Sawbones 278: Adenoviruses

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Intro (Clint McElroy): Sawbones is a show about medical history, and nothing the hosts say should be taken as medical advice or opinion. It's for fun. Can't you just have fun for an hour and not try to diagnose your mystery boil? We think you've earned it. Just sit back, relax, and enjoy a moment of distraction from that weird growth. You're worth it.

[theme music plays]

Justin: Hello, everybody, and welcome to Sawbones, a Marital Tour of Misguided Medicine. I'm your co-host, Justin McElroy.

Sydnee: And I'm Sydnee McElroy.

Justin: And I'm... just Justin McElroy.

Sydnee: You already did that. You did that first.

Justin: Not only did I do that, I actually did that last episode, so it's kinda gettin' to be kind of a fun tradition, here, isn't it?

Sydnee: No.

Justin: No, okay. You're not crazy about it.

Sydnee: No, I don't love it. For next week, come up with something else.

Justin: New.

Sydnee: Perhaps.

Justin: Some new stink.

Sydnee: Yeah. Some new material.

Justin: Some new stink—

Sydnee: Let's not.

Justin: —to put on this fastball.

Sydnee: Uh, my poor mom is sick.

Justin: It's very sad.

Sydnee: Yes. Uh, my mom started out with pinkeye a few days ago.

Justin: Did you get her permission to just share this very personal story?

Sydnee: I told her that the episode was gonna be about what she had.

Justin: Okay.

Sydnee: Uh, and then it has—

Justin: This is the episode where you're gonna reveal the secret medicine that you have that can fix her right away, that she's convinced that you're holding out on her.

Sydnee: Yes. Mom always thinks that doctors are holding out on her. Uh, she progressed to fevers and respiratory symptoms and generally... Kind of flu-like, I would say. A flu-like illness.

And, uh, it has become apparent to me... We haven't actually taken her in and had her tested, because, as we will discuss, I don't know that there's much of a point in it at this point. Um, because there's no—it wouldn't change treatment, I guess is what I mean. Uh, but I believe my mother has adenovirus.

Justin: Dun dun dun!

Sydnee: Yes.

Justin: I think that's a dun dun dun. I don't actually know what's dun dun dun-worthy.

Sydnee: Well, I—I was a little concerned. I went to look through our email to see if anybody had ever suggested this topic so I could thank them, even though I—I

kinda decided to do it because of mom, I still wanted to thank anybody who suggested it, and no one ever has.

Justin: Huh.

Sydnee: So I'm worried that nobody is interested in adenovirus.

Justin: You sh—that is a worry—I'm thinking—just as you're saying that now, I'm thinking about the tweet to get this one out there, and I don't know... Can you come up with, like, a better name for it? Is that maybe something that we could do this episode, something—a better name for adenovirus?

Sydnee: Not really, it's just—

Justin: What's the real name of Yellow Fever, right? What's the real name for Yellow Fever?

Sydnee: Just—what do you mean? We call it Yellow Fever.

Justin: Is it just Yellow Fever? Aw, man. Okay. What about, uh—okay. "Influenza." Nothing. "The flu." Dramatic! Sounds like a noir villain. So that's what I'm saying, is there like, a sexier name for adenovirus that we can help—that will get people excited about it?

Sydnee: No.

Justin: Okay!

Sydnee: I mean, you can call it by, like, what it causes. Like, a lot of people get, like, pharyngoconjunctivitis.

Justin: Pharyngoconjunctivitis?

Sydnee: Pharyngoconjunctivitis.

Justin: "The Fringe."

Sydnee: No, Pharyng—

Justin: Fringe.

Sydnee: Like, pha—like pharynx, like the—

Justin: I know, Sydnee!

Sydnee: Pharyngoconjunctivitis.

Justin: I know, but I'm just saying, it's a catchy name!

Sydnee: Um.

Justin: Why don't you ever let me brand illnesses?

Sydnee: I'm sorry.

Justin: I'll keep on it. I'll come up with something.

Sydnee: I'm sorry that I don't have anything better for you. Um—

Justin: That's my job. I'm the idea guy.

Sydnee: All right, well, you work on that.

Justin: Okay.

Sydnee: In the meantime, can I tell you about adenovirus?

Justin: Sure.

Sydnee: Is that acceptable?

Justin: Please do.

Sydnee: Okay. So, I want to talk about it 'cause I fear that we're all about to get it from my mom. It's a medium-sized virus. There are around 57 different serotypes that can cause disease in people.

Justin: What's a serotype?

Sydnee: So, there's like—

Justin: You've used this word with me five times today, and I still don't know what it means, I'm sorry. I was too embarrassed to admit it.

Sydnee: It's what you would—what you would probably call a strain.

Justin: Okay. A type.

Sydnee: Yeah. Well, there's like, the species, or like—yeah, like the species, and then the species are further divided out into, like, sort of sub-species—

Justin: Got it.

Sydnee: —things.

Justin: Okay, got it.

Sydnee: But serotypes is what we call them, various, um, very closely related but different.

Justin: Got it, perfect.

Sydnee: Okay. Uh, and there are about 57 different ones that are divided into 7 different species, and, uh, depending on which one you get determines what kind of symptoms you might get from it, and the severity.

And you may not have heard of adenovirus because a lot of times, what it causes is sort of like a cold, and so you probably would never know you had it, because you wouldn't get tested, because you—

Justin: It wouldn’t be that bad, right?

Sydnee: No, right. So for most people, actually most people by the time they're 10 years old have been infected with some strain or another of adenovirus at some point, so you've almost certainly had this.

Um, it was first isolated in the 1950s from adenoid tissue, and so that's why it was called adenovirus. That's where we—

Justin: Oh, the adenoid tissue that one can find... in the body? At...

Sydnee: Kind of like, up in—

Justin: Up in the...

Sydnee: —in the back of the nasopharynx—

Justin: Back of the nasophar area—

Sydnee: —kind of area.

Justin: Yeah, got it. Back in the nasopharynx! Like, where might that be?

Sydnee: Like, nose, thr—upper throat, nose, up there.

Justin: We're gettin' there.

Sydnee: Mm-hmm.

Justin: You remember this is a podcast for non-doctors, right?

Sydnee: [laughs]

Justin: You do have to slow things down just a little bit.

Sydnee: So, it's part of this—

Justin: I mean, I know, obviously.

Sydnee: —part of this tissue—

Justin: I know all of this.

Sydnee: If you've heard of adenoids, it's because you may have gotten them removed when your tonsils were removed.

Justin: Just while they were in there?

Sydnee: They do, they remove them for the same kinds of reasons.

Justin: They're pointless.

Sydnee: So they don't get inflamed—well, they're not—it's not that they're pointless, it's just that you can live without them.

Justin: I don't want to have this conversation again. We had a whole episode where we tried the, uh, pancreas.

Sydnee: No, it was the spleen.

Justin: The spleen, that's right.

Sydnee: So the symptoms depend on the strain, as well as the age of the person who gets it and their immune status, because if you have a compromised immune system it can be worse, which is true of many things.

Uh, you can get no symptoms at all. Some people have an adenovirus infection and never know they had it.

Justin: It'd be—are they contagious, still?

Sydnee: Mm... Yes, they can be, yes. They can still shed the virus in their stool, even if they didn't necessarily have symptoms.

Uh, you might get a cold. You'd get a sore throat. You'd get conjunctivitis, so inflammation of the eye, the conjunctiva of the eye, like pinkeye.

Justin: Got it.

Sydnee: That's what you would think of it as. Pinkeye.

Justin: Is it pinkeye?

Sydnee: Uh, it is—I mean, it is a form—

Justin: I don't actually know if pinkeye is, like, a th—

Sydnee: Of pinkeye, yes. Yeah.

Justin: Okay, yeah.

Sydnee: So, you can get bronchitis. You can get gastroenteritis, like diarrhea. You can get fevers, of course. In younger kids, we worry about things like pneumonia as severe complications. It's not common, but it can happen in little kids.

Uh, in older people, we worry about things like inflammation of the brain or inflammation of the tissues around the brain and spinal cord. Meningitis is what I'm talking about. So, meningitis, encephalitis. Those are, again, very serious, but extremely rare complications, uh, that we can see in certain age groups, and in immunocompromised people.

For the most part, you get fevers and, you know, sore throat, maybe a p—maybe symptoms of pinkeye, uh, maybe some upper respiratory symptoms, maybe some diarrhea, and you feel lousy for quite a while. That's the other thing about adenovirus, is it can knock you down for a week or two. You know, it's pretty signi—it's—more so than a cold.

Justin: It lingers.

Sydnee: It lingers.

Justin: Lingers a bit more, yeah.

Sydnee: For sure.

Justin: Is it more contagious than a cold, would you say?

Sydnee: It is very contagious, yeah. The virus is pretty hardy. It can survive on surfaces for a while, so that's a—that's a distinguishing factor among different viruses. Ones that can survive, uh, outside the human body better tend to be more contagious, because if you cough or sneeze on a surface and then somebody touches that surface, they can pick it up.

Justin: Yeah, this thing is insidious. Ever since you told about it, I keep feeling like I'm getting sick.

Sydnee: I know, my eyes have been itching ever since.

Justin: My eyes are watering now, and I'm like, "Well, that's it! I got it!"

Sydnee: It's—it's allergies right now. We are—we already had this before.

But anyway, uh—so, the big problem is, you get sick for a while. It's very contagious. It's spread—like I said, the virus is really hardy and it's spread through respiratory droplets, so if you cough or sneeze—

Justin: That's it.

Sydnee: —and you get it on your hands or on your body and then you touch other people, or if you get it on a surface and then somebody else touches that surface... Um, it can also be spread through the fecal-oral route. Uh, so, like I said, the virus is—even after you get better, you continue to have virus—what we call "shed" in your stool, so it comes out in your stool. Um, so swimming pools have been epicenters for these infections.

Justin: Fun. Great.

Sydnee: Sorta like the one my parents have. [laughs quietly]

Justin: Great! [laughing] Oh man, excellent. Oh, God. Is head itching part of it? My head itches!

Sydnee: No. But, uh, some good news. My dad is very attentive when it comes to pool maintenance.

Justin: That's true.

Sydnee: He is obsessive about the chlorine levels.

Justin: He blows it out.

Sydnee: And an appropriately chlorinated pool should kill the adenovirus. You should be fine.

Justin: That's why we chlorinate, folks.

Sydnee: The outbreaks have largely occurred in unchlorinated—or not—I shouldn't say "unchlorinated" but "underchlorinated," or like... There have been specific outbreaks where the chlorination system, like, failed for a while.

Justin: Ah, yeah.

Sydnee: Yeah. Uh, they've actually found it to be, like, a little hardier in water than, like... You know, polio is spread through water.

Justin: Sure, right.

Sydnee: That—we talked about that in the polio episode, that swimming pools were feared during the polio outbreaks in the summer. Um, it's a little—it's a little hardier than the enterovirus that causes polio. It's a little hardier than Hepatitis-A.

Justin: Worse than polio?

Sydnee: Well, I wouldn't say it's worse, certainly, but it—it can survive a little better in water.

Justin: Wow.

Sydnee: It's very contagious, is the point. There's actually one... I read about a whole, uh, series of outbreaks that occurred in swimming pools, and like, how many people were infected, and this is how they kind of figured out this connection to the water.

There was one that I thought was, uh, especially insidious. It happened at a summer camp in North Carolina in 1991. There was a 1 acre man-made pond that got infected. It became the epicenter of an outbreak. Which see—it doesn't seem fair that a pond should do it, right?

Justin: Who's getting in a 1 acre man-made pond?

Sydnee: Well, all the people at the summer camp.

Justin: Okay, may—but like, I don't know. I feel like you're playing with fire at that point anyway.

Sydnee: The campers who swam daily, uh, did not—like, about 48% of them swam daily, and they got sick at the same rate that people who only swam once a week.

Justin: So that's pretty intense.

Sydnee: It was pretty intense, yeah. They were trying to figure out, like, how much did you have to be exposed to this water to get it? And it turned out like, any at all.

Justin: Not much!

Sydnee: Not much at all.

Justin: All right!

Sydnee: Yeah, it, um—there was also a high rate of infection among towel sharers.

Justin: Don't—what—[laughs] this summer camp sucks! I'm gonna go take—who's like, "Okay, kids. You're dry enough, Paul, go ahead and pass your towel on to the next kid!" [laughs]

Sydnee: I thought that was some pretty intense towel sharing, too, 'cause like, when I think of getting out of, I guess, the pond, the swimmin' hole, and toweling off, it's sort of like a—more of a dabbing. Like, just kind of a general... I mean, like, I don't get naked.

Justin: Not way up—not way up in your butt cheeks? [laughs]

Sydnee: Right! It's not like an after-shower towel off, right? Unless maybe it is, at this summer camp.

Justin: This is a very hygenic summer camp, ironically.

Sydnee: Like, they got up in there with there—

Justin: Eugh.

Sydnee: —pond towels.

Justin: Oh, yeah!

Sydnee: And then passed 'em on to the next pond swimmer.

Justin: "Hey, pass that pond towel over here, Rick! I need to get dry, too. All over, if you know what I mean."

Sydnee: So they went, uh, to confirm it, they got a sample of pond water six feet below the surface, and they found adenovirus. They were able to isolate it from the water. That's a scary virus, to me, man.

Justin: Yeah. One that can live—it's like—it's like—

Sydnee: It's just in a pond, and it's still floatin' around enough to—

Justin: Tiny, invisible Jaws. [laughs]

Sydnee: Yeah. That's, uh—but I mean, again, like, I—polio is a fair comparison. Polio was the same problem, back when outbreaks of that happened, before the, you know, vaccine. That everybody should get.

Justin: Yep.

Sydnee: Um. Because of all the life saving that it does.

Justin: No, we know.

Sydnee: So anyway, in 1953, one of, uh, one of our favorite—my favorite people that we discuss on this podcast... Not Pliny the Elder. It's 1953, folks. If you were about to say Pliny the Elder, I did say it was 1953, so. Come on.

Justin: Yeah, it's—it's—

Sydnee: Come on.

Justin: He's like a—he's become a recurring favorite here on the show.

Sydnee: Maurice Hilleman.

Justin: Maurice Hilleman.

Sydnee: Uh, who was working at the Walter Reed Army Institute of Research. Uh, he was called to Fort Leonard Wood, Missouri to investigate what they thought

was a flu outbreak in—among troops. So, they thought, "Ah, this is a big, bad influenza outbreak that is happening. Uh, let's get Hilleman down here." 'Cause at the time, he'd already made his mark as an excellent, uh, epidemiologist and vaccine specialist, researcher, hero...

Justin: [laughs]

Sydnee: All around.

Justin: That's just what his business card said.

Sydnee: All around great guy.

Justin: [laughs]

Sydnee: Uh, who also didn't brag about it. Uh, he went and he checked out the outbreak, and he got some swabs from some soldiers and he went back to his lab, and he started isolating it, and he found that it was not flu, it was a whole new type of virus, one that belonged to a family that had just recently been discovered and named.

Justin: The adenos.

Sydnee: The adenos. The adenoviruses. So, uh, Hilleman found that these recruits were suffering from a pretty severe flu-like illness that turned out to be an adenovirus, uh, and they... Pretty quickly after that, they started checking out more and more army bases and finding that military recruits got adenovirus at a very high rate.

Uh, they started to find that a lot of the cases of acute respiratory illness... So, what we talk about as like—we call URIs, in medicine. Upper Respiratory Infections.

Justin: Sure.

Sydnee: A lot of them turned out to be due to adenoviruses, um, which was very different than the general population. Most people who—most civilians, when they walk into a doctor's office with some sort of cold or flu-like illness don't have adenovirus. But a lot of these military personnel that were living and training—you know, like in basic training situations—did, in fact, have adenovirus.

So it seemed to be very specifically targeted at kind of the living in close quarters that occurs, you know? Which is why when you look through outbreaks that have happened outside of, uh, military bases, you find, like, summer camps as a common place, or college campuses. Places where people live in really close quarters.

Justin: Sure.

Sydnee: So, uh, it did have a low mortality, they found, the adenovirus. It usually was not something that was fatal. However, it was associated—some of the various serotypes, the different strains, were associated with pretty significant morbidity, meaning you got sick, and you got so sick that you couldn't work, and you got sick for a while.

Justin: There we go.

Sydnee: So you actually had, like—and because it was so contagious, you had large numbers of troops who were down and out at the same time. Um, and this is not great for training situations.

Justin: National security.

Sydnee: Yeah, sure. It's not great when you think about—that you—I'm assuming that basic training happens on a certain schedule, and, you know, an interruption of a week or two is a big deal, and especially if you're talking, you know, 3/4ths of your—of your base are down at the same time.

Justin: What do you do, start over? Yeah, it's—yeah.

Sydnee: Exactly, so it's a huge interruption, plus the cost. The cost of everybody being sick and needing medical attention, and the lost time, and all that. Uh, so because of all that, there was a big effort at that point to come up with a vaccine.

Justin: Oh!

Sydnee: The idea being that if we had a vaccine, we could keep soldiers healthy, prevent loss of workdays, all the costs associated with illness, the interruptions in their training, and of course, I suppose somebody would have made the point

that if you carry this out to like, an actual military, like, active duty scenario, it would be very bad to get everybody sick with adenovirus at the same time.

Justin: Yeah, yeah.

Sydnee: So it made a lot of sense to come up with a vaccine, really targeted at military recruits at the time, not at the general public.

So Hilleman started the work and, uh, based on what he began, an inactivated adenovirus vaccine was developed in 1956, so a... When we say "inactivated," we mean a killed virus vaccine.

Justin: Why don't I have it? Why do I have to stress out about your mom? Why don't I have the vaccine?

Sydnee: Well, Justin, I'll tell you the history of the adenovirus vaccine, but before I do that, let's go to the billing department.

Justin: Let's go!

[theme music plays]

Justin: Folks, our first sponsor this week is MeUndies. You know, you spend... This says 90% of your life in underwear. It's much lower for me, as I've covered in great detail. Uh, but—[laughs] I don't like to brag, I just, uh, sleep in shorts without undies.

Sydnee: [laughs]

Justin: [laughing] So you know—

Sydnee: Is that a brag?

Justin: It's a brag of sorts, though. Uh—

Sydnee: I think anybody can do that, if they want to.

Justin: Anybody can do that, you just gotta believe in yourself.

Sydnee: [laughs]

Justin: Um, you owe it—no matter how much time you spend in your undies, you owe it to yourself to make sure you're wearing the softest ones in town. Uh, enter, stage left, MeUndies. Uh, I only own MeUndies. You only own MeUndies.

Sydnee: This—this is the truth.

Justin: The people that we know ask for MeUndies for holidays, um, because they're so wild about all the great patterns, in our underwear, which we show to anyone [quietly] that will look.

Sydnee: Yes. If you ever thought, "I don't know that I would feel comfortable buying my family members underwear for a holiday, their birthday, whatever," um, you will with MeUndies. Because I now—

Justin: It's what they want, folks!

Sydnee: We now do that.

Justin: You can get 15% off your first pair, free shipping, and a 100% satisfaction guarantee. You cannot beat 100%.

Sydnee: No, that is scientifically accurate.

Justin: Just go to meundies.com/sawbones right now, and try them out. That's meundies.com/sawbones.

If you have a big idea, what do you do with it, Syd? Write it on a scroll? That's nice.

Sydnee: No.

Justin: It's formal. Tasteful. Nice.

Sydnee: Uh-huh.

Justin: Hard to share. Scrolls are heavy and flammable. You know what's neither heavy nor flammable?

Sydnee: Uh...

Justin: The Internet, obviously. That's where your big idea needs to go, onto the Internet. Stop putting your big ideas on vellum!

Sydnee: Like Notepad, on there?

Justin: Don't put it on notepad paper, Sydnee, that's highly flammable.

Sydnee: Works?

Justin: Works?

Sydnee: [laughs]

Justin: [incredulously] What?!

Sydnee: [laughs]

Justin: Works?! Sydnee—brief diversion before I talk more about Squarespace. Sydnee, for the entire time I've known her, has had a habit of finding the most busted down, pre-loaded software on any computer, and making it the only system that she understands.

Sydnee: It—the—

Justin: "Works?"

Sydnee: [laughs] I'm sorry.

Justin: Sydnee- Sy—

Sydnee: Better than Notepad.

Justin: Nothing—yeah, that's—I guess that's true, Sydnee. Uh, you know, if you want to make a website about some good new software for my wife to try, uh, a great place to do that is Squarespace.

Uh, with a Squarespace website, you can showcase your work. You can create content. Um, you can sell stuff. And, uh, you know, you're—the sky's the limit, folks. No limit to your imagination, and your—your sheer will.

Uh, you got beautifi—beautifiable, customemeable—

Sydnee: [laughs]

Justin: [laughs] No, they're beautiful, custible—c—oh, man! This is—

Sydnee: Customizable, I'll say it for you.

Justin: There it is! Thank you, my dear. See? That's, that's a good marriage right there. The other one says the words that the first person is struggling with.

Uh, they're created by world class designers, and they're optimized for mobile right out of the box. They also have a new way to buy domains. You choose from over 200 extensions, uh, there's built in search engine optimization, SEO, if you're in the biz, like myself.

Sydnee: I knew that one. Thank you, Shark Tank. [laughs]

Justin: Uh—[laughing] you gotta try it, folks. Head on over to squarespace.com/sawbones for a free trial, and when you're ready to launch, use the offer code "sawbones" to save 10% off your first purchase of a website or a domain.

Squarespace: stop buying scrolls.

Sydnee: That's a great tag, Justin.

Justin: Thanks, I just wrote it. [laughs] They can have it for free.

Sydnee: So, okay. So Hilleman and the scientists that continued his work, they made this vaccine. Uh, it protected against two strains, by the way, 4 and 7, because those are the most common, um—

Justin: Nasty strains.

Sydnee: Those were the most common that they were isolating among military recruits.

Justin: Okay.

Sydnee: They added type 3 to the vaccine a little later, but even Hilleman was like... I love reading papers straight from Hilleman, 'cause I feel like I'm not reading about him, I'm actually reading his work, and it makes me feel a little closer to him. Um... He's like a rock star. He made so many vaccines.

Justin: So many. He—

Sydnee: So many. But he—

Justin: I would've been happy, in my life, making one. [laughs]

Sydnee: Really?

Justin: If I made one cool vaccine, I would've felt really good about it.

Sydnee: But—so Hilleman even noted, like, "I don't know that adding 3 was really necessary. It really didn't get us too much."

There was some—they would note later that there were some cross coverage of different strains, which you see sometimes. We say that with the flu vaccine as well, that even if we guess wrong and the flu strain that's prevalent that year was not one of the ones that was targeted with the vaccine, there is some cross coverage sometimes, so you are less likely to get as sick, if you get the vaccine.

Um, so they did see some of that. So he said that adding the 3 probably wasn't very helpful, but the 4 and the 7 were the main two that were targeted. They were the main two that they were finding were a problem. Now, there were some problems with the manufacturing of the adenovirus vaccine. There were two.

One, pretty straightforward. Hilleman had even noted in his initial paper that it's gotta be a pretty potent vaccine to be effective, and so if you aren't very careful with the manufacturing process of the vaccine, you won't actually have a, kind of—to put it in an easy way to understand, a strong enough vaccine to get the immune response you need.

Justin: Thank you for not saying, "To put it in Justin terms," like you normally do. I appreciate that, for the show.

Sydnee: So they had some variability among different vaccine lots, and so some of them weren't as effective as others. I found notes that like, "The vaccine wasn't very effective." It wasn't that the vaccine... The vaccine, as meant to be created, was quite effective. It's just that there were some lots that were made incorrectly.

There also was a problem with—and I think this merits just a little bit of conversation. Uh, there were some of the lots that were found to be infected with SV40, simian virus 40.

Justin: Okay.

Sydnee: Uh, now—

Justin: Is that anything like UB40?

Sydnee: Nothing like UB—UB40.

Justin: Fair enough.

Sydnee: Now, SV40, if you have... I'm gonna guess if you're listening to our podcast you're probably not anti-vaccine, 'cause I think most of those people—

Justin: I hope we've—we've, uh, shed them.

Sydnee: —would be too angry at this point to continue to listen to my voice.

Justin: Yes.

Sydnee: But you may know some people who are anti-vaccine, and they may have mentioned SV40 to you before, because SV40 is a virus that causes cancer in hamsters. We know that.

Justin: Okay.

Sydnee: It is, uh, isolated from the kidney cells of rhesus monkeys, and these cells were used in the production of some of these early vaccines.

Justin: Okay.

Sydnee: They used some of these kidney cells from monkeys, and the cells just happened to be infected with this virus, right?

Justin: Okay.

Sydnee: So the virus ended up in some of the vaccines. Now, this caused quite a stir when it was discovered in the polio vaccine. It wasn't just the adenovirus vaccine. The polio vaccine was also found to have been contaminated by this virus, some—some of it, not all of the polio vaccines, but some lots.

Um, and as a result, by 1963, all of those vaccines had been pulled out of circulation. They were tested for SV40, and from 1963 on, no vaccines have contained SV40.

Now, it is important to know this fact, because a lot of people will use this, uh, this example as a reason not to get vaccinated, because—

Justin: Or to show that vaccines are dangerous or carelessly created.

Sydnee: Yes, exactly. Uh, and they will try to say that people got cancer from vaccines. Well, here's a very important thing to note. SV40 has never been proven to cause cancer in humans. We've never been able to find that by researching it. It did in hamsters, but not in humans.

Justin: Everything causes cancer in hamsters.

Sydnee: Well, I don't know that everything does, but—

Justin: Almost everything.

Sydnee: —SV40 can. Uh, I'm not saying—they've still continued to study it, to see, did we just do it under the wrong circumstances? Is it still possible? Nobody has completely said it's impossible, but so far, we've never proven that it can.

Secondly, all the people who received polio vaccines in the time period that they could have been infected and all the people who received adenovirus vaccines in this time period—

Justin: Are long dead.

Sydnee: No.

Justin: Ah.

Sydnee: There has been no—they have all been studied, and there was no increase in the incidence of cancer among these patients.

Justin: Got it? [laughs]

Sydnee: So this is not true. If you hear people say, "Well, SV40, vaccines give you cancer." Nope! Nope, they don't.

Justin: Nope.

Sydnee: Still don't.

Justin: You're a dolt.

Sydnee: Vaccines are still great.

Justin: Yeah.

Sydnee: Uh, but because they found SV40 in some of the adenovirus vaccines, uh, they pulled all of these off the market. They went back to the drawing board, so to speak, and they came out with a live virus vaccine, which it was a little bit easier to make sure it was effective.

Justin: Okay.

Sydnee: You didn't have to worry so much about variability between different lots as they did with the other vaccine. Um, because it was live virus, they actually ended up making two; one against four and one against seven, instead of it being combined into one shot like it was before. These are actually two separate pills that you take.

Justin: Pills?!

Sydnee: It's an oral vaccine.

Justin: Even better!

Sydnee: It's a tablet vaccine. So there are two tablets. One is a live virus—

Justin: Do they still only give it to military people?

Sydnee: So, yes. At the time—

Justin: I just think it's funny that we're trying to save military people the pain and suffering of getting shots. They can handle it, I bet! I bet almost anybody in the military [laughing] can handle getting shots!

Sydnee: They just—they were able to make it this way. They made 'em enteric—

Justin: It's probably preferable. No—no—no shame.

Sydnee: They made 'em enteric-coated so that they could survive in the stomach, and, you know... And then you'd get vaccinated from the tablet and build up an immune response from the tablet instead of a shot.

Um, basically they kind of cause what we would think of as an asymptomatic, meaning no symptoms, and completely non communicable, you were not infectious, um, GI tract kind of infection. Like, they just—like a very—the virus got down there, and then your immune system attacked, and then you built up an antibody response.

Justin: Great!

Sydnee: But, you weren't gonna pass it along to anybody else, and you didn't have any symptoms, so it was great. So it worked really well. Uh, they gave the vaccines to different groups. This was all tried out among the military, so they gave it to different troops and then measured rates of adenovirus among people who got 4, people who 7, people who got both vaccines 4 and 7, people who got neither—

Justin: Uh-oh!

Sydnee: —and they figured it all out.

Justin: You got a placebo!

Sydnee: That—yes, they got a placebo. And they did all this research and they figured out that, "You know what? These both work really well, they greatly reduce the rates of adenovirus, and they should probably take both, because it's hard predict if they might get an outbreak of 4 or 7. Both of them cause problems, so let's give 'em both, and we should probably just give it to them as soon as they show up."

So it became the standard that within... Well, the way it initially written, within hours after their arrival at basic training.

Justin: Sure, I mean...

Sydnee: Starting in 1971 you would give, uh, recruits both of these tablets. Um, and this is great, and this should have been the end of the story, in terms of military personnel, because they're all getting vaccinated as soon as they show up.

Justin: Sure.

Sydnee: However, there was only one company making the vaccines.

Justin: LexCorp.

Sydnee: [laughs]

Justin: Then Batma—and then Superman shut 'em down.

Sydnee: No, this would be—this would be a weird twist. No, Wyeth Laboratories, uh, in 1994 they were the only people making the adenovirus vaccine, said, "Hey, look, U.S. Government. We need a new facility to continue to make this. Uh, we are not gonna be able to continue to meet modern production standard unless we get a bunch of money to build a new facility, and if you won't give it to us, we're not making it anymore. And we're the only ones making it, so you better give us some money."

Justin: [snorts] "And uh—a pool, we want a pool in the middle of it, or your soldiers are gonna have diarrhea."

Sydnee: Uh, so, um—

Justin: "Pinkeye."

Sydnee: [laughs] They—they continued for a while, as long as their equipment was functional, to make the vaccine. Um, in the meantime the government kind of went to other manufacturers and said, "Will you make it? Please? We need this, 'cause Wyeth is about to stop making it."

Uh, the—finally their facilities were not working the way they expected them to, so they stopped manufacturing the vaccine, 'cause they couldn't, they felt, safely manufacture it anymore, uh, and then they ran out, in 1999. So, the rest of the vaccine was depleted or it had all expired by 1999.

Justin: Gosh.

Sydnee: Uh, so they had nobody to make the vaccine at that point. And what immediately followed this?

Justin: Uh, a lot of people getting it.

Sydnee: Yeah. New recruits started getting adenovirus again. So they started seeing cases rise, um, and they started again losing workdays and the costs went up and all of the things that they already knew were a problem prior to this—

Justin: I'm gonna ask—I'm gonna ask a question that you may not have an answer to, but I'm just kind of curious. Why—I mean... I guess people are just bringing it from outside. It just seems like for year—years of giving this to everyone in the military seems like there would be, like, lower... Not viral load. That's not what I'm trying to say, but like—

Sydnee: You're thinking of herd immunity.

Justin: Yeah, yeah, yeah.

Sydnee: Yeah. I understand what you're saying, but—and again, I am not a military person, but this is my concept, my idea. Is that when you go to basic training...

Justin: You're coming from civilian life, right?

Sydnee: Yes.

Justin: I mean, it doesn't matter.

Sydnee: And once you're finished, you don't necessarily stay there.

Justin: Right.

Sydnee: You go somewhere else. You're—you know, you might be moved to a different place, would be my thought.

Justin: Okay, yeah.

Sydnee: So the places where the outbreaks were happening were being continually refreshed with unvaccinated—

Justin: Fresh, new—

Sydnee: —new recruits.

Justin: New blood coming in, yeah, that makes sense.

Sydnee: Exactly. So even though—I guess if some of the personnel, I don't know... Do you get to like, graduate and then hang around, like those people who...

Justin: Come back and see your teachers?

Sydnee: ...come back and hang around your high school all the time? Maybe you can, and they would probably be fine.

Justin: You sit—you sit in with the drum line one more time.

Sydnee: Like—like Matthew McConaughey in that... What movie is that in?

Justin: Oh. Uh, Dazed and Confused.

Sydnee: "All right, all right, all right."

Justin: Yeah. That's good!

Sydnee: Yeah, the—that one. [laughs]

Justin: It's a good Matt.

Sydnee: Uh, but I guess—I guess they would be okay, but all the new recruits are still vulnerable, and they're all still in close contact. Anyway, so people started getting it again. Uh, at this point, the military realized, "Ah, we gotta do something. Okay."

So in 2001, uh, the government contracted with a new manufacturer, Barr Pharmaceuticals, and provided the money that was necessary to start making the vaccines again, both type 4 and type 7. They had to kind of go back through the whole process of clinical trials and regulatory requirements and everything all over again, and it wasn't until March of 2011, ten years later, the vaccine was re-licensed and able to be used.

So by October of 2011, they started using it again. Over this course of time, over the ten years that it took to reestablish the adenovirus vaccination program, they invested 100 million dollars in the process.

Justin: Probably would've been cheaper to build those guys a new building. [laughs]

Sydnee: The—just as a comparison, Wyeth, the, um... What they had said, back in '94 and '95 when they were asking for money, they estimated that they needed between 3 and 5 million to make the changes necessary to continue.

Justin: [sarcastically] With inflation... that's pretty close.

Sydnee: So anyway, it was the—however much money it cost, I'm on the side of science. It was the right thing to do, because once they started vaccinating military personnel again, rates of adenovirus due to type 4 and type 7 begin to fall again, dramatically.

Um, and it's important to note that in the time period between when the vaccine ran out in '99 and when the new vaccine was introduced in 2011, 8 people in the military died of adenovirus. Now, I know that sounds like a small number—

Justin: No.

Sydnee: —because—especially on this podcast, because we talk about things like influenza and smallpox and the plague that, you know, kill thousands and thousands and millions of people. But if you're talking about young, healthy, you know, military service members, who came in, maybe in peak physical condition, and then are taken down by something that is preventable.

Justin: So, I'm—

Sydnee: One is too many!

Justin: Yeah, yeah, absolutely. And I hope your mom is just gonna skip that part, right?

Sydnee: Yeah, I hope she's not gonna listen to this.

Justin: She'll just skip that part. She didn't get that far.

Sydnee: I won't let her listen to this 'til she's all better.

Justin: We'll make her a special, edited version.

Sydnee: So it is very unlikely that one would ever die from adenovirus.

Justin: It's likely enough that eight people in the military died!

Sydnee: But it is possible in a severe enough outbreak that they can suffer severe complications and—and it can be fatal. Again, very unlikely, but possible. And so it is—and the reason that they did that—they actually did the study to like, prove this and publish this. The reason that the researchers did this, even though it was a lower number in the grand scheme of things, was to say that, um, "The more successful—" this is what they said. "The more successful a vaccine is, the more quickly the need for it will be forgotten."

Justin: Yeah.

Sydnee: So we have to remember, and I think that that can apply—that can be applied to a lot of the vaccines that we're talking about today, specifically like, measles. Nobody remembers what a big deal measles was, because our vaccine was so good at preventing it.

Everybody thinks measles isn't a big deal, and unfortunately it's taking the current measles outbreak for people to realize, like, "Oh, maybe measles actually was a big problem, and maybe it really was good that we were vaccinated against it, and maybe everybody who tells me not to get the vaccine is totally wrong, and—"

Justin: Uh, no doy.

Sydnee: "They should stop." Um, so what do we do—

Justin: I tell everybody to—you know, when we tell people to rate and subscribe and help share this show, they often forget that if everybody did it, none of this stuff would happen.

Sydnee: [laughs]

Justin: Just remember, I'm just saying. I don't mean that to sound like a threat, I'm just saying—

Sydnee: I don't know about that. I wish.

Justin: —if everybody listened to Sawbones, we'd be a lot healthier as a society.

Sydnee: I wish. Well, if everybody, uh, believed what I said, but—

Justin: I wish, too. Are you kiddin' me? [quietly] Ad rates for that? A podcast everyone listens to?

Sydnee: Mm-hmm. I mean, I—

Justin: Yes, please.

Sydnee: [laughs]

Justin: Listen, we're gonna have to rename this show Yacht Talk, 'cause it's just me and Syd, talking 'bout our yachts.

Sydnee: If it was a podcast everybody listened to, we'd have to rename it Serial. [laughs quietly] Um, so for the rest of us civilians who don't get the vaccine, what do we do?

Justin: Beg for it.

Sydnee: Well, no.

Justin: Buy it on eBay.

Sydnee: You just, uh—I mean, for most of us it just sucks. Supportive care, you just wait it out. Like, drink plenty of fluids, stay hydrated. I mean, I had it. Actually, Charlie and I had this a couple years ago. I figured it out because Charlie was sick for days with a fever and it scared the heck out of me, and then I woke up and my eye was matted shut, and I realized, like, "Aw, crap! We have adenovirus!"

Justin: Yeah.

Sydnee: That's when it hit me, but, um... Because it can manifest different ways, even among, like, family members during the same outbreak, because of our age differences. Uh, if you do get adenovirus or you think you have it, and you are having sustained high fevers, you're having neck pain, or you are confused, or you can't stop vomiting, or anything like that, trouble breathing, please go see a doctor immediately.

Um, for most people it's just something that sucks and you ride it out and you get better, but if you're having anything that worries you, go get checked out. It doesn't hurt to get checked out. Um, you may just need time and fluids, but—

Justin: Better than nothing.

Sydnee: You should always get checked out. There was a case of this at UVA just recently, like, yesterday it was reported.

Justin: Wow, okay.

Sydnee: So, um—and now—like I said, it's always concerning on college campuses, because, close quarters.

Justin: Close quarters, yeah.

Sydnee: Uh, and one interesting note about adenovirus so you don't have to hate on it too much. Can I say one cool thing?

Justin: Sure.

Sydnee: The adenovirus is—uh, has been used in a lot of different clinical trials to try to, uh—as a vehicle for gene therapy. It's a good, like, package, so to speak, to deliver genes to cells in gene therapy, so it's under investigation for that as well as, uh, for treatment of cancer.

Justin: Wow, cool.

Sydnee: It's—it's a way to—the virus can kill cancer cells on its own, but it has also been a way to, like, activate your immune system to attack cancer cells by infecting them with the virus.

Justin: Hm! All right.

Sydnee: Um, and then, uh, there are also—there are different genes. You can use the virus, like... Put the genes in the virus and then use the virus as a, like, Trojan horse to get into the cancer cells and deliver these genes that can stop the cancer.

It's all still experimental, it's all still clinical trial, investigative stuff, but it's—adenovirus has been found to be a really good virus for this kind of therapy.

Justin: I know you think that, um, that's really cool, and maybe I'm just, uh, a softie, but I just really wish your mom wasn't sick. And I—I guess—

Sydnee: Hey!

Justin: I think it's kind of a shame that people get it still, but I guess it is cool, Syd. [trailing off] It's a good point, I mean, it's pretty cool.

Sydnee: Justin...

Justin: I just wish people... Maybe I'm just sentimental, but I don't—I just don't like to see your mom sick. Hi, Mary.

Uh, we want to say thank you to people who sent stuff to our P.O. Box, P.O. Box 54, Huntington, West Virginia, 25706. If you want to send us stuff. You don't have to, but sometimes people send us stuff.

Uh, Diana sent some art. Uh, we got MRSA from Cat and Lynn, a toy from the Snaps, EAK sent books, Stephanie sent a prescription book, Colin, Kristen, Thea, and Gus for the Cadbury's, Hall for the tick and cards and mug.

When Mary got ill, Charlie thought it might be the tick that we got. It was a stuffed tick that we received, but she thought maybe that was the culprit, that it was a real tick, and that we all need to be super careful with it.

Sydnee: It is not. It's just a big, stuffed tick, but it is creepy-looking.

Justin: Uh, I want to say thank you to the Taxpayers for the use of their song Medicines as the intro and outro of our program.

Sydnee: And we hope you get better soon, Mom. Oh! And I—

Justin: Yes, please come watch our children.

Sydnee: Yes, mom.

Justin: We have to watch both of them, by ourselves? Are you kidding me? All day?!

Sydnee: If you are worried... I know I made this podcast sound very dire. If you're worried, my mom's gonna be just fine. She's okay.

Justin: Yeah, she's good.

Sydnee: She's gonna good again—

Justin: She had some french fries earlier.

Sydnee: Yeah. She's—we're keeping her hydrated with grape water, her favorite drink. Uh, and you know how last week on our paternity test episode, I said that this would be a great one for my dad to do on Court Appointed?

Justin: Yes.

Sydnee: They're doing it.

Justin: Oh, good!

Sydnee: Next week, on Court Appointed.

Justin: Perfect.

Sydnee: If you wanna hear the legal side of paternity testing, you should check out Court Appointed with my dad and my uncle Michael.

Justin: C-c-crossover!

Sydnee: They can talk about all the legal stuff.

Justin: Perfect.

Sydnee: Um, so, thought I would mention that.

Justin: That's gonna do it for us, folks. So, until next week, my name is Justin McElroy.

Sydnee: I'm Sydnee McElroy.

Justin: And, as always, don't drill a hole in your head!

[theme music plays]

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Speaker One: Welcome!

Group: Thank you.

Thanks.

No problem.

Thank you.

Speaker One: These are real podcast listeners, not actors. What do you look for in a podcast?

Speaker Two: Reliability is big for me.

Speaker Three: Power.

Speaker Four: I'd say comfort.

Speaker One: What do you think of this?

[loud clanging]

Group: [groans]

Speaker One: That's Jordan, Jesse, Go!

Speaker Two: Jordan, Jesse, Go?

Speaker Four: They came out of the floor?

[thud]

Speaker Four: And down from the ceiling?

Speaker Two: That can't be safe.

Speaker Four: I'm upset.

Speaker Three: Can we go now?

Speaker One: Soon.

Jordan, Jesse, Go! A real podcast.