

Blockchain Leaders Talk Healthcare at SXSW Conference

Blockchain technology first gained recognition via use of the cryptocurrency Bitcoin, but as other industries took notice, blockchain started growing exponentially. Because blockchains are secure by design and exemplify a distributed computing system, decentralized consensus has been achieved with them. Those in the healthcare industry were especially interested in those aspects, and have begun enthusiastically embracing the technology.

At the recent South by Southwest (SXSW) conference in Austin, Texas, a crowd of 400 attendees filled a room to learn more about Blockchain's potential to transform the healthcare system. John Bass, founder and CEO of Hashed Health, moderated a discussion titled, "Blockchain and the Crisis in Healthcare." Panelists included Aaron Symanski, CTO of Change Healthcare; Dominique Hurley of HealthVerity; and Elizabeth Breeden of Lipscomb University. The following is a transcript of the session as it unfolded:

John Bass: So, show of hands, how many people

out there would you classify yourself as kind of a crypto guy or girl?

Raise your hand. Alright. What about blockchain, pure blockchain guy or girl? And what about a healthcare nerd? That's a good mix. Well, you guys have come to the right spot. We're talking about healthcare and blockchain and maybe a little bit of crypto in there. But the goal of today's session is to talk about the crisis in healthcare and how blockchain can be an enabler of new solutions to solve for some of the problems that we have created over the last 10, 20, 30 years.

As context I'm John Bass. I'm the founder and chief executive officer of a company out of Nashville, Tennessee, called Hashed Health. Hashed Health is a healthcare innovation firm. It's focused on using blockchain to solve unmet critical needs in our healthcare delivery system. A little bit about my background and I'll let the panelists introduce themselves.

I have been fortunate to be a part of three—this is my third startup—to be a part of it all in

a healthcare technology field over the last 23 years or so. The work I've done professionally has all been focused on shared operating systems; how do we use technology to collaborate in healthcare? That theme of collaboration has been a passion of mine. It's taken some years off my life because as most of you healthcare nerds out there know, that idea of collaboration doesn't always come naturally to those of us who work in the healthcare field.

But I think the future is in collaboration and I think the opportunities are in new systems around collaborative ecosystems of shared value. I think that's probably the only way we can get through the problems that we've created for ourselves. Over that period of time I've come to believe that the healthcare system is not broken, it's working exactly as it was designed. The infrastructure that we have created in healthcare is perpetuating these problems around cost and quality that we're here to talk about today.

My background is in building applications that sit on top of relational databases. And during that experience at ImpactHealth and at InVivoLink, I think we were successful but we were successful at solving institutional problems by building applications that rest on top of relational databases that solve kind of siloed issues around trust and transparency for the company that we were implementing that product for. And I think there's an opportunity to think differently about the infrastructure in healthcare and how we can start looking at application development and solutions at more of a market level rather than an institutional siloed level.

So those are some of the themes that we're going to talk about today. How we use these concepts of trust and transparency and aligned incentives that blockchain seems to be purposely built to support, to solve all the trust and transparency and incentive alignment issues in healthcare, which are driving a lot of the financial and quality-related crises. Our panelists include Dominique Hurley and Aaron Symanski and Beth Breeden, all good friends of mine and we're fortunate to have them join us this afternoon. I'll let you guys introduce yourselves.

Dominique Hurley: Everybody, I'm Dominique Hurley and I'm vice president in charge of

strategic partnerships and innovation at HealthVerity.

HealthVerity is a company that is focused on delivering access, transparency, and connectivity to people that seek healthcare information. We have a large swath of clients across commercial, clinical, etc., that use this information. Prior to HealthVerity I was at Biogen. And at Biogen I was responsible for global commercial information. And during that time I was accountable to make sure that the information that our enterprise used was leverageable across the entire organization for all the different purposes.

And I uncovered some pretty big gaps in information flow and information exchange which led me to look for new solutions that might help solve this problem. And that landed me in the world of blockchain about two or so years ago which is when I had my friendship begin with John. And today at HealthVerity we're exploring how blockchain can improve the ability to move information around faster, more meaningfully. I'll share a little bit about that in a moment.

Aaron Symanski: Hi everyone. I'm Aaron Symanski.

I'm the CTO of Change Healthcare, a company you're seeing more of in media and our name. Formerly Emdeon, part of McKesson Technology Solutions also has come together in Change Healthcare. What we do is we connect all of the systems you hear of all the time, EPIC, Cerner, Optum, Aetna, all of the payers and providers in healthcare work through our networks of both medical claims and financial claims. We move about two out of three claims a day in the U.S. We move billions of dollars a year throughout the system and we have many products and services that sit on top of that—revenue cycle management, all kinds of different pieces where we help the providers of healthcare and the payers of healthcare in the U.S. perform their services more effectively.

Similar to the messages you've been hearing, we're very interested in new business models. We're really interested in new technologies. We've been doing a lot of integration and changes into the different ways healthcare is performed and executed in the U.S., and blockchain technology

is another piece of that puzzle and we'll talk more about where we think it's going, and personally.

In my background, I've had a real mix of careers. I built and ran global derivatives trading systems for one of the biggest banks in the world for years. I've had three startups in healthcare and outside of healthcare, and have also been at small companies, and Anderson as well. So, a real variety: I've done contracting, I have an economics background. So business models and technology, and how they come together to really make peoples' lives better is really a core interest of mine.

Beth Breeden: Good afternoon. I'm Beth Breeden from Nashville, Tennessee.

I'm a professor of pharmacy. I'm a pharmacist as well at Lipscomb University, in the college of pharmacy. And in that role I have the great opportunity to offer and create curricular offerings in health informatics. That's our area focus. We are looking at how we can use data, information, and knowledge but also technology and automation to make healthcare delivery more clinically and financially efficient.

And being in Nashville, being friends with John, we had the great opportunity to engage in some new innovation around blockchain and introducing that into our curricular offerings. So we have a free-standing Master's program in informatics, and then we also offer, we're the second college of pharmacy in the nation to offer our students that are getting their pharmacy degree the ability to also get a Masters of Informatics as well. So we joined the consortium, the healthcare collaborative with Hashed Health, and have started some research efforts around developments in this space, so a couple of those we'll talk about.

We have for instance, pharmacy students who are programming in blockchain right now which is we think particularly innovative. It's a great time to be in Nashville, a great time to be in this space and we're thrilled and delighted to be able to be a part of it. My background is in health system pharmacy and then I had the really great blessing to move into an electronic medical record company that created the EMR's around

'05, so I really had the chance to help develop some solutions around pharmacy, CPOE, EMAR, and bar-coding in the EMR as well, too. I'm really encouraged about the development in this space and delighted to be a part of the conversation here at the conference.

John Bass: Okay. Beth, let's keep going with you.

This panel is all about this crisis in healthcare and I think there's a couple different things you can think about. There's kind of this big financial crisis which is kind of the driver in my mind of the real burden that we're creating on the country. We're headed to 20% EDP and we are speeding toward the chasm. I mean it's going to eat our government, it's going to eat the country if we don't do something about it.

And over the last ten years I really don't see a whole lot of meaningful progress toward a solution. So from your perspective, define kind of what that crisis really is, what's driving the financial problems that we've created, and then we'll get into some of the blockchain specific concepts that enable us to redirect some of that.

Beth Breeden: Sure. It's a great place to start and I think some of the things that we're seeing is the inefficiencies in healthcare.

I think many of the audience indicated that you're in the healthcare space, so I'd just like to ask a question. How many of you have all of your healthcare data available to you immediately and in one location? Raise your hand. Wow. Very telling, very telling. It's exciting to see that we're there now—sort of—but obviously the need is there. And those are some of the things that we focus on.

We feel like the crisis has a lot to do with the administrative costs, the lack of interoperability, so that again to this point we don't have that data that's available. We don't have our patients involved in their healthcare process. So to have that data, to know about them, they have data maybe from their wearable technologies, their Fitbits and so forth, but is that actionable? Do they know what to do with that and how to utilize that? So that's I think one of the big areas that we're seeing need in, in development.

John Bass: There was a New York Times article

talking about American healthcare and what are the real drivers of the financial problems we've created. One was administrative burden as Beth just mentioned. But the other one that they talk a lot about is the price. So put that in context for us.

Aaron Symanski: Sure. When I think about price in healthcare there's a lot of elements that are coming together in that price.

It's not just the manufacturing of a drug. For example, my wife is an osteoplastic surgeon. She just had to get an additional license because the solution that's been put out there for the opioid crisis is to have another layer of licensing for physicians, when really the cost of tracking where those drugs are being prescribed, who's receiving those drugs, all that data is already out there. And so her costs as a provider have gone up unnecessarily. That is going to be passed through. That's what a business does.

If I'm building a closet I'm charging for the wood, I'm charging for my labor in building the closet. And so we imagine that multiplied out by the providers in healthcare, additional licensing which is unnecessary to try to solve a problem which is being treated in a very separated way from all the data that's out there.

It's very akin to what Beth was relating except we've moved the focus from the patient who's receiving, to the organizations that are prescribing. These are the things that we think about in healthcare when we're looking across this spectrum of services and products and costs that are out there and the way that they're coming together in really invisible, really insidious ways. Government and regulations and this separation of data are all coming into play together to increase costs.

John Bass: Hashed actually has a new initiative, it's funny, that's focused purely on credentialing and licensure of physicians which in the U.S. is like this driver of a massive amount of cost.

It takes four to six months for a physician to get credentialed and it's \$7,100 per day every day that takes. That's the lost revenue or lost financial opportunity. It's one of those non-sexy but very important problems that we can solve I think with blockchain. But Dominique, one other

thing on that, in the U.S. it's a cost-savings issue. But when you talk to people in other countries like we've been involved over in Dubai and the Middle East, it's all about access to care.

It's funny that here in the U.S. a lot of the blockchain initiatives are about reducing cost and reducing administrative burden, but the same use cases applied in a developing country is all about care and access to practitioners, patients' access to practitioners who need to be treated. So it's much directly more impactful about quality in access. Dominique, any comments on top of those? And let's start to transition to some of the big-picture, exciting concepts around blockchain. From a big-picture perspective, how do we start to tackle some of the issues that these guys just laid out?

Dominique Hurley: Sure. Let me just add one crisis to the pile here.

At Biogen we spent a lot of time worrying about how patients could have access to the therapies that they needed and then be trained appropriately, receive their drugs as they needed them, and then be able to be successful in the treatment of their disease. And in specialty medicine in general, that dynamic exists. It's a very complicated process for a physician to prescribe and a patient to finally get on therapy.

In my role in charge of information and trying to figure out where the gaps of that information were, we found over 52 different steps between when the patient was prescribed the therapy and how the patient ultimately had that therapy delivered and that involved the physician's engagement with a hub, which is a group that manages patient access to free drug or patient assistance programs like that. It involved interacting with the payer. It involved training and clearing that patient for ability to treat and so on and so forth. And sadly, we found that because of the time and because of the machinations of exactly the same information, a person was prescribed a drug because of a diagnosis. That same information had to be moved around many times in order for all of this to happen, for this patient ultimately to get on therapy.

So the crisis there is time. And we discovered that patients would age out and actually never get on

therapy because the people that were in charge of managing a particular patient became too burdened for them to treat. They simply let go or forgot about the patient; that was a problem. And so I think the crisis there is our inability to move information effectively and to leverage the connectivity between organizations well. What's exciting about blockchain in the future is that that actually goes away. You have the big picture for me is the place where that dynamic happens, that prescription is written, it's stored, everybody can access it.

That diagnosis exists, the claims are made, everybody can access them, and the information can be pulled and pushed as it needs to be with the trust which is a huge factor, a trust around the viability of the information that is available.

John Bass: Beth, from your perspective what you know is, as we travel the world and talk about blockchain and healthcare, everyone's favorite use case is medical records on the blockchain.

I think all of us share in a sense of optimism that over time that will be a fantastic use case. The idea of a patient opening and closing the door to their medical record using a wallet on their cell phone just makes a world of sense. What are your thoughts on that use case and its viability over the short term, though? Is that something that you feel we can solve in the next few years?

Beth Breeden: I do. I mean, I'm very excited about that and very excited about the potential that blockchain offers to be able to be a storehouse of that data, a central repository if you will, to help gain those efficiencies.

And the patient being in charge of that data so that they can then not only be aware of what that data holds but then to be able to share that with organizations, with their providers as they need. And then to get feedback on that data. I think an exciting extension of that is if we incentivize our patients to make healthy choices and to do things and then incentivize them perhaps with development of cryptocurrencies and different things that they could utilize to go to a pharmacy for instance, and pay for their co-pay for their pharmaceuticals.

So once again we've got the wearable

technologies and the things that are in place to be able to manage and monitor that. So I think that is very solvable. We've got several companies that are creating those business models and it's I think an exciting time to see that.

John Bass: But Beth, and Aaron and Dominique, feel free to jump in. What about the challenges here?

What about GDPR? What about HIPAA? And what about all the bodies in the road of the Googles and Apples and everyone else who's tried to put medical, put together a longitudinal health record?

I mean in my mind, the consumers never gravitated toward those solutions and there's been a lot of money spent, a lot of failures around those types of initiatives. What has changed? What's different about now that makes you think that we can accomplish that in the next few years?

Dominique Hurley: I'm actually going to disagree a little bit with what was just said.

I don't think patients care yet about their medical records. I think they consume them when they have to. They don't understand them when they're looking at them. And we're really pretty far away from the patient actually wanting to get in and own that record.

I think we all understand because of HIPAA that it's their right to own it and I think from a law standpoint we all have to comply with it. But we're pretty far away from the patient stepping up and saying, "I want ownership of that."

John Bass: Does anyone out there agree or disagree with this, or have a comment on the medical records on the blockchain use case? Can you jump to the mic real quick?

Audience member: I was going to say I disagree a little bit.

I think as people get older, they care; people who are having to see the doctor a lot. For everyone who's healthy and probably most of the people in this room, nobody cares. But if you're seeing the doctor regularly, you have a heart condition or whatever, I think it's absolutely important

because you're going to different doctors.

John Bass: So the point that you made is that if you're a patient with complex clinical comorbidities, or you've got a kid who's got a problem, there's niches of high-end utilization patients that might, that would have some value from instead of carting a big folder around to having that information on a phone. Any thoughts, Aaron?

Aaron Symanski: Yeah. One of the misconceptions, and I'm sure most of the people in this room don't have it, is that HIPAA gave individuals control of their medical record, and it didn't.

What HIPAA says is that the organization that owns your medical record, that medical service with you, owns that data. They have to share it with you but you don't ever own it. It stays with that provider. And I think blockchain gives us an ability to move away from the constriction that rule has put in place. All of the medical writers are not incented to work together. There's no benefit to them to bring all of those records together and make it available for the individual.

With blockchain we have the ability to start connecting all of those dots, all of those pieces together for the individual to see it all holistically. We have patient portals that we white-label for our customers where we're showing more and more of that information, where we're bringing the financial records in and we are really looking at blockchain being a great enabler of saying that yes, this is this individual. Identity, which is another topic for blockchain really being a good solution for, identity's been proven.

Now let's bring together this source of consent. Let's bring together this source of a specialist visit, of the general visit, of the prescriptions they're using, of the vaccinations they've received at the flu clinic down the street. Being able to use blockchain to enable the patient to execute that right, to gather all that information, I think is a great use case and I think a very powerful use case for blockchain.

Our company holds about one in five medical records in the U.S. And while today we have brought into production blockchain capabilities

on our medical claims network, that's the next story we're looking at. How to continue to bring to the patient all of their information in a way that not only they're seeing their medical experience but they're also seeing the financial experience they've had together with that. You want to leave the provider's office having made a payment that you're sure your insurance company has already signed off on, that you've got your co-pay and all those pieces put together as well. I think it's a real unifying technology and I'm looking forward to working with all kinds of companies in bringing that together.

John Bass: So medical records on the blockchain; kind of what everyone loves to talk about. Super sexy.

But it's going to be incremental in terms of at least from my perspective and I think from a couple of the other perspectives here, it's going to be incremental in terms of how we get there and how quickly. We've got some regulatory challenges. We've got some consumer adoption challenges. And I think everyone agrees that the early use cases that move the fastest are more B2B type things but certainly within consumers that need a solution like that and perhaps in other countries where we don't have some of the same burdens we can see that concept move more quickly.

What other big, kind of big high-level disruptive concepts in healthcare can help us tackle some of the big cost crises? And then we're going to talk about more granular how we get from here-to-there type stuff. And one that I think about a lot is this term of value-based care. What are either that or some of the more administratively focused initiatives do you see kind of rising up?

Dominique Hurley: At HealthVerity we're focusing on consent and patient consent, physician consent, and what that means.

So I'm either giving you rights to my information and your use of my information to deliver better care to me, I'm agreeing to participate in programs or not and this can happen as a caregiver, as a patient, or as a professional.

I think that's a terrific big picture place to

work because it's going to enable the flow of information so companies like Change Healthcare and the work that they're doing interacting with the patient and then exchanging information across entities is well managed.

John Bass: I agree. But I don't see e-consent as changing the world.

And I think it's a good place to start. There's going to be some value there. I think it's a great use case. But in terms of kind of like game-changing concepts on the blockchain, we talked about medical records. Do you guys have some other kind of big picture areas where you think blockchain will really be instrumental? What about payments?

Aaron Symanski: Payments? John was looking at me on that one.

What we've done is Change Healthcare has put into production blockchain on our medical network, our claims network. I mentioned moving two out of three claims. And what we wanted to do is move the conversation from a conversation to actually writing code, and putting this in place, and making it available for our customers business to business as John mentioned, B2B to utilize. Our financial networks are tied to that as well. The claims move through, the payers say here's how much I'm going to pay. That message goes back to the providers. The providers say hey, I actually did this kind of service. I want to modify it. It shouldn't have been denied or I'll accept it. Then we move the money as well.

There's a lot of steps in there and as we talked about just a few minutes ago the patient doesn't feel a part of that conversation. They don't know what's happening until 60 days later, 90 days later. They definitely don't have expectations set before you go to the clinic as to what your costs will be and that kind of transparency. So I think blockchain is something we're starting with in the claims network at Change. We're looking at how that's interacting. We have the speeds up. We have the velocity we need. And we're moving that into our other networks.

We have imaging networks. We have financial networks, pharmacy networks. And we're going to continue to expand that. And we see a

chain of chains. We see that there'll be many blockchains in healthcare. We expect to have a watching focus around the financial side, blockchain around the pharmaceutical side, chains connecting those things. And it's really powerful and great not only as a business model, but benefit for the patient. At the end of the day, that's why I'm in the business that I'm in.

The last thing I'll mention and I'll give others a chance to comment, I also have a strong belief that the business models that will be the killer app for blockchain are not being explored yet. We're seeing a lot of organizations that are doing individual proof of concepts. They'll have four developers go into a room and mimic being two or three different counter-parties. What we wanted to do is get out of that chicken and egg, get out of the conversation and into really using it.

And so by enabling our network which has a ton of volume moving through it so that our customers can interact with it and still see the same operational flows and same information through their API's and through their screens that they normally see. We want to move that conversation forward and start exploring those new business models that you get when six different parties do a transaction are looking at it simultaneously.

This is moving away from a lot of the cryptocurrency examples where it's just, "Beth is buying something from me and I'm moving some kind of coin or other token over to her." We see a multi-party network across larger and larger segments of healthcare as the future and we really want to explore those business models. We think there's a lot of impedance today in how people are approaching blockchain, the reticence to really dive in and use the technology and we really want to enable that. We think that'll be exciting.

John Bass: I'm glad you mentioned that. I think you're right.

I think that there's tons of use cases in healthcare around how the blockchain can help with trust or transparency or alignment of incentives, and the technical innovation is one thing but the business model innovation is as big or perhaps bigger opportunity and it's also a lot harder. And then

you've got governance and you've got all these different aspects. Everything in blockchain's kind of like a 3D chess match. I think the business model innovation I would agree is kind of where a lot of the really interesting stuff is going to start happening. Let's see.

My point was that's not a good use case. I'm just not sure it's like a game changer in terms of changing, like enabling, value-based care or medical records on the blockchain. I think it's a great place to start and maybe we should get into that part of the conversation. Like what are the things that are starting to happen now that can go to production in 2018 or 2019 that begin our journey down this path? Part of this conversation is also the fact that it's this concept of decentralization in healthcare. So blockchain is being used as a term to encompass a spectrum of trust-based transactional systems.

Some are very much still trending toward most, in fact probably all, I would say are trending toward these early use cases, are trending toward more decentralized systems with some aspects of control, private permission blockchains. What are your thoughts on early innovations? We think that most of them will probably be B2B with some types of controls and privacy and permissioning. Let's just comment about which use cases you think are coming and how they're configured.

Dominique Hurley: Sure. Let me just paint my big picture though.

Imagine walking into a practice, and when you walk into the practice whatever doctor you're seeing it's going to be a retinal scan. And that retinal scan's going to link you, and give that doctor at that moment in time, access to your records. That doctor doesn't have an EMR. They don't necessarily have to have their own version of who they think you are. At that moment in time, they can go and pull the data relevant for you because of the interoperability created through distributed ledger technology.

So that's the big idea and that's where consent comes into play because that scan is your authorization at that moment in time. So to answer your question right now, where do you start, what's possible, I do think that to Aaron's point we do need to start with B2B. We need to

make sure that we can put into play the use of blockchain to enable business. I don't think we're going to have patients engaging and changing the world right now. We need baby steps that can carry us forward.

So things like consent are base-foundational things that have to be in place in order for information to move. And I think we're going to be more successful if we focus on the pieces that everybody number one has a problem with today, and then number two, it can solve the problem and leverage blockchain at the same time.

John Bass: Beth, do you want to provide some thoughts?

Beth Breeden: Yes. I think a particularly good case model that we're seeing, we're working with a company that is focused on adherence.

Clearly we're all aware of the issues with adherence and people not taking their medicines or people not using them correctly. So if you incentivize them to do that, if you educate patients on the utilization to have this information on the blockchain, to engage them to have them again going to the pharmacy and utilizing, for instance, this incentive that they've been given then to pay their co-pay, then they're going to start continuing to do this. We find that some of the financial type things, the financial incentives are very, very important for patients.

So if I know that it's going to lower my insurance deductible, if I know that the co-pay is going to be covered, they're going to be involved in that. Another strong aspect is the behavioral aspect; getting patients to do something when they have that data, when it's actionable. Case in point, how many have a wearable on, like an Apple watch today or a Fitbit or something like that? So say it's seven o'clock at night and you're halfway through your steps for the day, what behavior modification is going to get you off the couch to get you to complete the rest of those steps? So again, we can provide the data but then we have to educate them around the behavioral modifications and we feel that some of the things that this company's doing with adherence is going to be a strong outlier.

Again to your point earlier, I think patients

across the board may not be as involved in their data, but when they see positive outcomes, when they're diabetics and that A1C is lowered, when they see that that company is getting incentivized because they're meeting these outcomes with their patients, that's when the adoption's going to continue to move forward really rapidly.

John Bass: Aaron, you talked about some of your early efforts in terms of Change Healthcare's business but you also mentioned business model innovation. You've obviously thought a lot about that, what business model, innovative business models do you see emerging? Do you have any kind of thoughts on what we have coming up?

Aaron Symanski: Sure. I think from a patient point of view we'll see businesses whose best points are figuring out how to monetize that improvement in health.

Is it going to be the employer who is recognizing the value of changing the behavior of individuals? Are individuals going to identify that themselves? Someone's going to figure out what the right lever point is to make money in doing that and providing what I believe will be a blockchain-based app on your phone. It'll integrate with your devices, draw on your medical records, and really help educate that individual into the right kind of behaviors and diets, and that kind of thing for who they are, for the environment they're in and such.

I think on the business side, it becomes more to me; very interesting and tricky. As you mentioned at the beginning, John and I very much agree with it, healthcare in the U.S. is working exactly as it is designed. And until the design changes it is a very high hurdle to bring in new business models. There's a lot of other industries that I've been involved in, I'm sure others in this room have been involved in where the regulatory hurdles were much lower and they were much more concentrated. There were far fewer regulators. And so it makes it much easier to create new business models, experiment on the edges of what can be done. In healthcare, the number of regimes and regulatory authorities and such that are out there I won't even try to count it, the controls that are on information being moved.

I mentioned the opioid crisis earlier. They're creating another data store and another set of regulations to deal with something that already is understood and known and recorded and can be managed. So I think on the business-to-business side the approaches we'll see for the near future will be consent being captured and being well executed. The pieces coming together and then we'll see how those come together in that; think of it as a chain of chains. As all of those pieces become available and start being assembled what we're doing with claims that's where new and interesting business models will come from. It's a big driver for us to really create an area that can seed that inventive and experimental area by hooking blockchain right into our network.

John Bass: At Hashed the two kind of projects that we're working on that are coming out, one came out last week and another one's coming out here in a few weeks and they both look like exchanges.

And the information, the asset, the digital asset that's moving across those exchanges in one case is a piece of an identity. It's credentialing a licensure. Basically it's a physician's identity. So that's the business model that we kind of see emerging for that concept of the movement or the infrastructure, the pipe that gets people digital identity, a licensure credentialing information from people who have it to people who need it.

The second is also an exchange. It's an exchange for people who have services to offer to people who need to acquire those services. So at least from Hashed's perspective the exchange concept, this idea of kind of public infrastructure where it's going to decentralize where people who have a digital asset to offer, can offer it to people who can consume it is kind of like a lot of what we think about.

And the digital assets that we think about are identity assets, service assets, patients moving through an episode of care, clinical trials, medical records, there's all kinds of different types of digital assets in healthcare that we can look at in terms of solving some of the critical problems in these value chains that we've created, that have become so bloated over

time that are driving a lot of the administrative burden. So let's open it up to the crowd for a couple questions. Does anyone want to go ahead? That mic may be working, so let's just form a line at the mic if you don't mind.

Audience member: I think we danced around this topic a little bit but I had a more specific question around the cost of implementing blockchain.

In a lot of these use cases like whether it's medical records, or digital identity, all these things, in the end the cost burden's going to fall to the patient because the patient drives most of the revenue in the healthcare space. But what's the expected cost model of who's going to pay for these improvements? Is it going to be insurance companies? Is it going to be the pharma companies? Is it going to be the provider networks?

It's such a distributed network already of the people who are involved and could potentially benefit from this system. I've yet to see any one segment of the healthcare industry that's going to more benefit from it enough that they see the cost benefit to invest in it.

John Bass: Yeah. That's a great question.

That 20% GDP is some incumbent's profit margin. So how do you get them engaged and involved and excited about working on projects that might affect them and I'll let these guys comment. I think there's opportunities to create new services on top of these solutions that will take us forward. But from your perspective guys, what are some of the challenges and opportunities from the incumbents who are trying to figure out what blockchain is and how it's going to affect their businesses?

Dominique Hurley: So to answer the question I think it drives operational efficiency and reduce cost connected to that.

There's a lot of money being spent every day by all of these providers and talking to them about how their costs could be simplified and their business processes improved is an angle in. In terms of how people are consuming today or paying for it today, again you go after a problem that is real. You demonstrate the power

of blockchain in action. You don't necessarily sell blockchain, you're selling the solution and then slowly you're weaving the enterprise into the use and future uses of the chain that has been created.

John Bass: One reason we like this credentialing and licensure use case is because we're not competing with any of the incumbents.

We're simply making it more efficient for those incumbents to move those assets from one to another. So that's one reason I think that's a good near-term use case and that's one reason that the exchange model makes sense to solve that problem without trying to be like a credentialing company or something like that. Next question.

Audience member: Howdy. I'm a registered nurse and I'm the chief executive officer of a 94-bed acute care psychiatric hospital in Harlingen, Texas.

Can you speak a little bit to the potential of blockchain to improve the utility and user experience with electronic health records? You know I've used EHR's in many hospitals and universally most people are really, really frustrated. Most practitioners are very, very frustrated with EHR's. In the last couple of institutions where I've been an administrator or an interim leader, the nurses are maintaining a separate Excel spreadsheet to tell the story of what's really going on with the patient because the EHR doesn't give a mechanism to do that.

It doesn't pull everything together in a way to efficiently give a report on a patient from one shift to the next and have meaningful transitions in care. And the doctors are depending on that document, too. It's in a shared folder where they can find it because they need that information, because the EHR doesn't paint the picture of the patient. And the nursing diagnoses are completely absent, and so you never get to "What does this illness mean to this person as a person?" because that's what nursing's all about. The nursing taxonomy is absent from most EHRs. So can you speak a little bit to the potential of blockchain to improve the quality and utility of electronic health records?

Aaron Symanski: My challenge, my personal

challenge with EHRs, is that they are records of many pieces of discrete data and they don't have the story.

The story is really the important piece. And they're a partial assemblage as well. The patient has had experiences in other service providers. Even in one facility they may have different systems where they recorded different pieces of data. And I always map back what we're doing at Change Healthcare in creating efficiencies. We're trying to create more time for the clinicians, the nurses and doctors, the technicians to write those stories to put the information together in a way that's meaningful to the next person who looks at that patient. Not looking at the patient record, not looking at the patient data, but you're looking at the patient.

You want to read the story and you want to be able to help them improve their quality of life. As you've heard from me earlier I think a federated blockchain federating all those different services, bringing in all those different pieces we've talked about on their own blockchains can help create the time to write those stories from each of those elements and the ability to bring them together.

Beth Breeden: I would echo those comments as well too, I think again for the end user.

I mean as a pharmacist, to be using EHRs, I've used those before and I've helped develop them and so we want to solve those inefficiencies. Why do I need to go to an Excel spreadsheet and have a manual tool that's in concert with an electronic tool? It's because these electronic tools are not all meeting the same need. And it's very frustrating.

Yes, it's very, very frustrating but I think the potential of blockchain to be able to, as we've talked about, to help solve some of those interoperability issues. For you to have access to the data, that you need a full picture of that patient of Aaron's, is going to make a big difference and I think for the end users to be able to have that information with blockchain and with some of the tools that we're seeing there will bring the efficiencies that we're needing. So that's the promise that we're seeing with this.

Audience member: Well that's what I'm hoping is

that it'll transform the work.

My iPhone transforms my work. It knows what I want before, it knows when I touch it exactly what I want to do. Electronic health records, when they develop them they say, "Send us your paper forms" and then they make electronic forms from the paper forms and all they've done is paved cow paths. They haven't transformed the work.

There's nothing intuitive. There's nothing that thinks like a nurse, or thinks like a doctor, or thinks like a therapist, or thinks like a pharmacist, and that's what we need. We need to transform the work. What are we doing for this person and how can we all get around taking care of this person? That's what's missing.

Beth Breeden: That is. And I think that's where the promise of where we're starting to see things with artificial intelligence and machine learning that are being enhanced in these EHRs right now.

I mean something just as simple as if I order these same ten medicines all the time, why do I have to go into a list and pull those ten out? Why does this not create an automatic favorites list for me? Those are the kinds of efficiencies that machine learning, as you use it more, you know. We're redoing a bathroom at our house. Every time I go into Amazon now I'm flooded with sinks and with all types of bathroom type things. It's there and it's available; it's just siloed. It's just not in the areas that we need it in.

John Bass: I'll tell you this, though. If you want to get kicked out of a hospital as a guy who sells blockchain solutions to a variety of different healthcare constituents, if you want to get kicked out of a hospital meeting, you tell them that you're going to go put their EMR on the blockchain, or that you're going to do anything that touches their EMR, that's the quickest way to make a fast exit from that facility.

So these are all reasons why you don't hold your breath for a solution in the next two years for that problem. I think that it's going to take a while, especially when you're dealing with anything with PHI and/or you're touching how people get paid. There's not a lot in production yet and we're not going to put something in

production; the first thing in production is not going to do those very complex tasks, unfortunately.

I wish I could tell you that I believe that that was going to happen in the next five years but I think that's probably on one of those five-to-ten-year time horizons. Can we get the next speaker, next question?

Audience member: Actually exactly to your point, the EHRs are here.

There's nothing we can do about it. I'm all for blockchains. I want to be very clear about it. But until we can solve the issues of interoperability, until we can solve the issue of terminology, do I have a broken foot or a fractured foot? Two different systems will put it in differently.

How do we consolidate it? The blockchain is great but it will not resolve the issue. And somehow we need to start with the basic issue of how we really exchange data between the 300 EHRs we have in the U.S. to date. It's not a question of two or three manufacturers. And some of those will address the issues that you're talking about today, but not all of them. So how do we get to the point at which we get true interoperability and we don't wait for FHIR that will be here in five to ten years?

Beth Breeden: I'll tell you one of the biggest things that the barriers I think to the interoperability issue was that we didn't have data standards in place.

And that was a huge problem. That was not in place and then we bring in these EHRs and now we're trying to do all this on a parallel track. So finally we're getting to the point where we have some data standards and we can share that information between disparate systems efficiently because it's stored in the same way. If we're using ICD-9 versus ICD-10, those types of things again we've got a standard terminology. If we're using RxNorm for our pharmaceuticals, so now we're to that point I think it's going to make these processes a little bit more efficient.

Think about when we were on a paper system entirely and coming to EHRs, there was a lot of promise there but again we didn't have these standards and things that were in place

that were making that more efficient. So hopefully we'll move beyond that and I think those efficiencies will come and it may be that blockchain is a singular solution. It may be that it's part of a hybrid solution as well, too. I think that's to be determined as we move forward.

John Bass: There's a lot of problems in healthcare but I just want to take this opportunity to remind you that blockchain is good for problems around trust and transparency and incentive alignment.

It is not the solution for everything. It's an enabler, but you have to be very critical of when and where to use it because a lot of times there are traditional issues and traditional systems that sometimes a traditional database is a more effective way to handle the problem and the problem is there because we've designed a system and blockchain's not going to solve all of that.

Aaron Symanski: It'll help. It'll help.

One of the experiences I've had throughout my career is we had very local systems and then they start working with each other and it grows and grows. And so in finance, we had very isolated technology systems. We had paper and people in between. As those systems began connecting it became very important to know what each other were talking about.

Healthcare in the United States today is highly fragmented. The technology in one organization is not actually talking to the technology in another. They're shipping a file using FTP. And blockchain is a technology that will help enable these conversations and when you put something on the chain, everyone on the network sees it at the same time. That is an event that occurs that will drive all these organizations to start thinking about is it a broken foot or is it a fractured foot, to the example before. Are we using ICD-10 DM or are we using ICD-9? Are we using SNOMED? How are we describing DRG's? Which libraries?

Everything that's out there today that they get away with because they're separated and I can go on and on with stories that will amaze you with how every local institution in healthcare has their own best practice and is a best practice and there are 1,000 of these identical best practices that are all different in the U.S.

So as a patient when you walk into a hospital you're going to get their best practice but it will not be the same one as if you go to the hospital down the road or a hospital in another state. And when you sit back and you think about that from a science/technology education, its 2018 point of view, you start asking yourself how do we get there faster? How do we really move healthcare to a place where they know who I am and there's some unique things about me but most of what is about me in healthcare is the same as everybody else in this room?

And how do we start building the best practice or at least get the best practices down to the five best practices? I think blockchain and the people in this room are thinking about how to use it in healthcare is a huge enabler for that.

Dominique Hurley: And in a minimum having a place where the information is easily reached is going to make it the new place to get information.

So by more and more people using blockchain, more and more systems will connect to blockchain and even if those native apps don't change, the pace at which they can consume information will be speeded up which is a big problem in our space.

Audience member: Thank you. Thank you all for the presentation today and just wanted to paint a quick picture for the crowd about what the crisis really means.

I practice emergency medicine and trauma medicine both here in the states and also internationally in countries that have single-payer systems. When I go overseas and I go into an emergency department or a trauma bay and I have a patient, with a couple keystrokes I find out everything about that patient, every place they've been, every medicine they've taken, even the phone calls they've made to their doctors in a matter of minutes.

I come back here to the states and practice and I am working with a deficit in knowledge that is crazily frustrating. I don't know anything about a patient coming in—especially if they're not able to speak with me. I'm working with guesswork at best. So when we talk about crisis and we talk

about in terms of the stove-piping of healthcare and health data in this country, it drives us crazy to the point that there's a mass exodus right now in our country. No one wants to work clinically anymore because it's so frustrating.

The government and businesses and insurance companies have made it so hard to practice medicine in our country, no one wants to do it. So everybody's leaving because they can make a lot more money working for a tech company being a consultant than they can working in an emergency department getting their hands dirty, working in a family medicine clinic. So to that end, think about what it takes to make a provider these days. It takes about 11 years to grow a doctor. So we're looking at this massive deficit with a combination of no one really incentivized to go into medicine and thousands leaving the practice of medicine.

So a couple things that I wanted to run by you both yourselves and the panel and the crowd itself, for when we think about these blockchain technologies. I'm a newbie so I've just been kind of percolating through your conference here but two things hit me. One is the decentralization of medical education. If it takes 11 years to grow a doctor, can we do better? And maybe that's the area that blockchain can really play into.

The second thing is it's crazy to think about, but hospital systems and hospitals themselves are not necessarily aligned with the patient's best interest. From the outside everybody says come here, we'll take care of you. But when you get inside the hospital you find out that there are a lot of competing interests between engineering staff, between clinical care staff, consultant staff, hospital staff. Certain parts of the hospital create a lot of work for other parts of the hospital and the care of the patient is really disincentivized because of that relationship politically between hospital departments.

So to that end, has anybody ever thought about marrying blockchain technology, and this is a cryptocurrency, with the development of a token economy within a hospital or healthcare system to incentivize positive behaviors and try to mitigate the negative behaviors so people who do good jobs and do good things to really care for that patient and move them promptly

through the healthcare system, they get their little health coin and we try to mitigate all the bad behaviors that detract from that proper use of resources in healthcare.

I'd love you all to think about that. And one thing if I could just ask you, when you're developing your technologies and you want to talk to medical professionals, please talk to the people that get their hands dirty, because a lot of times people talk to the writers that are more NDA than MD and you'll never get the scope of the practice, you'll never get the real feel for what's going on at the level of true patient care. Thank you all.

Beth Breden: I'll offer a bit of information about the medical education as well.

So obviously at our university we're training our students to be aware of these types of technologies. We're looking at innovating and developing these types of technologies. As I mentioned, we have students who have been part of a hackathon at Distributed Health, Hashed Health's meeting where they developed a solution to put vaccine verification on the blockchain so that you can utilize that in travel medicine.

So to get them introduced to this earlier they're going to be the practitioners of tomorrow. I think that's important and that's huge to get them utilizing and available to see what electronic health records are offering so that they can know how to be a consultant for these companies and develop solutions that are more aligned. So that's what we're doing with our students and making them aware.

We're also partnered with Hashed Health to create a solution where our graduation verification can be checked on the blockchain so that these students that are in this degree program right now that once they go and apply for these positions they're going to have their graduation verification credentials checked. So that's the medical education. That's what we're doing now with these pharmacy students to introduce them to entrepreneurial efforts, to introduce them to what we're seeing in the development space right now. But as far as the token and the creation of the token, I'll tee you up John. You all have got a great solution as well.

John Bass: Yeah. So a couple comments and I'd love to talk to you after because it's going to be quick, but education, credentialing, licensure all have the potential to really evolve over the next ten years.

It's going to take a little time but as we start to get better at proof-based credentialing we have the opportunity to start doing things like micro-credentialing, new types of licensure; there's all kinds of downstream effects that can have. And then on top of that you're kind of talking about reputation-based economies.

We're also working on a new system that does have a crypto component to it that basically allows you to start transacting a variety of different types of assets and services based off of specific types of asset stations and reputation-based systems. So again, feel free to come up after the conversation and I can get into some of those details. Did you have a question? We've got about one more minute, so probably last question here and then we'll wrap up.

Audience member: Okay. So just a really, really quick question.

It sounds to me like we have a battle. We've had this for a long time. Everybody talks a different language. They don't talk to each other. So how much will blockchain be an incentive to us to begin the conversation about a single payer, so that we don't have a multitude of sources and resources and interests and we actually are dedicated to providing patient care?

John Bass: My hope is that this provides an alternative to a single-payer solution where we are empowering the constituents, the consumers, and the providers of care and we kind of take the conversation in a different direction, more of a decentralized direction versus centralized to one single payer. At least that's my hope. But what are your all's thoughts?

Aaron Symanski: I mean my first degree is in economics, so I look at the discussion around single payer as just another way of saying each one of us is actually paying.

No matter what system we pick, the work that we get up and do every day, a portion of that is going to pay for our healthcare; whether that's

being siphoned off by our employer and handed over to an insurance company, or whether that's going through our taxes into the government. So for me personally, in a perfect, utopian world I would be able to see the path of those dollars, whether it's going through my taxes and government, whether it's going through my employer, and maybe they have a third-party that's the payer on that, as it's moving through my provider.

I think blockchain is an element of getting to that nirvana because like I said, I'm really kind of neutral as to how many payers there are or how long the chain is because I know at the end of the day it comes back to me. And right

now I don't have the visibility. I don't have the transparency. I'm handed a dollar amount once a year and being asked to make a choice between these two options and I can't follow that flow and know how it ends up in my physician's pocket or the person who takes the x-ray or any of that.

So I think blockchain is a key element of where we're going, and I want to see more and more work with it to help us figure out what are the right pieces and tools, and how we link it all together.

John Bass: Alright, well give it up for Dominique, and Aaron, and Beth. Thank you for coming.