**Dr. Erica Stringer-Reasor** **shares her expertise on precision medicine advancements in breast cancer**

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Karan Cushman: Welcome to the [*The Precision Medicine Podcast*](https://www.interventioninsights.com/precisionmedicinepodcast), sponsored by Trapelo. This is the podcast where experts come to discuss the problems oncologists, reference labs and payers face as precision medicine grows, and consider solutions for advancing the quality of patient-centered cancer care. Be sure to subscribe at precisionmedicinepodcast.com to get the latest episodes delivered straight to your inbox.

Jerome Madison: Welcome to The Precision Medicine Podcast. I'm Jerome Madison, and today we have Dr. Erica Stringer-Reasor, Assistant Professor of Hematology Oncology at the University of Alabama, Birmingham, who's here to talk to us about the advances of precision medicine in breast cancer. Dr. Reasor, welcome to the podcast.

Dr. Erica S-R.: Thank you.

Jerome Madison: We've known for some time that all breast cancers are not created equal. The ability to subdivide breast cancer based on its molecular characteristics has really served as a model for other cancer types, and now other diseases, to find more effective treatment options, Dr. Reasor.

Jerome Madison: I guess it was tamoxifen which was introduced as the first targeted therapy for hormone receptor-positive breast cancer, followed by trastuzumab, an anti-HER2 therapy. Which are perfect examples of the impact of precision medicine turning what was once a bad thing, having certain gene expression, into a good thing. Because we can target that gene with the therapy, and as a result improve outcomes. I guess the first question would be why has breast cancer led the way in the adoption of precision medicine?

Dr. Erica S-R.: Certainly. Breast cancer has certainly had so many landmark drugs over the last several decades. What we found is that one in eight women in the United States are affected with breast cancer, so that's almost about 268,000 new cases of breast cancer expected in 2019. Because there are so many women that are affected with breast cancer, it has led the path in research developments over the decades.

Dr. Erica S-R.: Certainly, tamoxifen was one of the first targeted therapies in which women that had hormone receptor-positive breast cancers certainly found not only a treatment effect, but it improved their outcomes. That drug was brought about in the 1970s, and fortunately it took us over 20-something years to even find a second targeted agent, which was trastuzumab for patients with even more advanced breast cancer. Again, there is a charged effort in very many women's consortiums to find more effective therapies in this disease that is affecting women not only in the United States but worldwide.

Jerome Madison: Would you say that really patient advocacy has really pushed that sense of urgency to find these developments or push these developments in breast cancer?

Dr. Erica S-R.: Yes. Certainly. They definitely have. When those developments have come about, as we talk about this oldie but goodie, tamoxifen has brought about, again, that we could improve patients' outcomes, not only their prognosis and their survival, and just with that effective targeted therapy it spurred the necessity to keep looking for even more targets to improve patients' outcomes as well.

Jerome Madison: Speaking of which, so I heard you speak this summer at the Best of ASCO meeting in Austin, Texas, and there is a considerable amount of research in metastatic breast cancer across different subtypes. You reviewed I think it was four different studies at that meeting, all of which involved different targets across the different subtypes. Why are there so many clinical trials targeting metastatic breast cancer?

Dr. Erica S-R.: There are…statistically one in eight women, again, will be diagnosed with an invasive breast cancer, and about a quarter of those patients will have a relapse. At the time the patients have these relapses, they may have incurable disease or stage-four disease, and so there's a dire need to find more targeted therapies to treat patients with late-stage disease. As the earlier drugs that we use in upfront diseases are helping patients to have a good response, and so now our goal has switched to prolong life in this high-risk population.

Jerome Madison: There's been a lot of conversations over the years as the goal is to turn cancer into a chronic disease. Do you think we're moving in that direction with finding all of these different targets and prolonging life in metastatic breast cancer?

Dr. Erica S-R.: Certainly, if you ask any physician, any physician scientist, our goal would be to try to cure cancer in general, and never have anyone have to make that decision thinking about cancer treatments. Oftentimes over the last several decades there have become more and more effective therapies for our patients with stage-four disease.

Dr. Erica S-R.: Our goal is to bring those effective therapies to the upfront setting, to the early stage setting when patients have curable stage one to three disease, to see if those therapies work more effectively in the early-stage breast cancer patients. So that we don't, as physicians, have to have discussions with our patients about recurrences. Certainly, myself and other physician scientists would love to find a cure for breast cancer and any other tumor.

Jerome Madison: Tell us about some of the targets that you talked about that are being studied and the impact they're making within these different subtypes of breast cancer patients.

Dr. Erica S-R.: Breast cancer used to be that we would just subdivide breast cancer into three different subcategories. Were you hormone positive or hormone negative? These tumors, were they driven by female hormones such as estrogen and progesterone? The second category are these HER2, overexpressed tumors, so these human epidermal growth factor receptor tumors.

Dr. Erica S-R.: We found that this protein or receptor was found not only in breast tissue but also in some of our gastrointestinal systems, such as our esophagus and stomach. Too much of that protein, overproduction of it actually spurred cancers to develop. Then the last one is this what we call a triple negative breast cancer. These tumors are not hormonally driven, so not driven by the estrogen or progesterone. Thirdly, they're not driven by this HER2 protein, which I discussed about.

Dr. Erica S-R.: This triple negative breast cancer is often seen in our younger patients, so young, less than 50 years old, and in our minority populations. Through the efforts of many researchers, breast cancer has been even more subdivided into smaller, even bigger groups. Again, why this is important is that all breast cancers act differently. Even in the hormone receptor-positive group, these estrogen positive groups, we found that we've subdivided them even more to tumors that are very sensitive to hormone blockage of these female hormones, then tumors that are not as sensitive.

Dr. Erica S-R.: For physicians, the reason why this is something that's very exciting is that we now know that we may be able to find better therapies for our patients and help them make personalized decisions in their treatments. We know that a patient has a hormone positive breast cancer, but we test the tumor and it seems like that their particular cancer may not respond to hormones, hormone blockade. We could help make a decision with the patient to try a different therapy to treat their cancers, that may be more effective.

Jerome Madison: You also have a research focus in pharmacogenetics. For our audience can you explain what that is, and how do you think it could complement genomic testing to find druggable targets?

Dr. Erica S-R.: My research focus is pharmacogenetics and pharmacokinetics. What pharmacogenetics is, is that we know that every human, every cell is made up of DNA. That's what genetics is. Pharmacogenetics is a branch of genetics concerned with the way in which a person or individual's genetics or attributes really affects their likely response to some drugs.

Dr. Erica S-R.: From here we know that I could take a medication and perhaps my neighbor could take a medication, but certainly some of the side effects may be different that I have than my neighbor's side effects. We wonder why that is. If you look at DNA of every person or their genetic makeup, 99% of our DNA is similar to our neighbor's. What about that 1% of our genetic makeup makes us different, and makes our bodies respond to variety of drugs differently than our neighbor's?

Dr. Erica S-R.: This subject of pharmacogenetics is very important as we look in different ways into developing drugs to target tumors and figuring out why patients respond to different drugs differently. Hopefully what we're looking to do and to develop is develop new ways to effectively target drugs and compensate for these differences among patients and patient populations.

Jerome Madison: It seems that the field of pharmacogenetics has just exploded. Everywhere you look there's a new lab offering a test. How has it been received clinically, or do you see this being used in your practice and even in the community setting? How is it being received and adopted?

Dr. Erica S-R.: We have different tests. You're right, we have different companies popping up with different platforms every month. How does this relate to our patients? Well, there are some genes that you are born with that passes down from your mom and dad, and those are some hereditary genes. For patients that are diagnosed with breast cancer, what we found is that there are some genes that can make your risk of having a second breast cancer by 50%.

Dr. Erica S-R.: We want to know if that patient has those genes. Our patients that are young that come into our clinics, as the average age of breast cancer is about 62. When a patient comes in in their 40s diagnosed with breast cancer, this is uncommon. We're seeing this more and more, so we want to know are they carrying one of these genetic risk factors such as Angelina Jolie's family, that BRCA1 or 2 mutations.

Dr. Erica S-R.: We also know that there are other smaller mutations that can make your risk increase up to 10% of having a recurrence. Again, that's a lot higher than the average population. We want to be able to give that information to our patients to empower them to make decisions about their health. Secondly, there's some genetic mutations that also make you at higher risk for hereditary cancer syndrome such as ovarian cancer in women, and also in men some prostate cancers, and colon cancers in both genders.

Dr. Erica S-R.: Not only is this a decision-making tool for the patient, but also may have some implications for offspring and siblings, and such, of that patient being diagnosed. Another tool that we're using to look at the genetics of tumors are not only these liquid blood biopsies, and also biopsying the tumor. We can look at the DNA of the tumor and actually see if we could target some mutations on the tumor to help us, again, pick more effective treatments or potentially sort out some more effective treatments for that patient, which may help their tumor respond.

Jerome Madison: You just talked about the different applications of the pharmacogenetic tests that are out there. What's your experience with patients coming in with these direct-to-consumer marketed tests like 23andMe and others that are out there? How do you message to them its utility versus some of the tests that you've just been talking about?

Dr. Erica S-R.: There are special labs that are certified looking at some of the DNA testing. What we say is you want to have a sensitive test, and you want to have an accurate test. You want to be able to take a test and know that those DNA mutations are found consistently among people that are doing the screening tests. Then you want to be able to, no matter what day it is or what time it is, that they can replicate these tests. You don't want to just get these genetic tests done in Mister Joe's Lab. You really want to have a certified lab who does this often and can detect mutations.

Dr. Erica S-R.: A lot of the off-market tests that you listed below, they can be helpful. Some of the major genes, they do test for some of the BRCA1 and 2 mutations in general, but we know that there are not just the main BRCA1 and 2 mutations, there are other mutations. Again, you want to discuss with your physician doing those tests in a certified laboratory. If you did get an abnormal test, you want to show that to your physician and have that repeated.

Jerome Madison: Dr. Reasor, we know, and I've done my background on you after hearing you speak, you're a very fast-rising star in the field of cancer research. For those who may not have heard of Dr. Reasor, you have been awarded several awards for your research, including AACR's Minority Scholar in Cancer Research, also the Conquer Cancer Foundation ASCO Young Investigator Award. For the majority of the country in the U.S. who are just as sick and tired of hearing Roll Tide as I am—sorry, Karen—Dr. Reasor is a proud graduate of Auburn University.

Jerome Madison: Well, you were recently recognized by your school, by your alma mater with the Young Alumni Achievement Award, which recognizes only one alumnus a year who has achieved notable accomplishments under the age of 40. Those were just a few. There are several that you've notched in your research career. What does it mean to be recognized by the university for the work you've done in cancer research?

Dr. Erica S-R.: It feels pretty awesome. I think that you guys know as well as I do that Alabama is really known for its football. If you Google anything about Alabama, you know there's Alabama football, as in the University of Alabama, and Auburn football as well. It means a great deal to stand out in a lifetime achievement award for being acknowledged for scientific merit. As women in science is growing and becoming more of a platform, but we feel there are a lot more men in the field.

Dr. Erica S-R.: Then secondly, just as a minority woman, feels good to be able to show that platform about women in science and minorities in science. Actually when my patients Google me, more than them seeing what grant I received from Susan G. Komen or B Foundation, they come up to that young early career lifetime achievement award from Auburn, immediately get some street credit. Like, "She must be okay. She's got the achievement award from Auburn." It has definitely been an honor.

Karan Cushman Jerome, I've got one additional question. I was curious, Dr. Reasor, your thoughts on clinical trials in the breast cancer space. Do you feel that because the focus is on advanced cancers, as you mentioned, and getting more targeted therapies, are more clinical trials becoming available and accessible to patients?

Dr. Erica S-R.: There are more clinical trials evaluating all stages of the cancer, from stage four to early stage disease. I think that one of the barriers to getting access to clinical trials in multiple institutions is that many of our patients are seen in the community. There are not many academic institutions that associate themselves with many of the community practices. In order to pull those patients from the community, because that's where they're being seen, to some of the academic facilities, we have to have good relationships with our community colleagues.

Dr. Erica S-R.: Then we have to bring the news out to these community physicians, so that they know what kind of trials are being run in our institutions. UAB and in many other academic institutions we try to do small informational reviews for our community colleagues. We do a small ASCO review for our community physicians sponsored by our hospital. We'll also do some small talks in some of the satellite clinics across the State of Alabama, lower Florida and in Georgia. Again, if patients have the ability to travel, they will come up to our institution.

Dr. Erica S-R.: I think the long-term resolution to this is to train and educate our community physician partners on how to run the clinical trials and bring those clinical trials to the patients, instead of the patients coming to us. The long-term goal, a lot of large institutions will need to affiliate with some of the community practice in order for us to bring better care to our patient and advance science quicker.

Karan Cushman Well, you answered part two of my question right away. Fabulous.

Dr. Erica S-R.: Perfect.

Jerome Madison: Well, we are honored by your presence on our podcast, and thank you for the work you do, and continue to do great things for not only breast cancer patients but other cancer patients in your research and as a care provider in the space.

Dr. Erica S-R.: Thank you so much for having me.

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**About Our Guest: Erica Stringer-Reasor**
Assistant Professor, University of Alabama Birmingham

Dr. Stringer-Reasor attended medical school at the University of South Alabama in Mobile, Alabama. She then did her internship in Internal Medicine at Tulane University, New Orleans, Louisiana and finished her residency at Baptist Health Systems in Birmingham, Alabama. She completed her training in both Medical Hematology/Oncology and Clinical Pharmacology and Pharmacogenomics at the University of Chicago in June 2015. Currently, Dr. Stringer-Reasor is an Assistant Professor at the University of Alabama at Birmingham.

She is a member of the Translational Breast Cancer Research Consortium (TBCRC), American Society for Clinical Pharmacology and Therapeutics (ASCPT), American Society of Clinical Oncology (ASCO) education and eLearning committee, American Association for Cancer Research (AACR), and National Comprehensive Cancer Network (NCCN) breast cancer guidelines committee.

Her translational research focuses on aggressive subtypes of breast cancer including human epidermal growth factor receptor positive (HER2+) and triple-negative ((ER-/PR-/HER2-) and early-phase clinical trial design. She works together with basic scientist to translate laboratory findings to the clinical setting, designing investigator-initiated clinical trials, and serving as lead investigators over national trials. Her research emphasizes the evaluation of pharmacogenomics, pharmacokinetics, and targeted therapy in breast cancer. Dr. Stringer-Reasor’s research has been funded by Susan G. Komen and Victory Foundation. She has several peer-reviewed publications in journals including *JAMA Oncology, Breast Cancer Research*, and *Gynecology Oncology*.