**EPISODE THIRTEEN:**
Dr. Bobby Ready:
Taking the Lead in Precision Medicine as a Surgeon
Dr. Bobby Ready, Chief Medical Officer, Nanthealth | May 2019*Welcome to* [*The Precision Medicine Podcast*](https://www.interventioninsights.com/precisionmedicinepodcast)*, 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.*

Jerome Madison: Welcome to the Precision Medicine Podcast. I’m Jerome Madison, Vice President of Provider Relations at Trapelo, and one of the hosts of the Precision Medicine Podcast. And today we have Sandeep “Bobby” Reddy, Chief Medical Officer of NantHealth, a gentleman who has produced over 100 abstracts, 30 peer-reviewed publications since 2014 in the field of precision medicine.

 Dr. Reddy, thank you for being a guest on the Precision Medicine Podcast.

Dr. Bobby Reddy: Thank you, Jerome. You can call me Bobby, and it’s a pleasure to be here.

Jerome Madison: Absolutely.

 Tell us about your training, and what was it that attracted you into the field of precision medicine?

Dr. Bobby Reddy: Well, I trained as a hematologist-oncologist, and at the time the notion of precision medicine was just emerging. In training one is exposed to the idea of evidence-based medicine, and you spend a lot of time memorizing the results of a clinical trial, that A beat B, that the hazard ratio was so and so and the p-value was statistically significant. And at that time there was this emerging idea that we could better select individual patients for these clinical trials, and it made me question and think about the data that I was memorizing, that I was internalizing. How we would choose which regimens for, say, a breast cancer patient, a colon cancer, lung cancer patient. The idea that we could actually change that from being agnostic to the individual patient, where we’re just looking at a big trial ... being able to take that data and drill it down to being highly specific, it just was very compelling for me at that time.

Jerome Madison: Bobby, I’ve known you for some years, and just going back in this field of precision medicine I still have conversations with early adopters, forward-thinkers like yourself, that back in 2005, 2004 people were saying, ah, we’re not there yet, we’re not there yet. And there’s still some saying, we’re not there yet. But what did you foresee that made you an early adopter of precision medicine, and in your practice, versus some of your peers who still have not embraced the use of genomic testing to inform treatment decisions?

Dr. Bobby Reddy: Yeah, I think that the advantage of precision medicine ... and I was very lucky, I was very fortunate, so I had some unique advantages by location. So I was in Southern California, and there’s a lot of activity in this space in this region. So there was a lot of companies in the San Diego biotech corridor and in Los Angeles that were developing precision medicine platforms that were reaching out and asking for patients, asking for samples. So that exposure was, I guess, a little bit unique, and gave me a different opportunity maybe than some of my colleagues. So when you get a chance to really look under the hood and see what actually is happening in the laboratory and you compare that with, say, what’s happening in your local pathology laboratory in the hospital, you see that, okay, this is similar high-quality data, the same kind of processes that are being undertaken in your hospital, but just with newer instruments.

 So rather than the microscope, which is several hundred years old, we’ve got newer instruments. We’ve got at this point it’s PCR and then sequencing coming on board, but better, newer technology. Same kinds of individuals, still working with pathologists. The same people who are giving you data that you would use to make clinical decisions, this is just another tool.

 So for me it was just the evolution of practice, and then also a very interesting time and place where we had this emerging technology and I was lucky enough to be deeply immersed in it.

Jerome Madison: You’ve been a thought leader even in the industry. You’ve helped shape the offering as a consultant or as a key opinion leader not only of companies that have emerging technologies in the industry, but also speaking to your peers across the country. What’s that experience been like working with industry and then helping your peers to understand how to adopt these tests and these different way of thinking into their practice?

Dr. Bobby Reddy: For the most part it’s a positive experience because, yeah, this is America and I believe in capitalism, and so in order to drive adoption and drive utility we need to have some economic benefit as well. We have to have clinical utility, we have to show that new technology is gonna benefit the patient, that’s first and foremost, but if it bankrupts the system at the same time it’s not tenable. And so industry is well-positioned to be able to bring economies of scale to things like molecular testing, any kind of testing, to bring innovation faster to market than maybe an academic institution could do. So industry has some of those advantages built in.

Dr. Bobby Reddy: Being able to talk to peers of course is fantastic. To your earlier question, there are various degrees of adoption. So you have early adopters, you have late adopters, you have non-adopters. And for me it’s been interesting and challenging at the same time because it’s helpful, it allows one to question one’s own thought process and one’s belief about data. If somebody says to you, well, why should I do that? Why should I treat this patient with, say, an EGFR inhibitor in the absence of clear data that the molecular test is necessary?

Dr. Bobby Reddy: So we’re going back to 2005. We were giving these drugs to people because they had a certain phenotype, which was non-smoking female, and now we know that non-smoking females who don’t have an EGFR mutation really don’t benefit and they should get chemotherapy. And smoking males with that mutation, although in that group it’s rare it does occur, they benefit from the targeted therapy. So once the data became available it became much easier, and we’ve seen that evolution I think that over time more and more precision-guided therapeutics have come to market because the data is there, and it’s become an easier path for clinicians to accept. But it certainly is ... it’s a challenge, but it’s also fun and exciting. Anything in the educational space is, I think, fun and exciting.

Jerome Madison: Yeah, definitely.

 Who are some of the companies that you worked with and the role that you had with those companies? It goes back a while with your career, can you share some of the companies?

Dr. Bobby Reddy: Yeah. Yeah, well you mentioned I’m with NantHealth now, and prior to this I was with Caris Life Sciences. And prior to that, as I said, I was lucky enough to be in Southern California so I served as a consultant for a variety of companies. I helped launch Response Genetics, and had been a consultant for companies like Biotheranostics and Genoptix. And as a result ... each of these companies has their own sweet spot. Some are focused one certain tumor types, some are focused on a certain technology platform, some are agnostic to platforms. Like at Caris there was immunohistochemistry on a grand scale, but also sequencing, micro-ray, FISH, CISH, you name it.

 So that has allowed me to have a different opinion maybe than others who only focus on one technical platform or one tumor type, and you can see that precision medicine has had tremendous successes in some areas and I would argue limited successes in others. We don’t have really a strong need for precision medicine in, say, sarcoma, where we don’t have precision therapeutics that are tied to molecular tests. But in lung cancer we have so many, and so many different platforms. We have a strong need for immunohistochemistry for PDL1, but we also need sequencing for EGFR, or we could do that by PCR, but we need some type of genomic test. We need to know their tumor mutation burden. So there’s a lot of different platforms out there, and each company I think has strengths in different platforms and different cancer subtypes.

Jerome Madison: In your clinical practice do you specialize in one particular tumor, or do you see general, across the board, different cancer types?

Dr. Bobby Reddy: It’s a funny question because that is the standard question that one gets. I think any oncologist can relate to this, that people ask, well, what do you specialize in? And for a long time now I have been stating to people that I’m not a generalist, I’m a molecularist. And they say, what does that mean? And the idea is that the tumor doesn’t care where it came from, the tumor doesn’t care that it’s a breast cancer, or lung cancer, or kidney cancer. It’s going to try to kill you either way. And understanding the underlying tumor biology, regardless of its site of origin, is critical to then be able to devise the most effective treatment strategy.

Dr. Bobby Reddy: And so I’m a generalist, I guess, in the sense that I’m looking at all cancers independently. We call it a pan-tumor approach, where it doesn’t matter the original site, it’s really about its underlying biology and being able to dig into that as deeply as possible. And we’ve evolved from in the early days one or two genes to now we can do a whole genome and a whole RNA transcriptome, so we can get a really deep look at the tumor and as well the host, the individual patient, and use all that information to pick, hopefully, the best treatment plan.

Jerome Madison: Hey Karan, we found our excerpt. Now that was powerful. I’ve never actually heard anybody say that, Bobby. You’re a molecularist.

Karan Cushman: Yeah, I know. I love it.

Jerome Madison: This is all commentary by the way, so-

Dr. Bobby Reddy: Alright, I’m trademarking it right now. Hold on, hold on, let me trademark it.

Jerome Madison: No doubt, man. No doubt. That was really powerful.

Karan Cushman: Get the dot-com, quick.

Jerome Madison: Yeah. So your practice, your clinical practice today, you still treat patients, correct?

Dr. Bobby Reddy: Yeah. I still see patients only one day a week, but I try to stay involved in clinical practice. I think it’s important to maintain one’s skills and credibility, but it’s also ... it gives me kind of a living laboratory to be able to use the technologies, all the various technologies that are at our fingertips, and see them in actual practice and actual use in real patients and be able to follow results dynamically over time. To me that’s really gratifying because there’s no point in building a better box if you can’t use it to help somebody.

Jerome Madison: That’s just super unique because not only do you still treat patients, you’re very involved with clinical trials, and you serve as Chief Medical Officer of a very innovative company NantHealth, not to mention all the publications that you’ve had in a very short period of time in precision medicine. How did your career evolve in that direction, and, my goodness, how do you manage it all?

Dr. Bobby Reddy: As I said, I attribute a lot of it to luck, being very fortunate to work with very good people. So the crux of it is, you can’t really manage everything, so you need good people, you need to surround yourself with good people. Being able to see patients on a part-time basis means that other people need to be available to see those patients to follow up on them, handle problems, and so I have good colleagues that are able to manage things when I’m away. Being able to publish means that you have to have excellent collaborators, and I’ve been very fortunate to have that and work with really good datasets, because without high-quality data you have nothing. And so very lucky to work with people that know what they’re doing and also possess high-quality data.

 And then in terms of clinical trials I think that’s sort of an obligation really for any oncologist, is to be able to at least refer patients to the right clinical trials if you can’t participate in them yourself. But clinical trials generally give us the opportunity to compare true standard of care versus something really novel and interesting. So that’s good for our patients because if the patients are getting standard of care we certainly can’t argue with that, and if the patients can get something novel and interesting and actually benefit from that that’s a win. So for me I think it’s just part and parcel of being a normal practicing medical oncologist.

Jerome Madison: Yes.

 You illustrated beautifully the evolution of the technologies, and not only the technology but the approach toward precision medicine going from maybe one or two targets to looking at a very broad spectrum of genomic targets. But when you consider the evolution that has happened and how far we need to go, where are we in the big picture of making precision medicine a routine clinical practice?

Dr. Bobby Reddy: We, I think, are in the infancy still. The reality is that we have a long way to go. And that shouldn’t dishearten people, and in fact it’s the opposite, it should enthuse people, you should get really excited because it means that there’s so much more out there. There’s a lot of fertile ground, a lot of territory for us to conquer. So for the young people who are in training this is a good field to be in because this is the future.

 The reason that we’re in its infancy is we know so very little. As you mentioned, we went from single gene platforms where we were doing Sanger sequencing, pyrosequencing, evolving to multiplex PCR, to now next generation sequencing where we can do the whole genome. But even the whole genome is not everything because now we need to look at RNA. And even if we do whole transcriptome we are not getting the non-coding RNA pieces, which we know have meaning, and that what we used to think was junk DNA it’s clearly not junk.

 And so even if we have all of that we don’t have the next level, which is the protein. And so proteomics is an evolving science, an evolving field, and even if we get to proteomics we still have to look at the interaction of RNA and protein because they form different complex interactions. It’s not just the linear sequence that matters, it’s that three-dimensional structural conformation and how they interact.

Dr. Bobby Reddy: And so our knowledge of this biology is very, very early, and so I think we have a long way to go, but as I said I think that’s very exciting because there’s so many great opportunities for discovery that yet remain to happen.

Jerome Madison: Yeah. I think it’s true the saying, the more you know the more you find that you don’t know. Right? The more information that comes forward it’s like, what do you do with that? But with that information, Bobby, there’s obviously so many companies that come out with different tests in this space, and for a practicing clinician it can be really hard to tell what’s a good test from something that’s not so good. What’s your advice for healthcare professionals who want to integrate precision medicine into routine practice?

Dr. Bobby Reddy: Well, I think there’s a couple different things I would say. The first thing is there are minimums. Right? So the minimums are CAP, CLIA certification of the laboratory, that’s the basic standard. So you want to make sure that the underlying quality of the work being performed is good, it’s been inspected and approved, and you can trust the output. And then the next step is, I think, the other levels of certification, so higher levels. And that’s gonna come from, say, New York State Department of Health certification and/or FDA, or CE mark for a device or test. So these higher levels of certification are much more difficult to obtain, but they do possess a certain level of gravitas, that in order to achieve an FDA approval one has to go through the ringer. And you know that the end result of that product is a result that you can trust to a higher level.

 Now, having said that, I certainly wouldn’t discount the value of what we call the LDT, the laboratory developed test, because laboratory developed tests allow us to be innovative. And as we learn ... as I mentioned earlier, it’s an evolving field, and so new things are being published every day. And so we can’t just stand on our laurels and say, well there’s this one test we developed three years ago and that’s that and we can’t move. We have to be constantly evolving.

 So there’s a role for both. I think clinicians need to choose a test based on what they feel comfortable with. I think there are practical considerations, which is, can the patient afford the test? Is it covered by their insurance plan? Is it being given freely, or is there a discount such that the patient can actually afford the test and then be able to get the rest of their treatment? Can this test lead to them getting treatment? So some tests are required for a patient to go on, say, a clinical trial or receive a certain drug, then that’s a very important gating item that needs to be considered. And then, I think last but not least, ease of use.

Dr. Bobby Reddy: So the worst thing to do is to get a result, and it doesn’t have to be a laboratory test, it can be an MRI or a CT scan, it could be anything, but if it adds to confusion rather than giving us clarity it’s not helpful. It’s hard enough to treat patients in real time in the real world, and so we need tests that the clinicians, the end user, can feel very comfortable with understanding what that result means and what the next step therapeutic action is based on that result.

Jerome Madison: I know I’m not saying much of people who’ve heard you speak and who’ve read your publications, that they learned so much ... I have learned so much from you over the course of being in this industry because you see things not only from the provider perspective, you’re a practicing medical oncologist and your peers respect your opinion very much, but you also see things from the commercial perspective and the scientific and discovery perspective. And that’s outside of the box, and maybe that comes from your love of comic books and thinking outside of the creative side of you. So where did the love of comic books come from and how does that creative side benefit you and your thinking in your practice and in business?

Dr. Bobby Reddy: Well, a creative outlet I think is always a good thing. People play instruments and it’s funny because I know a lot of well-known, academically successful hematologist-oncologists, I won’t name names during this podcast, who whenever I see them, we end up having a deep discussion about the comic books that we’re reading, or graphic novels rather. So I think I was a normal child and I read comic books as a child, but I probably never fully grew up. But I think that creative outlets are always good and that it does allow you to maybe think tangentially about problems.

 And certainly there is a fantasy element probably to precision medicine, which is that we have to hope and believe that we will get the right answer. And when we do a test, when we do a complex molecular test, we’re all hoping that it’s going to give us the right answer. And the truth is it really isn’t the test, it’s really at this point it’s the patient. In other words, if the patient has the right attributes, the right characteristics, if your patient is going to be the lucky patient who is PDL1 really positive and has a high tumor mutation burden and a lot of neoantigens and is going to do fantastic, when we give them immunotherapy then the test should show us that. And if it’s not, then the test isn’t going to show us that.

Dr. Bobby Reddy: I think that that’s ... there’s a, as I said, a hope and fantasy element built into there that probably everybody has, and mine just manifests in reading comic books.

Jerome Madison: That’s cool. That’s cool.

 Here at Trapelo we lead the conversation of how payers, labs, and providers should work together to provide greater access and scale to precision medicine. And one of the major obstacles to widespread adoption of course is that payers do not pay for much of the testing, or traditionally they haven’t, and they can make access to certain therapies very difficult. What are your thoughts about why payers should routinely pay for precision medicine testing and therapies?

Dr. Bobby Reddy: Well, I think that we have not, as an industry and even as a community, done a good enough job to convince payers, otherwise they’d be paying. If we really believe that this is both clinically and economically beneficial then the payers would agree, they would see it that way, if we had convincing evidence. So payers do pay for things. We know that, their name is ‘payer,’ it’s in their name.

 So they pay. And I think they don’t want to pay for things that are harmful or that are bad, they don’t want to pay for fraud, waste, abuse. They want to pay for good things, good outcomes, and if in the case of precision medicine we haven’t demonstrated that then that’s on us, not on the payer.

 I try to bridge that gap in my discussions with payers, and I try to frame it in such a way that we don’t look at this as a competitive environment. People look at it sometimes and say, well, precision medicine is at odds with evidence-based medicine, and that is wrong. What we should be thinking about is, I guess, baby steps. And so the way I like to position this is that within evidence-based medicine there are still choices that we make. In frontline colorectal cancer we choose between FOLFOX and FOLFIRI, we choose between an EGFR monoclonal antibody and Bevacizumab. How do we make those choices? Evidence-based medicine tells you that there isn’t one right answer, so any one of those choices, those combinations, is a potential right answer. And even left versus right colon cancer, that could point us in a direction. RAS mutation status points us in a direction certainly, but there’s deeper elements of potential possibilities from precision medicine where if we really could identify the true responders to one versus the other therapy that would be a good thing.

Dr. Bobby Reddy: And so I think that’s an example of precision medicine and evidence-based medicine meeting harmoniously because we now say, look, you have a RAS, not just KRAS, but a RAS family mutation, we are not giving you the EFGR monoclonal antibody, period. And so we didn’t know that 10 years ago, but we know that now. And so can we take all the other examples of what we know to be "standard of care" and we have multiple therapeutic options, and can we layer in some precision medicine and show that that helps? Can we do that?

 And then, as we move forward, I think we’re going to get greater and greater adoption by the payers because the payers are paying for RAS testing in colorectal cancer because they realize it’s beneficial in this limited circumstance. If we can show them, well, why don’t you do more testing? Why don’t you test other things? Because by testing, say, whether or not a patient can metabolize 5FU, do they have a DPD polymorphism? Do they have a UGT polymorphism? Are they going to take a drug that’s going to make them very ill and end up in the intensive care unit or certainly in the emergency department, and that’s going to cost money and it’s bad for the patient?

 So if we can show that that’s a true statement, that the testing leads to a change in physician behavior, a change in the drugs given, so that people don’t have bad outcomes, then you’re going to see adoption by the payers. But, until we do those studies, or until those studies are shown to be positive we are not going to get there. And I think, just to pile on a little bit, one of the problems is that we sometimes mislabel things as being precision medicine. And so we have large national studies and even international studies where we label things as being precision where perhaps the underlying technical platform we’re using lacks the precision necessary to really call that precision medicine. In other words, if you’re going to assign people to two cohorts based on some type of test the test has to work. And if it’s wrong 10% of the time and your study is powered to have a power at 15% difference you’re not going to make it statistically.

Dr. Bobby Reddy: So these are some of the things that we are struggling with today because the payers will argue, well, here’s a study that failed. And you say, well, yeah, that failed seven years ago. Nobody does that kind of "precision testing" anymore, we’ve moved on to something much better. So we’re playing catch-up.

Jerome Madison: Wow. Bobby Reddy, Dr. Bobby Reddy, Chief Medical Officer at NantHealth. Always a wealth of knowledge and always a fun conversation. Thank you for being a guest on the podcast.

 Very much my pleasure, I appreciate it. Thank you, Jerome, and I look forward to talking to you again sometime in the future.

Jerome Madison: Absolutely.

Jerome Madison: We’d like to thank Dr. Reddy for being on the podcast, and of course we thank all of our listeners for tuning in to the Precision Medicine Podcast. You can download transcripts of this episode at precisionmedicinepodcast.com, and don’t forget to follow us on Twitter @PMPbyTrapelo, that’s P-M-P-B-Y-T-R-A-P-E-L-O on Twitter.

Jerome Madison: If you enjoyed this episode, we know you know someone who would enjoy it to, so please tell them. They’ll thank you, and so will we.



**About Our Guest: Sandeep “Bobby” Reddy, M.D**Chief Medical Officer, NantHealth
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Dr. Reddy joined NantHealth in December of 2016 as Senior Executive Director of Medical Affairs and currently serves as Chief Medical Officer. His responsibilities include overseeing education, outreach, clinical development programs, and clinical trials for GPS, NantHealth’s proprietary revolutionary panomic cancer analytic platform. Prior to that, he was Chief Medical Officer at Caris Life Sciences. His executive and medical oversight has produced over 100 abstracts at major medical conferences and over 30 peer-reviewed publications since 2014.

Previously, Dr. Reddy was Chief of Staff at Los Alamitos Medical Center and actively practicing clinical hematology and oncology. Simultaneously he has held an adjunct faculty position at the Geffen/UCLA School of Medicine as a clinical instructor at Harbor-UCLA Medical Center, where he was awarded the distinguished teaching award for clinical faculty in 2006. He is a member of the Los Angeles Biomedical Institute, ASCO, IASLC and current SWOG investigator. His medical training includes fellowship training in hematology and medical oncology and therapeutics research at the City of Hope, and Internal Medicine residency at Harbor-UCLA Medical Center. Dr. Reddy received his MD from the Geffen/UCLA School of Medicine after receiving his BS in biomedical sciences at the University of California, Riverside.