SPEAKER 1: So good afternoon. I'd like to welcome you to the CCaTS Grand Rounds. Today's topic is plagiarism in science and the consequences. So it's a delight to have three of the panelists, who will each do a brief presentation. And then following that, we'll do a question and answer and discussion amongst the audience and the panelists.

So I'm going to start by introducing all three, and then we'll just get right into it. So our first speaker is Dr. Richard Sharp. His doctorate and master's is from Michigan State University, and he has a bachelor's in philosophy and sociology from Western Michigan University.

He joined Mayo Clinic in 2013. He's a Professor of Biomedical Ethics and Medicine and is also the Director of the Biomedical Ethics program. He has appointments in both the Division of Health Care Policy and Research and General Internal Medicine. Prior to joining Mayo Clinic, he was the Director of Bioethics Research at the Cleveland Clinic and co-director of the Center for Genetic Research, Ethics, and Law at Case Western Reserve University. This was a center that's one of six NIH centers of excellence in LC research.

Dr. Sharp has published widely on topics in biomedical ethics, including clinical ethics, consultation, informed consent, financial conflicts of interest, and ethical tensions in patient advocacy. His current research is in examining how patients and health care providers view new forms of personalized medicine and clinical interventions, enabled by molecular diagnosis. Dr. Sharp frequently advises health care organizations on ethical issues and has served on advisory committees for the National Institutes of Health, Institute of Medicine, American College of Medical Genetics, and the United States EPA.

So our second speaker is Dr. June Oshiro. She is a consultant and editor in the section of scientific publications at Mayo and is an Instructor in Biomedical Communications. She received her bachelor's in biological sciences from the University of Chicago, has a master's in food science microbiology from Rutgers University and her doctorate in microbiology and molecular genetics from Rutgers University and the University of Medicine and Dentistry of New Jersey.

She has numerous publications to her name and is a member of several professional organizations-- of note, the American Medical Writers Association, of which she's had several officer-type positions. She is certified by the American Medical Writers Association and is a certified member of the Board of Editors in Life Sciences.

Our third panelist is William Lanier, who received his bachelor's of science degree in microbiology from the University of Georgia and doctorate of medicine from the Medical College of Georgia. He was a resident in anesthesiology at Wake Forest University and followed that with subspecialty training in neurosurgical anesthesiology at the Mayo Clinic. He joined the Mayo faculty in 1984, and in 1995 had risen to the rank of Professor of Anesthesiology.

His research interests involved neurosurgical anesthesiology and ischemic heart/brain disease, and he has been engaged in research in both the laboratory and clinical setting over the past 32 years. He has numerous publications in this domain to his name and many, many honors. Of note, between 1993 and 1994, he was President of the Society for Neuroscience and Anesthesia and Critical Care.

In 2011, that same society recognized him as Teacher of the Year. He served on numerous National Advisory Boards. He's been on the editorial board of several journals, including the *Journal of Neurosurgical Anesthesiology* and the *Disaster Medicine and Public Health Preparedness.*

Dr. Lanier remains active as a physician today here at Mayo. However, since January of 1999, he has spent most of his professional efforts serving as Editor-in-Chief of the *Mayo Clinic Proceedings,* which is a 127,000 circulation, has an impact factor of 6.262, has a broad audience of general internal medicine, and is one of the third largest circulations of scholarly medical journals of this genre and receives much media coverage. So with that, I would like to welcome our speakers and start with Dr. Sharp.

RICHARD SHARP: Well, thank you, Jen, for that nice introduction, and thank you, everyone, for the opportunity to be here and to speak today. I'm not familiar with the field of disaster medicine, Dr. Lanier. You'll have to tell me more about that, because in ethics sometimes I feel like we're dealing with disasters. And perhaps we can work together on some of these things.

Kidding aside, I have the easy part in today's presentation. My charge is to really talk a little bit about what plagiarism is, and I think that June is then going to follow that by talking a little bit about how to find it. And Dr. Lanier spending some time about how to fix it when you do find it.

So again, I think I have the easier role here. I'm going to define what plagiarism is and talk specifically about that and the distinction between plagiarism and self-plagiarism, a related concept, and then talk a little bit about Mayo Clinic process and policy for responding to allegations related to plagiarism. So plagiarism is best understood as one of several different forms of research misconduct.

Research misconduct in the United States is governed by the Office of Research Integrity, and the Office of Research Integrity defines research misconduct in a fairly narrow way. Research misconduct from a federal or from a regulatory point of view involves what is sometimes referred to as FFP-- easy thing to remember. If you're confused about this, FFP is fabrication, falsification, or plagiarism, so the idea being that there are lots of ways in which researchers might misbehave.

They could be abusive, verbally abusive, to their technicians. They could ask them to do things outside of the scope of their employment. They could ask them to come home with them and mow their lawns, whatever it may be. Those are clearly bad behaviors on behalf of researchers, but it's not research misconduct from a regulatory point of view. From a regulatory point of view, research misconduct means making up data, manipulating your data in a way which misrepresents it, or appropriating the work of others and representing it as your own.

So FFP is the standard for research misconduct in the US. Let's focus for just a moment on plagiarism. We all know what plagiarism is. There's not a one of us in the room that doesn't understand the concept of plagiarism.

It involves the idea of somebody taking credit for work that you've done. It's something that we learned in grade school. If you have siblings, you know this. Mom's giving credit to Johnny for something that you did. It was you that took out the trash and not your sister, whoever it is.

We're all familiar with this idea of appropriating the work of someone else, and we all know, from an ethical point of view, it's wrong. This is not the challenging part of the discussion today. We all know this, and we learn it at a very early age. At what point in the work that we publish as scientists and as researchers does our work border on concepts related to plagiarism?

So in this context, much more specifically what we're talking about is when you use the work of someone else and their ideas in ways that suggest that those ideas are your own. And here, let me stress the distinction between using another person's words and using another person's ideas. We often think of plagiarism in the context of scientific publication in a very narrow sense, that you are using sentences that another person has authored.

And clearly that's one form of plagiarism-- stealing of text or lifting of text from an article that's not yours. But that's not really the most rampant form of plagiarism. The forms of plagiarism that you might encounter more frequently in your work are places where an individual is using a concept that clearly has been developed by another group or another team.

Their ideas and concepts are being appropriated without giving them credit. And it's the stealing of ideas, the stealing of approach, the stealing of concepts that's much more common in scientific publication than the mere lifting of words in text, though we need to be mindful and sensitive to both. So again, let's start with the easier of these types of concepts, the ones related to the stealing of phrases and words in text.

Obviously, if you're going to use the words and text of another author, you need to use quotation marks, and you need to provide an appropriate citation. Again, this is basic publication practice. You should also know-- and the reason I show this particular slide is that there are actually folks out there that are scanning the scientific literature to detect examples where people are lifting the words and phrases of others.

So there's a website that you can visit, and I suspect many of you may have at some point visited this website, called Retraction Watch. And if you go on there, you'll find that there are third parties out there that scour the literature, administer different plagiarism detection software to articles that have been published, with an eye toward trying to identify places where people may be misrepresenting themselves in the published literature. Sometimes this is done for very specific purposes.

Somebody has given this group a tip, if you will, or a heads-up that they believe some work has been plagiarized. And they want them to investigate it. Other times they simply stumble across this. But there are people out there that will be watching the work that you do and watching the publications that come out of a place like Mayo Clinic.

So if you weren't aware of that, I would definitely want you to be aware of that. The other thing that's perhaps obvious, too, is that there are significant implications for being accused of and found guilty of some form of plagiarism. Here, you see this gentleman here on the right who clearly has made a number of poor choices in life, but one of which was that he elected to plagiarize the work of others. In his case, he was an English professor who decided that it might be acceptable to steal from some of the great authors in the history of literature.

Which, again, clearly he's made a number of bad choices here, but the idea that no one would discover that he had stolen from people like Updike and so forth is really quite laughably stupid. But again, this sort of thing is out there. You should know that anyone who is caught plagiarizing is almost certainly going to lose their job or suffer other serious consequences at any institution, not just here, at a place like Mayo Clinic.

In addition, what you often will see are situations where plagiarists will pick and choose from different papers, lifting text here and there, with the goal of designing a paper that ultimately holds together. I use this example, because I was actually someone whose work was plagiarized in exactly this way. And here's how I discovered it. I was asked to be a Grant Reviewer for the Welcome Trust, a UK funder of research.

And during the course of that particular reviewing experience, I read through the application and discovered that there was text there that looks suspiciously like text that I had written myself. And I looked at it, and then I saw that there was a couple of citations that were really striking to me. I thought, who in their right mind would have found that? I remember when I found those papers that they were citing and that these authors had come across the same papers stood out to me.

And so what I did is I actually took the text that they had written and did a search in a document that I had as an MS Word document. I mean, I was the lead author on these papers, and so I knew them quite well. And I was able to find the particular sentence that had been lifted. And by doing that, I was able to discover not only that, but there were multiple papers of that sort that they had lifted from me.

So I notified the funder of that situation, thinking that it had implications for the review of the work and not knowing exactly how to manage that. What I didn't think about, because this was really quite early in my career, was that by going to the funder and alerting them to that situation a whole series of additional things were then triggered. Because the funder had a requirement that they notify the university of the alleged act of plagiarism.

I didn't think that I was making an allegation of plagiarism. I was trying to alert the funder to the fact that there was this indiscretion or impropriety in the application materials that were sent to me. When they found out about that, they did have to notify the university, and the university then proceeded with an investigation that ultimately led to formal sanctions against this individual.

So the point here is that this may come up for you in your own careers more often than you may think. I would never have expected as a student doing my research that this sort of thing would be something that I would encounter directly. But I do think that these experiences are more common than you might think.

I've already talked a little bit about the distinction between the lifting of text and the lifting of ideas. I think that's a particularly important distinction to be mindful of. Plagiarism does involve the stealing of ideas, not just text. And why do we get worried about this?

Many people have suggested that plagiarism somehow harms the research record. But as you think more about this, I'm not sure that this is true. I mean, if you represent the ideas as your own, but the ideas are still accurate and correct, you're really not harming science in any way. But you are harming the individuals that did that work and who should properly be credited for that.

More than that, though, I mean, if you're the kind of individual that's engaging in that sort of practice, aren't you doing something that in many ways is very much antithetical to the very goals of science itself? I mean, you go into science for the purpose of learning something, discovering something that others have not yet discovered, for advancing the field through your work. And if you're thinking about participating in some act of plagiarism, that act of dishonesty is just so foundationally at odds with the very goals of science that as we discover individuals that are plagiarizing, I think it really leads us to think about whether they ought to be in the field of science at all.

And so I think that's why we react so harshly and so strongly when plagiarism is discovered, because it's so out of step with what we believe to be an idealized version of a scientist. Let me shift, then, for just a second to talking a little bit about self-plagiarism. This is something that I think is also very common.

I think we've all had situations where we've been asked to write review articles or do reporting of papers that use the same methods as another paper that you might have used. And the question has come up for us, can we simply cut and paste some versions of our methods from a prior paper into the current paper? What are the ground rules for that? And what's out of step?

So what are some of those rules? According to the World Association of Medical Editors, self-plagiarism is often unintentional and is in many ways very different from acts of plagiarism. Self-plagiarism is not regarded as clearly unethical as acts of plagiarism. And I think more often than not, there's not the same level of consensus across different authors and across different scientific fields about what constitutes acceptable and unacceptable reuse of materials that you may have already published.

I think what is clear is that if you are attempting to represent data as original data that has been published previously, that is clearly out of step with what is acceptable. You should be acknowledging the fact that the data has been published previously. You should be providing a citation, and you should not be surprised if editors look at that and say, why should we reproduce work that's already been published elsewhere?

So from that point of view, there are clearly some boundaries here. Representing work as original when it's not is clearly an unethical scientific practice. But whether or not lifting parts of a method section and reusing that in another paper is acceptable is really highly dependent upon your particular field. And that may be considered acceptable in some areas of science and not in others.

So this is something that I would encourage you to talk to more senior people in your field, talk to editors in your field about what is and is not acceptable practice. What is also unambiguous in this context is that reusing text that you have published elsewhere does implicate certain copyright laws as well, depending upon the length of that text. And so that's another dimension of reusing your own work that you need to be mindful of.

The other thing I would mention here is that oftentimes publications that you may have coauthored with somebody else reflect the mutual intellectual contributions that the whole team has made. And so when you make a decision to reuse that material, it's really important that you talk with your co-authors about whether they're OK with that decision. Because, again, if you don't do that, then you're representing the work as uniquely yours and your own and not acknowledging the shared contributions that they may have made to that publication.

So we do know that plagiarism is relatively common. We know in particular that data duplication of the sorts that I just mentioned is fairly common. And it's noteworthy, as I said, that the Office of Research Integrity will view self-plagiarism and plagiarism very differently.

Here's a quote that says that ORI does not consider under plagiarism the reuse of material by a group of authors and redundant publication. So this is a very distinct thing and, as I said, an area where there's a lot of gray areas for authors. Lastly, let me just say a couple of things here as we wrap up and transition.

Anytime you're using data, as I mentioned, you need to be sure that you're clearly citing that. Failure to cite it could be understood as an act of plagiarism. When you are participating in group-authored activities, like the development of professional guidelines, you may have written sections of a report that's published. But that report is published under the of many individuals.

So be careful when you're involved in situations like that, that you understand the terms that apply to the reuse of those publications to make sure that you don't find yourself in a situation where you have either a copyright infringement or someone on that group of authors coming forward and saying, hey, I thought I contributed to that work, too. I'm shocked that I'm not listed as an author on this publication that you put out there. Those are the kinds of incidents that I think are unintentional oftentimes, but can get people into trouble.

Lastly, let me just say a little bit about plagiarism. As I was looking up some of these materials on plagiarism, I was shocked to find that somebody who had authored a plagiarism guideline actually plagiarized that guideline. And so I tell you, you can't make this stuff up. It's clearly something that's more common than we might think.

There have been reviews that have been done that have tried to assess the question of whether plagiarism is more common in certain regions of the world as opposed to others. I'm agnostic about that, because I think all of these studies are actually done in methodological ways that are very suspect. But what I use this slide for is to highlight the fact that plagiarism is not a regional problem.

It is a global problem. If you look at the darkness of the gray nations that are here that are meant to highlight hotspots with regard to plagiarism, you see that there are hotspots all around the globe. Plagiarism is an international scientific issue, not a uniquely regional phenomenon.

So if you have encountered plagiarism in your work or you believe that somebody may have plagiarized your work, what do you do? Here at Mayo Clinic, the starting point for those discussions is the Office of Responsible Conduct of Research, an office that I co-lead with Steve Evans in Research Administration. If you have any questions about whether there might be inappropriate conduct, research misconduct involved, give us a call. We can help you to talk that through and provide a very discreet sounding board for the concerns that you may have.

In addition, I'd encourage you, if you have a very high level or high visibility case of this sort, to talk with the dean at your respective area in Arizona, Florida, or Rochester. Here in Rochester, that's Dr. Gores. And lastly, if you have some case that you're not sure if it's plagiarism but it's unsettling to you in some other way-- you feel like perhaps somebody might have been misrepresenting work, that they're out there giving presentations and talking about work that you thought was jointly done, but they're not representing you fairly; maybe it's not plagiarism, but it doesn't feel quite right-- you can also call us. And we can help you to think through that sort of situation as well.

We support a service that we call the Clinical and Translational Research Ethics Consultation Service, which is designed specifically to help scientists to think through those sorts of challenges. Lastly, let me just finish with this slide, what research misconduct is not. Because I think there are a lot of confusion about this. It does not involve honest errors of judgment or differences of interpretation.

I think sometimes people worry that they're going to find themselves in these sorts of disputes, when at the end of the day, they've simply made a small error that can be easily corrected. You haven't realized that the work that you're submitting for publication, you had inadvertently submitted a portion of that somewhere else. Well, fix that before it gets out there in the scientific literature.

And don't be worried about the fact that you may be blowing the whistle on yourself when you come across a situation like that. Research misconduct doesn't include those kinds of honest errors that do on occasion happen and do happen in very big labs, too. Research misconduct does not include authorship or collaboration disputes, either.

Again, if you're feeling like somehow you should be assigned to third on the list of authors as opposed to sixth and so forth, that's not research misconduct, either. Those are the sorts of things that happen everyday in research and get negotiated and usually resolved appropriately. Nor does it involve forms of fiscal impropriety or issues involving the IRB or IACUC.

So the last piece of advice here is a simple one. If you are concerned about whether your work is adequately being represented by others and appropriately being represented, or whether or not you should be acknowledging the work of others and the publications that you have, always err on the side of transparency. It's a very simple takeaway from the talks this morning. Always err on the side of being more explicit rather than less explicit. And with that, let me go ahead and turn it over to June.

JUNE OSHIRO: So my part of today's presentation is to discuss with you the text matching software that we use here at Mayo Clinic. So the software product that we use, it is called CrossCheck and it's created by a company iThenticate. It's similar to that Turnitin program that you may be more familiar with if you have kids in high school or college, or perhaps you are recently out of college yourself.

So this software product is used by many, many major publishers of biomedical journals, including Elsevier, which alone has more than 2,000 journals, and also includes major titles such as *Nature, AAAS,* which publishes science, *New England Journal of Medicine.* The way that the software works essentially is it will take your manuscript, which you will upload onto their website, compares the submitted manuscript against their database, which is pretty much a massive and comprehensive database.

Part of the licensing agreement that that software company does is that when you become a member, you agree to let them index all of your content. And so nothing is behind a paywall. They have access to pretty much everything else Elsevier has ever published, everything New England Journal has ever published, and so on.

And what they will do once they've done their analysis-- and it's a very quick thing-- they'll give you a similarity index. And so what you see here is just a visual representation. This is an abstract that I tweaked a little bit as if I were plagiarizing and trying to reword things a little bit. But this kind of report is essentially what the journal will see when they run your manuscript through the software.

And so basically you'll see the areas of concern are highlighted. If I had munged together, copied and pasted from multiple sources, it would be color coded. Since I only copied from one source, everything is pink. But if there are four sources, you'd see pink and blue and yellow, and it would show very clearly where each match originated-- and a 71% similarity index, in this case.

It looks at the number of words that appear to match previously published sources over that total number of words. I should add also that we refer to this as text matching software and not plagiarism detection software, primarily because, as Richard said before, plagiarism has to do with your intent to hide or mislead the reader about the origin of the source. And this software does not attempt to understand what you are thinking when you generate this text.

So essentially, it's just looking for matches to previously published work. And once in a while, it will turn out that-- I've had this happen a few times-- we have author A who writes the original work, author B who plagiarizes it. And then author A self-plagiarizes, and then that's somehow caught because it's matching author B.

And it looks like that person is plagiarizing, even though it's the other way around. So it tends to look at the most recently published work when it's deciding its match. So because we use the same software that's available to the major biomedical journals, we encourage everybody to come and take advantage of this resource.

The license that we have is institutional, and so there's no cost to your department. It's a very fast turn around from the time you email it to us. We should be able to get it back to you within 48 hours.

The results are confidential. They are returned to the person who submitted their request. And if the person is not consultant level staff, then it goes to their staff contact person. And I tossed in nonjudgmental.

No shame about copying or anything like that. We just give you the report and help you understand it and help you make changes to your text if you would like that kind of help. And this service has been in place for a few years now, and it's been endorsed by the Board of Governors. Dr. Noseworthy would like you to take advantage of the service, so please don't hesitate to contact us. I feel like the service is not particularly well known throughout the institution.

So please tell your research colleagues, tell your supervisors, tell the people who work in the neighboring lab, and let them know that we are here to offer this resource. Basically, to access it, you'll go to the Mayo Dock. You go to Productivity Tools, and under that is something called Plagiarism Prevention.

If you click on that, that will trigger an Outlook message. And you'll attach your file to that. It will ask you for some contact information and things like that. And basically, like I said, a 48 hour turnaround, and you'll get the similarity report and some guidelines for understanding that.

Some of the questions that we get a lot about the service-- so who receives a copy of the report? So like I said before, it goes back to the person who requested the service, and also a staff level consultant or somebody of that level. What I want to emphasize is that we are on your side.

It's not us versus you. We are not a watchdog or a policing organization. The way that I like to think of it is that we want to catch any problems and help you address them in-house before you send your manuscript out to a journal.

I mean, if a journal runs your manuscript through, finds a lot of stuff, they're not going to tell you, no thanks, we don't like plagiarized work. They'll just say, sorry, this is not a high enough priority for our journal or something. They won't tell you what the problem was.

And so if there are things that we can take care of that will improve your chances of getting the paper accepted, why not? Let's take care of this while we can before it's submitted. The next question that we commonly get is, what level of similarity is generally acceptable?

My example had a 70% similarity index. And so there's no good answer for that. Because you can have fairly large matches that are completely OK, because they have the correct attribution. They have quotation marks indicating that this is verbatim reused text.

Or perhaps you've already gone through all the copyright channels and gotten all the appropriate permissions. So you can have a large match, which is ethically acceptable. And the flip side is you can have a very small match, which is completely not acceptable. Because you have, for example, a verbatim match but no attribution.

You could have, for example, two paragraphs in your discussion which seem to match somebody else's work entirely. And that's a big concern when a discussion is supposed to be an interpretation of your current study. And so why are you copying two paragraphs from somebody else?

And so there is no good cutoff to say, oh, this is a concern; this is not a concern. So you have to look at every individual match and make a judgment about whether it is OK. And some of the questions we also get is, I've got my similarity match; I see I have areas that I need to address. Well, how exactly do I do that?

As Richard said before, the first thing, if you are using a direct quote, put quotation marks around it. Make sure you include your source. I like to include this slide. What I think tends to happen is that when people are writing, everyone has 15 minutes here, an hour here, next week no time at all.

And people will be doing their background research. They get all their sources together, just dump it into the file. And then they go back to it three weeks later, and they cannot remember at all what was copied from some other thing, what they wrote themselves. And so my suggestion, if that's the way you operate, when you put your document together, annotate it right away.

And so my examples here-- I have need to paraphrase, so that when I open this up a month later, I'll be like, oh, right, this is not my own text. I've also highlighted. I have that reference source right there. So it's unambiguous that this is not my own writing. So add your citations.

In this case I use track changes, so I can see that this part has been rewritten. I have a note on the side that says, rewrote. I also have the citation. So as long as track or annotate in such a way that anybody who opens a file, if you're circulating among your co-authors, if you find it yourself six months later, it's still very clear to you what you've done, what you still need to do.

Another thing that I'd like to mention, and we've done this once in a while-- so when somebody has a large thing that they would like to reuse and for whatever reason is unwilling to rewrite text, we have worked with the original copyright holders-- so this would be the journal that's already published a review article-- and obtain the copyright permission for reuse of that text. We also put in the cover letter to the journal's editor, saying, portions of this manuscript have been previously published in journal source. And indicate that the copyright permission has been obtained for reuse.

And we also put that on the title page of the manuscript itself so the reviewers are also alerted. And this goes back to what Richard was saying about transparency and making sure that you let everybody know at every step of the way that you're not trying to fool anybody.

You're not trying to be sneaky about what you're doing. So yes, some of this has been published before. And if you're upfront about it, then you will not run into the ethical concerns about your intent. That's all I have to say.

WILLIAM LANIER: Thank you. It's a joy to present today. I love to speak to authors of all stages of their careers, but particularly those in the more formative years. And I can look at many faces here and remember myself before I got fat and wrinkled and old.

I want to talk about a little broader topic than what we've heard from the previous two speakers. And this is a broader net cast over author misconduct from an editor's perspective. During my talk, I want to discuss the common forms of author misconduct when dealing with biomedical journals from an operational point of view at a journal, locate some reference sources for you that should help you with the definitions of misconduct and identify appropriate responses to misconduct, and understand the actions taken by journals after misconduct has been identified and some of the consequences for authors, which you've heard a little bit about from the previous two speakers.

Here's the obligatory disclosure statement for the organizers. And myself, I have no conflicting or competing interests that will hinder the quality or integrity of my presentation, with one possible exception. And that is I have a huge dedication and loyalty to this journal that I edit, *Mayo Clinic Proceedings,* and will probably do anything legitimate in my power to make you think good thoughts about it.

You may not know much about *Mayo Clinic Proceedings* because it's right under your nose. And you might think that because it's got our institutions name of the title, well, how important can it be? But it is a very big to-do on the world stage.

Mayo Clinic Proceedings is a general internal medicine journal. That tends to be the largest, broadest message, most widely quoted type of journal, like *New England Journal of Medicine, JAMA, The Lancet, Annals of Internal Medicine.* This is a treat for you. This is the July issue cover that will be coming up in just a little bit.

And we're going to talk about these recent dietary guidelines that just came out from the government and whether they were legitimate or not. We've got two articles on that, one that says that the core data are highly illegitimate with conclusions about whether you should eat eggs or not this decade and what kind of fats you should eat this decade, versus next are bogus because the data are so flawed.

We've got some articles on renal replacement after heart surgery, streptococcal endocarditis, zoster vaccination in people who are immunosuppressed, overview of peripheral neuropathy, two articles on opioid analgesic use and abuse, and an article from Dr. Tefferi on myelodysplastic syndromes, which got incredible reviews during peer review. My perspectives that I will share with you today are informed by this journal. And just to put in a plug for our journal, we're in our 89th year of publication and sponsorship by Mayo Clinic.

The *Proceedings* is now the world's second largest circulation general internal medicine journal, ranking only behind *Journal of American Medical Association.* That means we are bigger than the *New England Journal of Medicine.* We're bigger than the *Annals of Internal Medicine.* Were four times the size of *The Lancet,* and our North American circulation is 20 times that of *The Lancet.*

We're also the world's third largest print biomedical journal of any genre. Only *JAMA* and *American Family Physician* are bigger. Our impact factor is 6.26. That ranks us 11 out of 152 journals in our category, or the best 7%. 80% of our authors are now not affiliated with Mayo-- 80%. They came from 50 countries last year.

Our acceptance rate last year was about 15% to 20%. This year it will be about 12% to 15%. Our website is accessed by 10,000 to 15,000 people a day, and we reach more than 4 million people a day through the media, or more than 1.2 billion last year. So your hometown journal is a very big to-do.

Now, the way we decide what gets into the journal is by process of peer review. We have an editor-in-chief, yours truly, seven associate editors, 35 board members, and last year we had more than 550 peer reviewers that helped us assess manuscripts. And they came from around the world.

The first thing we ask ourselves is, is the material relevant to our audience? Secondly, if it's relevant to our audience, is it important? Will it have an influence on the present and future of medicine? Are the results and conclusions generalizable?

That is, the results found in this population-- can they be used and applied to another population? Will other authors cite the material? We want to change the world, and we're not bashful about it. Because we have these incredible resources.

And finally, if we fulfill those criteria, we worry about the visibility of the material and where it might be picked up by other journals or by the media. Now, while we are looking at manuscripts from this good perspective of, do we want them, we've also got an eye out for author misconduct. And my list as an editor is a little different, but not so much from what you've seen before.

And we worry about plagiarism, duplicate publication, and misrepresentation or fraud. And I want to talk about those a little bit. We've heard from Dr. Sharp about plagiarism of words, and we've heard from both speakers about plagiarism of ideas.

With software, it's pretty easy to find plagiarism of words now. Before we had this software, it was amazing how many reviewers caught it. I'm just astounded at how knowledgeable the reviewers are and how well-versed they are in the literature. Plagiarism of ideas is a lot harder to detect, because there may be no shared words. And so we have to rely on techniques that you hear from the other authors.

How bad can plagiarism get? A couple of months ago, we had a recruited article from the most visible person in his field in the whole world of one of the hottest topics in medicine today. And his manuscript showed up, and it was 96% plagiarized.

The entire abstract varied by one word from other materials. The introduction was 3 and 1/2 pages long. I think it had five words that were different from somewhere else, and so on and so on and so on. At the same time, Dr. Vincent Rajkumar and I had written an editorial that was on topics that we both thought about for two decades.

And we wrote it, and I thought, boy, this is a good chance to see what people who are trying to do the right thing, Dr. Rajkumar and myself-- what sort of reproduction rate we have on something that we've written on a lot. And I gave it to my assistant, and she ran it. And she said, you're not going to believe this. What do you think the number is?

And I said, 23%. And she said 6%. And I've been writing on this for decades, and so had Dr. Rajkumar. This gets us into the issue of self-plagiarism. Dr. Sharp talked about it.

Philosophically, it's a really neat concept. Operationally, for an editor, it's very problematic, because half the people who talk about self-plagiarism want to snicker and cross their fingers when they talk about it. It doesn't do us much good to talk about self-plagiarism from an enforcement point of view.

So what we think about is copyright infringement, that if you publish in the *New England Journal of Medicine* or *Annals of Internal Medicine* or *Annals of Emergency Medicine,* the odds are overwhelming that that journal or publisher now owns a copyright for it. And if you take that material and you reproduce it without attribution, it's copyright infringement.

Now, what you can do to avoid this if it's self-plagiarism is give yourself a self-citation. In the introduction say, here are some ideas we've developed before, as in our previous publications, And here we're going to expand on those. On the methods you can say, here we describe the methods in brief, which we've reported in greater detail previously.

And you immunize yourself. If you have a question, send a note to the editor-in-chief. They may think what you did was stupid, but they won't think you're a crook.

One of the examples we had-- 10 world famous authors published in the *Proceedings.* The same material ends up in another journal, except they've changed the title around and the first sentence or two of every paragraph and turned the figures and tables around to camouflage them. You say, well, that's duplicate publication. No, it's plagiarism.

See, one of the authors took the manuscript and sent it to a leading journal in his field, of which he was on the editorial board. And there were 10 authors on both papers. And you say, well, they're all at fault. No, he went another step forward.

He took 10 forms that said, this is not duplicated, it's my own work. And he forged the names of nine other world famous people and sent it into his journal. So we tried to approach that journal and say, you've got a problem here. And for three months, they ignored us and just would not respond and do the right thing.

So I went to our legal department. We sent them a note and said, hello, we're the legal department of the $9 billion dollar a year Mayo Foundation, and if you don't act within the next 10 workdays, we will bring a major lawsuit against you for copyright violation. And about two nanoseconds later, we got a response saying, how can we make you happy? And I said, don't ignore us.

Duplicate publication is another issue. There's unauthorized duplicate publication. A more common form of this is let's say a US investigator goes to Eastern Europe to talk to our Super Speciality Society, speaks about a highly refined niche area.

They have him give the keynote address. They demand a little article that they can put in their journal. There are 100 people in the organization. There are 200 circulation for their journal, but it's indexed in PubMed.

He gets home. So people say, boy, that was a really neat article, you should go to a bigger organization. And being what they are, the person here agrees, sends it to another journal to tell them it gets published. Now it's in PubMed twice.

And we had one of those that was picked up by the*Cochrane Review* where somebody did that. And they wanted to know where their 1,201 patients or 2,402 patients that were studied for this phenomenon. Now, there is such a thing as authorized redundant publication.

That is the same story as I told you before, but that author approaches the first journal and says, I think this needs to go to a broader audience. And that journal says, we agree with you, we're fine with that. Then the author goes to a second journal and says, could we redundantly publish this with the full knowledge of both journals?

And we publish it and we say that everybody knows about everything and we admit that it's a repeat publication. And that is authorized redundant publication, and that's OK. There's also authorized concurrent publication. And in the August issue of the proceedings, we're going to do this for the first time in the journal's 89 year history.

The American Heart Association, when they have guidelines, sometimes they want it to go out to a US audience and a European audience, and sometimes they co-publish major guidelines with the *Journal of American College of Cardiology* or the *European Heart Journal* or *Resuscitation.* This time we became the first publisher, the publisher of record, for this, *Mayo Clinic Proceedings* and not *American Heart Association Journal* for an American Heart Association/European Society of Cardiology guideline. And the co-publication is coming from the *European Heart Journal,* a journal that has more than twice the impact factor of the*Proceedings.*

There will be a major press release, and everybody knows about everything. And that's OK. Misrepresentation or fraud, the things that we worry about are a fabrication.

There never was any research. There weren't any cell cultures. There were no patients. There were no lab rats. You just made it all up. Falsification-- you can do a study, but then falsify what happened to some of the patients or some of the rats or some of the cell cultures.

Or there is manipulation, and the most common form is image manipulation-- gel electrophoresis, blots. And before and after plastic surgery, you alter the lighting, ask the patient smile, and the wrinkles go away. There's a whole article in the *Proceedings* by Dr. Ricky Clay showing people who didn't have plastic surgery and how you can make it look like they had miracle plastic surgery.

And so these are problems. And then there's omission. You had a control group, you had two study arms. One study arm did what you wanted.

You publish it. The other study arm didn't. You pretend it never happened. This happened with the drug companies a fair amount, and this is why we have preregistration of randomized clinical trials. And if you don't preregister them, most big journals now will not publish your results.

This is a problem that you would think with all the technology that you heard about would be going away, but that's not the case. This is an article from the *Wall Street Journal* in 2011, fall of 2011. From 1977, when the first impact factor came out, there are this many articles cumulatively.

So now we are up around 20 million articles since 1977. And on the blue is the retractions per 100,000 publications. And you would hope that this would be sort of flat, but it's going up a lot faster than the number of publications. And that's because we're seeing more and more funny business than we've ever seen before.

This same study done by Thomson Reuters and the *Wall Street Journal* found that of all those retracted papers, three out of four were simple errors, like we've heard from the speakers before me. That's OK. We're human. We can make errors, but one out of four were for fraud.

What is the world record for fraud? That's been in debate recently, but two of the three, if not three of the three, winners of the fraud contest are anaesthesiologists-- third place, US, second place, Europe, first place, Japan. The new world record is by Dr. Fujii from Tokyo, Japan.

He published 180 articles largely on perioperative nausea and vomiting. About half of those have been shown so far to be fraudulent, and it's suspected that maybe all of them are. He's had his articles retracted by multiple journals, research into his research saying that it is statistically almost impossible that he got the results he did.

And one of the reasons is the results were too consistent among studies, and the randomization didn't look like randomization when you subjected it to forensic statistics. Multiple journals have retracted his articles, and there are other disciplinary actions from his institution and his home country.

If you have any questions about definitions or what you should do or not do, there is some great reference books-- the *Chicago Manual of Style,* the *Scientific Style and Format* from the Council of Science Editors, and the one we use at the *Proceedings, AMA Manual of Style, 10th Edition.* I'm so familiar with it, you turn off the lights at my office, put me at my computer screen, and my copy is right there. It has everything you can imagine about who should be an author and who shouldn't.

If you have a problem or you think you do, how do you avoid it? If you've committed an offense, how do you remediate it? What do journals do when they suspect misconduct?

At our journal we document our concerns and place that information in a confidential file. From the time we first find out about it until we do this is probably at most about four hours. We immediately form a task force that usually includes an associate editor and other members of our editorial board.

We may go outside for information, but we want confidentiality at all costs. We may assign a statistician. We may assign some office staff. We try to complete our investigation within a couple of days to a week. We don't tell anybody what we're doing until we've reached a decision.

If true misconduct is identified or strongly suspected, we halt the manuscript review process and notify the individual and that individual's home institution's ethics board. We do a nice thing. Usually, I give them two weeks or three weeks to notify their ethics board themselves, the investigators.

I send them a formal letter, and I tell them that when their ethics board responds to me, they have to give me my letter back. And we give them a certain amount of time to do their institutional review. What happens when misconduct is proven? There can be actions by the journal.

We can publish statements. We can retract articles. The institution can discipline the individual all the way up to firing. The funding organization, such as the NIH, can discipline the person up to withdrawing funds.

And if federal funds have been used inappropriately, misappropriated, you can go to prison for this. And one of the investigators in the anesthesia fraud in the United States went to prison for misappropriation of funds. The author's professional societies can kick them out. The journal, if they're on the editorial board, can kick them out.

You may say, well, gee, this would never happen any of us in the room, because this is about bad people who live halfway around the world. But it is true that in the 16 and 1/2 years I've been editor, we have caught author misconduct involving prominent institutional officials, department and division chairs, editors-in-chief of leading medical journals, people on the editorial boards of other leading journals, senior contributors to specialty boards, NIH-funded investigators, and leading national or international authorities in medicine.

You may say, ah, I've been paying attention to you, Lanier. Because 80% of your manuscripts come from outside Mayo, and that's where those bad people are. And that's true. The bad people at all those outside institutions check every one of these boxes, but Mayo employees-- Mayo Clinic employees-- check every one of these boxes, too-- I mean, really, in my personal experience.

So some of the most revered people in our institution have gotten caught up in this mess. And at Brigham and Women's Hospital last year, the Head of Anesthesiology stepped down quickly, and there are two other major figures that are under suspicion there for impropriety. There are major career benefits for publishing in the indexed biomedical literature.

This includes adding new information to a collective body of work, advancing clinical care, or redirecting current contemporary research, concepts, and advancing your career. It takes years or decades to positively affect a career by doing the right things, but only moments to harm it by one episode of fraud or some other type of author misconduct. So thank you very much.