# **Perinatal Mental Health**

# Presented by Joan Odom, MD

**Dr. Odom:** Good morning or good afternoon, depending on where you live. My name is Joan Odom, and I'm very excited to be here today. It's nice to be able to share time with you and to step beyond the behavioral health utilization and quality management silo for a few minutes with medicine.

I'm grateful to Dr. Monica Hajdena-Dawson and to Dr. Julie Ryan for shepherding me through today's process.

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I have been in healthcare for 35 years. I started my journey as a chiropractor interested in physical rehabilitation and [was] certified by the American College of Sports Medicine. For the past 25 years, I've been in behavioral health. Everywhere I've been, patients have been my best teachers.

I'm grounded by family, rooted in faith and integrated into life through the mind-body practices of Pilates and yoga. You can find me up with the sun and down with my body work. There's a saying in one of the studios where I go that motivation is what gets you started. Habit is what keeps you going. And I've learned through exercise science that practice makes permanent, but only perfect practice makes perfect.

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As we learn this material, I'm hopeful that it will elevate your practice, foster new habits and above all, motivate you to strive for the greater good. Namaste.

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What is a mother? A pregnant person? A pre-pregnant person? A never-pregnant person with 5 failed rounds of IVF (in vitro fertilization)? A person with an aborted pregnancy? A person after stillbirth? A surrogate? An egg donor? A cisgender female? A transgender female? A transgender male? An adoptive parent? The one who has a baby or the one who raises the child? An aunt? A sister? A grandmother? An uncle? A brother? A grandfather?

In my home, we have a dog named Gaia, and she would tell you that mother is an archetype embodying all of these earthly labels and one that plays a significant role in the evolution of the world. Perinatal mental health is a broad concept that takes into account the complexities of a modern family, while incorporating the traditional family view that has long honored the female-male heterosexual union. While the field of perinatal mental health adopts an overarching view of persons involved in the creation and care of babies, maternal mental health has a more narrow focus and looks at the female sex individual from the point of inception through pregnancy, delivery and the postpartum period.

Definitions of postpartum differ, but the most common refers to postpartum as the first 12 months following pregnancy and delivery, and we will use this definition when speaking about maternal mental health metrics.

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In 2022, the U.S. maternal mortality rate was estimated to be 22.3 deaths per 100,000 live births, which is significantly higher than for other Western industrialized nations.

Several federal programs are aimed at improving these statistics. The White House Blueprint for Addressing the Maternal Health Crisis, the Task Force on Maternal Mental Health's National Strategy to Improve Maternal Mental Health Care, the Overdose Prevention Strategy and the White House Initiative on Women's Health Research are some of the most important. But in late 2024, the Substance Abuse and Mental Health Services Administration (SAMHSA), an agency within the U.S. Department of Health and Human Services, awarded \$10 million for a new community-based maternal behavioral health services grant program.

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Maternal mental health is a driver of maternal mortality. Maternal mental health conditions such as depression, anxiety and substance use are the most prominent complications of pregnancy, childbirth and postpartum and the leading cause of pregnancy-related deaths in the U.S. Severe maternal morbidity refers to the health-impacting and life-threatening events that occur during hospitalization for childbirth, including unexpected outcomes of labor and delivery that result in significant short-or long-term consequences to a woman's health.

There are 70 to 100 of these events for each maternal death in the U.S., though there's increasing evidence that links severe maternal morbidity with increased risk of mental health disorders, including postpartum depression, PTSD (posttraumatic stress disorder) and substance abuse.

Pregnancy-related deaths, as measured by the CDC (Centers for Disease Control and Prevention), are deaths during pregnancy or within one year of pregnancy from a pregnancy complication, a chain of events initiated by pregnancy or the aggravation of an unrelated condition by the physiologic effects of pregnancy. Overall, unnatural deaths by suicide and overdose are the leading causes of pregnancy-related deaths, and in the Black community, unnatural deaths by homicide eclipse pregnancy-related deaths by suicide.

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The good news is that most of these deaths can be prevented, but we must screen. One of the best ways to get quick information is to ask women of apparent childbearing years if they are currently pregnant or have been pregnant within the past 12 months.

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The most recent version of the National Epidemiological Survey on Alcohol and Related Conditions showed a range of psychiatric disorders impacting pregnant and postpartum women. Other studies have shown that one in 10 women of reproductive age in the United States have symptoms of major depression.

The rate of depression diagnoses increases at delivery and during the postpartum period. Up to 75% of women will have some depressive symptoms in the first days

and weeks following delivery, and this is what we call the postpartum blues or the baby blues. With the blues, moods will go up and down, but symptoms tend to be mild, and they resolve in a couple of weeks.

Crying, irritability, fatigue and anxiety all occur with the blues, but when they persist or they worsen beyond the second postpartum week, it's crucial to evaluate for perinatal mood and anxiety disorders, sometimes abbreviated as PMADs. One in 8 women with a recent live birth will report symptoms of a PMAD.

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The pathophysiology of PMADs isn't clear. Research has implicated hormonal changes, immune or inflammatory processes, genetic and epigenetic changes and psychosocial factors like stress or problems with interpersonal relationships. Known risk factors include pre-pregnancy history of mood and anxiety disorders.

This is associated with earlier onset of symptoms and more severe presentation. Family history of mood and anxiety disorders predisposes to PMADs, as does perceived lack of support, a difficult pregnancy or delivery, multiples, financial stress, adverse childhood experiences, intimate partner violence, underage pregnancy, unplanned pregnancy, recent immigration and having a disability. Emerging evidence suggests that enhancing partner support through interventions that improve communication and relationship satisfaction may be a promising strategy for reducing the risk of PMADs, but more studies are needed.

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The *Diagnostic and Statistical Manual* [of *Mental Disorders*], the DSM, now in its fifth edition, is used by mental health professionals to diagnose psychiatric disorders. And it may surprise you, but the DSM does not have a separate category for PMADs.

PMADs are diagnosed when criteria for other disorders, such as major depressive disorder, bipolar disorder or obsessive-compulsive disorder, are met. The specifier with peripartum onset is used when the disorder begins during pregnancy or during the first month following delivery. When depressive and anxiety disorders predate and extend into pregnancy, it's best to treat these disorders using antidepressant medications, such as the serotonin-specific reuptake inhibitors, or SSRIs.

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Teresa Twomey, an official with Postpartum Support International, gives insight into the personal, psychological, medical, legal and historical perspectives of postpartum psychosis in this book. Statistically, 2 out of every 1,000 new mothers will develop postpartum psychosis, and this is considered to be bipolar disorder with peripartum onset and treated as such until proven otherwise.

Women with prior episodes of postpartum psychosis and personal or family histories of bipolar disorder are most at risk. Women with bipolar disorder should be treated throughout the pregnancy using mood-stabilizing medications that have less risk for the fetus, such as Lamictal and, in the second trimester, lithium. New-generation antipsychotic medications are also helpful, and they can be used throughout

pregnancy in this population and with pregnancy and postpartum mothers who have schizophrenia.

The onset of postpartum psychosis is usually within days or weeks following delivery. You can see mania, delusions, hallucinations and [they can] have suicidal or homicidal thoughts. It's often accompanied by confusion, cognitive impairments suggestive of delirium and bizarre behavior.

One meta-analysis found that 37% of women with a history of bipolar disorder had a postpartum relapse, and the recurrence rate of postpartum psychosis in subsequent deliveries hovers around 50%.

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While uncommon, postpartum psychosis is a true psychiatric emergency that requires immediate psychiatric evaluation and treatment. We treat postpartum psychosis with rapid tranquilization using benzodiazepines and antipsychotics, followed by mood stabilizers. And if these measures fail, we give a trial of electroconvulsive therapy. ECT can also be used for treatment-refractory major depressive disorder, both during pregnancy and in the postpartum period.

Left untreated, postpartum psychosis can result in harm to mother, baby and the extended family. I've worked with mothers who seriously injured and killed their babies while experiencing postpartum psychosis. And what I can tell you is that though it's heart-wrenching, the bright spot is that infanticide related to postpartum psychosis can be prevented when we provide appropriate care.

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A CDC study found that 66% of women retrospectively identified as having had major depressive disorder while pregnant never received a diagnosis. Many PMADs go undetected because women are afraid to mention mood changes, and many providers just don't ask. The stigma of mental illness, the fear of being judged as crazy or unfit for parenthood and the concern about losing custody of one's child are some of the reasons why depressed mothers often don't seek help.

But systematic screening during pregnancy and postpartum is an effective way to identify at-risk women. The U.S. Preventive Services Task Force guidelines, the American College of Obstetricians and Gynecologists and the Association of Women's Health Obstetric and Neonatal Nurses all advise screening pregnant and postpartum women at least once using a standardized, validated instrument. And several screening tools are available. Some are listed on this slide. Of these, the Edinburgh Postnatal Depression Scale meets the U.S. Preventive Services Task Force inclusion criteria. The Edinburgh can also be used to screen fathers as rates of paternal depression are increased when mothers have PMADs.

All providers treating pregnant and postpartum women, their children and families should screen for PMADs. The American Academy of Pediatrics recommends that pediatricians work with OB-GYNs to arrange prenatal visits as this allows the pediatrician a chance to get to know parents and to learn about high-risk conditions such as PMADs that will benefit from a plan of support for the mother-infant relationship.

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Almost one-half of women with PMADs receive no intervention. It's important to establish relationships with mental health professionals and social service agencies who can assist with referrals and care. We must follow up, however, to make sure that women with PMADs are accessing those services that they need and that their symptoms are improving.

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Untreated PMADs cost the United States \$14.2 billion a year. Early treatment is important for mother, baby and the rest of the family. Early mother-child bonding is important for the baby's development, and PMADs interfere with establishing this bond. Mothers may not be able to respond to the baby's needs, and if there are older children in the home, they may be missing support as well.

Remember that most PMADs will improve with a variety of interventions, but women with postpartum psychosis and women with more severe PMADs need mental health specialty care, and they may require immediate hospitalization.

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A meta-analysis of 37 randomized controlled trials by Sokal and colleagues found that psychosocial support and psychological interventions help.

Women who received any intervention, including postpartum home visits by professionals, phone-based peer support and interpersonal psychotherapy, showed a 27% reduction in PMAD symptoms at 6 months, while alternative treatments such as acupuncture, massage therapy, bright light therapy and vitamin or mineral supplementation did not demonstrate a benefit. The National Institutes of Health, Eunice Kennedy Shriver National Institute of Child Health and Human Development recommends some of the ways on this slide that all people can help support someone who has a PMAD.

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Here are some additional resources. And I'll make this slide deck and these resources available to you following the presentation.

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While I've been careful to discuss PMADs, I've talked less about postpartum substance use disorders, but these are no less destructive to new mothers and their families.

The United States Preventive Services Task Force recommends screening all persons 12 years of age and up for unhealthy alcohol and drug use.

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The Substance Abuse and Mental Health Services Administration's 2018 Self-Report National Surveys of Pregnant Women showed significant self-reported rates of substance use.

Experts believe that actual rates are probably 5 to 10 times higher, and that means that substance use and substance use disorders during pregnancy and postpartum are common and serious problems. There's a range of negative health impacts to offspring with increased rates of neurodevelopmental disorders, intrauterine growth retardation, small for gestational age infants, fetal alcohol spectrum disorders and neonatal drug withdrawal syndromes.

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Rates of pregnant women impacted by substance use disorders have increased exponentially over the past decade, with rates of maternal opioid use disorders showing the sharpest increase. From 2010 to 2017, the number of women with opioid-related diagnoses at delivery increased by 131%. Opioid-related risks to the neonate include preterm birth, stillbirth and the neonatal abstinence syndrome.

Please refer all persons with substance use disorders for help. This is SAMHSA's National Helpline Number.

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And here are some additional resources.

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Thank you for your time. Next slide will show references and then on to Dr. Monica Hajdena-Dawson's presentation.

# Getting Back to Basics: Why Eat, Sleep Console Presented By: Dr. Monica Hajdena-Dawson

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Thank you, Dr. Odom, for that awesome talk on perinatal mental health. It's quite a hard act to follow. I'm going to expand on the topic of substance use with a focus primarily on the fetus and newborn.

I'll go over some background for NAS (neonatal abstinence syndrome) and NOWS (neonatal opioid withdrawal syndrome) but focus primarily on our current treatment options and why we should be getting back to basics and focusing on non-pharmacologic treatment options for our NAS babies.

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I have nothing to disclose.

## [slide]

Just briefly, for those of you who don't know me, I'm Dr. Monica Hajdena-Dawson.

I'm a neonatologist for over 25 years. I am one of the NRS Medical Directors and the Women's Health Team Lead and have been with Optum since 2013. I have an interest in integrated health and improving women's health through integration, hopefully with primary care and mental health, as well as NAS.

I'm married with 4 children, who are mostly adults at this point and 2 pets.

#### [slide]

I'm going to start off with some definitions, which I'm sure that you guys are all aware of, but I want to make sure that we're all on the same page.

We have opioids, which is any substance that reduces the intensity of pain signals by activating an opioid receptor. It includes synthetic opioids, semi-synthetic opioids, as well as the natural opioids.

An opiate, on the other hand, refers only to natural opium, such as morphine and codeine, which comes from the beautiful little poppy plant that you see pictured on the right. Opioid use disorder, as I'm sure you are aware, is an addictive disorder. It's a neurobiological disease with genetic, psychosocial and environmental factors impacting how someone reacts to those medications, as well as whether they become addicted or not. Not everybody gets addicted.

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Neonatal abstinence syndrome is a broad spectrum. It refers to any drug exposure that a baby may withdraw from. It used to be primarily related to opioids. But with all the substances that now are out there, this is kind of an all-encompassing terminology, whereas we have a relatively newer terminology of neonatal opioid withdrawal syndrome, or NOWS, which refers specifically to babies that are withdrawing from opioids that they were exposed to in utero. We talk about licit substances, which are any legal substances that do not require prescriptions, such as tobacco, alcohol [and] cannabis. There are other drugs, such as mushrooms, that are legal in certain states. Those would all be considered licit, whereas illicit substances are substances obtained and used illegally, even if it is a prescription drug. If it's not your prescription, then it would be considered an illicit substance.

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Dr. Odom spoke about the U.S. maternal mortality. I'm just going to briefly touch on it. What I want you to focus on primarily is this increasing trend. On the right here, we have the total deaths. These are pregnancy-related deaths, and they're broken down into during pregnancy, early postpartum and late postpartum. Then, on the bottom, you have the obstetrical deaths that are related to overdoses.

These are just all pregnancy-related, and these are related specifically to overdoses. For example, if you take the orange, because it's probably the easier one to see, these would be the late postpartum pregnancy-related deaths. These are the pregnancy-related deaths or the late postpartum deaths related to an overdose.

You can see that, for example, in 2021, that almost half of those deaths were related to overdose. In order to affect this mortality rate, we must be treating the moms with substance use as well as mental health disorders, which then leads, oftentimes, to substance use. We need to address this to be able to actually decrease our maternal mortality rate.

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This is a list of commonly abused substances. I'm sure there's many more now. There's been a lot more synthetic substances created recently that aren't on this list.

We're going to focus primarily on the opioids. I did want to point out kratom. Kratom is an herbal substance that's relatively easy to get. It does have opioid-type withdrawal symptoms, both in babies and adults. They use it in teas as well as cough suppression, so just something to be aware of when you're screening your moms.

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Dr. Odom mentioned the increases in opioid-related diagnoses. This is a map of the United States from 2010 to 2017, the percentage of change. I want to just point that out. Percentage of change in maternal opioid-related diagnoses per 1,000 deliveries. For example, the darker the orange, the bigger the change. For Arizona, there was a 423% increase in opioid-related diagnoses. In a 2019 self-report, 7% of women reported using prescription opioids, and one in 5 reported misuse, so using opioids not prescribed by their provider.

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This is just our internal data. This is our Medicaid population. These are our NAS rates. It's a little bit different than what you see reported on the web or in research, because these are case numbers, so this is the percentage of cases that are primary NAS. We have both primary and secondary. The data is related to the primary NAS diagnoses, so our average length of stay, for example, was 13 days.

It's kind of consistent year over year. Our NAS case rate was 9.1% in 2023, and it has dropped down to 8% in 2024. The other thing we track is the treated versus observed. Our observed rate is slowly creeping up, which is what we would like to see, and I hope that you understand that better by the end of the talk.

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Opioids respond to opioid receptors. There are 3 primary receptors, mu, delta and kappa. The mu and the kappa are primarily the ones that methadone and morphine react to, so when mom is using substances, the fetal brain is bathed in opioids. In order to keep homeostasis, the brain upregulates the opioid receptors, and they decrease the neurotransmitter release. And this, in an adult or a substance user, decreases pain. That's how it works. So when a baby is born, you no longer have the substance reacting to the receptor. This increases … norepinephrine is released, and you see their withdrawal symptoms. So that's what causes their withdrawal symptoms, and these developmentally have some significant changes in the first 3 weeks of life.

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So, what does prenatal exposure to opioids—what have we seen in studies? We see significantly smaller brains, and it's kind of all around. You see gray matter decreases, white matter, brain stem ... You see microstructural alterations as well as signaling abnormalities, reductions in cell populations, the hippocampal and the astrocyte cell, thinner myelin sheets and increased inflammatory cytokine production. All of these effects then affect the baby's development and behavior, and what we see is an increased dysregulation.

We've all experienced this where babies take a long time to console after being stimulated; lower language, motor and cognitive scores; cognitive and psychomotor deficits up to 3 years of age, disorders of spatial cognition affecting memory; and difficulty performing goal-directed tasks. So not inconsequential effects that we're seeing in our infants and later on.

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There's another population that I just wanted to briefly mention, and that's those babies that are not exposed prenatally but have postnatal exposure to opioids. We can have a very sick population in the NICU (neonatal intensive care unit), and they do need to be treated for all that they go through. There is evidence to support that our premature infants actually are hypersensitive to pain compared to term infants, and I'm not saying that we shouldn't be treating babies, but I do think we should be aware of the effects. The babies have developing brains, and these substances have effects on those developing brains, which later lead to developmental effects. So we need to be cautious when we use it. Of course, use it when needed, and we also need to do more research on looking for better ways to treat the pain in our babies.

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I just want to give you a brief timeline. Morphine was first isolated in the early 1800s. Heroin was first synthesized in 1874, and the first reported case of neonatal withdrawal was in 1875. Heroin was not considered ... No one knew what heroin was, and it was in cough syrups. It was over the counter. It was in a lot of products, so not surprisingly, it was given to babies. Early 1900s was the first time that morphine was used to treat a baby with withdrawal. And then I just wanted to point out that what we consider now our traditional management model was formulated somewhere in the late 1960s, early 1970s when there was a heroin epidemic, and they had to figure out how to treat all the babies that were coming in. Prior to 1960, there was not really a lot of treatment for these babies, and a good majority of babies that were exposed ended up actually dying. So it wasn't until methadone was developed that they started looking at ways to treat these infants.

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We're going to take a look at our treatment options for both NAS or NOWS—doesn't matter which—so we have our standard traditional approach, which has been around for about 50 years. We do Finnegan scoring, and it primarily is focused on pharmacologic treatment. Then we have our more recent, within the last decade, Eat, Sleep, Console model, which focuses on functional assessment of the baby and primarily nonpharmacologic treatment options prior to going to pharmacologic options.

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I'm going to take a brief break here, and there is a point to this. I want you to take a look at this puzzle, so there we have 9 dots. I want you to connect all 9 dots with 4 straight lines without taking your finger and or cursor off the screen. So connect all of the 9 dots with 4 straight lines without taking your finger off the screen. I'm going to give you about 30 seconds.

All right, so hopefully you guys have had some time to play around with it, so let's take a look how you did. So you start here. You go one, 2, 3, 4. So now what's the

point? Why did I make you guys do this? One was to just take a little breather, but also, this is where the concept of thinking outside the box comes from. And why is this important? Well, it's important because, I think often in science and in medicine, we aren't often doing just that. And thinking outside the box, you would think, means that we have to extend these lines past this box, but what it actually refers to is that there is no box, so that box, if you made it—now maybe not everybody did, but I surely did when I did this the first time—is you create a box around this, and you feel for some reason that you need to stay within that box, which you can't solve the problem for. But there is no box. These are 9 separate dots, and I just asked you to connect the dots.

I didn't ask you to stay in any perimeter. I didn't say that we had a box here. So oftentimes, what we do when we're thinking about things in medicine and how we're improving it is, when somebody asks you why you do something, you typically are referring to either a protocol or a guideline. Or the answer oftentimes is: that's how we've always done it. But we need to be aware that that's not the correct answer, and just because it's been done that way doesn't mean that it's the right way. And also, in neonatology especially, it doesn't mean that it's been vetted out. So when you're asked to think about things, I want you to think about not putting constraints around yourself when you're doing it, because I think we oftentimes put self-imposed constraints.

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So let's take a look at first the standard approach, and then we're going to kind of take it apart. And the reason we're doing that is that's exactly how they got the Eat, Sleep, Console model. They took a look at this model and whether it was the right way to be treating these babies. So what do we do with these babies? What are the components? So, for the most part, the majority of the time, these babies get admitted to the NICU.

Now, if you think about it, NICUs are meant for high-intense issues. These babies, for the most part, not all of them, but the majority of them are in room air. They're typically maintaining their temperatures, or maybe have a little bit of a temp, and usually they're eating. Sometimes they require gravage feeds, but for the most part, they do at least try initially to eat. So not really NICU-related stuff, but there's a lot of noise. There's lots of lights. There's lots of stimulation present in the NICUs, and if you think about these babies, that's exactly the wrong environment for them to be in.

So what's another part of it? We do Finnegan scoring or some modified Finnegan scoring, so let's take a look at where that came from.

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So, it was developed in the 1970s by Dr. Loretta Finnegan and her group, and it was in response to a heroin epidemic and an onslaught of heroin-addicted babies that they were seeing. So they looked at all the withdrawal syndromes, put them in different categories and there [were] 31 clinical signs of withdrawal that they then ended up scoring. And based on these different severit[ies], they chose a number of 8, greater than or equal to 8, or then there's also 12 that we use for consecutive 12s, to either start medications and/or wean our medications. Now, of course, these numbers were very vetted out, and they knew exactly that this was the right number.

Well, you'll be surprised to know that that's not actually the case, so where did this number come from?

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So, the number came from that group at that time. The infant with a score of 7 or less was not treated with drugs for the abstinence syndrome because, in our experience, he would recover rapidly with swaddling and demand feeds. Infants whose score was 8 or above were treated pharmacologically, so based on this alone is how we've used 8 for the last 50 years, and it's never actually been researched in any depth or detail. There have been studies to look at different scoring tools and whether they coincide with the Finnegan, but no one's really taken the time to say, is 8 really the right number that we should be using?

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So, some of the other problems that we have all experienced, if you've done the Finnegan scoring, is [that] it's very complex and cumbersome. You definitely need user training. There's a lack of inter-rater reliability, even if there is user training. It's been shown to prolong length of stay as well as provide unnecessary exposure to medications. You need to arouse the baby to complete the assessment for some of the assessment, and developmentally, these babies sometimes are there for 4 to 6 weeks and beyond. As they get older, some of these scores aren't really developmentally appropriate.

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So, what do we do with these scores? The whole point of this standard approach and the scoring is to initiate medications and then to adjust the medications. And the thing about this is, once we start the medications, if you think about the standard approach, we start a round-the-clock treatment. So, that means that not only do we expose them to medication, but we expose them to potentially weeks of medication as we stabilize them and then start weaning.

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So, these are the common meds that we use now. Morphine and methadone are the primary ones that you see. Buprenorphine is being looked at, but it contains a lot of ethanol, and so until they find a better formula for it for babies, it's not being used too much. And then we have clonidine and phenobarb as our secondary agents. So again, once we start, we are typically exposing these babies to between 80 and 100 doses. Just think about that number. That's a lot if we think about the effects these can have.

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And then finally, who cares for the baby? Typically, the staff. It's been shown in studies that, especially for this population, there is a stigmata. Both RNs and moms and/or caregivers that have been polled and screened say that usually the nurses say they don't really ask mom to care for baby. They're not really as welcomed. They would prefer to take care of the baby themselves because there is a historic[al] perspective that these moms don't show up. And then from mom's perspective, they feel they're not welcome. They feel that they are often stigmatized, and this is an opportunity for us to be helping the family bond, and instead we're discouraging it.

So, something to think about that probably not the best way to be treating these babies.

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So, let's take a look at the Eat, Sleep, Console model. Where did it come from and why? It was developed by Dr. Matthew Grossman in 2014 as a quality improvement project to reduce the length of stay for these NAS babies.

So, Dr. Grossman is not a neonatologist. He is a hospitalist, which is probably a good thing because I don't know if a neonatologist would have taken the time to actually analyze these babies to this degree. So, at the time, when he was at Yale, when he started, he was in charge of this NAS population.

They would go to the NICU, get stabilized and then after 4 or 5 days, they would come to the floor. And these babies, compared to their other pediatric admissions, had an incredibly long length of stay, and so his focus was wondering whether there was anything they could do to help improve not only the management of these babies, but also to reduce the length of stay. So, he examined the "why" of the standard approach. So, the components that we just mentioned before and we talked about, he did the exact same exercise. I am going to go over this briefly just because of time ...

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... so I'm not going to specify everything that they did. It did take many years, but one of the things they did do is they looked at the various medications. So, this was in 2006 was when he was looking at this, and so they looked at the various studies of medications, looking to see if there was anything obvious that should be getting done.

DTO is tincture of opium. That was highly used at that point in time as well as morphine and methadone. And for the most part, even though there is a huge range here, there wasn't anything consistent that he could find with respect to the medications. There was an occasional study that showed some benefit, but nothing that was consistent. But one of the things he did focus on was that these babies all had the same diagnoses, but the range that they had here from 8 to 79 days for the same diagnoses ... something had to be different that was going on. And what could that be?

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So, the bottom line is that they took a step back, and they looked at ... the AAP (American Academy of Pediatrics) at that time had mentioned some nonpharmacologic options that were supposedly supposed to be the primary treatment, and then you would refer to meds as a secondary, but in reality, that was not really being looked at.

There was about 50 words on that, and there were pages upon pages about the medication. So, it wasn't a huge focus in 2014, or I think it was 2012. It has become significantly different now if you go look at the AAP in 2022. So, they said, what if we didn't know that this baby had been exposed? What would we be doing for this baby? And typically, these babies are crying and fussing and hypertonic, so what

would you do if you saw a baby in a crib doing this? And basically, it was you would pick the baby up, you would feed it if needed, you would make sure you would swaddle it, cuddle it, try and console it and get it to try and sleep.

So, all of these things, ability to eat, sleep and be consoled, are what the baby needs to function and grow. And so, maybe we should be focused on trying to get this done and seeing if actually utilizing the nonpharmacologic methods and optimizing them to the best of our abilities would help and reduce the need for medications. So, that's exactly what they ended up doing.

They took all the different criteria. And this, of course, takes a lot of time, and the nurses do not have that kind of time. So, one of the things that they had to figure out was how they could always have somebody with a baby, and they figured that typically the mom and/or caregiver should be providing this "love," is what they ended up calling it. And so, that's what they started to try and incorporate into their method of treatment.

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So, what they did, the changes they made, and again, this was over many years change is never easy—and it took them a while to get buy-in by their staff as well. They moved all the admissions from the NICU to the inpatient unit as long as the baby was stable and didn't have any other diagnoses, and mom stayed with baby once she got discharged from her delivery. They changed to on-demand feeding, and what they mean by on-demand was if the baby needed to eat, the baby needed to eat. It wasn't on a feeding schedule of every 3 hours, [which is] how we seem to do it in the NICU. So, it's very hard to get on-demand feeding. And that was one of their biggest issues was trying to get babies fed on a demand feed as they would at home.

They discontinued the use of Finnegan scoring tool. They did score just for their research purposes, but they didn't utilize it to do their management. Instead, they managed based on the ability for the baby to eat, sleep and be consoled.

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So, this is kind of an example of what could be used. Again, they don't have a specific one, but this is from Yale where he worked. So, this is the primary area that we're looking at. This is the primary things that they're scoring, and this just kind of provides some additional information. So, it's just an example. There's also one that the AAP provides as well that you can utilize.

## [slide]

One of the other things that they looked at was whether they could change the way they do the medications. As I had mentioned, in the standard method, we typically do around-the-clock dosing. So where did that come from? There is no good actual research out there as to where it came from for babies. In adult medicine, that is how people get weaned, but babies' brains are different and it wasn't clear whether this was needed, so they decided to try and not do it and just treat the baby as needed.

So, if a baby, for example, had a fussy day, they would give a dose of morphine, and then 4 hours later, they would look to see ... if the baby was quiet and consoled, they

didn't proceed. And of course, they were willing to change if they noticed that it wasn't working, but what they found was typically they needed one or 2 doses. That was it, and the rest of the time, they were able to get them to be consoled or to do their fundamental requirements without medication. The bottom line was the babies needed to feel loved, and they looked at the moms and/or caregivers for primary therapy and also utilized cuddlers when the families weren't available or not appropriate. There's different circumstances for different babies, and so sometimes that wasn't an option.

## [slide]

So, how did they do? So, again, you started here, so it took several years. It wasn't a quick process, and they made changes slowly. They had to get buy-in, not only from the hospital inpatient staff, but also from their NICU staff. And finally, by 2014, they were able to get everything that they wanted done according to the way they felt it should be. You could see that their length of stay dropped from 30 days to about 6 days, so it's a very significant drop by utilizing this method. They also reduced the length of treatment for babies that did need treatment. They also reduced, I think, by 60% to 70% the [number] of babies that actually required any type of opioid treatment. Since then, there have been several studies.

## [slide]

This is a meta-analysis looking at 10 different studies looking at the length of stay for Eat, Sleep, Console versus the Finnegan scoring, and you can see that all of the 10 are favoring the Eat, Sleep, Console method. This is an average of all of those, and it strongly favors the Eat, Sleep, Console method for reducing the length of stay.

# [slide]

This is the same meta-analysis looking at length of treatment. So if a baby required treatment, was it better for them to be with Eat, Sleep, Console or Finnegan? And the Eat, Sleep, Console favored them, and that makes sense because these are PRN (as needed) doses versus the Finnegan, which is around the clock, so obviously, that's going to make you have a longer length of stay.

## [slide]

This is an internal comparison that we have, Hushabye, which is in Arizona. This is our Medicaid population specifically, and I did the national numbers, and then Arizona, because Hushabye is in Arizona. They have epitomized this model, and they do a fantastic job and they have very similar results in reducing their length of stay. And not only do they reduce the length of stay, but in 2024, 80% of their babies went home with a family member and stayed out of the foster care system. So that's an amazing statistic. They do an incredible job, and they do follow these moms during pregnancy and beyond, so it is an intensive program, but they are getting amazing results.

## [slide]

So, let's take a look at Finnegan versus Eat, Sleep, Console. The Finnegan requires a NICU admission, typically ... noisy, high stimulation, mom is allowed to visit but doesn't typically stay with baby. We have a complex scoring tool. The primary treatment is focused on medications and weaning and such. The nurses primarily care for the infant, and we tend to see longer length of stay and increasing

medication usage. The Eat, Sleep, Console model typically is an inpatient admission where mom and baby can room together.

It's quieter and private. More suitable to what the baby needs. We have a simple functional assessment—Eat, Sleep, Console—that provides our guidance for our treatment. The primary treatment is mom and/or caregiver and nonpharmacologic interventions, and only after those have failed do we then go to medications if needed. And they would be PRN medications.

The staff coaches the family, but the mom and/or caregiver engage in 24/7 care. They're involved [and] they bond. We're watching them to make sure that their interactions are appropriate, and if we're concerned about mom, at that point you can also refer mom to help if she needs it. This has been shown to decrease the length of stay as well as length of treatment, and it's also been shown in studies to have increased satisfaction not only by the families, moms, but also by the nursing staff.

So, what I want to say is: it's a difficult model, for sure. It takes a lot of effort, but once you can institute it, it's so much better for the family and for the baby. So we should be encouraging this and educating this with our hospitals as much as possible and making sure that they're doing it correctly. One thing that I have noticed is that they're piecemealing. So, they're scoring with Eat, Sleep, Console, but then they start the medications, and they do round the clock. The model is meant to work with a specific way of functioning. We have to make sure that people are doing it the right way.

[slide] Thank you so much.