

Sawbones 152: EpiPen

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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.

[Intro, 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:

Sydnee, there's been... Um, the... Medicine has been the news once again. Which is usually about a 50/50 split as to whether or not that's good or bad.

Sydnee:

Most of the time, I feel like when medicine's in the news, it's just somebody on TV who's telling you like, not to eat eggs or it's time to eat eggs, or that coffee is bad for you or isn't.

Justin:

Eggs are back.

Sydnee:

I feel like it's made—

Justin:

Eggs are out again.

Sydnee:

... it's either eggs or coffee. Isn't that pretty much—

Justin:

Wine.

Sydnee:

... all they ever talk about, like medically? Wine?

Justin:

Wine. For a while it was like, "Drink six glasses of wine every night. Go to town. You'll be, hell, you'll live forever."

Sydnee:

And they were like, "Forget that. Eggs are in, wine's out."

Justin: Yeah.

Sydnee:

"No, forget the eggs again. And also, sausage is bad." That's usually the medical stuff that's on TV. [laughs]

Justin:

Yeah. But recently it's been a lot of discussion about the EpiPen.

Sydnee:

That's right.

Justin:

Which, I've always really liked the EpiPen as an idea because it seemed to... I really like medical devices that are easy enough for everybody to use. You know what I mean?

Sydnee:

Mm-hmm.

Justin:

The ones that really level the playing field.

Sydnee:

Well I'm... Yes. It's created specifically... By leveling the playing field, do you mean keeping everyone alive? Is that... Is that kind of what you're saying?

Justin:

No. I mean like, anybody gets to be—

Sydnee:

Leveling the... the life playing field? Like, the “being alive, continuing to breathe” playing field? [laughs]

Justin:

No, I mean like everybody gets to be a doctor.

Sydnee:

Oh, okay.

Justin:

You know what I mean? Like anybody can be a doctor with an EpiPen.

Sydnee:

Uh, well... I mean, I don't know that it makes you—

Justin:

It's like an... It's like an—

Sydnee:

... I don't know if it makes you a doctor or not...

Justin:

It's like that one scene in *Pulp Fiction* where Uma Thurman gets stung by a bee really bad, I'm assuming, and she was like, dying and then—

Sydnee:

Right.

Justin:

... John Travolta jams a EpiPen into her heart, saves her life.

Sydnee:

Yeah.

Justin:

It's a beautiful and heroic...

Sydnee:

That's... Gets stung by that awful bee, that awful...

Justin:

It was awful, several bees. They don't show the bees, but like—

Sydnee:

I think it was a... I think it was a horsefly.

Justin:

Yeah. Wink.

Sydnee:

Did you get it? Was that a good...?

Justin:

Yeah. That was good.

Sydnee:

Was that a good drug joke?

Justin:

That's a good drug joke. So Syd, what is the deal with EpiPens? Why is everybody so hot to trot about those bad boys?

Sydnee:

Well, I wanna tell you about EpiPens, Justin, but before I get there, I wanna take you back.

Justin:

[Doc from *Back to the Future* voice] "We gotta go back."

Sydnee:

We gotta go back. [laughs]

Justin:

[Doc from *Back to the Future* voice] "Marty!"

Sydnee:

Not too far back.

Justin:

Okay.

Sydnee:

In the grand scheme of this show...

Justin:

Yeah.

Sydnee:

... not too far back. Let's just go back to 1901.

Justin:

Okay. Mm, hold on. Let me set the dials here. [dial noises] Okay, we're here. [time travel noise] Whoa. All the clothes are so different.

Sydnee:

All right, it's—

Justin:

Nobody has electricity. This is wild.

Sydnee:

[laughs] Wait. Really?

Justin:

Some people might have electricity.

Sydnee: [laughs]

Justin:

It's unclear. [laughs]

Sydnee:

[laughs] We are a medical history show.

Justin:

There are lights—

Sydnee:

We stick to what we know here.

Justin:

Yeah. There are... there are lights, but they might be candles. It's hard to say from this distance. We're staying out of the... Because of our future clothing—

Sydnee:

People appear to be clothed, though.

Justin:

... we're staying out of sight.

Sydnee:

There are definitely clothing and buildings.

Justin:

We don't want to—

Sydnee:

Fire is here and the wheel as well. [laughs]

Justin:

We don't wanna alter the past and create a paradox, we're staying outta their way.

Sydnee:

Let's... It's 1901 and we are aboard a yacht.

Justin:

Okay.

Sydnee:

On a lovely cruise with Prince Albert of Monaco.

Justin:

Oh, it... So he's in a boat, not a can? [laughs]

Sydnee:

[laughs] I... You know I knew that was gonna happen? That that joke, if we were talking about Prince Albert that was gonna happen.

Justin:

It's because *Court Appointed* just recorded in here and the haze—

Sydnee:

Oh, the dad jokes. [laughs]

Justin:

... of dad joke is still thick in the air.

Sydnee:

So, he set off on a cruise, Prince Albert did, in 1901, with two physiologists. This is not the beginning of a weird joke.

Justin:

Yeah. Two physiologists and Prince Albert were in a can.

Sydnee:

[laughs] Um, this is not the beginning of a joke. And this sounds like a really weird thing for him to do, but actually Prince Albert was a big fan of scientific research.

He was really intrigued with marine biology and basically ocean ecology, all things to do with the ocean.

Justin:

Mm-hmm.

Sydnee:

And so he was... It was not uncommon for him to set forth on these sort of scientific voyages with various scientists on board his ship to study whatever the heck they wanna study that's out in the ocean.

Justin:

Whatever science people were doing out there.

Sydnee:

Exactly. So it was kind of a cool use, I think, of his money and yacht.

Justin:

Yeah.

Sydnee:

Yachts, plural. Go on these science cruises.

Justin:

Turn it into a science yacht, I'm into that.

Sydnee:

I'm really jealous. I would love to be on this science cruise by the way.

Justin:

With Prince Albert?

Sydnee:

Yeah. With Prince Albert on his yacht, and two physiologists named Paul Portier and Charles Richet, which is kind of cool that they also rhyme.
[laughs]

Justin:

That's how they got to be friends, actually.

Sydney:

Paul... Let me give you a little history of them. Paul wanted to be a research scientist. He really didn't wanna be a doctor. He liked more like bench research, meaning like in the lab research.

Justin:

Okay.

Sydney:

That was really where his passions were. He liked the natural sciences a lot. He really loved physiology when he got into it.

But his parents made him go to medical school before he was allowed to study all that... [laughs] all that other stuff.

Justin:

Classic. Classic rebel, wants to just do science and his parents are like, "No, young man, you gotta be a doctor."

And he's like, "Oh man, pop, you don't understand. I love it out there."

Sydney:

[As Paul Portier] "In the lab..." [laughs]

Justin:

[As Paul Portier] "In front of my science bench. In the lab."

Sydney:

In front of... [laughs] not a science bench. That's what you call the lab. Like on the lab bench, on the lab, like...

Justin:

Lab bench is better than science bench. That's fine.

Sydnee:

It is. Well, it's a thing. A science bench is not a thing.

Justin:

Okay.

Sydnee:

Except—

Justin:

What would you call a bench on what you did science?

Sydnee:

A lab. Bench.

Justin:

Okay. That's fine.

Sydnee:

Anyway, Charles—

Justin:

Seems reductive to me.

Sydnee:

... Charles was more of a Renaissance man.

Justin:

Mm-hmm.

Sydnee:

He was indeed a surgeon and he did pursue medicine intentionally, not just 'cause his parents made him.

But he was also a poet, he was a pacifist. He was a philosopher, he studied Latin. He loved sailing. He wrote books and plays. He liked physiology as well, and also he was really into poisons.

And this is where the two kind of cross paths. Paul was already going on some of these science cruises with Prince Albert. And now—

Justin:

Which is how they were advertising the brochure that he found.

Sydnee:

[laughs] [As brochure] "Science cruises with Prince Albert."

Justin:

[As brochure] "Go on a scien- One, two-day science cruise with Prince Albert."

Sydnee:

And so—

Justin:

[As brochure] "Featuring Barenaked Ladies—"

Sydnee:

[laughs]

Justin:

[As brochure] "... Smash Mouth, Sugar Ray, Prince Albert, Science."

Sydnee:

[laughs] This is the most... is this a cool science cruise? I still don't think it's cool with the bands you—

Justin:

It's a pretty- It's like a... throwback '90s—

Sydnee:

... does Smash Mouth have to be there?

Justin:

It's a throwback '90s science cruise. It's his yacht, he can do what he wants.

Sydnee:

Is that who Prince Albert's into?

Justin:

Mm-hmm.

Sydnee:

Sure.

Justin:

Those are his bands.

Sydnee:

So the two cross paths because Paul was already kind of going on these science cruises and then Charles was really interested in the toxins from jellyfish, specifically Portuguese man o' wars.

Justin:

Mm-hmm.

Sydnee:

Which could be found off the coast of France and in the deep waters. And so you kind of needed to like, get way out there to find them.

Justin:

Mm-hmm.

Sydnee:

And so... And as a doctor, he was interested in, you know, they stung a lot of people, they caused a lot of damage, what could we do about this?

So they set forth on this cruise, these two physiologists and Prince Albert, and I'm sure there were some other people, but let's focus on them.

Justin:

Mm-hmm. Probably people to like, run the boat.

Sydnee:

Yeah.

Justin:

Probably.

Sydnee:

Probably some other, like—

Justin:

Some boatsmen.

Sydnee:

Some other sailors or whatnot. On a cruise to find them. It was a two-and-a-half-month cruise and their plan was to try to collect some of these buggers.

On July 5th, they departed from Toulon in search of what you can also call Physalia or Portuguese man o' wars is probably what most people prefer. That sounds more intense.

Justin:

Yeah. And easier to remember.

Sydnee:

It took 'em a while to find them. It took 'em about four or five weeks before they found like a big... I don't know, like patch of them.

Justin:

Okay.

Sydnee:

A—

Justin:

Herd?

Sydnee:

... grove.

Justin:

A flock?

Sydnee:

Whatever, of jellyfish. Justin—

Justin:

What do you call a group of- Hold on.

Sydnee:

... what do you call a group of jellyfish?

Justin:

[singing] Time for our segment, Justin Googles the internet.

Sydnee:

A pride of jellyfish? A murder of jellyfish? You got anything?

Justin:

You can't stop talking while I Google the internet. That is like—

Sydnee:

Like, a flock? I don't know. I only know so many names of—

Justin:

Think of the next thing and I'll like—

Sydnee:

Okay.

Justin:

And then check back in with me.

Sydnee:

So—

Justin:

I'll be in the lab.

Sydnee:

Okay. So this is... This is not a particularly scientific point that I'll make then, while you're looking that up.

In the four to five weeks it took them to find the jellyfish Richet wrote a play.

Justin:

Oh.

Sydnee:

Circe, which was loved by Prince Albert, performed in 1905 in Monte Carlo, starring the then very famous Sarah Bernhardt, a French actress.

Justin:

Oh, right on.

Sydnee:

Just an interesting little fact for you there.

Justin:

Here's another fact for you, a group of jellyfish is called a bloom.

Sydnee:

Oh.

Justin:

Yeah, isn't that nice? Sometimes very rarely, sometimes in other cases is called a swarm. But, uh—

Sydnee:

That's scarier.

Justin:

Bloom.

Sydnee:

That is what I would call them. If they came at me, I would not think, "Aw, a bloom of jellyfish."

Justin:

"Aw, a bloom!"

Sydnee:

I would think, "Ah, they're swarming."

Justin:

Ah!

Sydnee:

They were swarming this summer.

Justin:

Oh yeah. There was a ton of them.

Sydnee:

Anyway, so they found their bloom of jellyfish. They caught them and they started taking various bits of goo from the jellyfish in various locations and injecting it into ducks and pigeons and guinea pigs and frogs.

Until they figured out that the tentacle goo seemed to hurt them the most, made them kind of like sedated and quiet and sleepy. And they named that hypotoxin. They got back to the lab to study this some more.

They were still paired up at the this point. And it was really hard to get this Portuguese man o' war toxin.

So they had figured out by now that the toxin was fairly similar to one from a sea anemone that was pretty abundant in the coastal areas.

Justin:

Mm-hmm.

Sydnee:

So they could go gather these pretty easily.

So they started working with this sea [sic] anenome, anemone... anemone... toxin and injecting it into dogs.

Their thought process- this was not intended to be mean- their thought was that if they did teeny little amounts, that maybe they could build up tolerance.

And so then there was some belief like maybe we could figure out a way to make humans tolerant to the toxin.

Justin:

Okay. Yeah. Like cocaine powder, just have a little bit.

Sydnee:

Exactly.

Justin:

Got it.

Sydnee:

Exactly like cocaine powder.

So, they started injecting it into the dogs and they had a very unexpected and unpleasant result.

Some of the dogs who they were injecting teeny, teeny little, way lower than lethal dose amounts of this toxin into, got very sick and died very quickly one day.

Justin:

Hm.

Sydnee:

Like eight of them all at once within a half an hour.

Justin:

Wow.

Sydnee:

And they got... And very sick, dramatically ill. Um—

Justin:

This is like a long time after they got the toxin or...?

Sydnee:

They got the toxin, about three weeks later, they got another injection of the toxin and they died almost instantly.

Justin:

Oh my gosh.

Sydnee:

And so they began to posit that instead of building up a tolerance, there is some sort of counter protection that can occur when you're exposed to certain toxins.

As in, you've been sensitized to it. You got it once, you got a little sick, you get exposed to it a few weeks later, you get super sick.

Justin:

Okay.

Sydnee:

And they called that aphyllaxis, which is from the Greek for "contrary to protection." A phylaxis.

Now, aphyllaxis didn't sound as nice, so they changed it to anaphylaxis. That is literally why it was changed. [laughs]

Justin:

So basically your body gets hit by something that hurts it and your body like freaks out about it.

It's like, "Oh, holy crap. Did you guys see that? Everybody get out here. We have to build like crazy defenses and walls and turrets and lasers and everything."

Sydnee:

Mm-hmm.

Justin:

"So if that mothergrabber comes back, we are gonna be ready for it."

Sydnee:

We're just gonna... yeah. "We're gonna smash it to bits."

Justin:

Right.

Sydnee:

Except for then your whole body goes nuts. It's filled with a... IgE is the antibody that attacks everything, which is a thing that that's always in operation with allergic reactions.

Justin:

[exhales]

Sydnee:

The thing that makes you release a bunch of histamine and everything gets inflamed and swollen and you get this whole inflammatory response everywhere. Um, that's what happens—

Justin:

So it's—

Sydnee:

... dramatically quickly.

Justin:

So it's more like a bunch of bats fly into your town and everybody's like, "That sucked."

Sydnee:

Right.

Justin:

"I'll tell everybody how bad that sucked. If those bats ever come back here, so help me god, I'm gonna burn the whole city to the ground."

Sydnee:

"I'm gonna blow the whole town up."

Justin:

Okay. Got it.

Sydnee:

Exactly. That's a good analogy for it, Justin.

Justin:

That's about people who hate bats that much.

Sydnee:

[laughs] So that's anaphylaxis. It's a fatal systemic reaction. And when I say fatal, I mean, if you don't do something about it.

Obviously there are things we can do about it. But if you don't do anything about it, it can very well be fatal to a normally well tolerated substance. So something that not necessarily kills everybody or always kills.

And it can involve, obviously, cardiac symptoms, you know, heart symptoms, lung symptoms, respiratory problems, classically you can't breathe, skin symptoms, you can get horrible rashes.

GI symptoms, you can get very sick to your stomach, start throwing up. Blood can be involved. And then ultimately, basically everything just collapses.

Justin:

Okay.

Sydnee:

And you die. Or hopefully you don't because we do something about it.

So they published the whole thing. This was a very important breakthrough that they made, and they went their separate ways.

An interesting footnote Richet would go on to be famous for this. And about 10 years later, win a Nobel prize. Portier was not mentioned at all in that.

Justin:

Weird.

Sydnee:

I mean, we know he did it, like, obviously I'm telling you this, this isn't a secret.

But by all accounts, he was totally cool with that because I guess it was just like, at the time, it was normal for a younger scientist to do just like do all the work for an older scientist and then never get any credit for it.

So he was cool with it.

Justin:

He was just happy to get back to his bench.

Sydnee:

There's a... There's a stamp that you can see from 1953 from Monaco, a Mona- Monacan... stamp?

Justin:

Yeah. Maybe.

Sydnee:

Sure. From 1953, that commemorates the discovery of anaphylaxis. It says something like that on it. The discovery of anaphylaxis.

And it's got a picture of Prince Albert and these two dudes, Portier and Richet, a jellyfish, [laughs] and a yacht.

Justin:

God, that sounds awesome.

Sydnee:

It's a pretty cool stamp.

Justin:

I wanna blow that up as a poster.

Sydnee:

If you don't know what this stamp is about, that is the weirdest stamp you could ever collect.

Justin:

[laughs] I do wanna collect stamps, but just that one. I just wanna frame that one and hang it up behind me.

Sydnee:

I kinda... I do want that stamp on our wall.

Justin:

So Sydnee, how do we... Obviously identifying it is always the first step, how do we treat it?

Sydnee:

Well Justin, I wanna tell you about how we treat anaphylaxis, but first, why don't you follow me to the Billing Department?

Justin:

Let's go!

[Theme song plays as we go to the Billing Department]

[We leave the Billing Department]

Justin:

So Sydney, we were talking just before the break about how to treat anaphylaxis.

Sydnee:

So you may already have a hint that epinephrine, the substance that is in the so-called EpiPen is the number one treatment for anaphylaxis.

Now, epinephrine, or you also may call it adrenaline.

Justin:

Mm-hmm.

Sydnee:

We're talking about the same thing, by the way.

Justin:

I actually fully think that's what, kidding aside, I think it was adrenaline that he pumped into Uma Therman's [laughing] heart in *Pulp Fiction*.

Sydnee:

That's epinephrine, that's adrenaline.

Justin:

Okay.

Sydnee: That's... It's the same thing. It depends on where and who you are as to what you might call it. But it's the same thing.

Obviously, this is something our bodies already make. We have this. If you... If you call it adrenaline, you might know it's from your adrenal glands.

Either way we make a lot of it already and an easy way to think about what it does in your body is that you've probably heard of the fight or flight response?

Justin:

Sure. Yeah.

Sydnee:

So when we encounter a predator, we either want to fight it or—

Justin:

Flight it.

Sydnee:

... or run away. Right, flight it. [laughs] Put it on an airplane.

Justin:

Sure.

Sydnee:

You can give it a nice flight to the other side of the earth.

Justin:

I mean, that would fix your issue. They never talk about that one. Fight or run, or put it on an airplane, watch it fly away. Woohoo, you're safe.

Sydnee:

[laughs] The things that it does in order to help you fight or... and/or fly... flight, is it raises your heart rate. It raises your blood pressure. It will actually direct the flow of blood to skin and your skeletal muscle.

Now, why would your... and skeletal muscle, by that I mean like legs and arms and those kinds of muscles... why would you need that?

Justin:

Um—

Sydnee:

Think about it. Why would you need more blood flow there? 'Cause you're gonna fight or flight.

Justin:

Oh, that makes sense.

Sydnee:

Yeah. 'Cause you're gonna run away or you're gonna fight somebody.

It will make your pupils bigger. Your pupils dilate. It will dilate your bronchi, your airways. So that's why it helps you breathe. 'Cause it's opening up your airways.

It's gonna increase your oxygenation so you get more oxygen everywhere. You get more blood to your brain and it'll also raise your glucose.

All of these things to prepare you for some big intense event that your body's about to undertake.

Justin:

So if you can't find an EpiPen, one thing you can do is tell somebody about like, how you're gonna go wakeboarding with them later or hang gliding or any other sort of extreme sport that really gets the adrenaline pumping.

Sydnee:

Mm-hmm.

Justin:

And you're gonna do some BASE jumping or whatever, and that will actually do the same thing.

Sydnee:

Watch a suspenseful movie.

Justin:

Watch... watch, uh... *Scream 3*, [laughs] for example, you can do that.

Sydnee:

[laughs] Listen to our podcast.

Justin:

Yeah.

Sydnee:

That's thrilling.

Justin:

You think?

Sydnee:

I don't know.

Justin:

I don't think it's like adrenaline pumping. It is a history show, but—

Sydnee:

[laughs]

Justin:

... maybe in certain... In rare circumstances.

Sydnee:

Speak for yourself.

Justin:

Yeah. I mean, okay, I will. And I'm saying it's [laughing] not particularly thrilling.

Sydnee:

[laughs] Uh, we knew for many years that there was something in the adrenal glands of animals that we could inject into people and make things happen.

Justin:

Mm-hmm.

Sydnee:

This is how we figured out what epinephrine was, where it came from.

There's one... There's a lot of stories of people isolating like various animals' adrenal glands and grinding them up and, you know, turning them into bits and figuring out what's in them.

One of my favorite is George Oliver back in the late 1800s, who was a doctor who... I... Either this is a famous story or an apocryphal story.

Justin:

It could be both.

Sydnee:

There's no records of it actually like, written down by him. He didn't write it down, but everybody else said this happened. So who knows?

He injected his son with ground up adrenal glands from a sheep and then measured the size of his son's radial artery, which is in your wrist.

Justin:

Mm-hmm.

Sydnee:

And he could tell that it was getting smaller, it was constricting, because he invented the instrument that measured that. He was like a tinkerer, tinkerer doctor, who did that.

And so he got all excited and he was one of the first ones to like, write about this like, "Hey, if you use these adrenal glands, it'll make your arteries smaller."

Justin:

But he used his son?

Sydnee:

Yeah. But he used his son. [laughs]

Justin:

Okay. I'm assuming he didn't have a lot of friends.

Sydnee:

Uh, no. Or at least—

Justin:

That he could have asked first.

Sydnee:

... maybe... maybe they'd learned their lesson.

Justin:

Wised up.

Sydnee:

[As George's ex-friends] "Don't hang out with George." [laughs] In the early 1900s, we actually isolated adrenaline or epinephrine and figured out what it was.

Most of the time we talk about Jokichi Takamine as the one who finally did this and gets the credit for the discovery.

There were several scientists just in case there was anyone who's into this topic and debating it. There were multiple scientists involved. We usually cite him with the discovery.

We synthesized it in like 1904 and so then we could make it ourselves. And initially it was mainly used for asthma.

Justin:

Hmm.

Sydnee:

Because it could open airways.

Justin:

Mm. Your airways, right.

Sydnee:

Right. So for people with asthma, this was kind of an emergency treatment.

But we figured out eventually that albuterol, which is now the mainstay for asthma, worked better. So it fell out of favor when it came to asthma.

But we were still studying it 'cause we knew this thing did a lot of stuff. And so there are... there are like over 12,000 studies in this time period on epinephrine. Well throughout the years.

What can we do with it? What can it help? What is it most useful for? Through that, we found that it was good for some breathing issues, even though it is not the main treatment for asthma.

It was good for stopping bleeding. So you'll see us add it to like a local anesthetic, if we're gonna like inject you with a little bit of something to numb you before we stitch something up or something—

Justin:

Mm-hmm.

Sydnee:

... or cut something off you, we will put some epinephrine in there so that there's not a lot of bleeding.

Justin:

Okay.

Sydnee:

We use it a lot of the time alongside anesthetics in the OR. It's good for code blues. We use epinephrine commonly as part of our protocol for running a code if someone's heart stops.

Justin:

And code blue is a bad one. You don't want that one.

Sydnee:

That's a bad one. Yep.

Justin:

Not code red?

Sydnee:

There's no code that's a good one. [laughs]

Justin:

Okay. That's fair. Yeah. You never hear like, "code yellow." It's like, "Well, I need some Nilla wafers, so I called a code yellow."

Sydnee:

[laughs] I mean code blue's a bad one, but like code black means the computers are down, code red means there's a fire. So I mean—

Justin:

Yeah.

Sydnee:

... none of 'em are great. [laughs]

Justin:

No fun codes. Right.

Sydnee:

And because it was good for raising blood pressure and heart rate and opening airways and improving your oxygenation, we figured out that it was really good for severe allergic reactions, specifically... anaphylaxis.

Justin:

Okay.

Sydnee:

And then... And because, you know, some of the things I mentioned, I didn't clarify this, in anaphylaxis, your blood pressure can plummet.

And so something that would raise your blood pressure is really important so that you keep getting blood, you know, to all of your organs. It's very important.

In the 1960s, we realized that epinephrine was good to have on hand. It was good to have a round for like, emergency situations because we were figuring out more and more that people are severely allergic to some foods.

Like peanuts, for instance.

Justin:

Right.

Sydnee:

Some insects like bees, for instance. And then some drug reactions, like penicillin could be very severe and people could stop breathing and so having epinephrine kind of in your emergency kit became standard.

It was so good that it became, the World Health Organization listed it as, an essential drug, meaning you've gotta have- This is just something you have to have.

Like, it is an accepted worldwide standard, if you're gonna be, you know, an emergency medical care facility, you've gotta have this stuff.

In the 1970s, Sheldon Kaplan made something called a combo pen. And this was actually initially just for the military in the event of chemical warfare.

And it was something that would quickly autoinject epinephrine into you. So you could click it yourself and shoot yourself full of epinephrine.

Justin:

So many advances there. Military and space program.

Sydnee:

Absolutely. Absolutely. Yeah. Yeah. Thanks to the military, definitely for this one.

Because what followed was in 1987, the EpiPen was born.

Justin:

[Trumpet sound]

Sydnee:

Now, for those of you keeping track, the EpiPen has been around since 1987.

Justin:

Okay. Coming up on 30 years.

Sydnee:

Mm-hmm.

Justin:

Always a big, big milestone.

Sydnee:

Yeah. It's a pretty old drug. One thing to note about drugs is that the older they get traditionally, the cheaper they get.

Justin:

Mm-hmm.

Sydnee:

So just so that we're aware, the EpiPen was born in 1987. I was born in 1983. So just a little bit after me.

Justin:

Okay.

Sydnee:

The drug passed hands a few times, as these older drugs often do, as far as like what company owns them, who gets the patent on them. It was bought as part of a generics package from Merck.

So Merck is a big drug company you may have heard of. And it was... There's a common theme where smaller pharmaceutical companies will buy up old generic drugs from big pharmaceutical companies.

So a generic drug, meaning like it has been around so long that the brand is gone and it can be generic.

Justin:

Right.

Sydnee:

So it was bought as part of some other generics, by Mylan Pharmaceuticals in 2007.

Justin:

Okay. But why... why... if it's a generic, why can't other people- everybody make 'em?

Sydnee:

Well, the fact is that just not many people do. There are just some drugs that not a lot of people are making. And the EpiPen and epinephrine in general is one of them.

There are only a couple other drugs similar to the EpiPen. One, the AUVI-Q, which was released just a couple years ago, got recalled almost, I mean, within two years of it coming out. So that one's not around anymore.

There's also one called the Adrenaclick.

Justin:

Mm-hmm.

Sydnee:

Which you may have heard of. It's been around since 2003. It just doesn't have nearly the market share that EpiPen did. EpiPen is...

And why that's important is not just because you've heard of it. While- Although that is important.

What's really important is what formulary you have. So like your insurance company has a list of drugs that it wants me as your doctor to prescribe you.

Justin:

Okay.

Sydnee:

And if I'm going to go off that list, I have to justify why I'm gonna do it.

Well, the fact is, if two drugs are the same and I know they would work the same, it's gonna be really hard for me to argue why you should have one instead of the other.

So that can trip you up a lot of times, you know, if, if you want a certain drug, but another one's on your formulary, it can be really hard for you to get the one that you think might be better for you, or cheaper maybe.

So when Mylan got the EpiPen, it was making about \$200 million a year. The EpiPen was, okay? In profits.

Justin:

Right.

Sydnee:

Now, it is making 1.1 billion a year.

Justin:

Okay.

Sydnee:

That's a lot more money. Mylan's been pretty clever in a couple of areas. One has been getting it out as an essential drug in schools.

They actually... a lot of that was done through the United States government, to mandate that schools have an EpiPen, which... That's not a bad idea. I'm not saying that that's a bad idea.

But it certainly was beneficial for Mylan to get to sell the US, you know, school system—

Justin:

Right. It sort of worked out great for everybody.

Sydnee:

... lots of EpiPens. The other thing is they have a lot of commercials. There are a lot of very dramatic commercials for the EpiPen where you see people having these severe allergic reactions as a-

And these are direct-to-consumer commercials to remind you that you need an EpiPen and to terrify parents.

Justin:

Mm-hmm.

Sydnee:

Now their drug, which initially was about 90 bucks for two, is \$600 for two pens.

Justin:

Mm-hmm.

Sydnee:

Now, obviously a pen is a single-use thing.

Justin:

Right.

Sydnee:

You use it, it's done. So two uses. Now the bigger deal is you're probably not gonna need these very often.

So what tends to happen is you have to have them on hand because if you or your child or someone in your family has an anaphylactic response to something and you don't have this on hand, we...

I mean, you can figure out the consequences.

Justin:

Sure.

Sydnee:

But they often expire before people ever get to use 'em, thank goodness.

Justin:

Right.

Sydnee:

But they gotta still get 'em. It's not like you can just hold onto an expired one. You've still gotta, when that one runs out, you gotta go get a new one.

Justin:

Right.

Sydnee:

So that you always have one that would work on hand. Now obviously there's been a lot of fuss about how much this costs and how this is prohibitive.

Mylan's response to this has been, they'll give you a half-off coupon.

Justin:

I heard also they're doing a half off, this may be the same thing, but they're doing a generic version, that's half as much.

Sydnee:

Right.

Justin:

Yeah.

Sydnee:

Because \$300 is a lot easier than \$600, I guess, for some people.

Why do drugs cost so much?

Justin:

That's what I was about to ask you, Sydnee!

Sydnee:

That's a good question. Some of this goes back to—

Justin:

Thank you.

Sydnee:

... you know... huh?

Justin:

Thank you. [laughs]

Sydnee:

Oh, you're welcome. It... A lot of this, you know, we started making drugs prescription really only in like the '50s. That's not really... That's kind of a newer concept if you think about it.

Justin:

Mm-hmm.

Sydnee:

What can be over the counter, what can be prescription.

And along with in the '50s, when we started regulating what was only prescribable by doctors, we started holding them up to all these new standards.

And so all these drugs had to go through all these protocols to be approved, which increased the cost of making drugs. Because now you had to do a lot of studies to prove that they work, right?

Justin:

Right.

Sydnee:

You have to prove that they're safe. So the cost of making drugs definitely has gone up, but that is a small part.

Because that's what a drug company will tell you, that it is just because of all the research and development that goes into making the drug.

However, it's more complicated than that. When we go back to AZT, which is a medication for HIV, when it was first introduced to the market, it was costing people between like eight and 10,000 dollars a year to treat themselves with AZT.

Now at the time, that was a crazy amount for a medication.

Justin:

Right.

Sydnee:

Today, with some cancer drugs, that'd be a drop in the bucket, but at the time that was a crazy amount.

And the reasoning was just, "Look, we're the only ones making it and people really need it. And we don't have any competition. And it was really hard to make, so..."

Justin:

[sarcastically cheery] Capitalism!

Sydnee:

[As Drug Company] "Deal with it."

Justin:

[sarcastically cheery] Hooray.

Sydnee:

Capitalism. Since then we've seen- And by the way, ACT UP protested on Wall Street and got the price reduced.

Justin:

Oh, nice.

Sydnee:

Which is a cool story. Yeah.

Justin:

ACT UP, actual reality.

Sydnee:

Yeah.

Justin:

Fight AIDS.

Sydnee:

Um—

Justin:

Check!

Sydnee:

... cancer drugs have followed suit as well because—

Justin:

You interrupted my whole *Rent* pastiche there that I was doing for everybody, all the *Rent* heads out there.

Sydnee:

I was enjoying it.

Justin:

Thanks, Syd.

Sydnee:

I was enjoying the *Rent*.

Cancer drugs have followed suit because they hold a similar place in that people really need them, people are, you know, they're scared and they're desperate for them.

And they're often hard to develop, and the only one in a certain class.

Since 2000, the price of drugs in the US is going up at a crazy rate. Part of that is that there are a lot of new drugs and it costs a lot to make them.

But there's also a lot of the profits that pharmaceutical companies make, go to administration.

Justin:

Sure.

Sydnee:

And marketing. The... When the government allowed you, the drug companies, to start marketing drugs to you, the consumer, that greatly increased the price of drugs.

Justin:

Oh. Which also side note, is just here, in the US and Australia?

Sydnee:

I think those are the only—

Justin:

Is that right?

Sydnee:

Yeah, I think that's the only other country—

Justin:

Australia or New Zealand?

Sydnee:

... that allows that. It's a crazy thing. Why are they marketing a drug to you? Why are...? I mean, think about that. Really think about that.

In addition, greed. Greed is a big part of why drugs are so expensive. What happens a lot is that large companies, large pharmaceutical companies, may not even do all the research and development to make the drug.

They will be watching a smaller company that has done that and has made this drug that they're gonna start selling now, that's really important, and they know is gonna be a revolutionary breakthrough drug.

The large company will buy that company, and then start selling it at a crazy markup. And their excuse is, "Well, it cost so much to develop it."

Well, they didn't... they didn't bur- None of that cost was on them.

Justin:

Right, right.

Sydnee:

None of that cost burden was ever on them. It was on the smaller company that probably would've never sold it for that amount.

They also buy generics. This is another thing drug companies do. They'll buy generics that might hold a singular place in a treatment market, and then mark them up crazily.

Which is what they've done with the EpiPen, which is what that jerk Martin [sic, mispronouncing "Shkreli"] Sherlecky...

Justin:

Yeah.

Sydnee:

That same jerk did with the other HIV medication—

Justin:

Careful with the language.

Sydnee:

Sorry. [laughs] He's a jerk. It's the same idea. Buy up a generic and make it super expensive because it's the only thing that works and people have to have it.

The length of patents has gotten longer. So a drug can stay brand name much longer than it used to so that then they can charge a brand name price for it.

Justin:

Which free market capitalists would tell you is a way to incentivize people to create new drugs.

Sydnee:

Right. 'Cause it's a really easy marketplace to get into. Do you have several million dollars with which to do the research and development for a new drug?

Justin:

I don't on hand...

Sydnee:

No? And we have really trouble breaking the patents.

You know in Brazil when HIV drugs got so expensive that the citizens couldn't afford them, the minister of health basically said, "Forget your patents. We're charging generic prices."

Because you can do that when human lives are at stake.

Justin:

Now, Brazil's got its own problems.

Sydnee:

Okay. Now, Brazil has some other issues. [laughs]

Justin:

Let's... Let's not like... They're... They didn't get it corre- They didn't get it great on everything.

Sydnee:

I'm just saying...

Justin:

Right?

Sydnee:

... there are ways around this.

There are also orphan drugs which are drugs where like maybe only a small—

Justin:

Only for orphans.

Sydnee:

[laughs] No, only a small subset of the population really needs them 'cause maybe it's for a rare disease.

Justin:

Right.

Sydnee:

So the drug companies feel justified marking them up at crazy rates because I mean, "We're making them, isn't that enough?"

Here's the other point. We fund up to 85% of the basic research that goes into these drugs, through our taxes.

Justin:

[incredulous] Wait, what?

Sydnee:

Up to 85% of the research that they are so overwhelmed with paying for, is funded by taxpayers. The basic research.

Justin:

Well that doesn't—

Sydnee:

Not the final clinical trials.

Justin:

That doesn't seem quite fair, Sydnee.

Sydnee:

So we are all invested in these drugs that we can't afford. And you can't negotiate, because this isn't a free market.

You don't choose the disease you have, you didn't get to go negotiate for which illness you wanted to get.

Justin:

Sure.

Sydnee:

You don't get to pick the treatment that was already created that is appropriate for the illness that you just got. You can't... capitalism does not apply to disease and illness.

Justin:

It really is where capitalism as a model, one of the many ways in which it breaks down, is when you apply it to medicine. It just doesn't make any sense anymore.

Sydnee:

No. It doesn't make any sense at all.

Justin:

Either you need, or you do not need, there is no want in there. It's... it's...

Sydnee:

No, you didn't go buy diabetes. So it doesn't make sense that there's some way for us to just compete to see which diabetes treatment you get.

Justin:

"Vicky, I don't know. Listen, she said at Christmas she wanted this diabetes and so we scrimped and we saved and we got her diabetes. She never plays with it."

Sydnee:

[laughs]

Justin:

[As diabetes purchaser] "All she does is complain about it. And we have to keep hard candies in your purse constantly. I regret it. Honestly, I do. We should have gotten the puppy.

"I told you, we should have gotten the puppy."

Sydnee:

[laughs] What are some actual things that we could do to fix this? Because obvious this is...

The system is broken, as indicated by the fact that a lifesaving medication that has been around since 1987 is, I mean, unobtainable by many, many people in this country right now.

So we need to be able to negotiate drug prices.

For instance, the government should be able to negotiate the prices of drugs through Medicare, which is a government funded, well, taxpayer/government funded healthcare program.

They should be able to go to the drug companies and negotiate the costs of the drugs that they're going to pay for. They can't do that right now. That's a really easy thing that is constantly introduced in the House and then killed.

That would be a really easy thing for you to tell your representative that you would want to happen.

We need price caps. There's just no reason. These drugs are just so ex- And there's no reason. There's no justification. There is no research and development that justifies the price of some of these drugs. It's crazy.

Price capping in every other country works. It works. We need that. We need march-in rights, which is sort of what... What I said when, I mentioned Brazil broke the patents?

We need that, we need that. We need to be able to say, "Listen, we can't keep this on patent anymore, people are dying, we need to do something." We need that ability.

We need faster generics. Right now, the process for getting generics approved, like to go from brand to generic through the FDA is crazy long.

It takes them so long to get these generics approved and make sure that they're equivalent to the brand that they say they are.

We have to find a way to expedite that process, to do it safely, to do it appropriately, but also to do it faster, remove some of the red tape so that we can get these drugs out there.

We need to import drugs from other countries if we're not gonna do it right.

Justin:

[sarcastic] Well, I'm not—

Sydnee:

You need to be able to buy your drugs from Canada if you're not—

Justin:

[sarcastic] I... I don't agree with that, I mean. Buy USA, right? I don't buy anything that isn't American made. I certainly am not gonna start with drugs.

Sydnee:

If Charlie needed an EpiPen and you could get it from Canada and we couldn't afford it from here, you'd buy it in a heartbeat.

Justin:

Yeah, that's true. But like, go USA?

Sydnee:

[laughs] I'm just saying—

Justin:

Counterpoint.

Sydnee:

... either we do it right or we need to start letting people get- I mean, if it's, you know, if we're a global economy, [laughs] let 'em buy drugs where they can afford 'em.

Obviously you can talk to your doctor about some things. Sometimes we can do things with like, giving you 90 days instead of 30 days to help out with the cost.

Sometimes we can figure out other cheaper medications that might still work.

Sometimes talking to your pharmacist or looking for other pharmacies can help.

Justin:

Mm-hmm.

Sydnee:

And then also you can call your representatives.

Because there are actual things that could be done, laws that could be passed, that have done well all over the world that we could do to take money out of medicine and put drugs in the hands of people who need them.

So it's not the same thing as buying a new car, when you go to the doctor and get a medication prescribed. It's not the same thing and we have to stop treating it like it is in this country.

Justin:

All right Syd, you've convinced me.

Sydnee:

[laughs]

Justin:

I'm gonna buy an EpiPen.

Sydnee:

You're gonna buy an EpiPen?

Justin:

Yeah. Is that what we're working towards? Did you want me to get an Epi...?
If you're trying to sell me an EpiPen...

Sydnee:

[laughs]

Justin:

... they sound great. They're very hot right now.

Sydnee:

No, 'cause— [laughs]

Justin:

Hottest ticket in town.

Sydnee:

... you'd still—

Justin:

They're the *Hamilton* tickets of drugs.

Sydnee:

... [laughs] you still need a prescription! That's the crazy thing.

Justin:

[Old-timey radio voice] "Hollywood starlets love the EpiPen!"

Sydnee:

That's the crazy thing. They're advertising something to you you can't buy. I mean you can, but only if I prescribe it to you, it's crazy!

Justin:

Folks, that's gonna do it for us. Thank you so much for enjoying our program. Thanks to everybody out there who has been sharing the show and tweeting about the show and what have you. We sure appreciate it.

We wanna say a special thank you to The Taxpayers, for letting us use their song "Medicines" as the intro and outro of our program.

Right this second, if you go over to thetaxpayers.bandcamp.com, you are going to be able to listen to a different version of our theme song, that is really cool.

That's actually just... I misspoke. Just taxpayers.bandcamp.com, not the taxpayers. So taxpayers.bandcamp.com, head over there and check all that out.

And thank you to the Maximum Fun network for having us on. There's a ton of great shows for you to enjoy.

Might I recommend *Still Buffering*, a show that Sydnee hosts with her sisters, Taylor and Rileigh, as they try to navigate the choppy waters of teen life.

It is a fine program and I think you would enjoy it. If you found this one, you can find that one where you found this one. It's not hard.

Sydnee:

Thank you, Justin.

Justin:

Yeah, hey.

Sydnee:

How nice of you.

Justin:

Least I could do, Sydster. Folks, that's gonna do it for us. 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.

[Outro, theme music plays]

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