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TRANSCRIPT - GR 02 23 24 "***Sedation in the ICU*** " Wes Ely, MD, from Vanderbilt University Medical Center

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Internal Medicine Grand Rounds

- Alright! Everyone. Welcome to Madison grand rounds today. I have the pleasure of introducing Dr. Wes Ely. Dr. Eli Andrett earned his medical degree and Mph. At Tulane University.
- He completed his Medical Residency, Chief Residency and Fellowships in pulmonary and Critical care, medicine and Geriatric Neuropology at Wake Forest University. This was followed by a lung transplantation fellowship at Washington University, at St. Louis.
- Doctor Healy is now a professor in medicine in the division of pulmonary Critical Care Medicine at Vanderbilt University and Medical Center.
- Dr. Eiley's research has focused on improving the care and outcomes of critically ill patients with Icu acquired brain disease, including delirium and long-term cognitive impairment.
- In 2,000. Doctor Elaine founded the icu delirium and cognitive impairment study Group, which has since been renamed the Critical illness, brain dysfunction and survivorship, or CIBS. Center, the CIBS. Center now consists over 90 investigators from multiple departments, and this center has amassed thousands of patients into cohort and randomized controlled trials. Together they have built the methodology for IC required brain disease, research and newly adapted treatment paradigms, including the Adf. Bundle and his team, also developed the cam icu, which is the primary tool by which delirium is measured in Icu based trials and in Icu's worldwide, including ours.

  Dr. Eli has been continuously funded since 2,001 and has coordinated multiple large critical care trials and prospective prospective cohort studies with over 600 peer review publications. More recently his work has been acquired. Dementia is taken on new directions as he works with national leaders to focus on the public health problem of long Covid. Please join me in welcoming Dr. Wesley.

- What's up? Thanks. Everybody for coming today is the volume. Okay?
- Alright, good deal. So my name is Wes. It's a real privilege to be here. I just went around and met a bunch of you. I put all the residents in charge of asking me the questions and telling me where to get off, because I'll say something that they disagree with. I wanna hear from all of you later, and I love the fact that we have a whole row of Pts. O t's, and speech therapists in the back as well. I feel like my peeps are in town. So this is good.
- I am a by the way before I get past this. I think it's so interesting how all of you sat in the back. And you you're afraid of these first 3 rows, and actually saw 3 people just walk in. See? The first 3 goes open. Say, no, we're not staying. And they left. So there's something going on in Uk in the profit. Everybody come on down the front

row you've got. You've got space up here. Yeah. My name is Wesley, and I have 3 daughters. They're in their twenties. My wife is a pathologist. She runs cycle pathology at Vanderbilt and she's a head neck pathologist, and we raised Kim's brother who's got who's got down syndrome. He's 59 years old, and my, I'm telling you on purpose at the beginning about my life outside of medicine, because all of us bring into the room here all of who we are.

- So we are not just doctors. We are not just occupational therapists, speech therapists, nurse practitioners, etc. We have so much to us that makes us who we are, and we come to work and talk about our resume values, and we kind of leave all that other stuff at the at the door.
- Our patients have all of that, too and if we try to take care of our patients just by paying attention to their heart or their lung. We miss the entire person just the same as if I try to connect with you, and I don't hear that you have a daughter named Sophia, and that she is, you know, wanting to get in bed with you at night when your husband's not there because she thinks the big bed is more fun. Then I don't know all about you, and I'm missing something.
- So one of the cardinal things I'm going to teach you today is to switch the preposition from saying to a patient what is the matter with you to what matters to you? And if we can switch the preposition to what matters to you, it forces us to see the whole person.
- My journey in medicine has been one of carrying around a great sense of shame and guilt, and knowing that I was doing people harm and trying to find out how I was doing them harm, and establish the science to prove it to the rest of medicine that we were doing harm.
- Kara, let me ask you a question. If I stand right. Here am I still okay, from a zoom perspective camera, wise and everything. Okay, do you need me to change anything about the way I'm doing this yet?
- Okay, cause you're the boss. Alright. I don't have any industry conflicts. I am nih, and va funded. And, by the way, this is too high for me. So I'm going to stand here and you'll see me just looking back enough to know which slide we're on.
- I do have work that we're doing with a drug made by Eli Lilly, called Veracitinib. It's a jackstat inhibitor. I will talk to you more about that as we go, but I don't have any financial financial conflicts with this at all, not a single penny in consulting fees, stoch etc. This is done purely from a scientific investigative perspective. So I wanted you to know that disclosure and those are my disclosures.
- Now, this is a group of people that work at the Sib center. We are about 120 people large. We have at the at Vanderbilt University and the Va. With our newest grant. We have just about 65 million dollars in federal funding for our investigations. So it's real science. It's it's legitimate. Zoom bus buy Federal funding. And it's about people. This is research about the human condition and about what makes somebody who they are. So we can see them in full, vivid color, and about changing medicine to allow that full person to be to find themselves in their recovery process. When people lose themselves in the recovery process, they lose their why and they die and I have no doubt that there are so. There are untold number of people right now in the ground who had died during Covid, who died of broken hearts. It's intangible. I can't measure it. But what we did was wrong and when we did this wrong thing we were. It was anti medicine, it was anti healing, and it broke people, and I don't ever want to live that way again as a doctor, and I hope that we can all teach each other and realize that what we did was incorrect and we

were scared. We didn't have vaccines. We didn't have enough Ppe, so we did it because it was the best thing we could with the light best way we could see with light we had at the time. But we're going to see better after today, and as we go into tomorrow. So that's part of what I want to get to.

- So 50 critical care is 50 years old and when we were in our first 25 years we were building a car and constructing it, and the second 25 years we've been deconstructing the ways that the car was wrecking to try and make it travel more safely towards healing.
- Right? If you give your kid the keys to A to a Bentley, and tell them to drive across Charlottesville, even though there's not much traffic here, they're going to wreck the bent.
- Okay? Critical care is a pretty cool technology. You could equate it to a Bentley with all of our fancy tools, but we were wrecking the heck out of that Bentley, and the last 2025 years. We're learning how to get safely across town.
- That's my analogy. So I'm going to talk to you about the deconstruction phase this last 25 years, where I think we're getting to a more humanistic place in medicine, where we can actually see that entire person and do it more safely.
- What if that told you that we knew how to do it. But we're not doing it.
- We actually have the scientific data. I'm going to present it to you today. But we're not doing it very well, and I've spent all of yesterday last evening and today going to your unit talking to people learning from Claire and learning from from Kyle and others here about what's going on. And then I've been asking lots of questions that Kyle and Claire don't know that I've been asking to nurses Pts. Ot's other colleagues and asking, I've been taking the pulse on this culture, and what I'm hearing is, you know what we're making progress but we've got a ways to go.
- So my job here today is to affirm you with this quote, I love this quote. I thought of it for for Uva, because of what you've all been telling me. The future belongs to the discontent I hear the to the discontented. I hear that you are discontented and your discontentedness is healthy and good because you're saying we aren't doing well enough for our patients.
- They are being put in a bed sedated, immobilized, and whenever we use a drug with intended benevolence a sedative, for example, just use an example with intended benevolence that puts people in and in enough of a mobilized state that they don't get out of bed on a regular basis, or they are too delirious to talk to their family.
- That's injurious to them as a person and that is not benevolence. It's not beneficence, it's maleficence. And what I'm telling you is that I'm guilty of this.
- So I'm pointing all these fingers back at me as a gray inherit intensity. I just turned 60 this year and I know that I have increased the death rate of some of my patients and of amongst those survivors I've created are.
- So I'm going to talk to you about this honestly and openly. Today. I was here at Uva. I came and did a rotation in infectious disease. As a fourth year Med student, when I was at Tulane, my wife came and did pathology. Here I worked with Brian Whistleway. Am I lucky? Or what somebody told me? He's the he's the he's the smartest oncologist you have at Uva whistle way would take us down in the old hospital. This is before y'all had the new hospital and I don't. I never! If he's online, I hope he's hearing me say this, I never understood the gift he gave me. I never understood how he would be so willing to give the gift of sitting with me over lunch each day and teaching me all about antimicrobials and the disease processes. We had a patient with an Eloisor flat. I've never forgotten that patient, and for those of

the young residents in here who don't know what Eloise are flat. Let's go look that up! And he spent time with me to talk out loud about what was our goal at the bedside with our patients. And, by the way, the person serving us were the pink ladies. Raise your hand if you ever heard of the UV a pink ladies.

- Okay, there's there's one or 2 people here. They were the women who made, and I guess it was all women, cause. I never heard pink men, but they provided us our lunch, and it was. It was it was amazing to be here at Uva and learn and not know what would my future be. And a few months later. just a few months later, in that same year, I took care of this woman.
- Teresa Martin and Teresa Martin changed my life.
- She was a young woman in Eddbb. The book that I wrote about patients which is called every deep drawn breath. She's a featured person in the very in the very beginning of the book, because when I took care of her in the Icu. I did what I now refer to as malignant normality link normality is when I accept the status quo as okay. And it's actually a malignant status quo. something super dangerous for her. We were giving her 125 milligrams a day of benzosomorphic and that was the rule of the day every patient in the Icu got morphine and benzos and that was how we took care of people. And I see you because we're trying to make them unaware of the suffering they were going through.
- When somebody lands in critical illness, they have to go through some degree of suffering to get out of that critical illness, Robert Frost said. The only way out is through there have to go through something and we can't prevent them from going through it by putting them in a tent scone.
- We create more injury by doing that. and that's what I did to Teresa. And when Teresa came back to me, my first ever post-isu clinic and 90.
- Some of you probably weren't born yet I thought that Teresa was going to come in there high-fiving me, Dr. Eli, I'm 26 years old. You gave me my life back. You're an awesome doctor.
- No! Teresa was wheeled in a wheelchair by her mom with bags under her eyes, unable to talk to me in a stupor. Months after her Icu experience, and the mother said. What is wrong with my daughter? And I had no idea
- I didn't understand what pics was. We didn't have a term like that post-intensive care syndrome and I took some X-rays. She had calcification in her elbows, shoulders, and knees. There was heterotopic ossification inflammation, immobilization came. Rocks, and joints.
- This was hydrogenesis imperfect. It was a dangerous dangerous thing that I'd done to her, and I knew something was wrong, but I didn't understand what it was. so I thought, well, we've got to get people off the ventilator faster. So, as a chief resident at Wake Forest, I designed this randomized, controlled trial. The doctors thought it would be stupid, but I had one mentor, who said it was a good idea and Aponic who has taught one person in here. I'm I'm aware, and I believe he taught Tim and and Ed, who's a senior author on here, god godfather of my children, my twins said, let's do this study, and all the people in the middle. There are fellows and the fellows all did this with no money. We stopped the ventilator every day, screen the person, and see if we could get them off the ventilator and cut 2 days off the mechanical ventilation. It cut complications in half and saved 5 grand per patient.
- So it got in the New England Journal. And I said, Okay, great. I can go into academics. But I was still being selfish.

- I was being selfish. I was thinking of myself and my academic career, and how I could do a better to climb that academic ladder. I wasn't yet aware of how my academic ladder was actually harming people and Patchett writes in a state of wonder, beautiful book in science. Never be so focused on what you're looking for that you overlook what you actually find a few years after that New England journal paper that established these spt, spontaneous breathing trials which we use in the Icu. Now I was evaluating the data and I realized that although I was looking at it about old versus young cause I'm very interested in geriatric critical care, and I wanted to see what was making the older patients more vulnerable and I analyzed and published a couple of papers in annals of internal medicine, to show that the older people, although they came in the Icu with this ticket for respiratory failure ticket for a ventilator. They were actually getting off the ventilator just as quickly as the young people, so their lungs were healing as fast as the 20 and 30 year olds. But then the old people bounced back into the Icu more often, and had more death down the line.
- So I was overlooking. I thought this really about the physiology of the chest is my point and I thought this was classical. The doctor and problem. I'm a pulmonologist. That's where I'll focus. I love guidance and physiology and all that. So I thought, that's my love. I'll focus there. I was wrong.
- And I was overlooking the break in the research that this pointed out, which was it's not about the lung anymore. It's something else. And this famous graph by morrow of the depersonalization chamber.
- The? Oh, so yeah, there it is, the deepers relationship. So come in in bright colors and you come down, and you're in great great gray zones, individual people or populations of people coming in with favorite foods, music pets, names.
- hobbies, and then we just do this to them.
- Patient, patient, patient, patient, patient.
- It mobilized today to mobilize today and mobilize the data. This is the factory that we created. And so I had to say to myself, maybe there's something we're doing in this process that's hurting them. That's not between the clavicle and the diaphragm and we began to hedge our bets. and we thought maybe
- I was thinking, either liver, kiddies or brain that was my is liver. Kiddies are brain.
- And I thought, let's hedge on. The brain.
- Didn't know if it was to be real or not. But I had come here in this this library right along this. There's somewhere around here. There's a library in an alleyway, right? I mean in a tube. And I was reading in there about about delirium and and every article. I was always fascinated by this topic. Every article said mechanically. Ventilated patients were excluded.
- I thought, Oh, well but I need to measure delirium, and mechanically ventilated patients. Mechanically validated patients are excluded. So I thought, How do I do that? I spread out all these delirium papers on the table, and I kept circling that sentence, and every paper had that sentence.
- So I contacted Sharon Inoway at Yale University, I said, you have this thing called a cam.
- Can I work with you. She wouldn't take my call. For a long time I kept bugging her, bugging her buggy. Finally she said, what is it that you want. I'm an intensus.
- I'm afraid of you but if you can talk to me for a second, she goes. What is it? I said. I promise you we have 4 times as much delirium as you've ever seen in our unit, but I can't prove it to you, cause we have no tool.

- So we created this tool called the cam icu. It worked. We showed we. We coupled it with a tool called the ras, which was invented by a guy just down the road at Mcv or we Richmond and they were gonna call it the Richmond. They were gonna call it the the Cecil's agitation. Sedation scale. But then that would be Cecil's ass. So they said that they didn't call it so. They said they call it the Wrasse, and the Wrasse became the tool. And this is our paper and jam on the wrath.
- I love that it has this big boat here, this big boat. It has people in it. They're they're lost at sea. They're trying to find their way. I felt like that was me. I thought it was great that jam. I paired this this painting with the wrath. I feel like I'm trying to find my way. And I remember when this came out and I was. I was reading this book on the diagnosis of super and coma and in the book on the diagnosis of stupor and coma, I looked up the word consciousness in the index. I went to the page. It said, consciousness is arousal and content.
- Since said that so clearly I said, arousal and kind of Oh, my gosh!
- That's what we're doing wrong. We're paying attention to arousal and we're not paying attention to content of consciousness.
- So it's like, if a person wakes up and they look at me, but their brain's off, then I think they're aroused. But what if their content of consciousness is completely awry like the man. I was up in the Icu this morning on rounds with Alex Coddle and her team, and the man was in the bed. I didn't go in the room, and I wouldn't break any hip or anything. But he was in the bed with his eyes wide open, looking around, but I know that he was delirious. So the elevator's working. But it's not going all the way, the top okay, or the light's on, but nobody's home. And so when I started putting all this together, I thought, maybe this is the injury, because the body has to respond to the brain. The brain is the CPU.
- There's all this organ cross talk. If you take animal models and actually make the brain go down, the other organs go down too. You don't have to injure the other organs. They start having a problem because the brain's not doing the right crosstall.
- If this is talking gibberish, and this is talking English, and this is talking Japanese and Spanish. Nobody can talk to each other. We have a big, a big body problem.
- So that's where we were thinking of. With these tools, we we put them together. We measured them. We found out there was a death problem independent predictor of death. And you see in the title. It says Predictor. As the fourth word predictor I had put associated the Jama editors said, your data. Your methodology is predictor methodology.
- It's robust. You should not say, this is association. This is a predictor so they told me to change it to predictor. I was trying to be cautious, not pissed them off. We actually found a dose response. If this is my brain totem pole, this is normal, delirious. And the further I go down that brain totem pole. The longer a patient spends down here the more death, independent predictor. Okay, there's actually one in between subsyndromal delirium.
- The psychiatrists are all here. They know about subsyndomal delirium. The person doesn't meet the full syndrome delirium. They have sub syndromal delirium and actually on a capital America. It's not plotted here, but if you look at mortality in. In Icu patients it goes highest mortality for people whose brain stays normal.
- I'll notch down for those who have a duration of sub syndromal, then delirium and coma. So it's all dosed out.

- It's amazing. But we think, oh, they're gonna get delirious. They're critically ill. No, big.
- Yes, this is an epidemic in Covid delirium was the epidemic within the pandemic and the Spanish doctors were there first emailing me? We have all this delirium West. What can we do with this, Dr. Eli? What can we do? And he said, Company, Dr. Ellie, what can we do with the delirium? I said, let's study it.
- And they got me on Twitter. I've never been on social media, and we advertise. We're doing a delirium study. If you want to enroll your patients, and we had 2,100 patients enrolled in in about a month and we found that delirium. I'll show you the data. Was this profound problem inside of Covid. Why inflammation and blood flow?
- The brain doesn't do well without food and oxygen.
- And when you have Microsoft microclots, and then you put everybody on all these drugs. And we have a big, big problem. So people were telling me at the time, this is just for the young people in the room don't do this work.
- This is actually a dead end. You'll never fund your career. It's not going to get. There's no academic legs here, and I was going to give it up.
- So, Nadia don't give up.
- We just had a hard conversation a minute ago and so this woman came into my life and I have. By the way, my one disclosure is that I have written permission from every one of the people. I'm going to tell you their stories, and I have files of their consent forms, or whatever. More than that, they've been involved in their own stories being told.
- I'm a medical historian. When I write my narrative nonfiction, and they're all involved. One of the absolute best stories for Ed. dB, every Dean drop the book. That book there is not in the book, because at the last second, before it went off to print, the family called me back and said, You know what we don't want his story in the book.
- And I said I didn't. I just said, absolutely, you're you're you're college. You're. I'm here to tell your story
- with you if you don't want it in, so it's not in there, and I'll tell you the Doozy. But but they were in control of our story. So Donna Hilly in the stripes was a CEO of Music road, 3 or 400 employees, big time person pictures with the President of the United States. All that, and she came into Icu Garden variety ards no big deal, and when she left she was a geriatric. elderly, frail woman and her daughter, her sister
- Witten vile, wrote to me and said, what happened to my sister?
- What is wrong? What did y'all do to her?
- And what's amazing is she teaches delirium for Kaiser prominente. And so she was saying, I think she ate. Her delirium caused this, so I stayed in on this topic. They brought me back in, and I started noticing ads like this. Diffuse anxiety. Infused verse said, for the continuous call in the Icu. This was our culture, but you're having a hangover of culture right now at Uva right now, because II talked to to you today and yesterday, and I'm I'm listening.
- And I said, will it be offensive if I point out what I heard, they said, please say it
- so. What I'm saying to you, I was told, is we were doing really well, in 2,018 we had gotten this nip, this in the bud. We weren't using benzos. We didn't have our patients all sedated. They were awakened getting out of bed like people do like they. They do this, and they stand up with their own 2 feet. But Covid brought us all

the way another direction. We'll get back to that. But this is we're back with this culture. It's kind of scary.

- Thomas Paine, in common sense, wrote a long habit of not thinking anything wrong gives it a superficial appearance of being right.
- I love this quote. This is what happened in critical care.
- We were. We were like the frog in the water one degree higher. We just sat there getting hotter and hotter and hotter until it was lethal for other people, and we kept going with it. So we started study. I said, how can we prove it? Well, let's let's change the drug and let's change the dose.
- So this was a for a change in the drug. Instead of using a Gabaergic to hit the Vlpo. The perilateral parapet nucleus in the brain, we said, let's go deeper down to locus ceruleus. Let's use an alpha, 2 agonist, and this is Alpha, 2. Agonism in black versus Gabaergic in Gray. I didn't care about the drug. I wanted to change the receptor.
- So we randomized, controlled trial. And you see, the black bars are much lower, less delirium than the gray bars. So yeah, maybe getting away from Gabaergics, which is propofol and benzos essentially in the icu. Maybe that's better. We even saw a mortality signal here, not statistic significant, but a trend. And we said, Let's let's keep going with that.
- But the time, by the way, some of you will say, Well, you're men's to study the English Journal. Yeah, we published a paper in 2020, I think, called Men's 2, where we pitted decks up. It's propavall, and there wasn't a difference in survival.
- The difference is between 2,008 and 2020 is that the probable patients were getting way. Less than the benzos were in the 28. So I think we were actually seeing a real mortality problem back in the 2 thousands.
- I think it's less terrible now, but it doesn't mean that there's not a problem we use too much. It's just that the the intervention arm with the gaba with men's 2 was a lot safer than the intervention with the gaba in men's one so where were we? So we? We knew that Icu delirium in independently increased mortality.
- There's about 20 7 or so the more delirium was higher mortality. Benzos and sedatives for ventilation increased delirium. We had to reduce that incidence, and to do that we needed to get people off the ventilator. So then steps in Tim Gerard, who was here uva Med. Student and a friend of your program directors and Tim
- Tina Vanderbilt and he did this study, called the ABC. Study, Awakening, breathing, coordination. Jp. Kress who is best friends with Emory, your pulmonary critical care chief or chair chief, I guess. He had this study where he stopped sedation every day, so I had stopped the ventilator with the Sbt. Study. Jp. Came back and stopped the sedation every day, and both of them worked to reduce time on vent, but neither of them reduced death and neither of those individual things. Stopping the vent, stopping the drug reduced time in the hospital.
- They reduced time in the unit, but it was, you know, not enough. So we thought, what if we do both?
- And we set this study to do both and we had measured we had measured outcome here and it wasn't statistically significant. The p-value was like point oh, 8, instead of the New England Journal, and they rejected it and by that time we had a year outcome, and it became highly significant. We had enough time and a pace whatever. So it was significant. So we sent to Lancet, and they published it Lancet. I was so glad that all happened because I'd never published a paper in Lancet, and I have a lot of respect for that journal. So anyway at the end of a year turning off

drug and turning off the vent in an A B fashion. Awakening trial, breathing, trial became something that for every 7 people we did that to one person with a life that's the first time in all of critical care that something on the back end of critical care proved a mortality advantage. So here's your arc of critical care income in the Icu. Put them on everything. Here's your back end of procure removing stuff.

- So now we start realizing removing stuff can save a life and it reduced the ice. You stay by 4 days, and for the first time ever the hospital stayed by 4 days, we thought, Wow there's there's something going on here. Imagine getting out of the hospital on a Monday instead of a Thursday or a Friday.
- Think of all the extra Dvds pressure ulcers, extra delirium, all that stuff, and getting back into your environment where you remember your why to live.
- So then we started saying, Well, if this is a brain injury, maybe it goes on for a long time. Let's go to the United, get money to study an acquired dementia and I'm going to start going faster. So I don't run out of time.
- We did 800 patients, and at the other day we found that their brain. Dysfunction was there, and the New England Journal editor said, What about young people so same graph? But on the far left you've got 30 and 40 year olds
- 30 and 40 year old people should not have a dementia that's around traumatic brain injury and Alzheimer's disease.
- But they did. and a thousand news agencies in the world pick this up.
- And we thought, Wow, traffic. This is traction here. People are listening to this story because who can imagine that 30 and 40 year olds should have dementia.
- And then the and Nih started wondering, what are they gonna do with this? And they said, What's causing? We said. Well, the data showed that delirium is the driver of this delirium has a dose response for duration of delirium. You know. I'm gonna teach the residents of this. You know what Dic is right
- disseminated, intravascular coagulation. But it's also a math problem for research. Did you know that the dependent variable equals, the independent variable plus the covariance DIC, so in this case you've got the dependent. Variable is death or neurop psychological function, and the independent variable is duration of delirium the causal variable, and you got covariance. So in our math we adjust for the covariates and see what's the independent role of this independent, causal variable on the outcome, which is dying or living or brain function.
- And this graph shows you that the outcome of brain function in a year is worse if you have a higher amount of the I, the Dic, the independent, variable. Okay, so that's how the math works on that. And if you look at imaging studies, you can see more atrophy in brains of people who had more delirium the one on the right. Lord, this is an anecdotal example of what we found in our actual studies. So maybe the delirium is a phenotype of losing brain cells. So this morning, when I was in the unit and Claire was showing me her bundle board, which is amazing kudos to Claire round of clause for Claire for building the public report.
- It's amazing. It was all delirium delirium. I said, they're gonna get delirium fatigue. And she said, another way of looking at it is, we've got a lot of organ dysfunction, this Icu.
- So instead of getting delirium fatigue, and let us fall into the Oh, ho! Hum! It's delirium again. Think! Oh, my gosh! We have to do something and that's the right answer. I was amazed that she said that, but people around the world started confirming our findings. Look at the bottom bullet. This is a Dutch study, delirium, and independent predictor of long-term cognitive impairment. Now the Ltc. Thing is

is a look at 3 times higher rates, odds, ratios of cognitive impairment. Why did we call it Ltci?

- Why, our New England Journal paper? Because the because medicine had not matured itself. Let me show you the paper again.
- Come on look at the term long-term cognitive impairment after her Clones that could read dementia after critical illness. But medicine wasn't ready to hear that medicine was scared of calling in dementia, and so they wouldn't let us, so we couldn't get the New England Journal to tell us that. But you tell me what this? What this quote says. When I returned home, the work I did before seemed foreign and unfamiliar. I became isolated and excluded. No one wanted to believe me. My wife of 36 years told me that I was feeling sorry for myself. I needed to get on with my life. I nearly died by suicide. Then, after 5 years of this hell on 2,013, the news report ran a story about people like me from that report. I found you! I cried.
- I've got hundreds of these hundreds thousands. We have a support group every day at the sip center for survivors of acute illness.
- Now we have support groups for long covid patients and their spouses and their family members. Because everybody's going through this.
- The family is not immune. The family's involved I go to Alanon. I have a lot of people with addiction in my life. So every week I go to 2 Alan meetings I have a sponsor. I live by the 12 steps. It's a spiritual, not religious program, and I go to Alan and Alan. We say addiction is a family disease and I've got my own addictions. I've got addiction of codependency.
- I was so addicted to try and fix everything around me. My father left when I was a little boy I never had a father growing up, and my mom did her best, but it was tough. $17,000 a year. She made working, running a youth shelter for runaway and and disenfranchised children, and in the absence of any money living in a 4 room house, I became really good at controlling my environment and thinking I can fix everything around me. I will, I will study harder, I will swim faster, I will swim longer. I will stay in the fields longer as a farmer, which I did for many years of farming. Farming. Farming, kid well, of of a man who wanted to marry my bet, my mom! But she never married him and I bought that all the way into critical care and I thought I could. I can control this
- like I can dial that ventilator. I can dial that pressure, and I will. I will maintain control of all this, but as I grew into my 40 s. And 50 Si realized, this is not a healthy way to live and my wife kept saying I didn't plan on saying all this, but I think it's it's important for the story. Here. My wife kept saying, something's wrong with you. I said, No, I'm good. I'm good. I'm fine, although I think you should talk to somebody. No, Kim, I'm fine like I'm an Icu doctor. This is what we did like there's not a problem and pain has got to come out somewhere.
- So this man's pain had to come out and we created through our research some way for his pain to come out, and he did not die by suicide.
- And what we have created the sib center which I see you creating here.
- You've got a survivorship clinic which is now functioning also as a Lon Cova clinic. You've got this bundle board to make sure that you see the whole person.
- I am amazed.
- And where you are, Uva you're so far ahead of so many people, but the future belongs to the discontented.

- It's it's not enough. You can keep going to get out of this this long, this Covid haze. So what is this? Really this? A to that bundle which we created? I'll show you the data in a minute is essentially a It's a humanism bundle.
- It's I want to see the whole person again.
- Well, how can I do that. Well, I knew that nobody would just listen to humanism that's too warm and fuzzy. We've got to make sure that they see the whole person, but it's got to be scientifically driven. So a is a weight, a is analgesia. It used to be a weight and then breathing, but we've changed it to make pain first. So Analgesia, breathing trials and awakening trials, choice of sedation, delirium, early mobility and family.
- You don't have the whole bundle here, yet you don't. You told me today. It's not the whole thing yet. You, Claire, also told me that you've done an experiment, an actual experiment where you introduce the bundle in portions, in one chunks in another, and the whole thing in the in the third way, and she thinks that the whole thing worked better. People had greater acceptance faster, although it might have been a bit more jarring at the beginning. So think about incorporating the whole thing, because what good is it if the F. Isn't in there? The inventor, when when when I see liberation wanted to happen?
- We this is a society critical care mess, I'll show you the data. I'll come back to the story.
- This is 2 graphs.
- And what you see is this graph going up and this graph going up. And the x-axis both times is compliance.
- 10% compliance, 50% compliance, 90% compliance with the A 2 F, but as you go across the X-axis independent of time on ventilator Apache scores and age just the amount of implementation of the bundle. Increasing survival, increasing brain function, Norman normality that's pretty moving one multi center trial. But how about if we go to a larger trial with all these ags around the country, and we prove in the same way, but with 15,000 people. The last study was 6,000 people. Now it's 15. So we have 21,000 people now studied and the more we go up in compliance. Now compliance is, is here more compliance, we go more likely than an Icu discharge. more likely hospital discharge less likelihood of death lower likelihood of of coma, delirium and physical restraint. Use. I said, at the beginning of this thing we're going to see more delirium.
- We're gonna see more pain, because if you wake somebody up and they can talk to you they're going to tell you about pain. So the pain went up because they were able to tell me that they were in pain, which is good. I don't want more pain, but I want to know if you're in pain to treat it. And my favorite graph in all of this is that we had less icu admissions and less discharges to nursing homes because, remember, at the beginning. I told you the Anne Patchet quote don't ignore what you found, but what I found was the old people's lungs were getting better as quickly, but something else was causing them to bounce back and to go to nursing homes and die.
- But wait a minute. When we built the whole package, look at the whole person and have their family with them. They went home.
- This is humanism. This is the innate
- dignity of every person you will ever care for, is never more or less in a different person. It's always inestimable.

- And so if you take the papers that you say, oh, it's warm and fuzzy, West. No? Oh, if I only use New England Journal Jamma and Lancet papers
- to talk about this! Then I've got all these New England Journal jam and Lansing papers at the B, at the C, at the D, at the E, the F.
- And about picks. This is extremely well established in medicine. One of the things I said at the beginning was, what if I told you we knew how to do it?
- But we weren't doing pre covid? These are papers just on the bundle. The quote from Jack Washington Hopkins, the a 2 F. Bundle of sum is greater than its individual parts just like a person. We're all more than our individual organs.
- where mind, body, and spirit, and if you take care of my body and you don't pay attention to my spirit.
- I don't want you as a doctor. I want you to pay attention to all of me. And, by the way, that's not my personal opinion. That's the literature.
- If you ask the if you look at the literature on spiritual history patients vast majority of them want you to take a spiritual history, because if you take a spiritual history, and you say it like this. Do you have any spiritual values that you want me to know so that I can be a better healthcare professional for you.
- The vast majority say yes, because I might answer, Yes, I am an atheist, and I do not want you to talk to me about God or my case will be. Yes, I am Catholic and I would love to have a priest come and talk to me because I need to go to confession, or something like that, you know, whatever the path is, and then I respect that person's path, and I make sure the whole team knows that they're Buddhist, or Muslim, or Agnostic, or whatever it is that they are, cause they are in the driver's seat. So spiritual history puts them in the driver's seat for that component of their healing process.
- But guess what can happen if they're delirious? How do I have that conversation? I've now eliminated my ability to understand what matters to them.
- switching the preposition.
- So to get back to what matters to you, I have to have the Ada Bundle to get the ability for that person to tell them so.
- It's interprofessional. It's a changing care process. It's an additional measurement. Yes, you've got to measure the delirium, but that's a burglar alarm for you. It's a canary in the coal mine.
- It's time and effort. But what are we here for? Are we here for us? Are we here for them?
- Believe in the end. It's about humanism and dignity and science. And that's what I'm telling you about is that I said to myself as a person who is now injured because I feel like I've done something wrong. I'm going to use science to bring the humanism forward, and we'll do that as medical teams, and that's what we've kind of done. So a lot of literature on this, if you want to get back to it. But let's use a patient. So this is Janet Keith. She had necrotizing fasciitis of her face.
- Brutal. 21 surgeries. We took her face off from here to here. And the whole time I was with Janet again. Remember, I have permission. She's a close friend of mine. She emailed me yesterday.
- She said she was on the vent, intubated, unable to talk, and I kept whispering to, and she told me this afterwards. I didn't even remember this, but she said. You kept saying you're a refined badass, and I didn't know why I said that, but she had a picture in the room of herself with her husband, Bill at at the Eiffel Tower.
- And I, said, Janet, you're a refined badass. You've got to get out of this bed.

- And so every day in the unit. When she was going through this, looking like this, we got her out of the bed and walked her. On the first day that she was ever extubated.
- She walked down the hall. Her room was back here and you see she is 40 50 feet
- walking down that hall was Scott Hawes, our physical therapist and a nurse and the OTS were no doubt around, right around, outside the camera lens. How is that possible?
- With 21 surgeries on the ventilator and multi-organ dysfunction to be walking that far. Why, only because we were doing it every day. because she was getting the H. 2 F. Bundle the whole time. If you wait, you lose.
- By the way, I won't get into the literature here. But if you look at all the mobility literature, and you look at day 1, 2, 3, 7, 8, 9 in the on ventilators and you divide the mobility literature into the studies that implemented early mobility at days. 2 through 4 versus those that implemented early mobility at days 6 through 8.
- These are all negative and these are all possible.
- That's the story. Right there. You've got to do it early. If you wait you're out. The patient's out.
- How do you mobilize people here? Holly Bailey in the in the Addb book. She was the originator of this idea in Utah, she said, when she went to Hopkins. Roy Brower, 6 verses 12, title, White and Fame, brought her to Hopkins, and she said.
- Roy said, What should we do here, Polly a nurse leading the fancy doctor?
- We should stop the sedation. What you need to hear Pauli.
- Stopization, broken records. Stop the station. You can't walk people if they're sedated. So it starts with this ABC. Piece, awakening, breathing trials, etc. So Carla Steven has helped you all. She I know she's worked with you on your post. Icu clinic. Kyle infield told me that they work together so she's an icon here in Covid. I'll go real fast with us, and I'm gonna bring to a close for questions here in 3 min.
- And Covid, the beginning. Helms published this paper that deeply saddened me. Because if you look at the table on the top left, it says right here 86% of people
- and Covid are on today's lab. I was like, Excuse my French. But SH.
- This is scary. In the New England Journal. We're telling that 90% of people in Covid have to be on Benzo. And I was like, this is going to open Pandora's box. And it did.
- And so I told you about the Spanish doctors writing to me historically, up to 2,01470 to 80% of people measured in the Icu had delirium.
- But when we implemented the bundle, we got it down to 40 to 50% in Covid, it went right back up to 80% delirium and 80% benzo use. Okay, these are these are data that you already aware of because you lived it in the Covid D study that we did the whole Twitter study published Atlantic respiratory. We found 2 things that were driving this problem sedation, overuse, sedative overuse and family underuse back to the story about the family calm your wrath down.
- The story was that Gordon Moore who founded Intel, Intel, computer Chips Billionaire Gordon Moore went into the Icu at a famous hospital in Palo Alto and he was very unhappy.
- He said this was terrible. I was delirious. They didn't have the family in there, and so he gave money to the Sccm. Society of Critical Care medicine to do the IC. Liberation one. The the graph of the United States, with the Hs. All over it.
- That was that project. Gordon Moore funded that and he said, We've got to fix this. So they called my phone and said, Wes, would you be the pi of our Icu liberation program. I said, yes, flew out to Palo. Alto, sat at the Gordon and Bettymore big table made out of a big tree. It's awesome table. And I said, Oh, I've got the solution

here we're gonna do the a 2 e bundle that was it. It was a 2 e butter and go to Gordon Moore and Seinfeld. Shame said, no soup for you, no money for you, so I will not get any money unless you include the family.

- Wow, A, BCDE F family. So we put the family in there. I didn't know it was data driven, but it is data driven. I showed you some papers. And that's what we added the family, and it made all the difference, and, thank goodness, he pushed us.
- Mr. Parker had Covid. He was the first person that we gave open label Barry to after our Bear Sitnip trial. You may know the story. Justin Stepping published a paper in Lancet, showing with the AI. Artificial intelligence that the computer predicted that the Jack Stat. Barry would be the best drug for Covid. So we designed an Rct. Of it. We ran it. It's called a Covarrier study.
- And it worked. And 80% of our people were on steroids.
- And then we're randomized to Barry versus placebo. and they still got the largest survival advantage of any drug in the Covid era even on the steroids. So the Jack Stat is the most solidly proven drug for covid survival.
- If you are on oxygen, if you're in a hospital on oxygen, then it's syndicated.
- He made it. He did. Great he was. He was like Snoopy's dog house going way way down. He came back up and and made it, and he's he's a beautiful anecdote. I normally show a video. But I'm not going to do it today because I wanted to create space for for Q&A, and I'm going to stop talking now. But if you want to find this video, just go to our website, which is Icu delirium org icu delirium orgy and go to the far right. And there's a survivorship program and watch the videos 5 min long. And it will. It will show patience and their stories and what we're doing. And I hope that Uva will continue to increase your your implementation of these programs. What now?
- We have to look at things differently. Look at a different angle.
- My dad! My dad was in a car wreck and has had a broken neck. I told you he left us when he was early, but he I did get his glasses when he died, and I gave these glasses to my daughter, and she's sitting there, my environmental engineer daughter, looking at a different angle.
- And this is my last slide. What are my do's and don'ts in critical care do put touch before technology.
- And that's a lot from an intensivist switch the preposition, take a spiritual history. teach and practice compassion.
- compatio to supper with, suffer with your patients. that my definition of mercy is my willingness to dive into the chaos of another person's life and provide lifting and heal and diving in their chaos is not enough. You gotta figure out how you're gonna provide lifting and healing. Take a knee. I kneel down with my patients all the time, cause it makes me small and makes them big, and I've got this massive pride, and I've got to reduce my pride so that they can become large, and I can become small, and I can see what is my role here for this servant attitude. We are in a campaign of human service a campaign. Nobody goes into a campaign alone. This is not a political campaign. It's not a war campaign, it's a campaign of love.
- And Avestan, Abedian, the great father of quality. Improvement, said that the secret quality, the secret of quality. Improvement is love.
- So that's what we're doing here. Don't overuse equanimity, equanimatas. Osler's famous speech. I was doing. I was pulling back too far and I would have no, I was not. I was not diving into their chaos, so don't overuse that term. It becomes a

liability set. Don't separate loved ones. Don't think benevolence is okay. It's beneficence we're after.

- Don't allow them to look at normality. Don't fear failure. Don't rob yourself with joy.
- I think you know what I mean by that. Let me stop there. Take your questions. I appreciate you being with me today. Thanks for your time.
- Okay? Challenges, please.
- What are you wondering if you need to leave? Please leave. No, no, no offense taken, Bob. I'll stay here as long as you want to ask questions.
- Thank you for sharing that with us, and you know the use of story is very powerful. So I'll share a story in the Covid unit, which is you know, we all trained in the era that we knew Medazlan was bad, and it felt like we got backed into a a corner because our patients were just dying on us, and you know, to paralyze and prone someone you do need to have them sedated, and it just seemed like every time at least in that first wave when we came down on the Midas cause we were good doctors and we wanted to do it.
- They would go from an FIO. 2 of 50% to 60 to 70 to 80 to 90. And
- I wasn't willing to not reset them. They were to Kip Nic they were.
- They were struggling. So it it just seemed at the time that if you took it away you were going to actually not have people alive and in retrospect maybe we overshot. But in the moment we were we were just trying to keep people alive. So I'm trying to like understand. The overuse would get kind of on the grounds of what I felt at the time managing those patients. Yeah, okay, lot of that. Yeah, please. Yeah. My reply is that I think you were doing the absolute best you could as a physician under some very trying and very unusual circumstances and it was a very long illness. It was 3 weeks long, you know, instead of a one week. It was a 3 week long illness, and we did the best we could. I think a lot of times we were finding ourselves at day 10 to day 14 trying to pull back when I told you that that you know that damage had been done at that point they were kind of committed to a tombstone at that point. I don't know what could have happened if we hadn't prone and paralyzed them. But prone and paralysis brings with it a huge culture of sedation.
- Well, all I can say now, in the light of where we are in 2024 is that we unlearned good things and acquired some very dangerous habits of the of acceptance of people sedated, Demo mobilized in beds, and all we can do now is say, I wanted to go forward and going forward. I need my patients to be awake and talking to me and out of the bed, because we we if you take that one chunk of covid which I can't erase that or fix it. But we know from 25 years of data a safer way to do it. So let's just try and get back to what we know is safe and build that culture back again, and it requires culture change. And you told me this morning, culture, it's strategy for breakfast, and that's what's happening to us. We're getting eaten by culture, please hey? Great talk! The results are pretty intuitive, and I can appreciate the sentiment. I was just wondering for some of the foundational studies for the bundles. Effectiveness. If you could speak to how you might have mitigated selection bias, I was thinking through in the unit of of who might have the bundle instated. For if someone's being worked up for brain death or they're on 4 press, or they gonna actually do the bundle. Have you auto selected for the people that are already going to improve by more actively engaging in the bundle for those patients? Okay, stay there for a second, because I may have to ask you another question. So what I hear you saying is, could it be that you were implementing the bundle? Who and people who are already going to improve, and you weren't implementing it, and

people who perhaps it would have failed it. Okay, I love that. You asked, that that's very smart. And what I think is that what I can say is that we implemented in everybody at the beginning, and we taught the teams that this isn't necessarily so a bundle for survivorship. It's a bundle for end of life just as much. I didn't bring that up. So you call you're calling me out. But I think that the bundle is every bit as important for end of life as is for people who are gonna survive. And so in those 6,000 person studies and in the 15,000 person study, that was all comers including those who were going to die. And we looked at the independent variable that Dsc. That independent, variable, was bundle compliance across all of it.

- And it showed those data. So I think it's it's legitimate and and very robust findings that which were highly significant.
- And also, I think that we found that the bundle in those who are dying provided a more peaceful and better end of end of life circumstance. So Jackie Cruiser, who's now Wisconsin and intensivist, was intuitive about that at the beginning, and she said, I wanna say the end of life component of this? And she did, and the bundle was a was a was a key advantage. Even those who were going to die.
- Hope, that helps. Yeah. Thanks. Thank you for that. I appreciate the sensitive question.
- Another question. Resident Row. I told y'all you're gonna have to have a question. So come on, somebody raise your hand while Nadia is here. One of you can think of your question. Thank you for such a wonderful talk as always.
- Curious to hear your thoughts about virtual reality with the technological advancement. And what's possible. Now, do you think that that may have a role in all of this help. VR tool you can use. Yes, actually, that's very smart, Dr. Lenardi. There is a There is a A has been developed a teaching tool for Icu delirium with VR.
- And you put III know, this cause. I they use. They let me do it, and I put it on, and I can. I can connect you with the person who's who's done this. She's an intensive Mr. Cell, and it is wild. You put this thing on, and you watch the person go into that cu be in a bed very realistically, and then the person has some hallucinations. Things happen like one of the the most common hallucination or delusion in the Icu is that our patients think that they're actually underwater and drowning.
- It's that's the most recurrent delusion and hallucination, whether it's it's imagined, or whatever, and and that drowning has got to be miserable. And so in this VR. Thing they have a drowning patient drown. The water goes up and they can't breathe.
- But so people are using that to teach us what our patients are experiencing because we can't see it. I love that you asked that President. Thank you so much for coming to speak with us. It was so exciting to hear you talk. One thing that I've seen at a couple of different institutions is that physicians nurses Pto. T. Everybody recognizes. This is what we should be doing, and they say, gosh, we need to. We need to be doing the bundle. We need to be doing. SATS. But not in this patient. Not today. This one's too sick that one needs rest.
- And I wonder, how do you shift that culture? How do you get the teams as a whole to spend as much time talking about the ridiculous amount of CC's an hour of propofol. We're putting in somebody in the same way that they'll talk about the rate of saline going into them, because, gosh! There's always a 10 min discussion of saline.
- How do we ship that culture on the sedative side as well? How have you been able to do it?

- Okay, good. Let's talk about that. And, by the way, you're very lucky to have him and his leadership here in psychiatric as many hospitals don't have a Doctor Rosen to help them realize these these psychiatric components in the Icu. One thing is that we need to stop, saying we might hurt them, and say, by keeping the bed, we are hurting them.
- This is actual injury to the person by keeping them in the bed and the other thing is that somebody says, Well, what if they self excavate?
- And I was in Korea giving a talk, and they wheeled in a patient and she had had I. Ph. She had pathop pulmonary hemispheresis, and she had been kept on the ventilator and sedated, and everything. And this woman had been Icu 2 years earlier, and she was only 28, and they wheeled her in, and I lifted her leg up. It was just a femur no soft tissue. 2 years later and the doctor and I said to them, Why did y'all keep her on so much session? And the doctors over here said what if she would have self-excavated? And the doctor over here a woman leader? It was really bold and amazing to how she just blurted out, what if she never walks again?
- I'll never forget her saying that.
- What if she never walks in so we need to put in our mind about their survivorship.
- What if this person had to walk you? And every day they're losing X percent of muscle mass and creating nerve injury? The Vasob azorum of their nerves are damaged and the muscles getting injured, the nerves, too. So every day we leave them in that bed, they're they're getting more of a pix problem. They're acquiring new disease. We have to think about disease acquisition.
- And the last thing I'll say about the answer is this, so if the person's lying in the bed, and I can't get them back, because I'm afraid they're going to injure. But I get them up like this and they get and they're up like this, and somebody's holding them. The Pto. Are there with them, and then they collapse and they fall into a chair.
- You get 2 responses to that one could be see. I told you so but the right response is, they got out of the bed for 5 s, and they stood up because that right there becomes this tomorrow.
- And then remember Janet Keith when she finally gets out the middle, like she's walking down the the unit. So it is not a failure if they get out of the bed and can't do anything else. This is a marathon out of sprint. So you have to start somewhere. And that's my main response.
- Do it safe. There will be self exhibitions if you get aggressive. This is data data data proven. Some of you know this data, but in the ABC. Study in Lansing there will be an increase in self-examations if you get aggressive about stopping the drugs. But there will not be an increase in reintegration. The patient was right in that study we had no increase in in reinteurations. Please. Thanks for this talk. One of the things I remember striking about Icu survivorship data is the rates of Ptsd.
- Are you aware of like data about the degree of sedation or sedation affecting that. Yes, we published a paper on. Thank you for that, you that it's fine to not know it. But what we did was we took the ABC data, and we followed them for for over a year, and there was no in the patients in whom we shut the drugs off. By the way, the A. The awakening trial is not a ween of the drug. It's a shut off.
- Turn the drug off and then, if you need it, you go back at half the dose. So you make the patient prove it to you that I need it. For some. They they have to get dangerous to themselves and others to get more in the patients in whom the drug was shut off every day.

- There was actually no increase at all in Ptsd or depression it was they actually were doing better in the longer run. We have more data further out. We follow those patients now for 12 years. and we haven't published that yet. We're working on a long-term outcomes paper. By the way, you could find a paper in Jama that repeated what we did and was negative by Sanghita Meita in. I went to that hospital and they had. So they had turned the drugs off and the study didn't improve outcomes.
- Okay? And I went to the hospital and asked it to the nurses. What did you all do? Oh, you mean the study where we took? Oh, yeah, we hated that study. Why did you hate it? They said we hated that study because we want our patients deeply sedated. So we follow the protocol. We turned it off, and then, as soon as she'd walk away, we turn it right back on and ramp it up to get them deeply sedated and it turned out in the study. Get this in our study, we cut benzos and propofol and morphine in half. So in our study we actually did. Did an investigation, and there was an experiment in their study in these shut-off group. They went up in their sedation, use their benzos went higher. so no doubt that it didn't work.
- Okay, maybe one more question that we'll call it because I we're after time a question from the rest of the room.
- Nobody has any. What's happening in your head. Just what? What are you wondering?
- All right, we have 2 up there we go think so. I don't know my tweet type, one method. Database like, what? What sort of place?
- Yeah. So what it looks like. So what it looks like is, use whatever you need to use to get somebody intubated. Wrap a sequence, whatever. and then we'll say that's late in the afternoon and we'll say, you know what we're going to get this patient calm down. So we're on this increase of illness curve. and as soon as we get to here and things are stabilized we don't wait till here.
- This is 3 or 4 days of stabilization, and this is recovery. This is the front end of critical care.
- As soon as we get to here we're shutting this stuff off and you don't say, wait a minute. We just did it yesterday. We put them on a littleization, and it was helpful. And you don't say today it was helpful yesterday. It's gonna be helpful today. What you say is that's injurious. I've got to shut it down. So the day the second the sun comes up the next day. What you do is say, return the drugs off, waking them up. There's a screen. Look for the screen, but we're gonna turn them off, see if they don't get dangerous and then we're going to get them out of the bed and wake them up. And if we have to shut the drug back on. We only shut it at half the dose. And so we're going to use drugs, analogous sedation, which is fentanyl. Only not 2 drugs, but just one an alcoholication for pain and sedation. Or we're going to use Alpha 2 agonus or we might use an antipotent.
- We talked about that last night, we might use antip psychotic, which just suppresses that positive wrath. Stuff doesn't cause respiratory suppression.
- So shunting more towards a single drug, and especially, maybe a drug that doesn't cause respiratory suppression.
- You get one last question gonna ask about okay thank you. Pick. So what picks is an acquisition of 3 problems above the neck, which is depression, Ptsd and dementia.

- And it's a neck down problem of muscle and nerve disease. So we rehab these patients. We get them off of a lot of drugs. We cut their drugs about half in the post in the post Icu clinic.
- We get them physical therapy and occupational therapy. We get them cognitive rehab with computer games. We get them in a support group because we get injured in private and we heal the community. Okay, we feel like we need to be with other people who they're going through this process with.
- And we can get them into a community of survivors, so they can talk about it, share, cream, scream, cry, and recover, and that's what it looks like, and it goes on for years, and that saves their life.
- Thanks. Everybody appreciate you. I'll stay up here if you have any questions. Come on up.