Melanie Cole, MS (Host): Welcome to the podcast series from the specialists at Penn Medicine. I'm Melanie Cole and joining me today is Dr. Rebecca Hamm. She's an Assistant Professor of Obstetrics and Gynecology at Penn Medicine, and she's here to highlight Standardization and Implementation Science at Penn Medicine. Dr. Hamm, thank you so much for joining us today.

Let's just get right into this. What is Implementation Science?

Rebecca Hamm, MD: So, Implementation Science is a relatively new field. It really recognizes the idea that there is a huge gap between all of the evidence that we produce in our sort of standard research pathways and actually getting those evidence-based practices to the patients who need them.

It brings together a ton of fields like psychology and business, as well as sort of our standard research methodologies to really understand how best to do that.

Host: Well, it certainly is a multifactorial science, as I understand it, and you said that Implementation Science lends tools to help reduce disparities and develop and scale effective innovations in healthcare. Explain some of those tools for us and how that they can really work to achieve these objectives.

Rebecca Hamm, MD: So I think when you think about the people who need interventions most, who need the evidence-based practices, who have the biggest problems with morbidity and mortality, especially as we think about them around maternal health, which is my specialty; these people are actually the hardest to reach in terms of getting evidence based practices.

And so it really takes the most thought around context. We think about differences in where people get care and how they get care, how they access care, and how, you know, evidence based practices might get to patients; those differences are often seen in regular research as a problem, right? Everything should be the same in your sort of gold standard randomized clinical trial.

But Implementation Science is different because it actually loves those differences and is really studying how to get a practice baked into care at a specific site for a specific population of patients who really need it most.

And so Implementation Science in that way, actually has the potential to overcome some of our worst disparities that we see, again, especially in maternal health outcomes, by trying to reach the patients who need the interventions most.

Host: This is such an important topic Dr. Hamm and one of the studies you took part in sought to define implementation research priorities to address the maternal health crisis in the United States, which you were just discussing. And the study surveyed researchers about implementation research areas in maternal health, including practices to prioritize and those to de implement. Among the practices to de implement in maternal care were cesarean delivery for low risk patients, and routine discontinuation of all psychiatric medications during pregnancy. Why did researchers feel these practices should be removed or reduced? Explain that to us.

Rebecca Hamm, MD: Let's start with psychiatric medications, these are so important to our patient's mental health. This is really a huge problem. And mental health is paramount. We know that women with mental health disorders going into pregnancy have significant risks of exacerbations, both during their pregnancy and especially after delivery. And yet, many medications that patients are on are being discontinued by providers, both before patients become pregnant and in the early parts of pregnancy, without the consideration for the risks associated with that. And so that practice is something else that really needs focus in terms of researchers putting time and effort into figuring out why this is happening across the US and how we can prevent it from happening.

Cesarean delivery is overused in the United States. We know that about a third of all deliveries in the U.S. are by Cesarean, and some data shows that about somewhere between 15 and 40 percent of those Cesarean deliveries may be unnecessary.

In addition, there are significant disparities, racial and ethnic disparities, in who undergoes Cesarean delivery in the US. We also know that Cesarean delivery is ~~such~~ a driver of maternal morbidity and mortality. A Cesarean delivery in comparison to a vaginal delivery is associated with increased risks of things like obstetric hemorrhage, infection after delivery, need to go to the ICU, and then subsequent complications like how the placenta implants, placenta previa, placenta accreta, and even need for the removal of the uterus in future deliveries like a hysterectomy. Now that's not to say that Cesarean delivery isn't necessary sometimes and a life saving procedure, but it also is associated with birth trauma. It is a large abdominal surgery. So if we can prevent that unnecessary first Cesarean, this can have a really critical impact on both physical and mental health for our patients. And so that's one of the practices that I think there's the biggest stress in terms of trying to reduce across the United States.

On the other side of the Cesarean conundrum is labor induction, about which you and your colleagues have written several times.

One of those reports sought to identify which of the individual components of an evidence based labor induction protocol are most associated with reduced rates of Cesarean delivery, what you were discussing, maternal morbidity, and neonatal morbidity. This sounds complicated, but the conclusion of the study seems intuitive and simple. Talk about this report just a little bit.

Rebecca Hamm, MD: So we were talking about Cesarean delivery and how common that is in the United States. But many Cesarean deliveries occur after labor induction. So about 30 percent of all deliveries at this point, in the U.S. are by labor induction. And those rates of labor induction, starting labor off artificially, are only increasing. There's sicker patients in the United States with higher BMI and higher rates of high blood pressure and diabetes that leads them to need medically indicated inductions.

And there's also higher rates of elective inductions after recent studies that demonstrated, reduced Cesarean delivery rates after induction. And so induction itself, importantly, does not increase the risk of Cesarean delivery, but patients who need an induction, for whatever reason, are at increased risk of Cesarean delivery.

When thinking about labor induction, there is huge variation in how induction is practiced across the United States by site, by provider, by geography. This variation in care has to do with the different steps of a labor induction. Everything from how often a patient's cervix might be checked in the early parts of labor or in active labor, to when people decide to break their water during labor, when to start certain medications like oxytocin, or when to act when people aren't making change in their cervix to try and intervene to move labor ahead.

Those are different no matter where you go or who's taking care of a patient. And we all know that variation in care is really subject to bias, right? And that bias can be associated with patient's race and ethnicity that could be subject to systemic racism as well as individual bias. So if we can get people to use evidence-based, active management of labor induction and standardize the way we're doing those steps, we might actually be able to decrease the morbidity associated with induction, which can be overall rates of Cesarean delivery or long labors or infection that happens after induction. But it also can be reducing the disparities in those outcomes because we think that variation is probably most affecting our patients of color who are undergoing labor induction.

That's what we were working on, is really trying to understand if an evidence based protocol can reduce those outcomes overall, as well as disparities in those

outcomes, and to understand which components were most critical to making that happen. In addition, we're doing work both with interviewing clinicians, as well as with patients, to try to understand the acceptability of these different components, how we can get people to change their practice towards these evidence based management strategies, which isn't without challenges.

There's tons of challenges in terms of trying to get people to change their practice, right? As well as to get patients on board with all of the things that we think are evidence based to help prevent them from having poor outcomes. So that's a summary of a lot of different pieces of work that we're doing to try to standardize care in this space.

Host: Such a complex topic with so many avenues of need and you're hitting some of the most important ones. Where would we find Implementation Science being practiced at Penn Medicine? And please offer providers that are interested in this topic, your best advice, what you would like them to know, and the key takeaways from this very important episode were.

Rebecca Hamm, MD: Thank you so much. There are so many places where Implementation Science is being practiced across Penn Medicine. First, we have our own Penn Implementation Science Center called PISC, that's led by one of my partners in research, Meghan Lane-Fall. There is a ton of learning opportunities, workshops, seminars, training programs through PISC that you can get involved in.

In addition, we now, as of, fall of last year, have a center specifically related to Implementation Science in maternal health equity work. It's called AMETHIST, which stands for Achieving Maternal Health Equity Through Implementation Science and Training. It is a program that really has a ton of training opportunities for those who are interested and excited about Implementation Science work.

It's focused in the area of maternal health equity where I work. There are tons of research studies that are incorporating Implementation Science concepts, and what I would tell people out in Penn Medicine who are interested in the ideas we've talked about today is that Implementation Science can be incorporated into work that you're doing at any stage of research. This does not need to wait until you already have a ton of data to show that a thing is evidence based. Once you're studying the thing initially, you're doing any sort of study on a new medication, a new innovation, a new process, you should be looking at Implementation Science concepts early on.

Because no matter what, you're going to need to get it out into care. You're going to need to get it to patients who need it. And so looking at some of these things like patient acceptability, clinician acceptability, adoption of the practice, sustainability, cost and scale up; my recommendation is always that these concepts can be incorporated into any research project, any quality improvement project even, and that there are tons of places to get some of the education around doing that.

Penn also runs an Implementation Science Institute each June. It's a week long program where you can learn these concepts, the basics of these concepts, in depth; as well as get mentorship from the leaders in this field, so that you can best incorporate these concepts into your work. There's also an Implementation Science certificate program here through Penn, where you can get more in depth study of Implementation Science, if that's something that interests you.

Host: What a fascinating topic and a great discussion. Dr. Hamm, thank you so much for joining us today and sharing your incredible expertise on this topic with us today. To refer your patient to Dr. Hamm at Penn Medicine, please call our 24/7 provider only line at 877-937-PENN, or you can submit your referral via our secure online referral line form by visiting our website at pennmedicine.org/referyourpatient. That concludes this episode from the specialists at Penn Medicine. I'm Melanie Cole. Thanks so much for joining us today.