TPWKY	(This Podcast Will Kill You intro theme)
Erin Welsh	Hi.
Erin Allmann Updyke	Hi.
Erin Welsh	I'm Erin Welsh.
Erin Allmann Updyke	And I'm Erin Allmann Updyke.
Erin Welsh	And this is This Podcast Will Kill You.
Erin Allmann Updyke	Ask us things!
Erin Welsh	Yes. We have a very special edition this week. A couple weeks ago or a couple episodes again anyway-
Erin Allmann Updyke	It's like a while ago now.
Erin Welsh	A while ago we asked you all to send us your questions about anything and everything and wow did you do that. It was incredible. We got hundreds of questions, excellent questions, it was super fun to read through. Yeah, it's gonna be great.
Erin Allmann Updyke	I'm excited.
Erin Welsh	Yeah. Unfortunately we won't be able to answer all however many hundreds of questions we got.
Erin Allmann Updyke	Not today.
Erin Welsh	Yeah, today anyway. But we have selected sort of a variety.
Erin Allmann Updyke	Yes.
Erin Welsh	A little buffet of different options.
Erin Allmann Updyke	Yeah, we tried to mix it up, throwing them at you in a randomish order.
Erin Welsh	Yeah, we're gonna see how this goes. I think I'm a little nervous about it.
Erin Allmann Updyke	Me too, I'm really nervous. (laughs)
Erin Welsh	Okay. (laughs) Well yeah. To calm our nerves, just kidding, terrible idea to do that, we are starting with our quarantini and placeborita this week.
Erin Allmann Updyke	Yes.
Erin Welsh	So Erin, what are you drinking?

Erin Allmann Updyke	I'm drinking passion fruit LaCroix.
Erin Welsh	This is not an ad.
Erin Allmann Updyke	Is that how you're supposed to say it? This is not an ad. Oh I should say generic passion fruit flavored sparkling water.
Erin Welsh	There we go. And I am drinking cloudberry Saison.
Erin Allmann Updyke	Ooh, that sounds really tasty.
Erin Welsh	It's really tasty. We didn't plan a specific quarantini this week because we wanted to just sort of go with the flow.
Erin Allmann Updyke	Yeah. So pull up your favorite bev and drink that while you listen.
Erin Welsh	Is your favorite bev a generic sparkling water passion fruit flavor?
Erin Allmann Updyke	These days it's like the most exciting beverage that I drink, so. (laughs)
Erin Welsh	(laughs) Yeah well, okay.
Erin Allmann Updyke	But it's a good choice I would say if you're on the placeborita train.
Erin Welsh	Yeah, there we go.
Erin Allmann Updyke	There we go.
Erin Welsh	Okay.
Erin Allmann Updyke	Okay.
Erin Welsh	So should we jump in?
Erin Allmann Updyke	I think so, I don't think we ever have any real business to cover, do we?
Erin Welsh	No, we never do.
Erin Allmann Updyke	We never do.
Erin Welsh	I think that's okay.
Erin Allmann Updyke	I think that's great.
Erin Welsh	Yeah.
Erin Allmann Updyke	So let's jump in with our first question.

Erin Welsh	Okay.
Erin Allmann Updyke	Speaking of quarantinis.
Erin Welsh	So our first question comes from Paisley who asked, "How do you come up with quarantinis and what essential liquors or liqueurs would you recommend for a budget mixologist?"
Erin Allmann Updyke	Such a fun question.
Erin Welsh	And we also got a related question which we will answer probably immediately after this, whether either of us were ever bartenders.
Erin Allmann Updyke	Yeah, ooh. So how do we come up with our quarantinis? That's kind of a pretty random process usually.
Erin Welsh	Oh my gosh. Sometimes there's a guiding force. Like with Burning Love which was the one for our gonorrhea episode we knew that we wanted to have something that was like burning or hot or spicy.
Erin Allmann Updyke	Right, something spicy.
Erin Welsh	Yeah. And then we kind of just went from there.
Erin Allmann Updyke	Yeah I think sometimes we come up with the name first and then the name sort of guides us like what types of liquors should there be in a drink of this name. But a lot of times we're just like what liquor do we think matches with gonorrhea?
Erin Welsh	Yeah, or what do I not need to go to the store to get? (laughs)
Erin Allmann Updyke	That's true, that's very real.
Erin Welsh	Out of sheer laziness, what do I have in my pantry?
Erin Allmann Updyke	Yeah.
Erin Welsh	Which has then given birth to a lot of these simple syrups that we've incorporated which is fun.
Erin Allmann Updyke	Yes. Yeah, simple syrups we've learned are a great way to add more flavor and pizzazz to your drinks without having to spend a bunch of money on these fancy liqueurs that you would use like one time.
Erin Welsh	Right and so that kind of goes into that second question is what liquors or liqueurs would we recommend for someone who's wanting to stay on a budget cause talk about an expensive hobby and also unhealthy.
Erin Allmann Updyke	Very expensive and unhealthy hobby.
Erin Welsh	I would say I think that we looked into this once.
Erin Allmann Updyke	Yeah.

Erin Welsh	There was like a bartender bible that I got from the library and it's like definitely bitters is essential.
Erin Allmann Updyke	Bitters for sure.
Erin Welsh	A whiskey of some kind, like a mild whiskey probably would be the best. And I feel like sweet vermouth was on there.
Erin Allmann Updyke	I think a sweet vermouth was on there and I think you have to have tequila on your bar cart, maybe that's a personal opinion.
Erin Welsh	Okay so let's say that I move to Finland and I went to for instance, just a random example, throwing it out there-
Erin Allmann Updyke	For instance.
Erin Welsh	And I had to go and stock an entire liquor cabinet. What would I get?
Erin Allmann Updyke	What did you get? Probably vodka, whiskey.
Erin Welsh	I got some vodka, I got whiskey, I got gin, I didn't get rum but that's just a personal choice.
Erin Allmann Updyke	Yeah.
Erin Welsh	I think eventually I got rum. Sweet vermouth, Campari, bitters.
Erin Allmann Updyke	Yeah and then as long as you have lemon juice or lime juice or citrus juices that you can have on hand, you can make a ton of drinks with just those items. And then some kind of simple syrup, so for that you just need sugar and water.
Erin Welsh	Yeah, yeah. The amount you can do with simple syrup and club soda is amazing.
Erin Allmann Updyke	Yes. Yeah, yeah.
Erin Welsh	Yeah.
Erin Allmann Updyke	Fun question. And neither of us have been bartenders.
Erin Welsh	No. We did discuss... I have dated a bartender.
Erin Allmann Updyke	And my husband was once a bartender. (laughs)
Erin Welsh	(laughs) So I think...yeah.
Erin Allmann Updyke	We've had exposure to the biz. That's fun. Okay the next question, this is very cute, "How did we meet?" asks Hannah and Rachel.
Erin Welsh	How did we meet? Okay so here's what I remember.

Erin Allmann Updyke	Tell me.
Erin Welsh	I was in my office on campus.
Erin Allmann Updyke	Yep.
Erin Welsh	Which I was the only person in that office and I loved it because there was that nuclear fallout sign on the door from the actual 1960s and 70s.
Erin Allmann Updyke	Yeah.
Erin Welsh	And I was there working on a Friday and you knocked on the door and said, 'Hi! Are you Erin?' And then from that point on I was like oh great, this is the other Erin that I'd been promised. And I think it was a couple hours from 5 which was when the grad student happy hour started so I said you should come and we'll hang out. And that was it.
Erin Allmann Updyke	Yeah, the rest is history pretty much. We remember it very similarly.
Erin Welsh	Yeah. We met because we were in the same lab.
Erin Allmann Updyke	Right. Yeah. yeah so we did our PhDs in the same lab but yeah, the very first time we met you didn't just say, 'Oh you should come,' you said, 'Oh there's happy hour, you're coming.'
Erin Welsh	(laughs) That sounds like me, yeah.
Erin Allmann Updyke	You're like here's where it is, here's what time, I'll introduce you to everybody. It was fantastic.
Erin Welsh	It was great, yeah. And then we pretty much had, that first semester even became almost instance best friends. We had at least one dance movie marathon night.
Erin Allmann Updyke	Oh yes. Oh yes. In my old very crappy apartment. That was...yeah.
Erin Welsh	I think that's when I was still living in that house with like 14 other people or 15 other people. It was.
Erin Allmann Updyke	Yes. That's why we did it at my apartment, yeah.
Erin Welsh	That's exactly why, yeah. You're exactly right.
Erin Allmann Updyke	That's exactly right!
Erin Welsh	Okay going off the rails here, this is fun.
Erin Allmann Updyke	Yes we are, this is fun. Okay. I'm feeling less nervous.
Erin Welsh	Good. Yeah, me too.
Erin Allmann Updyke	Good.

Erin Welsh	Oh but then here comes this question.
Erin Allmann Updyke	Oh gosh.
Erin Welsh	So someone who is a PhD candidate in medieval studies asked, "What role do you see the humanities and social sciences playing in fields like epidemiology, medicine, and other areas of scientific research?"
Erin Allmann Updyke	Gosh we went from like I can do this to like heavy.
Erin Welsh	Yeah. Talk about that's like the full rollercoaster of a PhD.
Erin Allmann Updyke	Yeah, that's so true. This is a great question though.
Erin Welsh	Yeah. This is a great question.
Erin Allmann Updyke	Yeah. I feel like the humanities and social sciences are super important in fields like medicine and science and I think they're often overlooked and not taught in schools as much. And so I think that's one of the things I really love about what we get to do in this podcast is try and incorporate a little bit of that and like humanize a lot of the biology and medicine.
Erin Welsh	Yeah, I agree. And I think that lately there has been more of a trend or more of a push towards integrating these seemingly disparate fields in specific social science research with hardcore ecology or epidemiology. I think bridging those gaps and actually having people talk to one another, not only can you allow for more information to be exchanged but you also have different perspectives and that's really valuable. When you ask somebody who is in social sciences or humanities, 'What do you see as the most interesting question or the challenges to do research in this area?' you're going to get a very different answer than you would if you asked someone in medicine or epidemiology. Although the trend is in that direction, I think that the world would benefit greatly from even more connectivity between those fields.
Erin Allmann Updyke	Very well said, I agree entirely.
Erin Welsh	Oh thanks.
Erin Allmann Updyke	Okay here's an easier question.
Erin Welsh	Oh good.
Erin Allmann Updyke	Multiple people wanted to know, Kiriana, Justin, Megan, they all wanna know how do we record in two different locations?
Erin Welsh	Two different locations. Okay. Well I am currently in Finland and it is around 10pm.
Erin Allmann Updyke	Gosh, that's late.

Erin Welsh	It's late but it's still very bright outside, so the joys of summer. Legitimate joy, it's wonderful. And you're in Illinois. And so what we do is, this is just kind of a logistical answer to this question but we both have Skype so we're looking at each other's faces while we're doing this. And we both are recording on microphones on our individual computers and then we will align the tracks in a audio editing software and then we'll go from there.
Erin Allmann Updyke	Yeah, yeah. We found that that's the way that makes it sound the most, like we get the best sound quality when we each record ourselves separately and mix it together.
Erin Welsh	Yeah.
Erin Allmann Updyke	Yeah.
Erin Welsh	It took a little bit of trying but I think it's all right.
Erin Allmann Updyke	Yeah. It's not quite as much fun when I only see your face on a computer screen.
Erin Welsh	Definitely.
Erin Allmann Updyke	But it does the trick.
Erin Welsh	Okay we got several questions along these lines so I don't know, I have a few of the names written down but in general basically break down for the audience what degrees we have and then after that what we currently do for our work.
Erin Allmann Updyke	Do you wanna go first or do you want me to go first?
Erin Welsh	You go first.
Erin Allmann Updyke	Okay. So I did my undergrad degrees, bachelor's in aquatic biology and global studies, so not disease related. And then I did a master's in epidemiology and then my PhD in entomology where I studied Chagas disease and I'm working on my MD. So I don't have a real job, I'm still a student forever.
Erin Welsh	I think that that's a pretty real job, you work all the time.
Erin Allmann Updyke	Yeah, it's true, it's true. So right now I'm in my clinical years of my medical school degree. I've got two years left. Wish me luck everyone.
Erin Welsh	Luck. I'll do it.
Erin Allmann Updyke	What about you?
Erin Welsh	Oh okay. So it's funny, we've always talked about how we're basically the same person.
Erin Allmann Updyke	Yes.

Erin Welsh	So we do have some parallel shared history there in some way. I have a bachelor's of science in biology, I have a master's of science in epidemiology, and my PhD was in ecology, evolution, and conservation biology. And right now I am a postdoctoral researcher in Finland. We're researching questions looking at the role of different wildlife species in disease transmission.
Erin Allmann Updyke	Awesome.
Erin Welsh	Yeah.
Erin Allmann Updyke	Yeah.
Erin Welsh	It's pretty wonderful.
Erin Allmann Updyke	Okay the next question, I like this question this is fun, is from Micah who asked, "How much do you know about what the other Erin is gonna be talking about?"
Erin Welsh	This is a great question.
Erin Allmann Updyke	It's such a good question.
Erin Welsh	It's a great question. We know very, very little.
Erin Allmann Updyke	Very little.
Erin Welsh	And we do this on purpose. We learned I think it was when we recorded the very first episode and I was researching it and I couldn't stop talking to you about it before we recorded and then we were both like wait a second, we need to stop talking about this and capture this.
Erin Allmann Updyke	Yeah.
Erin Welsh	Like we should be recording. First of all that's like twice the amount of work if I have to learn the biology of something on my own.
Erin Allmann Updyke	Yeah I don't wanna learn the history, that's why you do it.
Erin Welsh	So yeah, we do go into it blind. And yes there are some things of course that we might know more about than others but there are so many other things always that we're each going to learn.
Erin Allmann Updyke	Yeah. I think we decided to do that because we wanted for this podcast to be conversational and relaxed and i think that's one of the things that keeps it that way is that we get to learn what you guys are learning at the same time which is really, really fun.
Erin Welsh	Yeah, yeah.
Erin Allmann Updyke	So I'm not lying when I say, 'What?' Some people think I'm faking it. I'm just dumb.
Erin Welsh	No, we're not faking it. I'm a terrible actress so... Really. Okay.
Erin Allmann Updyke	Okay.

Erin Welsh	All right. I am so excited to read this email. This email was so cute that we wanted to read it out specifically.
Erin Allmann Updyke	Yeah.
Erin Welsh	Okay here we go.
	"This email has been dictated by 9 year old Autumn with help from 6 year old Reid."
Erin Allmann Updyke	I'm dead already.
Erin Welsh	Yes, I know! I know.
	"Dear Erins, your podcast is so good I want to listen to it every night. Even if I get scared like with the yellow fever episode. I like that you tell the history and biology of dangerous pathogens. Please do another crossover episode with In Defense of Plants." Yes!
Erin Allmann Updyke	You're welcome.
Erin Welsh	"And maybe an episode about strep throat. That would be a great idea."
Erin Allmann Updyke	Definitely on our list.
Erin Welsh	"I want to know if you go to your local library to find information because my mom is a teacher of librarians and we love the library."
	Yes, I love to go to my local library. The library is my happy place. Like I'm not lying that one of my favorite memories during my PhD in Illinois is when it would snow in the winter on a weekend and I would wake up and the ground everywhere would be covered in fresh snow and I would put on my boots and grab my jacket and walk however long it was to the library and just grab a book and start reading and just sit there for hours.
Erin Allmann Updyke	Yeah we love libraries, they're fantastic.
Erin Welsh	Love libraries. Okay but there's more here.
Erin Allmann Updyke	Oh there's more.
Erin Welsh	"How old are you?" This is from Reid who's the 6 year old. "And also what were you like when you were 9?"
Erin Allmann Updyke	So we can say how old we are, right? That's fine.
Erin Welsh	Sure.
Erin Allmann Updyke	I'm 31 now. Just turned.
Erin Welsh	I'm 32.

Erin Allmann Updyke	Ooh. And what were we like when we were 9? I was very nerdy.
Erin Welsh	Tell me more about that.
Erin Allmann Updyke	Well okay so when I was 9 I think was when we moved from San Diego to Irvine and so I didn't have a lot of friends obviously, like I moved to a brand new school and stuff like that. And one of my mom's favorite stories to tell about me when I was 9 and a budding Hufflepuff is that my mom was asking the teacher like, 'Oh how is Erin doing? Is she settling in okay?' And the teach was like, 'Yeah! You know about a week after she started we had student council elections and Erin decided to run.'
Erin Welsh	Wow, I am not surprised.
Erin Allmann Updyke	I lost, you guys. But I was like yeah sure, that sounds cool, I'll do student council. That's the kind of kid I was when I was 9. Just like no concept of the fact that I had no friends at this new school.
Erin Welsh	What did you do after school? What kind of things did you do?
Erin Allmann Updyke	I don't know. I have such a bad memory, I can't remember. I made a good friend as soon as we moved there, Darren, shout out. So I probably just hung out with her and her sister all the time and did whatever they wanted to do. What were you like when you were 9? Would we have been friends?
Erin Welsh	Yes. Yeah, we would've been friends, of course. Also that's really funny, I didn't know that that's when you moved from San Diego to Irvine.
Erin Allmann Updyke	Yeah.
Erin Welsh	Cause that's around when I moved from Florida to Kentucky.
Erin Allmann Updyke	Oh okay. You're 9 in 4th grade, right? That's about right?
Erin Welsh	Yeah, that was right before 4th grade. I started 4th grade in Kentucky.
Erin Allmann Updyke	We moved in the middle of the 4th grade year.
Erin Welsh	Oh wow. We are even more the same person than we previously realized.
Erin Allmann Updyke	I know. How fun.
Erin Welsh	Let's see though. When I was 9 I was reading all the time, that was actually when I first really I think fell in love with reading books, like reading fiction books. My 4th grade teacher Mrs. Layerson gave me Animorphs and The Hobbit. (laughs) It's already shaping my very, very nerdy personality. And that's when I was like wow, there's a whole world that you can just lose yourself in. It was really wonderful, I spent a lot of time outside, I was always running to the woods, running, playing soccer constantly. I remember that year we built a haunted trail in the woods of Kentucky.
Erin Allmann Updyke	Nice.

Erin Welsh	Moving from Florida to Kentucky wasn't that traumatic for me, I think I was excited because my favorite summer holidays we would go to western North Carolina and the Smokies and I would just spend the whole time playing in creeks and catching fireflies and running around.
Erin Allmann Updyke	Catching hookworm.
Erin Welsh	And hookworm. (laughs) And so to be in Kentucky and get to be outside all the time was amazing. I still remember the magic of like you mean I can just run around here? Still, yeah.
Erin Allmann Updyke	That's so cute baby Erin.
Erin Welsh	So a verdy kid that just ran around outside.
Erin Allmann Updyke	I bet we would've had fun together.
Erin Welsh	Definitely.
Erin Allmann Updyke	Okay this is a fun... Also Autumn, Reid, and their mom Kristie, thank you so much, that was the cutest email.
Erin Welsh	Yeah.
Erin Allmann Updyke	We loved it. The next question from Jen, easy peasy. "Are you a cat or a dog person?"
Erin Welsh	Oh this is a really challenging - just kidding, I'm a dog person.
Erin Allmann Updyke	(laughs) If there was ever any doubt, Erin Welsh is not a cat person.
Erin Welsh	I'm formally declaring for dogs right now.
Erin Allmann Updyke	I love both cats and dogs, I don't wanna declare for one or the other because I love them both. Yeah.
Erin Welsh	Yeah, playing both sides, keeping everyone happy.
Erin Allmann Updyke	Hufflepuff! But I was on an episode of The Purrrcast so I feel like that gives me some cat person cred, you know what I mean?
Erin Welsh	Sure.
Erin Allmann Updyke	I don't know, I feel like it does. I thought I wasn't a cat person enough to be on it but I felt very at home there, so.
Erin Welsh	I think I would like to say I had a horrible experience with a cat growing up, our family cat was pure evil and I'm sure that even people who are cat people can acknowledge that some cats can be pure evil.
Erin Allmann Updyke	Yeah, some dogs too, I mean.

Erin Welsh	Oh absolutely. Absolutely. I could go into all the merits of dogs but I won't.
Erin Allmann Updyke	Save it for another episode.
Erin Welsh	Yeah, yeah. (laughs) Okay. This question from Jenna is, "What is your favorite part of making the podcast?"
Erin Allmann Updyke	Ooh. That's a good question. My absolute favorite part? I feel like I have a lot of favorite parts. Do you have one specific good answer for this?
Erin Welsh	No, I feel like I don't have a good answer for any of these.
Erin Allmann Updyke	I feel like my favorite part that I wasn't expecting - how bout that?
Erin Welsh	Sure.
Erin Allmann Updyke	Is how positive and amazing the feedback has been. I love hearing from people that love this podcast, it's still so overwhelming to me to think that people are voluntarily listening to us talk and enjoying it. And then telling their friends about it, that's the thing that really... I was telling my husband today actually how much that blows my mind like on Twitter to see people recommending us to their friends the way that I recommend podcasts that I listen to to friends. It's really overwhelmingly exciting. That's I think one of my favorite things I didn't ever expect to happen.
Erin Welsh	Yeah. It's very surreal. Like I look at those comments and I think oh that's happening to someone else, that's not me. That's not us. No.
Erin Allmann Updyke	Right. Yeah.
Erin Welsh	But I think one of my favorite parts of making the podcast is recording the podcast. So there are so many things that go into-
Erin Allmann Updyke	Cause you love me so much?
Erin Welsh	(laughs) Exactly. Well there's so many things that go into the prep to make the episode and then to edit it and to add music and then to find the social media images that we put on there and all those things. But I think that it's such a huge payoff to actually sit down and record and tell that story and sort of have that like... Cause we're just nerding out over diseases and that's fun.
Erin Allmann Updyke	True. It's really fun.
Erin Welsh	It's just fun. I can't believe that we get to do this I think.
Erin Allmann Updyke	I know.
Erin Welsh	Yeah. So all of it is amazing.
Erin Allmann Updyke	Agreed. Next question from Shannon is, "What is your go-to drink when you order something?"

Erin Welsh	I have an immediate answer for this question.
Erin Allmann Updyke	Oh, give it to me then.
Erin Welsh	Okay well I have two answers. One I would say is for winter months, that would be an Old Fashioned preferably made with Woodford Reserve, once again not an ad.
Erin Allmann Updyke	Not an ad.
Erin Welsh	Just one of my personal favorites, Rowan's Creek.. There are some great bourbons out there. But yeah, old reliable Woodford. And then I think my other absolute favorite is gin and tonic.
Erin Allmann Updyke	Classics. I don't have a go-to drink I think, I've always wanted to have a go-to drink but I've never really fallen so deeply in love with one thing that I could just order that. I will say that since I haven't been drinking for many months, the thing I miss the most is tequila and rosé.
Erin Welsh	Hanging out with you at your house when we'd be like let's make something, it was often a Manhattan.
Erin Allmann Updyke	I do love Manhattans. I love Manhattans. But I also am just like those are the things I know how to make very easily so sometimes when I go to a bar I get very nervous so I just order like a Manhattan or an Old Fashioned because I know what that is and I know I can order it. Cause I get nervous about looking stupid. (laughs) It's true.
Erin Welsh	(laughs) I don't know what to say to that.
Erin Allmann Updyke	I also love a Boulevardier, I will say.
Erin Welsh	Oh yeah.
Erin Allmann Updyke	That's a fave.
Erin Welsh	Yeah.
Erin Allmann Updyke	Yeah.
Erin Welsh	There's a whole world of drinks out there.
Erin Allmann Updyke	There is. On that note perhaps it's time for a quick break.
Erin Welsh	Yes. Go make yourself a custom quarantini.
Erin Allmann Updyke	Your favorite version.
TPWKY	(transition theme)
Erin Welsh	And we're back.
Erin Allmann Updyke	We're back!

Erin Welsh	Okay so I have a question from Lindsay who asked, "How do you deal with people who accuse you of being in the pocket of Big Pharma or whatever?" And as I was going through these questions I also found another one that was along the same vein which is "How do you navigate a friendship with an anti-vaxx friend?"
Erin Allmann Updyke	Yeah.
Erin Welsh	These are very good questions and difficult ones.
Erin Allmann Updyke	They're really difficult questions. Do you have a good answer?
Erin Welsh	Again you ask me if I have a good answer, of course I don't have a good answer. I could put together an answer. (laughs) DO you have a good answer?
Erin Allmann Updyke	I don't have a good answer except I do think it's important to keep in mind that yelling at people has pretty much never solved anything ever.
Erin Welsh	Yeah.
Erin Allmann Updyke	But it's hard I think to not let your own frustrations win when you have friends or family members maybe who are not willing to listen to reason sometimes. I think it can be really difficult but as much as you can I think trying to maintain communication can be really helpful because maybe someday you would be able to have a conversation with someone like that where you could at least present your side of the information in a way that's not judgmental and then maybe someday they might listen.
Erin Welsh	Yeah.
Erin Allmann Updyke	Hard.
Erin Welsh	I mean I think it's especially hard because you have to make this judgment call of whether the energy that you're putting into this, both emotional energy and just the time and effort into talking to this person and trying to convince them that you're not in the pocket of Big Pharma or that vaccines truly work and are safe. Some people are more vaccine hesitant than they are anti-vaxx for instance.
Erin Allmann Updyke	Yeah.
Erin Welsh	And so identifying those people and maintaining this space where you can talk about it in a way that's comforting or comfortable, that's really important. And maybe sometimes they just want someone to listen to what they have to say and say like, 'Are my concerns valid?'
Erin Allmann Updyke	Yeah.
Erin Welsh	And sometimes yeah, like of course you're concerned for your child, you're concerned about whatever. But sometimes they're looking for validation and if you don't provide that that can be difficult to talk with them. I think that everyone has a duty I feel to at least try once.
Erin Allmann Updyke	Yeah.

Erin Welsh	Then it becomes more of a judgment call of is this actually making any progress? And I think that this is a bigger picture thing that I'm about to say but in this political climate where we tend to make our own bubbles, that isolation there, that complete lack of connect between one group and another group, that is not necessarily progress.
Erin Allmann Updyke	Right.
Erin Welsh	I don't know how progress is going to be made but I feel like maintaining that bubble or that echo chamber isn't the way.
Erin Allmann Updyke	You know a piece of advice that I heard, so this is not my advice but I thought that this was a really good piece of advice when I heard it was that sometimes there might be people in your life who are kind of distant friends or friends of friends or distant relations or something that you know have a stance that's maybe very out there. And you know that if you tried to talk to them they would never listen to you because who are you to them? You are a distant friend or you don't know them very well. But maybe you know someone who knows them better. And so sometimes talking to people that you are closer with who maybe just don't feel comfortable talking about these issues and helping to educate them so that they could be better intermediates between you and the person who's farther away from you but maybe also farther down the spectrum of anti-vaccine. Does that make sense?
Erin Welsh	Yeah. I think it's empowering people with knowledge and information who may not necessarily feel inclined to go out and pass along that message maybe.
Erin Allmann Updyke	Yeah, exactly.
Erin Welsh	Something like that. Yeah.
Erin Allmann Updyke	All right well the next question is a fun one. "Are humans reservoir hosts for any diseases that infect animals?" That's a question from Jen.
Erin Welsh	And yes.
Erin Allmann Updyke	Yes. (laughs)
Erin Welsh	Humans are.
Erin Allmann Updyke	Yeah. I think we talk more often about diseases that spillover from animals into humans, right, zoonotic diseases. But there are a number of different diseases that humans are sort of the more definitive hosts that we can also give to animals. Things like tuberculosis you can spread both ways.
Erin Welsh	Yep.
Erin Allmann Updyke	Even influenza you can give to your dog.
Erin Welsh	Yeah.

Erin Allmann Updyke	We see that going back and forth between a lot of different animals. There's a lot of other ones. This is the only question where I looked up to be able to have an answer for cause I liked the question but I was like oh I can't name a bunch of diseases off the top of my head. Mumps, salmonella - these are fun - Giardia. Oh my gosh, Giardia.
Erin Welsh	Well that makes sense. Parasite.
Erin Allmann Updyke	Right, yeah. It goes both ways.
Erin Welsh	Probably the list is probably a lot shorter for a couple of reasons. One is because humans will interact with all different kinds of animals, like a high number of humans will interact with many different kinds of animals in ways that might make exposure more likely such as slaughtering an animal. You know? But I think that the proportion of animals that will interact with humans of a particular species is a lot lower. And so that's maybe one of the reasons why that other kind of spillover is less common and I think in addition it's probably just a lack of knowledge about wildlife diseases.
Erin Allmann Updyke	Totes. I think that's very accurate. It probably happens a lot more often than we're even aware of.
Erin Welsh	Oh yeah, I'm sure that the diversity of parasites and pathogens in animals is incredibly high that we just don't have any idea.
Erin Allmann Updyke	Yeah.
Erin Welsh	So.
Erin Allmann Updyke	Fun! Don't cough on your dog or share poop.
Erin Welsh	Yeah. Also don't let them lick your face when you're sick.
Erin Allmann Updyke	Yeah, you can get them sick.
Erin Welsh	Yeah. Liz A. asked, "What did you wanna be when you were little?"
Erin Allmann Updyke	Oh gosh. I wanted to be a lot of different things I think. I definitely wanted to be a vet I'm pretty sure at some point.
Erin Welsh	We are the same person.
Erin Allmann Updyke	I wanted to be Bill Nye the Science Guy. That was probably my #1 most long lasting. I wanted to be a teacher. Yeah. Bill Nye the Science Guy is who I wanted to be.
Erin Welsh	I wanted to be a vet and then Jeff Corwin.
Erin Allmann Updyke	(laughs) So we are the same person. Slightly... God that's funny, Erin.
Erin Welsh	(laughs) Yeah. God I love Jeff Corwin. I mean I also loved Steve Irwin but for some reason Jeff Corwin is what I taped on VHS.

Erin Allmann Updyke	I feel like he's the dorkier version so I feel like it was just... I eman I love Jeff Corwin also but it's you know.
Erin Welsh	He did have like the worst jokes sometimes and it was just so corny and I loved it, I genuinely loved it.
Erin Allmann Updyke	Yes! So dorky. It's fantastic.
Erin Welsh	Oh my god.
Erin Allmann Updyke	Okay the next question is from Amy who asked, "How do you find your references?" Google!
Erin Welsh	Well yes and no. Sometimes it's a lot easier than other times.
Erin Allmann Updyke	Yeah.
Erin Welsh	Sometimes there's a book about prions, sometimes there's a book about whatever. I go to Google Scholar and I look for certain keywords. Another resource that I have actually used and I will freely admit to this is Wikipedia, the citations in the Wikipedia article. That has been varyingly helpful depending on what I'm researching. But a lot of it is Google and a lot of it is sort of having a bank of books that are more encyclopedic in nature and then I just kind of do down the rabbit hole reference tracking.
Erin Allmann Updyke	Yeah. Yeah I also start often with Wikipedia, there's no shame in doing that. Wikipedia has a lot of great sources, you just then have to go one step further in finding where they found their information from. I also heavily use the CDC and WHO websites and then Google Scholar, that's where I get most of my info.
Erin Welsh	Yeah.
Erin Allmann Updyke	Google Scholar for those who might not be familiar is where you can find peer-reviewed literature, so primary literature sources about pretty much every topic ever.
Erin Welsh	It doesn't necessarily mean that everything that's on Google Scholar is peer-reviewed.
Erin Allmann Updyke	No, it does not.
Erin Welsh	But for ones where you see a lot of citations, that is more than likely going to be peer-reviewed.
Erin Allmann Updyke	Yeah.
Erin Welsh	Yeah. Okay.
Erin Allmann Updyke	Okay.
Erin Welsh	I have a question about antibiotics.
Erin Allmann Updyke	Okay.
Erin Welsh	So a more specific question, here we go.

Erin Allmann Updyke	All right.
Erin Welsh	So why do we need antibiotics for infections that we've had before?
Erin Allmann Updyke	Okay.
Erin Welsh	Before you answer that question cause I think you'll do a better job answering it than I will, there's a correction and so I want to quickly make this correction. And so the person that wrote this in, I really appreciate them sending this because this was sort of a throwaway comment that I made about positive reinforcement or negative reinforcement. And I used it incorrectly. So here's what they said, so this is in the first vaccine episode:
	"Towards the end we were talking about Australia and the utilization of positive reinforcement for vaccination. You guys got that term right but when you were talking about how if you're not up to date on vaccinations people would show up, that is actually type 1 or positive punishment as opposed to negative reinforcement. So both positive and negative reinforcement, they go on to say, "will increase the likelihood of someone engaging in a particular behavior. Positive just means presenting something to bring about or affect a behavior. Conversely negative means removing something to affect a behavior. So with regards to vaccinations, positively reinforcing someone for getting vaccinated would be something like giving them $100 after they received the vaccination. And an example of negatively reinforcing someone would be if you're being super annoying to them, asking them every minute 'why aren't you getting vaccinated?' And then stopped contingent upon them receiving the vaccination. So you would be removing, i.e. negatively reinforcing the annoying stimulus of bombarding them with questions."
	So thank you very much for sending that correction, I learned a lot and I will try very hard to incorporate that into my language, my vocabulary.
Erin Allmann Updyke	Yeah. Yeah we're definitely not experts on a lot of things so let us know when we get things like that wrong, thank you.
Erin Welsh	Yeah, that was great. Okay so why do we need antibiotics for infections that we've had before?
Erin Allmann Updyke	This is a good question and we've had a couple similar ones too about... This touches on the idea of what a strain is, what a strain of a pathogen is. So for some pathogens they have a lot of variation, they have a lot of variation in the proteins on their surface that our immune system responds to. And so even though we've been exposed to them in the past and we've mounted an immune response, the next time that we're exposed it's a slightly different bacteria or in some cases like with influenza a slightly different virus. So we're not completely immune even though we've been exposed to say Strep. pneumonia before. There are like hundreds and hundreds of different strains, they just look a little bit different on the outside so our body doesn't recognize them precisely which means that we're not able to fight off the infection completely. Is that a good answer?
Erin Welsh	Makes sense to me.
Erin Allmann Updyke	Oh good.
Erin Welsh	Great job, great job.

Erin Allmann Updyke	Okay. Ooh this is fun.
Erin Welsh	Oh good.
Erin Allmann Updyke	Elen wants to know, "Do you prefer lab work or fieldwork?"
Erin Welsh	Fieldwork.
Erin Allmann Updyke	That was easy for you.
Erin Welsh	That was easy. Fieldwork is my life blood, I could do fieldwork just forever and ever and ever.
Erin Allmann Updyke	I prefer neither. I'm a little bit burnt out on research at the moment. Maybe ask me again in a couple of years. I'm enjoying clinical work right now, how about that?
Erin Welsh	During your PhD what did you like more?
Erin Allmann Updyke	Gosh. I don't know. I don't know, Erin. (laughs) I liked parts of the fieldwork. Our fieldwork, it had a lot of challenges to it. I think I would've liked it a lot more if I wasn't alone doing it.
Erin Welsh	You had helpers.
Erin Allmann Updyke	Yeah but you know, all of the coordination and all of the things that go into fieldwork are not my favorite. But lab work can get quite tedious but then also you sometimes get automatic results which is very exciting cause it's satisfying. Like at the end of the day you know that you've done all this. So I don't know, I enjoy them both in small quantities.
Erin Welsh	I enjoy lab work and I prefer lab and fieldwork to grant writing for example.
Erin Allmann Updyke	Big time.
Erin Welsh	Yeah. But yeah lab work does get tedious but I also love it cause you just pop in some earbuds and listen to some podcasts or music or books on tape. But yeah, fieldwork, I could do it forever.
Erin Allmann Updyke	That's where your heart and soul is.
Erin Welsh	It is, it is. (laughs) Okay so we have a question from someone who... So we asked everyone to send their question and also say whether they cared about if their name was said on air.
Erin Allmann Updyke	Yeah.
Erin Welsh	And this person said, "You have my permission and I dare you." Because their name, Greg, their last name is very difficult to pronounce and I don't think I'm gonna touch it.
Erin Allmann Updyke	Oh Greg.
Erin Welsh	Greg.

Erin Allmann Updyke	You got us, we're not gonna touch your last name, Greg.
Erin Welsh	Yeah, yeah. (laughs)
Erin Allmann Updyke	(laughs) But we'll read your question.
Erin Welsh	We will. Greg would love to know how someone can still be symptomatic but no longer contagious. So how are these guidelines established?
Erin Allmann Updyke	That's a fun question.
Erin Welsh	It is a fun question.
Erin Allmann Updyke	I don't know if there's a specific way that the guidelines are established necessarily but it is gonna vary for every disease and it's essentially just dependent on how long you are shedding that virus or bacteria. So for some infections like influenza you are shedding a high amount of virus before you ever begin to show symptoms and then the majority of the symptoms that you see are not necessarily from the virus itself but from your body fighting off that infection. So then towards the end of when you're feeling sick, though you might still be feeling cruddy, you're not shedding the virus and so then you're no longer contagious. Does that make sense?
Erin Welsh	It makes sense to me. I wonder if it's like the number of viral particles that is able to cause an infection in another person or the bacterial load or something like that.
Erin Allmann Updyke	Yeah. And it probably also depends too on whether the symptoms that you're seeing are from the infection itself or from your body fighting off the infection. Right? Cause something like diarrhea, if you're still actively having diarrhea with something like Giardia, then you're still pooping out active parasite so then you're still infectious the whole time that you have diarrhea.
Erin Welsh	Right.
Erin Allmann Updyke	But with something else like flu where you're just maybe having a residual cough, that might just be from all of the immune cells that have sort of built up in your system even though your body has fought off the viral infection such that you're not shedding active virus when you cough towards the end.
Erin Welsh	Right, your body's just recovering from the infection.
Erin Allmann Updyke	Yeah, exactly. Yeah.
Erin Welsh	I wonder how much person to person variation there is in that.
Erin Allmann Updyke	Oh I bet there's tons. Yeah, that's a fun question though Greg.
Erin Welsh	Yes, thanks Greg.
Erin Allmann Updyke	Do you remember in Succession when he says, "Cousin Greg" in the best way ever?
Erin Welsh	When is that show coming back?

Erin Allmann Updyke	I think September.
Erin Welsh	Okay.
Erin Allmann Updyke	Okay.
Erin Welsh	Cousin Greg.
Erin Allmann Updyke	Cousin Greg. Next question is what is the role of climate change in infectious disease? And I'm gonna let you field this.
Erin Welsh	Oh this is a really, really easy one to answer, it's gonna be a very short answer.
Erin Allmann Updyke	Okay.
Erin Welsh	Just kidding. I actually am going to keep it very short. But because the answer is very complex and very varied. So one thing is certain and that is that climate change will impact infectious diseases. I can give you a few different instances or a few different examples of how it might do that. I think primarily when people think of climate change and infectious disease they think of it in terms of vector-borne diseases, so those are ones that are transmitted by arthropod vectors such as ticks or mosquitoes and that's because as climate change happens the environment is going to change and that will change the distribution or the seasonality of these different insect or arthropod life cycles. So for instance something like Lyme disease, as things gets warmer that might make the tick that transmits it more able to live at higher latitudes or even in higher altitudes depending on where you are. And then there's things like just seasonality and impacting the amount of humidity that you have.
	And no matter what disease system you're working on, no matter what geography you're researching in, this is going to be a very complex question and a very complex answer even. The answer is typically it depends, even if you say something like Lyme disease. What is going to happen with Lyme disease and climate change depends on where you are, depends on what animals are around you. That's the beauty of ecology and also sort of the difficulty in trying to predict or alleviate some of the negative effects of climate change on infectious diseases. And then there's the whole landscape change and urbanization and that's a whole other bag of fleas that I won't go into.
Erin Allmann Updyke	Great answer, Erin.
Erin Welsh	Thanks.
Erin Allmann Updyke	Fabulous job.
Erin Welsh	Thank you. Okay a bunch of people asked a question and I'll name a few of them. So we have Claire and Emily and Maggie, another Erin, Andrew, Justin, Sarah, McKenna, Scarlet, Jessie, etc etc, Lily. We have a bunch of people who asked us how did we get into epidemiology and what steps are necessarily to become an epidemiologist?
Erin Allmann Updyke	Ooh. So like how did we get interested in epidemiology and studying it?
Erin Welsh	Sure. Yeah, sure.

Erin Allmann Updyke	I have an easy answer for this one.
Erin Welsh	Oh good.
Erin Allmann Updyke	So I in undergrad wanted to be a shark biologist, that was my goal in life. And it wasn't until I took an ecological parasitology class that I became interested in disease. And it was kind of a life changing moment for me in terms of as soon as I started learning about these parasites and how complex their life cycles were and the impact that they have on people, I was completely hooked and knew that I had to study something about disease and parasites. So that was what sort of sparked it for me and I went to Armand Kuris who taught that class and I said, 'Help me, what do I do with my life? I'm about to graduate and I need to change everything about what I want to do.' And he was like, 'Don't worry about, go get your master's in public health.' So that's what I did. Yeah.
Erin Welsh	Yeah. I wish I could've taken that class.
Erin Allmann Updyke	That was a great class.
Erin Welsh	Yeah. I got interested because i kind of went a roundabout way, I started out majoring my undergrad in nursing and had to take a microbiology class for that in my second year and it was an 8am class which was horrible for me, I am not an early riser. (laughs) As you can tell maybe from our late recording sessions. But I found myself going to it, riding my bike to it every single Monday, Wednesday, Friday and not wanting to miss it because I thought it was so exciting and so thrilling and I thought oh, this might be what I need to do instead. So I switched my major to biology, looked at some independent research projects that I could do, cold emailed someone working in a plague lab and I thought people work on plague? What? This is so exciting. And then I became one of the people working on plague and it was so exciting.
	And to be a complete full nerd, as I was working on primarily surface proteins on the plague bacterium but I was still sort of feeling like okay, I'm working on this amazingly cool bacterium but there's more here, what's the story here? So then I read a bunch of books on the plague and found myself much more fascinated by the overall pattern and impact of the disease than on the individual proteins so then I decided to take a year off and then applied to epidemiology. And then disease ecology kind of happened because when I was doing my master's one of my advisors who was a biologist asked me or kind of looked at me sideways and was like, 'You know that a lot of the things that you're writing about in your thesis are ecology questions, right?' And I was like, 'What? No, I thought it was epidemiology.' And he was like, 'You might wanna look at ecology grad programs.' I was oh okay.
Erin Allmann Updyke	I don't think I've heard that part of the story before. That's really cool.
Erin Welsh	Yeah. I was clueless. (laughs) So yeah. So okay, what steps are necessary to become an epidemiologist?
Erin Allmann Updyke	Well I feel I've never actually worked as an epidemiologist so I don't know how to answer this question fully.
Erin Welsh	Yeah. I think there are many different pathways in which you can do epidemiology or public health.
Erin Allmann Updyke	Yes.

Erin Welsh	Or things related to disease, period.
Erin Allmann Updyke	Yeah.
Erin Welsh	And I think the first step would be to identify the things that interest you the most or the things when you envision yourself doing epidemiology, what is it that feels the most exciting to you? Or what is it that you are envisioning doing? If it's something like fieldwork where you're going out to investigate an outbreak, then maybe you wanna go to a school of public health and get a PhD or an MD in infectious disease. If it's something like statistics then maybe you wanna look at biostatistics programs. If it's something like wildlife disease you could look at veterinary programs or disease ecology programs or a combination of all of these. If it's like policy you could look at policy programs. I think that that's one of the beauties of public health as a field is that there's so many different avenues that you can get there and it's just sort of finding out what you like to do, want to do. So talk to people who do these things.
Erin Allmann Updyke	Yeah. I think it never hurts to email, like if you find... Actually something we had to do in our first semester of grad school here-
Erin Welsh	I remember this.
Erin Allmann Updyke	Yeah. It's a useful exercise. What we had to do was find somebody with a job that we wanted. So find a job that you think you want and look up their CV. And sometimes they might not have it online, so maybe you email them and you ask, 'Could I have a copy of your CV?' And they might just give it to you or they might have it on their website already. And then you can see what did they do to get to the position that they're in. And then that can help guide you in figuring out what you might need to do to get to that position someday.
Erin Welsh	Erin, can I reveal what yours was cause I remember this.
Erin Allmann Updyke	(laughs) Yeah, you can reveal it.
Erin Welsh	So Erin Allmann Updyke over here decided that she would download and print up and bring to class the - was it the Surgeon General?
Erin Allmann Updyke	Yes, the Surgeon General of the United States.
Erin Welsh	The United States Surgeon General CV.
Erin Allmann Updyke	That whose CV I brought in.
Erin Welsh	Our advisor was like, 'Um, so...'
Erin Allmann Updyke	(laughs) He asked if I was serious or if I misunderstood the prompt or if we needed to have a really serious discussion about how high I wanted to aim. What were we thinking? Anyways, hopefully that's helpful advice.
Erin Welsh	Yeah I think in general undergrad career could be something like biology, statistics, math, chemistry. And then I also don't wanna discount things like social sciences.
Erin Allmann Updyke	Yeah, anthropology major.

Erin Welsh	Or humanities. Yeah, anthropology, sociology, psychology.
Erin Allmann Updyke	Yeah.
Erin Welsh	Art even, I mean the need for graphical design in getting infographics particularly to people where literacy or regions where literacy might be quite low, that's huge!
Erin Allmann Updyke	Yeah.
Erin Welsh	I mean there are so many different ways to be involved in public health. If you wanna do epidemiology in the strictest definition of the word then you would wanna choose probably a more quote "hard science" undergrad degree and then sort of go down those steps. But you know, look at job boards and say, 'Is that a job that I would wanna do?' Find people who have that job, talk to them.
Erin Allmann Updyke	Yeah.
Erin Welsh	Stuff like that.
Erin Allmann Updyke	Yeah. I think that's good advice. Okay this is a fun next question that a number of people asked. Alec, Marceline, Lizzy, Jennifer, they all want to know - probably more people too that I forgot to write down - what is our favorite disease or parasite or infection and why?
Erin Welsh	This is so hard because I feel like I have been fascinated by every single one of them.
Erin Allmann Updyke	What if I answered what I think you would say and you answered what you think I would say and then we say whether we're right or wrong?
Erin Welsh	Okay.
Erin Allmann Updyke	Ooh. That's fun.
Erin Welsh	Yeah.
Erin Allmann Updyke	I would think, if i just guessed what yours would be to this-
Erin Welsh	Just real quick, are we talking ones that we have covered on the show so far or anything?
Erin Allmann Updyke	Oh I just was thinking just in general.
Erin Welsh	Okay, okay.
Erin Allmann Updyke	I think one of your top favorites is the plague.
Erin Welsh	Of course.
Erin Allmann Updyke	Yes.

Erin Welsh	Yeah. But why would I find it the most intriguing?
Erin Allmann Updyke	Oh I think that you love how huge it is and how huge of an impact and how you can see the impact that it's had across all of humanity and what a massive, massive disease it has been. And how interesting it is biologically on top of that.
Erin Welsh	Yeah. I think that's a pretty good answer.
Erin Allmann Updyke	(laughs) What's mine?
Erin Welsh	I think yours is schistosomiasis.
Erin Allmann Updyke	Yeah, i think it probably is.
Erin Welsh	I think that you have answered that for this before, for this question before or a similar question.
Erin Allmann Updyke	Yeah.
Erin Welsh	Because there's something that's very intriguing or fascinating about a multi-host parasite.
Erin Allmann Updyke	Yeah. It was also one of my first, it was the hook lecture in the parasitology class that I took so it has a special place in my heart.
Erin Welsh	Right. Just as plague and I.
Erin Allmann Updyke	Yeah. Your first love is, you know, etc.
Erin Welsh	First love, yeah. All those things, yeah.
Erin Allmann Updyke	Oh that was fun.
Erin Welsh	That was fun, yeah. Thanks for all those, everyone who asked that question.
Erin Allmann Updyke	Yeah.
Erin Welsh	Okay so Danielle asked, "You asked Dr. Hotez if he could snap his fingers and instantly have a new vaccine for a disease that doesn't currently have one, what would he choose?" So they would like to know which we would choose.
Erin Allmann Updyke	Oh gosh.
Erin Welsh	This is hard.
Erin Allmann Updyke	This is very hard. I can think of three that come to mind immediately.
Erin Welsh	Okay, what are they?
Erin Allmann Updyke	Malaria.

Erin Welsh	What about the new malaria?
Erin Allmann Updyke	Yeah I just don't know that much about it.
Erin Welsh	Okay.
Erin Allmann Updyke	So if I could snap my fingers and know that it works, that'd be awesome.
Erin Welsh	Okay.
Erin Allmann Updyke	HIV and universal influenza.
Erin Welsh	I think malaria was one of my gut ones too and then also gut parasites, wormy parasites.
Erin Allmann Updyke	Yeah, ooh.
Erin Welsh	If I could do one that hit like roundworm, hookworm, and whipworm.
Erin Allmann Updyke	That's good. Ooh that's a good question.
Erin Welsh	It's a good question.
Erin Allmann Updyke	Should we take another quick break?
Erin Welsh	Let's do it, yeah.
TPWKY	(transition theme)
Erin Allmann Updyke	Welcome back.
Erin Welsh	Hello.
Erin Allmann Updyke	Hello and welcome back to this episode of - anyways, I'm not gonna do that voice forever. Okay next question. This is a fun question that we got from a number of different people, Stephanie, Tyler, Kendall and a few others. What career options are there for epidemiologists?
Erin Welsh	Good question. Many different career options. And you know one of the things that came to mind as we were putting this episode together is that we really need to put together an episode that is just about epidemiology or infectious disease or whatever as a career.
Erin Allmann Updyke	Yeah.
Erin Welsh	We really want to bring in people who actually do have varied careers in epidemiology or disease ecology or medicine and have them talk to you about their experiences, what their path was like, what advice that they have. Because there are so many different things that you can do with a public health degree or with any other kinds of degrees in public health.
Erin Allmann Updyke	Yeah.

Erin Welsh	And so to answer the question of what career options are there for epidemiologists, the short answer is many different things.
Erin Allmann Updyke	Tons. Yeah, we got in general a lot of questions asking for sort of advice on how to find careers or what to do for careers and what kinds of options are available. And we've only done what we've done so far, so we don't have answers to all of those questions.
Erin Welsh	Right.
Erin Allmann Updyke	So we are planning of our next season to put together an episode where we interview people who have all kinds of different careers and had all kinds of different pathways that they took getting to those careers. So hopefully that'll be able to answer a lot more of these types of questions more specifically.
Erin Welsh	Yeah. But I would say to not leave you so completely unsatisfied, as an epidemiologist you could be as I mentioned somewhere out there in the field looking for spillover events looking for outbreaks, investigating whether there are a higher number of brain tumors at this one production factory than there should be as expected due to chance. Or you could be someone who works through long term data that's been collected for years and years and years and says, 'Oh, you know what, there's a risk between working the night shift and having higher rates of a certain types of cancer' or whatever it is.
Erin Allmann Updyke	Yeah.
Erin Welsh	Or there could be someone who is more about initiating science communication programs or saying let's have a tick van as they do here in Finland.
Erin Allmann Updyke	A tick van?
Erin Welsh	Yeah they have like a tick van and it's an informational tick van and they also provide the tick-borne encephalitis vaccine.
Erin Allmann Updyke	Oh that's so cool.
Erin Welsh	Which is really cool. So we saw it once when we were doing fieldwork down south.
Erin Allmann Updyke	Oh that's so fun.
Erin Welsh	It was really cool. But yeah so that would be something that an epidemiologist could be involved in depending on your training and your interest and skills.
Erin Allmann Updyke	There's also a lot of opportunities for things like policy advocates, so depending on what you focus on with a public health type degree, there's a lot of need for people to do policy whether it's policy research or policy advocacy, writing policies, working with lawmakers, all that kind of stuff. So there's a huge range within public health of the kinds of jobs that you could potentially have.
Erin Welsh	Yeah.
Erin Allmann Updyke	Cool.

Erin Welsh	We have gotten in addition to this question which I'm gonna read to you, we've gotten a lot of responses from people in general about saying like, 'Oh I did so poorly in science during high school or during college that I thought that this isn't for me, I can't do this, this is not the right fit. But then at the same time really having still and interest in it.' So one of the questions that we got from several people was how performance in certain courses affected both our decisions for what to study and then also whether it's worth it to try to do something that you're interested in if you don't feel like you are performing well.
Erin Allmann Updyke	That's a difficult question.
Erin Welsh	These are difficult, yeah. Difficult questions.
Erin Allmann Updyke	I mean for me I think one of the reasons I'm still in school is because school is a thing that I am good at, so I just stay in it forever and ever. But I do think that grad school is a lot different than most other schools. So even if you think, 'Oh I didn't do well in these classes in high school or in college,' grad school whether it's a master's or PhD is really nothing like those schools. And so I think just because you maybe didn't do well in a classroom setting doesn't mean that you couldn't do well in a research setting if that's something that you're interested in pursuing.
Erin Welsh	Yeah I mean I do think that that's part of it. There are certain science courses that made me feel I don't belong here and also certain times during my PhD when I thought oh, I don't belong here.
Erin Allmann Updyke	Most of my PhD.
Erin Welsh	And so I do think that anyone can do science if they want to do it, if they're really driven to do it but there are also sometimes science - and I think this is very context-dependent, it depends on how it's taught in a certain school, maybe you're stuck with a really lousy teacher who doesn't quite care enough or lacks the skills to teach it in a certain way that's accessible. But then there's also even if you love it so much, is it worth it to be so miserable during your undergrad for instance? Or is there a way that you can incorporate your interest in science or in diseases or medicine in a career that's not necessarily focused on learning some of the skills that you may not be interested in learning?
Erin Allmann Updyke	Yeah.
Erin Welsh	I'll second your statement that grad school research is a lot different than undergraduate so I think that yeah, it's definitely a rule that if you succeeded in something in undergraduate, you might not succeed as well in grad school in that same field.
Erin Allmann Updyke	And vice versa.
Erin Welsh	And vice versa, yeah.
Erin Allmann Updyke	Yeah. All right. Cool.
Erin Welsh	Cool.

Erin Allmann Updyke	So the next question. We got a couple questions similar to this. This is a fun one. So I'll read this one from Lisa. She asked how do we manage being full-time grad students or in this age now postdoc and student and creating the podcast? How do we...yeah. She asked are we wizards? We're not wizards. (laughs)
Erin Welsh	(laughs) I wish we were wizards.
Erin Allmann Updyke	That would make it easy. If we had a Time-Turner like Hermione, that would make this a lot easier.
Erin Welsh	Yeah, oh my god. You know I think about that like not infrequently?
Erin Allmann Updyke	(laughs) I didn't know that.
Erin Welsh	Also before I answer this question, I wanna say Lisa, I definitely remember meeting you at EEID a couple years ago and it was really nice. She mentioned that I gave her this zine.
Erin Allmann Updyke	Your zine!
Erin Welsh	The zine that my older sister made of my research and it's one of my favorite possessions. It's super cool. Maybe I'll put it up on the website or something.
Erin Allmann Updyke	You should cause it's really cute.
Erin Welsh	I really should. I love it.
Erin Allmann Updyke	But then Carrie, make one for me too. What the heck.
Erin Welsh	I know. Carrie.
Erin Allmann Updyke	Carrie.
Erin Welsh	Okay anyway.
Erin Allmann Updyke	Anyways, are we wizards? How do we manage our time?
Erin Welsh	We are not wizards.
Erin Allmann Updyke	No.
Erin Welsh	Definitely time management, this is gonna sound so cliché, it's an ongoing struggle. You constantly have to work on it, constantly have to learn how to do it. And so at the beginning when we started this podcast it was very poorly managed time-wise. Very poorly. My research suffered, I think I can say that for both of us.
Erin Allmann Updyke	Yes.
Erin Welsh	Yes. And so now we've fallen into a bit more of a routine. It's a lot of work. I would say a lot of weekends, at least one full weekend day is typically dedicated to doing something of the podcast and I would say 4 or 5 weeknights I'm doing something related to it, several hours.

Erin Allmann Updyke	Yeah.
Erin Welsh	It's just practice.
Erin Allmann Updyke	Yeah. I think the biggest things that we've had to learn how to do is balance it all and yeah, like Erin said, we didn't used to be very good at it which is why we had such a long hiatus between Season 1 and Season 2 cause we had to finish our actual PhDs.
Erin Welsh	Actually finish. (laughs)
Erin Allmann Updyke	But we have gotten a bit better at it but it is still something that we continually have to work on and so sometimes things slip by the wayside, whether that's our social media, sorry guys, sometimes it doesn't get all of our attention.
Erin Welsh	Yeah.
Erin Allmann Updyke	Or whatever else it is, sometimes things. There are ebbs and flows but we also just don't really have lives outside of work and the podcast.
Erin Welsh	Yeah. I think that there's a lot of things that at the beginning took a lot of time, like the editing, learning how to just do the editing. Editing used to take a lot longer and so as you get more efficient in all of these different areas things just get a little bit more streamlined.
Erin Allmann Updyke	Yeah. And something that we try, because we were friends before we started this podcast and our goal is to maintain being friends throughout it so that's something that we also work on pretty hard is just maintaining communication between the two of us so that if one of us is super busy, the other one tries to pick up the slack and vice versa and just sort of having communication. So I think we wouldn't be able to do this without a partner.
Erin Welsh	No, yeah, that's for sure.
Erin Allmann Updyke	Yeah. Okay.
Erin Welsh	Okay. So on that note of time management and so on, advice for someone considering a PhD in any field. What kind of advice do we have to offer?
Erin Allmann Updyke	Don't do it. Just kidding.
Erin Welsh	(laughs) Oh boy, come on.
Erin Allmann Updyke	I can't say that. Do we have to answer this question, Erin?
Erin Welsh	Yes.
Erin Allmann Updyke	I would say wherever you're applying, talk to your potential advisor a lot beforehand and talk to other students in their lab because PhDs are very challenging and very long and your advisor can kind of make or break the experience.

Erin Welsh	I would agree with that. And I would also say that I feel like we were so incredibly fortunate to have basically the world's best advisor.
Erin Allmann Updyke	Yeah. Brian! Shout out!
Erin Welsh	Brian.
Erin Allmann Updyke	He'll never hear this.
Erin Welsh	He'll never hear this, that's okay. But there are things that you want to look out for and there are definitely some red flags. Like if there's a grad student who says, 'Don't come here,' that's an obvious red flag.
Erin Allmann Updyke	Yes.
Erin Welsh	Cause the point is this is going to be, for a PhD, depending on your field, this could be anywhere from 4-7 years of your life.
Erin Allmann Updyke	Or more.
Erin Welsh	Yeah. You are essentially married to this person, your PhD advisor and you have to be able to get along and work well together if you don't wanna have a completely miserable existence.
Erin Allmann Updyke	Yeah.
Erin Welsh	Cause grad school is hard enough as it is without having a terrible advisor on top of that. Also look at the atmosphere within the department, that's really huge.
Erin Allmann Updyke	Yes.
Erin Welsh	Do the professors interact with one another, are they friends? Or is it highly competitive both amongst the professors and among the grad students?
Erin Allmann Updyke	Right.
Erin Welsh	Are you guaranteed funding?
Erin Allmann Updyke	Yes, that's major.
Erin Welsh	If you're not guaranteed funding, bye bye.
Erin Allmann Updyke	Peace out.
Erin Welsh	For a PhD, yeah. There are differences between choosing between different programs and then choosing between going to grad school or not going to grad school.
Erin Allmann Updyke	Do I do a PhD or not, yeah. That's a harder question.
Erin Welsh	That's a harder question. If your only reason is, 'I don't know what else to do,' don't go.

Erin Allmann Updyke	Don't do it, no. For me the only thing that kept me going through the hardest parts of my PhD is that I came into it wanting to do a very specific thing and even though at this point I don't know that that's what I want to do with my life anymore, I came in with a goal. And so for me I think that was essential because I was like I'm doing this for a reason. So I think knowing what you want to do with the PhD, even if it's not precise, knowing that you need it to get you to the next stage I think is really, really helpful.
Erin Welsh	Yeah. And I think that again googling jobs, going to any job website and typing something that you think you might be interested in or if you know someone that has a job that you would wanna do, see what kind of qualifications you need.
Erin Allmann Updyke	Yeah.
Erin Welsh	Do you need a PhD?
Erin Allmann Updyke	Cause if not...
Erin Welsh	The field is increasingly competitive and I feel like we're both sounding very negative on this question but it is because it's a massive undertaking and it is the grad school culture or the expectations are not always the kindest to your mental health.
Erin Allmann Updyke	Yeah.
Erin Welsh	And to time management and to personal life, a division between personal life and work life becomes...yeah. It's tough. That being said it is an incredible experience, some of it is really wonderful. Erin is looking at me very doubtfully right now. Very doubtfully. We were again very fortunate with having an incredible community as well with our international secret wine society.
Erin Allmann Updyke	Yes.
Erin Welsh	Shout out to everyone there.
Erin Allmann Updyke	We couldn't have done it alone.
Erin Welsh	(laughs) That's the thing is that you're at least in the trenches with a bunch of other people.
Erin Allmann Updyke	Yeah.
Erin Welsh	I don't know if that's comforting or not but...
Erin Allmann Updyke	It was for me.
Erin Welsh	Yeah. And then in my case you get to do fieldwork and be in beautiful places. Yeah, so.
Erin Allmann Updyke	Well.
Erin Welsh	Anyway.

Erin Allmann Updyke	Let's move onto more happy things.
Erin Welsh	Let's move on. Yeah.
Erin Allmann Updyke	Like this wonderful question from Paul. I like this question.
Erin Welsh	Okay tell me.
Erin Allmann Updyke	So they asked how we got interested in things that will kill us which we kind of have talked about how we got interested in epidemiology but the part of the question that I really like is they ask, we often sound in admiration of how ingenious viruses and bacteria are but we clearly love vaccines. So they're asking are we on the side of vaccines or on the side of the viruses and bacteria? (laughs)
Erin Welsh	Well, Paul.
Erin Allmann Updyke	Whose side are we on?
Erin Welsh	All right Paul, let me give it to ya straight. (laughs) I will personally say I'm on the side of vaccines and medical technology and I'm also on the side of just straight up evolution. I think that when we talk about how ingenious viruses and bacteria and parasites are and how incredible it is, the hookworm life cycle is, what did we call it? We called it like aspirational.
Erin Allmann Updyke	Yes.
Erin Welsh	And I mean it is, the fact that that exists is...I mean unbelievable is not a good enough word for it.
Erin Allmann Updyke	No, it's incredible.
Erin Welsh	It's so beautiful to see that evolution has led to the existence of these parasitic life forms that have these unimaginably complex life cycles and I do, yeah I mean I can hear the admiration coming out. But I am I will say ultimately, yes, on the side of also human ingenuity and technological advancement.
Erin Allmann Updyke	Yeah. I feel like the way Dr. Who feels about it. I feel like he has equal admiration for a lot of life forms and just maybe loves humans just a tiny bit more to where you wanna see them succeed.
Erin Welsh	Yeah, you have to I think have a good healthy dose of respect and fear for these guys, these viruses, bacteria, and pathogens.
Erin Allmann Updyke	Yeah. They're all just trying to make their living the same way that we are, you know.
Erin Welsh	Yeah.
Erin Allmann Updyke	So yeah. I agree on the side of evolution but also medical technology at the same time.
Erin Welsh	Yeah, yeah.
Erin Allmann Updyke	We can love both, Paul.

Erin Welsh	Yeah Paul, come on. (laughs) Don't put us in this corner here.
Erin Allmann Updyke	Yeah. That was fun.
Erin Welsh	Okay Miley asked, "If you could shrink yourself down and get injected into an infected person to see a disease at work, what disease would you want to see in action and why?"
Erin Allmann Updyke	Oh this is a very fun question. Also to come on the heels of the other. I didn't do that on purpose in ordering these.
Erin Welsh	That's good.
Erin Allmann Updyke	Yeah. I think I'd wanna see one of these really complex life cycle diseases of sure.
Erin Welsh	Yeah.
Erin Allmann Updyke	I'd wanna see schistosomiasis or no, I probably would wanna follow something like schisto cause I'd wanna follow it all the way through all of its hosts. Oh my gosh can you even imagine?
Erin Welsh	It would be like Osmosis Jones but biologically accurate.
Erin Allmann Updyke	Yes! Ugh, that would be amazing. Let's Magic School Bus it.
Erin Welsh	Yes! Oh yeah, that sounds great. New TV show idea. I think my first instinct was something similar like hookworm.
Erin Allmann Updyke	Yeah.
Erin Welsh	I mean just because I wanna go through the whole lungs etc etc.
Erin Allmann Updyke	Yeah!
Erin Welsh	But I also would love to cross the blood-brain barrier with rabies or like cordyceps. Be like what is actually happening here?
Erin Allmann Updyke	Oh my gosh.
Erin Welsh	Cordyceps would be maybe what I want, yeah.
Erin Allmann Updyke	Cordyceps I'd like to ask, I'd like to be able to talk to the fungus and be like, 'Listen, what's going on here man?'
Erin Welsh	Oh man, oh man.
Erin Allmann Updyke	Oh that would be so cool. What a fun question.
Erin Welsh	Yeah.

Erin Allmann Updyke	Okay next one. Ready?
Erin Welsh	Okay.
Erin Allmann Updyke	Someone who is a part-time lecturer of writing and literature asked us when we look at writing, both fiction and nonfiction that focuses on epidemics or is about pathogens or uses epidemics as like a plot point, what do we think is the underlying narrative that's often being told? I feel like you can answer this one much better than I can.
Erin Welsh	I love this question. This is gonna sound super dorky. I would love to take a class on this particular topic.
Erin Allmann Updyke	I wonder if they teach it.
Erin Welsh	Maybe, on disease, like disease in fiction.
Erin Allmann Updyke	Yeah.
Erin Welsh	It would be so cool and having this type of question on a quiz or exam or something, oh my god.
Erin Allmann Updyke	(laughs) You sound so nerdy right now.
Erin Welsh	Yeah I'm just really nerdy. But I think that the narrative that I can immediately think of off the top of my head maybe is a fresh start. So what do humans do with a fresh start and what aspects of humanity will prevail? Is it going to be positive aspects? Is it going to be this survival, this teamwork, this 'let's group together' or is it going to be an individual 'how much evil can one person do to bring down this newly created society that...'?
Erin Allmann Updyke	Yeah but it's never the disease itself.
Erin Welsh	No, it's never the disease itself. It's never about... And I think it comes down more to society but also individual choice. So like 'The Girl With All The Gifts' which is sort of a blend between infectious disease and zombies, it is about these individual choices and how our morality or philosophies have to shift as our worldview is completely shattered from the wiping out of humanity or whatever else. I mean I love it. I think it is all just staging up a morality play or a humanity play, what does humanity really do in times of trouble?
Erin Allmann Updyke	Yeah.
Erin Welsh	Okay. Our next is about - this goes right on the heels of this nicely - what is your favorite book about diseases, fiction or nonfiction?
Erin Allmann Updyke	Erin you shouldn't have read this question cause you are gonna have a better answer for it cause you read way more books than me.
Erin Welsh	But honestly I'm going on Goodreads right now to our-
Erin Allmann Updyke	To try and find your answer from Goodreads?

Erin Welsh	Yeah I'm going to Goodreads, The Books Will Kill You.
Erin Allmann Updyke	Well you just said 'The Girl With All The Gifts' and I had forgotten about that. I think the problem is I have a terrible memory. So I forget when I've read a book that I enjoyed but I loved 'The Girl With All The Gifts'.
Erin Welsh	That's a very fun one.
Erin Allmann Updyke	I'm reading a book right now that's not about disease but it's about death and I love it.
Erin Welsh	What's it called?
Erin Allmann Updyke	It's called 'Working Stiff', it's by a forensic pathologist. It's fantastic.
Erin Welsh	That sounds good.
Erin Allmann Updyke	Oh I love it.
Erin Welsh	What about 'Andromeda Strain'? You read that.
Erin Allmann Updyke	I never did. I watched that movie, I never read it.
Erin Welsh	I thought you did. Oh, okay.
Erin Allmann Updyke	Yeah.
Erin Welsh	Okay.
Erin Allmann Updyke	And I never finished the Stephen King one that everyone loves.
Erin Welsh	Oh my god me either, I feel like the worst person about it.
Erin Allmann Updyke	I know, I know.
Erin Welsh	I remember reading it for ages in my hammock in Panama.
Erin Allmann Updyke	Yep.
Erin Welsh	And I just-
Erin Allmann Updyke	Never made it through.
Erin Welsh	Okay so i think I would say one of my favorites is 'Blindness' which is not really about disease but it is about an epidemic of blindness that happens.
Erin Allmann Updyke	Ooh. And this is a fiction?
Erin Welsh	Fiction. Oh it's so beautiful. And there's another, there's a sequel that I haven't read called 'Sight' or 'Seeing' or something by José Saramago.

Erin Allmann Updyke	If you don't know yet about our Goodreads list, Erin puts so many good books on it and then you guys can also add your own favorite books so we can all have our favorite fiction and nonfiction disease books in one place. It's called These Books Will Kill You.
Erin Welsh	Yes. It's great, it's really a really fun resource for me cause I get to look and see what else is here.
Erin Allmann Updyke	Yeah.
Erin Welsh	And I think the nonfiction might be 'The Family That Couldn't Sleep'. That was just a really fun, very well-written book. But I don't know.
Erin Allmann Updyke	Not 'Awakenings'?
Erin Welsh	Awakenings', I mean everything. It's so hard. Like that is much more difficult for me to choose is the nonfiction I think.
Erin Allmann Updyke	Yeah. There's a lot of good ones.
Erin Welsh	Yeah. Okay.
Erin Allmann Updyke	Okay. Next question from Kaz. Ooh, okay. Advice for avoiding academic research burnout.
Erin Welsh	Uh oh.
Erin Allmann Updyke	Also isn't this the person who said they work as a quality control chemist at a brewery? Kaz! We're gonna hit you up.
Erin Welsh	Yeah we are.
Erin Allmann Updyke	No seriously. I wanna go to your brewery, that sounds awesome. Academic research burnout. This is a big topic that I think we talk a lot about. Luckily people are talking about it a lot more these days and not just ignoring it like it isn't a real thing. So that's a first step I think, recognizing that burnout is very real and a lot of people experience it. I think, I don't know, trying to find ways to take time for yourself and doing things that you actually enjoy and not falling into the trap of thinking that you have to be working 100% of the time I think is the biggest thing.
Erin Welsh	Yeah.
Erin Allmann Updyke	Cause people fall into that trap because that's very much the academia mindset and it's not true, it doesn't make you a better academic if you work 24 hours a day. If you want to, fine, that's cool too but if you don't which most humans don't, that's fine and that's normal.

Erin Welsh	Yeah. I think it's very difficult to have strict advice on how not to burnout because I think your advice of making sure that you have personal time is huge but there are ways that the culture can really seep into your life in negative ways so like this constant comparison where there's this imposter syndrome. Like the imposter syndrome then also plays into constantly comparing your own achievements to everyone else around you and like, 'Oh well do I know 'R' well enough? Can I ever know 'R' well enough? Did I have enough papers this year? Did I have enough grant money this year? That person was here at the lab before I arrived and they're still here when I'm leaving, I'm not here long enough.' Like all of these questions are constantly or at least in my case were circulating a lot and never quite feeling good enough or capable enough or worthy or whatever else. And that emotional exhaustion really plays into burnout.
Erin Allmann Updyke	Yeah.
Erin Welsh	I think being aware of some of these things is good at least so you can prepare yourself. I think the other thing is having a support group like a community of friends to talk about it with or talk about other things. So you know what, we just need to have a night where we just watch dance movie montages.
Erin Allmann Updyke	And drink whiskey.
Erin Welsh	As we've mentioned. Drink whiskey.
Erin Allmann Updyke	Just kidding, we don't.
Erin Welsh	Knob Creek, rare. Yeah but choosing a grad school track or a grad school strategy is important. So if you don't wanna be an R1 researcher, you may not have to do the types of things that an R1 researcher is going to do during their PhD.
Erin Allmann Updyke	Right.
Erin Welsh	And so if you don't need to get all of those NSF grants then don't kill yourself doing it, you know.
Erin Allmann Updyke	Yeah.
Erin Welsh	So Kaz also asked if it was to be a 29 year old grad student and how you work up the nerves to not have your voice shake. I think those are fun questions.
Erin Allmann Updyke	Those are fun questions. It's not weird to be a 29 year old grad student, we were.
Erin Welsh	Yeah.
Erin Allmann Updyke	Yeah. It's very not weird.
Erin Welsh	And even if your starting out like no, it's still not weird, there are definitely people I knew that were that age or older when they started.
Erin Allmann Updyke	For sure. That's the great thing about grad school, it's like everyone. How do we not have our voice shake while defending? My voice does shake still when I present.
Erin Welsh	Yeah, mine does.

Erin Allmann Updyke	My key is I never use the laser pointer cause then no one can see your hands shaking.
Erin Welsh	Yes. Smart.
Erin Allmann Updyke	That's a little pro tip.
Erin Welsh	Yeah. I think that also what goes through my head frequently is something that our advisor said to us frequently as a way to encourage us. He would always say, 'No one knows your research better than you do. No one else in the world.'
Erin Allmann Updyke	Yeah, that's true.
Erin Welsh	That was a good reminder because when you're defending your dissertation you are full of - well I was full of self-doubt, I was like I'm probably gonna fail this, whatever. No. And so hearing that little voice in my head say, 'You know this, this is what you have lived the past 5/6 years.'
Erin Allmann Updyke	Yeah. Cool.
Erin Welsh	Okay, okay. Shelley asked, "What exactly is a disease ecologist and how do you interact with different medical professionals and scientists?"
Erin Allmann Updyke	Oh I feel like you are a disease ecologist today so I feel like you should tackle this one.
Erin Welsh	Oh my gosh, I feel like I've been talking so much. (laughs)
Erin Allmann Updyke	(laughs) That's what we do on our podcast.
Erin Welsh	Also you are a disease ecologist, so this is ridiculous. But a disease ecologist is someone who studies disease and the interaction with the environment and it's a relatively new field, it's definitely emerging and that for the most part has centered around infectious diseases. So how climate change impacts the spread of Lyme disease would be one example of doing disease ecology. Basically the environment is part of what you're looking at in your research.
Erin Allmann Updyke	Yeah. And I think in terms of how disease ecologists interact with other scientists and medical professionals, one of the cool things about disease ecology because it's a newish field is that there is a lot of collaboration across discipline. So between epidemiologists and more microbiologists and disease ecologists, there's a lot of room for collaboration to be able to ask really big picture questions which is very exciting.
Erin Welsh	Yeah.
Erin Allmann Updyke	Whether that means collaborating on big research grants where people apply for grants like all together, a whole bunch of people or just sharing information at - what do you call them?
Erin Welsh	Conferences? Symposia?
Erin Allmann Updyke	Symposia. Wow. Okay.
Erin Welsh	You've been out of grad school too long.

Erin Allmann Updyke	Yeah, yeah. One whole year. Anyways Shreya asked - this is fun - what would we name our quarantini bar?
Erin Welsh	Oh, Shreya. I don't know. I'm trying to think of like quippy little things and the only thing I can come up with is The Hot Zone but I feel like that would be-
Erin Allmann Updyke	It's been taken maybe? (laughs)
Erin Welsh	(laughs) Let's see, maybe BSL-4.
Erin Allmann Updyke	BSL-4! That's funny. Can you tell who comes up with most of our quarantini names guys? It's not me.
Erin Welsh	Just Containment or like yeah.
Erin Allmann Updyke	We should work on this. We're not opening a bar anytime soon clearly cause we don't have a name for it.
Erin Welsh	Oh I would love that though, that would be a fun business venture.
Erin Allmann Updyke	It would be fun, yeah. All right.
Erin Welsh	So somebody asked, "Is there a biological component that allows some people to contract a disease and be able to survive and does a particular disease always work the same way biologically in each person who contracts it? And if not, why not?"
Erin Allmann Updyke	This is a good question, this is a hard question because we don't really know enough about human biology and disease to have a good answer for it. There definitely are components of a human's immune system that vary from person to person that are going to affect whether or not you get sick if you are exposed to a disease, if you do get sick how sick are you going to get and how likely is it that you're going to die. So there is a lot of variation among people in terms of how robust your immune response is and how likely it is that you're gonna die from a disease. There's not like a single gene that we know of or anything that controls all of this, it's very sort of multifactorial. And that actually plays into a question that a lot of people asked about why not everyone develops immunity when you give them a vaccine and it's just honestly because there's so much variation in individual immune responses.
Erin Welsh	Yeah.
Erin Allmann Updyke	I feel like that's not a satisfying answer, sorry.
Erin Welsh	Well it's better than I could do.
Erin Allmann Updyke	Okay. Oh this one's a bit easier. Jennifer asked what has been our favorite course that we've taken through all of school? Do you have a favorite?
Erin Welsh	Yeah, I think I do actually and it's going to sound pandering.
Erin Allmann Updyke	Okay.

Erin Welsh	But it's the truth. It's this course that I took in the final year of my undergrad and I had like a space where I needed to just put an elective or something and so I was like okay, well let's go for a 100 or 200 level course, I don't wanna have to try too hard. And I was always interested in history so I was just sort of skimming the course catalog back when there were physical copies of course catalogs and there was a course called The History of Science and Technology Since the Industrial Revolution.
Erin Allmann Updyke	I've heard you mention this course.
Erin Welsh	Yes and this course was the first time where my brain opened up to the way that you could link these events, these historical events and these technological achievements and sort of brought in the context of your perspective of history. It's not just about, I think that the example that I use cause I've thought about this course and talked about this course a lot and the example that I remember for the first time my mind going, 'Oh my god, what?' is the development of clock technology or keeping time technology and how crucial that was for navigational purposes. And how that changed the entire course of humanity. And it was this beautiful course, we went all the way through. We read this amazing book about the atom bomb, I learned so much and I think very fondly. And also this course was taught entirely on overhead projector.
Erin Allmann Updyke	Yes!
Erin Welsh	In 2009 is when I took it.
Erin Allmann Updyke	Wow.
Erin Welsh	And for a course that had the history of science and technology as the title, the person who taught it was completely technologically not very skilled. It was beautiful.
Erin Allmann Updyke	Oh that's hilarious.
Erin Welsh	I wonder if it's still taught, it was at the University of Kentucky. Yeah.
Erin Allmann Updyke	Oh man.
Erin Welsh	I loved it. What about you?
Erin Allmann Updyke	Mine was without a doubt the ecological parasitology class that I took. If you are a student at UCSB, go Gauchos, absolutely you should take it, everyone should take it. It was a complete life changing class. And I remember talking with Armand Kuris who at that time taught the class, he might not still, I'm not sure and jokingly asking him what classes of his I should take cause he taught a whole number. And he got very, very serious and said, '1 in 10 students lives are changed by the parasitology class.'
Erin Welsh	Oh my god.
Erin Allmann Updyke	And I was like okay, that's funny. And it was totally true for me, like I was the 1 in 10. Yeah.
Erin Welsh	(laughs) I wonder how he gathered that statistic.
Erin Allmann Updyke	Oh he 100% made it up after several glasses of wine. I don't know.

Erin Welsh	Yeah, okay.
Erin Allmann Updyke	But yeah, I loved that class.
Erin Welsh	Okay. So Daniella asked, "What are your lab or field confessions? So what are the worst, dumbest, weirdest, whatever things that you did while working in a lab or field?"
Erin Allmann Updyke	Oh my gosh.
Erin Welsh	Where do I even begin?
Erin Allmann Updyke	I know, I feel like I did so many dumb things that I just don't even know what could possibly be the dumbest.
Erin Welsh	I once made...(laughs) So always during my entire career, I have been terrified of making solutions in a lab.
Erin Allmann Updyke	Yes.
Erin Welsh	And having to calculate molarity and having to calculate whatever percentages and all those things scare the pants off me, I don't like it. And this is my way of saying that making 70% ethanol was a challenge one weekend when I was trying to do - you're laughing so hard, Erin. (laughs)
Erin Allmann Updyke	(laughs)
Erin Welsh	I was trying to do my phenol-chloroform extractions, right, and those things, those beasts take two days and so I was there on a weekend doing it just trying to finish up my stupid lab work for my PhD and I was like, 'Why are the pellets disappearing? Like I'm supposed to be just washing the pellets in cold 70% ethanol, they're disappearing.' I made 30% ethanol. So there you have it, everyone. First time admitting this.
Erin Allmann Updyke	(laughs) We all do dumb things.
Erin Welsh	I was like why isn't this working? Luckily it was only 24 samples and they were replaceable but oh, I felt like such an idiot.
Erin Allmann Updyke	That's really funny.
Erin Welsh	I also used to go camera trapping in Panama without cellphone service deep, deep, I'm dumb.
Erin Allmann Updyke	Yeah that's just like unsafe. Yeah, it was dumb.
Erin Welsh	Yeah it was very unsafe. I did some very unsafe... I mean fieldwork is a whole other realm of unsafe choices.
Erin Allmann Updyke	Yeah, yeah.
Erin Welsh	Yeah.

Erin Allmann Updyke	Gosh I can't even think of one good story.
Erin Welsh	You never made any mistakes.
Erin Allmann Updyke	No I made so many mistakes that it's just my entire PhD.
Erin Welsh	I'm trying to think if I was there for any of them.
Erin Allmann Updyke	Yeah, do you remember any of my dumb moments?
Erin Welsh	No.
Erin Allmann Updyke	Yeah I don't know. I tried and failed a lot at building things and making things and wiring things.
Erin Welsh	Well that's just fieldwork.
Erin Allmann Updyke	I know, it's not exciting. I don't have a good story.
Erin Welsh	I got the truck stuck in a field somewhere.
Erin Allmann Updyke	Oh I did almost drive off the side of the road into someone's house one time.
Erin Welsh	Oh, I didn't know that.
Erin Allmann Updyke	Yeah it was a very narrow road. And actually twice. Once I almost hit someone's house and that would have been really bad, the other time it was just almost stuck in a really, really deep ditch that I was like...
Erin Welsh	Oh.
Erin Allmann Updyke	Oh dear.
Erin Welsh	Surprise ditches.
Erin Allmann Updyke	And I didn't know how to turn on the four-wheel drive, like how to actually engage it with those locking things on the wheels.
Erin Welsh	Oh it was the old truck?
Erin Allmann Updyke	Yes, yeah.
Erin Welsh	Yeah.
Erin Allmann Updyke	Anyways.
Erin Welsh	Good times.
Erin Allmann Updyke	Let's move on. So speaking of our lab and fieldwork, tell me about your PhD work, Erin.

Erin Welsh	I researched tick-borne disease in Panama. So my interests were in how the density of infected ticks changed throughout the year and also across Panama, mainly looking at where the Panama Canal is. And so along the Panama Canal there's this steep precipitation gradient, so at the north end of the canal which is on the Caribbean, on the Atlantic Ocean, you get a ton more rainfall than you do on the Pacific end which is on the southern end. And there's like not very much space, it's like 70 km or something like that, like it's very, very short distance. But because of that, these environmental changes across this area, you get a lot of different changes in forest structure and daily humidity values and temperature and things like that.
	And so I wanted to investigate how that impacted the tick species that were living there when they were present during the year and also what pathogens they carried. And so to answer all of these questions I also had to say okay well what are the animal hosts that are there? So my fieldwork involved collecting ticks across the Panama isthmus for every week and then also setting up camera traps to see what animals were around which was super fun, I think my favorite part just hiking around. And then doing tick survival experiments. So do different tick species survive under different environmental conditions? Yeah. What about you Erin, what did you do for your PhD?
Erin Allmann Updyke	I did my PhD on Chagas disease. So Chagas is a disease we'll definitely cover at some point. It's a disease that is caused by a parasite and it's transmitted by these bugs called kissing bugs which are true bugs. No one cares about this, it's entomology. (laughs)
Erin Welsh	(laughs) Your nerd is showing. Just kidding.
Erin Allmann Updyke	I know. So I was working also in Panama and so I was interested in both the ecology and the epidemiology of Chagas disease, specifically looking at how risk factors vary for Chagas disease transmission across an urban to rural gradient. So all of my fieldwork was unlike Erin's which was in deep, deep forest, mine was in people's houses and backyards. So I went door to door doing surveys and having people collect bugs that they found in their houses for me to then look at what was different among these houses across these land use gradients to see what kinds of things might be driving bugs to peoples houses and what kinds of communities might be more at risk or less at risk for coming into contact with these bugs and then also looking at what percentages of these bugs might be infected with the Chagas parasite vs uninfected and things like that. So yeah.
Erin Welsh	Yeah.
Erin Allmann Updyke	Yeah so that was our research.
Erin Welsh	Did you get like a wave of anxiety from talking about it?
Erin Allmann Updyke	Maybe just a small one. Just makes me realize how many papers I need to work on I haven't even touched.
Erin Welsh	Oh my gosh, don't even. Don't even remind me.
Erin Allmann Updyke	Anyways. Shall we move onto our last question?
Erin Welsh	Our last question. Aw, yeah. Okay.

Erin Allmann Updyke	This is a really cute question, we actually got this from a number of different people that I'm gonna read their names but first I'll read this specific email cause it's so adorable. So this email is from Stephanie who wrote, "My 12 year old daughter Georgia would like y'all to know that she loves your podcast and is learning a lot." You guys we love that you listen to this with your kids, that's thrilling.
Erin Welsh	I had no idea and it's amazing. It's amazing.
Erin Allmann Updyke	Ugh, it's my favorite.
Erin Welsh	Yeah.
Erin Allmann Updyke	Okay so she writes, "At the end of most episodes you talk about how worried we should be about the disease that we're talking about." So Georgia would like to know out of the diseases that we've covered, which should we be the most worried about? And we got a very similar question from also Trisha and her 10 year old Poppy.
Erin Welsh	Hi Poppy, hi Trisha!
Erin Allmann Updyke	Hi! Jenny, Julia, another Erin, Karenoid, Jessica, a bunch of people wanna know what disease scares us the most.
Erin Welsh	Georgia, everyone. Great question.
Erin Allmann Updyke	Of the diseases that we've covered, that's an easy one for me.
Erin Welsh	Can I guess yours cause I think it's mine too.
Erin Allmann Updyke	Yes. Yeah.
Erin Welsh	Influenza.
Erin Allmann Updyke	100%.
Erin Welsh	Yes.
Erin Allmann Updyke	Yes.
Erin Welsh	Influenza. So tell me why are you the most scared or why should we be the most scared of influenza without completely doing the entire influenza episode again.

Erin Allmann Updyke	Yes. Influenza is the virus that just can mutate so rapidly, can change and infect so many different animals and then undergo these massive rearrangements that make it really difficult for us to mount a good immune response cause there are so, so many different strains, so many different versions of this virus floating around out there and new ones constantly being evolved. And it is a much gnarlier pathogen than a lot of people give it credit for. It really does cause a large amount of what we call morbidity, so getting sick, and mortality, dying. And then makes you susceptible because it blasts you, makes you really sick so then when you're sick you're more susceptible to other infections. So that is I think why it's so scary. It's both that it does make you very sick and it can kill you and it's really hard for us to develop a vaccine against, it's really hard for us to fight it off with our immune system, and it spreads air-borne so it's everywhere.
Erin Welsh	And it spreads before you show symptoms.
Erin Allmann Updyke	Exactly! It's terrifying.
Erin Welsh	And people don't take it seriously.
Erin Allmann Updyke	They don't.
Erin Welsh	Like I think that that's one of the things that I hear most often with people if I'm striking up a conversation about vaccines and vaccine hesitancy, a lot of people are like, 'Oh well vaccines are great but the flu shot, I mean that's-' No, the flu shot is a vaccine and as we discussed on the vaccine episode, it does reduce the time that you spend in a hospital, it reduces the risk that you would even go into the hospital. And so it's sort of seen as, 'Oh well I got the flu, I'm gonna be out for a couple of days.' When it really-
Erin Allmann Updyke	It's much more than that.
Erin Welsh	I mean it is greatly underestimated and everyone should pick up either 'Flu' by Gina Kolata or 'The Great Influenza' by John Barry to remind yourselves just how bad this pathogen is.
Erin Allmann Updyke	Yeah.
Erin Welsh	And there are things in researching it, things like prions, things like MRSA that are terrifying to me.
Erin Allmann Updyke	Right.
Erin Welsh	But influenza is the one that I think is the most realistic for leading to another pandemic. We are not equipped.
Erin Allmann Updyke	I agree.
Erin Welsh	And maybe we could never be equipped.
Erin Allmann Updyke	Right. Great question.
Erin Welsh	Great question.
Erin Allmann Updyke	So fun.

Erin Welsh	Thank you Georgia and everyone else for that question and also thank you to every single person who wrote in, I think that this is already a very long episode and I think we have to stop here. But we loved reading through them and maybe we'll do a second round of this.
Erin Allmann Updyke	Yeah.
Erin Welsh	That would be super fun.
Erin Allmann Updyke	We got so many good questions and we're sorry that we can't answer every single one but we did enjoy reading every single one, for what that's worth.
Erin Welsh	We did.
Erin Allmann Updyke	So thank you for writing to us.
Erin Welsh	Yeah. Everyone who wrote in had some beautiful, very nice, kind, sweet thing to say and it was a joy and as I said, so surreal.
Erin Allmann Updyke	Yeah.
Erin Welsh	What? You wanna know these things about us? You wanna know what kind of cereal we would be?
Erin Allmann Updyke	Oh we didn't answer that question!
Erin Welsh	We didn't answer that question. I would be Cracklin' Oat Bran.
Erin Allmann Updyke	Of course you would be Cracklin' Oat Bran. (laughs)
Erin Welsh	(laughs) It's so good.
Erin Allmann Updyke	I love cereal too much to pick on specific.
Erin Welsh	You'd be Cinnamon Toast Crunch.
Erin Allmann Updyke	Oh my god, do you know that's the first one I thought of? But I have no reason why! It's not even my favorite cereal.
Erin Welsh	I know but that's what you would be.
Erin Allmann Updyke	(laughs) That's the first cereal that came to mind, Erin. How is it that that's the same one that you came up with?
Erin Welsh	It's brainwaves, it's brainwaves. They're traveling long distances but they're still working.
Erin Allmann Updyke	That is the most... That's not even my favorite cereal. That's my favorite, okay. And episode's over. Thanks everyone.

Erin Welsh	Thank you. (laughs) We really cannot end on a higher note actually.
Erin Allmann Updyke	No, no.
Erin Welsh	Okay well thank you again to everyone who wrote in and also everyone listening now and any other time.
Erin Allmann Updyke	And forever.
Erin Welsh	Forever. Thank you to Bloodmobile for providing the music for this episode and all of our episodes.
Erin Allmann Updyke	And until next time-
Erin Welsh	Wash your hands!
Erin Allmann Updyke	You filthy animals.