

Erin Welsh

We want to start with a disclaimer that throughout this series we feature explanations and stories that include some heavy material, including early pregnancy loss, stillbirth, and other traumatic experiences of pregnancy, childbirth, and the postpartum period.

Anonymous

It was the morning of my son's 4th birthday party and I was feeling just not like myself. I was really tired which is pretty abnormal for me, especially in the morning time and my breasts were pretty tender and I was feeling a little nauseous. So I started doing the math in my head, just thinking about when I could have possibly become pregnant, if that is the case, and I started doing the math. And my husband's a pilot, so I know exactly when he's home and the days that we've had sex. And that's when I was like wow, I could be pregnant right now. And it was only 4 weeks so I was due to get my menstrual cycle that week, so it's very early. So I asked him to go to the store because we needed to get ice for the birthday party and pick up the cake. So I said hey, while you're there, can you go get a pregnancy test? And he was like okay, if that's what you need, then that's what you need.

So I remember he came home, he was putting the drinks in the cooler, and I went into the spare bathroom and I took the pregnancy test and it came up right away that I was pregnant. And in that moment I had just this realization of wow, I'm having another baby. And I went outside and I told my husband that I was pregnant and we were so excited. And we're like wow, we're really doing this. And it was really neat because this whole party that we had there, we probably had about 30 people with kids and parents, and we were the only two people that knew in that moment that I was pregnant. And it felt really special. But then after the party was pretty died down, us and a couple other family friends, we're all sitting by a fire that we had in our backyard, a little campfire. And there was a baby there. And my son had a really good friend and his mom had just had his baby sister. She was about 2 weeks old.

And so I'm looking at this baby that's sitting in front of me and I started doing the math in my head again, just counting the months. If I'm pregnant and this pregnancy is viable and we end up having this baby, this baby will be born in August before school starts and that means that this baby is going to be in the same grade as that baby that's sitting right in front of me. This baby that I just have found out I'm pregnant with is going to grow up with that little girl that's sitting in front of me. And that blew my mind that I was gonna grow a whole human in the school year. And so fast forward 7 years later and these two children are now in the same grade, sometimes they're in the same class, and they are growing up together. And it's just something that's fun to think back on.

Henny

My name is Henny, I'm 34 from New Zealand, and 5 years ago I woke up with pain in my right lower belly and vomiting. I took a pregnancy test and it was positive. What followed was the scariest two days of my life, during which they found an ectopic pregnancy on ultrasound. By the end of 2 days, I had pain in my right shoulder tip but no abdominal pain. As an emergency nurse I know that shoulder tip pain can be a type of referred pain indicating diaphragmatic irritation from blood in the peritoneal cavity. The OBGYN on call decided that my lack of abdominal pain meant that I could go home and wait for surgery. All I could think of was a case I had treated a few months prior in my emergency department. She had a ruptured ectopic pregnancy and we'd poured blood into her, rushed her to surgery, and she nearly died. That case and my knowledge about the importance of shoulder tip pain led me to advocate for myself strongly. I put my foot down and refused to leave.

An hour later I was in surgery and an hour after that they called my partner to say my left fallopian tube was completely blocked and there was blood in my belly. If I had gone home, there is a very real chance it would have burst completely and I could have died. Being an emergency nurse and an advocate for myself saved my life. Losing a fallopian tube was really hard mentally until I learned the biggest health lesson I ever have. I can't believe I got through so many anatomy classes without knowing this but your fallopian tubes aren't fixed, although that's how the textbooks show them. They can reach out and move and grab eggs. 6 months post-ectopic and I got pregnant again and all of the anxiety came back.

But I was very lucky. 9 months later we welcomed our beautiful son and another year and a half later our second son. My other two pregnancies and births had their own challenges but I'll never forget my first. Wondering what could have been for that pregnancy; what could have happened if I wasn't my best advocate. And I think about my experience every time I go to work in my own emergency department and treat potential ectopics. It made me a better nurse, a better patient advocate. I'm so grateful for my two boys who managed to find their way to my uterus instead of my one remaining tube.

TPWKY

(This Podcast Will Kill You intro theme)

Erin Welsh

Thank you all so, so very much for sharing your story with us and a huge thank you to everyone who has written in with their experiences, we read each and every single one of them, hundreds of submissions.

Erin Allmann Updyke

Yeah. So many.

Erin Welsh

And we're so grateful and honored that you felt like you could share those experiences with us and we tried to include as many of your stories as possible. And you'll hear more of these firsthand accounts throughout this episode and the rest of our episodes.

Erin Allmann Updyke

Yeah, it was honestly such a privilege-

Erin Welsh

Truly.

Erin Allmann Updyke

To be able to read every one of your stories and hear so many of your stories. And as many as we included, there were so many more that we were not able to. So we thank you again from the bottom of our hearts for sharing your stories with us.

Erin Welsh

Yeah, thank you, thank you. Hi, I'm Erin Welsh.

Erin Allmann Updyke

And I'm Erin Allmann Updyke.

Erin Welsh

And this is This Podcast Will Kill You.

Erin Allmann Updyke

And we're coming to you today with the first of four episodes all about pregnancy.

Erin Welsh

Yeah. Four, just four.

Erin Allmann Updyke

Just four. It should have been more.

Erin Welsh

I know, really.

Erin Allmann Updyke

And we're also coming to you from the Exactly Right studios for the first time which is nerve-wracking and exciting.

Erin Welsh

I know but this space is so cool.

Erin Allmann Updyke

It's gorgeous.

Erin Welsh

We got to decorate little bookshelves. I feel very fancy right now.

Erin Allmann Updyke

I feel very fancy. Too fancy for our real lives.

Erin Welsh

I mean for sure. Very, very different than my tiny little office.

Erin Allmann Updyke

I know. Or my closet, literally. So we're super excited to be here.

Erin Welsh

Yes we are.

Erin Allmann Updyke

We're really, really excited about this series.

Erin Welsh

Yes for sure. And before we get into this episode, we want to share a few words about what these four episodes will cover, the language that we'll be using, and our goals really with creating the series.

Erin Allmann Updyke

Yeah.

Erin Welsh

And so we decided early on to dedicate four episodes to cover pregnancy, just four.

Erin Allmann Updyke

Just four.

Erin Welsh

One for each trimester. And at the outset, I mean we knew that we wouldn't be able to adequately cover every single aspect of pregnancy and childbirth and the postpartum period in just four episodes.

Erin Allmann Updyke

Right.

Erin Welsh

And throughout our research we did begin jotting down a list of future topics to cover things like preeclampsia and breastfeeding and rhesus factor. And so there will be more episodes-

Erin Allmann Updyke

There will be.

Erin Welsh

On these and more topics in the future.

Erin Allmann Updyke

Exactly. So this series might not, and it likely will not, answer all of your questions about pregnancy or cover every experience that a person might have. Pregnancy is a very individual experience, as highlighted in so many of our firsthand accounts. But what we aim to do with this series is take you through the really broad changes that happen in our human bodies during pregnancy and childbirth and postpartum and also explore some of the historical and evolutionary aspects, I'm really excited about that, Erin, of pregnancy and childbirth. So each episode very roughly corresponds to each trimester. So in this episode, the first one, we're going to be talking about how you even know whether or not you're pregnant.

Erin Welsh

Yeah.

Erin Allmann Updyke

How do you know?

Erin Welsh

How do you know?

Erin Allmann Updyke

And what's happening in very, very early embryonic development.

Erin Welsh

And then our second episode centers on the amazing organ that is the placenta.

Erin Allmann Updyke

It's really cool.

Erin Welsh

I think we'll all leave with a little more appreciation for the placenta.

Erin Allmann Updyke

I hope so.

Erin Welsh

I hope so. That's my goal. And some of the physiological changes that a person experiences throughout pregnancy, including some of the complications that can arise.

Erin Allmann Updyke

Right. And then our third episode is going to focus on childbirth itself. So labor and different modes of delivery and then the history of the cesarean section.

Erin Welsh

Yeah, yeah.

Erin Allmann Updyke

Yeah.

Erin Welsh

Yeah. And then finally our fourth episode and our season finale, our season 7 season finale.

Erin Allmann Updyke

That's crazy.

Erin Welsh

I know.

Erin Allmann Updyke

It's exciting.

Erin Welsh

It is really exciting.

Erin Allmann Updyke

Yeah.

Erin Welsh

But the last episode in the series will be about this concept of the 4th trimester, like maybe you've heard of it, maybe you haven't. What is it? We'll get into all of that. And explore the changes that happen in your body after pregnancy. And we'll also be talking like big picture history about the medicalization of pregnancy and childbirth, including the transition from home to hospital.

Erin Allmann Updyke

Yeah. We intend for all of these episodes to be inclusive of all families and we recognize that not everyone who experiences pregnancy actually identifies as a woman. So we try as much as we can, wherever we can, to use gender neutral language like 'pregnant person' and that's what you'll mostly hear through this episode. However at the same time we know that much of what we discuss when it comes to medical bias during pregnancy and childbirth, both historically and today, is in fact the result of gender discrimination as well as racism. And so in those contexts we may also use the term 'woman' or 'women'. And throughout these episodes we'll be using the term 'mother' or 'maternal' and 'paternal' as these are terms that are used in the scientific and medical literature.

Erin Welsh

Yeah. And we also want to acknowledge that there is no such thing as a normal pregnancy.

Erin Allmann Updyke

Yeah.

Erin Welsh

Like there just isn't.

Erin Allmann Updyke

There's not one.

Erin Welsh

But we do want to provide a baseline of the expected physiological and anatomical changes that occur during pregnancy as it helps us to understand where these complications arise from and what is a complication.

Erin Allmann Updyke

Right, right.

Erin Welsh

Yeah.

Erin Allmann Updyke

So we will get into all of that starting with the first trimester. But first-

Erin Welsh

But first.

Erin Allmann Updyke

It's quarantini time.

Erin Welsh

It is. Erin, what are we drinking this and the next 4 weeks?

Erin Allmann Updyke

We are drinking Great Expectations.

Erin Welsh

I love this name.

Erin Allmann Updyke

It's a really good name.

Erin Welsh

It's a good name.

Erin Allmann Updyke

Apt, we think.

Erin Welsh

And we're also making this, this is a placeborita.

Erin Allmann Updyke

It's a placeborita.

Erin Welsh

For reasons that probably are clear to people listening.

Erin Allmann Updyke I would think.

Erin Welsh Yep.

Erin Allmann Updyke It's non-alcoholic.

Erin Welsh It's non-alcoholic.

Erin Allmann Updyke Is what that means.

Erin Welsh Yep, it is. And Erin, what is in Great Expectations?

Erin Allmann Updyke It's a really delicious combination of blackberry, ginger ale, lemon, and mint.

Erin Welsh And?

Erin Allmann Updyke And if you check out the Exactly Right YouTube channel, you will find a video of us making that drink as well as a super secret surprise quarantini coming to us from no one other than Georgia Hardstark herself.

Erin Welsh That was the secret.

Erin Allmann Updyke Oh sorry.

Erin Welsh No I'm kidding, it's perfect.

Erin Allmann Updyke Well go check it out, it's gonna be great.

Erin Welsh It's gonna be great. Gosh, I'm so excited.

Erin Allmann Updyke Me too.

Erin Welsh It's like beyond thrilling.

Erin Allmann Updyke I know.

Erin Welsh It really is.

Erin Allmann Updyke I'm very excited about it.

Erin Welsh And so yeah, to get the recipes for our quarantini and placeborita for this episode and all of our episodes actually, make sure you're following us on social media and you can also find those on our website [thispodcastwillkillyou.com](http://thispodcastwillkillyou.com).

Erin Allmann Updyke You can, you can.

Erin Welsh Over to you, Erin, to tell me what's on the website.

Erin Allmann Updyke Thank you so much.

Erin Welsh: I'm so glad I don't have to do this one.

Erin Allmann Updyke: Let me tell you what's on our website. We have so much information there, Erin. We have merch. We have... Oh, I lost it already.

Erin Welsh: Transcripts.

Erin Allmann Updyke: We have transcripts. We've got Goodreads list. We've got a link to Bloodmobile. We've got all of the sources from all of our episodes.

Erin Welsh: Contact us form.

Erin Allmann Updyke: Contact us form, a firsthand account form.

Erin Welsh: Firsthand account form.

Erin Allmann Updyke: We've got a lot, Erin.

Erin Welsh: We've got a lot.

Erin Allmann Updyke: Check it out.

Erin Welsh: There's so much.

Erin Allmann Updyke: There's so much. One last piece of business?

Erin Welsh: Yes, one last piece of business. Okay, so I am super excited to announce that I have started a new hosting role at another podcast.

Erin Allmann Updyke: We're really excited for her. She's not leaving.

Erin Welsh: I'm not leaving. No. So this podcast is called Advances in Care and in it I interview physicians and physician scientists at New York Presbyterian Hospital about their incredible cutting edge research and groundbreaking medical innovations.

Erin Allmann Updyke: Yeah.

Erin Welsh: It's really thrilling.

Erin Allmann Updyke: It's very exciting stuff.

Erin Welsh: I mean it actually is and it's really fun to actually get to read about like oh, this is someone who's working on this right now.

Erin Allmann Updyke: Right. Like in real life, in real time.

Erin Welsh: Yes. These are the studies.

Erin Allmann Updyke Things that are actually making a difference in people's lives.

Erin Welsh Yeah, yeah.

Erin Allmann Updyke It's really cool.

Erin Welsh It's been such a fun project to work on. And if you want to learn more about the research that's truly shaping the future of medicine, this podcast is for you. Again, it's called Advances in Care and you can get it wherever you get your podcasts.

Erin Allmann Updyke Yeah. Check it out.

Erin Welsh Yeah, check it out.

Erin Allmann Updyke I don't have any business.

Erin Welsh I think that's it.

Erin Allmann Updyke Yeah, shall we?

Erin Welsh I think we shall.

Erin Allmann Updyke Okay.

Erin Welsh Oh my gosh.

Erin Allmann Updyke We'll take a break and then get into the history of pregnancy.

Erin Welsh Sure, something like that.

TPWKY (transition theme)

Anonymous Entered my second trimester of my pregnancy, I started having really intense pain in my abdomen and in my legs and in my hips. And it kind of rendered me almost completely unable to take part in any kind of physical activity or exercise and even walking became increasingly uncomfortable. And I really started to notice as I got bigger that my baby was really crowded to one side of my belly and I seemed to be protruding far further forward than any other woman that I saw that was at the same stage as me. And when I brought those concerns to my OB, it was kind of laughed off. Isn't that so funny when a baby prefers one side over the other? And no further exams or tests were ordered to kind of check out what was going on. So I managed through the rest of that increasingly uncomfortable pregnancy.

And then I went into labor three weeks prior to my due date. It was a very fast, very intense labor. I started having contractions at about 9 pm. I was at the hospital at 1:30 in the morning. And then in my first cervical exams, the doctors found that I was only 2 or 3 centimeters dilated and they really treated me as such, kind of put me on the last of the list for an epidural request because I was a woman who was clearly not close to being ready to push. And so I was in this very extremely painful and uncomfortable state for an hour and a half while I waited for an epidural. Once they got that epidural in, they were able to perform a more thorough exam as I was more relaxed and they found that I had a blockage in front of my cervix. And behind that blockage I was fully effaced, fully dilated, and actively pushing to get this baby out.



So I was rushed in for an emergency C-section and my daughter came out just fine, distressed but fine. And they held up my uterus and found that I had what's called a bicornuate uterus, which is when the membrane that is formed when your uterus is being formed doesn't disintegrate and basically leads to you having two halves of a uterus. And so I was growing a baby in a half of a uterus and then trying to give birth through a cervix that was blocked by another cervix. And so while I've healed from that experience, I'm also left wondering why wasn't that found and discovered not only during pregnancy but also prior to pregnancy. And what kind of implications does it mean for a future pregnancy? Thank you so much for allowing me to tell my story.

Stevie

Hi, my name is Stevie, my pronouns are they/them, and I live in Ontario, Canada. In 2012 my husband and I were extremely excited to be expecting our first child. At 10 weeks we had started seeing an OB. I'd been spotting off and on but he kept saying that everything was fine and while bleeding isn't normal, it is common and don't worry. He said the same thing at every appointment. It's not normal but it's common, don't worry, everything's fine. At 18 weeks he sent me to a specialist. I wasn't expecting it to be a big deal, after all everything was fine, right? I was wrong. I was blown away by the list of issues and complications being laid in front of me. The only thing I really remember is that I was at a high risk for preterm labor. About a week later at work, I stood up to get something and felt a gush. I reached down and my fingers came up red. I was hemorrhaging. I had a friend drive me to the ER. My husband met me there and we waited.

I was told that if I was miscarrying, I'd have to stay down in the ER, I was too early to go up to labor and delivery. The ultrasound showed a good heartbeat though and bleeding slowed down, so I was sent home on bed rest. Around 1:00 am on November 11th, I woke up and vomited. I had an intense cramping in my stomach and my back. I told my husband something was wrong. We went back to the ER. The OB said I was in labor and it can be triggered by dehydration, so I was given an IV and it stopped. I was moved to a room and told I was staying there until I delivered, whenever that was. But at under 24 weeks there was really no hope for the baby. On November 14th, at 21 weeks and 4 days, I went into labor. This time it didn't stop. Our daughter was delivered at 1:26 in the afternoon. She weighed exactly 1 pound. Our families were there and we sang her happy birthday. She lived for 3 hours. During that short time, she knew nothing but love. We all held her and sang to her. She took her last breath with me.

That night, my husband and I went to sleep in the postpartum ward to the sound of other people's babies crying. The specialist never found a reason for our loss. She said it was probably a placental abruption but she really wasn't sure. We went on to have two more pregnancies and we have another daughter and a son. We have pictures of our firstborn and she's very much part of our lives. Our other kids say they see her when they see the first stars come out at night. As I always say, she's our perfect girl made of stars. I share our story as often as I can. Pregnancy and infant loss affects 1 in 4 pregnancies and is not discussed enough. I felt so alone after our loss. Every year on her birthday, I share our story and new people will share their own stories with me. I hope that sharing my story here will help people to feel less alone. Our loss should not be hidden. We shouldn't have to grieve in silence.

TPWKY

(transition theme)

Erin Welsh

If you search for a list of the top medical advancements in history, you might find on that list things like antibiotics, vaccines, gene editing, medical imaging, kidney dialysis, organ transplantation, the manufacture of insulin, and anesthesia for a start.

Erin Allmann Updyke

It's a long list.

Erin Welsh: It's a long list.

Erin Allmann Updyke: Yeah.

Erin Welsh: I couldn't stop once I started.

Erin Allmann Updyke: Yeah.

Erin Welsh: But I would be shocked if you found home pregnancy tests on one of those lists.

Erin Allmann Updyke: No, I don't think, I wouldn't have guessed it.

Erin Welsh: You wouldn't have expected it. Yeah. And I know this because I've often skimmed these kinds of lists looking for inspiration for future episode topics.

Erin Allmann Updyke: A lot of those are on our list.

Erin Welsh: True, yeah. Kidney dialysis, we need to do that one.

Erin Allmann Updyke: I know.

Erin Welsh: I know. And so many-

Erin Allmann Updyke: Anesthesia too.

Erin Welsh: Anesthesia, I know, I know. But I've never seen home pregnancy tests mentioned.

Erin Allmann Updyke: I don't think so.

Erin Welsh: And to a degree, I get it, right. Like these tests didn't provide new avenues for treatment, nor did they represent a paradigm shift in how we understood the workings of the human body.

Erin Allmann Updyke: Okay.

Erin Welsh: But I would argue that these sticks and the plastic rectangular boxes that preceded them absolutely deserve a place on any list of significant medical breakthroughs.

Erin Allmann Updyke: I'm already just so invested in this, Erin.

Erin Welsh: I mean are you convinced?

Erin Allmann Updyke: Yeah.

Erin Welsh: So I can stop.

Erin Allmann Updyke: Yeah. Done.

Erin Welsh: Okay, done. They're on the list.

Erin Allmann Updyke

Okay.

Erin Welsh

But the reason I feel so strongly about this is because of the type of knowledge that they grant us. Not guiding principles, not laws of nature, home pregnancy tests give us deeply personal knowledge about our own bodies, empowering us to do with that knowledge what we decide we want or need to do. Share it, keep it to yourself. For the first time that choice was up to the test taker, they were the first to know. Not the lab technician running the test, not the frog being tested. More on that.

Erin Allmann Updyke

Can't wait for it.

Erin Welsh

Not the doctor who deigned to prescribe a test.

Erin Allmann Updyke

Oh.

Erin Welsh

Yeah, prescription only.

Erin Allmann Updyke

Okay.

Erin Welsh

The transfer of this knowledge out of the hands of the medical provider and into the hands of the test taker held profound implications for women's reproductive rights. Of course probably no one needs to be reminded that what you decide to do in terms of continuing with the pregnancy or not is not always up to the pregnant person alone.

Erin Allmann Updyke

Yep, especially not in the United States right now.

Erin Welsh

Nope. But the story that I want to tell today is about the quest for this knowledge, like what ultimately led us to the near universally recognizable stick-

Erin Allmann Updyke

Yeah.

Erin Welsh

That shows one or two blue lines and where we might go from here.

Erin Allmann Updyke

I'm so excited, Erin.

Erin Welsh

Me too. Okay. For thousands of years people have searched for a way of knowing whether someone was pregnant or not.

Erin Allmann Updyke

Okay.

Erin Welsh

Outside of the bodily signs like morning sickness, missed periods, tender breasts, and quickening, the fetus's first movements, which was considered really one of the most significant signs-

Erin Allmann Updyke

Right.

Erin Welsh

In terms of like that is when a pregnancy became real.

Erin Allmann Updyke

Right.

Erin Welsh: Was quickening.

Erin Allmann Updyke: Yeah.

Erin Welsh: And I won't speculate on why there was a need or want to know whether it came from within, someone wanting help understanding what their body was trying to tell them, or whether it came from without, like someone wanting to know whether their partner, their friend, their daughter was telling the truth. And I'm sure there were many reasons for a test.

Erin Allmann Updyke: Right.

Erin Welsh: Right? That you would want to test.

Erin Allmann Updyke: Yeah.

Erin Welsh: The first pregnancy test comes to us all the way from an Ancient Egyptian papyrus.

Erin Allmann Updyke: Stop it.

Erin Welsh: I know.

Erin Allmann Updyke: How can you pull Ancient Egypt out when we're talking about pregnancy tests?

Erin Welsh: I thought okay, what are my usual go-tos?

Erin Allmann Updyke: Right.

Erin Welsh: Ancient Egypt, Hippocrates, germ theory.

Erin Allmann Updyke: Yeah.

Erin Welsh: Like things I feel like I have to mention. The humors. I think the humors is the only one I don't mention in any of these episodes.

Erin Allmann Updyke: Okay, shocking.

Erin Welsh: I know. But yeah, Ancient Egypt pregnancy test.

Erin Allmann Updyke: Stop it.

Erin Welsh: 1350 BCE. There was a papyrus or something that instructed women to pee in two bags. One bag contained wheat, one bag contained barley.

Erin Allmann Updyke: Okay.

Erin Welsh: If the wheat grew, it meant a female child. If the barley grew, it meant a male child.

Erin Allmann Updyke: Why does this feel vaguely familiar?

Erin Welsh: I think we might have talked about it in our IVF episode part one.

Erin Allmann Updyke: Oh okay.

Erin Welsh: Yeah.

Erin Allmann Updyke: Okay.

Erin Welsh: Yeah.

Erin Allmann Updyke: Weird.

Erin Welsh: But I don't remember if I dug any deeper because I did this time.

Erin Allmann Updyke: Okay.

Erin Welsh: And it turns out that some researchers tested this like a few decades ago.

Erin Allmann Updyke: Don't tell me. No way.

Erin Welsh: And yeah, it's not great but it's not entirely incorrect.

Erin Allmann Updyke: Is it more than 50%?

Erin Welsh: Yeah.

Erin Allmann Updyke: What?

Erin Welsh: 70%.

Erin Allmann Updyke: Really?

Erin Welsh: I know. There's no association with the sex of the fetus.

Erin Allmann Updyke: Just like whether or not you are pregnant.

Erin Welsh: Yeah. So it's like growth hormones in urine.

Erin Allmann Updyke: Oh my god that's so weird. Your pee.

Erin Welsh: In your pee.

Erin Allmann Updyke: It's interesting that even the first test was pee.

Erin Welsh: Pee has always been a main feature.

Erin Allmann Updyke: Really?

Erin Welsh: I think it's really, it's fascinating.

Erin Allmann Updyke: Okay.

Erin Welsh: Yeah. And I don't know where that, like how people made that connection.

Erin Allmann Updyke: Right.

Erin Welsh: And so for instance in medieval England, there was a profession called a piss prophet.

Erin Allmann Updyke: Really?

Erin Welsh: A piss prophet.

Erin Allmann Updyke: A piss prophet.

Erin Welsh: Can you imagine being like on your business card-

Erin Allmann Updyke: What's your job?

Erin Welsh: Yeah.

Erin Allmann Updyke: Piss prophet.

Erin Welsh: Official assistant piss prophet. Assistant to the piss prophet. Yeah, apprentice piss prophet. I can't.

Erin Allmann Updyke: Oh my god, that's great.

Erin Welsh: So yeah, yeah.

Erin Allmann Updyke: Okay. And what did a piss prophet do?

Erin Welsh: I mean basically what it sounds like.

Erin Allmann Updyke: Okay.

Erin Welsh: Right, like you be able to hold up the the urine in a glass-

Erin Allmann Updyke: Okay.

Erin Welsh: And be like oh, this person has this disease, that disease.

Erin Allmann Updyke: Okay. It was more than just pregnancy at this point?

Erin Welsh: Yeah, yeah, yeah. It was like anything.

Erin Allmann Updyke: It was lots of things? Okay.

Erin Welsh: Horoscope even probably.

Erin Allmann Updyke: A lot of things you can see in your pee, so I get it.

Erin Welsh: Exactly. So there is some basis to this.

Erin Allmann Updyke: Yeah. For sure.

Erin Welsh: So some piss prophets claimed that, I know I keep saying it, claimed that deposits of white flaky material in urine that had been left standing for a couple of days could indicate pregnancy.

Erin Allmann Updyke: Okay.

Erin Welsh: So the deposit may have been casein.

Erin Allmann Updyke: Okay.

Erin Welsh: Is that how you say it?

Erin Allmann Updyke: I mean casein is a thing.

Erin Welsh: Casein, yeah.

Erin Allmann Updyke: Like a protein thing.

Erin Welsh: Yeah, which is part of breast milk produced during pregnancy.

Erin Allmann Updyke: Oh yeah, okay.

Erin Welsh: Yeah. Urine did briefly fall out of favor in the 18th and 19th centuries for pregnancy testing.

Erin Allmann Updyke: Okay.

Erin Welsh: And instead physicians performed physical exams to determine whether or not someone was pregnant. Although I know-

Erin Allmann Updyke: That doesn't sound great.

Erin Welsh: Doesn't sound great. And the doctors were like, as is typical, so afraid of modesty. And so it would just be like kind of just like closing their eyes and like searching.

Erin Allmann Updyke: Eyes closed.

Erin Welsh: Yeah, it's not great to think about.

Erin Allmann Updyke: Okay.

Erin Welsh

But these signs often included things like changes in the color of the cervix, vagina, labia, softening of the cervix, changes in breasts or nipples, changes in the abdomen, things that typically happened after at least two missed periods.

Erin Allmann Updyke

Okay.

Erin Welsh

But these were by no means telltale signs of pregnancy and doctors usually advised to just give it time. Give it time, wait for the quickening, then you'll know.

Erin Allmann Updyke

Right.

Erin Welsh

And in fact until the 20th century rolled around, because there was no single 100% reliable way of determining pregnancy from an outside perspective which is mind blowing to think about-

Erin Allmann Updyke

Yeah.

Erin Welsh

Doctors usually took their patient's word for it. Yeah.

Erin Allmann Updyke

Okay.

Erin Welsh

Because-

Erin Allmann Updyke

They believed them.

Erin Welsh

They believed them.

Erin Allmann Updyke

Wow.

Erin Welsh

Then once the lab-based pregnancy test came about, that word slowly held less and less weight in the eyes of medicine. And these tests, these lab-based tests also made it easier to prosecute someone for abortion because you had proof of early pregnancy even if you couldn't distinguish between abortion and pregnancy loss.

Erin Allmann Updyke

Oh wow, that's interesting.

Erin Welsh

Yeah.

Erin Allmann Updyke

And horrible.

Erin Welsh

And horrible. Okay, so how did these tests come about? Science has never followed a straight line of progress and lab pregnancy tests are no exception.

Erin Allmann Updyke

Okay.

Erin Welsh

But to keep things streamlined for today, I'm sticking to the major steps along the journey. And if you want that extra nuance, check out the books 'A Woman's Right to Know' by Jesse Olszynko-Gryn and 'Pregnancy Test' by Karen Weingarten. In the first couple of decades of the 20th century, the field of endocrinology, which is the study of hormones, took off in full force. Researchers investigated how adrenaline worked, what insulin did, which hormones fluctuated during pregnancy, and other endocrinology related questions. There were a million of them.



Erin Allmann Updyke

Yeah.

Erin Welsh

Finding the answers to some of these questions like which hormone is excreted in urine in people who are pregnant before they even realize they are pregnant, led them to even more questions like what would happen if we injected some of this urine into immature female mice?

Erin Allmann Updyke

That's a normal question.

Erin Welsh

It's a normal question. And that pretty much sums up how the first lab pregnancy test came to be.

Erin Allmann Updyke

Oh really?

Erin Welsh

Really. In 1927, two researchers, Aschheim and Zondek, who gave their names to this test, developed a protocol where they would take urine from a possibly pregnant person-

Erin Allmann Updyke

Okay.

Erin Welsh

Inject it into five immature female mice twice a day for three days-

Erin Allmann Updyke

Whoa.

Erin Welsh

Kill the mice and then take a peek at their ovaries.

Erin Allmann Updyke

Sorry, okay.

Erin Welsh

Yeah.

Erin Allmann Updyke

Is this... Okay, I have so many questions.

Erin Welsh

I know.

Erin Allmann Updyke

Are they having to pee multiple days for this twice a day, three times a day? Or like one sample...

Erin Welsh

It's a good question.

Erin Allmann Updyke

Okay. Too detailed.

Erin Welsh

My guess is it was just one sample.

Erin Allmann Updyke

Okay. So this is taking many days before you're-

Erin Welsh

It's taking many days. Yeah.

Erin Allmann Updyke

Okay.

Erin Welsh: And like five mice, is that how many I said?

Erin Allmann Updyke: Five mice, yeah.

Erin Welsh: Yeah.

Erin Allmann Updyke: Okay.

Erin Welsh: It's a process.

Erin Allmann Updyke: Yeah.

Erin Welsh: And then once they cut the mice open to look at their ovaries, if those ovaries were enlarged and congested, it meant that the person was pregnant.

Erin Allmann Updyke: That I mean makes sense physiologically.

Erin Welsh: Yeah.

Erin Allmann Updyke: But okay, very interesting.

Erin Welsh: Yeah.

Erin Allmann Updyke: Yeah.

Erin Welsh: So and what these animals were responding to was a hormone in the urine called-

Erin Allmann Updyke: HCG.

Erin Welsh: HCG, human chorionic gonadotropin.

Erin Allmann Updyke: Human chorionic gonadotropin. That wasn't even planned.

Erin Welsh: That was really, yeah, synced. Initially researchers thought it was produced in the pituitary gland.

Erin Allmann Updyke: Okay.

Erin Welsh: But physician scientist Georgeanna Seegar Jones correctly identified its origin as the uterus and gave it its name in 1945.

Erin Allmann Updyke: Wow, okay.

Erin Welsh: Yeah.

Erin Allmann Updyke: 1945, they figured out.

Erin Welsh: Is when HCG was named HCG.

Erin Allmann Updyke: Named, okay.

Erin Welsh: Yeah.

Erin Allmann Updyke: Okay.

Erin Welsh: And found to be from the uterus. And eventually rabbits replaced mice because you could get a result faster and you didn't have to use as many animals.

Erin Allmann Updyke: Gosh, okay.

Erin Welsh: The phrase 'the rabbit died', have you ever heard of this?

Erin Allmann Updyke: No.

Erin Welsh: It's used, I feel like I've been rewatching Mad Men and there's another part of Mad Men, I've been thinking a lot about Mad Men and pregnancy. But that is a euphemism that was commonly used to be like...

Erin Allmann Updyke: Did that mean that you were pregnant or weren't pregnant.

Erin Welsh: That you were pregnant. But it doesn't really make sense because-

Erin Allmann Updyke: They killed all the rabbits.

Erin Welsh: Yeah.

Erin Allmann Updyke: Okay.

Erin Welsh: Yeah.

Erin Allmann Updyke: Weird.

Erin Welsh: I know.

Erin Allmann Updyke: Okay.

Erin Welsh: But I do find it's interesting that there was a euphemism because pregnancy wasn't really something that was discussed out loud very much until the middle of the 20th century at the earliest.

Erin Allmann Updyke: Really?

Erin Welsh: Yeah, it was kind of just not like taboo but it was in hush terms, euphemisms.

Erin Allmann Updyke: You just don't talk about it.

Erin Welsh: Yeah, exactly. But these tests, the Aschheim-Zondek test and the Friedman test, which is what the rabbit one was called, delivered pretty accurate results but they did come with limitations. So for one the urine was often, about 7% of the time, toxic.

Erin Allmann Updyke: Oh so then it would kill the...

Erin Welsh: It would kill, yeah.

Erin Allmann Updyke: Maybe that's where it comes from.

Erin Welsh: I mean... And it had to be treated, otherwise it would kill the rabbit just outright.

Erin Allmann Updyke: Okay, okay.

Erin Welsh: Yeah. And the second was that the animals were expensive to keep.

Erin Allmann Updyke: Yeah.

Erin Welsh: Animal welfare didn't seem like a pressing concern at the time but cost was.

Erin Allmann Updyke: Okay.

Erin Welsh: Unfortunately a cheaper animal was available, the African clawed frog.

Erin Allmann Updyke: Oh they're so cute!

Erin Welsh: They're very cute, aren't they? Also known as the African clawed toad.

Erin Allmann Updyke: Is it a frog or a toad?

Erin Welsh: I don't know. I'm pretty sure it's a frog.

Erin Allmann Updyke: Okay.

Erin Welsh: Yeah. It's the scientific name *Xenopus laevis*.

Erin Allmann Updyke: Okay.

Erin Welsh: I don't know. But it only happens to ovulate in the presence of a male frog or in the presence of HCG.

Erin Allmann Updyke: Or HCG. So then with these did you just have to like squirt it on top because they just diffuse through their skin or...?

Erin Welsh: Essentially, yeah.

Erin Allmann Updyke: Okay.

Erin Welsh: Yeah. So in 1933 researchers Shapiro and Zwarenstein discovered that, yeah, if you just sort of sprinkle urine, well I don't know if it was actually sprinkling, like if you expose-

Erin Allmann Updyke: Okay.

Erin Welsh: I'll say that, urine from a pregnant person to these frogs and you could induce ovulation in the frog 8-12 hours later.

Erin Allmann Updyke: And then so that's much quicker.

Erin Welsh: Much quicker.

Erin Allmann Updyke: And do you have to kill the frog or no?

Erin Welsh: Nope.

Erin Allmann Updyke: Can you reuse that frog?

Erin Welsh: I think you can.

Erin Allmann Updyke: Okay.

Erin Welsh: I think you just would not like...

Erin Allmann Updyke: Like have to give it like a washout period or something?

Erin Welsh: Right. Exactly, yeah.

Erin Allmann Updyke: Okay.

Erin Welsh: Yeah. And so soon labs around the world began importing these frogs for pregnancy testing.

Erin Allmann Updyke: Wow!

Erin Welsh: And guess what may have hitched a ride?

Erin Allmann Updyke: Chytrid?

Erin Welsh: Chytrid.

Erin Allmann Updyke: Stop it.

Erin Welsh: Yeah.

Erin Allmann Updyke: How did we not talk about this in our chytrid episode?

Erin Welsh: We may have, Erin, that was like 7 years ago.

Erin Allmann Updyke

No way.

Erin Welsh

Yeah. And for those of you who haven't heard of chytrid or haven't listened to our chytrid episode, chytrid is a type of fungus that is absolutely deadly.

Erin Allmann Updyke

Yeah.

Erin Welsh

Like devastating to some species of amphibians.

Erin Allmann Updyke

It wiped out populations of frogs.

Erin Welsh

Oh yeah, like extinction in the wild type of a thing.

Erin Allmann Updyke

Yeah.

Erin Welsh

Yeah. But some researchers think that the widespread distribution of these African clawed frogs for pregnancy testing may have led to the global spread of chytrid.

Erin Allmann Updyke

I kind of hope that we actually did cover this and I have completely forgotten it.

Erin Welsh

I know.

Erin Allmann Updyke

It's embarrassing.

Erin Welsh

I feel like we did.

Erin Allmann Updyke

We might, I don't know though.

Erin Welsh

It sounded vaguely familiar. Or is it like one of those where it's a memory and then it becomes... Or it's a new thing, it becomes a memory.

Erin Allmann Updyke

A manufactured memory or whatever.

Erin Welsh

Exactly.

Erin Allmann Updyke

Okay.

Erin Welsh

Yeah.

Erin Allmann Updyke

Wow. Okay, that's really interesting.

Erin Welsh

Yeah.

Erin Allmann Updyke

Is there data to back it up or it's just like a guess?

Erin Welsh

Oh funny you should ask. One of the earliest identified specimens of chytrid infection is from one of these frogs in 1938.

Erin Allmann Updyke

Okay. Wow.

Erin Welsh: 1938, yeah.

Erin Allmann Updyke: Okay, okay.

Erin Welsh: Isn't that wild?

Erin Allmann Updyke: Yeah, that is wild.

Erin Welsh: But so anyway, the frogs were an improvement from the rabbits and the mice. But do you know what would be even better?

Erin Allmann Updyke: If you didn't need to kill an animal?

Erin Welsh: Exactly, yeah. Or keep the animals because they're so expensive.

Erin Allmann Updyke: Or keep the animals, yeah.

Erin Welsh: But the first of these dreamed of tests was developed in the late 1950s and it was an immunoassay that detected HCG.

Erin Allmann Updyke: Okay.

Erin Welsh: With these tests, especially as specificity increased and false positive decreased with later improvements, researchers could decrease turnaround time as well as cost.

Erin Allmann Updyke: Okay.

Erin Welsh: And that ultimately resulted in more people utilizing these tests. But probably not as many as you think. Getting a pregnancy test was by no means a typical part of any pregnancy throughout the 1950s and the 1960s and in fact most people didn't get tested. Why? First of all, access. If you wanted a pregnancy test, you had to make a doctor's appointment and get a prescription for a test, at least in the US.

Erin Allmann Updyke: Even after they moved away from these animal assays, like just to the immunoassay ones.

Erin Welsh: Yeah.

Erin Allmann Updyke: Okay.

Erin Welsh: Everything was prescription, yeah.

Erin Allmann Updyke: Okay.

Erin Welsh: And then you had to wait weeks to hear the results from the doctor.

Erin Allmann Updyke: And you're like I already have missed like three periods by now, so I know. Okay.

Erin Welsh: I think I know.

Erin Allmann Updyke

Yeah.

Erin Welsh

These things cost time and money, right. And second of all, stigma. Some doctors refused to test certain people to prevent them from getting an abortion. And so they would withhold that information until it was too late. They would say well if you want to test, I'm worried about what you're going to do with those results.

Erin Allmann Updyke

Oh my god, I hate that so much and I wish that it surprised me more.

Erin Welsh

I know, I know.

Erin Allmann Updyke

Wow.

Erin Welsh

Or they would tell husband first so that he could make a decision.

Erin Allmann Updyke

I didn't know I was going to get livid this early in the series, Erin.

Erin Welsh

So sorry. It's just... Get ready, strap in.

Erin Allmann Updyke

Yeah, yeah. Strapped.

Erin Welsh

Strapped. There was stigma attached to wanting to find out if you were pregnant before you started showing these quote unquote "natural signs".

Erin Allmann Updyke

Interesting.

Erin Welsh

Because it suggested you had anxiety about the pregnancy or about the father. If you were married, forget about it. Your reputation would never recover.

Erin Allmann Updyke

What?

Erin Welsh

Often, yeah.

Erin Allmann Updyke

Just for like wanting to know this information, then people assumed that you were up to something.

Erin Welsh

Often, yeah.

Erin Allmann Updyke

Wow.

Erin Welsh

The 1966 Better Homes & Gardens Baby Book said that pregnancy tests, quote, "there is no need for one." Yeah.

Erin Allmann Updyke

Wow.

Erin Welsh

And it's hard not to see this is just another way to control women and the choices they make, right.



Erin Allmann Updyke 100%.

Erin Welsh This is knowledge that does not belong to them.

Erin Allmann Updyke It doesn't belong to you.

Erin Welsh Yeah.

Erin Allmann Updyke No.

Erin Welsh And the introduction of the home pregnancy test in the 1970s, it didn't immediately erase the stigma but it did make testing an option or at least more of an option for the people who where previously it wasn't. Who saw this need and did something about it?

Erin Allmann Updyke Someone who could make money off it?

Erin Welsh Actually no.

Erin Allmann Updyke Oh okay.

Erin Welsh I know. Pleasantly surprised. There was a woman by the name of Margaret or Meg Crane.

Erin Allmann Updyke Okay.

Erin Welsh So one day in 1967, the 26-year-old Crane was walking through the offices of Organon, which sounds made up, a pharmaceutical company where she worked as a freelance graphic designer and something caught her eye. One of the rooms as she walked past was filled with a bunch of test tubes hanging in some sort of bizarre contraption. And she asked her colleague what's going on in there? It turns out they were pregnancy tests. Crane listened as her colleague explained how they work and she thought to herself this sounds pretty simple, like why can't we do this ourselves at home? And this thought followed Crane around and she found herself in her spare time designing a home pregnancy test prototype.

Erin Allmann Updyke As a graphic designer, she's like I can do this.

Erin Welsh Yes. Yeah.

Erin Allmann Updyke I love it.

Erin Welsh She's like this is not that hard. We should be able to do this.

Erin Allmann Updyke What, like it's hard?

Erin Welsh Yeah. That's perfect.

Erin Allmann Updyke Thank you.

Erin Welsh But yeah, she didn't do it because her boss asked her to do it. She just knew how revolutionary it could be. She saw the potential and what a change it would make.

Erin Allmann Updyke

Wow. Okay. I love this.

Erin Welsh

And in fact when she showed her boss her design, he scoffed. But when a male employee later suggested a home pregnancy test, the option seemed more appealing. So a few weeks later Crane walked into work to find a big meeting taking place and she was like what's going on in there? Turns out it was a meeting to discuss different home pregnancy test designs. So she crashed the meeting, put her design on the table with all the others, which all of which were designed by men. One had rhinestone edging, one had a cute little tassel. All were pink except Crane's. But Crane's was the only one to include a urine collection cup.

Erin Allmann Updyke

Oh my god, are you serious?

Erin Welsh

Yeah.

Erin Allmann Updyke

We've got the rhinestones but not the collection cup.

Erin Welsh

Right.

Erin Allmann Updyke

What do we use, a mug?

Erin Welsh

Exactly. So someone's like what? And one of the one of the other designers was like yeah, I I just figured... And then they're like what do you do with that afterwards?

Erin Allmann Updyke

I love this story, Erin.

Erin Welsh

I know, I know. And so Crane's, because of this and because of the other practical aspects of its design, was considered the winning model.

Erin Allmann Updyke

Okay.

Erin Welsh

And so let me paint you a picture.

Erin Allmann Updyke

Please.

Erin Welsh

A hard, clear, rectangular box made of two pieces that joined in the center.

Erin Allmann Updyke

Okay.

Erin Welsh

Inside the box was a dropper and a test tube that contained dried rabbit antibodies and sheep blood. So you collect some urine into the top half of the box, add a few drops to the test tube along with some tap water.

Erin Allmann Updyke

Okay.

Erin Welsh

And then you waited for two hours.

Erin Allmann Updyke

Okay.

Erin Welsh

It's much better than two weeks.

Erin Allmann Updyke Right.

Erin Welsh With the test tube sitting in the bottom half of the box.

Erin Allmann Updyke Okay.

Erin Welsh And that had a mirror. It's complicated.

Erin Allmann Updyke Wow, yeah.

Erin Welsh If you were pregnant, a red-brown ring like a doughnut would form in the bottom of the tube reflected by the mirror. No doughnut meant no pregnant.

Erin Allmann Updyke Oh, no pregnant. No donut, no pregnant. Okay, wow. That is really complicated.

Erin Welsh It's really complicated. But it's also something that is, like it was very much-

Erin Allmann Updyke You could do it at home.

Erin Welsh Yeah.

Erin Allmann Updyke Right.

Erin Welsh It was very similar to-

Erin Allmann Updyke Not that much harder than like COVID tests.

Erin Welsh Oh yeah.

Erin Allmann Updyke Where you're like okay, I swab this and I move this and I dropper this and I... right?

Erin Welsh Yeah, I'm something of a-

Erin Allmann Updyke An expert?

Erin Welsh An epidemiologist myself. Yeah. Also I just want to add a cute little side note.

Erin Allmann Updyke Please.

Erin Welsh So Crane met her future husband at that meeting. He I think was the one who was like this design is clearly the best.

Erin Allmann Updyke Oh good.

Erin Welsh I know.

Erin Allmann Updyke Not like I produced the rhinestone one?

Erin Welsh: No, no, no. And eventually they opened their own ad agency where she was the head designer and he was the copy chief.

Erin Allmann Updyke: Oh so cute.

Erin Welsh: Yeah. But with Crane's design in hand, Organon sought to get this test to market. Facing heavy opposition in the US. Was it reliable enough? What would women do with this information? Organon instead turned to Canada, where unlike the US, you did not have to have a prescription to get a pregnancy test-

Erin Allmann Updyke: Okay.

Erin Welsh: And you could just take one at the pharmacy without a doctor's appointment.

Erin Allmann Updyke: Okay.

Erin Welsh: Unbelievable. I mean totally believable. By summer of 1971, Predictor, which is Organon's home pregnancy test, was on the shelves in Canadian drug stores for \$5.50.

Erin Allmann Updyke: Wow.

Erin Welsh: Which is about the same price as a bra and a little less expensive than a lab test.

Erin Allmann Updyke: Okay.

Erin Welsh: Just to put it in context.

Erin Allmann Updyke: Yeah, perspective.

Erin Welsh: Not everyone was a fan of the lab tests. So one pharmacist in British Columbia named Bob, no last name that I could detect, said that he wouldn't be stocking them because he quote "didn't think women could be trusted to accurately obtain results".

Erin Allmann Updyke: Okay, Bob.

Erin Welsh: Thanks, Bob.

Erin Allmann Updyke: We can't read directions or pee in a cup? Come on.

Erin Welsh: Yep, yep.

Erin Allmann Updyke: Jeez.

Erin Welsh: Others described it as a passing fad.

Erin Allmann Updyke: Oh of course it is.

Erin Welsh: Yeah. But the market didn't lie. The test flew off the shelves and it quickly sold out. And with such a successful launch in Canada, other countries' approval wasn't too far behind. Home pregnancy tests became available in many places around the world by the end of the 1970s.

Erin Allmann Updyke: Wow.

Erin Welsh: In the US, the FDA approved the test in 1976 and they hit the shelves in 1977.

Erin Allmann Updyke: Wow.

Erin Welsh: One of the earliest ads for these tests, the EPT in-home early pregnancy test, described it as quote "a private little revolution any woman can easily buy at her drugstore".

Erin Allmann Updyke: I love it.

Erin Welsh: Yeah. Early TV ads ended with "time is on your side at last". The tone from these ads reflects the push for and the milestones in reproductive rights in the US in the 1970s.

Erin Allmann Updyke: Okay.

Erin Welsh: Like Roe v. Wade was 1973 for instance. But the private little revolution wasn't immediate. These tests cost \$10 US, \$51 in 2024.

Erin Allmann Updyke: Wow. Holy cow!

Erin Welsh: Yeah. Took two hours for a result again and had a decently high rate of false negatives, not false positives though which is good.

Erin Allmann Updyke: Okay.

Erin Welsh: This was not a cheap test and the recommendation to buy two tests in case you took the first test too early-

Erin Allmann Updyke: Too early.

Erin Welsh: It made home testing prohibitively expensive for some people. And according to some who used it, the test wasn't the most intuitive and in fact it was kind of complicated. You just had to sit for two hours in a completely still, dark environment. Any jostling-

Erin Allmann Updyke: Oh dark.

Erin Welsh: Yeah because otherwise the ring would probably dissolve. The doughnut.

Erin Allmann Updyke: Oh interesting. Okay.

Erin Welsh: Yeah. And stigma lingered, right. There was one state official telling Consumer Reports in 1978 that quote "there is no reason for a woman in Maryland to buy such a kit as the EPT unless she doesn't want to be seen at the health department". Yeah.

Erin Allmann Updyke: Oh my goodness.

Erin Welsh Leading the magazine to conclude that it was a quote unquote "useless purchase".

Erin Allmann Updyke Wow.

Erin Welsh Yeah.

Erin Allmann Updyke Just like our avocado toast.

Erin Welsh If you didn't buy so much avocado toast maybe you could buy a house.

Erin Allmann Updyke Maybe you could buy a house.

Erin Welsh But the sentiment revealed a disconnect between what most physicians, some politicians, and a puritanical patriarchal society thought women needed and what women felt they needed, especially in the US where there initially was pushback against allowing the test to be sold in drugstores over the counter.

Erin Allmann Updyke Yeah.

Erin Welsh Regardless of how accessible you made pregnancy tests at the clinic, like getting rid of prescription requirements, reducing the cost, whatever the tests revealed at those clinics was first learned by someone else, not ever the patient.

Erin Allmann Updyke Right.

Erin Welsh Putting pregnancy tests in the hands of women reasserted their rightful control over their own bodies and the knowledge about their bodies.

Erin Allmann Updyke Yeah.

Erin Welsh So there's a quote I'm going to read you from the book 'Pregnancy Test' by Karen Weingarten. Quote: "With a home pregnancy test, women could take control of their decision from day one. They wouldn't need to find a doctor willing to test them for pregnancy who might question their motives or next steps. They wouldn't even need to share their news with anyone until they were ready." End quote. Even early marketing materials focused on what this meant for women, not families, not a couple, but for a woman who thinks she might be pregnant, focusing on the privacy aspect of these tests. The pharmaceutical companies that produced them also had to convince physicians that this was a good thing, that early pregnancy detection meant people could get prenatal care earlier. And most physicians agreed with that potential positive impact but many remained skeptical that the tests were accurate and that they would insist on a clinical test to confirm home results.

Erin Allmann Updyke Confirm.

Erin Welsh And this is not without merit of course. Even the most accurate tests today are not 100% accurate or may not be able to give you all the information that you need to decide what to do next. The pregnancy test does not reduce the need for or replace medical care at all.

Erin Allmann Updyke At all.

Erin Welsh	It is simply often the first step along the journey, whatever that journey may be. By the 1980s and Reagan's presidency, these ads shifted in tone to be more about family values.
Erin Allmann Updyke	Of course they did.
Erin Welsh	Of course. Featuring straight couples sharing the joy that a test could bring. The 1990s saw reality advertising for pregnancy tests with couples finding out on camera the results of those tests.
Erin Allmann Updyke	Interesting. All the way in the 90s.
Erin Welsh	All the way in the 90s, yeah.
Erin Allmann Updyke	Okay.
Erin Welsh	I mean come on, like Jerry Springer, Maury, stuff like that.
Erin Allmann Updyke	Yeah, yeah, yeah.
Erin Welsh	Okay.
Erin Allmann Updyke	America's Funniest Home Videos.
Erin Welsh	Sure.
Erin Allmann Updyke	Sorry.
Erin Welsh	I don't know, I'm sure pregnancy tests featured on some of those.
Erin Allmann Updyke	I'm sure they didn't.
Erin Welsh	But these 90s tests, that's when the first time people of color were featured in many of these ads. And while most couples in these realities... So it would be a couple being like, oh, let's find out the results on air or whatever.
Erin Allmann Updyke	Okay.
Erin Welsh	And then most of them like clearly wanted a positive result.
Erin Allmann Updyke	Right.
Erin Welsh	They were happy with the positive result. One couple was relieved about their negative test. Which is interesting.
Erin Allmann Updyke	Fascinating, yeah.

Erin Welsh	What was missing from these ads were depictions of women who did not want to be pregnant but were. David Lynch, so the guy who did Twin Peaks and the movie Blue Velvet, he passed away recently, directed a 1997 pregnancy test ad where the woman in the ad finds out the results but the audience doesn't get to see them. I love it.
TPWKY	(audio from ad) Waiting to find out if you're pregnant or not, nothing else in the world matters until you know. Introducing Clear Blue Easy one minute pregnancy test because only Clear Blue Easy gives you a clear yes or no in one minute.
Erin Allmann Updyke	So that's the first time that it's just waiting and you have to kind of infer yourself.
Erin Welsh	I think so.
Erin Allmann Updyke	Interesting.
Erin Welsh	Yeah. Isn't that so fascinating?
Erin Allmann Updyke	Yeah.
Erin Welsh	Because a lot of the other ones were like it's positive, I'm happy.
Erin Allmann Updyke	Right.
Erin Welsh	Or it's negative, I'm relieved.
Erin Allmann Updyke	Okay.
Erin Welsh	But this one, she's smiling and you don't know.
Erin Allmann Updyke	You have no idea.
Erin Welsh	Is she happy that it's positive or negative?
Erin Allmann Updyke	Right. Interesting.
Erin Welsh	I really like it. Yeah.
Erin Allmann Updyke	The mystery.
Erin Welsh	The mystery of it. That ad is especially important too for showing that it's about the knowledge, not about the result. And I think that's a big shift in that perception of like what these tests have given us.
Erin Allmann Updyke	Okay.
Erin Welsh	So within 25 years of their release, home pregnancy tests had become a widely used, recognizable, commonplace diagnostic tool, as well as a useful plot device. TV shows, movies, novels all began to feature pregnancy tests as a useful way to increase dramatic tension or force character growth. I mean how many sitcoms have an episode where someone finds a positive pregnancy test in the trash? Whose is it?



Erin Allmann Updyke: Everyone.

Erin Welsh: Oh my god, I can think of so many.

Erin Allmann Updyke: Yeah.

Erin Welsh: They've been used in TV and movies as an opportunity for safe sex talks between parents and a teenager, a moment of self-reflection for whether or not a character wants the test to be positive or negative, whether they want children at all or feel ready to have kids, on reality TV in really twisted scenarios. Like there's a Maury one where it's like someone's teenage daughter takes one on air to be like is she lying or not?

Erin Allmann Updyke: Oh my god.

Erin Welsh: I know.

Erin Allmann Updyke: That's horrific.

Erin Welsh: I know. Yeah. But there are, yeah, a million examples, right. In 1991, the show Murphy Brown showed Murphy taking a home pregnancy test and ultimately deciding to become a single mother after considering abortion. This is 1991.

Erin Allmann Updyke: Wow.

Erin Welsh: I feel like that's...

Erin Allmann Updyke: It's like not allowed today.

Erin Welsh: Yeah, yep. And this plot line was criticized by Vice President Dan Quayle as quote unquote "eroding family values".

Erin Allmann Updyke: Of course it was.

Erin Welsh: Right? Yeah. I think that test though or that sitcom Murphy Brown, when she took the pregnancy test, that also helped to kind of popularize it and be like this is a thing that people can do.

Erin Allmann Updyke: Right.

Erin Welsh: Yeah. I think it just kind of increased momentum.

Erin Allmann Updyke: Right, made it even more like normal.

Erin Welsh: Yeah, exactly.

Erin Allmann Updyke: Okay.

Erin Welsh: But it's incredible how over the almost five decades since its release, the home pregnancy test has become almost universally recognizable even for people who have never used one.

Erin Allmann Updyke Right.

Erin Welsh I loved how like yeah, the early COVID tests and people would take pictures and everyone thought it was a pregnancy test immediately.

Erin Allmann Updyke Pregnancy test.

Erin Welsh Yeah. But improvements to the test over these decades include things like the invention of monoclonal antibodies which eliminated the need for lab animals, more precise testing, the now familiar, easy to read stick pregnancy test with the two lines was introduced in 1987.

Erin Allmann Updyke Wow.

Erin Welsh Now some of them say pregnant or not pregnant.

Erin Allmann Updyke Yeah, digital ones.

Erin Welsh In 2021, a flushable pregnancy test was introduced which is an incredible development to protect privacy.

Erin Allmann Updyke Wow!

Erin Welsh Yeah.

Erin Allmann Updyke I was just thinking about sewage lines, like are they actually flushable?

Erin Welsh I mean I think they are, yeah.

Erin Allmann Updyke Fascinating.

Erin Welsh Tests have been developed that can be read by blind or low vision people without the help of someone else.

Erin Allmann Updyke Wow!

Erin Welsh I know.

Erin Allmann Updyke That's amazing. I never would have thought of that.

Erin Welsh I know.

Erin Allmann Updyke Ugh, my ableism is showing.

Erin Welsh I know. It's so incredible the different innovations that have been thought of.

Erin Allmann Updyke Yeah.

Erin Welsh: One organization has introduced a test that measures HCG as a way of verifying that an abortion worked. And so you take like a sequential test afterwards to be like is it dropping?

Erin Allmann Updyke: Right.

Erin Welsh: I've seen different estimates but around 8 million people in the US alone used a home pregnancy test in 2020.

Erin Allmann Updyke: Wow.

Erin Welsh: Think about that compared to 50 years ago. I'm going to read you a quote from an article by historian Sarah Abigail Leavitt. Quote: "Though women have found ways throughout history to find out about impending pregnancy, it has only been within the last quarter century that this information was available to so many women with such reliable accuracy. Women in this generation who take home pregnancy tests are able to know something about themselves and their futures in a time frame that was simply not possible for their grandmothers or even their mothers." Isn't that mind blowing? Like my grandma wouldn't have taken a pregnancy test.

Erin Allmann Updyke: I wish that I could ask my grandma.

Erin Welsh: My mom took a home pregnancy test.

Erin Allmann Updyke: I assume that my mom did but I never asked her.

Erin Welsh: Yeah.

Erin Allmann Updyke: I asked her so many other things about her pregnancies for this episode but I didn't ask her that.

Erin Welsh: I know, same. Yeah, it's incredible.

Erin Allmann Updyke: Yeah.

Erin Welsh: But that knowledge can come at a cost. Also from Leavitt: "The pregnancy test has liberated women by giving them information earlier and allowing them to digest the information in the privacy of their own homes. However it oppresses women when it forces them to make decisions earlier and earlier, when it forces them to confront a miscarriage they might otherwise never have known about, or when it falls into the hands of those with whom they did not wish to share the information and when it proves an untrustworthy narrator and gets the answer wrong."

Erin Allmann Updyke: Yeah.

Erin Welsh: People have been and continue to be tested for pregnancy without their consent or by those who have ulterior motives, such as testing unhoused women in the 1980s in New York City who had to be tested if they wanted city housing.

Erin Allmann Updyke: Wow.

Erin Welsh: Or women on certain police forces being secretly tested. Employers pretending to test potential employees for drugs but actually testing for pregnancy. That has happened.

Erin Allmann Updyke

Oh my god.

Erin Welsh

Yeah. The US Immigration and Customs Enforcement, ICE, tests those arriving at a detention center who are over 10 years old.

Erin Allmann Updyke

Oh my god.

Erin Welsh

Ads for free pregnancy testing at clinics that are actually anti-abortion clinics.

Erin Allmann Updyke

That's major.

Erin Welsh

That's a major one. And then the early detection and sensitivity of these tests could be seen as a double-edged sword. Some suggest that pregnancy test is not really an accurate term, that these tests aren't detecting viable pregnancies but just the presence of HCG. And so non-viable pregnancies that may not have been noticed in the past are now recognized, potentially increasing the trauma of that experience. For some however that experience may be incredibly meaningful. These days in the US, early detection of pregnancy can be critical especially for those living in states that restrict abortion to a narrow window like 6 weeks.

Erin Allmann Updyke

Right. Or like outlaw it at all, so you have to figure out where you're going to travel to.

Erin Welsh

Where you're gonna travel, yeah. Waiting until you've missed a period to take a test might already be too late. Knowledge is power and that can be dangerous if that knowledge falls into the wrong hands or is used against us. But it can also be incredibly liberating and empowering, giving us access to and control over information about our bodies that should have been ours all along.

Erin Allmann Updyke

To begin with.

Erin Welsh

Yeah. And so with that, Erin, I'd love for you to tell me about how HCG works and what's going on in early pregnancy.

Erin Allmann Updyke

I don't know if I'm going to answer that first question.

Erin Welsh

Okay, what's going on in early pregnancy?

Erin Allmann Updyke

But we'll do it.

Erin Welsh

Okay, great.

Erin Allmann Updyke

Right after this break.

TPWKY

(transition theme)

Anonymous

I didn't have a glowing pregnancy. Sciatica made every step painful, Braxton Hicks robbed me of my sleep, and even the smell of my beloved garlic turned my stomach. Hormones didn't help, especially when my husband jokingly called me Shamu after the infamous killer whale because of my black and white maternity wardrobe. I snapped at him one night when he made what I thought was a mean comment about how puffy my ankles were looking and then I forgot about it. Until January 17, 2018. At 2 am my waters broke. We grabbed a cab to Lewisham Hospital in southeast London, expecting to be sent home as labor had not started yet. Instead after a long wait and a quick reflex test where my leg shot up in the air, we realized that those puffy ankles had been an indicator of preeclampsia. The only cure, birth within 24 hours. Suddenly I was on a hormone drip to induce labor and magnesium drip to prevent seizures.

Hooked up to monitors, I was told that I could not eat anything. For hours I waited, feeling contractions build. But just when I needed the epidural most, we realized that it had become detached. And I had to push without pain relief which resulted in my blood pressure increasing in a way that the midwives were not very happy about. Suddenly the room blurred in a wave of blue medical sheets and rushing staff. My baby was facing the wrong way up, another complication. The doctor used a vacuum to rotate her and finally, to Queen's 'I Want To Break Free', my daughter entered the world. The traditional National Health Service tea and toast afterwards is still to this day the best meal of my life. Two days later we went home. That baby is now a feisty 7 year old testing every boundary. Life since hasn't been simple. We've moved countries, she's learned new languages, and her dad and I have separated but she's the center of our universe. And through it all, even though I've never fully understood why I got preeclampsia and why we hadn't noticed it earlier, I'll forever be grateful to the NHS for bringing us through safely.

Anonymous

For the most part my pregnancy was pretty typical, pretty textbook, no complications or anything. The two things that really kind of stood out to me as different in my experience that I was not prepared for first was when the whole time that I was pregnant, people always were saying oh when you go into labor, you may not even know it, it may be hard to tell when labor starts. It's not gonna be like it is in the movies where you have this big dramatic gush of your water breaking and that's what starts things. But that was exactly what happened. I had woken up at about 4 o'clock in the morning, needed to use the bathroom, and I got up off, I was sleeping on my basement couch, got up off the couch as best I could and the second my feet hit the floor, it was a gush that was unmistakable. I knew at that point that it was time to go to the hospital.

Then the other unexpected for me was as my labor progressed, it seemed like things were going relatively quickly and just a few short hours into being at the hospital I was told oh, it's time to push. And at that point I was thinking oh okay, I'm gonna have the baby in just a few minutes. Everybody I've ever talked to says they pushed for 15 minutes or two pushes and the baby was out. That was definitely not my experience. I pushed for two hours. That was pretty grueling. And overall everything turned out fine but I did not realize before that point that you could be ready to push and have it still take that long. She hadn't descended through my pelvis yet, so even though I was already fully effaced and dilated, it took a little bit of work. All in all it was worth it and I would do it again but you just really never know what you're signing up for when you get pregnant.

TPWKY

(transition theme)

Erin Allmann Updyke

So This might sound silly now after everything that you went through but I felt like to make all of these episodes make sense, I wanted to start by just defining pregnancy.

Erin Welsh

No, that's a great way to start.

Erin Allmann Updyke: Okay. Cool. I'm like it might sound very obvious, right, like I think we all know what we think pregnancy is, right. It is the period of time when there is a fetus growing in your uterus. That's what we think of as a pregnancy.

Erin Welsh: Okay, yeah.

Erin Allmann Updyke: But like you just walked us through, how we've been able to determine whether or not someone is pregnant has really changed over time. So I want to start with how we date a pregnancy today.

Erin Welsh: Great.

Erin Allmann Updyke: Okay. This is how we decide when a pregnancy quote unquote "begins".

Erin Welsh: Okay.

Erin Allmann Updyke: And in medicine, that is pretty universally based on your last menstrual period.

Erin Welsh: Okay.

Erin Allmann Updyke: The first day of your last menstrual period is the start of a cycle, your menstrual cycle.

Erin Welsh: Yeah.

Erin Allmann Updyke: We assume in medicine that all menstrual cycles are 28 days long exactly. We know that they're not but that's an average.

Erin Welsh: Yeah.

Erin Allmann Updyke: And so based on that assumption, pregnancy is 40 weeks long. It's about 280 days.

Erin Welsh: All right.

Erin Allmann Updyke: The time that it takes from fertilization, and we'll get there, to a mature fetus or baby is about 38 weeks, 266 days. So that extra two weeks between 38 and 40, that's the time it takes from the start of that last menstrual period to ovulation/fertilization. Does that make sense?

Erin Welsh: I think so.

Erin Allmann Updyke: So that's why your pregnancies are always longer than you would think it is. By the time that you have missed a period-

Erin Welsh: Yeah.

Erin Allmann Updyke: You're already four weeks pregnant.

Erin Welsh: Oh my gosh.

Erin Allmann Updyke Even though fertilization just happened two weeks ago.

Erin Welsh Got it.

Erin Allmann Updyke Okay?

Erin Welsh Yeah.

Erin Allmann Updyke And it is confusing.

Erin Welsh Yeah.

Erin Allmann Updyke Because then it really makes that timetable, and if we're talking about access to abortion and things like that, it's really important.

Erin Welsh Right.

Erin Allmann Updyke So we'll go through all of what is happening there but I just want to set the stage. So that is how we define pregnancy.

Erin Welsh Okay.

Erin Allmann Updyke That's the time frame of pregnancy.

Erin Welsh Okay, I have a question real quick.

Erin Allmann Updyke Already?

Erin Welsh I know, already.

Erin Allmann Updyke Give it to me, give it to me.

Erin Welsh All right. So there then is a potential like error bars around...

Erin Allmann Updyke Absolutely.

Erin Welsh And so then let's say that you know conception happened on this date.

Erin Allmann Updyke Okay.

Erin Welsh But then your doctor's like oh well when was the last day of your last period?

Erin Allmann Updyke You want to talk about me? Because that was my life.

Erin Welsh Yeah. I was angling to.

Erin Allmann Updyke Yeah. So if you have like for example very long menstrual cycles-

Erin Welsh: Yeah.

Erin Allmann Updyke: Like 36 days or something like that, that's pretty different than 28 days, then your conception date might be more accurate if you know it. That's like your ovulation date. But generally what happens is that we use ultrasound, early ultrasound to measure what the embryo and fetus is growing as.

Erin Welsh: Yeah.

Erin Allmann Updyke: And if it's off by a certain number of days, then you change the date of the pregnancy.

Erin Welsh: Okay.

Erin Allmann Updyke: Does that make sense?

Erin Welsh: Yeah.

Erin Allmann Updyke: And it all depends on how early that ultrasound is, how it's growing, and all of that. And there's very specific regulations on how that's all decided.

Erin Welsh: Okay.

Erin Allmann Updyke: But yes, for some people that date ends up changing and it's not exactly consistent. But at the start it's always assumed that the start of your pregnancy is the first day of your last menstrual period.

Erin Welsh: Interesting.

Erin Allmann Updyke: Yeah.

Erin Welsh: Okay, so I feel like that has such huge implications for-

Erin Allmann Updyke: Huge.

Erin Welsh: Yeah.

Erin Allmann Updyke: Huge.

Erin Welsh: Everything.

Erin Allmann Updyke: Yeah.

Erin Welsh: Okay.

Erin Allmann Updyke: And it really does. Like for both of my pregnancies were not dated accurately based on that.

Erin Welsh: Right.



Erin Allmann Updyke

One of them I found out early on and it was fine. The next one it was the day I went in for an induction.

Erin Welsh

Oh my gosh.

Erin Allmann Updyke

It's all fine.

Erin Welsh

Right. Because then there's that. It's like well you need an induction.

Erin Allmann Updyke

Right. Or you don't.

Erin Welsh

But do you? Yeah.

Erin Allmann Updyke

Yeah. So it does matter.

Erin Welsh

Yeah.

Erin Allmann Updyke

And now that we have the better ultrasounds that we have, the more accurate we can be in dating if you have access to an early ultrasound.

Erin Welsh

Okay.

Erin Allmann Updyke

Because ultrasound gets less accurate the farther you get in pregnancy. I am going so far off.

Erin Welsh

No, this is great. I'm sorry.

Erin Allmann Updyke

No, I love it.

Erin Welsh

I started down this rabbit hole.

Erin Allmann Updyke

I love it. Okay.

Erin Welsh

Okay.

Erin Allmann Updyke

But so let me find where I'm at.

Erin Welsh

Yeah.

Erin Allmann Updyke

Okay. But yes, so that is how we define it in medicine. I'm going to walk through the steps after fertilization and the very early parts of a pregnancy.

Erin Welsh

Okay.

Erin Allmann Updyke

So if any of my dating gets confusing where you're like what does that mean? Just stop me.

Erin Welsh

Okay.

Erin Allmann Updyke

So I can clarify. Okay? And that is what I'm going to walk us through today is early development, and then some of the things that can go wrong within that early, very early time period, and we'll talk a lot about miscarriage and early pregnancy loss. And my goal for this part of the episode is to help us understand the question of what has to happen biologically for a pregnancy to be possible.

Erin Welsh

Yeah.

Erin Allmann Updyke

Okay. So we will begin two weeks after your last menstrual cycle, on average.

Erin Welsh

Okay.

Erin Allmann Updyke

You have ovulation, that's when you ovulate, and if a sperm is present, then you have fertilization. These two single cells will come together and join their nuclear contents and make a brand new cell. I'm taking everything that happens prior to that point for granted because it's cool but it's way too detailed.

Erin Welsh

Okay.

Erin Allmann Updyke

So that's where we begin. Within the first 12-24 hours after this fertilization event is when you'll have the first cell division.

Erin Welsh

Okay.

Erin Allmann Updyke

So pretty quickly you go from one cell to two. And then every 12-24 hours or so after that, you continue dividing. So you go from 2 to 4 to 8 to 16 to 32 cells in this tight little ball by about day three after ovulation, which is like 17 days or so after your last menstrual period.

Erin Welsh

Got it.

Erin Allmann Updyke

And as this ball of cells continues to divide, it starts to take a shape. It forms itself by about day 5 or 6, so 19 or 20 of your menstrual period, after your last menstrual period, into a hollow, fluid-filled ball. And we talked about this in our IVF episode. It's called a blastocyst.

Erin Welsh

Yep.

Erin Allmann Updyke

And I imagine the blastocyst like a tennis ball.

Erin Welsh

Yes.

Erin Allmann Updyke

I brought one.

Erin Welsh

Did you bring one? Okay, perfect.

Erin Allmann Updyke

It's a tennis ball. Okay?

Erin Welsh

Your dog is going to be really sad.

Erin Allmann Updyke

She was when I was making what I made for this.

Erin Welsh: She was like we're playing, right?

Erin Allmann Updyke: She was like is that my ball? Is that my ball? I did not take her ball. Okay, so imagine this is a hollow ball, right, but it's filled with fluid instead of just being filled with air like an actual tennis ball. But instead of being perfectly symmetric inside and outside, in the blastocyst there is on the inside an extra few layers of cells called the inner cell mass. And this inner cell mass that we have here is what will eventually become the embryo and eventually the fetus.

Erin Welsh: Okay, okay.

Erin Allmann Updyke: Just this few little cells. And at this blastocyst stage, 6 or 7 days or so after fertilization, about day 21 of your menstrual cycle, this is when implantation will begin.

Erin Welsh: Okay.

Erin Allmann Updyke: So implantation itself, implanting into the uterine wall, it's not a discrete event. It's not one time point. It takes at least well over a week or so. And what it results with is this blastocyst completely embedding itself into the wall of the uterus. So our uterus has a cavity, right? It has this empty space in the middle.

Erin Welsh: Yep.

Erin Allmann Updyke: But this blastocyst and eventually fetus does not grow in that cavity, it grows within the wall of the uterus. Okay. Now the outer wall of that blastocyst, like the fuzzy green layer of the tennis ball-

Erin Welsh: Yep.

Erin Allmann Updyke: It's called the syncytiotrophoblast. And that is the layer that will continue to invade into the walls of our endometrium, into our uterus-

Erin Welsh: Yep.

Erin Allmann Updyke: And all the way into the first third of the muscle layer, the myometrium of our uterine wall.

Erin Welsh: Yeah.

Erin Allmann Updyke: And I know you're going to talk more about that next episode, Erin.

Erin Welsh: Kind of, yeah. Yes.

Erin Allmann Updyke: So the maternal endometrium, like our own cells are not passive in this process by any means.

Erin Welsh: No way.

Erin Allmann Updyke: Our body is responding to the invasion of these fetal cells that will eventually by the way become the placenta by completely remodeling. So the structure of our uterine lining completely changes. We have huge changes in the inflammatory signals that are being sent within our body. I'm excited for you to talk more about it. And then also big changes in the hormones that are dancing around in our bloodstream.

Erin Welsh: Okay, so just to to recap it briefly. So the cell implantation, multiplication, some of those multiplied cells become the placenta eventually and some become the embryo, later fetus.

Erin Allmann Updyke: Exactly. Exactly, yeah.

Erin Welsh: Yeah.

Erin Allmann Updyke: The inside part is what's going to become eventually the baby.

Erin Welsh: Yep.

Erin Allmann Updyke: The outside part is what invades and then becomes the placenta.

Erin Welsh: Yep.

Erin Allmann Updyke: And there's like layers, obviously.

Erin Welsh: It's so interesting the differentiation.

Erin Allmann Updyke: I know.

Erin Welsh: What are the signals that say you be placenta, you be embryo?

Erin Allmann Updyke: I love it. It's so, so, so fascinating, Erin.

Erin Welsh: Yeah.

Erin Allmann Updyke: And you could go in so much more detail on like every single step within this.

Erin Welsh: Right. There are entire textbooks on like this exact thing.

Erin Allmann Updyke: This layer, I know. I'm not going to go there. But I'm going to focus on this for a second because the start of implantation, so the start of that implantation process which again takes time, it's a really, really important milestone in a pregnancy for a few reasons. The first is that about 48 hours or so after implantation starts is when the cells of that syncytiotrophoblast, the cells that are burrowing their way into our endometrium, will start to secrete HCG. And that is not only important for detecting a pregnancy but also one of the major keys for a pregnancy to be able to continue.

Erin Welsh: Okay.

Erin Allmann Updyke: Because...

Erin Welsh: Yep.

Erin Allmann Updyke Don't worry, I'll get there. Because up until this point all of the tissues of our endometrium, the lining of our endometrium and everything that has changed thus far, it has been supported primarily by the hormone progesterone. And that hormone up until this point of implantation and HCG secretion has been secreted by this thing called the corpus luteum which is what's left over in your ovary after you ovulate.

Erin Welsh Okay.

Erin Allmann Updyke So everyone makes one of these every time they ovulate and it hangs out there for like two weeks-

Erin Welsh Yeah.

Erin Allmann Updyke Supporting the lining of your endometrium, hoping that a blastocyst will implant.

Erin Welsh Right.

Erin Allmann Updyke But the corpus luteum only lives about two weeks or so. So by day 14 after ovulation, 28 days or so after your last menstrual period, if you don't have the presence of HCG in your system, then this corpus luteum will disintegrate, your progesterone levels will drop, and you will have a menstrual period.

Erin Welsh Right.

Erin Allmann Updyke You will shed the lining of your uterus.

Erin Welsh The decidua.

Erin Allmann Updyke The decidua, yes.

Erin Welsh Well I'm just trying to track that with all the stuff.

Erin Allmann Updyke I know, yes.

Erin Welsh Which I don't even know if I talk about the decidua.

Erin Allmann Updyke That is what it is called.

Erin Welsh It is, yeah.

Erin Allmann Updyke What the lining of your uterus becomes is called the decidua.

Erin Welsh Yeah, yeah, okay.

Erin Allmann Updyke But if this blastocyst was able to successfully start implantation, it starts secreting HCG. And that HCG sends a signal to our corpus luteum, don't disintegrate, keep it going, keep secreting progesterone, and it does. Our corpus luteum will continue to produce progesterone for several more weeks, all the way until the point that the placenta has formed and can take over the majority of the necessary hormone production to support the growing pregnancy.

Erin Welsh: Okay.

Erin Allmann Updyke: Right?

Erin Welsh: Amazing.

Erin Allmann Updyke: Amazing. So we've already learned a lot.

Erin Welsh: Yeah.

Erin Allmann Updyke: First, it means that the absolute earliest that you could conceivably test for a pregnancy via HCG is a couple days after implantation which is usually a few days prior to your missed period, because it's like 48 hours after implantation which is day 5, 6, 7, somewhere in there.

Erin Welsh: Got it. Okay.

Erin Allmann Updyke: So most people are going to be considered 4 weeks pregnant at this point, plus or minus.

Erin Welsh: That is... I have strong feelings about that.

Erin Allmann Updyke: Yeah. Tell me your feelings.

Erin Welsh: Rage, I guess. Like that is so inaccurate.

Erin Allmann Updyke: Yeah.

Erin Welsh: I mean it's not because... Okay, it's consistently inaccurate so that's one aspect of it.

Erin Allmann Updyke: It is, so it's consistent, okay.

Erin Welsh: Except it also... Great, that's that's the one pro of this.

Erin Allmann Updyke: Yeah.

Erin Welsh: The rest is that everything else is then shifted.

Erin Allmann Updyke: Right.

Erin Welsh: And I mean, yeah.

Erin Allmann Updyke: I know. It's interesting. And I mean it's really a relic of when we didn't have ultrasound and things like that.

Erin Welsh: Right. A relic that laws are now based on.

Erin Allmann Updyke: Oh yeah, 100% Erin. Preaching, choir.

Erin Welsh: Yeah.

Erin Allmann Updyke

And this process of implantation, it's also a very delicate sort of dance. A lot of things can go not as I just explained within this process and prior, leading up to this process. So I'm going to pause here and actually take a few steps backward to talk about some of the potential either complications that can arise even as early as this-

Erin Welsh

Okay.

Erin Allmann Updyke

Or just things that don't go this way. Like what are the alternative routes that can happen here?

Erin Welsh

Yeah.

Erin Allmann Updyke

And then we'll come back and I'll talk more about the inner cell mass and how it becomes an embryo. There's a few things that can happen with implantation, the process of implantation. One is that it could happen in an atypical location. And that is called an ectopic pregnancy. And because most fertilization events happen in the fallopian tubes, which are the little tubes leading from our ovaries to our uterus, then most of the time, like 95%-96% of the time, if an ectopic pregnancy happens, it happens in the fallopian tube.

Erin Welsh

Okay.

Erin Allmann Updyke

So this blastocyst implants in the wrong place in your fallopian tube.

Erin Welsh

Got it.

Erin Allmann Updyke

Or right at the junction there where the fallopian tube meets the uterus.

Erin Welsh

Yep.

Erin Allmann Updyke

And because fallopian tubes cannot expand the way that the uterus can, as that blastocyst continues to grow into an embryo, it can cause rupture of the fallopian tubes which can cause catastrophic blood loss. So ectopic pregnancies are very dangerous. The fallopian tube is not the only place that it can implant. Ectopic pregnancies can also happen in the cervix, so like a little too far down.

Erin Welsh

Interesting, okay.

Erin Allmann Updyke

They can happen in the scar from a cesarean section which might end up being a viable pregnancy, depending on how it continues to grow. They can sometimes happen in the ovary or even in the abdominal cavity because the ovaries and your fallopian tubes are not connected, they're like floating. And your fallopian tubes can also move around back and forth and things like that.

Erin Welsh

Okay, that's amazing.

Erin Allmann Updyke

I know. But it's not great if one implants in the abdominal cavity.

Erin Welsh

No. And so all of these are considered ectopic because it's atypical just outside of-

Erin Allmann Updyke

It's all under the umbrella. Exactly.

Erin Welsh	Yeah.
Erin Allmann Updyke	Ectopic, just outside of the uterus.
Erin Welsh	Of the uterus.
Erin Allmann Updyke	Overall most estimates are that about 1%-2% of pregnancies are ectopic, depending on the source.
Erin Welsh	1%-2%, okay. Okay, question.
Erin Allmann Updyke	I expected questions, I have answers.
Erin Welsh	Okay, wonderful. So 1%-2% of the time, how do you figure out whether something's an ectopic pregnancy, number one? Number two, what next?
Erin Allmann Updyke	Great questions. How do you determine it? A lot of different ways is the answer to that question.
Erin Welsh	Okay.
Erin Allmann Updyke	Ultrasound is really important in this but it also can depend on how early that pregnancy is because sometimes if it's super early then you don't see anything in the uterus or elsewhere, then it might be classified as a pregnancy of unknown location. And so then what you do with that might change kind of depending. But in general it's ultrasound to try and determine that.
Erin Welsh	Okay.
Erin Allmann Updyke	A lot of times ectopic pregnancies might present as atypical early on. So you might have bleeding that we don't expect, you might have abdominal pain, especially like one-sided abdominal pain but not always. Sometimes you might not have symptoms. What you do about it is really important. So ectopic pregnancies are very important to be treated and they're generally treated one of two ways. So one is with a medicine called methotrexate which is also used in some places for abortions. But methotrexate is one medication that you can use, especially if it's small and it's at low risk of rupture. It requires continued medical monitoring to make sure that you've completely lost the rest of that pregnancy tissue. Or it requires surgery. And surgery usually requires the loss of that fallopian tube if that's where it implanted.
Erin Welsh	Okay. If that's where it is. Okay. And how often is it surgery vs medication?
Erin Allmann Updyke	It's a good question, I don't have data on that.
Erin Welsh	Okay.
Erin Allmann Updyke	That's a solid question. I think it probably depends like location, geography, all that kind of stuff.
Erin Welsh	Gosh, we really should do an entire episode on the history because I really am just curious how we learned about ectopic pregnancies.



Erin Allmann Updyke Right. And how we figured it out early on and before ultrasound, what happened?

Erin Welsh Right, yeah.

Erin Allmann Updyke Oof. Probably wasn't good.

Erin Welsh No.

Erin Allmann Updyke Yeah. Yeah, so that's ectopic pregnancies.

Erin Welsh Okay.

Erin Allmann Updyke Do you have more questions?

Erin Welsh Not right now but I'm sure I will in just a few minutes.

Erin Allmann Updyke Okay, good. There's other atypical ways that a blastocyst can implant that might end up in a viable pregnancy. If the blastocyst implants too low in the uterus but not in the cervical canal, then it can result in what's called placenta previa. So the placenta completely covers the os or the opening to the cervix. And that is potentially dangerous, it can cause bleeding during pregnancy but it also if that placenta, if the baby has to deliver through the placenta, that doesn't...

Erin Welsh Right.

Erin Allmann Updyke That's not safe.

Erin Welsh It's not.

Erin Allmann Updyke So generally that goes to a cesarean section which we'll talk way more about later. And then of course there is miscarriage or early pregnancy loss. So I'm going to spend quite a bit of time talking about this.

Erin Welsh Okay.

Erin Allmann Updyke The definition of miscarriage actually is different depending on where you live and what country that you live in.

Erin Welsh Okay.

Erin Allmann Updyke Because it is defined generally as the spontaneous loss of, and these words are important, the spontaneous loss of a recognized pregnancy prior either to a certain gestational age or a certain weight of the fetus, depending on what country you live in and things like that. So in the US we define a miscarriage as a pregnancy loss prior to 20 weeks gestation. In the UK it's prior to 24 weeks. In other parts of the EU it's like 22 weeks. And per the World Health Organization guidelines, it's the loss of a pregnancy with a fetus that weighs 500 g or less which is about 22 weeks gestational age.

Erin Welsh Why is there such variation?

Erin Allmann Updyke: It's in part because it depends on like the definitions of viability and things like that.

Erin Welsh: Okay.

Erin Allmann Updyke: I don't have a great answer as to why there's variation but the variation exists. Which does mean that there's differences in terms of like reporting what is considered a miscarriage or an early pregnancy loss and then what is considered a stillbirth which is if you have a pregnancy loss after that time point.

Erin Welsh: I see. Okay.

Erin Allmann Updyke: But again, that time point varies a little bit.

Erin Welsh: And what's the recognized part?

Erin Allmann Updyke: Yeah, great question, Erin.

Erin Welsh: Okay.

Erin Allmann Updyke: So that also the definitions kind of differ. So there are like clinically recognized pregnancies and then there are pregnancies that maybe weren't recognized clinically. And some of that depends on whether or not it was seen on ultrasound.

Erin Welsh: Okay.

Erin Allmann Updyke: Which means not only did you have access to ultrasound but how early was it?

Erin Welsh: Yep.

Erin Allmann Updyke: And then like you said, Erin, is that the more that we have access to these very, very early pregnancy tests that can detect... Some of the home pregnancy tests now can detect very low levels of HCG which means you can get it earlier and earlier and earlier. And so that does change our like rates of miscarriage.

Erin Welsh: Yeah.

Erin Allmann Updyke: But in some of the literature, if there's not a documented pregnancy with ultrasound then it's not classified as a miscarriage but it might be classified as an "early pregnancy loss", quote unquote-

Erin Welsh: Okay.

Erin Allmann Updyke: Or a biochemical pregnancy loss is another term that gets thrown around a lot, biochemical pregnancy.

Erin Welsh: Yes, I've seen that. Yeah.

Erin Allmann Updyke: Or sometimes they're called pre-clinical pregnancy losses.

Erin Welsh: All right. Okay.

Erin Allmann Updyke

So it all is important but yeah, the definitions kind of vary and so there's a lot of different words that get thrown around in the literature.

Erin Welsh

Yeah. Okay.

Erin Allmann Updyke

But all that being said, overall the rate of spontaneous loss of early embryos is very, very high in humans. So a lot of those blastocysts that we were talking about never actually make it to the point of implantation. So they are lost before implantation which means you never knew that you could have been pregnant, even though again we're defining pregnancy as your last menstrual period. So it's very confusing.

Erin Welsh

Yeah, yeah, yeah.

Erin Allmann Updyke

We don't know exactly how many of these like pre-embryos are lost prior to implantation but it's estimated to be somewhere between 20%-40% which is very high.

Erin Welsh

That is very high.

Erin Allmann Updyke

It's very high.

Erin Welsh

Yeah.

Erin Allmann Updyke

And those are estimates.

Erin Welsh

Also yeah, 20-40 is a huge range.

Erin Allmann Updyke

It's a huge range. Yeah. And then after implantation, so after that start of implantation, a further 30% are lost. But it's thought that about half of those happened so early that most people, and caveats here with early pregnancy tests, but most people would never know that they were pregnant or were almost pregnant, could have been pregnant. Because they don't ever miss a period, right?

Erin Welsh

Yeah.

Erin Allmann Updyke

So the implantation starts but then it doesn't continue. So then you have shedding of your uterine lining at the time that you typically would.

Erin Welsh

Right.

Erin Allmann Updyke

And those are most often classified as biochemical or pre-clinical pregnancy losses.

Erin Welsh

Okay.

Erin Allmann Updyke

But the more that we have early pregnancy tests, the more that people are going to know that that happened to them, right.

Erin Welsh

Yeah, yeah.

Erin Allmann Updyke Most estimates of the overall risk of miscarriage, so the loss of that recognized pregnancy prior to 24 weeks is about 15% globally.

Erin Welsh Wow.

Erin Allmann Updyke And that's a huge number.

Erin Welsh Yeah, it really is.

Erin Allmann Updyke 15% is 23 million recognized miscarriages worldwide every year.

Erin Welsh Wow.

Erin Allmann Updyke I know. We don't talk about it at all.

Erin Welsh We don't, no.

Erin Allmann Updyke It's not something that we talk about. It's not something that's polite to talk about. But something, there's a few things I feel like I have a lot of feelings about this.

Erin Welsh Yeah.

Erin Allmann Updyke But 1 in 3 women are also estimated to experience a miscarriage at some point during their reproductive years. So it's not just that it's common globally-

Erin Welsh Right.

Erin Allmann Updyke It's also common that you might have throughout your reproductive lifespan a miscarriage at some point in time. And something being common does not make it unimportant, right.

Erin Welsh Yeah, of course.

Erin Allmann Updyke Oh it happens all the time. It's really important.

Erin Welsh Right.

Erin Allmann Updyke There was a study in a paper that I read that looked at only 500 women, so it's a small study but I think this is still really important data. 537 women with a pregnancy loss, a recognized pregnancy loss, found that after 9 months 18% of them met criteria for post-traumatic stress, 17% for moderate or severe anxiety, and 6% for moderate or severe depression. So like losing a pregnancy, whether it was a planned pregnancy, an unplanned pregnancy, an early pregnancy loss or a later pregnancy loss, that is very hard potentially.

Erin Welsh Right, right.

Erin Allmann Updyke And it's really lonely if it's something that you're not able to talk about in quote unquote "polite company".

Erin Welsh: Yeah. Well and I feel like you make a really good point that like even though this does happen a lot and it's not talked about a lot and it doesn't take away the pain and the trauma that that can result.

Erin Allmann Updyke: Exactly. Yeah. Right, yeah. Most pregnancy losses, most miscarriages happen in the first trimester, so sometime in the first 10-12 weeks.

Erin Welsh: Okay.

Erin Allmann Updyke: But 1%-2% of pregnancy losses will happen in the second or third trimester. And like we said, if it's after that 20-24 weeks then we classify it as a stillbirth rather than a miscarriage. And no matter how early, any pregnancy loss has the potential to be met with shame or stigma-

Erin Welsh: Yeah.

Erin Allmann Updyke: Loneliness, guilt, fear, frustration, like so many different things. And a lot of people understandably want to know like what causes this?

Erin Welsh: Right. Why?

Erin Allmann Updyke: Why is this happening? And we don't know.

Erin Welsh: Yeah.

Erin Allmann Updyke: Right? Except that it happens like very commonly across the board to these early embryos especially. Most estimates are that about 50%-80% of the time, miscarriages are due to chromosomal abnormalities in the fetus.

Erin Welsh: All right, okay.

Erin Allmann Updyke: And that is one of the big reasons that age, female age specifically, is a big contributor, where younger people are much less likely to have a miscarriage compared to as we get older. The rates are like vastly different.

Erin Welsh: It's so interesting because I know that we talk about the impact of female age but I feel like it can add blame sometimes.

Erin Allmann Updyke: Absolutely.

Erin Welsh: And also the sperm age or like age of the person who's making the sperm also plays a role.

Erin Allmann Updyke: Right. I think I saw at least one study that looked at that and there is actually an increased risk of miscarriage I believe.

Erin Welsh: Yeah.

Erin Allmann Updyke: I wish I had written more detail on this but it's at an older age whereas with females it starts at like 35 or so that the rates of increased chance of miscarriage go up, it starts later, like after 40 or maybe it was 45.

Erin Welsh: Okay.

Erin Allmann Updyke: Don't quote me on that because I'd have to go back to the paper.

Erin Welsh: Yeah, yeah.

Erin Allmann Updyke: But yeah, so you're right, it's not a nil factor.

Erin Welsh: Right.

Erin Allmann Updyke: It is a contributor but we don't talk about it.

Erin Welsh: Well just always it's like age of the mother, age of the woman.

Erin Allmann Updyke: Advanced maternal age.

Erin Welsh: Advanced maternal age. Geriatric womb.

Erin Allmann Updyke: We don't call that that anymore. Okay, I don't. I'm sure people do.

Erin Welsh: Yeah, I'm sure. I think there are probably a handful out there.

Erin Allmann Updyke: I don't. So yeah, so miscarriage is a really important topic I think to talk about.

Erin Welsh: Yeah, yeah.

Erin Allmann Updyke: The other thing important to know about miscarriage is how we manage it because there's three main ways medically that we can manage it. One is called expectant management which basically means you don't do anything, like there's no medical intervention and you wait for that tissue to pass on its own spontaneously. There's another option which is a medication option and most of the time there's a combination of medicines that are used, misoprostol and mifepristone, AKA abortion medicines.

Erin Welsh: Yeah.

Erin Allmann Updyke: Or with a vacuum aspiration or a D&C which is a dilation and curettage which is the exact same surgical procedures as are used in quote unquote "elective" abortions.

Erin Welsh: Abortion is healthcare.

Erin Allmann Updyke: Abortion is healthcare. Every one of these options, expectant management, medical management, and surgical management are all associated with risks and benefits for the individual. And in fact in the data there's no difference in like one is more risky, one is less risky. They all have risks of bleeding, they have risks of infection, and the choice to do one or the other should lie only with the person who is pregnant and their medical doctor. However-

Erin Welsh: However?

Erin Allmann Updyke: Because we live currently in the United States, especially with all of these abortion restrictions that are going into place, this is no longer the case. It is now very often the decision between a legal team and the hospital administration on when to do something about it-

Erin Welsh: Yep.

Erin Allmann Updyke: On when not to do something about it, on when you have to just wait, etc, etc.

Erin Welsh: Just around a conference table, someone's making decisions about what is happening inside your body.

Erin Allmann Updyke: Yep. And you're not involved in that decision. Yep.

Erin Welsh: You don't have a seat at the table.

Erin Allmann Updyke: Oh gosh, that's a lot.

Erin Welsh: Yeah.

Erin Allmann Updyke: That's a lot. Do you have any questions about that?

Erin Welsh: I have feelings about that.

Erin Allmann Updyke: I do too.

Erin Welsh: I'm trying to think if I have any specific questions.

Erin Allmann Updyke: Yeah.

Erin Welsh: Okay, one question I have is like you said that the risks associated with each of these are more or less the same, so then why would someone opt for one vs another?

Erin Allmann Updyke: I mean it's in part personal preference, it's in part too like how far along you might be or if you have sort of started to pass that or not. And then a lot of it really is personal preference because it's like are you going to feel more comfortable doing this at home where you have maybe support around you or maybe you don't have any support at home? Maybe the thought of having to wait a long time because you don't know how long it will take to pass it on your own is really more traumatic. And so having something done where it's over and you know that it's done is maybe more appealing to you.

Erin Welsh: Right. Okay.

Erin Allmann Updyke: So there's not like a hard line that this has to be one way or the other.

Erin Welsh: Got it, okay.

Erin Allmann Updyke: Yeah. So let's stop there for now.

Erin Welsh: Okay.

Erin Allmann Updyke: And bring it all the way back to the developing embryo.

Erin Welsh: Got it. Oh.

Erin Allmann Updyke: Just this. I'm just reminding you where we left off-

Erin Welsh: Here we go. Okay. I was like what, another prop?

Erin Allmann Updyke: It's the same prop, my tennis ball. This inner cell mass. Okay, we're here. So during all of this time and before implantation and after implantation starts, what's happening with this inner cell mass, I'm going to walk you through really quickly embryonic development.

Erin Welsh: Okay.

Erin Allmann Updyke: And when I say really quickly, I mean this is like the most CliffsNotes version, right.

Erin Welsh: Okay.

Erin Allmann Updyke: So we are back now at about 2 weeks post-fertilization, week 4 of pregnancy. Okay? And this little pre-embryo at this point, this inner cell mass, it's a little disc of cells that has formed the three essential germ layers that will eventually become all of the different tissues and organs in our body.

Erin Welsh: Okay.

Erin Allmann Updyke: And then these little discs of tissue will form tubes.

Erin Welsh: Tubes. Yeah.

Erin Allmann Updyke: One tube will become our brain and spinal cord.

Erin Welsh: Yeah.

Erin Allmann Updyke: The other tube will become our guts. Isn't that cute?

Erin Welsh: That's very cute.

Erin Allmann Updyke: Two tubes. And then after that a little lump will start to form at the top of this tube of cells and that lump will become our head. And then little bumps come up along the back and those will eventually become our vertebra. By about the 6th week of pregnancy, so there's about 2 weeks after your missed period potentially, this embryo, it's called an embryo now, it still does not look like a human like at all.

Erin Welsh: No.

Erin Allmann Updyke: It looks to me very much like the alien in Alien.

Erin Welsh: I mean like embryonic development, there's some quote and I don't remember who it's by, whether it's like Dobzhansky or I don't know, it's one of those old evolutionary biologists-



Erin Allmann Updyke

Okay.

Erin Welsh

That's like everything, our entire evolutionary history can be traced to ontogeny and like the development of an embryo. I'm probably butchering that quote horrifically.

Erin Allmann Updyke

I mean I like it.

Erin Welsh

Yeah. I wish I knew who it was by.

Erin Allmann Updyke

Well listen-

Erin Welsh

It wasn't Dobzhansky.

Erin Allmann Updyke

At this point we look like an alien. Okay, like the head thing is like curved over.

Erin Welsh

Yeah.

Erin Allmann Updyke

There's this big long thing that comes off the back, these bumps along the back.

Erin Welsh

Very reptilian.

Erin Allmann Updyke

Very reptilian.

Erin Welsh

I mean our origins, our evolutionary origins, yeah.

Erin Allmann Updyke

Right. And when you look at like embryo development side by side of like all the different species, we look all the same, the same, the same, the same all the way through this point.

Erin Welsh

Yeah.

Erin Allmann Updyke

But we're not as scary as an alien because it's like 2 millimeters long.

Erin Welsh

Not as scary as an alien. Oh as Alien, capital A.

Erin Allmann Updyke

As capital A Alien. Yeah.

Erin Welsh

Proper noun Alien.

Erin Allmann Updyke

Proper noun. But at this point too when we look like Alien is when things like the eyes, what will become the eyes start to develop. So you get these two little dots that will eventually become our eye cells. The parts that will become our jaws and our ears and all of this is very important patterning that has to happen in exactly the right way for all of our body parts to actually develop.

Erin Welsh

Yeah.

Erin Allmann Updyke

And at this point too, about week 6 is when you could first detect what will become a heartbeat. So this little bulge that will become our heart starts to beat and you can see that on ultrasound. It's also when we start to see arm and leg buds. (pop)

Erin Welsh: The buds, yeah.

Erin Allmann Updyke: That was loud, start to kind of pop out just a little bit. And then eventually those limb buds will make paddles first and then little fingers and toe buds. And then by the end of the 10th week of pregnancy, so 10 weeks after your last menstrual period-

Erin Welsh: Okay.

Erin Allmann Updyke: 8 weeks since fertilization.

Erin Welsh: Got it.

Erin Allmann Updyke: Okay? Is when you start to have something that looks more like a human than all of our vertebrate cousins and that is when we are almost to the 2nd trimester and then we enter the fetal period.

Erin Welsh: The fetal period.

Erin Allmann Updyke: The fetal period. At the same time as this is also when that syncytiotrophoblast that has during this whole time been invading its way into the myometrium all the way through, it has finally at the same time point finished the formation of the placenta, which isn't all the way formed until week 13 of our pregnancy.

Erin Welsh: Which is wild.

Erin Allmann Updyke: I know. And that is the organ that you, Erin, will pick up with next week.

Erin Welsh: I certainly will. I have questions.

Erin Allmann Updyke: Oh gosh.

Erin Welsh: And you might be getting into them next week.

Erin Allmann Updyke: Okay, I probably won't so give them to me now.

Erin Welsh: What's going on in the pregnant person's body? Is that all next week?

Erin Allmann Updyke: That's all next week.

Erin Welsh: Okay.

Erin Allmann Updyke: But I'm so glad you asked because I cannot wait to tell you about it.

Erin Welsh: Oh my gosh.

Erin Allmann Updyke: It's really good because it's already started.

Erin Welsh: Yeah.

Erin Allmann Updyke

Oh I'm so excited about it.

Erin Welsh

Oh I can't wait, I can't wait.

Erin Allmann Updyke

I know. I'm also done talking about the fetus, I'm not going to mention them again pretty much.

Erin Welsh

Okay. We will do more fetus stuff in the future.

Erin Allmann Updyke

I have so much feelings about it-

Erin Welsh

I know.

Erin Allmann Updyke

And I want to talk all about it but we're talking about pregnancy for this series.

Erin Welsh

Were talking about pregnancy.

Erin Allmann Updyke

So there we are.

Erin Welsh

There we are.

Erin Allmann Updyke

We've made it to the end of the first trimester.

Erin Welsh

Oh my gosh.

Erin Allmann Updyke

Oh my gosh.

Erin Welsh

That went by faster-

Erin Allmann Updyke

I know.

Erin Welsh

And also we covered so much.

Erin Allmann Updyke

I know.

Erin Welsh

But we didn't cover a lot.

Erin Allmann Updyke

We have so much more to cover.

Erin Welsh

I have thoughts. Okay.

Erin Allmann Updyke

Me too. But everyone is going to have more that they want to learn, so we're going to tell you where to learn it and all of our sources.

Erin Welsh

Yeah. Yes. Okay. So for this I actually didn't have as many sources as I do for my later episodes. I have a few more but I'm going to shout out three in particular. One is the book 'Pregnancy Test' by Karen Weingarten which I referred to in my notes. Also 'A Woman's Right to Know' by Jesse Olszynko-Gryn. And then by Sarah Abigail Leavitt, 'A Private Little Revolution', it's an article about the home pregnancy test.

Erin Allmann Updyke: Okay.

Erin Welsh: And I really liked those three together as sort of like this big picture view of everything that I talked about.

Erin Allmann Updyke: Well I loved your whole part, so it made me want to read those.

Erin Welsh: Thank you.

Erin Allmann Updyke: I relied very heavily on a textbook that's very old at this point. It was by Jones and Lopez and it was called 'Human Reproductive Biology'. So it's like a primer on it all.

Erin Welsh: Is it very old mean the late 20th century as like the youth say? It's like wait...

Erin Allmann Updyke: It was the 21st century, it was from 2013. It's like 10 years old but I mean...

Erin Welsh: Yeah, for a textbook is yeah.

Erin Allmann Updyke: Our knowledge of this part hasn't changed. But I will also say that it's good for data but it has a lot of weird, I don't know, editorialization in parts of it. So I don't know.

Erin Welsh: Interesting. Okay.

Erin Allmann Updyke: Anyways, I cited it. It's what I used primarily. And then a few other papers that I think were really important, especially in learning about the placental development, if you want more detail on that which you'll get to next week. But there was one from Proceedings of the Royal Society B from 2023 called 'The Human Placenta: New Perspectives on its Formation and Function during Early Pregnancy'.

Erin Welsh: Ooh.

Erin Allmann Updyke: And then there was a whole series in The Lancet from 2021 all about miscarriage.

Erin Welsh: Okay.

Erin Allmann Updyke: And my favorite one from that was called 'Miscarriage Matters: The Epidemiological, Physical, Psychological, and Economic Costs of Early Pregnancy Loss'.

Erin Welsh: Wow.

Erin Allmann Updyke: But there was a few other papers in that series as well. But as always-

Erin Welsh: As always.

Erin Allmann Updyke: You can find all of our sources because there's so many more on our website [thispodcastwillkillyou.com](http://thispodcastwillkillyou.com) under the EPISODES tab.

Erin Welsh: You certainly can.

Erin Allmann Updyke	This and all of our episodes.
Erin Welsh	All of our episodes.
Erin Allmann Updyke	We have literally so many sources.
Erin Welsh	It's kind of unbelievable.
Erin Allmann Updyke	Yeah, proud of us.
Erin Welsh	Me too. Thank you again so, so much to everyone who provided their firsthand account, everyone who wrote in with their firsthand account. We really don't have the words to express how grateful we are.
Erin Allmann Updyke	No, like so, so, so meaningful to us.
Erin Welsh	Yeah.
Erin Allmann Updyke	And we could not do especially this series without you.
Erin Welsh	Yeah.
Erin Allmann Updyke	So thank you.
Erin Welsh	Thank you.
Erin Allmann Updyke	Thank you also to Exactly Right studios and everyone who's here looking at the window, it's so exciting.
Erin Welsh	It is very exciting.
Erin Allmann Updyke	Thank you to Tom and Lianna who's not here today but will be, and I'm saying too much. Thank you to Jessica and to Brent and to Craig and everyone else.
Erin Welsh	Yeah.
Erin Allmann Updyke	And all. We're so excited about this.
Erin Welsh	It's really been so much fun. I feel so cool. And I don't often feel cool.
Erin Allmann Updyke	I still feel too nerdy. But I'm having a lot of fun.
Erin Welsh	Me too, me too.
Erin Allmann Updyke	Yes. So thank you all for all of your work. We're excited.
Erin Welsh	Yes, thank you. Thank you to Bloodmobile who provides music for this episode and all of our episodes.

Erin Allmann Updyke

And thank you to you, listeners.

Erin Welsh

Yeah, for listening.

Erin Allmann Updyke

And viewers too.

Erin Welsh

And viewers. Yeah. Amazing.

Erin Allmann Updyke

We hope you had fun with this one.

Erin Welsh

Yeah.

Erin Allmann Updyke

And you're prepared for three more episodes on pregnancy.

Erin Welsh

Yeah, I hope you like more where this is coming from because we've got it.

Erin Allmann Updyke

It's coming, it's still coming.

Erin Welsh

I don't know, that sentence didn't make sense.

Erin Allmann Updyke

It's fine.

Erin Welsh

And thank you to our patrons. We really do appreciate your support. It means the world to us.

Erin Allmann Updyke

It really does. Thank you.

Erin Welsh

Yeah. Well until next time, wash your hands.

Erin Allmann Updyke

You filthy animals!