

## Sawbones 495: CPR

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

[theme music plays]

**Justin:** Hello everybody, and welcome to *Sawbones*, a marital tour of misguided medicine. I'm your cohost, Justin McElroy.

**Sydnee:** And I'm Sydnee McElroy.

**Justin:** And I am so excited, Syd, to be dovetailing off maybe the beginning of another one of our famous combo chains of episodes.

**Sydnee:** You really love when we do combo chains of episodes.

**Justin:** I so.

**Sydnee:** Is that a video game thing, do you think?

**Justin:** It's like gamifying—

**Sydnee:** Yeah.

**Justin:** — podcasting in a way that it doesn't need to be, but I do like the idea that you can like dovetail between them. I don't know, it's seren— It's like everybody is trying to get natural segues, right?

**Sydnee:** Mm-hmm.

**Justin:** That's one of the first things you learn, and then once you learn that you're like, "Well I'm done," and then you see it, out there in the distance.

**Sydnee:** Mm-hmm.

**Justin:** The elusive segue not between bits, but between—

**Sydnee & Justin:** [simultaneously] – episodes.

**Justin:** [chuckles] And then that's— it sort of becomes your Everest, you know?

**Sydnee:** I don't know, I like— I always like to be surprised by the topic. Like, "Ooo, this'll be a fun—" Like I just stumble upon something, like a listener sends us an email or whatever, you ask me a question. So knowing the next topic in advance sometimes is a little bit of a...

**Justin:** You like to have— just have your antenna out.

**Sydnee:** A spoiler.

**Justin:** And let the universe kinda pipe it in, I love that.

**Sydnee:** Exactly. We'll see.

**Justin:** But no, we are building off of last week's episode, which was about the Lazarus syndrome.

**Sydnee:** Yes.

**Justin:** Where people just come back to life sometimes. [snorts] Very rarely, usually very briefly.

**Sydnee:** Yes.

**Justin:** But they do.

**Sydnee:** Autoresuscitation after cardiopulmonary resuscitation.

**Justin:** Or! Lazarus syndrome, of you wanna sound like a human being.

**Sydnee:** Well that too. Anyway, we're gonna talk about CPR. Now I— Let me say this, cardiopulmonary resuscitation, that's CPR. I'm gonna say CPR. Everybody kinda knows that abbreviation.

**Justin:** I think considering it's a shortened version of the other thing, that's perfectly acceptable. [chuckles] For you to say CPR.

**Sydnee:** [chuckles] Well that's a— it's a lot— it's a mouthful, otherwise.

**Justin:** Yeah, yeah.

**Sydnee:** CPR, to do the entire history of all of CPR would be an epic like three hour long or longer episode of *Sawbones*.

**Justin:** Okay.

**Sydnee:** There's so— I mean 'cause it's a lot of things that are put together into one thing, right? There's chest compressions, and how did we get to those, and there's breathing for people, whether we're talking about mouth to mouth or using a bag mask or intubating people.

Like there's all the ways we breathe for people, and then there's the whole history of that. And then there's like shocking people with like a defibrillator.

**Justin:** Mm-hmm.

**Sydnee:** And there's the whole history of that. So— And which we also— we've done electricity in medicine.

**Justin:** Yes.

**Sydnee:** And so like that kind of leads it— So we've kind of covered some of this ground, but anyway, it's a lot of stuff.

**Justin:** Little bit more focused.

**Sydnee:** Yes.

**Justin:** Little bit more of a focus to this one.

**Sydnee:** Well, I'm— Instead of focusing in on just one area, 'cause I also don't know that those are particularly interesting each— [chuckles] each unto themselves. To you, the listening audience, who I think is seeking entertainment. So this is more of a general overview.

**Justin:** Okay.

**Sydnee:** Is my point. I'm giving you the general when did we start thinking about bringing people back to life, so to speak? Not really that, but sort of.

**Justin:** Basically.

**Sydnee:** And what did we— how did we get to where we are now.

**Justin:** Okay.

**Sydnee:** So the concept— When you talk about— Whenever you read an article about the history of CPR, they always wanna trace it back to ancient origins. They're always like, "The idea of breathing life into someone dates back to Ancient Egyptian writings, or to Biblical references."

**Justin:** Mmm.

**Sydnee:** And like I don't know that that was meant to be literal.

**Justin:** Yeah, I think that that's— I think more like breathing life into like clay, you know what I mean?

**Sydnee:** Right.

**Justin:** That kind of usage of like that kinda— A little bit more, you know, making a homunculus.

**Sydnee:** [giggles]

**Justin:** [chuckles] Not necessarily a brea— bringing your friend Dany back to life.

**Sydnee:** Exactly, I don't think they're talking about literal mouth to mouth resuscitation—

**Justin:** Right.

**Sydnee:** — when they talk about breathing life into someone. I do think the idea that we— I mean, we've been— All of medicine is an attempt to stop death.

**Justin:** That's true.

**Sydnee:** So, it makes sense that CPR almost certainly dates back to the origins of...

**Justin:** Death.

**Sydnee:** Humanity, and mortality.

**Justin:** Right.

**Sydnee:** And this is— Man, this is gettin' real dark. My point is, I'm sure we've been trying in some way to stop people from dying, or bringing them back to life—

**Justin:** Right.

**Sydnee:** — when they've died, for all of human history. Certainly.

**Justin:** Yes.

**Sydnee:** [chuckles] But—

**Justin:** I mean, let's hope so. There was the— [chuckles] one era between like Cro-Magnon and Paleolithic man where it was just like, "Eh, I don't know. You win some, you lose some."

**Sydnee:** [chuckles]

**Justin:** Like, "We'll figure it out. Give us a few—"

**Sydnee:** "Que sera sera."

**Justin:** Yeah, "Give us a few millennia. We haven't even done language yet, we can't— we have no help here."

**Sydnee:** So, CPR— Let me get into what is CPR.

**Justin:** What is CPR?

**Sydnee:** Do you know what CPR is? Like—

**Justin:** Cardio pulmitar— col— chest pulmintary resuscitation. [chuckles]

**Sydnee:** What are we doing when we do CPR?

**Justin:** You're—

**Sydnee:** What are we trying to do?

**Justin:** You're trying to bring somebody back to life, trying to get their heart going again.

**Sydnee:** Yes, we're trying to pump oxygenated blood through someone's body.

**Justin:** Right.

**Sydnee:** The heart is supposed to do that. When someone has had a cardiac arrest, then what has happened is either the heart is not squeezing.

**Justin:** Mm-hmm.

**Sydnee:** At all.

**Justin:** Not gooshing the blood through the body.

**Sydnee:** Right, or it is beating in a way that is not effective at pumping. It's not pumping.

**Justin:** Beating ineffectively.

**Sydnee:** Yes, so—

**Justin:** It's movin' around, it's jiggling and wiggling.

**Sydnee:** [chuckles] It—

**Justin:** But not pumping the blood it needs to.

**Sydnee:** Yes, exactly.

**Justin:** Gotcha.

**Sydnee:** So like a good example of that is when the— is fibrillation, especially like ventricular fibrillation. The ventricle is the big meaty part, [chuckles] at the bottom of the heart that squeezes the blood through the whole body.

**Justin:** Very appetizing, yeah.

**Sydnee:** It is, it's the big meaty part. And if it is just sort of quivering or fibrillating—

**Justin:** It's not—

**Sydnee:** — then blood's not being pumped, okay?

**Justin:** Right. Okay, so we need to get that goin'.

**Sydnee:** Yeah. We usually do chest compressions, that is the primary thing we're doing. Which if you haven't seen them, then you haven't seen *Madame Web*.

**Justin:** Right.

**Sydnee:** I'm assuming.

**Justin:** Yeah, if you need some great examples of what not to do, there's like 113 to 15 different scenes of people performing CPR—

**Sydnee:** Mm-hmm.

**Justin:** — to various degrees of effect. No, it always works, almost. But it is— it would not in the real world.

**Sydnee:** It always works, they— and they know it works without checking for a pulse, which is wild to me. Do you know how many times they stop CPR and go “They’re fine.”

**Justin:** [chuckles]

**Sydnee:** Or like—

**Justin:** “They’re back.”

**Sydnee:** — “They’re back,” and they haven’t checked for a pulse?

**Justin:** [chuckles]

**Sydnee:** It’s— Anyway. So usually we’re doing chest compressions, meaning we’re like using our hands to push firmly and deeply.

**Justin:** Right.

**Sydnee:** Into the center of the chest, to pump the heart.

**Justin:** To get the— Yeah.

**Sydnee:** You have to physically pump the heart. It can also involve breathing efforts, whether we’re talking about mouth to mouth or— Which, I mean, I think that’s self-explanatory, but you’re putting your mouth on someone’s mouth and blowing air into them.

**Justin:** There you go.

**Sydnee:** Or using like a bag mask, if you’ve seen like an ambu-bag, the big—

**Justin:** Mm-hmm.

**Sydnee:** The big plastic bag—

**Justin:** Yes.

**Sydnee:** — attached to the mask. Or actually putting an airway in, for instance, if you’re watching *ER*, this usually involves a pen in the trachea.



**Justin:** Mm-hmm.

**Sydnee:** That is not standard of care. [chuckles]

**Justin:** You are throwing a lot of shade for somebody who's watched three seasons of *ER* in two weeks.

**Sydnee:** It's just, it's a really good show.

**Justin:** Yes.

**Sydnee:** I don't know if you've heard of this show, *ER*. [chuckles]

**Justin:** [giggles]

**Sydnee:** Michael Crichton was involved.

**Justin:** Yes.

**Sydnee:** Anyway.

**Justin:** It was a whole thing.

**Sydnee:** George Clooney is on it.

**Justin:** It was a whole moment.

**Sydnee:** [chuckles] It's great. So there are exceptions. When I talk about like sort of the standard of CPR, I'm talking about what used to be the ABCs, what's now the CABs, I'm gonna go into what that means. There are specialized scenarios, like for instance respiratory arrest, when someone's heart is still beating, but they're not breathing.

**Justin:** Mm-hmm.

**Sydnee:** This happens a lot in my line of work, because I take care of a lot of people who have substance abuse disorder, and therefore are at risk for overdosing, especially on opioid medications, which suppresses your respiratory drive.

**Justin:** Mm-hmm.

**Sydnee:** So your heart might still be pumping, but you're not breathing in oxygen for your blood, so then your blood isn't oxygenated.

**Justin:** So then you give them like NAR-Can.

**Sydnee:** Mm-hmm.

**Justin:** And that knocks the opioids off the receptors, and gets it goin' again.

**Sydnee:** And it—

**Justin:** For some period.

**Sydnee:** Exactly, and in those cases, if I am going to intervene, I am probably gonna do rescue breathing, whether it's mouth to mouth or a bag mask, because typically they do not need chest compressions, because—

**Justin:** The heart is still beating, yeah.

**Sydnee:** They still have a pulse and— But the thing is, and I wanna stress this, this is not, what I'm about to share with you, any sort of CPR training course. I am not teaching you CPR. I'm giving you some examples why we do, how we do.

**Justin:** She refuses.

**Sydnee:** No, I am not training you— I'm not certified to train you in CPR. Just because I know it doesn't mean I can teach it, right?

**Justin:** Mm.

**Sydnee:** Like that is not— that is— I am not certified to teach someone PLS or ACLS, any of these things. So if you would like to learn these skills though, I guarantee you, in your local community, at either the Red Cross, the Health Department, maybe through the Fire Department.

**Justin:** Any.

**Sydnee:** Maybe through EMS.

**Justin:** Any government building.

**Sydnee:** Check your local library for where these classes are available. A lot of times they're free classes, or maybe for a small fee. You can learn how to do basic life saving and CPR all on your own, and I would highly recommend that. This is not what this is. I'm just telling you about these things.

**Justin:** Right, just pod—

**Sydnee:** You have not been trained by me. [chuckles] In old CPR, we would always do what we would call the ABCs, and that stands for "Airway, Breathing, and Circulation." That is no longer the order in which we address things.

**Justin:** Uh oh.

**Sydnee:** Now it's CAB.

**Justin & Sydnee:** [simultaneously] "Circulation, Airway, Breathing."

**Justin:** Okay, at least that stayed the same. That's good.

**Sydnee:** And that is because we've found that a focus on high quality chest compressions, meaning knowing how to do a chest compression and doing it properly, is your best chance of keeping someone alive until you can get them into some definitive care.

**Justin:** We're looking at you—

**Sydnee:** Like an ambulance or a hospital.

**Justin:** We're looking at you, Adam Scott, with your one-handed chest compressions.

**Sydnee:** That is nothing. That was nothing. He was barely moving his hand.

**Justin:** [wheezes]

**Sydnee:** And a lot of times, you will see, if you're watching like a movie or a TV show where people are doing chest compressions, they're not doing them as firmly and deeply as you would need to, but there's [chuckles] a good reason for that.

**Justin:** What?

**Sydnee:** Well, if this is an actual actor they're performing them on and not—

**Justin:** It could break their ribs, right?

**Sydnee:** They could break their ribs.

**Justin:** Okay.

**Sydnee:** And if you were doing them properly, you will injure the person you're doing it to.

**Justin:** Not good.

**Sydnee:** So.

**Justin:** Not good, don't like that.

**Sydnee:** That makes sense. When we talk about like our kind of concept of what sort of things do you do to a human to try to get 'em breathing again, we can go all the way back to the 5<sup>th</sup> century, to a Persian physician called Kermani.

Who— Dr. Kermani, who was the first one to sort of say like, "Here's some ideas about some things you could do." [chuckles] "If someone has stopped breathing, or their heart's stopped beating, or in some way they seem to be dying."

And the description is, "If the patient had weak pulse or pulseless and yellowness," which I think they mean like their complexion has changed because they're not circulating blood, "shake him, stimulate and move the

arms and the left side of patient, and compress the left side of his or her chest.”

So, what’s really interesting about that is you see... a couple different things, like the idea of trying to like stimulate somebody to get ‘em breathing again, but also the first sort of mention of like chest compressions. Of like—

**Justin:** The concept of like—

**Sydnee:** Pushing on the outside—

**Justin:** — “We know this thing beats. Maybe we can get it goin’ on our own.”

**Sydnee:** — to make— yeah.

**Justin:** Yeah.

**Sydnee:** To make the inside thing beat, which is pretty cool. Now this was long before we would have a standardized way of doing that, but you can see that we were already thinking about “Is it possible to just—” I love that too, it’s just so like... It’s just such a clear, practical thought, like, “Well, it’s right under there. Can we just push on it? Can we—”

**Justin:** “Push it? Over and over again?”

**Sydnee:** “— push it?”

**Justin:** [laughs]

**Sydnee:** For a while after that, people tried the bellows method.

**Justin:** What, like getting actual bellows and—?

**Sydnee:** Using like fireplace bellows. So if you’ve ever seen, I don’t know if you— If you haven’t seen a fireplace bellows, which I’m sure you could Google, but it looks like a big kind of like accordion thing, that as you open it up it pulls air in, and then as you push it it pushes air back out.

**Justin:** Like Miracle Max.

**Sydnee:** Exactly like in *The Princess Bride*.

**Justin:** Okay.

**Sydnee:** Yes. Except instead of just pumping air into somebody so you could ask them a question, [chuckles] you would try to get them breathing.

**Justin:** "To blave."

**Sydnee:** [chuckles] I don't have stats on this.

**Justin:** Yeah.

**Sydnee:** I'm gonna guess it wasn't very effective.

**Justin:** Yeah, it doesn't seem like it. Although it works in the movie, I mean, to be fair.

**Sydnee:** Just to make him talk.

**Justin:** Yeah, that's true.

**Sydnee:** They give him a magic pill to make him come back to life.

**Justin:** "Chocolate coating makes it go down easier."

**Sydnee:** [chuckles] Which is not— As far as I know, there is no magic pill that I can just give somebody that's coated in chocolate, to bring 'em back to life.

**Justin:** The—

**Sydnee:** Maybe someday.

**Justin:** I know the doctors are keeping it from us. It's alright.

**Sydnee:** I will say, I think this is a good moment to mention part of why the place bellows thing would not necessarily be effective, and may well

do more harm, is a good illustration of why we don't hand out, if you've seen somebody use an ambu-bag, the little bag mask thing.

**Justin:** Mm-hmm.

**Sydnee:** We don't just like toss those out to everybody to use. You kind of need some training to understand how to use them. Because you can push air into the lungs much more effectively with that than you can just with mouth to mouth, right?

**Justin:** Right.

**Sydnee:** And you can push too much air.

**Justin:** Ew.

**Sydnee:** In. You can— I mean if you're pushing hard enough, you could actually, you know, rupture a lung, you could cause like a lung to collapse. But probably more than likely, the big mistake you could make with those is pumping air into the stomach, and you can make somebody vomit.

**Justin:** Fart.

**Sydnee:** No. Not fart. Vomit.

**Justin:** Vomit.

**Sydnee:** Vomit.

**Justin:** Okay.

**Sydnee:** And that's bad when you are not conscious—

**Justin:** You can see though where—

**Sydnee:** — 'cause you could aspirate.

**Justin:** Okay, but you can see where I would become confused.

**Sydnee:** Yeah, I thought— I can see where you thought I was gonna say that. [chuckles]

**Justin:** No, I didn't in any reality think you were going to say the word "fart," unless you were being legally mandated to by the court of law.

**Sydnee:** [chuckles]

**Justin:** But, I— Yeah, I thought you were gonna—

**Sydnee:** And then they're—

**Justin:** — make a fart come out.

**Sydnee:** And then they're gonna have a heart attack, and...

**Justin:** Go ahead.

**Sydnee:** Fart attack.

**Justin:** [chuckles] Alright. [wheezes]

**Sydnee:** Things change. [chuckles] From—

**Justin:** Indeed, Sydnee, too true. Too true, but what of the podcast?

**Sydnee:** Things changed from the bellows method when a doctor in Scotland, William Toesock, brings back a coal miner who had... had some sort of—

I'm imagining was like had suffocated inside either a collapse in the mine, or maybe just because the air inside can be really noxious, and so had collapsed. Surrounded by 400 people, the doctor performed mouth to mouth resuscitation on this miner for allegedly between 30 and 45 minutes.

**Justin:** Jeez.

**Sydnee:** And did bring him back, and he went back to work a few days later.



**Justin:** Okay.

**Sydnee:** He didn't publish his account, Dr Toesock didn't publish his account of this until 12 years later.

**Justin:** A little suspect.

**Sydnee:** So I don't know. There's some— The idea that you could do 45 minutes of— First of all, 45 minutes of mouth to mouth is a lot of mouth to mouth.

**Justin:** Lot of mouth to mouth, yeah.

**Sydnee:** And the chances of that—

**Justin:** I hope you got him— [chuckles] I hope you at least got some dinner first or somethin'.

**Sydnee:** [chuckles] The chances of that being successful, and the person not only coming back, but coming back completely intact.

**Justin:** Mm-hmm.

**Sydnee:** Are pretty slim. But anyway, the point is it did definitely reinvigorate interests in mouth-to-mouth resuscitation.

**Justin:** Mm, yeah.

**Sydnee:** As—

**Justin:** One would think.

**Sydnee:** Let's do that instead of the whole fireplace bellows thing, and then you don't have to find... bellows, right?

**Justin:** Right.

**Sydnee:** Like 'cause before you would have to go look for 'em. You don't even have to find 'em. So this is cool, so we've kinda come around to we have mouth to mouth resuscitation.

**Justin:** Mm-hmm.

**Sydnee:** And certainly it was the easier thing to address when someone wasn't breathing, than if their heart was not beating effectively.

**Justin:** Right.

**Sydnee:** Because you have to have at least a teeny bit of medical training to know if that's happening. Nowadays we use a monitor to look at a heart rhythm. You could use a stethoscope if you had one, but back then the best thing you had was to feel for a pulse.

**Justin:** Mm-hmm.

**Sydnee:** Which I know that that can sound like a really easy thing. But if you haven't been trained in where all the pulses are and how to feel for 'em, it might be tough to know if someone has a pulse.

**Justin:** Doesn't sound—

**Sydnee:** Or not.

**Justin:** Doesn't sound easy to me, I think that would be very hard.

**Sydnee:** Which is why we don't encourage, even today, we don't encourage laypeople to try to assess for a pulse. We just tell them they should do chest compressions. Because it can be hard to know, and even if you feel a pulse, does that mean that the heart is beating the way we need it to?

**Justin:** I don't know.

**Sydnee:** Not necessarily. So you can see where, as we start to move into the— We're into the 1700s, the efforts to help people who have stopped breathing start breathing again.

**Justin:** Mm-hmm.

**Sydnee:** Sort of outpace getting the heart started.

**Justin:** Mm-hmm.

**Sydnee:** Because it's the thing we can identify more clearly.

**Justin:** Yup.

**Sydnee:** So I wanna talk about kind of our first organized efforts.

**Justin:** Finally.

**Sydnee:** To get people breathing.

**Justin:** Alright.

**Sydnee:** But before we do that.

**Justin:** Yeah.

**Sydnee:** We gotta go to the Billing Department.

**Justin:** Let's go.

[transition theme music plays]

[ad break]

**Justin:** Okay Sydnee, we were just getting organized, just getting ready to really crank on this thing.

**Sydnee:** Yes.

**Justin:** What are we doin'?

**Sydnee:** So, in the 1700s, specifically 1767, we see kind of our first— This is cool, these are kind of like precursors to modern emergency services formed. The Society for the Recovery of Drowned Persons is formed in Amsterdam.

**Justin:** Mm.

**Sydnee:** And the reason I think again that we're focusing on drowning is it's really easy to... I mean, you know it's hap— like they're in water. It's not hard to diagnose. [chuckles]

**Justin:** Yes, that's true, yeah.

**Sydnee:** Like—

**Justin:** You can almost right away, you're gonna know, for sure.

**Sydnee:** They're in water, and then you pull them out of the water.

**Justin:** Yeah.

**Sydnee:** And they're not breathing.

**Justin:** That's easy.

**Sydnee:** That's a slam dunk diagnosis right there.

**Justin:** Right.

**Sydnee:** And that's easier than a lot of the other reasons people's hearts stop. Like you can't— there would be no way, as a layperson, I mean even now you can't look at someone and know they're having a heart attack, right?

**Justin:** But if they've got like seaweed all over 'em.

**Sydnee:** [chuckles quietly]

**Justin:** And like the pop bottle rings.

**Sydnee:** Mm-hmm.

**Justin:** You know, like then you know they were just pulled out of the water, and they have been drowning.

**Sydnee:** Now I am going to guess, and this is not my area of expertise, but I am going to guess that the pop bottle rings did not exist in 1767. [chuckles]

**Justin:** Okay yes, that is true. It would've been, I guess, tea bottle rings?

**Sydnee:** [chuckles]

**Justin:** Or perhaps ale bottle rings. Thank you, Sydnee. Sarsaparilla bottle rings.

**Sydnee:** I— Doesn't this predate plastic at this point? [chuckles]

**Justin:** Interesting. We did use to use hemp.

**Sydnee:** Ohhh.

**Justin:** For— To hold together. Yes, it was much more ecologically—

**Sydnee:** Was that better for the ducks and turtles?

**Justin:** The Pepsi and the Cokes, and even the Coke Zeroes, were tied together with a hemp sort of material—

**Sydnee:** Mmm...

**Justin:** — that was more ecologically sound.

**Sydnee:** I know all you listeners out there are my good pop bottle ring clippers, aren't yah.

**Justin:** Yeah.

**Sydnee:** We all saw those ads. They never left us.

**Justin:** Yeah.

**Sydnee:** Anyway, so the Society for the Recovery of Drowned Persons was the first—

**Justin:** Which sounds like a group that is devoted to... like, "Alright, guys, listen. We gotta get 'em out of here."

**Sydnee:** [chuckles]

**Justin:** “Everyone’s complaining about the look of it, the water is the same water we drink, we gotta get— we gotta recover these drowned persons and get `em out of the water, it’s gross.”

**Sydnee:** We’ve talked about it before, I mean like the Thames did get pretty rowdy for a while there.

**Justin:** Yeah.

**Sydnee:** So you never know. So, they would recommend like, “Here are the things we have found to be the most helpful when it comes to if you’ve pulled somebody out of the water and they’re apparently not breathing—”

**Justin:** Mm-hmm.

**Sydnee:** “— how might you try to bring them back.” Mouth to mouth was a key piece of that, so breathing for them. Getting them warm was a big part of that. They—

The idea of like trying to get the water back out of their lungs, by like putting them head down, like trying to get them in a position where their head was down, and sort of like pushing on their stomachs to try to push the water back out was a big part of it.

And then they would do things, and this was happening all over the place, to stimulate them back to life? Like rectal fumigation.

**Justin:** Sorry, what?

**Sydnee:** They would blow tobacco smoke up their butts.

**Justin:** The— Literally?

**Sydnee:** Yes.

**Justin:** Blowing smoke up their butts.

**Sydnee:** Yeah, literally blowing smoke up their butts.

**Justin:** [chuckles]

**Sydnee:** I don't know— I mean there are a number of ways you could fumigate, it doesn't have to be like shot gunning, but when I first read that, I thought like... [blows] Like blow—

**Justin:** [wheezes]

**Sydnee:** That can't be right. Surely not that.

**Justin:** It simply can't.

**Sydnee:** If nothing else, the pressure alone wouldn't be enough.

**Justin:** I'm sorry, it's just the idea that you would— like it's undignified enough you already died in the river, and then they get you out [wheezes] like one final insult.

**Sydnee:** Fumigate their butts with tobacco smoke.

**Justin:** [wheezes] It's just you on all fours, the whole town comes around to see the— [wheezes]

**Sydnee:** [sighs]

**Justin:** Oh man.

**Sydnee:** The human condition.

**Justin:** Yeah, it is.

**Sydnee:** It's difficult. Bloodletting was recommended for drowning.

**Justin:** Got to.

**Sydnee:** Just like everything else.

**Justin:** Got to.

**Sydnee:** That was not effective. I'm just gonna go ahead and put my foot down on that one and say not effective. Now, it was very— supposedly

very successful. They claimed that they saved 150 people in the first four years. That's a lot.

**Justin:** Not bad.

**Sydnee:** That's a lot of people.

**Justin:** More than me.

**Sydnee:** And it led to other organizations being founded all over Europe, in Hamburg and Venice and Paris, and all kinds of places. People started to get onboard with these kinds of techniques, and then like the best place they would like do presentations in churches.

I think just as a place in the community where people gathered, they could stand up and read some like, "Hey, if you see someone drown, here's some stuff you could do."

**Justin:** [chuckles]

**Sydnee:** Which again, it makes sense. If you're thinking about "Why would they start with drowning? Why the focus on drowning?" again I think it's visible, it can impact anyone.

**Justin:** Mm-hmm.

**Sydnee:** We didn't exactly have a lot of water safety at that point. Like I don't think—

**Justin:** It's also notoriously difficult I would think to study, right?

**Sydnee:** Yes.

**Justin:** 'Cause you can't— You can only do it sort of retroactively, you don't know when this is gonna happen. And it's— it seems pretty random as to where it could strike.

**Sydnee:** It impacts the advancement of our understanding of this area of medicine, even to this day.

**Justin:** Mm.



**Sydnee:** The fact that this isn't— I mean, a lot of times in medicine, we can, you know, we have some people with some kind of chronic illness, and we give one group one pill and one group the other pill, and we see who does better and that kind of thing.

**Justin:** Mm-hmm.

**Sydnee:** Or we like can stimulate some kinda— or simulate some kind of condition in a lab.

**Justin:** Mm-hmm.

**Sydnee:** And then we can test the different responses. You can't really do an ethical study where [chuckles] you stop people's hearts.

**Justin:** Right.

**Sydnee:** Intentionally.

**Justin:** Right.

**Sydnee:** And then see what the best way of bringing them back to life is.

**Justin:** Right. It's—

**Sydnee:** Right? Like please don't do that.

**Justin:** And you—

**Sydnee:** I'm not advocating for that, don't do that. [chuckles]

**Justin:** And in the real world, if you come across this scenario, you have one shot to save your Uncle Dylan, I don't think that's gonna be a time where you're like trying to experiment on some new— wild new approaches that you've heard about.

You're probably just gonna go with what people have traditionally... Sort of like the childbirth thing that we talked about, right? Like no— there's not enough research there because no-one [chuckles] wants to research.

**Sydnee:** Yeah.

**Justin:** On their fetus.

**Sydnee:** It's hard, 'cause if you have— Yeah, I mean that's the truth. What medicines are safe in pregnancy, our list is still pretty short because we don't want to test meds on pregnant people.

**Justin:** Right.

**Sydnee:** We're still very reluctant to do that, and I mean that makes sense. It's rough. Ethically, some of these areas get pretty rough. How do we advance our understanding so we can take better care of people, but we don't wanna do that by putting other people in harm's way—

**Justin:** Right.

**Sydnee:** — to gain that knowledge.

**Justin:** Right.

**Sydnee:** That's a great challenge of medical science, I think.

**Justin:** Yeah.

**Sydnee:** So anyway, along this same time, they're having this success in Amsterdam, you've got a physician in England, William Hoss, who is using some of these same methods, especially tobacco smoke enemas, people really liked that.

**Justin:** [chuckles]

**Sydnee:** And he has a reward out there for like, "If you can bring me— Like if you ha— find— If you see somebody drowning and you can pull 'em out of the water quick enough, and get them to my office." [chuckles]

**Justin:** [wheezes] "I'll give you half a crown!"

**Sydnee:** "I'll pay you money." Which like— And this would lead to in England they started what they called the Society for the Recovery of

Persons Apparently Drowned. [chuckles] They're hedging their bets a little bit there

**Justin:** Yeah.

**Sydnee:** They're not coming down all the way on like Society for the Recovery of Drowned Persons, they're saying that they're apparently drowned.

**Justin:** Well, I think—

**Sydnee:** "We heard."

**Justin:** You're getting into semantics, right? 'Cause you're also sayin' that— Like I would argue that is someone's drowned, I feel like that's kinda it.

**Sydnee:** [chuckles]

**Justin:** "Apparently drowned" is like, "I mean it looks like they're drowned, but let's go ahead and try."

**Sydnee:** Maybe they're just drown-ing.

**Justin:** Yeah. Or exactly.

**Sydnee:** [chuckles]

**Justin:** Could be in progress.

**Sydnee:** That would eventually become the Royal Humane Society.

**Justin:** Oh! Interesting.

**Sydnee:** Which was sort of like the first... EMS.

**Justin:** Mm, really.

**Sydnee:** In England, and would lead to other organizations that were based on that in other places, and they also started to explore the idea of like going to where people were. That was sort of the next step, right?

**Justin:** The beach.

**Sydnee:** [chuckles] In a lot of these cases it's "If you can get the person who's drowned to the office of someone, then they'll do these things," as opposed to "Let's put people— Let's get people out to the site of the drowning, and try to do things to bring them back there."

**Justin:** Right. That's—

**Sydnee:** Like that was a big shot. I know that sounds like a commonsense thing, but it would take a while, right?

**Justin:** Yeah.

**Sydnee:** It also would take medical professionals who were willing to go out into the community and do this stuff, and it also would take laypeople being trained in these methods.

**Justin:** Right.

**Sydnee:** Which is kinda like— It's interesting 'cause that's—

**Justin:** 'Cause they all had to be kind of— Everybody had to be kind of ready.

**Sydnee:** Yes.

**Justin:** 'Cause you never knew who was going to be the first person on the site.

**Sydnee:** On a side note, I think it's worth mentioning that around the same time that we're kind of developing different ways of breathing for people, we're doing a lot of experimentation, as we move into the 1800s, with like electricity and stuff.

**Justin:** Mm-hmm.

**Sydnee:** And it's cool because you see the first mention of using an electric shock to bring someone back. [chuckles]

**Justin:** Oh yeah.

**Sydnee:** With a chicken. And that is with [chuckles] Dr— a Danish physician, Peter Christian Aboltgard, who he studied med— at medical school, and then he was like studying like pharmacy and then chemistry.

And then we was selected to go join... In France, to go join an effort to stop cattle disease, so he was like put in veterinary school. So like he just got to, I don't know. I don't know if he had any agency in any of those.

**Justin:** [giggles]

**Sydnee:** One way or another, he ended up as a veterinarian, and he did these studies on like, "If I shock a chicken's head, it dies. But if I shock its chest—"

**Justin:** [wheezes]

**Sydnee:** "— it sometimes comes back."

**Justin:** [chuckles]

**Sydnee:** And he allegedly did it to the same chicken over and over again, and was like, "Look, I can bring him back every time." [chuckles]

**Justin:** [chuckles] "Believe it or not, I'm doin' it, y'all!"

**Sydnee:** "Just— I keep bringing the chicken back." And the chicken did so well that it laid an egg later, so.

**Justin:** Sorry, haters.

**Sydnee:** Maybe it's self-defense.

**Justin:** [chuckles]

**Sydnee:** "I have a kid now! You can't shock me anymore!" [chuckles]

**Justin:** [laughs]

**Sydnee:** “There’s a life that depends on me!” Anyway, some of the efforts that were being— as they were kind of like drilling down on “Okay, we’re bringing drowned people back, we’re trying to breath for people, what are all the different ways we can do it?” you see like all these different maneuvers.

**Justin:** Mm-hmm.

**Sydnee:** Invented by these different groups. There’s one by Marshall Hall that becomes really popular for a while, where you roll the person onto their stomach.

**Justin:** Mm-hmm.

**Sydnee:** And then back onto their side, and then onto their stomach, and then onto their side. And you keep rolling them back and forth.

**Justin:** [scoffs]

**Sydnee:** To try to mimic the action of breathing in and out.

**Justin:** Yeah.

**Sydnee:** And you do it at a rate of 16 times a minutes.

**Justin:** That’s exhausting!

**Sydnee:** That would be hard. [chuckles]

**Justin:** Yeah.

**Sydnee:** There would be some limitations to that. So then Sylvester comes along and introduces the Sylvester method, and he’s like, “Okay, rolling people onto their stomachs and all this, this is too much.”

**Justin:** Too much work.

**Sydnee:** “What if they’re too big?”

**Justin:** It’s exhausting.

**Sydnee:** “What if they’re heavy and you’re not strong, and—” You know, there— it— there’s a lot of reasons why this might be tough. Also like as you’re rolling them back and forth, you need another person there to kinda support their face.

**Justin:** Yeah. ‘Cause it’ll be smooshing right into the concrete.

**Sydnee:** You’re smooshing it, exactly. So... he had a method where you would raise the patient’s arms up by the sides of their head, and then extend them gently and steadily upwards, and then forwards, and you’re trying to like elevate the ribs, to like pull air in.

**Justin:** So like they’re the bellows.

**Sydnee:** Yes.

**Justin:** You’re like opening and squishing them to try to get the air going.

**Sydnee:** ‘Cause then you would push their arms back down to their sides—

**Justin:** [chuckles]

**Sydnee:** — and make ‘em breath out. Well, that’s what you’re trying to do. They’re not breathing, but this is what you’re trying to do, it’s trying— you’re trying to like... make...

**Justin:** Turn them—

**Sydnee:** Inspiration and expiration happen.

**Justin:** You’re trying to make the person into the ambu.

**Sydnee:** [chuckles] And these would continue all throughout the 1800s, these methods would be debated and different groups would be trying different things.

Because I mean like, at this point, we’re into 1910, we’re back to what we called the Schaffer method, where we flip people back over onto their stomachs, and then just sort of pound in the middle of their back. So we’re almost at chest compressions, we’ve just got ‘em upside down.

**Justin:** [chuckles]

**Sydnee:** But we're getting closer. It would be, after all this— And so like if you remember, way back in the 1700— in the early 1700s, we had mouth to mouth resuscitation happening.

**Justin:** Yeah.

**Sydnee:** We went through all of these different methods to come back around, in the mid-1900s.

**Justin:** Wow.

**Sydnee:** We're talkin' polio years.

**Justin:** Holy crap.

**Sydnee:** To come—

**Justin:** That's so recent.

**Sydnee:** To come back around to mouth-to-mouth resuscitation, taking back over from the Schaffer method, and the Sylvester, and all these other things.

And it was because there was a point where a bunch of machinery had stopped working, and some anesthesiologists had to do something quickly for polio victims who couldn't rely on iron lungs and things like that. And they found that breathing for them was the most effective way to keep 'em breathing.

**Justin:** Hmm.

**Sydnee:** And so then they started pushing to bring back like, "Instead of all this stuff that we do, we should just do mouth to mouth resuscitation."

**Justin:** Mm.

**Sydnee:** And that's where you see— I mean but we're in like the 1950s.



**Justin:** That's wild.

**Sydnee:** Before this is coming back around.

**Justin:** That's wild.

**Sydnee:** I know, but again it's kinda like you said, it's a hard thing to study. Somebody has to be... dying to study it, so it's tough.

**Justin:** Hard thing to change too. It doesn't— It's not as responsive as you would want it. It moves at a slower pace, I think, stuff like that.

**Sydnee:** Absolutely. You finally see like chest compressions starting to come back around. Again, we're in the middle of the 1900s, before like you see it formalized as like bringing all this together.

Chest compressions were really just— we know that like to get the heart beating, we need to push on the heart, but then we're like, "How fast? How many? How— Do we stop to breath for them too, or do we just keep doing the chest compressions?"

**Justin:** Yeah.

**Sydnee:** That debate is happening. "How deep? You know, how— what is the force of the chest compressions?" We're sort of like figuring out all that throughout the 1950, and then finally we get to a point where, in the '60s, we're putting it all together.

**Justin:** Mm.

**Sydnee:** The researchers who were studying chest compressions and the researchers who were studying mouth to mouth resuscitation, they come together in a big conference, and in 1960 they say, "Okay. This is the— This—"

**Justin:** "This is the thing."

**Sydnee:** "We got the combo."

**Justin:** "We got it."

**Sydnee:** “We got the combo.” And like I said, I’m not gonna get into the entire history of defibrillation and shocking people ‘cause that was an entire like parallel history that is happening alongside all this stuff. Us figuring out how to do that safely and not just kill people, but like also bring ‘em back to life.

**Justin:** Yeah.

**Sydnee:** But we finally see, in the 1960s, like what we would come to know as the ABCs. It was a much longer... sort of algorithm for a while. It was like— There was ABCD, and it went down to— I mean there— It went down to like, “I.” There was a whole list. [chuckles]

**Justin:** [chuckles]

**Sydnee:** Of different things that you could do, and so for a while, the next big debate was “Okay. We figured out a way to do CPR, for now.” It was the airway, breathing, circulation back then, which was a mixture of so many chest compressions mixed with rescue breaths.

**Justin:** Right.

**Sydnee:** It may be the thing you’ve only been trained in. If you haven’t been trained in CPR in a while, that might be the thing you still think is right. It’s not. Go to a new class.

**Justin:** [chuckles]

**Sydnee:** But you might be familiar with what I’m talkin’ about. But the next big thing was “Should we teach it to laypeople?” Because initially all of the different like medical organizations, the American Heart Organization and the Red Cross and everybody were very against that.

**Justin:** Yeah.

**Sydnee:** The idea being that they just can’t, they won’t be able to do it right, it’s too complicated, it’s too high risk. You can if you’re doing, like we’ve talked about, if you’re doing chest compressions the right way, you could break ribs. Like this isn’t something that is appropriate, and we just need to focus on calling the appropriate EMS, you know, who— Get a rescue squad there.

**Justin:** Right.

**Sydnee:** Get someone there who could do what needs to be done. We can't just teach this stuff. The liability of teaching it to laypeople is too high.

**Justin:** Okay.

**Sydnee:** And they did some studies even, and like in 1966, where they tried to teach CPR to laypeople, and then like how did they do with it, and how did they— Like if we look six months later, like come in and demonstrate to us what you've learned. And the results weren't great, like people just didn't remember.

**Justin:** Right.

**Sydnee:** Which is tough if you're not... doing it.

**Justin:** It's hard.

**Sydnee:** But eventually enough people made the point that like one, if we simplify it, they cut out all those extra letters, and two the more people we teach it to, like it's the only... It's the only way even knowing this makes sense.

Because if someone collapses suddenly, what are the chances that you are in a hospital, or close enough to one, or that an ambulance is right nearby, right?

**Justin:** Right. You've gotta have somebody there who... It's better than nothing, right? [chuckles]

**Sydnee:** Exactly. So that's when they started making sort of videos and training people, and came up with like the national guidelines for "This is what CPR is, and this is how we teach it to everyone."

And like I said nowadays, this has been since 2015, what we found is that focusing on the chest compressions is the most important thing, breathing typically is gonna be secondary to that. And if you're going to forgo chest compressions for only breathing.

**Justin:** Mm-hmm.

**Sydnee:** It's gonna be a medical professional who makes that call. Somebody, whether it's EMS has arrived and you've gotten a paramedic or an EMT who's there making that call, or you do have someone like me, like a doctor on scene. We might be able to make that, but you as the layperson performing CPR, focus on the chest compressions.

**Justin:** Yeah.

**Sydnee:** Is the most effective thing you can do.

**Justin:** But you'll hear that at the class you're gonna go take, and not from us.

**Sydnee:** Not from us.

**Justin:** We're just telling you for entertainment purposes.

**Sydnee:** And then you can find out about the other things, like there are defibrillators out around the community.

**Justin:** Mm-hmm.

**Sydnee:** You might see them somewhere in public, there's a label.

**Justin:** There's little AED boxes.

**Sydnee:** Exactly, and the nice thing about them is when you open them up, they talk you through what you're supposed to do. They literally tell you "Here's where you put the pads on the chest," and then it will tell you is this a heart rhythm that can be shocked, 'cause not all heart rhythms benefit from being defibrillated, from being shocked.

And then it will do it for you, and tell you to get out of the way. And now, now things are changing even more, because even with all that, all that that we have learned and all the hundreds of years we've studied this stuff, our outcomes from CPR are not... great.

**Justin:** Yeah, you delight in mentioning this to me pretty frequently.

**Sydnee:** I don't delight. I—

**Justin:** [giggles]

**Sydnee:** It's— I think we get a really warped perception from media. TV and *Madame Web*.

**Justin:** *Madame Web* specifically.

**Sydnee:** *Madame Web* specifically—

**Justin:** [chuckles]

**Sydnee:** — makes it look like CPR always works. They kinda— She almost says it. She almost says, "If you just do this."

**Justin:** This is like a power that she gives them, like she— There's a scene where she teach— We can't talk about *Madame Web* on the internet.

**Sydnee:** I know. I can't. But like it's not just *Madame Web*, there are a lot of shows that give the impression that CPR is usually successful. The truth is the opposite. So when it comes to doing CPR outside of a hospital, so out in the world somewhere where someone has collapsed, our success rates are like 5 to 10%.

**Justin:** Sydnee. [chuckles]

**Sydnee:** Like maybe—

**Justin:** That's such a bummer!

**Sydnee:** One study suggested maybe it's as high as 12.

**Justin:** Ayyyy!

**Sydnee:** But that's about it.

**Justin:** Oh.

**Sydnee:** Yeah. In the hospital, it's better, but still not great. It's like 20 to 25%.

**Justin:** Oh man.

**Sydnee:** And that's just people that we're able to get return of spontaneous circulation, meaning their heart is pumping blood on its own.

**Justin:** This is why—

**Sydnee:** Of those people that we resuscitate, only about 10% actually make it out— back out of the hospital at some point, so like... [sighs]

**Justin:** It's why we try to reinforce on *Sawbones*, it is so important to keep your heart from stopping in the first place.

**Sydnee:** [chuckles]

**Justin:** Like really you should try to keep it going, if at all possible.

**Sydnee:** And I know when you hear this, you think like, "Okay, but why in the world would I go do a CPR class if these are—"

**Justin:** That's what I'm wondering over here.

**Sydnee:** "If this is as good as this intervention is?" Well one, the alternative is that— I mean like this—

**Justin:** [wheezes]

**Sydnee:** The risk benefit ratio plays out here.

**Justin:** Yeah.

**Sydnee:** 5 to 10% is better than 0%.

**Justin:** Yeah.

**Sydnee:** Two, obviously it's different depending on the situation, and there are times, like in a lot of the respiratory arrests that I take care of, I

can— I mean we are successful— I have been successful 100% of the time out in the field.

**Justin:** Ey, there she goes, beatin' the odds.

**Sydnee:** Well, I'm not—

**Justin:** Everybody else is messing up your averages, right? [chuckles]

**Sydnee:** Listen, the longer I do this work, I know I won't always be 100%, but my point is there are many cases where you can intervene and save someone's life. Or keep someone alive until EMS gets there.

**Justin:** Sure.

**Sydnee:** You know, help preserve brain tissue, other organs that need blood and oxygen. So like it is a useful thing to do, and we're—

The more we do these things, the better we get at them, the more we learn, which is why even now we have a new effort to try something called "ECMO," you may have heard of ECMO. "Extra Corporeal Membrane Oxygenation." It's like a heart lung machine, that's a simplified way of thinking of it.

**Justin:** 'Kay.

**Sydnee:** We have those in hospitals, we've used them in hospitals for a while. What if we put 'em in trucks that were mobile, and sent 'em out into the community? And if somebody's heart stopped, we could hook 'em up to an ECMO right there.

**Justin:** Yeah.

**Sydnee:** The survival rates are so far looking to be better in the limited places where they're trying this intervention. Obviously it's very expensive.

**Justin:** Yeah.

**Sydnee:** Resource intensive, and—

**Justin:** Gotta have some ed— well-educated operators, I would imagine.

**Sydnee:** Right, this is not something you could teach laypeople. This is something— I mean, I as a physician do not know how to hook someone up to ECMO. I could not do it. I would need to be specially trained, and then you would need a lot of practice to make sure you were...

**Justin:** Right.

**Sydnee:** Proficient at it. So this is not something we could train to laypeople to do. But if we did have these mobile response units, we maybe could save more lives, so maybe that is the next frontier where we actually start to get better and see those statistics look improved.

**Justin:** Yeah.

**Sydnee:** But in the meantime.

**Justin:** Yeah.

**Sydnee:** That's my last push, like check your community. You can probably check your local library, libraries are great, they can tell you everything. Where CPR classes— I'm sure— You know what you could also do? There's this thing called the internet.

**Justin:** Hey, there she goes.

**Sydnee:** And I bet [chuckles] if you looked up "CPR classes near me," it would tell you.

**Justin:** Yeah.

**Sydnee:** I bet you. [chuckles]

**Justin:** That's— I bet you're 100% right, Syd.

**Sydnee:** I forget about the internet sometimes, 'cause I love libraries so much. [chuckles]

**Justin:** Yeah. That is gonna do it for us this week on *Sawbones*. Thanks to the Taxpayers for the use of their song "Medicines" as the intro and



ontro of our program. And thanks to you for listening, we really appreciate it.

[theme music fades in]

**Justin:** That is gonna do it for this week. Until next time, my name's 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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