

More Intelligent Tomorrow Podcast: **Surgery: Cutting Costs and Optimizing Outcomes with AI**

Empiric Health founders Rick Adam and Justin Schaper talk about how they use AI to improve patient outcomes and the affordability of expensive healthcare procedures, such as surgery.

TRANSCRIPT

Speaker 1:

Hello, and welcome to More Intelligent Tomorrow, a wide-ranging exploration of the potential impact of AI on the world around us, as envisioned by the future heroes of the human and machine intelligence revolution. How is AI ameliorating skyrocketing surgery costs and reducing hospital stay durations? We'll discuss this, and more, with Rick Adam and Justin Schaper on today's episode. And now, your host Ari Kaplan.

Ari Kaplan:

Hi everyone. I'm pleased to have with me, Rick Adam, and Justin Schaper, the CEO and CTO of Empiric Health. They're an AI powered clinical analytics company that improves patient outcomes and the affordability of healthcare such as surgery. So welcome, and why don't you introduce yourselves and tell us a bit how you met?

Rick Adam:

Ari, first of all, thank you for having Justin and I on your podcast. I was asked to take a technology from Intermountain Healthcare and commercialize it, so I was the first person in the operation, and the next person I hired was Justin, to be our Chief Technology Officer.

Justin Schaper:

Thanks Rick. As Rick was saying, Intermountain launched Empiric about three years ago, and at that time they really looked to bring in a top down across the nation. They brought Rick in first. Rick and I got together during that process, and just really impressed right out of the gate, with the vision that Intermountain was bringing into the space and what we wanted to do with data science and clinical analytics.

Ari Kaplan:

Yeah, I hear the juxtaposition of technology and analytics. Where do you see some of the progression? I know a lot of analytics and data science is quote, unquote, "new" to some of the industry. Where do you see technology and data as the foundation?

Rick Adam:

We're on the verge of having 20% of the Gross Domestic Product, the GDP, in the United States be spent on healthcare. That's roughly twice what any other developed nations spends on healthcare. To be kind, I would say our results are sort of average. We spend twice as much as any other developed nation for kind of average results. I think, if you're technology person, almost all technology is deployed to make something work better. A lot of things have come together where we can now make technology support make healthcare work a lot

better. The axis that we cared about are to make it more affordable, to improve the outcomes on behalf of the patient, and to significantly improve access so that everybody in the country has access to high quality health care.

Justin Schaper:

Interesting thing that's happened in healthcare over the last few years is with the rollout of electronic medical records, and really the implementation of the HRS throughout much of the industry. There's now just a rapid buildup of data. Being able to really make good use of that data and turn that into actionable intelligence, both real time and retrospectively, is one of the biggest challenges that we've got in the industry right now. Along with that goes a whole host of other problems, whether it's data integrity, data validation, or just figuring out how to take the right perspective in looking at that and trying to understand what it tells you. That's where data science and some of the newer innovations, that really came out of the big data work in social media, bring us to a capability that really wasn't possible just a few years ago.

Rick Adam:

I would say it's only been in the last 20 years, there was much automation around clinical programs, quality programs or clinical operations, that sort of thing. The Affordable Care Act, part of that was to subsidize hospitals and doctor's offices putting in electronic medical records. Once they started putting in electronic medical records, we had the raw material we needed to start looking at clinical outcomes. Now that we're trying to manage cost and quality at the same time, if you can clean the data up, and using the kind of tools that DataRobot produces, you can actually start to correlate what things cost, versus what was done, versus how the patient does out the back end, longitudinally. The first step, let me say, was like a railroad, the Affordable Care Act and the electronic medical records sort of laid the railroad tracks, and now that they're down, we can start to do clever things with them when you clean the data up and use modern AI kinds of tooling.

Ari Kaplan:

Yeah. That's fascinating. You mentioned the Affordable Care Act, how has that changed the data landscape in healthcare?

Justin Schaper:

Part of the rollout of that has meant that now with the HRS and MRS in most of the major healthcare systems throughout the country, as well as in electronic medical records in primary care offices, specialists, there's just a magnitude of data more than what we've had, and orders of magnitude were getting added every day throughout the system. So part of that is the question, the challenge that that presents is, how do you work with that? How do you really start to get the signal out of the noise? Again, how do you pull out of that what's really relevant for the particular piece of work you're trying to improve or broach? Now, with that being widely rolled out, we've got a lot more in-depth information.

Justin Schaper:

We've got things like clinician notes that are in electronic formats, we've got lab values, images, diagnostic images pulled together in single platforms. It makes for a much more robust and richer environment to work in,

but it also requires a great deal of navigation to be able to pull out what you need.

Ari Kaplan:

I know we've talked about them on your website, you have some great case studies, like Intermountain being able to save some significant amount of money. Can you tell us an example of how one might take raw data, or healthcare data, transform it, do data science or AI, and then achieve some value out of that?

Rick Adam:

Sure, happy to do that. Intermountain's initial focus, and then as we commercialized this three plus years ago, the focus was surgeries. If you look at how a surgery is done, what it costs to do the surgery, and how the patient does, you can start to see patterns on surgeries that are very effective, from a cost point of view are very affordable, and the patient does well. Then you can see some that they're expensive and the patient doesn't do so well, and you can see some that are affordable, but the patient doesn't do so well. What Intermountain did was take surgeries and try and get them organized so that they're essentially apples to apples.

Rick Adam:

They eventually looked at all surgeries, but they began with knee surgeries. They saw a team at Intermountain, that once they did a knee replacement, the patient was in the hospital a day less than all the other patients in the system, and their system has 24 hospitals. When they looked at the technique that those doctors were using, they decided it was best demonstrator practice, and over a couple year period all the other orthopedic surgeons adopted that. Then across the whole system, all the patients that got knee surgeries were in the hospital a day less. So the patient's better off, and the bill is more affordable, and everybody involved in it feels like they discovered a good way to do something and everybody followed it. So there's a good case example.

Rick Adam:

We've taken that methodology and taken it to our other clients, and we see similar results across the country in roughly another a hundred hospitals that we're working in.

Justin Schaper:

One of the things we've been able to do over the last few years, is really automate and streamline that by bringing AI tools to bear on it, including natural language processing. As we look at the operative notes and figure out what things really belong in those apples to apples comparisons, or as we like to talk about it, the red apple comparisons, to really get it down to something that's meaningful to the clinician.

Justin Schaper:

Often when we talk about AI, we talk about being able to predict and certainly machine learning and predictive modeling is a real key piece of this. But some of that same modeling work isn't necessarily has its most value in just real time analytics, it may be looking retrospectively at something that happened already. What was it that really happened there? And bringing that same sort of clinicians perspective, putting it into the machine model and being able to apply that to data to help get that signal out of the noise.

Ari Kaplan:

That's an interesting point in that in AI, you have subject matter experts. It's really joining artificial intelligence and human intelligence. Would you say the clinicians in this case are the subject matter experts?

Justin Schaper:

Absolutely. That's absolutely at the center of anything that's going to be successful in healthcare in general. That level of expertise, that subject matter knowledge, but also that commitment and understanding that it's the patient at the end of the day that is going to be on the other end of this.

Rick Adam:

All serious innovation, all material innovation, is the result of a great collaboration. We've been able to get our team of clinicians, of data scientists, and consultants who know how to talk to doctors, to collaborate in a way. Now, we're able to collaborate with folks like DataRobot, and take everything they've ever learned and bring it to bear here. I think we've already created some really remarkable breakthroughs in how to use data science to improve healthcare. I think in the next decade, using these kind of tools, this kind of collaboration, we have a great chance to make healthcare everything we want it to be.

Ari Kaplan:

It sounds like there's so much to do, you're talking about hundreds of different models and questions to ask. How do you decide, what are your priorities? What are you doing this week, or this month, or in the next 12 months?

Rick Adam:

Patient health and patient safety and quality is always number one by a lot. But after that, if you allow me this little bit of a joke, it's like they asked Willie Sutton why he robbed banks, and he said, "Because that's where the money is." So, after we look at patient wellbeing, then we follow Sutton's law, which is "Where's the money?"

Rick Adam:

In a hospital, 60% of revenue, and usually about 60% of cost, is surgery. If you wanted to pick a place to start, that's where you would start, and that's where Intermountain started, and that's what we've carried out in the marketplace. But after that, where we look is in areas where the results are not the best, or the cost is the highest, and see if our analytics can make a difference there. It's really the value of the opportunity, either from a quality point of view or a cost point of view.

Justin Schaper:

Also, again, part of the tough questions we have to ask ourselves as an AI and technology company, are we using those tools in the most effective way? Is what we've got in front of us taking advantage of some of those capabilities, and are we really using those as leverage to accomplish those bigger priorities that Rick described?

Rick Adam:

There's tons and tons of analytics and AI floating everywhere, and certainly there's tons of it in healthcare. Unfortunately, very little of that AI or analytics has changed healthcare practice. In the United States, something like 80% of healthcare cost is a result of a doctor placing an order. The doctor orders out an MRI for you, or a high-cost drug, or lab work, or what the surgeon chooses to take in the operating room with them. You really cannot change the cost curve until you change clinical practice, and you can't change clinical practice until the doctor decides to change.

Rick Adam:

The great breakthrough that we at Empiric had is, is you've heard our technology is absolutely world-class and groundbreaking, but we figured out how to take the insights we get, and present them to surgeons, and surgical leaders, and chief medical officers in a way to say, "Yeah, that data makes sense to us. We don't see any flaws in the data. We see where it suggests we should go, and we'll do it, or we'll take a look at it." I think that the thing we're the most proud of is that we're actually changing clinical practice with this data.

Ari Kaplan:

A lot of great ideas about the intelligence revolution, and combining artificial and human intelligence, might call it augmented intelligence. What are some of your thoughts on, for example, like the trust? You are doing a prediction or a segmentation of a customer, how do you give guidance on what's accurate, what's not accurate, is there bias or not, just trust in AI as we call it?

Justin Schaper:

First of all, transparency is really important, and transparency covers several different levels. One level is being very transparent with the physician, with the surgeon, with the clinician around how the data is pulled together, the process and the people. Behind the AI, there's data scientists and analysts and clinicians who have been part of that, so one of the things we tried to do is put our data scientists and others right to the front, and have them be involved and engaged in those conversations with the surgeons. That way you begin to build some trust in the people doing the work behind the AI, but then also transparency in how that AI was put together and assembled. Then we also, obviously, try to spend a lot of time when we're getting the results out, really helping them unpack the why. Why is this different?

Rick Adam:

You have to project an ethical persona. When you come into this with any of this kind of data, however you got there, AI or analytics or whatever, it's got to be very clear that you're doing it in the most ethical way possible. Early in our conversation, I started with, look, the very first thing we do is to make sure we never back up on patient safety or patient quality. That's a must, right? Then after that, are there any chances to optimize or take out waste or whatever? I think it's got to be really, really ethically anchored at the front end.

Ari Kaplan:

I was wondering, Empiric Health, what are some ideas of where you want to take the company in the next couple of years?

Rick Adam:

As Justin mentioned, once we unpack this data, we very often discover best clinical practice for a given type of patient, given what you're trying to do to the patient, or with the patient. What we would like is to have that information as broadly distributed as possible, so that more and more people can take advantage of it. Through our direct sales effort, we'll get more and more hospitals, help them understand these things.

Rick Adam:

But we're also going to look for some partners, potentially in pharma, or in medical devices or others, where we discover the best practice, then we can use other people's marketing channels or education or training channels, to sort of get the word out there.

Rick Adam:

If we can reduce the level of waste in the system and move everybody toward the best clinical practice, the people paying the bills will be better off, the patients will obviously be better off, the doctors and the rest of the clinical teams will feel better about it. But maybe most importantly, we'll probably end up with enough of a surplus that everybody in the country can have high quality medical care for roughly the bill we're paying today. I think that the issues of social justice and access to good healthcare is something we should all care about. We're obviously a small company, but I think we and people like us, and folks like DataRobot who are providing us the tool set, really have the opportunity to completely transform US healthcare. We'll keep moving the company that way to tackle the most valuable challenges first, and then get the word out through multiple different channels.

Ari Kaplan:

Great, so the title of this podcast is More Intelligent Tomorrow, and wanted to get your thoughts on what does that mean to you?

Justin Schaper:

There's a lot of really great groundbreaking work happening around clinical decision-making and support. I hope to see that a lot of these technologies get used more from a patient experience point of view, and really being able to give more of an integrated sense of what's happening as family members move through the care continuum, really being able to help pull together the different pieces of the American healthcare system in those different fragments and helping connect them. Some of that's just about continuity, continuity of information, as much as anything else. I think that the technologies we have really can be a driver for that.

Ari Kaplan:

I know that access to healthcare is one of the huge challenges, globally, that's kind of like level setting on the base, and then in terms of the positivity, like 10 years from now, where there could be some incredible inventions, where do you see some new inventions or innovations in healthcare 10 years from now?

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Rick Adam:

We're patterned to say healthcare, and so we all do that all the time, but the other piece of this is just health. When people get tools to help them stay healthy, then they require less healthcare, if you will. I think lifestyle choices, people with fitness watches, you know the fitness watches now, they can detect arterial fibrillation, Afib. I think that there'll be all kinds of early warning stuff, and lifestyle stuff, that I think technology generally, and particularly your personal devices, are going to help us keep patients out of the doctor's office, and out of the hospital, and just keep them healthy. I think that's a very promising part of the future is more health than healthcare.

Rick Adam:

The US has to improve the productivity of our healthcare system, because, 20% of the GDP, you really can't go north of that and be competitive. We have to take that amount of money and make it work better. The key to doing that is to show evidence to doctors and other clinicians, so they can make informed choices, and that evidence is not easy to get to. There hasn't been data for that long, some of the data is a little messy. Those of us who are in the analytics business need to get data that's compelling enough, and visually attractive enough, that we can show it to clinicians and get them to make thoughtful decisions about how they're taking care of their patients.

Rick Adam:

If we do that, and get a little help from the people paying the bills, the government and the commercial payers, I think we can break the cost curve over and take it down, and then use the surplus to improve the quality of everybody's care, and improve the access to care. I think all of us that are working in this line of work, that's what we're trying to get done.

Ari Kaplan:

Okay. Great. Well, this has been fantastic. It's been inspirational, it's been educational, and it's been fun. We appreciate having you both on, Rick, Justin, and thank you for your time.

Rick Adam:

Thank you so much for hearing our story.

Justin Schaper:

Thank you, Ari.