Childhood Vaccine Schedule 1

[00:00:00]

EW: Hi, I'm Erin

EAU: And I'm Erin Allmann Updyke,

EW: and this is, This Podcast Will Kill You

EAU: we're coming at you with season eight.

EW: season eight. Yeah. Uh, season seven was like literally

EAU: Last week. Yep. Mm-hmm.

EW: And so if you did notice the long break between seasons, that is by design, that is intentional. There wasn't a

EAU: There wasn't

EW: You know, given all of the disturbing and widespread changes that are happening to public health and the sciences here in the us, we decided, you know, maybe we should just like keep things

EAU: just keep going.

EW: to stay on top of some of these horrific changes and provide you all with clear info and reliable sources for some of the things that you're seeing. Splashed across

EAU: Mm-hmm.

EW: things like devastating funding, cuts to scientific research, outbreaks of vaccine preventable illnesses,

EAU: measles.

EW: including measles, the intentional concealment of vital public health information, massive cuts to healthcare access, a profiteer of vaccine

disinformation at the helm of the most significant public health institution. In the US the list goes on.

EAU: Yeah,

EW: Yep.

EAU: it's,

EW: is everywhere and it's growing by the second,

EAU: is. And the truth is, we are all, all of us susceptible to it. Every one of us, even me and you, Erin,

EW: yeah.

EAU: even if we think we aren't, we like to think we aren't. So what do we do about it?

EAU: Well,

EW: about

EAU: well, we'll tell you what we are gonna do about it.

EW: Yeah.

EAU: Uh, what we are going to do is through this podcast, throughout the season, continue to be sources of reliable information about issues in health and medicine. To continue to provide historical context about scientific developments and to explore the current research shaping the future of health on this planet. That is what we have done. That is what we will continue to do.

EW: Mm-hmm.

EAU: Our list for this season is long, and so far includes fun things like raw milk, SSRIs, avian influenza. We hear you we're doing it,

EW: Mm-hmm.

EAU: fluoride and literally so many more. It's a long list.

EW: Do you notice a trend here?

EAU: So to help us fill out this schedule for this season and prioritize our focus, we wanted to ask you guys all for your help.

EW: Mm-hmm.

EAU: what do you wanna learn about? What topics are you seeing misinformation about? Which episodes that we've done in the past would you like an update on?

EW: Yes.

EAU: Let us know. Reach out. The best way to do that is through the Contact us form on our website. This podcast will kill you.com or you can send us an email to This podcast will kill you@gmail.com.

EW: Yep. Yes. Uh, we can't wait to hear from you. Uh, yeah,

EAU: Yeah,

EW: be a, it's gonna be a season full of

EAU: it's going to be a season period. Moving on.

EW: moving on.

EAU: What are we doing now?

EW: what are we doing now? Yes, this week and next week we are going to be talking about the childhood vaccine schedule, especially the one that we have here in the

EAU: Mm-hmm.

EW: And it's actually, it's funny because like we ended the pregnancy series and we were like, oh, well, and we'll talk about childhood stuff some other

EAU: Right.

EW: about infancy some other time. And actually this is like kind of a

EAU: It's a nice continuation. It's almost like we planned it. Mm-hmm.

EW: And part of the reason that we decided to do this is because, you know, you, you may have come across the news that RFK Jr, who is longtime anti-vaccine activist, and now the secretary of the uh, US Department of Health and Human Services, has indicated that he intends to investigate the childhood vaccine schedule after saying previously that he would not. What are the possible consequences

EAU: Yeah.

EW: That's what we're gonna

EAU: That's what we wanna know.

EW: Yes. And so to do this, we're splitting this topic into two episodes because we want to first just do a general review

EAU: Mm-hmm.

EW: vaccines work, what these childhood vaccines protect us against, and what these vaccinations do for us as individuals and as members of a community. in our second episode, we're going to go deeper into the schedule itself. You know, what vaccines do kids get and when, how we decided upon this vaccination schedule, how and why it differs from schedules in other parts of the world, some of the latest trends and outbreaks of vaccine preventable diseases. And finally, just some strategies on how to talk with people who might be on the fence about vaccines.

EAU: Just a few small topics for us to cover in two episodes. No problem.

EW: Yeah.

EAU: Before we get into all of that, it is quarantine time.

EW: It is erin. Ah, this

EAU: This week

EW: Boosted what's in Boosted because I have, I have already forgotten

EAU: um, it's a delicious little [00:05:00] bev gin, uh, lemonade and raspberries, raspberry lemonade. Add gin if you prefer

EW: Easy peasy. Delicious and squeezy, I dunno. Yeah.

EAU: We'll We'll post the full recipes on our website. This podcast will kill you.com as well as our social media channels. If you're not following us, you should be there.

EW: should

EAU: We're there?

EW: should be on our website. You can find all kinds of things. You can find a firsthand account form. You can find a Contact us form. You can find links to Music by Blood Mobile. Links to our bookshop.org affiliate account. Our

EAU: Mm-hmm.

EW: uh, links to merch sources for all of our episodes, transcripts, Patreon, there's

EAU: so much there.

EW: wealth of

EAU: My goodness.

EW: Uh,

EAU: we?

EW: other business.

EAU: Welcome back. Good to see you.

EW: Welcome back. It's been so long.

EAU: Alright, um, let's start right after a short break.

EW: A calamity of the most serious kind has swept down upon this beautiful group of islands, and its ravages will have to be computed, not by the hundred, but by thousands. A most extraordinary scene was presented of whole towns with the houses closed, the lanes and squares silent as death and the inhabitants all down - old men and infants, young men and mothers of families - one heap of illness. The Destroying Angel had silenced every dwelling, and there was a weird quiet about the place that struck very peculiarly upon one's feelings. Daily the canoes were to be seen carrying the dead to their breezy resting-places on the opposite shore, and day and night was the death drum beating, and the wails of the mourners rose on the air. Strong winds and heavy rains added to the horrors of the situation, and the Bauans almost starved for food, the people being unable to get to the mainland where their gardens were. Hard-worked in the day and with broken rest at night, I passed through some weeks, the like of which I hope never to see again. At home in our own land, there is always a large proportion of healthy persons who act as a relief to the many stricken by prevailing disease; but here you have a whole country down, all sick - men, women and children dying all around you every day - your best friends among the people dying.

EW: Childhood vaccine schedules have been for quite some time a major target of anti-vaccine propaganda. Vaccine disinformation, spreaders. Want people to question why do we need so many? Don't these vaccines overwhelm our immune

EAU: Do they hear him?

EW: No. Long story short,

EAU: Yeah, you're right.

EW: ra, rather than declaring vaccines unsafe just across the board, these anti-vaccine activists seek to reach a broader audience by normalizing vaccine hesitancy and making it more

EAU: Mm-hmm.

EW: You know, they reframe their position from anti-vax, which is more

EAU: Right.

EW: extreme to "pro safe" vaccination, because who doesn't want safe vaccines, right? We all want safe

EAU: I want safe vaccine.

EW: safe vaccines is the thing,

EAU: I want them

EW: right?

EAU: have them

EW: And we have them. the truth is that. The vaccines we have, the schedule we use, these things are safe and they have been proven to be so over the decades with so much data to

EAU: so much.

EW: this

EAU: Mm-hmm.

EW: we'll get more into that in these episodes. Parents want the best for their children. They wanna set them up for a happy and healthy life. Every decision that you make seems fraught with the potential for harm. Things like which crib to choose, sleeping schedule is, the gonna be the

EAU: Do you even sleep train, Erin? I don't know.

EW: Ah, I have idea you. But you want to do the right thing for your child. Wanting to make the right decision and worrying about the outcome is completely understandable help you decide what to do. You may ask your doctor, you may talk with your trusted friends, or you may, you know, ask the

EAU: Consult the TikTok.

EW: TikTok. Oh gosh, no, don't consult TikTok. And, but each of these things might advise you differently or they might see the balance of risks and benefits

EAU: Mm-hmm.

EW: when it comes to vaccines. Finding reliable information on the internet is increasingly challenging. And given our medical system here in the US finding

the time to make an appointment with your doctor to fact check some of the things that you've read about vaccines on the internet, that can be next to impossible, Or, let's say that [00:10:00] you do find the time or you do find the money to make an appointment, to talk with your doctor, and somehow in that 10 minute appointment you manage to squeeze in a couple of questions about vaccines and your doctor just scoffs and condescends to

EW: you

EAU: yeah.

EW: you feel bad for asking these questions in the first

EAU: Yeah.

EW: And maybe you can't shake that little seed of doubt planted by a TikTok video that you saw that was spouting vaccine misinformation. this video that makes you ask, what

EAU: Mm-hmm.

EW: the, what if that anti-vaccine activists, this, the question that they try to plant is, what if these vaccines are not safe? When really the what if should be, what if my child gets measles, Disinformation spreaders minimize that future threat of being unvaccinated, and they falsely amplify the minuscule risks posed by vaccinations, or they just invent risks altogether. Choosing not to vaccinate gives you the illusion of control, when in fact it takes it away entirely because you cannot predict whether your child will be the one to die in a measles

EAU: Yeah.

EW: of the ones to

EAU: Yeah.

EW: outbreak,

EAU: so sad.

EW: it is. It's so tremendously

EAU: Yeah.

EW: You can't predict whether they'll have permanent lung damage after about of whooping cough, which they also transmitted to a baby that was too young to be vaccinated. We wanna start these episodes with the message that we get it.

EAU: Mm-hmm.

EW: easy to fall prey to this vaccine disinformation because of the way that it plays on those specific

EAU: Yeah.

EW: because it gives you this illusion of control because it tells you that you're doing right by your child vaccine disinformation is specifically engineered to do

EAU: Right. And not just on TikTok. I feel like we've we've blasted poor TikTok a few times now.

EW: we have. Yeah. But it's, it's everywhere in everything. And addressing each one of the invalid claims that are made by anti-vaccine activists, it can actually breathe more air into their movement. so rather than doing targeted myth busting, what we are gonna do in this and next episode is we're gonna present the factual information about vaccines, the diseases that they prevent and why we have the childhood vaccine schedule that we do.

EAU: Yeah.

EW: So first, Aaron, let's start back at the beginning. What are vaccines and how do they work?

EAU: can't wait to get into this, Erin. It's really just like a, an appreciation of our immune system for a moment here. Ready for this.

EW: our immune system.

EAU: Every single time that we breathe in, everything that we put in our mouths, that we wipe across our snotty noses, that we rub into our eyes. All of this exposes us to antigens and antigen is just the fancy medical word for stuff that our immune system can recognize as not me,

EW: mm-hmm.

EAU: Not self. We are exposed to these antigens all the time. From literally the minute that we're born and we take our first breath and we open our eyes.

EAU: Once these antigens enter our body, they get recognized by white blood cells whose job is antigen recognition. That's their title. Then they present that antigen to other white blood cells in our lymph nodes. Some of these white blood cells in our lymph nodes make antibodies and antibodies are like little Lego flags that are hyper-specific markers that can recognize and Lego click onto one single antigen or like one part of one single antigen.

EW: I love, I love the visual of Allego

EAU: I know.

EAU: And they, they, really do a little snap in place,

EW: in, key in

EAU: key in lock Lego, and they, they basically flag it for destruction. That's what an antibody is doing. But the part that actually protects us in the long term is that these antibody producing cells stick around in our bodies so that if that particular antigen ever dares to show its face in our body, again, we're ready for it. Right?

EW: Mm-hmm.

EAU: These memory cells can super quickly make a whole bunch more of these Lego flags and just stick 'em all over. Any antigens that dare to enter before that virus or bacteria or whatever it is, can make us sick.

EW: Mm-hmm.

EAU: And this process is how our antibody mediated immune response, which is just one of our incredible immune system things. That's how it works across the board. When we are sick with a viral infection or a bacterial infection like the flu or something else, our immune system is running through this whole immune response, but it's doing so while the virus is replicating, and then we get [00:15:00] super, super sick.

EW: Yeah.

EAU: We're

EW: can die.

EAU: exactly, we're protected from a repeat infection, but there is a cost, right? Some of us will get very sick. We might be hospitalized. We might even die from this infection.

EW: Mm-hmm.

EAU: So what vaccines do is just allow us to produce these antibodies that will protect us from a future infection without ever having to get sick in the first place. That's what they do. Like, it's just truly incredible.

EW: it is, it is. Vaccines are so, I I, I love

EAU: I, it,

EW: put,

EAU: it simply put, because vaccines are just introducing these antigens in a very small amount, in a, in a specific time and place, right?

EW: a, it's a shortcut that. Saves lives and saves, saves permanent injury and, and illness. And even just short

EAU: Right.

EW: right? Like being miserable with the flu. You don't have to feel that.

EAU: Right.

EW: just,

EAU: they're incredible. And there are a number of different types of vaccines that we use. There are things like live attenuated vaccines. There are killed virus or killed bacteria vaccines. There are toxoid vaccines, there are mRNA vaccines, and there are lots of other types of like specific vaccines.

EW: Like subtypes and whatnot.

EAU: can link to so many detail, more detail. But the bottom line is that each of these different types of vaccines has both pros and cons and some types of vaccines are going to work better for some diseases than others. And when people, meaning regulatory bodies are deciding which vaccine is approved or included in our vaccine schedule, they're looking at things like efficacy, safety, and how well it produces an immune response.

EAU: All of these things have to be considered. And every single vaccine, just like every single thing that we put into our bodies, medicine, food, quarantining, all of it, as well as every single disease or pathogen that we're exposed to has a potential for side effects. But the side effects of vaccines are generally quite mild. They're things like a sore arm, swelling maybe around the injection site fever. Now, fevers in children can sometimes cause seizures, and while vaccines can cause a fever, febrile seizures after vaccination are actually quite rare, and you're far more likely to get a febrile seizure from an infection rather than a vaccination.

EW: Right,

EAU: And in general, any serious side effects from a vaccine, like for example, the rash that can happen after an MMR or a varicella vaccine, they tend to be milder versions of the same symptoms that you can have from the disease itself. But most of the time you can't then spread that to others the way that you can in the context of an infectious disease.

EW: right, right.

EAU: The only risk that exists with vaccination that doesn't really exist with what people call natural infections, whatever that means

EW: Natural.

EAU: is so natural, um, is the potential for an allergic reaction. And that mostly has to do with vaccine components rather than the antigens from that virus or bacteria itself. And it's estimated that there are one to two severe allergic reactions per million doses of vaccines.

EW: Mm-hmm.

EAU: So when we're comparing risks and benefits, we have to compare apples to apples. I. One to two severe allergic reactions per million doses of vaccine. If we're looking at measles, for example, one in five kids with measles is hospitalized with severe infection and one to three of every 1000 kids with measles will die.

EW: One to three for every 1000

EAU: Yeah. And no kid should be dying from a disease that we can prevent.

EW: No.

EAU: No.

EW: No.

EAU: So that's like how vaccines work across the board and a little bit of the risks and comparing the actual risks to risks of the diseases that we're preventing against.

EW: Mm-hmm.

EAU: But, so if we're talking about the childhood vaccination schedule, what are the vaccines on that schedule and what are the diseases that we're actually able to prevent?

EW: Yes. Let's go through

EAU: Let's, we're gonna back and forth this. This is a fun not typical episode for us.

EW: It's been fun to put it

EAU: Yeah.

EAU: But before we get into it, let's take a quick break and then we'll come back with all of these vaccines and diseases.

EW: can't wait.

EAU: So when we're talking about protecting kids, which is what we're talking about in this [00:20:00] episode, I.

EW: Mm-hmm.

EAU: can start before they're even born because there are some vaccines that we can give during pregnancy to provide passive immunity to the baby, which includes Tdap. And we'll get into the diseases covered by that vaccine in a little bit, but it also includes RSV. And if you didn't get the RSV vaccine during pregnancy, there's another type of immunization works a little bit differently that your baby can get in the first week of life. So Aaron, walk us through what is RSV? What is the RSV vaccine protecting us from?

EW: Okay. I, I am going to tell you all of that, but first I've realized we should probably mention that we have disease specific episodes for

EAU: Oh yeah,

EW: the diseases that we will cover, in addition to a two-parter on vaccines and the history of their development and how they work more detail about all of this. And so, just as a little preamble to this section, we will link to all of these other episodes in the show notes for this one and on our website. And so if you want more info,

EAU: got it.

EW: so much.

EAU: I feel like we said that to each other so many times while we were like working on this episode that we forgot to

EW: Yeah,

EAU: say it. We're like, oh, it will obviously, we'll say that a million times.

EW: I know. I was like, oh, we didn't say it yet.

EAU: If you want more detail, we've got it. This is overview, go.

EW: And RSV is one of

EAU: Yes.

EW: RSV episode.

EW: Okay. RSV stands for Respiratory syncytial virus, as its name suggests, it is a respiratory infection.

EAU: is

EW: It's transmitted via air and direct contact, and for most adults, infection with RSV is relatively mild, but in infants and in elderly adults or those who have lung issues, it can be deadly or it can lead to complications like repeat hospitalizations, long-term lung impairment and asthma or recurrent wheeze. There is no widely available

EAU: Mm-hmm. Nope.

EW: widely available, each year this virus causes 3.6 million hospitalizations globally and an estimated 100,000 deaths in children under the age of five, 100,000.

EAU: which is, uh, so sad. Erin,

EW: know, I

EAU: it's gonna be on repeat.

EW: It's uh, yeah, we're gonna be repeating so many numbers. I feel like both the vaccine given to the pregnant person and the monoclonal antibody given to a newborn offer short-term protection for the newborn until their lungs are a bit more developed and then they're less likely at that point to have a severe infection that requires hospitalization.

EAU: Yeah, and in general, people are recommended to get one or the other. So if they didn't get the RSV vaccine during pregnancy, then that baby will get the monoclonal antibody immunization. But most babies, the first vaccine that they will get is actually Hepatitis B, which is given right after birth, usually within the first 24 to 48 hours of life. Erin, what's Hepatitis B?

EW: the Hepatitis B virus, it's a

EAU: Mm-hmm.

EW: It's transmitted via blood and bodily fluids, and it can be transmitted from mother to baby

EAU: Mm-hmm.

EW: And the real risk with hepatitis B, especially for those who are infected at a young age, is chronic infection, which can lead to liver cirrhosis and liver cancer. just to like emphasize this, here's some numbers. So it's estimated that 5% of adults newly infected with the Hep B virus will develop chronic hepatitis, but 95% of children under five who have the virus will develop

EAU: Right?

EW: why vaccination is so critical. three dose series of this vaccine is nearly 100% effective in entirely preventing infection with this

EAU: It is so amazing. Yeah.

EW: It's amazing. And even though we've had a Hepatitis B vaccine since the early 1980s, an estimated 254 million people around the world are chronically infected with this virus with around 1.2 million new infections every year, and an estimated 1.1 million deaths in 2022.

EAU: Yeah. So that's why we vaccinate.

EW: That is why we vaccinate.

EAU: After the birth dose of Hepatitis B, the first round of shots as it's often called for babies in the US is at two months old. So at the two month well child visit, we get five different vaccines plus a second dose of the hepatitis B. So we get DTaP, which is diptheria, tetanus, and acellular pertussis. We get IPV, which is the inactivated poliovirus, and we get HIB or Heus influenza type B and PCV, or the pneumococcal vaccine as well as rotavirus. So Aaron,

EW: And the second dose of hep

EAU: and the second I said that I did. So Aaron, that's [00:25:00] a lot all at once. Can you please walk me through what each one of these diseases are please?

EW: five, these five vaccines, it's amazing. Okay? Uh, you are protected from so many

EAU: I know.

EW: Let's start with rotavirus, right? So rotavirus is transmitted fecal, oral, or direct contact with an infected individual or through contaminated

EAU: Mm-hmm.

EW: Symptoms of rotavirus can include watery, diarrhea, vomiting, and severe dehydration that can lead to death if rehydration therapy is not provided. Rotavirus is a major killer globally with a 2.5% case fatality rate in children who are living in low income countries. And even though we've had a vaccine since 2008, rotavirus still causes a substantial burden of global death and disease. So, for instance, in 2016, rotavirus was estimated to cause 258 million infections globally and 129,000 deaths in children under the age of five.

EAU: It's just so sad. Erin.

EW: It's so

EAU: preventable diarrheal disease. Like, okay, we've got more.

EW: diptheria. So diptheria is our first bacterial disease on this list, and it's our first in a combo shot along with the vaccines for tetanus and pertussis. DTaP, um, is what

EAU: yeah. DTaP T DAP for adults. Just if anyone's confused about that.

EW: Diptheria is caused by a bacteria named Corynebacterium diphtheriae. Corynebacterium is just a really fun word to

EAU: isn't it?

EW: It is. It's another respiratory pathogen. It's transmitted through sneezes and coughs. And the symptoms of diptheria can be things like sore throat fever, swollen neck glands, weakness. And I still vividly remember from our diptheria episode

EAU: Mm-hmm.

EW: like back in 20 18,

EAU: It's a very old 2017. I don't remember. Anyways,

EW: mean, it was months apart. It's,

EAU: it stuck in your mind is the point.

EW: And this is one of the hallmark symptoms of diptheria. It is a gray odiferous membrane made up of dead tissue that coats your respiratory tract. And this makes it super difficult to swallow and

EAU: Mm-hmm.

EW: makes it difficult

EW: to

EAU: Mm-hmm.

EW: The bacterium also produces a toxin that can injure your heart and your nerves leading to long-term complications. is an incredibly deadly infection with death occurring in 30% of unvaccinated individuals without access to treatment like antibiotics or

EAU: Mm-hmm.

EW: But even having those things is not a guarantee of

EAU: Yeah.

EW: Right. A study that looked at diptheria cases in unvaccinated individuals between 1959 and 1970, found that even when treated with antibiotics, antitoxin and supportive care, 10% of people died.

EAU: Yeah.

EW: Yep.

EAU: Dip theory is a scary one.

EW: it really

EAU: Yeah.

EW: Okay. We've got a few more for this, this,

EAU: A lot more the the two month. Well, child check is a big deal. It's like when it's no longer truly terrifying if your child gets a fever, because before this point, like they're in the emergency room, you're concerned for a very serious infection if they have a fever and after this, they're protected from so many of the things that used to kill babies all the time,

EW: all the

EAU: So

EW: like tetanus. The next on our list, this is another bacterial disease caused by Clostridium tetani. And most people probably know that it's transmitted through exposure to spores of this bacterium, which can live in soil ash, rusty tools, and in the intestinal tracts and feces of humans and mammals who are

EW: infected with

EAU: Mm-hmm.

EW: Infection can occur when you have like a deep puncture wound, but most tetanus infections actually happened during birth. Like if the umbilical cord was cut with a contaminated tool, or if the pregnant person had not been adequately vaccinated.

EAU: Yeah.

EW: The symptoms of tetanus include painful muscle spasms, trouble swallowing, lock jaw, which is another name for tetanus, seizures, headache, fever, blood pressure changes, elevated heart rate, and death is quite a common outcome

EAU: Yeah.

EW: even with all that modern medicine can offer. Like you, you know, get tetanus symptoms show you go to the hospital right away. You have all of the best treatment in the world.

EAU: In like 2025.

EW: in 2025, 10% of people with tetanus will die from the

EAU: Yeah.

EW: And those that do recover are not protected from future infections. Only the vaccine gives you immunity, not the infection

EAU: Which is so interesting. And like you could do a deep dive on why that is and it's 'cause we are exposed to a much larger amount of the toxin, but it can't actually make us sick, whereas that's so interesting.

EW: Yeah. this is still a major problem around the

EAU: Yeah.

EW: [00:30:00] the WHO reported that in twenty eighteen, twenty 5,000 newborns died from neonatal tetanus.

EAU: Wow.

EW: number. But that number 25,000 was a 97% drop from 1988 when 787,000 babies died within their first month of life. From tetanus.

EAU: my God, Erin, in 1988, that's the year I was born.

EW: Yeah.

EAU: Hmm. There's more.

EW: these vaccines protect you

EAU: They protect us from all of it. Pertussis,

EW: So this is Pertussis is the last in our Tdap

EAU: DTaP, and T dap.

EW: I have written. DTaP

EAU: It's okay.

EW: head wants to say Tdap. Okay, pertussis. So this pertussis is a bacterial disease caused by borella pertussis. This is another airborne infection. It's spread when someone talks, sneezes or coughs. And symptoms can include fever, runny nose, and the characteristic hacking cough of this infection that gives it its other name, whooping

EAU: Mm-hmm.

EW: Pertussis can turn into a very serious illness, especially in infants, and this disease remained a major killer in childhood for many parts of the world into the mid 20th century with a case fatality rate of around 10%. Antibiotics aren't very effective against pertussis, even though this is a bacterial

EAU: Yeah.

EW: And antibiotics are mostly used just to, to reduce the spread of the disease, not reduce the severity of an individual infection. Like that's what they're most effective against.

EAU: other people in the community who are unvaccinated or unvaccinated from getting sick.

EW: Yes. study from the CDC showed that kids not vaccinated against pertussis were 16 times more likely to get the infection compared to vaccinated kids.

EAU: Yeah.

EW: Within a few decades of the pertussis vaccine being introduced, mortality rates dropped around 90%. Yes. And since babies can't get the pertussis vaccine right at birth, they're super vulnerable to this infection, which is why pregnant people get the vaccine during the last weeks of their pregnancy why it's so important to be vaccinated, to be up to date on your vaccines if you're gonna be spending time near a newborn. Yep.

EAU: get those shots

EW: Next.

EAU: Erin. There's so many more. This is two month well, child check. I love, I love doing this by the way. This is fun.

EW: thrilling. This is,

EAU: I

EW: I just, I just love that like this. We have, we're naming all these really scary things there are, we're also, there are ways to prevent them

EAU: We're not, we're not just saying these are scary things. We're saying these are scary things that we protect against when your child is two months old.

EW: Yes.

EAU: two months

EW: Yep. Like hemophilus, influenza type B, so this is also known as

EAU: hib.

EW: There are bacteria that can cause severe respiratory infections, especially in children under five years of age. These bacteria are common residents of our respiratory tract, and in most people, they don't cause any disease. They're just part of our microbiome. But if a baby or a child gets exposed, HIB can cause severe invasive disease. So what, what does that mean? It means meningitis, it means pneumonia, it means severe ear infections. Epiglottitis, even sepsis, complications of infection such as deafness, blindness, cerebral palsy, and hydrocephalus happen at high rates. there was a study that looked at the global burden of HIB infections prior to the vaccine and found that more than 520,000 children died of HIB infections. Every year. Every

EAU: that's a half a million babies globally.

EW: Ugh. Yes. The Between 2020 15, the vaccine has been estimated to save over 1.2 million children from dying of hib, which is a decline of 90%. And again, like with pertussis, diptheria and tetanus, this is not an infection where

you can rely on antibiotics. Antibiotic resistance has become a real issue with hib, and the search for an effective medication can cost you precious hours. I,

EAU: And especially with meningitis or with epiglottitis, which is very, it's an infection of like your, your throat that basically makes it so that you can't breathe. Um, it like blocks off your trachea so that you cannot breathe. So it's, it's very severe if it's not treated right away.

EW: yeah.

EAU: so antibiotic resistance is super scary,

EW: Yep.

EAU: but there's a vaccine.

EW: But there's a vaccine just as there is a vaccine for pneumococcal conjugates. So this vaccine protects against a bacterium, streptococcus pneumoniae that's commonly found in people's respiratory tracts, kind of like hib who don't appear

EAU: Right. Just lives there.

EW: It just lives there. And this one is also transmitted via the respiratory root. And infants [00:35:00] and young children are especially susceptible to severe disease from this bacterium. And like Hibs strep pneumonia can cause pneumonia, meningitis, sinus infections, ear infections, bacteremia and sepsis. The deployment of these vaccines between 2020 15 reduced deaths globally due to strep pneumonia by 51%.

EAU: Yeah.

EW: Again, antibiotic resistance is a growing concern that makes these vaccines ever more

EAU: This one also really hits home for me because the Pneumococcal conjugate vaccine wasn't approved for kids until the year 2000. And in 1988, my older brother got meningitis streptococcus pneumonia, um, and almost died. Did not die. Lost his hearing completely. So it's like very much a reality. That's not that long ago. Like that was the year that I was born. So it these, and I mean, we get pneumonia and things. These bacteria circulate everywhere all the time. So the fact that we have this vaccine is phenomenal.

EW: It is. Yeah.

EAU: Yeah.

EW: amazing.

EAU: And we have more

EW: And we have more polio.

EAU: polio.

EW: polio is caused by. Poliovirus it Is. This virus is transmitted through the air like coughing or sneezing, and through the fecal oral root, who aren't symptomatic can still shed virus into the environment and infect others. Polio can cause fever, fatigue, headache, vomiting, stiff neck, and classically can sometimes progress to paralysis. That is usually

EAU: Mm-hmm.

EW: Paralysis can be so extreme that five to 10% of people who have this symptom can die as a result. There is no treatment. None.

EAU: None for polio

EW: None. There is only prevention via vaccination in the us. In 1952, which is the year before the vaccine was introduced, there were more than 57,000 polio cases, 21,000 paralytic, and 3000 fatal.

EAU: the US alone.

EW: In the US

EAU: Yeah.

EW: in 20 23 0 cases in the

EAU: Yeah.

EW: Yep.

EAU: Yeah.

EW: similar, amazing improvements have been seen around the world. In 1988 when the global campaign to eliminate polio started 350,000 people globally we're paralyzed due to polio. then, cases have dropped 99%.

EAU: amazing.

EW: It is

EAU: So close and yet, so far from eradication for polio.

EW: I know. It's hard too. 'cause it's environmental

EAU: It is. Yeah, exactly. So most of all of those vaccines that we've had so far. Require multiple doses to provide enough protection. So as we're going through our childhood vaccine schedule, the next well child check is usually at four months. And at that visit, you actually get all those same ones that we just talked about, minus hepatitis B. You don't need a third dose of hepatitis B quite yet.

EW: Okay.

EAU: And then again, at the sixth month visit, you'll get a third dose of that DTaP, another dose of that pneumonia, the pneumococcal vaccine, another dose of the polio vaccine, and a third dose of the Hepatitis B vaccine. And then depending on like vaccine manufacturers, 'cause there's a few different types, there might be another dose of hib, there might be another dose of the rotavirus, or sometimes you don't need those, depending on which ones you got, which one your doctor's office had. But at six months old is also when babies are finally old enough to get their flu and covid shots.

EW: Mm-hmm.

EAU: Aaron, we all know about this one, right?

EW: most people are, are, are familiar with both of these I

EAU: Mm-hmm.

EW: go over them

EAU: Yeah.

EW: Uh, COVID, right? I think all know. We

EAU: Do we know? We all know?

EW: We all

EAU: Mm-hmm.

EW: Uh, COVID is caused by SARS COV to two Coronavirus, and, um, at this point in time, it has caused over 777 million reported cases worldwide since

EAU: That's in five years. Okay.

EW: it has killed over 7 million people since 2020. And this of course, continues to circulate and cause significant morbidity and mortality.

EAU: Yep.

EW: Yep.

EAU: That's Covid.

EW: Influenza,

EAU: there it is. We know it.

EW: know, we know influenza. It's also caused by a respiratory

EAU: Mm-hmm.

EW: This causes seasonal outbreaks. And in the US in the 20 24, 20 25 season, so far of the week of February 22nd, influenza has already resulted in 98 pediatric deaths and has caused at least 37 million illnesses. 480,000 hospitalizations and 21,000 deaths overall from flu season so far in the [00:40:00] US alone.

EAU: I actually can't, like, those numbers are so astounding to me. It's been a very bad flu season,

EW: been a very

EAU: a very bad flu season, but like still.

EW: Yeah.

EAU: Oh goodness. So that's flu and COVID. You are eligible for those at six months

EW: Mm-hmm.

EAU: flu season, obviously it would might, you might be older if it's not flu season anyways, after six months in the US on our schedule, there usually aren't any other vaccines at the nine month while baby visit, which is typically the next time that you'll see your doctor unless you missed any of your vaccines. So then the next round of vaccines is at 12 months of age, and at this visit, there'll be a few of our old faves. Now you'll get either your third or fourth dose. Your final dose of hib, whether it was three or four, depends on the manufacturer, the fourth dose of the pneumococcal vaccine, and then three very important vaccines that a baby hasn't gotten yet. That's MMR, measles, mumps rubella, varicella chickenpox, and Hepatitis A. So, Erin, take it away.

EW: Ah, let's start with

EAU: Let's please.

EW: Okay. Let's start with the first M, which I am designating measles.

EAU: always measles.

EW: Yeah, I mean, it was the first. V of these vaccines to be developed.

EAU: That makes sense. I just was like, it is the big one. So it's first.

EW: big one. Yeah. And so, yes, measles is the first M in the MMR combo

EAU: Mm-hmm.

EW: and it's caused by a virus, the most contagious virus ever discovered. Period.

EAU: Period.

EW: infected person can transmit the virus to 14 to 18 susceptible people.

EAU: to just pause. Pause that. That means for every one person who has measles, 14 to 18, people will get infected from that one person if they're all not vaccinated.

EW: Yep.

EAU: Yeah.

EW: This, um, the rnot, I think that most of us are now familiar with that term, thanks

EAU: Yeah. Uhhuh.

EW: Yeah. 14 to

EAU: Yep.

EW: It is staggering.

EAU: is.

EW: staggering. Measles is

EAU: Mm-hmm.

EW: and infectious particles can hang out in the air for

EAU: Yeah.

EW: after the infectious person has

EAU: Right?

EW: Infected individuals can spread measles to others before symptoms

EAU: Mm-hmm.

EW: also contributes to its contagiousness. These symptoms include a runny nose, cough, red, watery eyes, and the classic rash starting on the face and neck, and then spreading throughout the whole

EAU: Yeah.

EW: Measles is not a mild illness. It can lead to complications such as blindness, encephalitis, ear infections, pneumonia and death. Even if a child's course of illness seems minor, measles can induce immune amnesia, which makes their immune system forget how to fight off infections that they've previously been exposed

EAU: Right.

EW: And this leaves them vulnerable to other pathogens. It wrecks you.

EAU: It wrecks you. It really, really does.

EW: Before the measles vaccine was developed in the 1960s, this infection was one of the most dreaded childhood infections, and has throughout history led to enormous death tolls, especially especially in more isolated communities or ones under oppressive colonial rule like Fiji, which in 1875, as you heard in our firsthand account, lost a quarter of its population to measles.

EAU: quarter of its population. Mm-hmm.

EW: the vaccine was introduced in 1963, the measles virus caused an estimated 2.6 million deaths each year, globally,

EAU: I,

EW: million every year.

EAU: I, yeah, it's.

EW: I, you

EAU: You can't wrap your head around that kind of just destruction.

EW: Between 2020 23, the measles vaccine as estimated to have prevented 60 million deaths due to measles, 60 million deaths. That didn't happen because we had this

EAU: Right. And that's not even just like, that's not infections. 'cause there's plenty of other complications that can arise just after an infection. That's 60 million people who are alive today because they had a measles vaccine. Hmm

EW: And because measles is so infectious, is so contagious. Vaccine coverage has to be really high to prevent outbreaks and thus deaths, and unfortunately that isn't always achieved due to access and or

EAU: mm-hmm.

EW: And each year, the death toll remains high.

EAU: Yeah.

EW: the WHO estimates that over 107,000 people, mostly unvaccinated or under vaccinated children under five, died of the disease in 2023

EAU: That's so sad.

EW: So many

EW: children, and this is why measles infections often serve as a canary in the coal mine because that indicates that vaccination coverage has waned. And we'll talk more about the current outbreak that's [00:45:00] ongoing

EAU: the us. Mm-hmm.

EW: us. We'll talk about that next week. And I think just to really hammer home how infectious measles is and how much the vaccine protects you, a study from Johns Hopkins that found that unvaccinated children between the ages of five and nine were 170 times more likely to contract measles compared to their vaccinated peers.

EAU: Yeah, I mean the measles vaccine is incredibly effective. Like one single dose is like 93% effective and two doses is like 97% effective.

EW: Yes,

EAU: is. It is incredible.

EW: it is incredible.

EAU: Ah,

EW: okay. Moving on to the next M, which is mumps. So the other, this is the other M in MMR, uh, mumps is also a viral infection. It's transmitted via direct contact or airborne particles. Symptoms include body aches, headache, general cruddy, feeling, low grade fever, and often these like big painful swellings of the parotid salivary

EAU: Yeah. Down here.

EW: Yeah. Down

EAU: Yeah.

EW: um, mumps can also lead to swelling of the testes and ultimately infertility.

EAU: Yeah.

EW: Before the vaccine, mumps used to be incredibly widespread. And during World War ii, the US Surgeon General called it one of the most disabling infectious diseases among new recruits. It really spreads well in a crowd,

EAU: Mm-hmm.

EW: most

EAU: Many diseases. Yeah.

EW: Since the introduction of the vaccine in the late 1960s, mumps cases have declined over 99%.

EAU: Wow.

EW: Over 99% since its introduction in 1967.

EAU: It's pretty incredible, Erin.

EW: It is. All right. Moving on to r. This is Rubella. The r and MMR Rubella is also caused by a virus transmitted also through airborne droplets. Symptoms can consist of rash, fever, nausea, conjunctivitis, and swollen lymph glands behind the ears and in the neck. For most people who get infected, the illness is mild and self-contained, but this virus poses a huge risk to pregnant

EAU: Right.

EW: This virus can cross the placenta and infect the fetus, which in 80% of cases will result in the death of the fetus or congenital

EAU: Uh,

EW: syndrome.

EAU: which is very severe

EW: very severe. Before the rubella vaccine was developed, cases of rubella numbered into the millions. So For instance, in the us in the 1963 to 1965 rubella epidemic, there were 12 and a half million cases of rubella in the

EAU: in the US alone.

EW: leading to 20,000 cases of congenital rubella syndrome, 11,000 miscarriages and therapeutic abortions, and 2000 newborn deaths.

EAU: Geez Louise Erin.

EW: Yep. Just in a few, in a couple

EAU: Just a couple of years. Yeah.

EW: And right before the vaccine came

EAU: Yeah.

EW: and since the introduction of the vaccine in 1966, cases of rubella congenital rubella syndrome and miscarriage and neonatal death attributable to rubella have declined sharply in countries that have incorporated the vaccine into their schedule.

EAU: Yeah.

EW: Alright. MMR is

EAU: MMR. I'm so impressed the way you just breezed through all that, Erin.

EW: I mean the numbers weigh

EAU: I know they do, don't they?

EW: yeah.

EAU: There's more

EW: next is varicella. So varicella is also known as chickenpox. It's an infection caused by the varicella zoster virus. It's spread through the air from respiratory secretions or from the fluid of skin lesions. And also direct contact include fever, a general cruddy feeling, and of course the classic itchy chickenpox rash. It sucks.

EAU: confirm.

EW: from

EAU: Got it right before the vaccine. Oh, I do remember.

EW: Yeah.

EAU: Yeah. And then I remember, I think that, I think my mom said we had appointments to get our chickenpox vaccine or something. It was like the year I think that the vaccine came out, but then we just got sick instead.

EW: And I'm, I'm older than you, so i, no,

EAU: By one whole year, Erin,

EW: but it, you know, I think chickenpox, we have this idea of it potentially as this like mild

EAU: right?

EW: not

EAU: does. Yeah.

EW: are severe complications that can arise after a chickenpox infection or during chickenpox

EAU: Mm-hmm.

EW: And these things can be like secondary bacterial

EAU: Mm-hmm.

EW: pneumonia, encephalitis, and permanent nerve damage, or visual

EAU: Right.

EW: Newborns, elder adults and immunocompromised individuals are especially at risk of severe infection with this virus. And even if you have a mild infection in childhood, the virus will hide out in your nerve cells where it can become reactivated later in life and cause shingles before the vaccine was introduced, varicella caused an estimated 4 million cases in the US alone every year leading to 10,500 to 13,500 hospitalizations [00:50:00] and a hundred to 150 deaths primarily in children.

EW: Access and uptake of this vaccine is not very high globally, and so we do still see a substantial number of cases and complications. 140 million infections with 4.2 million hospitalizations and 4,200 deaths around the world each year. Again, hard to take

EAU: Hard to take in. Erin,

EW: Elast at this appointment

EAU: disappointment. Love that. Mm-hmm.

EW: Hep A. Like Hep B is a viral infection that affects the liver. It's spread fecal orally, often through food or water, contaminated with the feces of someone who's infected with the

EAU: Mm-hmm.

EW: Symptoms include things like fever, feeling cruddy, appetite, loss, diarrhea, nausea, jaundice, dark urine. Usually this infection is self-limited, but it can progress to fulminant hepatitis, which can lead to death. is no treatment for Hepatitis

EAU: None.

EW: none, but even though a vaccine has been available since 1995, global cases of Hepatitis A have been on the

EAU: Mm-hmm.

EW: with nearly 160 million infections estimated in 2019.

EAU: Yeah,

EW: Huge

EAU: huge number.

EW: And this rise is in part due to the vaccine not being included in routine immunizations in many countries which often have high rates of the disease.

EAU: so that was a lot. But that is also the vast majority of all of the childhood vaccines, because by your 12 month visit, they're almost all done. Yay.

EW: yeah.

EAU: Because by 12 months, your baby is strong enough to kick when you try and give them their shots. Just saying. Um, usually at the 15 month visit, there's a fourth dose of the DTaP. That's usually when that one is given. And then at 18 months is when you'll get the second dose of Hepatitis A. That's a two dose vaccine series. But after that, after that 18 months, it's just annual flu and covid shots until a kid reaches school age, which is four to six, depending on when you start school. And to enter kindergarten. Kids will get a couple of other shots. They're all just booster doses, essentially, of the shots that they've already gotten. So it's a fifth dose of the DTaP, a fourth dose of the polio virus, and a second dose of MMR and Varicella, which sometimes can be given as one MMRV shot. So combined in one,

EW: Combo shots are great.

EAU: We love them combo shots.

EW: Love

EAU: Then during the rest of most of the rest of elementary school, it's just annual flu and covid. Like just, just like what adults get

EW: Yeah.

EAU: until age 11 to 12 years old, which is when kids will get their first dose of T dap. We've, we've said, we'll mention it.

EW: Yep.

EAU: It's basically just a different version of DTaP. It has like slightly different concentrations of things.

EW: Okay.

EAU: but T DAP has a booster for tetanus as well as pertussis and the diptheria in there. And then they'll also get two vaccines they haven't gotten yet. And that is HPV and the meningococcal vaccine. So Erin, tell us about these to close us out on the childhood vaccination schedule.

EW: you know, I am so passionate about the HPV vaccine. It's, yeah,

EAU: lifesaving.

EW: it is so life. I mean, they all

EAU: They all are. I know,

EW: yes.

EAU: think it's because this one is the most recent for us and so it, it feels like most exciting.

EW: like uphill battle because of the way it was

EAU: Exactly.

EW: Yes.

EAU: it prevents cancer, which is so cool.

EW: Yes.

EAU: Sorry, we're getting ahead of ourselves.

EW: HPV, also known as human papillomavirus, is of course a virus, a group of viruses that cause cervical cancer and also

EAU: Mm-hmm.

EW: This group of viruses caused nearly 700,000 cases of cancer globally in 20

EAU: 2019.

EW: year,

EAU: year

EW: including all cases of cervical cancer that were tested, and also upwards of 80% of anal cancers, up to 50% of penile cancers, 30% of oropharyngeal cancers, also vulvar and vaginal cancers. Laryngeal cancer, and more

EAU: Yeah,

EW: cervical cancer alone caused an estimated 350,000 deaths in 2022. This is a preventable

EAU: cancer, preventable cancer

EW: Mm-hmm.

EAU: and so many, I think that also gets under attention. Not enough attention is paid to the fact that it's

EW: of

EAU: right. So many other, I mean 80% of all anal cancers, HPV associated,

EW: Yes.

EAU: vaccination. Love it.

EW: All right, meningococcal. So the meningococcal vaccine protects against a bacterium known as RIA meningitis, and this bacterium can cause severe [00:55:00] infections, mostly meningitis and bloodstream infections. These are most common in children and adolescents. It is spread by respiratory droplets, and an estimated five to 10% of people carry this bacterium in their nose without it causing

EAU: It just hangs out lives on us.

EW: out

EAU: Yep.

EW: But when it does cause illness, it is often very severe. And even with antibiotic treatment, about 10 to 15% of cases result in death.

EAU: Yeah.

EW: Yep. It has also been on the rise in the US since at least 2021 with an estimated 438 cases of invasive meningococcal disease in the US alone in 2023. antibiotic resistance is on the

EAU: Yeah. Meningococcus is no joke,

EW: It is no joke. Yes.

EAU: but that is the childhood vaccine schedule.

EW: I also feel like we should mention, or maybe I want to mention is that if you didn't get one of these vaccines as a child, or if you

EAU: Mm-hmm.

EW: get them as the number of doses that we just mentioned, talk to your

EAU: Yeah.

EW: And because these are not like things that you can only get in a narrow window. Even with HPV, they're expanding the age

EAU: up to 42 now. You can get it covered by insurance up to age 42. For HPV vaccine used to only be 26. The pneumococcal vaccine didn't really exist when a lot of us that were adults were kids, and so we're, that's also recommended for adults, either over a certain age or if you have asthma or other comorbidities. So yeah, like all of these vaccines, talk to your healthcare providers because

EW: Yeah. If you're not sure if you were vaccinated,

EAU: check your titers.

EW: take your time. Yeah, exactly.

EAU: Love it.

EW: Okay.

EAU: it was a lot.

EW: it was a lot. Yeah. We, we just ran through what feels like a million, a million different vaccines and diseases and, you know, we've got all these facts and numbers that are swirling around in our

EAU: Yeah,

EW: It's a lot to

EAU: it can be.

EW: And we wanted to go through each of the diseases in the childhood vaccine schedule so that there's a sense of what each vaccine protects you

EAU: Yeah.

EW: what life was like, or what life is like without these vaccinations. Because we have a short memory as a society, most of us have never met someone who was paralyzed from polio or whose child died of measles or who lost their pregnancy due to a rubella infection. thank goodness for

EAU: Right. Think that's amazing. that we can say that.

EW: yes. Vaccines are in part a victim of their own success. They have been so effective in preventing disease and death that we take them for granted. Tragedies are obvious. We can easily observe them.

EW: We can see them

EAU: Right.

EW: But a tragedy averted is nearly invisible. If you look around a high school graduation in the US in the 1930s, you would immediately see the impact of polio. Crutches, wheelchairs, empty chairs. But if you do the same thing today, you don't see how many kids are alive and healthy and excited to start their future lives because of vaccines, because they didn't die or suffer permanent injury from polio or measles or rubella or varicella or hib or diptheria or tetanus or so many other vaccine-preventable diseases.

EAU: It's actually like genuinely making me cry a little bit

EW: I know it is. like

EAU: because that's an image we don't ever think about. Like looking around us and thinking how incredible it is that we are all here and alive. And I mean, it's not it we do, we just take it for granted.

EW: we take it for granted so, so much.

EAU: Yeah.

EW: And also in, in this

EAU: In this country, a hundred percent. 'cause that's not true everywhere.

EW: it's not, yeah. In the us, in and other high income countries, vaccines have given us profound freedom from infectious disease. one of the greatest tragedies is that people use that freedom to choose not to

EAU: Mm-hmm.

EW: and hopefully with our disease by disease spiel of the facts. You know, we've shown you how deadly these diseases can be without vaccines and why vaccines are the best way to ensure your child's health. But not every person can be vaccinated, or not every child who is vaccinated actually mounts an immune

EAU: Right.

EW: Vaccines don't just protect you, they also protect your

EAU: Mm-hmm. Yeah.

EW: people in a community are vaccinated, these diseases can't spread. That's called herd immunity, but this herd immunity only works when a certain proportion of the population is vaccinated. that proportion declines as it has done in recent years, that leaves more people vulnerable to infection and allows outbreaks to happen. speaking Specifically about the us, although I'm sure that this applies elsewhere as well, we are infected with this idea of total freedom. It is what we deserve. It is what We, have. We,

EAU: me. Mine mean,

EW: Me, [01:00:00] yes. Protect. You know, it's like the people in your immediate

EAU: right? Yeah. That's it.

EW: We should be able to do whatever we want whenever we want, just like no consequences, right? But that is simply not true. That is not true. It is false.

EAU: It is not the reality of the world.

EW: No. By living in a society, by driving on the roads, the public roads that we drive on by everything, we have to abide by certain rules. By a social contract, we should want what's best, not just for ourselves, but also for our neighbor. We are not on our own. We all depend on each other, and we are affected by the choices that we make, both individually and collectively. And what we need to do is reconnect with the truth that vaccines are a big part of what gives us this freedom. They don't take it awaY

EAU: Right, because vaccines are preventing against diseases that spread through populations. They're not something that just affects an individual.

EW: yes,

EAU: They are not the same as a lot of other medical choices that people make.

EW: Mm-hmm. Mm-hmm.

EAU: Yeah,

EW: And to bring it all the way back to what we said at the top of this episode, we understand. We understand the fear, the hesitancy, the confusion, the shame. This is not an easy thing to navigate when the overwhelming amount of conflicting information that is out

EAU: Yeah.

EW: this topic makes it really hard to know what to do, makes it really hard to sift through, to find quality information, and then recognize

EAU: Yeah,

EW: we find

EAU: yeah.

EW: do we even know that that is quality, a quality

EAU: Especially because most of the quality information is hard to read

EW: Hard

EAU: through,

EW: Yep.

EAU: TikTok videos are snap a not to, again, I'm not just blaming TikTok.

EW: I, I don't know. Are you though, Erin? No, but one of the biggest battles in this is just knowing who you can

EAU: Yeah,

EW: to find this information. And so I think on that note, would like to bring it to the sources that we used for this episode

EAU: prove you can trust us.

EW: Yes. Uh, um, Erin, I have like 1,000,001 sources for

EAU: wonderful. I don't have as many as I expected, but, um, I also have a million old episodes that we did that I went back to my notes on, so,

EW: Yes. Largely, I would say just like to, to not go through these million in

EAU: yeah.

EW: used a lot of the, um, for the individual diseases, I used a lot of the, the wHO website has a great. For most of the diseases, great websites for, uh, pro-vaccine mortality rates, um, and also like the symptoms, what this vaccine does when it was developed, all these types of things.

EW: And then also I found really just broadly speaking, there's a paper from 2024 from The Lancet, and it is by Shaddock et al, and it is titled Contribution of Vaccination to Improved Survival and Health Modeling, 50 years of the Expanded Program on Immunization. And just as like a bottom line of this, this paper found that since 1974 vaccination has averted 154 million deaths around the world.

EAU: Wow.

EW: And that includes 146 million deaths among children younger than five. So vaccination

EAU: Has saved the millions and millions of lives.

EW: of lives.

EAU: I also use the World Health Organization and the CDC for a bunch of things, including like the side effects from vaccines. We'll link to that site that they have. The, um, paper though that I wanted to give a shout out to was from 2021 in the journal vaccines called Vaccine Technologies and Platforms for Infectious Diseases.

EAU: Current progress challenges and opportunities has a lot more deep dive on the different types of vaccines and what we use and why we use it and those kinds of things, which I think is really helpful. Um, but we have a lot, a lot more sources. So we'll post all of them from this episode and all of our other episodes on our website, this podcast will kill you.com under the episodes tab. Check it out.

EW: we certainly will check it out. Um, I thank you to Blood Mobile for providing the music for this episode and all of our

EAU: Thank you so much. Thank you to Tom Bre Fogel and Leona Sci for the incredible audio mixing. Thank you to Brent and Pete and the entire video editing team. Love you.

EW: Thank you to Exactly right.

EAU: And thank you to you listeners.

EW: Yes. Thank you for listening. Thank you for tuning in. Thank you for

EAU: Thank you for watching. If this is a video, still really weird.

EW: Yeah. a special thank you to our

EAU: Yeah.

EW: We appreciate your support so, so [01:05:00] very much. It really does mean so

EAU: It

EW: us.

EAU: does. Thank you,

EW: Well, until next time, wash your hands.

EAU: you filthy animals,