

## Healthcare Triage Reproducibility in Science Podcast Episode 5: The Role of the Media

Aaron Carroll:

Welcome back to the Healthcare Triage Podcast. This is the fifth episode of our series on Science, Culture and Reproducibility. And today we're focusing on the role of the media. We spoke to some major players in science journalism and asked them what role does the media have to play in all of this?

Ivan Oransky:

The media has an incredibly important role to play, but it isn't always the one that, well, even the media thinks of itself is doing, or that scientists and researchers think of themselves as doing or public health officials think of themselves as doing. To me, good journalism about anything, about any subject, is about holding institutions and people accountable and especially powerful people.

Nsikan Akpan:

Being a science journalist, it seems a little unfair to blame the reproducibility crisis only on scientists themselves. I think that universities, I think that science journalists, I think science communicators of all stripes can do a better job.

Ed Yong:

Yeah. We are part of the problem too.

Christie Aschwanden:

I think that the way that we have been communicating about science to the public is just really flawed.

Tiffany Doherty:

In this episode we'll touch on how a lot of media hype over scientific studies actually begins with scientific institutions and journals. Then we'll dig into how we might counteract that. How can the media help us get to a place where we produce more reliable science? How can they help us keep the spotlight off of questionable work? And what is their role in helping the public understand all the nuances of scientific studies and how single studies fit into the overall scientific consensus? And what exactly is the role of journalism in holding science accountable? In terms of how media attention may directly influence scientific practice, keep in mind that there is a personal fame factor to media attention that can definitely function as an incentive for scientists. Here's a small aside on that from one of our experts that we'll introduce in this episode.

Nsikan Akpan:

Yeah. I mean, I think in terms of misaligned incentives, it's funny working in both fields and seeing how people react to, say, "Oh, my publication was cited a bunch of times, or I landed this grant." And then seeing how people react to, "Oh, our story went viral."

Nsikan Akpan:

There's a lot of overlap in how those addictive bursts of neurotransmitters in our brains cause people to behave. And I think in both cases it can drive misdeeds.

Aaron Carroll:

Journals are more likely to publish work that will get big media attention. Given the publish or perish culture that we've been covering, this can play into the incentives for scientists to publish splashy work over more careful, reproducible work. Let's kick things off with Ed Yong, a science writer at The Atlantic who we introduced in episode two and Stephanie Lee, a science writer for BuzzFeed, who we introduced in the first episode.

Ed Yong:

Before I started writing about reproducibility, I wrote it about a lot of, frankly, terrible psychology studies that seemed to me at the time to be very interesting and were published in high profile journals, like Nature and Science and had that sort of imprimatur of quality attached to them. And do you know, I think even when I was writing about them, there was never a point when I thought, oh, Nature and Science, therefore it must be true. But there's an insidious way in which that cultural value works its way into our heads. But those instincts can service really badly, because the work that is most counterintuitive is also most likely to be wrong. And journals are more likely to publish that work because they know it's going to get the media attention and we then provide them with the attention that they crave. And so we reinforce that cycle, then shower the attention upon researchers and just increase the incentives for doing similar kinds of work. If you have just done pathetically underpowered studies your entire career, and yet are getting Nature and Science papers and are covered in the New York Times, then of course you're going to carry on doing that. The entire world around you has repeatedly told you that this is a fine thing that will only improve your standing in the world.

Ed Yong:

So yeah, we do have a role to play and I think it's really telling that since what writing on reproducibility, I have almost completely ceased coverage of social psychology studies and have instead mostly focused my attention on the reproducibility issue itself. And that's because just a lot of work doesn't really pass even very simple sniff tests.

Stephanie Lee:

I think that journalism and science share a similar metabolism in some ways and a very different one in other ways. The news business, we're always looking for, what is the next story? What's new? What are people talking about? And we're always trying to scoop our fellow colleagues in writing about that. In science, every day dozens of things come out from under embargo and they're presented to journalists and a lot of them write about them. Study says X, and while it's true that a study came out that day, that doesn't mean that the story is what the study found. And so it's very easy to write these over simplistic headlines when you're doing that kind of story, because it is study says X causes Y or whatever. When really the story is most likely multiple studies suggest X under certain conditions, but there's disagreement over key things. And here's where the commonalities and also the disagreements are.

Stephanie Lee:

That is really closer to the true heart of scientific publishing, what's emerging from an accumulation of evidence and not just one. But it's easy to fixate on the one because as I said, we've got deadlines going all the time, hourly, daily, weekly. I think that stories that do a bit of a longer view, looking at multiple studies, what does the preponderance of evidence show, that doesn't make the story less interesting. It just makes it different and it makes it harder because it takes more time and resources and nuance to read more and talk to more people. And that is not something that every news outlet is able to do. And

so I'm very fortunate that in my job, our general rule is to not cover single studies unless something's particularly noteworthy or controversial and demands explanation.

Aaron Carroll:

I get it. But when I think about TV, they're never going to do that. They're all single news stories because they're three to five minutes, and to have a Good Morning America segment on, new studies says X, but we look through the literature and it really doesn't change anything. They're not ever going to do that story, to waste a segment on nothing to see here, move along, is never going to happen. They're primed to, this has to be exciting and new and you got to change your life.

Tiffany Doherty:

If there's a bridge between the ivory tower of academia and the public that pays for the research done there, it is not a very accessible bridge. What goes on in that tower is not well understood outside of it, leaving an extremely inaccurate public view of what science actually is. Because scientific research is generally disseminated via publications in scientific journals that the public usually has to pay to read, and because that research is often written in indecipherable jargon that only serves to frustrate most non-scientists, and if we're being honest, plenty of scientists too, the lion's share of science dissemination to the public falls on the media. This is a heavy responsibility given the amount of nuance that must be communicated. And given what we've heard so far, it sounds like we have some things to fix in order to better live up to that responsibility. So let's talk more about it. Let's get back to our conversation with Ed Yong.

Aaron Carroll:

So another pet peeve of mine and how research sometimes gets reported is that there's so many media journalists that cover single study art, they're just covering the flash in the pan, which is, I think, tied into reproducibility. Because there is no sense of how does this change our pre-study probability? What did we think about the world before? How does this change it? It is almost like every new study exists in a vacuum and that news is just what is new versus what we have known before. So as someone in journalism, is that just a lack of training? Is that just because it's too hard? Is that because too many people are writing about science without understanding science? Is it all of those things? Is it something I'm not thinking about?

Ed Yong:

I think a lot of it is structural. People have deadlines and writing about a new study that comes out is by far the easiest way of covering science. And in some fields I think covering single studies is totally legitimate. Say paleoanthropology, there are not a hundred new major fossils being discovered every year. So every new one is actually important in what it adds to the bigger picture and is therefore cause for analysis. By contrast, nutrition famously is a field, which is I think very rightly lambasted for creating both scholarship and coverage that feels repeatedly contradictory. That old adage of one minute scientists are telling us that this thing causes cancer. And then the next minute they're saying it cures cancer. I used to work at a cancer charity as a spokesperson, so I'm familiar with this problem.

Ed Yong:

And the pandemic is a little bit towards that latter extreme. There's just so much out there, which is why I and my colleagues at The Atlantic have tried very hard to do bigger, broader pieces that aren't just

single study write outs, but actually look at large scopes of thought and research. But we have the capacity to do that. We have the training to do that, and we have the support that allows us to do that.

Aaron Carroll:

We also approached this topic with Dr. Oransky, and he pointed out the part of the problem is that many journalists labor under the same kind of incentives we've been pointing fingers at here in the world of science and the internet has intensified them.

Ivan Oransky:

I think that for a lot of reasons, and some of them sort of predate the internet, the internet has certainly made things worse if you will, or accelerated these changes. But the way that journalism has happened on the internet in many, many cases has fallen prey to the same kinds of problematic metrics, even if they're different metrics, so they share a lot of characteristics that science has. We have to get traffic to our websites. We have to serve advertising against more and more traffic. We have to have big splashy stories like a big splashy paper in Science or Nature or New England Journal of Medicine in order to get all those eyeballs, in order to sell more advertising or allow our salespeople to sell more advertising. So we're under a lot of the same kinds of pressures.

Ivan Oransky:

And the other thing that is a, I think, mostly unique to journalism about science and medicine is that a lot of reporters have allowed themselves to basically be beholden to journals because of things called embargoes and some related issues, and journalists are beholden to scientific journals who tell them what's news and when it's news. And that isn't how science works. Science doesn't work, it doesn't happen when a journal is published or a paper is published. It actually probably happened six months or a year before that and the finding may have been presented at a meeting even before that. So we're telling a false narrative and I know that's a strong way to put it, but I believe that. We're not actually talking about how science works or how risk works or how uncertainty works, which is probably the key thing that we really should be talking about when we write about science and medicine.

Ivan Oransky:

And again, a lot of it is because of these incentives that we're under as journalists. So I think journalists have a huge role to play. And I think that some journalists are doing a hell of a job, but I think most scientists wake up wanting to do great work and wanting to do honest work and rigorous work, same thing is true for journalists, but then they go to work or they try and file a story or sell a story to someone and they have to jump through so many hoops and certain kinds of hoops. It's going to skew how things end up being published or on video. And I think we have to be honest about that, too.

Tiffany Doherty:

Let's continue this discussion on the role of incentives in science journalism with another one of our media experts, Dr. Nsikan Akpan.

Nsikan Akpan:

My name is Nsikan Akpan. I am a science editor for National Geographic.

Nsikan Akpan:

So my road to science editing went through science itself. I have a PhD in pathobiology from Columbia University where I was studying drug treatments for stroke and Alzheimer's disease. But during my PhD, about maybe three years in, I decided that I didn't want to stay in academia for the rest of my life. And I had always been interested in science writing and science communication. I think that the biggest differences between how scientists and science journalists view academic research, I think a lot of those differences center around incentives. For science journalists, we're trying to objectively portray what's going on in the world, but we also have, I guess, incentives that are driven by subscribers that are driven by page views that are driven by getting people to read our content.

Nsikan Akpan:

I think the best science journalists, the ones that I like the most, are the ones who can do both while also staying true to the accuracy and the precision of the research itself. But I think you do have some media outlets that are more driven by covering a single study with the biggest, craziest headline that they can throw on there. And I think that can sometimes be detrimental to the public perception of science overall, because I think it's just confusing. I think people just don't get the right takeaways about how the science was conducted, how a single study really, if ever, can be the end all for any topic. Misaligned incentives can drive researchers to potentially cut corners because there is a lot of pressure to win funding. And there's only so much money. I think the same thing happens in journalism. There are only so many viewers, there are only so many advertisers, and I think if you have a journalism system that's based on acquiring as many unique visitors as possible, you're going to have some outlets that cut corners.

Nsikan Akpan:

It's less an issue with the major news outlets. I think by and large major news outlets do a really good job of fact-based reporting and making sure that their stories are accurate. But I think even some of those places, sometimes you can see headlines that oversell because you want people to read the story because it's important for your bottom line.

Nsikan Akpan:

But I would say the bigger issue is that you have a lot of quote unquote media outlets that I wouldn't describe as news. I think that they're opinionated. I think they're slanting the perceptions of science because there's that same incentive-based system that's driving, that wants them to write really hyperbolic headlines, that wants them to not explain things in full context because they're trying to make money. And I think it's a bigger issue with those outlets, ones that willingly use this internet infrastructure to make money off of misinformation.

Tiffany Doherty:

Let's circle back to an idea introduced in the beginning of the episode, which is the role of journalists in holding science and scientists accountable. We asked Stephanie Lee what her view was on this.

Stephanie Lee:

Yes, I absolutely think journalists should hold science accountable. I think a lot of people think of science journalism as the main goal is to explain complicated science and distill it for the layman, which is absolutely a function of science journalism. That's step one. But I would say it's not the only function. The way our job differs from that of a public information officer is that we're not just explaining the

science, but we're interrogating how it's produced, who funds it, what are the problems in it? Just beyond simple scientific disagreements over the findings. There's so many factors that contribute to the production of science and that's where I see the job of a science journalist is to try to understand that process and make it clear to the public.

Tiffany Doherty:

We had a similar conversation with Dr. Akpan on both of these topics, holding science accountable and on presenting not only scientific results, but interrogating what goes on behind that science and how it fits into the bigger picture.

Nsikan Akpan:

I think everyone could be doing a better job of holding everyone accountable. I think the media could be doing a greater job of saying, okay, here's something that a scientist said. Here is a study. Here is a huge claim that they're making. Okay, I am a journalist. I know that claim cannot be true. I know that that claim is not precise. And then I think it is really incumbent on journalists to say, okay, here's what the general public needs to know about this claim to make sure that they're not perpetuating misinformation or misconceptions. I think science communicators of all stripes can do a better job of presenting the limitations of any study in showing that, okay, either this study is trying to fit into a hole that makes up an idea in general. And so don't just use this one study to decide what you want to do with everything in your life.

Nsikan Akpan:

I think we can all do a better job as communicators to talk about what reproducibility is and how it factors into developing and understanding, leaning towards or moving towards a comprehension of how things work rather than saying this one study, this one thing tells us everything that we need to know about the topic at hand. I think if you really want to handle the reproducibility crisis, you need to be exposing what the limitations of any quote, unquote, big study, what those limitations are. Because I think by doing that, you naturally teach people that a single result can't make up everything.

Aaron Carroll:

So why do you think we have trouble doing that? Why do you think we jump to the conclusions and do all those other things?

Nsikan Akpan:

Yeah, this is going to sound weird coming from a journalist. And it's a thing that makes me really sad, but I think lies spread faster than the truth. I think it's easier to believe a lie. It's easier to believe a misconception than it is to believe something that is true and gives you an objective view the world. At my darkest moments, I think about that. I do quite a bit, because it is pretty upsetting, but I think that's what you see. I think you see a lot of people capitalizing on the fact that misinformation, mistruths, lies, that they spread faster. They resonate more with people just because a lot of them tap into our preconceived notions. And we just know from psychology and from behavioral and neuroscience, that people can be very loyal to their preconceived notions. I think good science reporting, I think science communication from researchers, that the best, the examples that are the most honest, it really fights against that idea of allowing misperceptions to spread faster or farther than the truth. But it's tough. I think it's really, really hard. I think writers, I think journalists really have to be working towards giving as

much context as possible so that way people can break away from those preconceived notions and really understand how the world works. And I think that falls on scientists as well.

Tiffany Doherty:

For more, let's move back now to our conversation with science journalist Christie Aschwanden who we introduced in episode two. She adds a very important dimension to this whole conversation. We don't prioritize communicating to the public what science really is, a process to reduce uncertainty, not a magic wand revealing all the truths in one swipe.

Aaron Carroll:

So how well do you think the media does in general in terms of science journalism?

Christie Aschwanden:

My answer to that depends a little bit, are you talking about TV media? Are you talking about local newspapers? Are talking about major national publications? I think that there are a lot of really great science journalists out there working right now that do a really great job. I think there's just, we're living in this time where people can pick and choose their news sources. And so there's a lot of really bad sources of science news out there. There's a lot of things, I guess certain people would call them mainstream media, that really do a great job I think. I'm thinking of places like the major newspapers, big magazines, things like that, but there's still a lot of really bad science journalism out there. Just journalism in general that's polluting the information environment with misinformation and it's a big problem.

Aaron Carroll:

You know what, let's focus on the bad parts first, I guess. So when you talk about that they're polluting and are not doing well. How does that happen? Or how do you think it manifests? And then I want to talk about why you think it manifests.

Christie Aschwanden:

Yeah, there's a couple things. I mean, one is just that in some circumstances you have reporters who aren't trained in science, who don't understand how science works, just reporting on things. And I think this happens a lot when people are reporting on single studies as news. So it's like, "Oh, new study out today shows this or that." And so it's really lacking the context and I think that we need to change the way that we're presenting it. And what I mean by that is I think that too often, the public is presented with science. There's this idea that science is a magic wand that turns everything it touches to truth. That's not how science works. That's not what science is. Science is the very best tool that we have for understanding the world around us. It's the best means that we have for seeking truths, but it is not something that creates absolute certainty. And in fact, uncertainty is sort of a key feature of science and the scientific process. Science is actually a process. It's not an answer. It's a process of uncertainty reduction.

Aaron Carroll:

In a way, this mirrors our conversation with Dr. Goodman in episode two, about how scientists too often use statistics to show the truth rather than as a tool for getting the uncertainty right. If the scientists are approaching it in this manner, it's not a big surprise that this then snowballs through to press releases

and eventually the media consumed by the public. Dr. Oransky had views similar to Christie Aschwanden's in terms of journalism.

Ivan Oransky:

We're not actually talking about how science works or how risk works or how uncertainty works, which is probably the key thing that we really should be talking about when we write about science and medicine.

Aaron Carroll:

Back to Christie Aschwanden to talk about the consequences of this.

Christie Aschwanden:

And when people don't understand that, there's a couple of things that happen. One is that you have this sense that science is really herky-jerky and scientists can't decide what's going on and therefore it's all terrible, and life is awful and we can't trust scientists because first they told us not to wear masks. Now they're telling us to wear masks. So obviously they don't know anything.

Christie Aschwanden:

But if you understand that is a process and that it's this process of uncertainty reduction where you're going through and figuring out the things you know and you don't know, you understand that actually updating your beliefs about something is actually a key feature. That's a sign that science is working. If we have fixed beliefs that are not open to new evidence, then that's not really science, but the public doesn't tend to understand that. And too often I think science is presented as, okay, we have this study. And so now we know everything and this is the truth, when in fact, every new study, every new piece of evidence has to put in the context of what came before and we need to...

Christie Aschwanden:

I think one important issue is that each study can answer one very specific question, which is what happened under these very specific circumstances? But what we really want is more generalizable knowledge. Too often we tend to generalize beyond what the data are really showing. And I think that's where a lot of these problems arise.

Aaron Carroll:

Why do you think that this happens? Is it that most journalists aren't well trained to do this? Is it that they don't understand it, even if they are? Is it that scientists are pushing information without properly placing it in context themselves? I don't necessarily think any one group is at fault here, but I would certainly love to hear your take.

Christie Aschwanden:

There's not one single answer to that question. Looking at science, there are all sorts of perverse incentives there. Yeah, there's this idea that there's all this hype that starts with the media and the media is always hyping science, when in fact there's very good evidence now that most of that hype tends to originate with the scientific institutions or the journals that publish that research or the researchers themselves. And so this idea that the media is just hyping stuff, that's really false. We know that that's not generally the case. And there's a lot of perverse incentives within science for people to

prefer really exciting findings. And those are the ones that are least likely to hold up over time. There's a lot of reward for people to publish in certain journals, and those journals tend to have publication bias, which means that they're more likely to publish positive results than negative ones. So in other words, the experiment worked. You found something interesting. They published those studies preferentially compared to studies that said, "Oh, we had the hypothesis. So we didn't find anything. It didn't stand up." But we know if we are really interested in the truth and how the world works, we need to have both kinds of studies. So that's another avenue.

Christie Aschwanden:

But I also think that it's interesting, because the public and I think people really do trust science, and I think that uncertainty is something I just wish that we could do more to educate the public about, uncertainty's role in science and the fact that science is this process of uncertainty reduction and not uncertainty elimination, because what we've seen, I wrote a story at FiveThirtyEight about this called There's No Such Thing as Sound Science. And what we've seen is that when people don't understand this stuff about uncertainty, it makes them ripe for distrust of science. Because when they see things are changing or new study comes out to overturn existing beliefs, the idea is, well, science, there must be something wrong or scientists don't know what they're doing because every time they do a new study, something changes. But it also creates this dangerous situation. And we've seen this historically with the tobacco stuff, where you can have these vested interests who really play up uncertainty. And they use that uncertainty as a weapon against science. And I think that's a really important issue that is going to continue to be important.

Aaron Carroll:

I've written for organizations where I try to write careful stories and then the next day they take a press release, they reprint it, it counters everything that I've tried to do and they get way more clicks because of course, publishing eat this one nutrient then you'll live forever gets a million eyeballs. So how do we counteract the fact that it's incredibly lucrative and easy and successful to do this badly?

Christie Aschwanden:

Well, when you figure out the answer, please tell me, because I would love to know.

Aaron Carroll:

No, I want you to have the answer.

Christie Aschwanden:

I don't think there are obvious answer. And particularly, I think we're also at a moment right now where information is so widespread and cheap and we're at this moment where people are picking and choosing what they want to believe, and we no longer... 20 or 30 years ago, everyone watched the same nightly news. They subscribed to the same newspaper. We had this common set of agreed upon sources of who is credible and all of that. And we don't have that anymore. And I think it's really tough, but I think the other thing is that human nature is, we want certain things to be true. I want wine to make me live longer and be happier and all of these things. Does it? I don't know, but we have these human biases and everyone wants the magic bullet. The secret is that there is no secret, but that's not the answer anyone wants. And so we keep trying to find the magic.

Tiffany Doherty:

And here in the conversation, Aaron brings up an important point. We do focus on replication in science sometimes, but those efforts seem to be based more on settling what appears to the public to be a controversy, when in fact it is more or less a settled issue in science. However, media coverage of these replications feeds the narrative that the science still isn't settled.

Aaron Carroll:

Another thing that I sometimes wonder is that we seem to want to replicate the studies in the areas where there're the least need for it. So I personally would be fine if we never funded another study on do vaccines cause autism again. I would be fine if we never published that such a study if it was conducted I would be fine if the media would refuse to report on that study, even if it was published, because no study conducted today could probably overwhelm the collected evidence that we already have, unless it involves millions of people. But nonetheless, if there is a crappy case controlled study of an incredibly tiny population involving a hundred people that finds a statistically significant association between vaccines and autism, it'll be published in every paper in the country. And that drives me insane. How do we beat that?

Christie Aschwanden:

Well, I can just tell you, I often feel like one of the most important decisions I can make is to not write a story. And I do that quite frequently. And I think that's something that a lot of good science journalists do. A study like that, I would choose not to write about it. Now I might eventually end up writing about it and that would happen if this has made news and everyone in my social media feeds is talking about it and it becomes a news event in its own right, that this crappy study made news. But then story is not about the study as much as it is the study's bad and why is it being covered? And it's more of a navel gazing, looking at the media and why you shouldn't read these stories basically.

Tiffany Doherty:

So what can we do on an individual level to address some of the issues we've brought up in this episode? What do our experts have to say about the kind of training and other experiences that make for better science journalists? Following completion of his PhD, Dr. Akpan completed the science communication program at UC Santa Cruz, giving him extensive training on both sides of the science and media coin.

Nsikan Akpan:

What's great about the science communication program at UC Santa Cruz is that it's designed for researchers. So it's designed for people who have spent time in a lab and now want to make this transition to communication. I think that was a huge part of me being able to report in the way that I do, be able to bring science to the masses for national news outlets. I think you really learn the tricks that you need to do that in one of those programs. That said, I think you can learn how to report without going to a journalism program. I think you can do it through freelancing. It just might be a little bit harder. You might have to devote a little more time, especially at the beginning to do it. Carl Zimmer doesn't have a science background, which is something that they're like... He doesn't have a research background, but he was able to become one of the preeminent science writers of our time just by learning and reading everything he could and becoming acquainted with how research as an institution

has its own language and its own processes that you just have to pick up in order to understand how science works.

Tiffany Doherty:

Our other experts agree that while training, resources, and experiences are essential, an extended background in science and/or research is not. Here's Aaron speaking with Stephanie Lee again.

Aaron Carroll:

Do you think that journalists who are going to cover science should have perhaps some more just education in some of these methods, so they understand what P-hacking is or some of the major issues?

Stephanie Lee:

Yeah. I think that every journalist who writes about science, even if that's not their full-time beat, as we call it, should have an understanding of this. There are a lot of resources out there to learn from. And I'm very fortunate to have a network of people who know a lot about statistics and other experts in other fields who are willing to help me decipher things. Yeah. So in general, I'm definitely in favor of journalists who are in science and other people writing about science talking to experts, being skeptical of press releases, seeking out training to ground themselves in the principles of science. But I also don't think you need to have a science PhD, because I certainly don't and wouldn't be here otherwise,

Tiffany Doherty:

And more here from Christie Aschwanden.

Aaron Carroll:

Why do you think some are good at this? What makes them good?

Christie Aschwanden:

Some of it is practice. I think I'm a much better journalist now than I was in my first years. I've learned a lot and I approach things differently. I think some of it is understanding the scientific process. A lot of science journalists have some sort of background at science, but at the same time, I don't think that that's necessary in all cases. You can learn on the job and it's not... I want to make sure to make this important distinction, too, that it's not our job to promote science. And there's another thing, science communication, which is really about heralding findings and getting information out there. And as a journalist, my job is to hold a little more critical eye towards things. I think a lot about that old saw from the Cold War, trust but verify, and I think that's really approach that I take. And I think that's the approach that good science journalists will take is you trust, but verify. You want to see the data. You want to interrogate it and ask questions.

Tiffany Doherty:

Christie also brought up a critical point about something we can do in a broader sense to improve the ability of science journalists to report science in the ways our experts have suggested in this episode.

Aaron Carroll:

How do we get to better informed, more aware, better practicing healthcare journalists, or I should say research journalists, science journalists?

Christie Aschwanden:

I think some of it is just funding the media. You know, jobs are disappearing in this industry. Right now during the pandemic, a lot of the publications that I write for, they've had across the board pay cuts. They've had a lot of layoffs. It's pretty hard to keep good journalists employed when you don't have money to pay them. And one of the real problems here is that the media economic model is failing and that makes it very hard to employ a robust army of good science journalists if all the jobs are disappearing. So I think on a top down level, that's where I would start.

Aaron Carroll:

I agree with you. There's been a lot of consolidation, but I feel like I see a lot of phenomenal science journalists. It's just that those same places employ crappy science journalists.

Christie Aschwanden:

Yeah. I think it's a little of that and like any profession, there's good along with bad. And very often these not so great journalists are ones that have been doing it a long time. And it's hard to fire people. I don't want to name names, but I know there's one prominent journalist who gets a lot of criticism and this is someone who's been at this major newspaper for decades and probably not going to be leaving soon. Yeah, it's tough. But I think that there's a lot of really good journalists that are coming on the scene, too. And I think that in terms of actual people who would identify as science journalists and people working in those kind of jobs, I think that the quality is generally quite good.

Tiffany Doherty:

In the book, *The Misinformation Age*, the authors Cailin O'Connor and James Owen Weatherall, stress many of the same concepts brought up here by our experts. They note the need for journalists to avoid sensationalizing new findings, and both journalists and consumers of media would be better off understanding that a single surprising or contrary research article is not, on its own, newsworthy. What is newsworthy is the overall scientific consensus or absence of consensus and the reasons that consensus does or does not exist. Ideally, institutions and journals would keep that in mind as well, particularly when dealing with press releases and embargoes. The *Misinformation Age* authors also recommend that science journalists rely on the consensus views of independent scientific organizations, as opposed to the views of individual scientists. And I'd say that goes for individual studies as well. You can generally find opposing opinions on any topic and scientific papers behind those opinions. Of course, contrarian views should be heard, but they should be placed in context, not covered in isolation. It is the overall consensus that often matters the most. And as these authors write, it is not the job of journalists to referee or make judgements on scientific disputes. It is their job to investigate and report on matters of fact, and when covering a controversy, to focus on the reasons that controversy exists.

Aaron Carroll:

There are many, many stellar science journalists, our experts here included, who abide by such guidelines and endorse their use across the field. We're grateful for the time they took in helping us understand the role of media in science culture and reproducibility, the relationship between scientific entities in the media, and how that contributes to science representation and how we might improve some of the issues detailed in this episode. Our series is about half over, but before we get to the final two episodes, which focus on solutions, we have one more topic to cover, mentorship and authority and

science. Sometimes bad practices are perpetuated or even forced through the mentorship model of science. It's a topic that doesn't see the light of day very often, swept under the rug for reasons of collegiality, but we aren't afraid of the tough topics because we believe they need to be addressed on the road to solutions.

Aaron Carroll:

We hope you'll will join us on the next episode for what is sure to be another interesting discussion.

Aaron Carroll:

Thanks for listening to this special episode of the Healthcare Triage Podcast, part of an eight episode series on Science, Culture and Reproducibility, edited and produced by Stan Mueller and Mark Olson. We would like to thank the National Institutes of Health for funding this series, and a special thanks to our guests for lending their time and expertise. If you're interested in incorporating this series into your undergraduate or graduate courses, please visit [www.healthcatriage.info/reproducibility-podcast](http://www.healthcatriage.info/reproducibility-podcast), where you'll find free lesson guides to accompany each episode.