Sawbones 286: Fever

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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: Uh…

Sydnee: It's good to be back.

Justin: It is good to be back. It feels like forever since we've recorded a real, live episode of this podcast.

Sydnee: Well, not live. I mean, it's recorded live, I guess. It's live like SNL is live, sort of.

Justin: SNL is live. What do you mean?

Sydnee: Recorded live. Like those musicals on Fox.

Justin: Live to tape. Yes.

Sydnee: Live to tape.

Justin: Live to tape. Yes. This is live to tape. We are not doing this live in your phone, I guess would be the—or like, streaming over the internet, I guess.

Sydnee: Yeah, I think that's called streaming, honey.

Justin: Streaming. The people do not live in the phone. I don't know how everybody keeps getting that so confused. Anyway, this is a marital tour of misguided medicine. We are here with you after some live episodes and some absences.

Sydnee: I am sorry that we were gone. We did not want to be gone.

Justin: Yeah. It's just life, folks. Life finds a way. Y'know, it's like Jeff Goldblum says. Life finds a way to kick you in the pants every once in a while.

Sydnee: I don't think that's… I don't think—that's not the quote.

Justin: Ehh, that is the quote. I had the lunch box. Do not try to test me. 'Cause you know I love my geek trivia. Bazinga. [laughs] Do not try to test me.

Sydnee: I was always a bigger fan of the, "All you thought about was if you could, you didn't stop to think if you should." That was always…

Justin: Yeah. Yeah. Sydnee, I love—

Sydnee: That's like our whole—that's a good one for our show.

Justin: I love Bicentennial Man as well. I celebrate Robin Williams' entire canon. But this is about—

Sydnee: No, that's from—

Justin: Sawbones, and about medicine.

Sydnee: Jurassic Park.

Justin: Jurassic Park. Okay.

Sydnee: Anyway, Justin, a lot of people have written to us through the years now.

Justin: Yeah. Gosh.

Sydnee: Years.

Justin: Just… the 13th. We just passed the six year anniversary.

Sydnee: And they've asked about this topic, and I don't know why we haven't covered it, and it just kind of struck me that we should talk about fevers. Because fevers are very common, and they're, I think, still seen as scarier than they typically are. Like, the fever itself. Not necessarily what's causing it. But I still think people tend to get pretty anxious when they, or a loved one, has a fever, about the fever part of it. Does that—is that fair to say?

Justin: Right. Okay. I feel like I understand what a fever is.

Sydnee: Okay.

Justin: And I'm gonna try to give you my best understanding of it.

Sydnee: Okay.

Justin: Okay. So, imagine that your body is sort of like a, uh, like a den of thieves. And, um, murderers. And bad people. Right? And then, your white blood cells are like… renegade cops, right?

Sydnee: … Yeah?

Justin: And the renegade cops are like, "Burn it down with them inside." And then they flick the cigarette at your body and then walk away. And they're like, "I'm gonna burn this place down and kill all the germs, or criminals in our case." Is my metaphor. So like, we're gonna burn this building down… to just take out all the germs. And the building will be extremely uncomfortable and want a Gatorade. But we are going to build this building down to try to kill all the bad stuff.

Sydnee: Okay. That, y'know, I see where you're going with this. It's not a bad analogy. It's questionable. You were conflating both what a fever is, and what—why a fever occurs.

Justin: Yes.

Sydnee: Together. And let's break those two down. Because what you said is true in a sense, but there's some parts of it that are debatable. Is that fair to… but you—I mean, like, it was pretty good.

Justin: It's the gist. It was a gist.

Sydnee: That's like a C.

Justin: A C?!

Sydnee: Maybe a B minus.

Justin: Y'know what, I would've loved a B minus in science growing up. So I will take it, uh, with pride.

Sydnee: So, first of all, what is a fever?

Justin: I literally just to—don't wait for me to explain to you. I literally just told you my understanding.

Sydnee: No, very easily. What—what—when I say fever, you think, your temperature's up, right? That seems very basic.

Justin: Yes. Your temperature's up, it makes your body hot.

Sydnee: So, there's a part of your brain called the hypothalamus. It's kind of at the base of the brain. And it's—it has many jobs. But one of its jobs it to act as like, your body's thermostat, right?

Justin: Okay.

Sydnee: So it's gonna regulate your temperature. And there are things called pyrogens, which are these little substances that float around in your blood stream, and they can reach your hypothalamus and tell your hypothalamus, "Hey, turn the heat up. Let's make it hot in here." That's their job.

Justin: Good. Cool job.

Sydnee: And why would pyrogens do that? Well, they are triggered by different things. The most common reason would be some sort of invader. A virus, a bacteria, fungus, some sort of pathogen that will trigger the release of these pyrogens, which will then go to your brain and say, "Time to heat up."

Justin: Crank it.

Sydnee: "We got bad guys." Right?

Justin: Okay.

Sydnee: They can be produced from the body tissues for other reasons. That is not the only thing that triggers a fever. A fever doesn't always mean infection; although, it often does. But then, your body generates more heat, and you get all the symptoms associated with a fever, right? Like, when you get a fever, you feel uncomfortable. You get—

Justin: Achey.

Sydnee: Achey. You get chills. It's like that paradoxical thing. Y'know, somebody has a fever when it's like, a comfortable room, and they're covered in eight blankets, and…

Justin: Right.

Sydnee: You can get the shakes. We call them rigors. That's the like, really intense shakes.

Justin: Oh, those are the worst. Yeah.

Sydnee: That you can get chills. Um, and uh, and you feel really bad. And sometimes, you can act a little goofy. Y'know?

Justin: Mm-hmm. A little floaty.

Sydnee: Yeah. Get tired. Um, children can get higher fevers and can get faster fevers, so it can be really disturbing when a kid gets a fever. 'Cause it can seem to come out of nowhere.

Justin: I fully can remember a night at like, two AM, taking Charlie, like, a two year old Charlie, like, opening the door to the porch, because she was so hot, that we were just trying to do anything to cool her off a little bit.

Sydnee: And here's the thing – as we tell this story, I'm gonna tell you that know. I know in my doctor brain that that was unnecessary. And my doctor brain at the time knew it was unnecessary. My parent brain did—could not hear anything from my doctor brain at the moment. My parent brain was screaming, "Ahh, your child's so hot! Her brain's gonna boil!" That's not a thing that happens.

Justin: Folks, that's what—that's not a thing that happens, but this is why you—doctors don't treat their family.

Sydnee: Exactly. Exactly.

Justin: This is a case study.

Sydnee: So you kind of alluded to the next part, which is why you get a fever. Why? Why would this happen?

Justin: Like, what is the—what is the cause, or what is the application of the fever?

Sydnee: Why would this—what is the application? What is the purpose of a fever? So, partially, to stimulate your immune response. There are different factors in your body that respond to that change in temperature. And to the pyrogens themselves, and other factors that are released because of the temperature and all that.

But the other part is that we think it is to make our body less hospitable for the invaders. Because we know that heat can kill some viruses and bacteria, and so maybe if we're… that was the—that's the hypothesis, right? So if we—if our body is heating up, it's in an attempt to kill these invaders.

Now, this is still debatable, though. We're not 100% sure that that's true, because—

Justin: Really?

Sydnee: Well, because in a lot of cases, you can heat somebody up, and it won't kill an infection. Y'know? If that were the case, then a fever would kill off all the infections, right?

Justin: Right.

Sydnee: But they don't. And we know for, specifically, for things like bacterial infections, we often need antibiotics to help out.

Justin: Sure, that's true.

Sydnee: Because in a pre-antibiotic era, people died a lot.

Justin: We have lots of defense mechanisms that are busted, though. It doesn't mean that it's like… like, what about the booger thing? Like, "Oh, I'll catch all the germs here with these little hairs!" Nice try. You didn't get all of them. It didn't work. I still got sick. Nice try, cilia.

Sydnee: Well, and maybe that's more the answer. It's more of a, it aids in the process, and it also was a lot—it was as helpful as anything could get before we had better things. Right?

Justin: These dumb things weren't meant to last as long as we've made them last. These dumb bodies.

Sydnee: [laughs]

Justin: They're doing their best, but they're… I mean, they're not meant for a modern world. The situation we've put them in.

Sydnee: [laughing] That's why our brains are helping out. By making medicine.

Justin: Yeah. I wish we could just tell our body, like, "Hey dumb dumb, you don't need to get so hot. You're not doing anything. The scientists looked at it, and you didn't kill anything. It didn't work. Bad try."

Sydnee: I'm not saying that they don't—

Justin: I'm so frustrated. I thought my body was being all cool and killing a bunch of germs, and you're telling me it's doing nothing, just like, "Dad, help! Help, dad! Send pills! Help!"

Sydnee: [laughing] I'm not saying that it doesn't do anything. I'm not saying it doesn't help at all. I'm just saying that, obviously, a fever in and of itself is not going to cure disease.

Justin: Right. [laughs] Right, that's true.

Sydnee: Yes. Uh, now, what—there was one interesting point I found as I was reading about like, why do fevers—and this isn't it. 'Cause this really rocked my world, 'cause I always thought that, too. That was kind of honestly what I was told in med school. But if that's not the reason for a fever, what is?

One theory that I thought was really interesting is the idea that, because a fever produces really obvious symptoms, most people know when they're febrile. Have a fever. Most people feel it. And it is something that another person can feel by simply putting their hand on you. You can feel that someone's hot. That doesn't always mean that you know they have a fever, but you can feel that they're hot.

Because it is something that is so easy to recognize, it is a good way to communicate, "This person is sick, stay away from them," isolate them from the community, they might have an infection that is contagious. So from an evolutionary perspective, fevers are very useful, because then, y'know, you stay away from the person.

Justin: Is it possible that your—maybe it's partially also your body trying to get you to like, chill out so it can fight infection. Like, you don't feel like doing anything, so you're just gonna like, lay down. Just please stop doing a bunch of stuff so we can do our jobs down here.

Sydnee: Uh, I mean, I don't have any… I don't have any evidence that that's the reason, but…

Justin: Well no, Sydnee, I'm personifying like, white blood cells to have intent. I'm saying, do you think it makes sense, though?

Sydnee: I think that that's—

Justin: Like, it's your body's way of saying like, "Hey, slow down a little bit. Just take a break." You're not gonna grant me this, because you make fun of me for resting when I'm sick, and you never rest when you're sick, and you don't want to—

Sydnee: I never rest.

Justin: You don’t want to blame biology.

Sydnee: I'm like the girl from The Ring. I never sleep.

Justin: That is the only way in which you're like the girl from The Ring. And the crawling backwards, but other than that. Nothing like the girl from The Ring.

Sydnee: One point I'd like to make briefly is that a fever is a temperature of 100.4 Fahrenheit or greater. 100.4 Fahrenheit or greater. That’s 38 degrees Celsius, if that’s your jam.

Justin: I would imagine that the 38 came first, right?

Sydnee: Yeah.

Justin: ‘Cause it’s like—

Sydnee: I know, such a nice, round number, right? 38 as opposed to—

Justin: Like, ooh, 38! Easy to remember.

Sydnee: 100.4.

Justin: 100.4 is like… is tough. You don’t have a—this took me so long. This was way after we got married before I finally learned that like… I just kind of—I guess I've always associated like, if it’s above 98.6, then you got a fever, basically. That that’s a “fever,” quote unquote.

Sydnee: Your body temperature varies throughout the day. It is depending on the activities you’ve done, depending on the temperature of the room, the ambient temperature… I mean, if you're outside, and it’s really hot. If you've just had a meal. It can vary throughout like, an ovulatory cycle in a person who has ovulatory cycles.

I mean, like, there are a lot of different reasons that your temperature varies. So, if you have a temperature of 99, you do not have a "low grade fever."

Justin: Okay.

Sydnee: Just a little point there. 100.4 or greater. Now, we've obviously been having fevers since ancient times, because I mean…

Justin: Yeah, since the start, probably.

Sydnee: As far as I know, humans have been having fevers as long as there have been humans. Uh, but if you look back to like, ancient Greek and Roman writings, you don't see a lot of distinction between fever the symptom, and the fever, as in, some sort of disease process.

Justin: Okay.

Sydnee: Because a lot of times, a disease that was causing a fever within the community—something that would be like, communicable. So like, the flu going around. Or, in a lot of these cases, it was malaria. They would just say, "Uh oh, it's the fever."

Justin: Okay.

Sydnee: Because people got a fever, and it's contagious, and we don't really know what it is. And sometimes, they'd say like, the fever with a rash, or the fever with, y'know, the red spots. The fever with the sore throat. The fever with the headache. Like, they'd kind of—fever with a cough. And all of these were probably correlated with different infectious diseases that we would now test for, or diagnose clinically, or whatever.

But "the fever" and "fever" were used kind of interchangeably. So sometimes, it's hard to tell what they're trying to like, diagnose or treat. "A" fever, or "the" fever.

Justin: Okay.

Sydnee: They knew it was an elevated temperature, though. Whether they were talking about a fever or the fever, either way, we're talking about something where you got hotter. The Greek word, pyrexia, which is their word for fever, pyrexia, in the verb of it, translates to "I am on fire." [laughs]

Justin: That's really interesting. Pyrex is a material used in a lot of baking stuff that is a, uh, heatproof glass. Pyrex.

Sydnee: It would be good for being on fire. 'Cause it wouldn't.

Justin: Yeah. 'Cause it wouldn't be.

Sydnee: 'Cause it wouldn't. Uh, Galen talks about, uh, fever, saying that basically, you have an excess of heat. And that was a lot of the early Greek writers, and then the Roman writers, talked about the idea that fever was this excess heat that had accumulated in the body that comes from the heart, and then is pumped out of the heart through the arteries, and spreads throughout the body.

And it was really seen as like, a substance of sorts. Like a whole other thing. There was this stuff that was heat, and it was flowing through your body, and we could tell, because you're hot. Right?

Justin: Mm-hmm.

Sydnee: There were certain connections that were drawn. Like, Hippocrates talked about, if you have a lot of headaches, or a lot of fevers that keep coming with headaches, then you're probably gonna die. [laughs] So I don't know exactly… maybe meningitis is what that was talking about. But like, you could see writers connecting, like, "This fever, not so big a deal. *This* fever, if you have this with it, I mean, we don't know what it is, but you're gonna die."

Justin: "I think you're probably gonna die" is one that people should've leaned on a lot more in ancient times. Because if you think about it… [laughs] Like, if you tell someone like, "Oh, that's a bad fever. You're gonna die." There's two outcomes. Like, one, they die, and then you're like, "Got another one." [laughs] "I was right about that."

Sydnee: I knew it.

Justin: "Knew it. Called it." Or they come back, and they're like, "Hey, I didn't die!" And you're like, "Aw, thank our multiple gods. That is excellent news. What a gift." [laughing] "What a gift. What a gift."

Sydnee: [laughing]

Justin: "Awesome. Awesome. So glad to be wrong on this one. Anyway, that'll be 60 drachma."

Sydnee: That sounds like a good idea, but I can tell you, in practice, that is not something I would endorse. I can't imagine the fallout of me telling all my patients like, "Well, this is probably fatal."

Justin: [laughs] No, I mean…

Sydnee: "Bye."

Justin: "Byeee."

Sydnee: "Just stop at the desk for your bill." [laughs] Uh, so, Galen went on all the work of his predecessors to like, take all that and break down fevers into three main types. So… and this kind of got into like, what they thought caused a fever. 'Cause a fever was not necessarily seen as like, just a symptom that can be connected to a multitude of diseases or processes, right? 'Cause that's what a fever is. A fever isn't caused by one thing. A fever is caused by lots of different things. It's a symptom.

Justin: Mm-hmm.

Sydnee: Uh, but, there was a thought that a fever was a distinct thing in and of itself, and that there could be certain types of them that occur independent of whatever might be going on in the body. So there were ephemeral fevers, which were like, the no big deal fevers. And this is probably like a fever that was caught in connection with something like a cold. Like a viral illness. And they would say, "Well, you have an ephemeral fever. I don't know what's going on with you, but it's gonna go away pretty quickly, and you should be fine." And that was probably right.

There were also fevers that could be caused by a corruption of humors. So, your humors, different ones can become like, putrid. And then, they would cause fevers. And so, you'd get different fevers linked to different humors, y'know, becoming putrid. Going bad. Rotting.

Justin: I wish there was a thing you could click on for podcasts… I wish you could click on podcast audio, so people could click whenever we started talking about humors, and take them to a five minute diversion about how humors are a fake thing that are not real. Like, we're probably gonna address these as if they're a thing, but humors are nothing. This is nothing.

Sydnee: No. The Greeks—many, many systems of medicine throughout history believed that there were four humors in the human body that you had to keep balanced in order to maintain health.

Justin: You know this is a long time Sawbones—

Sydnee: Blood, phlegm, black bile, yellow bile.

Justin: --listener, but if you're new to the show, you should know that humors are nothing.

Sydnee: This is not a thing. I mean, we do have blood. We do have phlegm. We do have bile. But this is not what—

Justin: Oh, okay. So three out of four ain't bad. The humoral system, makin' a comeback.

Sydnee: The name stayed. Everything else was wrong. And then there were also hectic fevers, which were the worst, the most unpredictable, the most dangerous fevers. And all of these things, we could probably go back and look at descriptions and link each case to what was the likely, y'know… was this small pox? Was this malaria? Was this typhoid? What was going on? We could probably do that now in retrospect.

Um, later, Avicenna would build on a lot of this work, and correctly say, "Listen, um, all this humors stuff is wrong." He identified, infection is probably the main thing that's happening behind these fevers. All of these uh, fever curves and everything ,this is nice. Like, "Oh, you have fever every third day, fourth day, whatever. That's all cool, but it's probably from an infection."

As far as what people did about fevers… well, a lot of what was done is a lot of what we talk about when we get into humoral medicine. The humors system of medicine, which, again, is fake. We can just balance your humors with, y'know, letting some of one out, or trying to put more of one in. So bloodletting, like leeching and cutting open a vein and bleeding people, very common.

Emetics, things to make you puke. Laxatives to make you poop. Diuretics to make you pee. Just something to get a humor out, depending on what type of fever it was considered, would be the most common target. Especially bleeding a person. Bleeding a person, because blood was thought to be hot, and so…

Justin: Hot blood, get the blood out. Yeah.

Sydnee: Get the blood out. So bleeding was the most common. Now, I always like to see what Pliny the Elder has to say about things.

Justin: Gotta check in with Pliny.

Sydnee: Our old buddy Pliny always writes extensively about everything, ever, anywhere. And there was a Roman goddess of fever, Febris, and you could make offerings and create amulets in Febris' name to protect you from

fever. And so, as a result, Pliny documents a whole lot of things that you could do. Because he says, basically, doctors can't do anything, so amulets are your best bet.

Justin: You're gonna wanna go amulet on this.

Sydnee: Yes. [laughs]

Justin: I'd love to help you, but you are… [laughs] You should go with an amulet.

Sydnee: So, for—so, here's an example. The dust in which a hawk has bathed itself can be tied up in a linen cloth with a red string and attached to the body. So you could do that. Just find the dust in which a hawk has bathed.

Justin: Okay. Perfect. Yeah, I know lots of hawks around.

Sydnee: Uh, you could take the longest tooth of a black dog. Wear it as an amulet.

Justin: Best of luck. [laughs] That's one unhappy dog.

Sydnee: Uh, you could also… the first wasp that you see in the current year.

Justin: I'll never find that fool again! [laughs]

Sydnee: If you can catch it.

Justin: I remember it. It was May 13th. I saw him.

Sydnee: You need to catch it, though, with your left hand.

Justin: Oh my… Pliny…

Sydnee: And you can tie it below your chin.

Justin: He had to know this one was—

Sydnee: I assume you want it dead first, 'cause that—I mean, it's a wasp, man.

Justin: Pliny, you knew that one was beat.

Sydnee: Cut off a viper's head, wrap it in a linen cloth. You could also take the viper's heart. I mean, you've already got the viper, right? You've already cut its head off. You might as well take its heart, too.

Justin: It's not doing anything with it at that point.

Sydnee: You could wrap that in a linen cloth, I guess. Uh, you can also take the tips of a mouse's ears and wrap those… it's all a red cloth. The red cloth seems to be big. Maybe just the red cloth.

Justin: Yeah. Just wrap anything in a red cloth.

Sydnee: These are all amulets you could create.

Justin: Do you think… I have a question for you, Sydnee.

Sydnee: [laughing] He does say to swallow a few things, like the heart of a sea diver. So there are some things—

Justin: [laughs] What?!

Sydnee: It's a kind of bird, right?

Justin: Okay, I guess. Yeah.

Sydnee: But that's… yeah. It's a kind of bird.

Justin: I ate Jacques Cousteau's heart. I messed up. My fever's gone, but I'm in jail.

Sydnee: [laughing] You can add some pepper.

Justin: Do you think they had am… it's so hard not to say amliet. Do you think—that's what our child says. She's ruined pronunciation for us on many words, like "amliet," or…

Sydnee: "Reglier."

Justin: "Reglier." Okay. Do you think an *amulet*… do you think they have amulet rentals? Like, do you think they did amulet rental?

Sydnee: I guarantee there were people who sold amulets.

Justin: Not sold.

Sydnee: Oh, rent?

Justin: Rental.

Sydnee: Now, that I don't know, but I guarantee they sold them.

Justin: 'Cause you don't need them after you got better, eh? So like—

Sydnee: Well, it would fee—it would ward it off, too. These would also ward off fevers.

Justin: There's a lot of—I mean, I'm not gonna wear all these amulets. [laughs]

Sydnee: An ounce of prevention's worth a pound of cure. [laughs]

Justin: Yeah, but 30 amulets is a pound, so that's hanging around my neck. Now I've got some lower back issues, 'cause I'm wearing all these ding-dang amulets.

Sydnee: I'm just saying that once you've taken the time to cut the head off a viper and all that, like… you're not gonna want to get rid of that.

Justin: Yeah, but you're gonna loan it to your friend Jared for cash.

Sydnee: I mean, maybe.

Justin: I just think that they had a brisk amulet rental business.

Sydnee: He does, uh, advise some things you can take, like prophylactically, like swallow's dung with some goat's milk and raisin wine.

Justin: And do what with it?

Sydnee: Drink it.

Justin: Okay.

Sydnee: And that's like a fever prevention. Also the skin of an asp—

Justin: Prevention. That's so wild, that I'm going to drink swallow's dung, because I don't want to get a fever. He—I don't care how little the understood about medicine. They have to know that makes no sense. [laughing]

Sydnee: You have to understand, though – fevers are still scary to people today, and they were a heck of a lot scarier back when a fever meant, "Well… you might just die now. We have no idea what's happening. We have no idea how to fix it. Mmm… good luck." So it makes more sense in that context.

Now, Justin, I've been talking about how to fix a fever. But I want to talk about what a fever can fix.

Justin: Okay. Let’s do it.

Sydnee: But first…

Justin: Aw.

Sydnee: Let’s go to the billing department.

Justin: Let’s go.

[theme music plays]

Justin: Our first sponsor this week is Casper. Uh, we have a beautiful, dare I say, luxurious Casper mattress that we enjoy. Uh, it is one of the best night’s sleep you're gonna get. It’s one of the best in the biz, I think, in terms of night’s sleep that you're gonna get.

Sydnee: It’s a very comfortable mattress.

Justin: It’s a very comfortable mattress. Y'know, they revolutionized the mattress industry by making it easier than ever to buy a premium foam mattress. Now they’re building on that legacy with… are you ready for it? The Hybrid collection. Foam layers, now available with… springs. Too long you've lived in a world with no springs. And now, your sleep is going to be augmented by those great coils that we all crave.

Sydnee: [laughs]

Justin: [laughing] I'm telling you folks, this is a game changer, if the game is sleeping. Because these… they got springs in ‘em. Alright? I don’t think I need to tell you. You're looking for support. You're looking for coils. You're looking for foam. You can't find all those in one mattress. Now you can. Hybrid collection.

Sydnee: Even as a person who doesn’t sleep myself, as I've already referenced—

Justin: [laughs] A non-sleeper like Sydnee.

Sydnee: I can't understand the need for this. But, even though I still—I am—I can see the allure, and I am excited for all the humans who do need sleep.

Justin: Uh, you can get $50 towards select mattresses by visiting Casper.com/Sawbones, and using 'Sawbones' at check out. Folks, it's time to go to bed. It's gonna be the best part of your day. [wheezes] Just go to Casper.com/Sawbones, and use the code 'Sawbones' at check out, and get $50 towards select mattresses. Terms and conditions apply.

We also have Stitch Fix. Sydnee, would you like to tell people about Stitch Fix? Are you wearing Stitch Fix right now?

Sydnee: I am wearing Stitch Fix. I am wearing, uh… two of the three items I'm wearing are from Stitch Fix. How do you like that?

Justin: I like it a lot, 'cause you look great.

Sydnee: Aw, why thank you.

Justin: You look comfortable, too.

Sydnee: Everybody has their own style, and it can be hard to like, find all the right pieces that fit your style and to define your style. I know that, uh, the style I wanted to go for was, uh, Helen Hunt from Twister. And that, y'know, can seem like a strange thing to share with a stranger. But I don't feel that way with Stitch Fix, 'cause you can tell your expert stylist at Stitch Fix that you want to look like Helen Hunt from Twister, or Laura Dern from Jurassic Park. It's the same thing.

And they don't judge you, and they will help you achieve that look. [laughs] In spades. It's an online personal styling service. You can get your favorite clothing brands delivered right to your door. Um, and you keep what you like, you send back what you don't, and your stylist really gets to know you,

and I can't tell you how many times I have kept every single piece of clothing I have been sent.

And they've also got shoes and accessories and all that kind of stuff, too. But it's a wonderful experience.

Justin: It's lovely. We did—it's very convenient. They just send you a package, and you throw the clothes you don't want in there, and then you send it back to them. There've been lots of times, though, where Syd's wanted to keep everything, or I've wanted to keep everything. It's really, uh… their stylists are super talented.

There's a problem, though, when you put the package outside to go out with the mail… our last Stitch Fix, we put out there, there was like, one or two things Sydnee was sending back. And we left the package on our doorstep. No fewer than three people who were visiting us thought they were doing us a solid by bringing this package back inside the house. "Hey, you've got a package out here."
"I don't. It's going back to Stitch Fix. Please."

Sydnee: "I'm trying to get this to you, Stitch Fix!"

Justin: "Please stop bringing it in our home!"

Sydnee: So get started today at StitchFix.com/Sawbones, and get an extra 25% off when you keep everything in your box. That's StitchFix.com/Sawbones.

Justin: What was it again? Stick—

Sydnee: Stitch Fix.

Justin: You said Sticks Fitch.

Sydnee: [laughs]

Justin: [laughing] That's nothing.

Sydnee: Stitch…

Justin: Stitch…

Sydnee: Fix.

Justin: Fix.

Sydnee: Dot com. Slash. Sawbones.

Justin: Uh, Sydnee, you had teased a little bit that you were gonna tell me about what fevers can do. Right?

Sydnee: Yes.

Justin: Okay.

Sydnee: So, because we have had this concept that fevers are intentional, our bodies attempt to kill an invading organism, because we've had this idea for a long time. A lot of doctors and people who weren't really doctors, but practice medicine, throughout history, even from ancient times, have theorized that you could use a fever to fix disease. If you could make fevers happen, then you could cure diseases, as well. And this is called pyrotherapy. It's using a fever to treat things.

Justin: Okay.

Sydnee: I have found the quote… well, it's been paraphrased. I don't know what the exact quote is supposed to be. But basically, it's, "If I could produce as well as treat intermittent fevers, I would be the greatest physician of all time." And it has been attributed to… I've found it in several different articles, and in every one, it said, "As Hippocrates once said… As Dioscorides once said… As Boerhaave once said…" I don't know who said it.

Justin: Okay.

Sydnee: Maybe all of them. But the idea that the fever was so important, that we just need to learn how to harness its power…

Justin: The power of the fever.

Sydnee: To treat disease is pretty pervasive. Um, Hippocrates was one of the first to propose that, uh, if we could—he observed a patient who had epilepsy greatly improve after a bout of malaria. And he was one of the first ones to say, "Man, if there was a way we could just do that…"

Justin: Is that anything?

Sydnee: With epilepsy? Not that I'm aware of.

Justin: Okay.

Sydnee: No. Uh, Galen wrote about a case of melancholia, which was probably depression is what we probably would've said now. Melancholia is what they used to say. That was greatly improved after they had some sort of illness that included a fever. Um, there were, uh, a lot of ideas about this, but nobody actually tried it until the 18th century. And that's when you first start to read some like, case reports of uh, people with… usually some sort of psychiatric illness. It was really focused on that.

And so, epilepsy cases were included as well, because it used to be thought of as a psychiatric illness. But epilepsy, and then different forms of like, depression, or anxiety, or schizophrenia, bipolar disorder… those sorts of things, were attempted to be treated by wrapping people in really warm blankets and elevating their temperatures. Or putting them in a really hot bath.

There were some scattered reports of like, actually infecting people with things. Like E. coli was used in one case.

Justin: Oh my gosh.

Sydnee: Like, give someone E. coli so that they get a fever in response to that, to try to cure… whatever illness they had. But nobody was really doing it routinely. Or in any sort of like, controlled, scientific, experimental way.

Justin: Just giving it a whirl.

Sydnee: Yeah. Just like, I don't know, I read about this. Hippocrates or Boerhaave, maybe somebody said it, so…

Justin: This is before we invented science.

Sydnee: [laughs] So in the 20th century is when we really start to see, uh, people trying out pyrotherapy for real. And this can mainly be credited to an Austrian psychiatrist, Julius Wagner-Jauregg, who uh, in 1917…

Justin: That's quite a name.

Sydnee: Yes. Announced the discovery of malaria fever therapy, as a cure, specifically, for what was called the general paralysis of the insane. GPI is what they called it. But what this really was was late stage syphilis. Tertiary syphilis.

Justin: Okay.

Sydnee: Because late stages of syphilis, the little spirochetes, the little bugs, get in the brain. And you can begin to manifest psychiatric symptoms and neurological symptoms and things like that.

But of course, at this point in history, nobody really knew that it was late stage syphilis. There was a lot of debate about how to treat it, because no one knew what caused it. And so, it really fell to psychiatrists to manage it, even though, as we would eventually discover… I think it was around 1913, that syphilis was the cause, and this was actually an infectious disease, it needed to be treated, as opposed to a psychiatric illness that was managed differently.

Um, so, uh, Jauregg was one of the—was a psychiatrist. And so, he was interested in ways to treat GPI in new methods, since nothing so far had been very effective. Um, and he observed that one of his patients, uh, Hilda, who was in patient at the hospital, in the psychiatric unit, uh, recovered after an attack of erysipelas. So, a strep infection.

The patient had a strep infection, had high fevers, got better. And he also noticed that a lot of psychiatric symptoms that she was manifesting also improved after she recovered from her fever.

Justin: Hm.

Sydnee: And so, his theory was, well, the heat of the fever must've killed whatever was causing this. Uh, so, he decided, the best way to mimic this is to give patients the same thing that the patient had. That Hilda had, in order to treat their GPI. So, that was the first thing he tried. He actually gave patients water that had strep bacteria. Streptococcal bacteria in it, similar to what would cause strep throat. He basically gave patients strep throat.

Justin: And I'm gonna go ahead and assume that was terrifically effective, and that is why we still give ourselves strep throat all the time, to this day, whenever we catch a stray syphilis.

Sydnee: Uh, no. It was not particularly effective. Except, I guess, at giving people strep throat. It was probably effective… if that was your—

Justin: You want a couple days off school? You want to miss a field trip? You want a good excuse to eat some dreamcicles? He's got you.

Sydnee: So, he tried that. It didn't work very well. So then he tried tuberculin. And tuberculin is… it's derived from tuberculosis, from the toxin, and it actually is like, used to make the vaccine against tuberculosis. Which we don't use in the US, but they use other places. And uh, there was a lot of research being done on tuberculin at the time, and a lot of thought that it could be used in other good medical applications.

Justin: Tuberculin sounds like the worst artificial sweetener of all time.

Sydnee: [laughs]

Justin: Now made with tuberculin! You'll never know the difference!

Sydnee: If you see that, don't buy that.

Justin: Don't buy anything with tuberculin, folks. Yes, it's delicious. Yes, we know.

Sydnee: So, he started treating patients with tuberculin, and actually published a series of papers based on this, indicating some success. That he did notice some improvement in his patients with GPI. Which, as we're doing these different studies, um… these occur over the course of many years, by the way. Like, his first idea that fever therapy could be used for GPI, uh, he doesn't do anything with it for like, five or six years. And then he starts doing some of these studies, and he stops for a while when they don't work very well, and then he tries them again.

So, this whole course takes place over many years. And during the course of all these different studies is when they actually figure out that syphilis is the cause of GPI. They still don't know how to treat it, but they have, by now, figured out that syphilis is the cause.

But so, he's using the tuberculin, and he's doing the fevers, and some of his patients seem to be recovering from the syphilis. The tertiary syphilis, the GPI. He even wrote that one of the patients that he treated with tuberculin, the next day, uh, her family came to visit her, and her sister came up to him and said, "What have you done with my sister? She has suddenly become intelligent."

Justin: That's a sister burn if I ever heard one.

Sydnee: That's very sisterly.

Justin: It's probably like, just within earshot. Just barely within hearing range.

Sydnee: She was like, "Hey… did you say that about me?"

Justin: "Hey. Come on."

Sydnee: "That was mean."

Justin: "No, you must've misheard."

Sydnee: "I didn't say anything. It was just the syphilis. It's the syphilis."

Justin: [snorts]

Sydnee: [laughs] So, but the problem was, even though he was having some success with this tuberculin, or so his research indicated, there was a lot of argument in the medical community at this time as to the toxicity of tuberculin. And there were a lot of people saying that it could do things it couldn't do, and a lot of people who were so concerned that we should just stay away from it altogether… so it was kind of a controversial thing to be using, and he really didn't want to be associated with all of that…

Justin: Okay.

Sydnee: Argument at that moment.

Justin: He just wants to live in peace and give people…

Sydnee: Fevers.

Justin: Malaria. [laughing]

Sydnee: He just wants to… hey, we're not there yet. He's not giving them malaria yet.

Justin: Oh, right, okay.

Sydnee: He just wants to give them fevers. Uh, and he also wasn't completely satisfied with the results, because a lot of his patients would relapse later. So, they would seem to get better for a while, but then they would revert to the symptoms of tertiary syphilis again, and so, he started looking for other sources of infection to cause the fever. Other ways that he could trigger a fever in a patient.

And it was around this time that a soldier who had been at the Macedonian front came and was admitted to the hospital for some injuries. And he also happened to have malaria. And Jauregg noticed this, and before he could be treated, he kind of told the other doctors like, "Wait, no, no, no, don't treat his malaria just yet."

Justin: Let me get at him real quick.

Sydnee: "Let me get at that malaria blood. I need some of that malaria blood." So, he went and he took a sample of the soldier's blood, and he injected it into several of his patients who had the GPI, who had the tertiary syphilis. And then, after he did that, he got worried. [laughs]

Justin: Why, for the obvious reasons, you mean? "What did I do?"

Sydnee: [laughs] Not for the obvious reasons. Although, he may have. History does not say whether or not he was worried about that. But we do know that he was worried that, perhaps, he could cause an outbreak of malaria if there was an anopheles mosquito hangin' around. Because that's the way malaria is spread. It's mosquito spreads at person to person, not directly from person to person.

Justin: And then people he didn't want to definitely give malaria to might get malaria.

Sydnee: And then everybody would be like, "Jauregg, you gave everybody malaria!"

Justin: "Hey, all our syphilis is great, though!"

Sydnee: "But now we have malaria!"

Justin: "Dang!"

Sydnee: So, he started to get worried about that. So, he went and he got one of his other patients. This is what's documented. He got another one of his patients, and said, "Hey, I want you to go outside and catch as many bugs as you can. Just whatever bugs. Just catch some bugs and bring them back to me. It's okay if they're dead, I just need to see them."

Justin: That patient was being treated for terminal gullibility. So it's very sad that it would be misused in this way.

Sydnee: [laughs] So the patient went outside and caught a bunch of bugs, brought them back to Dr. Jauregg, and gave them to him, and he examined them all and decided, none of these are the anopheles mosquito, which is the mosquito that has—you have to have that mosquito to carry the malaria.

So he said, "None of these are the anopheles mosquito, so we're good."

Justin: Science!

Sydnee: "This small sample that my patient has captured of bugs…" I picture this in the middle of the night, like…

Justin: [laughs]

Sydnee: This poor guy running around, catching bugs.

Justin: Yeah.

Sydnee: Anyway. So, he was happy they weren't, and so, he wasn't gonna cause an outbreak of malaria. So he followed the patients that he treated, and he found that several of them seemed to get better.

Justin: Hm.

Sydnee: The syphilis symptoms seemed to resolve; or at least, improve greatly. Uh, and so, based on these results, he continued these experiments. And he published a whole series of cases. Every time he'd get more patients in, he had to have somebody nearby who had malaria.

Justin: Right.

Sydnee: He had to have access to a malaria patient, which wasn't terribly hard at the time. But he would go get blood from someone who had malaria, and he would then inject it into the new patients he had. And what he found at the end of it all, with all the different cases, 'cause he treated many patients this way, is that it offered about a 30% chance of complete remission.

Justin: Pretty good, all things considered.

Sydnee: Pretty good. A lot of patients still did relapse. Some of them never improved completely, and unfortunately, also about 30% died of malaria.

Justin: Malaria. Right. 'Cause it's so bad.

Sydnee: Yes. 'Cause malaria… especially—there wasn't always control for which type of malaria, and sometimes, they'd get it wrong. They thought a patient had one type, and they really had a different type of malaria. And some of them are more aggressive than others, or more fatal.

Justin: You just wanna give 'em the chill malaria, and they had that really bad stuff.

Sydnee: He just wanted the fun malaria.

Justin: Fun, good malaria.

Sydnee: But it was the serious malaria.

Justin: Like when you need to get out of a field trip, or you want an excuse to eat dreamcicles. That malaria. [laughs]

Sydnee: So he uh… so, he continued to do these treatments, and as he published results, it became so interesting to the rest of the medical community that a lot of other people started following suit. And they tried other types of fevers, they tried something called rat bite fever, there was an African relapsing fever… all kinds of things that we probably would identify by different names today.

But basically, let's give our patients something to make them sick, and then, get a fever, and then maybe it'll cure their tertiary syphilis. In some places, instead of giving them inoculations of blood from other patients, they would actually like, get mosquitos that carried malaria and like, capture them and just put them on the patient. Like, put like, a little cup or something over it so it had to sit on your arm until it…

Justin: Eugh. How unpleasant.

Sydnee: …bit you.

Justin: How unpleasant. It's also kind of exploitative for the mosquito, right? What, you want me to just perform on command? I'm not a robot. I eat when I'm hungry. Maybe in a little while I'll bite this dude, but give me a sec.

Sydnee: Y'know, they've done this… I may have mentioned this in our malaria episode. But they've done this in places to look at like, the density of like, mosquitos in an area. Like, they'll have people just sit out and get bitten. And count how many mosquito bites they get in a period of time.

Justin: I mean, it's nice work if you can get it, but…

Sydnee: [laughs] Uh, I love science. Uh, but anyway, for all of this work, and all the people who followed in his footsteps, he won the Nobel Prize for medicine for the discovery of malaria therapy for tertiary syphilis in 1927.

Justin: Nice. Congratulations, bud.

Sydnee: And this was used for quite a while. Eventually, they started creating something called fever machines.

Justin: That's… a good… that's gotta be a band name, right?

Sydnee: I don't know. I don't know. It's a good name.

Justin: Definitely, definitely… I'm gonna look on Spotify.

Sydnee: It's a good name. But they started creating these fever machines, or fever cabinets, and they used this technology based on ultrasounds to like, heat up these big… they look kind of like iron lungs. It's like a big thing you lay in, like your head sticks out, and then they make you really hot. They induce a temperature of like 104.

Justin: Huh.

Sydnee: Or 105. They want to get you really hot. Like a really serious fever.

Justin: That's very hot.

Sydnee: Um, to treat, at the time, it could be any kind of infection. Like, it was tertiary syphilis, but they tried it for other infections that were resistant to any other treatment. They tried it for cancer, when we could diagnose, but had no idea what to do with cancer. They started using this kind of treatment for cancer.

You can find a lot of cool pictures of this online, if you're interested. I would recommend Google.

Justin: Cool.

Sydnee: It is.

Justin: Would everybody think they're cool, Syd, or do you think they're cool?

Sydnee: Everybody would think they're cool. They also do this in that show, The Knick, that used to be on.

Justin: Oh, yeah, yeah, yeah.

Sydnee: They cure a case of tertiary syphilis.

Justin: John Hodgman's 'The Knick,' as I like to think of it. [laughs]

Sydnee: They cure a case of syphilis with a fever cabinet. And I remember thinking, like, "No way!" But y'know, the thing is, there's enough data to say, there may have been some people who went into remission from this therapy. Um, from heating people up.

Justin: Hm.

Sydnee: It is possible that this did work somewhat, sometimes. Obviously, it wasn't an ideal treatment, and fell out of favor for multiple reasons. And this was used – I should say, this was used standardly until like, the '50s. But of course, antibiotics came around in the '40s, and that would be the death knell for a lot of interesting, but ineffective treatments for infections.

Justin: Yeah, sadly.

Sydnee: So with the rise of antibiotics, we had a much safer—

Justin: Boring old antibiotics.

Sydnee: Much safer, much more effective treatment for syphilis. Y'know, also, we consider giving patients infectious diseases intentionally unethical.

Justin: Bad.

Sydnee: So we would not give a patient malaria today. And it's an interesting conversation, 'cause he did… I mean, his justification is what a lot of bad science is based on. "Well, we don't have anything else, and you're gonna die of this, so I might as well try this."

And I mean, that's unethical. There's a reason we don't do that. That's not good enough for RIB approval. Y'know, you gotta do better. You can't just say, "Well, we don't have anything else, so try it." Um, but this came out of the heroic era of medicine, so…

Justin: When everything was a little higgledy-piggledy.

Sydnee: When it was just like, "I have no idea what I'm doing, but I'm a doctor, so… let's go!"

Justin: "Look at this cool mirror on my head! Come on!"

Sydnee: "I'm gonna give you malaria now!"

Justin: [laughs]

Sydnee: So obviously we don't do this anymore. Um, there is some interest in like, the concept of elevating the body temperature to help alongside other treatments for infections, or for cancer. I saw that there is some of that research that's been done. But none of this is like, standard right now. So if anybody's offering you fever therapy for your cancer, or fever therapy for an infection, I would raise an eyebrow at that. That's not real.

'Cause I mean, this is all just an interesting area of research, and it would all be used in conjunction with…

Justin: Real medicine.

Sydnee: Real medicine. Antibiotics, or chemotherapy, or whatever. These are the ways in which this research is being done. But nobody is advocating to give people malaria, or any other infection. Please don't do that.

But generally speaking, fever… I think this is one important point to make about fever. It has been scary throughout history, 'cause a lot of times, people got fevers and died, and we had no idea why. And there was nothing we could do. We have many, many treatments now. I still think fevers are kind of scary.

Justin: Especially if you're a parent.

Sydnee: Yes. Especially in kids, they can be—they can make you feel really helpless, and it can be really scary. But it is important to know that the fever, in and of itself, is generally harmless to your body.

Justin: Mm-hmm.

Sydnee: Obviously, very high temperatures, or sustained fevers… y'know, if you're getting temperatures up over 103, I would be concerned about that. There are things like febrile seizures, like a seizure associated with a fever, that usually happen in children, and they can be quite upsetting. Although, generally, they are harmless, they can be very scary.

Um, and things like that, I would get evaluated for, of course. And you're going to anyway.

Justin: Yes. Yes.

Sydnee: But fevers that you don't know where they're coming from, or whatever. But a lot of the time, this idea… I see a lot of people like, we've gotta get you on this cycle of Tylenol, and then ibuprofen, and Tylenol, and then ibuprofen, and then ice you down, and do a cold bath, and all this stuff to like, fight a fever. And we've been those parents. You really don't have to do that, the vast majority of the time.

Treating a fever can make you feel better. And that's worthwhile. I'm not saying it's not. But…

Justin: But you don't have to.

Sydnee: You don't have to. It's—and most of the time, it's not necessary. It's gonna… it's—you need to address the underlying cause. And once the underlying cause is either being treated, or in a lot of things like the common cold, allowed to run its course… you don't necessarily have to do anything about the fever. So I think that that's useful to remember.

Justin: Uh, folks, thank you so much for listening the our program. To play us out, uh, this week, from their 2011 album, Living in Oblivion, this is The Fever Machine. So sadly, the band name is taken. Heartbreaking.

[music plays]

Justin: Um, we want to thank the Maximum Fun network for having us on the—this is pretty intense for our show, actually. Let me turn it down a little bit. [laughs] Thank the Max Fun network for having us as a part of their extended podcasting family. Thank you to, uh, the Taxpayers for the use of their song, Medicines, as the intro and outro of our program.

And uh, thank you to… oh, oh, oh! I wanted to mention before I thank anybody else! I want to thank you in advance for heading over to McElroyMerch.com and checking out our new Sawbones Caduceus pin. It's kind of based on our logo, and it's neat, if you wanted to pick one of those up. That's new this month. So go check that totally out.

There's a couple other pins, and some other Sawbones stuff there, too. And uh, I don't think we gotta plug anything else this week, Syd. We got a book. The Sawbones Book. It's on Amazon, or at bookstores. You can go buy it, if you would be so kind.

But that is gonna do it for us, I believe.

Sydnee: Yes.

Justin: 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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[music plays]

Rileigh: I'm Rileigh Smirl.

Sydnee: I'm Sydnee McElroy.

Teylor: And I'm Teylor Smirl.

Sydnee: And together, we host a podcast called Still Buffering, where we answer questions like…

Rileigh: Why should I not fall asleep first at a slumber party?

Teylor: How do I be fleek?

Sydnee: Is it okay to break up with someone using emojis?

Teylor: And sometimes we talk about butts.

Rileigh: Nooo we don't. Nope.

Teylor: [laughs]

Sydnee: Find out the answers to these important questions, and many more, on Still Buffering, a sisters' guide to teens through the ages.

Rileigh: I am a teenager…

Sydnee: And I… was… too.

Teylor: [simultaneously] And I… was… too. Butts. Butts, butts, butts butts.

Rileigh: Nooo. [laughs]

[music plays]