



Anusha: Hi, and welcome to DigiHealth Talks, a podcast created and hosted by the Brown-Lifespan Center for Digital Health in Providence, Rhode Island. I'm your host, Anusha Rahman. Join us as we meet some of the masterminds behind the field of digital health, leveraging the innovative technology around us to help the public improve their well-being. Today, we are interviewing Dr. Ross Hilliard, an Assistant Professor of Medicine and Clinical Educator at Brown. He is both a clinician and a researcher, working to improve patient safety by leveraging the health records. Thank you so much for joining us. How are you doing today?

Dr. Hilliard: Great. It's a pleasure to be here.

A: Awesome. To start us off, can you tell us a little bit about your educational background and your current research focus?

H: Absolutely. I did medical school at the University of South Carolina and came to Brown for Residency and a Chief Residency in General Internal Medicine. And I'm now, clinically, a general internist, working both in primary care and in hospital medicine. And after medicine, I got involved with the electronic health record and informatics, and am board certified in both internal medicine and clinical informatics.

A: Could you tell us what informatics is?

H: So you'll get different definitions from different people, but informatics is a broad science, focused on the study and use of computer systems under other digital systems to study and obtain data and transmit data and share data, store data, related to health.

A: So it's like using and accumulating and analyzing data?

H: Absolutely. And is kind of used in lots of different ways. So the term informatics is really broad and really isn't owned by the healthcare system or the health record. Biomedical informatics or medical informatics really is informatics within healthcare.

A: And how did you get into that?

H: I've always had an interest in computers and in technology. I guess I joke that it was my backup career if medicine hadn't worked and hadn't worked out. But really for me, my introduction to medical informatics came as part of an elective in the third year of my residency, right as our health system was starting to implement and build out EPIC, an electronic health record that was implemented in 2015. And so, I got involved as that got started. And then

ended up as a faculty member and as a, you know, a young faculty member with a, with a role in helping to continually improve and implement new updates and changes to that system.

A: Very cool. So you've been here for- you've been in this field for, since the beginning almost?

H: Well, so the field of medical informatics really goes back much further probably into the early aughts and others would argue it goes back further than that. The first electronic health records actually started to exist back in the 70s but didn't really start to take off until the 90s, and then again with a significant boom related to the High Tech Act, as part of the Affordable Care Act, or Obamacare.

A: Thank you for that. Can you give us a little bit of background on EHR from a provider's perspective?

H: So from most providers perspective, the EHR was a progression from paper records that were either handwritten, or typed, or dictated and maintained on patients. You know, the cynical view is that they were created to be a billing platform, and in many cases they do have a billing platform at their core. But the kind of broader view and the broader scope is that the electronic health record came about to recognize the power of a computer to help us share data and maintain data and not lose data. One of the frustrating things that occurred in the realm of paper records were that they could actually get lost. Someone could take one home, even though they weren't supposed to, or have them stacked up on their desk. And then the patient could arrive in the emergency department or other parts of the hospital or another clinic, and no one would be able to review what had happened to that patient before. There are very impenetrable firewalls between different offices in different records. That is not improved as much as everyone would have hoped, I think, but it's definitely more reliable that you will be able to find data on your patient, information about your patient, when you see them, when they appear in your office.

A: So one of the major pros is that increased safety and security of patient information.

H: I think yes, we have the ability, the security is a very important part of it too. Paper records can get stolen. There are certainly security risks to online and EHR records as well, but we can implement more securities around that than we were able to with the paper chart that literally could "walk" out of the building.

A: So then what are some of the cons of using EHR?

H: So I think part of our current struggles are that the way the EHRs were implemented and some of the incentives that were put in that caused the significant rise in utilization and implementation of electronic health records in 2009, 2010 and in the years following, didn't include requirements for interoperability, didn't include requirements for records to talk to each other, so there still remains these barriers between different practices, between different states, between different health systems, between their different hospitals, and that continues to be a

frustrating point. I think in addition, some of the frustration, rightfully so, is that now it is easy to compile lots and lots and lots of data, to the point that it truly is, probably impossible, for a given physician or other provider to digest everything that the record knows about a patient. And our systems for being able to have the computer, have the system, summarize that data, find the important and salient points, and exclude noise, if you will, have not kept up, and so we are drowning our physicians and other providers in data, in the EHR. That can be quite overwhelming for lots of folks.

A: So then how can we balance that patient safety while still preventing this stress in providers?

H: That's probably a \$1,000,000 question and what a lot of people, myself included, are trying to find an answer to. I think, some of it will be smarter systems that are able to actually use systems like artificial intelligence, digest data and present what's most important, related to the patients' presentation. So that when someone comes in for primary care, you can very quickly see things about their past medical history and their health maintenance, routine screenings, and others along those lines, without having to go digging deep into the record. And comparable to that, if a patient arrives in an emergency department, unable to communicate those salient points of their medical history that are critical to know in an acute situation, are visible and digestible for the person who's taking care of that patient. I think 2) there's work that needs to be done just in terms of the volume of information that's provided and the volume of tasks. We know from some prior research that I've done that a lot of burnout-related symptoms for physicians and other providers are directly correlated with the number of messages from patients, from other staff, from other physicians, from other providers, directly drives burnout. And so trying to redistribute some of that workload, so that the mental tasks of completing all of those things don't fall to one person. I guess that would fall to another one of the downsides of the electronic health record is there used to be a lot more ability to delegate, by physicians, particularly in their own private offices. So letting different staff do different things with the electronic record. There are lots of things that have kind of crept, a little bit of scope creep, where more and more things, for whatever reason, are built such that the physician or other provider has to touch the item before it's taken care of. So that could be anything from refill requests for basic medications, to patient messages with relatively simple, non-clinical questions, etc, that aren't necessarily ideally distributed to the right people at the right time.

A: So a lot of the things that make patient accessibility to the provider easier for the patient is actually more harmful for the provider themselves.

H: The data suggests that, and I don't by any means want to sound like I don't want patients to have access. I think the problem is we've opened up a lot of these patient portals and other messaging systems without appropriately planning for how to handle some of those messages, because not every message needs to go to the physician. Not every message should go to every physician the patient has seen. Some messages can very appropriately and completely be answered by other members of the clinical team, but we haven't necessarily added those

members of the team to the team, and we don't necessarily always have systems that allow those people to work to the top of their credentials, to the top of their license.

A: And to take a step back for a second, would you mind just telling us what burnout even is?

H: I think burnout is slightly different for different people. One of the official definitions is a feeling of depersonalization and distancing from your work and from your tasks. For others, it really is just a feeling of being overwhelmed, rundown, and defeated by your work. But on a broader sense, burnout really is a symptom of a more systemic problem. I think anybody who knows about quality improvement or knows about improving systems needs to recognize that burnout is not an individual thing. It is a symptom of a failing in our health care system. I think it's been brought into stark contrast in the pandemic, just recognizing that the reserve of so many of our physicians and other providers has been depleted by relentless hits or, I don't want to say attacks, but more relentless kind of notches against your ability to maintain some sort of positive view of your work and what you're doing, and it's caused significant issues. We have, what's called now, the great resignation, exodus of a lot of different health care workers, particularly nurses, that has caused all sorts of downstream ripple effects for myself and my colleagues.

A: Can you tell us a little bit about what work you're doing to protect providers and also improve patient safety regarding EHR?

H: So the overall goal of what I do, in what I call applying medical informatics, is and, it's not my term, that's others' terms, but in applied medical informatics, is to make the system such that it's easy to do the right thing for patients and hard to do the wrong thing. And that involves both providing guidance at the right point at the right time to the right person, as well as working to eliminate noise, working to eliminate alerts that aren't helpful. Working to eliminate prompts or tasks that aren't necessary for actually providing patient care. Many of those involve kind of back and forth discussions about what truly is required, because a lot of the burdens and the tasks that have been placed are related to, I think, usually well-intentioned, but not always, well-designed requirements, regulations by all sorts of different bodies, that govern healthcare. And so sometimes it's discussing those, understanding those, and trying to reconfigure the system so that we can meet the requirements that are needed 'cause those are absolutely important, but not necessarily rely on every single thing to fall to a physician or a nurse or another provider.

A: And so in a similar vein of using digital health platforms to improve patient well-being, reduce stress on the provider, there has been an increase in symptom checker apps that are used to diagnose symptoms without patients having to see a provider. You are doing some active research on symptom checker apps. Can you tell us a little bit about that?

H: There have been a large number of symptom checkers, or diagnostic aids, that have exploded into the patient-facing sphere. The issue with these is that there's very little research to prove that they are accurate, both in the diagnosis that they yield as well as in the level of triage or

the recommendation. So you put your symptoms into an app and, in general, for most of these will tell you, oh, you should see your primary care doctor tomorrow, or you should go to the urgent care right now, or you should go to the emergency room, or maybe you should call EMS or 911. There's not great, really very limited data on how accurate these are and that really poses a problem because an inaccurate app like this could certainly cause patient harm, if the app just isn't able to ask the right questions or ask them in a way that the patient can understand. Particularly, then even, as we think about equity, talking about patient language, patients' medical understanding, patients' health literacy. If the questions aren't easily understood, and a patient answers differently than how it's actually happening, you certainly have the risk of telling someone to not worry about something that is actually really serious. And we just don't know. We don't know how accurate these are. So that's part of some of my research with some colleagues, like Dr. Fraser and Dr. Ranney in the Center for Digital Health. In terms of really testing this based off of, in comparison to, actual diagnoses and visits with physicians, so that we can get a better understanding of how well these apps actually work. And I think in some cases, these apps may eventually allow people to not see a healthcare provider, but I think that's probably even further off, 'cause I think for most of these, the answer is, even at a bare minimum, is you should see a physician or another provider in the next few days, as kind of the bare minimum. I think there may be some point in the future where we can, you know, accurately say yes, this is definitely just the common cold, and that you don't have any comorbidities, or other conditions that warrant evaluation to make sure that you don't have a complication, but that's probably further down the road. What we don't want to have is have someone be told, oh don't worry that shortness of breath you're getting going up the stairs with a little bit of a cough, is just a cold, when it's actually symptoms of an impending heart attack.

A: So then in your opinion, what role do symptom checkers play in increasing patient safety?

H: So I think it has a significant opportunity if we can improve their accuracy in helping patients who might be hesitant to get care, to seek care. And I think this was brought into some stark contrast in the setting of the early days of the pandemic, where people were listening and heeding the advice to stay home and not come into the hospital. But unfortunately ignored symptoms of very serious disorders and diseases, and so we saw lots of people who presented to the hospital or other health care settings after a heart attack that was missed because they were at home with chest pain, but wanted to avoid going in because that's what the instruction was. People were trying to follow the instructions they were hearing from public health experts and the government and others but may have neglected their own health. So I think for some conditions, that will be helpful in terms of really helping patients to get over the hurdle of seeking care, particularly seeking urgent or emergent care in appropriate settings. I think 2) for some more subtle symptoms of serious diseases, things like some strokes. Everybody thinks of a stroke as, all of a sudden you can't talk and none of your arms or legs work. But in truth, stroke can present in much more subtle and insidious ways. And so that can cause delays in patients seeking appropriate care. So I think there's some opportunity in those places for patients to be empowered with some knowledge and some tools to help identify concerning symptoms earlier on.

A: And so in the similar vein, there is some controversy surrounding using these symptom checkers apps and AI, and using them for diagnoses because it is opening up this door of patients not seeing providers. What are your thoughts on that?

H: And so again, I think it's unlikely that these apps will get to the point that they're keeping significant numbers of patients from seeing and seeking care. You know I do worry about using symptom checkers and then gatekeeping different elements of healthcare. There's some potential here for insurance companies, or other payers, to say, you've got to use this app, and based on the outcome of what it says, that's the only care you can get. And I think that's problematic, particularly before we really know that these work and they're accurate. Let's say you plug in your symptoms and it says you should see your primary care doctor, but you are really worried about whatever it is that is bothering you, and then you go to an urgent care, and then you find out afterwards that because you used an app and it was connected to your insurance company, that they're not going to pay for that urgent care visit because the app said you should go to XYZ. I think that's my biggest fear of misuse of these tools is, without data, using these tools, there are some payers in different parts of the country who are already using them and promoting them to their patients. But there's the potential to penalize patients for seeking care because an app determined it was not the appropriate place or level of care to seek.

A: That's really interesting. What can we do to prevent that from happening?

H: I think the first piece is what we're trying to do with our current study and some proposed studies going forward, is really looking at and assessing the accuracy of these apps. I think the other piece will be in advocacy, as it is often, where we need to advocate for the fact that patients may not be able to put into words, or even into an app, what they're feeling, but if they're having a feeling of unease or significantly feeling different from their normal, that they should be able to listen to that and not be penalized for seeking the care they thought they needed. You know the broader pieces, you know, we should have a system where it's not regulated and controlled to that, but that's a bigger question.

A: And so a final question, how do you see technology as a future requisite in healthcare, say 20 or 30 years from now?

H: So it's absolutely clear that technology will play a major role in healthcare in 20 to 30 years. I am hopeful that though healthcare technology has been slower than other areas of technology, that with the rapid adoption in EHRs, and with the maturation of many of these products, as well as recent legislation and requirements that are forcing some of the interoperability and the interconnectivity that we didn't have before, that we'll see an even more rapid growth and maturation of technology in healthcare. I think in 20 to 30 years, you know, the computer is going to be an essential sidekick for physicians and other providers, helping us to find the patterns, helping us to find the signal from the noise, within a patient chart, within a patient's history. Because right now in most systems, the longest, most places have been on an EHR is maybe 12-14 years. The VA certainly being the longest of those, with a longer track record, but

much of that data is not as easily accessible now. In 20 to 30 years, we'll have people where we have their entire life from birth to age 40, 50 in an EHR, where we'd be able to actually see all that data. And so I think the biggest thing that will have to happen is an ability to process that data at a speed that a human brain can't do, but still providing the information, because I don't see any way where, particularly with any complex diagnosis or medical management, that we're going to supplant physician expertise. We're just going to have to supplement it with computer expertise.

A: Thank you so much for that. I really appreciate you sharing your knowledge, your expertise with us, and I learned a lot.

H: Awesome. It was wonderful to talk to you and have a great rest of your day. Thank you.

A: Thank you! To learn more about the Brown-Lifespan Center for Digital Health, check us out at digitalhealth.med.brown.edu. Don't forget to listen to our past episodes, available wherever you get your podcasts.