Season 3 Episode 2 – The Credit Dilemma – Ethics of Authorship in Modern Research
Guest: Lisa Rasmussen, PhD

LEN USVYAT
Welcome to the Renal Research Institutes, Frontiers in Kidney Medicine and Bio Intelligence. Where we share knowledge and advances in kidney research with the world. In this episode, I'm joined by Lisa Rasmussen, professor in the Department of Philosophy at the University of North Carolina in Charlotte and editor in chief to the journal Accountability and Research. Together, we're going to discuss the ethics of authorship in research. Welcome, Lisa, to this podcast. I want to just start off and ask you; how did you get into this field and what drew you to studying this and understanding this topic on ethics of authorship?

LISA RASMUSSEN
My background is in bioethics, and I was initially focused on hospital ethics committees and questions of moral expertise. And when I got hired into the job, one of my bioethics teaching responsibilities was research ethics for graduate students, and there are many topics in that framework required by federal funding agencies. And so, authorship was one of the topics that I've been teaching for about 20 years now. But as we thought about a grant to propose to the National Science Foundation, several of us on my team had had experiences with the damage that authorship conflicts can cause, careers to people's psychological well-being. And so that sort of started to bubble up to the top as something we could really focus on, to start to get at a culture of research integrity, where people feel like they're being treated fairly.

LEN USVYAT
How do you think and why do you think authorship matters so much in academia and in research culture in general?

LISA RASMUSSEN
I think the obvious first point is that it's the coin of the realm, as many people have called it. It is the currency we use to show our impact on a field, our strengths, what we might bring to a new job, to a grant proposal, etc. so the pressures are significant just as a baseline. But increasingly in recent years, there has also been a lot of focus on metrics. How much are you being cited? How much are you publishing? What are the impact factors of the journals in which you're being published? Not to mention all the surrounding pressures, like most recently, large language models and AIs as coauthor, the appearance of predatory publishers and fake journals and all of these kinds of

things. Because the more metrics matter, the more important and profitable it is to game the system. So, all of this is the background for us trying to get reasonable credit for the work that we've done in a minefield.

LEN USVYAT
Yeah. And of course, it varies, I think, dramatically between being an author from an academic institution, being an author from, you know, working for an organization like ours, which is not really an academic institution. So, I realized there's also a lot of differences that you have to account for. So, yeah. What do you think is [un?]ethical authorship? I mean, I think that's a question a lot of people would have.

LISA RASMUSSEN
There are. I think, some basic and universal understandings of what it takes to be an author, which is that in some framework you've made a meaningful contribution, an important contribution, a substantial contribution to something that's being put forward to be published. What that amounts to varies by discipline varies by individual perceiver. So, we often see, for example, that students in academia, PhD students, for example, who need to publish as part of their career or to get their degree, um, sometimes think that the time that they spend on a project is what entitles them to authorship, right? So, they maybe they did a bunch of pipetting and somehow their 100 hours of pipetting, to them, it means they should have authorship. Maybe it does under certain circumstances, but it's harder to make the case that that's maybe an intellectual contribution, especially if they're being paid for it. So, these start to become very contentious, these understandings of what it takes to be an author.

But I think one thing that really does help is if you think about the credit aspect of authorship, together with the responsibility aspect of authorship, and that can help resolve some of these, and we might talk about those, um, as we go on. But just briefly, if you can't stand up for some important part of the paper on your own, you shouldn't be an author, right? Because if there are questions asked, somebody's got to defend what was done.

LEN USVYAT
Well yes, I think that's something very important that. The amount of time spent is not necessarily a predictor of where you are on the authorship list or even if you are an author per se, I think.

LISA RASMUSSEN

Absolutely. I don't know if everybody necessarily understands this, but I do think maybe that's how some people perceive it that way. I think one of the challenges is that there's so much - there's no universal standards for this. And I think, you know, the journals may not always have the same exact guidelines, and of course, the institution you work for may not have the same guidelines. Can you talk about this a little bit? Like do they vary a lot from one discipline to the other, from one journal to the other? They can vary significantly, which isn't necessarily a bad thing. You know, there are these practices from at least decades ago, if not longer, that have been baked into disciplines, and to move an entire discipline to a new way of thinking about giving credit means that they would have a hard time understanding the new system, right? So, to back up a little bit, there are two significant international organizations that have set up authorship criteria, and one is the International Council of Medical Journal Editors, ICMJE, and the other is COPE, the Committee on Publication Ethics. And these, both organizations were set up partly to address these kinds of questions about how to assign credit, although, interestingly, their standards are slightly different between the two international organizations. And then in addition, many journals don't have the same standards as these international organizations. So, in some disciplines it's a norm to list authors alphabetically. In other disciplines, the norm is to list the graduate student or post-doc or junior researcher who maybe wrote the first draft as the first author, and then the person who got the funding is the last author. You know, that's probably more of a standard. In others, it's a sliding scale of most to least contribution to the authorship list, so that when you look at a set of authors, I mean, everyone knows the first position is the one that's cited; it's “so-and-so et al.” Right. So that's the biggest fight. But there's also a big fight for the end spot. And then for graduate students, for junior faculty, for research scholars. If you're second versus fourth, that might matter, you know. So yeah, there aren't any standards that are universally applied.

LEN USVYAT

Yeah, I know that makes it quite a bit tough. I mean, I can I think I can tell you we work with a few universities where we work with PhD students and, you know, for some of them, for some of these PhD programs, the requirement is that somebody must have a certain number of papers as a first author, and sometimes they will accept two first authors as, ah, “that's your paper.” But of course, it does make a big difference on things like this that are very, very critical for many students, of course. So, I realize that can cause a lot of difficulties, especially since some of the stuff here is not always written in stone.

LISA RASMUSSEN

Just to jump in on that example, that introduces the pressure for a PhD supervisor to prioritize first authorship for the person who's closest to graduation, not necessarily the person who did the most work and deserves first authorship.

LEN USVYAT
Yeah, yeah. You know, I wanted to talk a little bit about why these kinds of authorship disputes are so common. This fights between where you are on the author list and whether you're even included or not included on the author list.

LISA RASMUSSEN
I think it's a combination of things. One is the pressure to publish that many people - until you get to the point where it just doesn't matter anymore (nd you have to be pretty advanced in your career for it not to matter at all), and then that is combined with non-universal authorship standards. So, it's not as though we have something external to which we could appeal to resolve the matter, and then in addition when we work on this interdisciplinary, multidisciplinary, large, international, fill-in-the-blank teams, what we're each doing is not visible to each other. And so, you could have been let's say you and I are collaborating and you have spent, you know, three hours a night after you get home from work, working on some puzzle. Right? I don't see that. And so, when we come up with an authorship list, I might say, well, I think I should go first because I haven't seen that work that you've done and you haven't seen the work that I've done. Right. So, it's just, it's just invisible.

LEN USVYAT
Yeah. Sometimes, actually, what you said about the alphabetic authorship list, this seems, in some ways a little easier and more objective because I think.

LISA RASMUSSEN
Yeah, absolutely. It would be more objective. Yeah. The challenge is we ask authorship to do a lot of work for us, including gauge the success of researchers. And so there I'm confident that you would end up with this empirical result in which people in the first few letters of the alphabet were overrepresented in more successful realms of scholarship, because those are the names that become familiar. Right? The most, at least to my knowledge, the highest number of authors was over 5000 on a paper from the CERN lab. And the first author is Dutch, and their first name or their last name starts with Aa. So, they moved right to the front. Right. So that's just an automatic benefit of having that name.

LEN USVYAT

Maybe there should be some random number generator for the authorship. I think that may solve some of these problems. Well, and of course, as you know, we work for a research institute that is part of a larger organization, Fresenius Medical Care. And for us, of course, as a corporate environment, authorship may mean slightly different things where it's a luxury to be able to. And we certainly feel very strongly about publishing a lot because I think we're so lucky to have so much data. But I'm sure you see some big differences between more academic authorship disputes versus things that you may see in nonacademic settings, where maybe these things don't matter as much of whether you are an author and where you are on the author list.

LISA RASMUSSEN

Yes, with some qualifications, because they may be a little closer than we might think at first blush. But the important caveat, I think, would be intellectual property issues, where to the extent that authorship is tied to intellectual property rights, a corporation might have a very specific interest in making sure an authorship list looks a certain way. Right. Given the way that the work was done and who's going to own it. Beyond that, we still would like it to be the case that the people who are - well, let me even back up step. We really want lots of people to be publishing. The fact that it's a corporation that is under Fresenius Medical Care doesn't mean that it's not academic, at least to me. Right. There's a lot of information that you all have that's potentially useful for the rest of us to have, and we want - the way that we share that information is publication and dissemination. So, there's that important publishing side, but there's also the responsibility side. And so, the same kinds of questions come up no matter who publishing is, which is who did this work, and if there are questions, how do we answer questions, and if we want more of the same kind of work, who do we fund? Who do we encourage? Who do we try and hire away to our team because Len is the one doing the work. And I want to bring Len over to my company or something. Right. So having accurate representation is still important, but the place where it differs, I think is number one for the young scholars who are still trying to get their stars for their degree, for publication, for promotion for tenure, etc. Those aren't necessarily going to matter as much in a corporation, at least to that degree. I suspect there is still some benefit, for example, to being in more important publications, right? It's going to somehow redound to your favor, right? So to that extent, the stakes may be a little lower, but they're still present, I think.

LEN USVYAT

Yeah, yeah. And I do think obviously we are - I think of ourselves as a much more academic shop, even though we do things that translate to operational improvement. But of course, as you know, we're very fortunate to have all this data, so it is very important to us and to me as an institute to actually share what we see with the community, because that is what publishing is all about. It's about sharing what we know and whatever research that we may have been able to do with our data. For us, of course, the other question is, since we have access to so many dialysis clinics and clinicians and nurses and dieticians and social workers who do a lot of this work on a daily basis, there's often a question of like, well, who of these thousands of people that we may be working with or that are contributing to this? Who should we include? You know, we have similar positions in our international side.

LISA RASMUSSEN

So, yes. And I think care is a particularly important place where that comes up. But it's also coming up in other areas where people are doing things like citizen science, community engaged research, and you're working with laypeople. And there's - so one of the areas I work on is citizen science, and there are really interesting questions that are coming up in that field about, well, when you go partner with a local neighborhood to do creek water testing, should they be authors and under what circumstances? I don't think those questions have been answered, and I think it's hard in the case that you mentioned as well. And this is partly where you can see the tension between different authorship standards. So if each of the people at an institution doing research with you has been named an author in the past, and they are entering an agreement with you to do more work, and then at the end of that, you say, well, you're not going to be authors, right? They might be justifiably surprised to find that out. Whether it's right or wrong, I can't say in advance. I think just like we've seen some grade inflation, I think we've seen authorship inflation, because if you're in any doubt, why not add more people to your list? Right. I think the same thing happens with undergraduates in an academic lab. Undergraduates are always now coming to faculty and saying, "I want to do research." And the sort of gold ring of doing that would be getting your name on a publication. And so, the magnanimous Mentor researcher wants to get them on the paper. So how much do they need to do? Is it a gift that you give? Right? Gift authorship is problematic. It's a gift when you give it to undergraduates who don't deserve it as much as it is to a colleague who doesn't deserve it. And it teaches them the wrong thing.

LEN USVYAT

I think it definitely makes sense, sometimes we talk about acknowledging people, for example, because I do think there are often people that we, you know, it probably

doesn't qualify to be an author. And I think especially in these cases of nurses, or maybe we work with somebody in a clinical team, or they've contributed something indirectly. What are your thoughts about this? And are there other avenues to acknowledge people? Maybe not through a formal authorship that's PubMed searchable, but are there are other ways you think is appropriate?

LISA RASMUSSEN
Really the only one I can think of is acknowledgments that you mentioned. And I guess one way to make that a little more real might be if you have the space, if you're not thanking a thousand people, right, which the journal may not let you do except in an online supplemental material. But if you have a brief footnote, if there's - just to take my example, an undergraduate student who was particularly helpful or a nurse who went above and beyond, you know, to have an almost a little more personal note, “we would like to thank this person for going above and beyond for truly extraordinary help with this.” Right. They then get acknowledgment. They get seen for what they did without anyone claiming that they built a model or, you know, evaluated the tests or set up the document or whatever.

LEN USVYAT
Yeah, I think this makes a lot of sense. I think - I also think there's a big difference between, obviously, a more full-blown publication in a peer reviewed journal versus these abstracts, which certainly we do a lot of them because it is something to get the message out, often faster. But of course, that also has a lot more space limitation typically. So you really cannot have a thousand people.

LISA RASMUSSEN
Yeah. But you know there's an interesting problem that a colleague of mine explained to me, which is some abstracts have a limit to the number of authors you can put on it. And so that forces you to exclude people who may actually have made an intellectual contribution and may be partly responsible. So it's forcing you to make them almost ghost authors, which is another sort of problematic authorship practice.

LEN USVYAT
Yeah. No. That definitely makes sense. Do you think that journals should enforce some sort of clear guidelines of what the authorship standards should be? And this is a standard that we should follow, and there's only a couple of them or a few of them around that I think hopefully we can agree on and ideally agree on globally. Um, because publications are global.

LISA RASMUSSEN

Yeah. Publications. That's the holy grail. I don't know how optimistic I am about that, but there's maybe an interim step, so I'll talk about that. Absolutely, I think journals should have standards, and sometimes that happens via those two international organizations I was talking about earlier. So a journal will say, “we subscribe to these standards, and these standards say you have to do X and Y and Z to be an author.” That doesn't tell you where you go in the list. No one's checking over your shoulder to make sure you did that right. But at least there's some guidelines. Other journals say, “here's what it takes to be an author,” and they'll augment or amplify something that the international standards have done. Other journals will say “we need an author contribution statement.” And it's this is where you typically see the initials: “so-and-so, and so-and-so did this. And so and so did this.” And then you can write your own. And that really does allow you in. Even where a journal has a standard approach to authorship, you might still want some kind of a footnote or note in there that says who did what. Because then you can really give people more credit for specific things. And then finally, the interim kind of step is something called the CRediT system, which is a sort of made up acronym for Contributor Role taxonomy. And this is a standardized table where you can actually go through and put a check mark for who did what, and then kind of submit that along with your submission to a journal or something like that, and it it's a little bit more objective. There's another companion that's called the MeRIT system, which is adding a few more kinds of metrics to that system. So at least - it doesn't tell you where they go in the order, but it gives you a way to say, if you're wondering who did the animal studies, it's these two people. If you're wondering who came up with the methods, it's that person. If you're wondering who wrote the draft, it's that person, right? So you get a little more of a signing of responsibility.

LEN USVYAT

Yeah. And I think it also makes it a bit clearer than what should you even be an author? Because I assume if you don't check one of the boxes, you probably should not even be an author. So I do think it's a little more, um, objective process than, you know, this, some of these less objective methods. Well, Lisa, I think given where we are today in this world, I don't think we can have any conversations that does not touch on AI and ChatGPT and Gemini and Claude and other generative AI methods. And of course, many times there are now authors for what people do. Some of these digital tools that we're living with. Tell me more about your thoughts on all these large language models. And again, computers as authors.

LISA RASMUSSEN
Yeah, it's been interesting to watch the evolution of thought within the field of research ethics and integrity about this. What we saw very early on was a journal like Science saying, “absolutely not, and you can't use it at all.” And then they quickly walk that back, because you have no way of telling whether people used it or not. Right. This the detectors are still not good. Yeah. So then the next sort of move I would say in the field was okay, but they can't be authors. And I still think that's the case because to be an author is to say you are an agent who came up with an idea and takes responsibility for it, and AI is incapable of doing either of those things. However, there's been a lot of softening about the use of AI, and in particular, discussions about how much we might be acting like ostriches and putting our heads in the sand if we refuse to allow AI a role in research, which is ludicrous because of the enormous capacity it has, particularly for big data that humans can't manage. Right. So I think for me, the Holy Grail is, particularly in light of what's called the “black box problem” in AI and large language models, which is you don't know how they came up with something, so you can't probe the methods, you know? Um, so it's hard to take responsibility for something an AI spit out when you don't have - you literally have no way of verifying it, right? I think there's a gap there, but I think what I would like to see is it spelled out exactly how AI was used - the prompts, the version models, things like that - and yet preserve a space for heterogeneous thinking, you know, contrary thinking. Right. And one of the interesting pieces of data that's coming out is the fact that using AI, when you're writing a prompt as a student to an SAT question, leads to homogeneous answers, which, for research, frightens me.

LEN USVYAT
Yeah. I think this. Is, you know, this is interesting. Lisa, I wonder if the day will come when there will be some AI disclosure section where I think you will have to say how you got into something.

LISA RASMUSSEN
Yeah, yeah, we ask for that in our journal.

LEN USVYAT
Do you really? Okay. It's quite interesting. I haven't seen this before. I haven't seen this yet, but I do think it's quite interesting. It reminds me a little bit of, you know, if you wanted to know how you got to the survival analysis, I think it's completely normal for a journal in theory to ask, “give me your SASS code” or whatever the program that you're using to generate the survival or other analyzes, so I could see that, I think, there -

instead of kind of hiding it and trying to pretend that, I think, people did not use large language models, maybe it is more appropriate to actually do what you just suggested and just clearly say what you did and where you made edits, you know?

LISA RASMUSSEN
And for the purposes of replication, which theoretically we're doing, we're not doing very much of it. Right. But it - that's what would be necessary to replicate.

LEN USVYAT
Yeah. Yeah. I think it's a, I think it's a very interesting idea. I often remember one of my mentors many years ago told me that they used to do Kaplan wire curves, curves by hand, you know, do the survival analysis by hand. Of course, now it's pretty much unthinkable that anybody even knows how to do this. And I wonder if the day will come, you know, where with large language models will be in somewhat of a similar boat. I do hope that I think will all retain the ability to be able to write critiques and papers and without large language models, and those will be tools that help us as, as opposed to, you know, doing the whole thing for us and not being involved. So very, very interesting. So what are some tricks, or some, really, standards that you think we should be following, at least some basic principles that I think we should be following. Again, you know, it's a corporate environment. So there's hierarchy. There's sometimes a sense of sure, this is a PhD student and you know, this is person is more senior. What are your thoughts, like what comes to mind as some lower-hanging fruits that I think we should do - outside of, of course, what we're required to do according to whatever the journal standards are.

LISA RASMUSSEN
I think the biggest danger in authorship, at least when it comes to teams, is the tension and conflict when people don't understand why a certain authorship list was the final one. And this affects people with less power within a certain setting, whether that's academic or corporate. So, you know, things like visiting - if you had a visiting researcher at RRI in my academic setting, it would be postdocs, it would be graduate students, it would be junior faculty who aren't tenured. Things like that. When they collaborate, I think - sunshine being the best disinfectant - one of the best things you can do to avoid problems is talk about authorship at the beginning, throughout the project, at the end, and explain reasons, right? So start off with, “hey, we're going to be working on this together. Guess what? There are no international standards of authorship. So we need to talk about what we're going to do together. Let's think about who's going to lead this and what that responsibility would look like. Who has the

bandwidth for that?" Right. Or I'm coming to my group with my idea and say, "I want to lead this, but I'd love to have some collaboration." Right. So some of that first author position I think needs to be set up towards the beginning, because there needs to be a conversation about what then - if you say you want it, then you need to step up and do X, Y and Z. There also should be multiple conversations and sort of touch bases. They can be really quick ones between the team that's collaborating on who's doing what, does someone need to pull back. So again, in the academic setting, sometimes what we see is and literally there's I've gone through two authorship disputes where this has been a kind of a case where one of the graduate students did a whole bunch of work. They submitted it. It was rejected. The graduate student graduates and finishes and they go away. The P.I. has it, and they go, "okay, well, we got all these comments. Let's rerun this. We're adding twice as many samples." Whatever it happens to be, a new graduate student does all that work. That means they have to rewrite all the previous manuscript. Arguably, that new graduate student should become the first author on the final product, but that doesn't mean that initial graduate student should drop off. But there needs - the PI in that case, the mentor, the PhD supervisor needs to say, "okay, you guys, just so you know, this new student has had to take on a lot of work. And that's really, you know, making them first author."
So just as an example of making clear to everyone what everyone else's contributions are so that you know why people are in the spot they are.

LEN USVYAT
Yeah. Yeah. I mean, obviously transparency. I think what you're saying is transparency is important. And from the very beginning I think I would, I would very much agree with it. We do often face the situation that I think you are describing. A twist on the situation that you're describing, which is we had somebody who works with us, and then they did a lot of work, and maybe we haven't gotten a chance to publish, but actually a lot of the work was originally done by that individual, and then they leave. And of course, we want to make sure that they're still included because they really did do a lot of work, and so we do try to generally include them. Then of course, the question becomes, well, what's the affiliation, which I think formally we usually do "what was their affiliation at the time of the work being done?" But these questions very often pop up and oftentimes they don't have a very clear answer. We also have - what are your thoughts about authors who clearly should be authors based on, you know, these checklists and maybe some of these a couple of these guidelines that I think you referred to, but they don't want to necessarily be authors. Maybe they don't feel like they want to be. Is that -do you think that's okay? Do you think that's….

LISA RASMUSSEN

Yeah, that's a hard one for a couple of reasons. One is sometimes it's because they don't have faith in the results and they don't want their name associated with it. Right. So literally they're saying “I no longer I'm willing to take responsibility for this given where it's going.” You can imagine them doing that in good faith or bad faith, right? Then there's other cases where we get this in in academia a lot with professional science master's degrees. So they've done research with a faculty member and they've gone off and gotten their industry job. They don't care about publication. Right. So they just don't want to be authors. But for the faculty member and their remaining students who have worked on that, they still need to publish it, it's still important work to get out there. And so they'll go forward without that person as an author. So I think it's a little bit of a gray area because you - in theory, you'd want to be able to draw on anyone who had any part of this paper if you wanted to challenge it. But for the most part, these papers don't get challenged. And if they did, this small bit of work isn't going to be the thing that got challenged, right. I think that's okay under most circumstances.

LEN USVYAT

Yeah, I think. That's quite interesting. Can you maybe talk a little bit about - obviously authorship is not just in scientific papers, but also things like intellectual property or grant applications and other areas like this. Can you maybe talk a little about your thoughts about that. Obviously, I do think some of them have their own standards, but maybe you can. Talk about that more.

LISA RASMUSSEN

I think the intersection between intellectual property and authorship is really interesting, and it's above my pay grade in terms of the legal implications. So, you know, I've had my intellectual property kind of “office” come and talk to our graduate students from time to time. And, and students leave with a very different understanding of intellectual property than they came in with, which is that the university owns the intellectual property, right? Or RRI or Fresenius Medical Care would own the intellectual property. The researcher gets a cut of it. But if I invent something on my university salary, it's not mine, right? It belongs to the university. And so - and the university is not an author. So there's a way in which those two things get missed as well. There are analogous standards for intellectual property, for other kinds of publications where you are trying to say, whose idea was this? Whose creation was this, who gets credit and blame for it? But I don't think the game is the same because in publication authorship, that's what's doing a bunch of other work that the IP isn't, right, the IP is doing this specific kind of

work about the money and the academic publications are doing. And by work, I mean it's giving us information for different purposes. Like promotion.

LEN USVYAT
Yeah, I think I find this to be very interesting. Have you ever done education sessions with actually corporate environments about authorship policies and overviews? Because as I'm listening to you, I actually think it would be very useful for many people to hear.

LISA RASMUSSEN
I would love to, honestly, because of the similarities and differences, right. I have given presentations in many different disciplines, and engineering is probably the closest thing to the corporate environment, that the same kinds of things tend to come up, I think. And for example, one of the engineering departments where I gave a presentation, someone just contacted me and said, “I keep thinking about these issues because we collaborated with a corporation, we created this enormous data set. Our collaboration was over, and they went on and published based on the data set that we gave them, without ever discussing who is going to be an author on the eventual …” right. So? So now there's significant bad blood between that department and that corporation. Probably they won't collaborate again. Probably there was some wrong done, and probably the corporation didn't even think about that.

LEN USVYAT
I'm assuming this is probably more likely to happen in a place like ours, where we do have access to a lot of data and also a lot of expertise. But these questions come up very frequently about the authorship on both abstracts and papers and, sometimes on intellectual property as well, because I do think a lot comes out of, of this organization. And I you know, I honestly think, I think AI is going to bring some other twist to this that I'm not actually sure yet what exactly the twist will be, but I do - it does seem like it's certainly not only in writing. What do you think about some of the literature searches that there's been many platforms, AI based platforms that help you with essentially literature research and give you some reason can almost write a discussion for you based on the various publications that are out there. What are your thoughts on that particular topic?

LISA RASMUSSEN
Well, I'm sure it's not news to you that - or probably anybody who's watching this that there are hallucinations in those literature surveys, uh, searches. And I remember my first experience with this a couple of months, probably, after the first version of the

public ChatGPT came out and I was finishing a paper. I said, let me just see what it comes up with and make sure I didn't miss anything. And then these papers came up. I said, “I can't, I can't believe I missed this. This is so appropriate for my work”, right? There was no paper according that match that criteria. So I think there are two things. I think obviously you have to be careful of hallucinations. Apparently the more recent models are getting better at that. And so, yes, incorporating these additional search tools to help you find appropriate literature might be a good thing. And in particular, it can get you outside of your citation bubble. Some fields have that more than others, but you tend to cite the people who were cited by people you read as opposed to something else. It could be very helpful. So becomes - there's a homogenization effect there. But in addition, um, I think the danger is that when it creates a literature review, that is an intellectual activity. And if you don't think about the framework within which that intellectual product is being presented, you don't actually understand what it's saying. And it could be saying something that you don't intend. And that's - a literature review is an important part of setting the background for the work that's being done.

LEN USVYAT
Yeah. Well, Lisa, I know we're essentially out of time. And I have to admit, I think I could talk to you about this forever, but this comes up all the time. And I think being ethical about it, being following the guidelines is just so important to us. So, Lisa, I do want to very, very much thank you. I think this has been absolutely terrific. So thank you for your time and thank you for joining us today.

LISA RASMUSSEN
Thanks so much for having me. It was a pleasure.

LEN USVYAT
And thank you to our listeners for joining the Renal Research Institute for this episode of Frontiers in Kidney Medicine and Biointelligence. We invite you to connect with us on our social media channels and stay tuned for future episodes as we continue sharing the insights and advancements in kidney research.