“Anything Is Possible if you Will it”: A Regulatory Affairs Conversation feat. Dr. Nash Hernandez

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Caitlyn: Welcome back to another episode of “Northeastern Next,” a showcase for the stories, talents, and thoughtful insights of our university’s current and future alumni. I’m your host, Caitlyn, a current D’amore-McKim graduate student.

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Caitlyn: Today, I’m here with Dr. Nash Hernandez, a serial entrepreneur and a triple Husky. Dr. Nash is a fractional regulatory affairs leader for multiple biopharma companies with more than 27 years of experience taking rare disease, gene therapy, cell therapy, and advanced tissue products from concept and clinical trials to approval and commercialization. Welcome, Dr. Nash.

Dr. Nash: Thank you, it’s great to be here.

Caitlyn: Yeah, we are excited to have you! So, for any listeners who aren’t aware of what regulatory affairs are or if they are just not familiar with the biopharma industry in general, can you just give a brief overview of your industry, what it is that you do, and sort of what drew you to this field initially in general?

Dr. Nash: Well, I will start with that first. I came to Boston on a waiting list for BU Medical School, I didn’t make that waiting list, but I got a job as a temp, so I fell into regulatory affairs working at a company that was developing blood substitutes for humans and animals. In terms of what the profession really is, it’s a profession that really developed from the desire of governments to protect public health. They wanted to do this by controlling the safety and efficacy of products in the areas of pharmaceuticals, veterinary medicine, medical devices, pesticides, agrichemical, cosmetics, and complementary medicines. They also wanted the companies who were doing this to be responsible for the discovery, the testing, the manufacturing, and marketing of these products so they could ensure that they are safe, and they make a worthwhile contribution to the public health and welfare.

So, this created a new class of professionals who emerged just to handle regulatory matters for companies. Most of us started out in a lab and then there was a filing for a regulatory agency and a person would say, “Hey, do you want to work on this particular filing?” So, a lot of it was just developing by experience, if you will. Then, later on, probably in the ‘90s or so, formal programs began to emerge that gave a formal way of studying regulatory science.

In terms of what we are responsible for, it’s a lot. Basically, we keep track of all regulations and legislations in regions where a company either operates or wish to have their products. We advise on legal and scientific matters requirements. We collect, collate, and evaluate scientific data. Present registration documents to agencies, conduct meetings with the FDA and the equivalent. And we also give strategic and technical advice at the highest levels in the company.

So, regulatory typically has a seat at the table. In short, we basically help companies avoid problems by badly kept records, inappropriate scientific thinking, or just a poor presentation of data.

Caitlyn: Well, I think that lends itself very well to my next question which is what would you say are the biggest challenges in the regulatory affairs industry. I know from a prior conversation you and I had, you created a model that's able to predict when there will be fewer drug approvals, so maybe you can talk a little bit about that. I assume the fact that such a small number of drugs actually receive FDA approval is a huge challenge in of itself. So, I'll turn it over to you to talk a little bit about those challenges.

Dr. **Nash**: Great! So, I will start with the biggest challenges in the regulatory affairs industry, which is really the increased regulatory requirements. Those are odorous and they are also expensive. The cost of compliance is quite high. There is also the increased safety of quality concerns which a lot of times come with the increased outsourcing functions. So, many companies in an effort to cut costs will outsource from countries who may not have strong regulatory capacity or systems in place. This will make quite a bit of a headache for the regulatory scientists.

There is also a heterogeneity among regulatory agents, not all regions of countries act the same way and so we are overburdened by trying to figure out what will pass muster in these particular countries or regions. And market size seems to matter very much and unfortunately so. So, we have seen a drive for orphan drugs, which are drugs who are for treatment and diseases where there are probably hundreds or thousands of patients.

And so, companies have realized that they can command a higher premium for these drugs and because the government has provided incentives, we are seeing more companies going away from sort of the largest disease areas and focusing on these rare diseases just to command higher prices. So, that has fueled—at least in my mind—what I see as a lack of innovation. Companies would follow the same targets, no one is really doing basic research anymore.

The other is the financial capital market. It's very difficult to raise capital. Last year alone, there were about 119 companies who had layoffs—23 alone was in November of last year. This year we already had 60 or so of those companies. So, those are sort of the challenges that I see. In terms of the model I created, the FDA is a regulatory agency, but they are also beholden to various stakeholders. So, what I have predicted was that once there is a FDA approval that turns out to be problematic, that based on that, these public servants would become more conservative in future approvals—they might not be willing to allow for flexibility and so that would result in fewer approvals. I would say that the worst decade or so—which I call "the decade to forget"—is basically 1996-2007, where the FDA approved a total of 199 new molecular entities, which are just new drugs that have never been marketed in any form. You can compare that to 2002-2007, where there were about 122, almost a 39% decline. This has changed; however, I have been looking at approvals since that time—it's trending anywhere from 22 to 49.

I think that what's important for everyone to understand is that there are particular concepts. So, the first is quality—that is a characteristic of the drug, including manufacturing—and there is safety, which is the relative risk of harm and the effectiveness which is the benefit that the drug provides to the patient. And, for a health authority, it's about the risk-benefit ratio. The degree to which the risk is acceptable, given the amount of benefit, that would provide the patient and the severity of the disease. So, you could imagine the agency would not allow the drug that has lots of toxicity for a skin condition, they may view that as cosmetic and not having a favorable benefit-risk ratio profile. Whereas as in cancer, or oncology, that benefit-risk ratio can change.

Caitlyn: That's super interesting to think about it like that and kind of hear a little bit about what the considerations are when bringing a drug into the market. I know you just mentioned a little bit about lack of innovation, can you just briefly scan upon what the implications are for a lack of innovation in the companies that develop these drugs?

Dr. Nash: Absolutely. I think that as public health suffers—and it suffers because we rely on pharmaceutical companies to bring drugs to market but if they are not doing basic research and just following what other companies are doing...because it's easier. Once you have a validated target, you know millions of dollars has been invested, I think it does a disservice to the public health because we are not getting that diversity of targets and a diversity of drugs as we should have.

Caitlyn: Yeah, absolutely. That makes sense. In an earlier conversation you and I had, you mentioned to me that your master's degree made you an expert, but your doctorate degree made you a thought leader in regulatory affairs. I loved it when you told me that, it really stuck with me. So, I'm wondering if you can talk about the differences between being an expert and being a thought leader in a field and what some of your big takeaways were from your programs at Northeastern?

Dr. Nash: Absolutely. So, I would say experts are technically qualified, but they often see things in black and white. Their expertise is rooted in training and what I would view as the accepted fundamentals of a profession. They would say, "Well, the regulations say this, the guidance says that" and they are usually sidelined because they think their job is to tell the team or the company what not to do. A thought leader or a key opinion leader is someone who based on expertise and industry perspective, offers unique guidance, and who inspires innovation and influences others. We share insightful ideas, often times points of view that cannot be obtained elsewhere. We also recognize trends when they happen.

An example of this is I work in rare diseases where there are no precedents. So, there have been no drugs approved in this disease. So, you really have to create a regulatory pathway. That means convincing a health authority, like the FDA, who might not have that knowledge because, in essence, innovation is always ahead of regulatory agency learning. So, when we are talking about a rare disease where there are only hundreds of patients, what does a clinical study look like? You can't do 1,000 to 5,000 patients study so trying to move that needle and create a

pathway is what I view as the hallmark of a thought leader. To me, it's the art and science of getting approval with the least burdensome program and having that approval during that first review cycle.

So, I went to Northeastern because I found it difficult to bring along the chief medical officer of the company I worked for. They would be like, "Well, I'm a doctor, so I want a parrot." And what I found, at least for me and really gives me a few of the takeaways, is that anything is possible if you will it. That's because you have to be willing to make the change, to take the necessary steps and even make sacrifices. And ideas without implementation have no bounds so you can think of things, and you can talk about them but if you don't implement them, or if you don't try, then the value is lost.

What Northeastern also made me realize is that in the knowledge economy, you are the product. So, when I go and speak to CEOs and chief medical officers, I am representing not only my knowledge but basically the body of evidence, the body of intelligence that I bleed from my experience in the masters of regulatory science program. I would say that like a husky, we are friendly, intelligent, outgoing, alert, and gentle.

But I find in society, not everyone is comfortable with ambition and so what Northeastern taught me really well is that there are two faces, if you will. There is the face that you wear when you are in those situations where you are the product, and you are on display, and you are actually making a difference. But there is also the face you wear when you are not as guarded. So, I have mentored students in regulatory affairs over the years and I have enjoyed it, primarily, because I get to give back and also receive because what you get is learning from others' experience and their perspectives. Taking all of that together, I would say Northeastern has changed my life for the better and has allowed me to live a life I would never have dreamed of as a young boy growing up in Trinidad and Spain.

Caitlyn: That is awesome. I love that so much. Thank you for sharing that story and kind of that journey at Northeastern and how that got you to where you are. I think it's really important, no matter what stage you are at in your career, to always be learning from others, listening to their perspectives, and taking it all in.

Dr. Nash: Well, thank you.

Caitlyn: So, Dr. Nash, because this is "Northeastern Next," I always like to end by asking our guests what is next?

Dr. Nash: That's a big question! I think what I have looked at my career, both on the entrepreneurial sides of things and in regulatory science, I want to not only advise companies—because companies come to consultants when they have a problem and so you solve the problem then you give the program back to the team who screwed it up in the first place. So, I was looking for a way that I could bring my knowledge of technology as well as science and make a difference. So, I'm working on an initiative and because I am a technologist, it blends

wonderfully. It's basically using artificial intelligence to find approved but off-patent drugs that can be reformulated and could work in many diseases based on the mechanism of action. So, you can imagine, we've had hundreds of thousands of drugs approved and all of this information is sitting in particular places. So, getting that and parsing through it to find potential candidates is what Hercules Bioscience will be doing because it really takes a herculean to cure disease.

The other is Footprint Therapeutics, and it is really what I call Founders Biotechnology Company. There are so many scientists in labs who just don't have that guidance or the ability or a team so the concept is that we would have founders join Footprints and they will work as founders and residents and spin out their own biotechnology company, benefitting from our staff and our expertise.

The other is Rexford Inc., and that is basically fractional regulatory affairs leaders. You can imagine how much it would cost the company to have an apartment when you can certainly have experts at a fraction of the cost.

And the last is Abi Therapeutics, and I have a high school friend who has worked with autistic kids, so she came to me about a year ago with an idea. So, Abi Therapeutics is basically a cognitive disorder company, and we will be looking at softwares in medical devices. This will not be medicine, but it will be softwares in a medical device to help people who have autism and other cognitive disorders. So, those are sort of what's next for me.

Caitlyn: That's incredible. That is a lot of things next. A lot that you are working on but they all sound super exciting, super rewarding, and super important. So, congratulations on all of those initiatives.

Dr. Nash: Well, thank you. Northeastern made me a thought leader and I thought it was important to share my story and ensure that all of our alums know that they are a part of a very rich and everlasting tradition.

Caitlyn: Absolutely. 100%. Well, thank you so much Dr. Nash for joining today. Again, I'm so excited for alums to hear this story, it's incredible and it's a really timely topic I think so thank you!

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Caitlyn: Thanks for listening to this episode of "Northeastern Next." If this episode brought back some great memories, check out our HuskyStarter page online to support current student endeavors or reach out to us via our email at alumni@northeastern.edu or on Instagram @northeastern_alumni to point us in a direction of a great story either from you or a friend. Lastly, don't forget to hit that subscribe button so you can hear a new episode in your feed every other Wednesday. Remember, once a Husky, always a Husky. See you the week after next.

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