: Well, it'll get better when you're when you're kiddo's older. I'm a I'm a nine hour girl if I can get it.

DR. TUBBS: So is my wife. They were also asking that too. It's like, you know, for any random comment, you know, people talk about sleep need, oh, you should get 7 to 8 hours. And it's like, well, my wife cannot sleep less than nine and not feel good. So it's a wide range of people. And so you got to work with that, too. And then, of course, you had the corporate executive types are like, I sleep for hours and I'm great. And it's like, well, good for you. You're going to die at 65 of a heart attack.

DR. KHOSLA: But unless they have that one like that, that genetic sort of I won't say gift, but some people genetically right can get by with 4 hours. But so you bring you raise an important issue, though, right? That there has been data demonstrating that between medical school and residency and fellowship, people get on average like an hour or two of sleep medicine training.

So, you know, kudos to you. So you know, you, I, I understand you're rotating as a medical student, right? You completed your PhD and now you are a medical student. So are you addressing sleep in the hospital then?

DR. TUBBS: Well, for for anyone who's familiar with the medical hierarchy, the answer will not come as a surprise is no, I usually don't address sleep that much because my ideas about how to help people sleep in the hospital get shut down, you know, I say, hey, let's let's not use Seroquel. maybe that's not a good idea. We don't have to throw an antipsychotic at them. And the people in the MICU are like, yeah, no, we're just going to give it to them. They need sleep. Because sedated is sleep, right, that's the same thing, where it's clearly not, that's sarcasm. But yeah, I try to talk about it and I think for a lot of the medical students, I gave this lecture teaching them about insomnia, teaching them about CBT-I. I think people are shocked that, you know, we have all these medications and CBT-I is the standard of care, right? It is the expectation of the American College of Physicians and the American Academy of Sleep Medicine and even the European, you know, regulatory or licensing agencies. They expect that CBT-I is the first thing offered to a patient with insomnia.

Do I do a lot for patients in the hospital, no, because they expect to get discharged. Nobody sleeps on a hospital anyway, which is a problem all of its own.

DR. KHOSLA: But that's a whole other conversation. Yes.

DR. TUBBS: Yeah. But I think it's more important for physicians to know their options when they when they do outpatient things, you know, for those primary care, family medicine, people who go into outpatient specialties like even if you don't have a CBT-I provider around, like there are lots of these good digital technologies that can be used. Now, you know, I not shilling for Somryst. I don't have any stake in Somryst. I'm just going to use it as an example because it's

FDA approved a software for a medical device for the treatment of insomnia, but it's to be prescribed by primary care providers. And I'm sitting there going, what primary care provider knows what the heck this is. Nobody knows. So how do you prescribe something that you don't even understand it? Right. So I think there's a there's a gap there where Pear Therapeutics or whatever they want people to prescribe Somryst for all their patients. And the physicians are like, I don't even know what you're asking me to prescribe. You want me to prescribe like a computer program to treat insomnia, right? But to tie it back in to, you know, the mind after midnight, right?

You might be if those of you at home might be wondering, like, okay, mind after midnight? What if it's true? What if it's all true? We just assume it's all true. And it's terrible to be awake in the middle of the night. People make bad decisions. What what do you do about it? Well, the simplest solution is just sleep to help people sleep.

Right. There is no mind after midnight if you are unconscious. So, you know, we can get into fancy pharmaceuticals about how to how to help people think better in the middle of the night, how to reduce risk. We'll find some magical agent that removes excess glutamate and makes the brain work better in the middle of the night. The first solution is just to help people sleep through the night. Then there's no risk at all and they feel better the next day.

DR. KHOSLA: It's it's kind of magic, isn't it?

DR. TUBBS: It's remarkable. It turns out sleep cures a lot of things.

DR. KHOSLA: It really does. Well, thank you for taking the time to talk with us today. The mind after midnight hypothesis is really interesting and certainly worth further investigation. And I think a lot of people, a lot of our colleagues can probably relate to making some, you know, poor decisions and late night early morning hours. But you this is more significant than maybe having that pint of ice cream. Right. We need to give special attention to those who may consider a more serious choice while they're struggling with sleep.

DR. TUBBS: Absolutely. Yeah. I think not everyone is vulnerable to suicide, but those who are maybe extra vulnerable. And that's kind of my focus on it.

DR. KHOSLA: Again, if you or someone you know is considering suicide, please call 988 the Suicide and Crisis Lifeline to be connected to a certified crisis center near where the call is placed.

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