Sawbones 427: E. coli

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Clint: *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 cohost, Justin McElroy.

Sydnee: And I'm Sydnee McElroy.

Justin: I tried to do a really normal one that time and it came out feeling weirder than if I didn't. Like...

Sydnee: It felt like you were doing an impersonation of yourself.

Justin: "I'm a normal guy. This is how a normal podcast host talks." [laughs quietly]

Sydnee: Uh, Justin, I— I almost made a major flub.

Justin: Yeah, let's talk about that a little bit, Sydster.

Sydnee: Major screw up. I don't know. [laughs quietly] Major something. Uh, so when I sat down to—

Justin: Major something.

Sydnee: —put toge—[laughs] put together this episode, um, many listeners— many of you wonderful listeners had written in saying that I should talk about a recent archaeological discovery that was made in Borneo by Indonesian and Australian scientists, archaeologists, of what we now know of— unless something changes in the future— as the first recorded surgical amputation. Well, the first discovered. I guess it wasn't recorded.

Justin: Right.

Sydnee: We found a skeleton that was missing a—

Justin: Maybe it was recorded.

Sydnee: [laughs] Well, yeah. We just—

Justin: And they were like, "I won't need this. Put it in the trash."

Sydnee: We haven't found the record.

Justin: Sorry, history.

Sydnee: But they did discover a 30-ish thousand year old— somewhere in there— skeleton that was missing a left foot. Um, and it appeared that the tibia and fibula were cleanly cut.

Justin: Ooh!

Sydnee: So, a surgical amputation. And not only that, the age of the skeleton was— it was probably around a person that was 19 or 20 years old-ish, and there was— you could tell there had been growth around it. Like, the bones had grown in certain ways that this amputation probably occurred six or nine years before the person died, meaning that not only did they have a surgical amputation performed, but they lived afterwards.

Justin: Beyond that.

Sydnee: Yes.

Justin: That was not the end of their story.

Sydnee: Exactly. Um, and there was no evidence in the bone at least of infection, the kind of damage you would see from infection, which means that they probably did a pretty good job of keeping it, you know, from getting contaminated. Which completely changes our understand of medical history and medical advances at the time. And that society, the structure of that society, that they took the time, they were able, they had the expertise, the technology, the

ability to do this, the desire to do this, to save a member of society who, you know, no longer...

Justin: Right, had value from, like, a working— like, you know, ability to contribute physically.

Sydnee: Not by our modern sense had value, but at the—

Justin: Right, exactly.

Sydnee: Yeah, our entire understand can shift. And also, this kind of work is also really important to undo kind of, um, racist ideas about different parts of the world and how underdeveloped they were at different times. I mean, our whole understanding of human history changes in a moment when we discover things like that.

Justin: [simultaneously] Just like that.

Sydnee: Fascinating discovery, so interesting, relevant to our show. And I thought, I'm gonna do a whole history of amputations and, you know, surgical amputation, and how we developed that technology. And I started working on that, and as I was looking for resources, I found... our show.

Justin: [laughs]

Sydnee: Where we have already done this episode. [laughs quietly]

Justin: [laughs]

Sydnee: Uh, it's been many years ago. This show's been going on a while. You'll have to forgive me.

Justin: Hey, that's the thing about it that a lot of people will forget, is this show's been going on a while.

Sydnee: The notes I found on my computer to, like, prove to myself, did we do th— yes, we did this— were so old that they're saved not on, like, anything in the cloud, it's not a Google doc.

Justin: Not even in the cloud.

Sydnee: It's just— it's just on this computer. It's on the hard drive of this computer. So if anything happens to this computer, those notes are gone. I— at some point, Justin, you need to help me move all these show notes—

Justin: Notes to the cloud.

Sydnee: —to the cloud. Because—

Justin: Huh. It's almost like I've said that I would do that, um, over a dozen times, and when I offer to do it [through laughter] you're always too busy doing something else for me to do it.

Sydnee: I also— it's saved on Open Office.

Justin: Oh my God.

Sydnee: Which my version of Open Office is so old and I don't know how to update it that it has, like, a permanent error box on my computer screen desktop at all times.

Justin: It's just on her screen. Like, you might as well save it on a cassingle. Like, that's how applicable—

Sydnee: Anyway, I need to get these show notes into the cloud before something happens.

Justin: Get 'em into the cloud!

Sydnee: [laughs] Before something happens. So we're not—

Justin: So the cloud can say, "Sydnee, you already did this episode!"

Sydnee: So I got to share this wonderful piece of medical history. I would encourage you to go read the paper about it. It's fascinating.

Justin: You know, we should've redone the episode. [wheezes] Because apparently [wheezes] the whole thing's incorrect now, the whole thing's outdated!

Sydnee: Well, I think the rest of— no, I looked through the show notes. The rest of it is all accurate. It's just—

Justin: We should just append, uh—[laughs]

Sydnee: We used to say the first known surgical amputation was about 7,000 years ago, and now we say it was about 30,000.

Justin: We should just do a thing at the beginning where like, "Hey. So, anyway, in the beginning some people figured this out, and then we all forgot about it for millennia. Anyway, okay, here we go!"

Sydnee: Yep, and then we remembered. So instead, I'm gonna talk about E. coli. [laughs quietly]

Justin: Okay. Natural— natural transition.

Sydnee: I did what I always do when I need a topic. When I'm in desperation, I turn to our emails, and Amanda recommended that I talk about E. coli. Amanda mentioned that it had recently been found— I don't know if it was just in Amanda's water or in all water, but either way it was in the water and it was concerning.

Justin: That's a— that's a massive distinction, whether or not—

Sydnee: [simultaneously] Well, I don't know!

Justin: —it's in Amanda's water or *all water*! That's a very— that's almost like the biggest difference there could be.

Sydnee: Listen. Here in West Virginia, our legislature is devoted to lowering water quality standards as far as they can go. So...

Justin: That's true.

Sydnee: That is not a concern—[wheezes] we don't worry about that. We welcome it. All E. coli welcome here!

Justin: Open for business.

Sydnee: So we've probably all thought or talked about E. coli at one point or another. I feel like it's one of the bacteria that people, like, you say it and— I mean, like, you have some sort of idea about it, right?

Justin: Yes.

Sydnee: What do you think of when you think of E. coli?

Justin: For me it's like— it's all connected to fast food. It's like, salad— salad bars is what I think of when I hear E. coli.

Sydnee: What does it cause?

Justin: I think salad bars and hamburger meat. Those are the two things that I think about.

Sydnee: And what does it cause?

Justin: Pooping.

Sydnee: Okay. Diarrhea.

Justin: Yeah.

Sydnee: That's what we think. Okay, yeah. I mean, not all bacteria would I be able to mention—

Justin: [simultaneously] Not, like, regular— not—

Sydnee: —and you would know immediately what it caused.

Justin: My impression of the pooping is it's not regular pooping, it's just like... pooping.

Sydnee: And sometimes— sometimes if you've had a urinary tract infection— I always feel bad, because if you don't know that E. coli also causes a good number of urinary tract infections, I know that it's always— and I've had them too, so this is something we all experience. There's always a moment where I have to explain to a patient, like, "It's E. coli. That's fine. That's normal. That's very common,

most common." Because it's not a long journey... from one... orifice to the other, down there.

Justin: [wheezes]

Sydnee: I mean, that's just the truth! And, like, that happens, and that's the truth.

Justin: Yeah.

Sydnee: And anyway, so it can cause urinary tract infections, too. But the point is, we usually associate it with, like, foodborne illness and diarrhea. I know it's unpleasant, sorry. That's what we're talking about.

Justin: [simultaneously] That's what I— yeah.

Sydnee: Uh, but when did we find it? Who is E? Who is the E of E. coli?

[pause]

Justin: I don't know.

Sydnee: Well, let's talk about it.

Justin: Oh, okay. I thought it was a mystery! That was about to be wild! Like, nobody knows?!

Sydnee: Nobody knows! It's just E.

Justin: It's like Oreo. No one knows why they're called that. They're just— that's what they're called.

Sydnee: No, we know what all the bacteria— why they're named what they're named, pretty much, because we've changed it many times over— like, we kept changing where things belonged. And like, "Oh, actually that doesn't belong in that genus, it's this one, or that family." You know, all that stuff.

Justin: For most of human history it's just all country name and then mumps. So it's like, the Spanish Mumps, the German Mumps, the Italian Mumps...

Sydnee: Hey, we did it with flu.

Justin: Yeah.

Sydnee: Or— or what animal. Pig flu, bird flu. I don't know.

Justin: I still— poor Spanish flu, man. Walk into Spain and be like, "What'd you guys do?! Why'd you do this? This is terrible!"

Sydnee: See, I try not to do that. I try to always say, like, the influenza pandemic of 1918, and not call it any specific country.

Justin: Hmm.

Sydnee: We have to rectify that historical mistake. The discovery was made by Dr. Theodore Escherich.

Justin: Hm! Theodore Escherich?

Sydnee: Escherich— Escherich— Escherich—

Justin: [simultaneously] That's a good— that's a good last name! I don't think I've heard.

Sydnee: Escherichia is the word that we're gonna— Escherichia coli is the full name. That's what the E is for.

Justin: Ohhh, okay. Cool.

Sydnee: In 1885 he was a German Austrian pediatrician. He was studying what kind of bacteria are in the newborn colon. Basically, he was taking samples of meconium— do you know what meconium is?

Justin: Yeah. It's the, um— it's the first dookie.

Sydnee: It's the first poop, yeah. Yes. On a side note, by the way—

Justin: Not— not impressed at all. I mean, I guess I am a father of two, so I should know that term.

Sydnee: I think we've talked about it. Meconium is that first poop, and it's, if you've ever seen one, it's kind of black and sticky and tarry. It's different. It's different than all the poops that will come thereafter.

Justin: It's amazing that we've gotten this far in human history and it's just, like, the first thing that happens as a parent is like, "This can't be right. This— something is wrong here. This can't be—"

Sydnee: "Is this okay?"

Justin: "This can't be right."

Sydnee: Uh, so by the way, on a side note, meconium, whether or not it is sterile, whether or not there is bacteria in meconium is still kind of debated. For a long time we thought it was sterile.

Justin: Really?

Sydnee: We though that, like, because the intrauterine environment is sterile, when a baby is born that first poop is also sterile. Then there have been some studies that found some bacterial DNA in meconium, which kind of called the whole thing into question. Like, well, is there bacteria in the meconium, and then is there bacteria in the intrauterine environment? Is that part of, like, just physiology? That's normal, that's just part of the developmental process. And all of that got kind of called into question.

So that's something we're still figuring out, because we know that we get colonized with bacteria in our colons really quickly after birth. Like, really soon you see bacteria in poop after birth. That's normal. That's part of it. There's nothing wrong with that. But then the question was, well, maybe does it happen even before? So, an area we are still investigating. Um, also meconium is from the Greek word for poppy.

Justin: Really?

Sydnee: Because— which is either because meconium, the black sticky stuff, looks like raw opium. Which as I was hearing this I was thinking, like, heroin is the way that it... black, sticky, tar.

Justin: Doctors then were so rad. They were like, "You know what that looks like? It looks— it looks like heroin, doesn't it?"

Sydnee: Well, raw opium, but yeah.

Justin: "Hey, Doug!"

Sydnee: [laughs]

Justin: "Doug! Hey, am I outta my gourd here? This looks like heroin, right?"

Like, "[goofy voice] That's heroin! Seen it 20 times today!" [laughs]

Sydnee: It may be either that or because Aristotle noted that it makes babies sleepy, meconium. Which is probably a reference to the fact that if babies aspirate or, like, inhale meconium while still in utero, sometimes they have issues when they're born. So, sleepy in a—

Justin: Oh, so that's why it's important to know if it's sterile or not. Because if they ingest it then... I mean...

Sydnee: That's a whole syndrome. Meconium aspiration syndrome is a thing that can happen when babies do pass—

Justin: Yeah, MAS.

Sydnee: Yeah, M— yes! That is what it—[laughs]

Justin: [laughs] Sometimes—

Sydnee: [simultaneously] When they do pass their first meconium in utero—

Justin: This is a good trick I can play on Sydnee. If she says a term that has multiple words in it and I say the acronym of that, that's what she would normally call it at work. So a lot of times I can get a half second of admiration [through laughter] out of Sydnee!

Sydnee: [laughs]

Justin: Where she looks at me like, "Huh!" And then she's like, "Aw, wait. You just abbrevi— you just abbreviated it. Okay."

Sydnee: You just— yeah. But that is a debate. 'Cause, like, that can happen if they pass the first meconium while they're still in utero and then they inhale it. It's usually like an inflammatory sort of response. It's treatable. This is not... I mean, it's something we want to treat and address, but this is not necessarily fatal or anything.

Um, but yeah, if there's bacteria in there that's a whole other question. So far we don't think so, but we're not sure.

Anyway, I digress. He was investigating meconiums and then first stools from infants. So, like, after they'd been alive for a bit, looking at that poop too.

Justin: Okay.

Sydnee: And he found these little short rod-shaped bacteria. He called 'em Bacterium coli commune. Meaning, like, "I find these common bacteria in lots of colons." [laughs quietly]

Uh, and he did all the tests that you do. When you find a bacteria you do a bunch of tests on it. I remember this from microbiology lab. I remember doing these tests, and then I have never done them since. But, like, you wanna figure out what they'll grow on. It grew on blood and agar. It made these little white colonies. You can look at that. What do they— what dyes will they take up? Like, how can you stain them so that they— so you can look at them? Do they ferment things? All the different things you do to try to define, where does this bacteria belong in the whole... *gigantic* world of bacteria that we even understand, let alone all the bacteria we haven't found yet. There's so many bacteria out there. We are so outnumbered by germs.

It wouldn't be until 1919 that the bacteria would actually bear his name. He didn't name it after himself. Two other scientists later, Castellani and Chalmers, did more research on it, helped reposition it in, you know, all of the world of bacteria, what its name should be, and called it Escherichia.

Justin: Oh, we actually have some—

Sydnee: Coli.

Justin: Oh, we have some audio of when he found out that they did that. Hold on, let me play it right now.

"[with false enthusiasm] Oh! [clicks tongue] Great! 'Cause it's such a good... yeah, absolutely! For— oh, forever? Yeah, I'll tie... yeah, yeah, yeah! Abso— thank you guy— wow!"

Sydnee: He may—

Justin: "Thank you! That's so great. You know, I didn't do that. I thought I had a reason. Uh, ah well, thank you. You kidders. That's really nice." [wheezes]

Sydnee: He may have actually passed away by then.

Justin: It doesn't— it's not— actually matter, does it?

Sydnee: [simultaneously] It doesn't matter, okay. I won't— I won't— yeah. Anyway.

Justin: Like, I know you love to bury every Sawbones topic but, like, it doesn't actually matter in this case.

Sydnee: So E. coli— and we're gonna go through the history. Like, so we found it. What has it done since then? A lot of stuff. Um, it is— like I said, it is one of the earliest bacteria to colonize our colons. It is there with us... from our earliest days of life, E. coli lives [laughs quietly] lives among us, within us, inside us, and is [holding back laughter] a part of who we are.

Justin: Yeah.

Sydnee: Um, which makes it an important bacteria. Uh, and there are lots of different strains, and they do lots of different things. Some of them are pathogenic, and we're gonna talk about some of those, and they can cause great harm to humans, and they have in the past and they will... I do not see any reality where they don't continue to occasionally. Um, because I've seen y'all in the bathroom. You don't—

Justin: Who's— who's y'all?

Sydnee: You know, you out there who don't wash your hands. I've seen you. I've been in many public restrooms and watched people walk right out of the stalls and right out that door. And don't you think nobody's watching! [laughs] Sydnee is watching.

Justin: [simultaneously] Sydnee is watching. Sydnee's always watching.

Sydnee: Sydnee sees you! [laughs]

Justin: Sydnee sees you don't wash your hands.

Sydnee: [simultaneously] There are always gonna be people out there.

Justin: Let's do a "Sydnee sees you not wash your hands" t-shirt.

Sydnee: [laughs]

Justin: Just you looking judgmental.

Sydnee: I see that happen and I always wanna— there is no nonjudgmental way to say, "Hey, you forgot to wash your hands!" There's no way to say that! And you'd think— you would think now, having, like... being in COVID times that everybody would be on board. And maybe it's better. Maybe, like— I mean, I haven't— this is anecdotal. I haven't collected data. Maybe it is better. Maybe if you did an observational study, which is creepy, where you watched people—

Justin: [laughs]

Sydnee: —in bathrooms to see—

Justin: Yeah, you can get— what's the body that approves that kind of thing?

Sydnee: IRB approval, yeah.

Justin: Yeah, IRB approval on that.

Sydnee: No, you're not gonna get IRB approval to watch people in bathrooms [through laughter] and see if they wash their hands.

Um, but if you did, maybe the numbers are better now. I don't know. But I know it's still out— I know that anecdotally I see you people. Wash your hands!

So it's also, in addition to, like, being pathogenic, there are probiotic strains that have, like, benefit for our colons. They're, like, part of the harmonious environment, our colonic flora.

Justin: Hmm!

Sydnee: We have natural flora inside our bodies, in various areas. There's certain flora that is supposed to inhabit different parts, and when we find it there we go, "That's just part of normal oral flora, or normal vaginal flora, normal... colonic flora." Whatever. So that is— E. coli is part of that, and it lives in harmony, and it's supposed to be there. Balance is really important in these parts of our body. If everything is in balance the way it should be, we function well, and our parts, our bits, function well. If something starts, you know, growing over everything else and taking control and trying to, you know, take over, like throw a colonic coup, things... you know, get out of whack.

But, uh, I want to talk about the times that Escherichia coli has caused problems.

Justin: Okay. Instead of found solutions. [laughs quietly]

Sydnee: [through laughter] But— but before we do that... we gotta go to the billing department.

Justin: Let's go!

[theme music plays]

[music plays]

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Jarrett: [laughs]

Tre'vell: Period.

[music and ad end]

[music plays]

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[chime]

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[music and ad end]

Justin: So Sydnee, you were about to tell me there's actually a downside to E. coli?

Sydnee: Yeah. So, there have been outbreaks, and this is probably why you associate them with fast food, because there have been well publicized [laughs quietly] outbreaks of Escherichia coli infections, um, related specifically to fast food. It's not always fast food, right? We know that. I feel like every other month we hear about, um, there's contaminated something somewhere, whether it's a meat or a vegetable product or a salad or a restaurant or, um, a certain company that makes something, or a grocery store.

Justin: Uh, yeah. It's, uh... it's, uh, always very gratifying when that happens with lettuce. 'Cause it's like, "Ah ha ha, I knew it! That serves you right, lettuce-eaters!"

Sydnee: It was rough when we couldn't—

Justin: It was roughage, actually.

Sydnee: [laughs quietly] It was rough when peanut butter was on the...

Justin: Oh, yeah, yeah! We got Jif.

Sydnee: [simultaneously] ... list there for a while.

Justin: Had to settle for Peter Pan.

Sydnee: That wasn't E. coli though. No. It was something else. But yeah, that was rough, because we had to... we had to throw away our peanut butter! That was rough. And our children are very picky about peanut butter, I discovered. I didn't know they were picky about peanut butter until...

Justin: Apparently if you give your kid the same peanut butter their whole life they only like that.

Sydnee: Yeah. And when you give 'em other peanut butters, they notice. How do they noti— how— you send 'em to school with a sandwich and they come home and they haven't eaten it, and they're like, "I hated that."

And you're like, "What?"

Justin: "I hate that peanut butter."

Sydnee: "You can tell?" Um, so there have been some outbreaks that have happened because of a specific strain of E. coli, and if you're in the medical world you know O157: H7. If you're not you're like, "That's— that's what you named it?" [laughs]

Justin: [laughs]

Sydnee: "You called it that series of numbers and letters and were like, 'Good. Good job.'"

Justin: "Good, it's done."

Sydnee: "That's done." Um... this strain is one that we talk about a lot in medical school and a lot of people are familiar with, because it can cause a bloody diarrhea. So a lot of intestinal damage and bloody diarrhea, and there's some life threatening complications that can result. Uh, it makes about 70,000-ish people in the US sick every year. Um, there are outbreaks everywhere.

But, um, the first big outbreak of— and I should say, by the way, the way— the thing that distinguishes these more deadly— or I shouldn't even say deadly. Like, more dangerous, more morbidity associated with certain strains— is Shiga toxin. that's the name of the toxin. Shiga toxin.

Justin: Shiga toxin.

Sydnee: And it specifically does more damage than a lot of the other— there are lots of ways E. coli can mess with your gut. Shiga toxin is, like, the worst, if that makes sense.

Justin: Okay.

Sydnee: So anyway, uh, in 1982 the first big outbreak in the US of E. coli O157: H7 occurred. In August of that year, several people in Oregon and Michigan started describing a diarrheal illness that was unique in its severity. It started out pretty typical, if you've had either, like, what you thought of as a stomach bug, or perhaps you were worried about some sort of foodborne illness, some sort of food poisoning, you get some cramping, and then you get some watery diarrhea. And that in and of itself you probably wouldn't— I mean, we don't all necessarily go to the doctor for, right? Like, you wouldn't— nobody would report that. You get some cramping, some watery diarrhea, then it goes away and you go, "Phew. I'm not

eating at that restaurant for a while." But then you inevitably go back. Because that's because we're human.

Um, in this case it was followed up by bloody diarrhea. In all of these cases in this specific outbreak, everybody got better. It all resolved.

Justin: Okay, good.

Sydnee: However, it was concerning enough that people went and sought medical care, which I think is pretty typical, you know? When we see blood, we start to worry more, we go seek some sort of evaluation and a diagnosis.

Um, so people sought out medical care, and this is how they discovered that all of these cases had this same strain, E. coli O157: H7, in their stool. This was the offending agent. So where did it come from? And they eventually linked it... now, this is what's interesting. The paper... uh, which was published in the New England Journal of Medicine...

Justin: NEMJ.

Sydnee: Mm-hmm. Three days before I was born...

Justin: Mm-hmm. Wow! That is interesting.

Sydnee: Yeah, March 24th, 1983, three days before I was born. It's called hemorrhagic colitis associated—

Justin: Sorry, NEJM! [wheeze-laughs]

Sydnee: How did you— oh...

Justin: [laughs] Dang it!

Sydnee: That was acting. Hemorrhagic colitis associated with a rare Escherichia coli serotype. It was linked to— I think it's cool that it was three days before I was born that this huge paper came out.

Justin: [simultaneously] Yeah, for sure!

Sydnee: Anyway. It was la—[wheezes] it—

Justin: You know, John Lennon was shot a month after I was born. [pause] I thought we were just saying stuff and how it was in relation to the date of our birth.

Sydnee: Anyway, uh, what they did— what they figured out with epidemiological investigative techniques is that these people in Oregon and Michigan had all eaten undercooked hamburger from a popular national fast food chain. This was not— by the way, this was in 1982 that this happened. It was published in 1983, but it happened in 1982. And that's a long time ago, and I think that whatever restaurant was responsible, you would expect that, like, by now people wouldn't still be like, "Oh, I'm never eating there."

Like, you would hear that and be like, "Well, I hope they've cleaned their act up since 1982."

It was not immediately available to me. I mean, I found it. I'm not saying I had to do, like, some incredible dark web sleuthing to find the name of the fast food chain.

Justin: [giggles]

Sydnee: But it wasn't immediately clear in the articles that I was reading about this outbreak what fast food chain it was.

Justin: Had you wanted to do some dark web sleuthing, Syd, where do you think you would've started with that?

Sydnee: I would've asked you.

Justin: Oh, well.

Sydnee: [laughs]

Justin: Syd, where do you think I would've started—[wheezes] with that!

Sydnee: I don't know how you get there.

Justin: I probably would've gone to, like, Coursera or something and be like— or go to Masterclass. Like, "Do you have how to use dark web?"

Sydnee: I don't know how to— I don't know if it's on our computer.

Justin: The dark web?

Sydnee: Uh-huh.

Justin: Go on. Continue.

Sydnee: [laughs]

Justin: Continue podcast, please. We actually don't have enough time for me to unpack this.

Sydnee: Is it like the email that I can only get on this computer? There's one kind of email that only comes to my laptop and I can't get on my phone, and I don't know how to find it.

Justin: Alright. Go— you— whatever you were gonna say next, um, just go for it.

Sydnee: It was McDonald's. [laughs quietly]

Justin: Yeah, we all knew it was McDonald's.

Sydnee: I didn't know it was McDonald's. Um, I found it in an article that was written about it later.

Justin: I mean, it's what we assume.

Sydnee: I think there was this sort of, like, veil of secrecy around it at the time. Like they all agreed "We won't tell people it's McDonald's." And I don't know if it was necessarily, like, this nefarious, like, "Well, corporations paid people off to hide the secret," or if it was like legitimate "We don't wanna scare everybody, 'cause so many people eat at McDonald's, and if we put this out there you're gonna have, like, people—"

'Cause, like, lots of people get diarrhea. And so every time someone gets diarrhea, so many people eat at— you know, statistically you're gonna think, "Oh my god, I ate at McDonald's!"

Justin: Yeah, it's— it's also this, like— we do a little bit of this just as a society. Like, just all agreeing, like, we don't really wanna remember the thing about McDonald's, right?

And everybody's like, "No! Stop mentioning it! Let it fade out of the public consciousness!"

Sydnee: You also have to think about— and Justin, I feel like this is an area of history you know more about. So, it's 1982. The concept of everyone eating from the same restaurant in the entire country is still pretty new, right?

Justin: In what year?

Sydnee: 1982?

Justin: Uh... sort of, yeah. I mean, it's early-ish.

Sydnee: Because we're talking about, like, at this point, how long had we been having massive foodborne outbreaks? Probably not very— I mean, if they were happening—

Justin: We almost certainly had a lot more local sourcing in those days rather than, you know, one plant in Montana shipping out all the milk to everywhere.

Sydnee: Exactly. It's the evolution of, like, the food industry in America, but also specifically in this case fast food. The concept that because somebody ate at a McDonald's in Oregon and got sick that you'd be worried about eating in a McDonald's in West Virginia. That wouldn't have been as clear cut then as it is now. Where, like, if you hear about, uh-oh, a McDonald's hamburger made somebody sick, we know enough about how food is distributed that you might worry about your hamburger here in West Virginia, right? Um, so I feel like that's part of why you don't see this kind of being recognized until, like, the 80's, is that it was happening sporadically, maybe, before. But then when everybody started getting their food from the same places, you'd get outbreaks.

Justin: Yeah.

Sydnee: Um, so it was undercooked hamburger. And why, by the way— and I think I've explained this to you before— why is it— why will I never eat a hamburger that's not well done, but I would eat a steak that wasn't well done?

Justin: Um, because when you grind meat, there's so many more surfaces... for the bacteria to grow on. Because the meat inside of a cut of meat should theoretically not be— it should be, you know, free of bacteria 'cause it's inside. There's no exposure to the outside, so there's less vector for infection.

Sydnee: So, in— exactly. In theory if you cook the outside of a steak, you've killed the bacteria. Now, if it's sat out for a long— I mean, obviously there are limitation to that. But with bac— with hamburger—

Justin: If it's set a long time, bad. If it sits out a long, *long* time, it's good again. Don't think about that. No one likes to think— "We don't wanna think about how dry-aging works, right?"

"No, we don't!"

Sydnee: When— and the other thing to think about is that E. coli also lives in the intestines of animals. And so that E. coli that's in that under cooked meat is getting from inside the intestines of those animals all through that hamburger. I'm sorry, I know that's upsetting. This is why I don't eat hamburgers unless they are fully cooked! [laughs quietly]

Justin: It's wild to me that McDonald's even has the mechanism by which undercooked beef could be served.

Sydnee: This was 1982.

Justin: Okay, yeah, yeah. That makes sense.

Sydnee: Um... so anyway, 10 years later another outbreak occurs. And in that time period, I will say, there wasn't this huge, like, public panic about fast food or about hamburger or about food contamination. That didn't happen, and in part it was probably because they never said the name of the— well, I mean, eventually they said the name of the restaurant. But it was not always— everyone did not know.

Um, and there wasn't this big, like— the media didn't have this big heyday with— it just wasn't this big thing until 1993, when the Jack in the Box outbreak occurred. And I think most people are sort of vaguely— and there are no Jack in the Box in this area. So, like—

Justin: But that was why— I think that's why— it's a regional chain, right? That isn't in other areas, right? So I think that is why that sticks in my craw a little bit more, because the first time I heard about Jack in the Box was this E. coli outbreak.

Sydnee: Yes.

Justin: So it was an early, early connection.

Sydnee: So at Jack in the Box there were— and this was much bigger, too. The other thing about it is this was much more of a severe, widespread outbreak. Um, contaminated hamburger. It was called the— they linked it to a specific burger, the monster burger.

Justin: [snorts]

Sydnee: Most people ate the monster burger, which the tagline for the monster burger was "So good it's scary."

Justin: [wheezes] So scary it's good!

Sydnee: It caused 732 people in four states to become sick. So a big, big, outbreak, right?

Justin: That's a big outbreak. That's a big burger, big hunger, big burger, big flavor, big outbreak.

Sydnee: And it's one of the biggest— like, if we look back at sheer numbers people getting sick— I mean, we've had big contaminations. We know periodically when, like, we can't get romaine at the supermarket, right? We've had this big, giant food contaminations. But to make this many people sick it was notable.

Justin: Yeah. I bet when you get that contact tracing call about the fact that you ate a monster burger and it gave you super diarrhea it's like, "Yeah, that sounds about right, actually. You're probably right about that."

Sydnee: It's weird how the idea that "I ate this food and it gave me diarrhea" has now become, like, the price you pay. Like, we talk about it as almost like,

"Well, of course you did. You ate at wherever." And it's like, why is that—[laughs] why have we accepted that? [laughs]

Justin: Yeah, that's probably you spending too much time with me and my brothers. [laughs]

Sydnee: Oh, that's true.

Justin: To be fair.

Sydnee: That is true. The— so the other hard part about this specific outbreak is that it— we— and we already knew this to some extent. I'm not saying this is when we discovered it, but it's when we saw it happen, um, all at once— was that you can get a complication from E. coli O157: H7 called hemolytic uremic syndrome. There are other bacteria, diarrheal illnesses, that can do this too, and then sometimes it's not necessarily associated with that. But this is what we connect it most strongly with. And the specific syndrome, which happened in some of these cases, and four people actually perished from this, related to this outbreak, causes basically kidney failure, and your platelets get really low, and it can be a deadly complication.

And so again, it's not only E. coli that does this. There are other things that can do it, too. But it's because of the Shiga toxin that is in specific strains. And so that is why E. coli O157: H7, when I learned about it in medical school, was one of the bigger deals. Like, there are lots of things that can give you diarrhea. There are lots of things that you can get from contaminated food. This is one of the big deal things you need to think about. Um, there have been other strains of E. coli that are not the O157: H7 that have caused illness as well. That happens all over the globe, so it's not just this one bad actor. Um, there was one specifically in Germany in 2011. Um, this was a— it was also a Shiga toxin producing one. That seems to be our worst, right? Like, when you have that Shiga toxin present.

Justin: Whoa, whoa, whoa. You just said Shiga toxin president, and that sounds—

Sydnee: [simultaneously] Present. [laughs]

Justin: —very scary to me. Why did we elect Shiga toxin? What were we thinking?

Sydnee: Um...

Justin: Just stuff wasn't bad enough? [laughs]

Sydnee: 4,300 people got sick. Uh, 852 people got that complication, that hemolytic uremic syndrome. Um, and over 50 people died. Um, they linked this one actually to fenugreek.

Justin: Oh, what is that? That sounds really familiar.

Sydnee: So, fenugreek seeds, these sprouts that— the reason that I know about fenugreek is that it was recommended to me for breastfeeding.

Justin: Ohh, maybe that…

Sydnee: To increase produ— so that is how they figured it out, is that most of the people who got sick were healthy young adult women, and they were more li— I mean, fenugreek is highly— you can— I mean, there are other, like, sort of health connections to fenugreek. But I know for me I had people telling me to eat fenugreek when I was trying to breastfeed. So there's the connection there. Which just to highlight— I say that just to highlight that, like, E. coli is not just in hamburgers. It's not just in meat. That is often what we think of, like you said, when we think of E. coli.

Um, but it is in, like you said, lettuce and spinach, cookie dough... oof. That's a rough one, because I have been guilty of eating raw cookie dough. You really shouldn't eat raw cookie dough. It's been linked to apple juice. It's been linked to cheese. It's been linked to, like I said, sprouts and raw mea—

Justin: Well, then eat the raw— then—

Sydnee: Any raw stuff. Raw milk. Please don't eat raw milk.

Justin: Then eat the raw cookie dough. If you're gonna get if from apples and stuff, like, just eat it. Just eat it.

Sydnee: You have to think about things like petting zoos. It's been linked to outbreaks at petting zoos, because animals have it.

Justin: Yeah, that's why should just look— look for those hand washing stations, y'all. If they don't have a hand washing station at the petting zoo, ooh, I don't know if you wanna go into that petting zoo. I don't know, bud.

Sydnee: Water parks.

Justin: [wheeze-laughs] Well... you're play— you pays your money and takes your chances with that. It's a water park.

Sydnee: I know how much you love the Flodge.

Justin: Oh yeah. Not that—

Sydnee: [simultaneously] Great Wolf Lodge.

Justin: Not that part.

Sydnee: I don't know of any out —by the way, I don't know of any outbreaks associated with Great Wolf Lodge. That was just— it is a water park. I don't mean to malign the good name of the Great Wolf Lodge.

Justin: Yeah, you could've mentioned Noah's Ark or the beach or Boomer's or, um... [unintelligible] beach.

Sydnee: Overall—

Justin: Typhoon Lagoon.

Sydnee: —there are six different pathogenic types of E. coli that cause diarrhea. Some are worse than others. There's one, for instance, um, that causes most of traveler's diarrhea, which is typically more benign and self-limited than these other things we're talking about.

Um, but also, as I said, some E. coli is good. It can be a probiotic. It can be— and it's also very useful in molecular biology. It's one of the big— there are some, you know, microbes that we've found are very useful in, like, constructing things, making things in molecular biology. So, like, um, pharmaceuticals are made using it. Things like, um, um... uh, erythropoietin.

Justin: Oh!

Sydnee: Human growth hormone. There are some clotting factors. Insulin. Different things that we need bacteria to help us create, E. coli is part of that process. It's been used in, like, industrial chemicals like phenol and mannitol. So it's— it's a very useful bacteria. And in many cases the strains are— not only are they not harmful, but they're good that they're in your colon. But then there are those rogue strains.

So at the end of the day, what should you do? How do you avoid getting an infection related to E. coli?

Justin: You can't.

Sydnee: No. [laughs quietly]

Justin: Just give up.

Sydnee: I mean, obviously we can't control everything.

Justin: I mean, there it is, folks. There it is.

Sydnee: But things— let's— let's be proactive.

Justin: Spinning through space.

Sydnee: What— harm reduction, what can we do to limit our risk?

Justin: Wash our hands!

Sydnee: Wash your hands... and cook your food.

Justin: Cook your food, you weirdos! [wheezes]

Sydnee: Wash your hands and cook your food are two major ways you can reduce your risk of getting E. coli, or other foodborne illnesses. Again, understanding that when you eat at a restaurant, when you eat food that's been mass produced from who knows where, um...

Justin: So just don't sweat it.

Sydnee: There are always gonna be risks in life, but cook your food, wash your hands, can— can limit your risks. Um, especially if you're at a petting zoo. Please wash your hands. Petting zoos are great, love petting z— please wash your hands.

Justin: Love a petting zoo. Please wash your hands. Uh, I mean, I don't know that I'm gonna change anything, Syd. It seems like E. coli is waiting around every corner to snatch me up and put me into its... diarrhea van. And so I will continue my existence unabated. I hope you will do the same, unless your hearts and minds have been changed by this and you decided to finally wash your hands, and I approve of that.

Sydnee: Semmelweis had it right.

Justin: Sydnee's always watching. Sydnee knows when you don't wash your hands.

Sydnee: [laughs quietly]

Justin: Uh, thank you so much for listening. Thanks to The Taxpayers for the use of their song, "Medicines," as the intro and outro of our program. And, uh, thanks to you for listening! We really appreciate it. Uh, that is gonna do it for us for this week, so until next time, 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]

[chord]