Introduction and episode setup

Good morning everyone and I'm glad that Good morning everyone and I'm glad that you joined us for Signals and Symptoms you joined us for Signals and Symptoms podcast. We are joined again with our podcast. We are joined again with our favorite uh new bestie that we are favorite uh new bestie that we are having having having at at at um um um Dr. Weiss. We had him a few days ago and Dr. Weiss. We had him a few days ago and we discussed more about AI, its we discussed more about AI, its implications, medical legal, all of implications, medical legal, all of that. But today I'm going to concentrate that. But today I'm going to concentrate on his amazing uh intellectual insights on his amazing uh intellectual insights into precision medicine, genetics, into precision medicine, genetics, genomics, and how AI is going to move genomics, and how AI is going to move that field forward. Before we move on, a that field forward. Before we move on, a big shout out to our own bestie, Top big shout out to our own bestie, Top Health 100 HealthTech Influencers, and Health 100 HealthTech Influencers, and then Harvey Castro is our then Harvey Castro is our one of them in this amazing effort that one of them in this amazing effort that we're doing. Of course, make sure that we're doing. Of course, make sure that you subscribe to his newsletter on you subscribe to his newsletter on Substack. This is the podcast and Substack. This is the podcast and definitely follow his influencer posts definitely follow his influencer posts on LinkedIn. He's just truly creates on LinkedIn. He's just truly creates amazing posts amazing posts uh into this.

uh into this. Thank you so much Harvey for helping us Thank you so much Harvey for helping us out in this. Ed, I'm sorry to hear about out in this. Ed, I'm sorry to hear about your friend.

your friend. Uh and of course my two besties, Isha Uh and of course my two besties, Isha and Ed, as usual are in the system and Ed, as usual are in the system talking about this. Uh before further talking about this. Uh before further ado, we're going to talk about this ado, we're going to talk about this personal precision and genomic medicine personal precision and genomic medicine and uh we'll go from there. And we'll and uh we'll go from there. And we'll show the slides as Dr. Weiss asked me in show the slides as Dr. Weiss asked me in between. But uh between. But uh Harvey, why don't you take Harvey, why don't you take started today. I'm just going to let started today. I'm just going to let everyone know that it's what you don't everyone know that it's what you don't know what you don't know is like, but I know what you don't know is like, but I don't know what I don't know and which don't know what I don't know and which is basically uh moving from genomics to is basically uh moving from genomics to precision to AI precision to AI in the sense that it's truly meaningful.

in the sense that it's truly meaningful. Uh Uh Uh Being a neurologist, I talked about we Being a neurologist, I talked about we did a lot of genetic information and did a lot of genetic information and testing on our kids with epilepsy. But testing on our kids with epilepsy.

Personal genomics and the promise of precision medicine

But it's always been an area that that it's always been an area that that requires, I believe now, special requires, I believe now, special uh insights. And um as usual, AI AI may uh insights. And um as usual, AI AI may play a role, but I'll let Harvey start.

play a role, but I'll let Harvey start. >> Yeah. Well, first of all, always an >> Yeah. Well, first of all, always an honor. What a crazy panel we got here honor. What a crazy panel we got here this morning. And thank you for coming this morning. And thank you for coming in. I appreciate you and Aisha and Dr.

in. I appreciate you and Aisha and Dr. Weiss and Khalil. I know it takes a it Weiss and Khalil. I know it takes a it takes a village, right, to do it. And takes a village, right, to do it. And with that statement, with that statement, you know, as we look at genetics, I you know, as we look at genetics, I remember my child when I had that first remember my child when I had that first panel done. And I remember as a medical panel done. And I remember as a medical student thinking, "God, I hope nothing student thinking, "God, I hope nothing my baby will have because

if they do, we my baby will have because if they do, we know there's something that we don't know there's something that we don't know what to do with it, right?" And so, know what to do with it, right?" And so, it's like a chicken or egg. Do I want to it's like a chicken or egg. Do I want to know or do I not want to know? Um but know or do I not want to know? Um but for me, I want to know. And so, I want for me, I want to know. And so, I want to kind of set the table because to kind of set the table because I really think this is the future. And I really think this is the future. And I'm just going to put it out there. I'll I'm just going to put it out there. I'll I'll I'll start with the story.

I'll I'll start with the story. My grandfather and I played chess. Uh we My grandfather and I played chess. Uh we started playing with since I was 5 years started playing with since I was 5 years old.

old. old. And he, unfortunately, developed macular And he, unfortunately, developed macular degeneration where just think of it as degeneration where just think of it as big blocks of blackness that he can't big blocks of blackness that he can't see. He can only see little minutia see. He can only see little minutia areas.

areas. areas. And over time, I didn't realize he was And over time, I didn't realize he was having trouble with his vision cuz he having trouble with his vision cuz he wasn't saying anything. And long story wasn't saying anything. And long story short, he started making some bonehead short, he started making some bonehead moves. And I'm like, "Grandpa, did you moves. And I'm like, "Grandpa, did you mean to move that piece?" And he's like, mean to move that piece?" And he's like, "Look, I just can't see." And so, fast "Look, I just can't see." And so, fast forward, I gave him some medical forward, I gave him some medical glasses. I gave him some AI so that we glasses. I gave him some AI so that we could still play chess. But the moral of could still play chess. But the moral of the story is this. I found out that I the story is this. I found out that I actually have uh the gene for macular actually have uh the gene for macular degeneration. And I thought, "Man, degeneration. And I thought, "Man, this prized thing that I play chess with this prized thing that I play chess with my child now, he's an adult.

my child now, he's an adult. Uh I was like, "God, if I end up being Uh I was like, "God, if I end up being like Grandpa where I can't play, like like Grandpa where I can't play, like that's going to take something away." that's going to take something away." And then I thought, "You know what? What And then I thought, "You know what? What if if if CRISPR technology is good enough to fix CRISPR technology is good enough to fix my gene and in the future fix my son's my gene and in the future fix my son's gene and then I know this is this is gene and then I know this is this is where I'm laying the the the the where I'm laying the the the the foundation here.

foundation here. What if whoever my son marries one day, What if whoever my son marries one day, I get her checked out for this gene and I get her checked out for this gene and what if I pay for him to have CRISPR, what if I pay for him to have CRISPR, her to have CRISPR and now my grandkids her to have CRISPR and now my grandkids won't even have the disease. So I just won't even have the disease. So I just wanted to set that stage and just jump wanted to set that stage and just jump in and in and see what see what I know Dr. Weiss is our guest. I want to I know Dr. Weiss is our guest. I want to see what you think and I want you to see what you think and I want you to tell us now of course right when I say tell us now of course right when I say that his camera comes off. Isha, what do that his camera comes off. Isha, what do you think?

you think? >> [snorts] >> [snorts] >> [snorts] >> Well, I mean especially in the >> Well, I mean especially in the pediatrics world, that implications are pediatrics world, that implications are so exciting and it's something that you so exciting and it's something that you know, we all hope to set future know, we all hope to set future generations up for their best health and generations up for their best health and and wellness. And Harvey, you talked and wellness. And Harvey, you talked about this a couple weeks ago how you about this a couple weeks ago how you know, the life expectancy know, the life expectancy we can ex- we can kind of expect that to we can ex- we can kind of expect that to increase even potentially in our increase even potentially in our lifetimes and then you imagine something lifetimes and then you imagine something like this, the ability to identify these like this, the ability to identify these conditions and to be able to manage them conditions and to be able to manage them better, that contributing to our, you better, that contributing to our, you know, expanding lifespan. I think it's know, expanding lifespan. I think it's very exciting and I'm super excited to very exciting and I'm super excited to hear what Al has to say once he's back hear what Al has to say once he's back because I think that's going to really, because I think that's going to really, you know, fill in a lot of gaps for us.

you know, fill in a lot of gaps for us. >> Okay. >> Okay. >> Okay. >> There he is. >> There he is. >> Yes, we're excited to hear what you had >> Yes, we're excited to hear what you had to say.

to say. >> Yeah, I mean I am >> Yeah, I mean I am fascinating discussion, great fascinating discussion, great discussion. So I I think this is yeah, discussion. So I I think this is yeah, this is the future, right? We're going this is the future, right? We're going to be able to detect genetic diseases to be able to detect genetic diseases and I think eventually we'll be able to and I think eventually we'll be able to cure some of them, prevent some of them, cure some of them, prevent some of them, which is really awesome.

which is really awesome. But at the same time I'm not sure we're But at the same time I'm not sure we're there yet. Look, I mean macular there yet. Look, I mean macular degeneration, I you know, Harvey, you degeneration, I you know, Harvey, you you are at risk for macular you are at risk for macular degeneration, but there's nothing you degeneration, but there's nothing you could do to prevent it right now.

could do to prevent it right now. There's no medication out there, there's There's no medication out there, there's no supplement you can take. So now no supplement you can take. So now you're the worried well.

you're the worried well. And that's one of the struggles I think And that's one of the struggles I think we have from a genetic point of view. we have from a genetic point of view.

Look, I mean, you know, if we look, Look, I mean, you know, if we look, there's no study out there that has there's no study out there that has definitely said that knowing your definitely said that knowing your genetic background genetic background helps you to change your lifestyle in helps you to change your lifestyle in some way, shape or form. So if we just some way, shape or form. So if we just look at the the way that we have look at the the way that we have current, you know, diseases, whether current, you know, diseases, whether it's diabetes or it's diabetes or or or or high blood pressure, there's no genetic high blood pressure, there's no genetic test, there's no study that says knowing test, there's no study that says knowing your genetic predisposition changes your your genetic predisposition changes your lifestyle in some way.

lifestyle in some way. And I think about like I have a friend And I think about like I have a friend of mine who used to be like she she of mine who used to be like she she would a colleague from the Cleveland would a colleague from the Cleveland Clinic. She was head of their genetic Clinic. She was head of their genetic testing.

testing. testing. And went ahead and did a 23andMe panel And went ahead and did a 23andMe panel on her. Now, she is, you know, in on her. Now, she is, you know, in amazing shape, she exercises like crazy, amazing shape, she exercises like crazy, never smokes, no drugs, you know, just never smokes, no drugs, you know, just is a fantastic like health specimen.

is a fantastic like health specimen. And she found out she's at risk for a And she found out she's at risk for a rare disease, a rare type of cancer rare disease, a rare type of cancer that's not preventable in any way, shape that's not preventable in any way, shape or form, and not treatable. And now, or form, and not treatable. And now, rather than make her feel assured by her rather than make her feel assured by her lifestyle, she's a worried well. She has lifestyle, she's a worried well. She has to think about every single symptom that to think about every single symptom that she's got and whether or not it's part she's got and whether or not it's part of that rare cancer.

of that rare cancer. So to me, I love the notion of genetic So to me, I love the notion of genetic testing. Now, let's face it, if you've testing. Now, let's face it, if you've got a genetic predisposition because of got a genetic predisposition because of your family for certain types of cancers your family for certain types of cancers or condition, that makes sense to get it or condition, that makes sense to get it tested. Um I think that screening makes tested. Um I think that screening makes sense.

sense. sense. But I'm not sure we're right there yet But I'm not sure we're right there yet for widespread for widespread genetic testing across the board. And genetic testing across the board. And that's something that I want to put in that's something that I want to put in place.

place. place. >> And perhaps that needs to be part of the >> And perhaps that needs to be part of the counseling process, too. You know, if counseling process, too. You know, if anyone who's undergoing testing like anyone who's undergoing testing like that, that, that, making sure that they have an making sure that they have an understanding of understanding of what they might find and making a what they might find and making a conscious decision to still pursue that conscious decision to still pursue that information. Because I love the idea of information. Because I love the idea of having more knowledge. You know, having more knowledge. You know, knowledge is power as we say on this knowledge is power as we say on this show a lot, but there is that aspect of show a lot, but there is that aspect of well, now what? You know, and until we well, now what? You know, and until we have the next steps, where's the have the next steps, where's the balance?

balance? balance? >> Mhm. >> Mhm. >> Mhm. Now, I always talk about this continuum Now, I always talk about this continuum of information. This is information, of information. This is information, data, knowledge, and wisdom. And data, knowledge, and wisdom. And knowledge is what to do, and wisdom is knowledge is what to do, and wisdom is most important, in my opinion, is what most important, in my opinion, is what not to do.

not to do. So, that's where the screening problem So, that's where the screening problem comes in. Before I jump into that, Ed, comes in.

Screening, counseling, and the worried well

Before I jump into that, Ed, and I know you're Thank you for again and I know you're Thank you for again joining us. Um joining us. Um as a board member of hospital systems, as a board member of hospital systems, and I'm actually coming in with and I'm actually coming in with presumably a new next generation presumably a new next generation sequence DNA testing, and I'm telling sequence DNA testing, and I'm telling you that you should, you know, offer it you that you should, you know, offer it to your whole hospital system, 40 to your whole hospital system, 40 hospitals, 20 clinics, 30, you know, hospitals, 20 clinics, 30, you know, imaging centers. And then, uh imaging centers. And then, uh would you do it? Would you recommend it would you do it? Would you recommend it right now in this current state? A, why right now in this current state? A, why would you do it? And if not, why would you do it? And if not, why wouldn't you do it?

wouldn't you do it? >> Yeah, I I'm on the I University of >> Yeah, I I'm on the I University of Pittsburgh campus out here for a Pittsburgh campus out here for a a pit uh UPMC AI conference uh given the a pit uh UPMC AI conference uh given the topic of our show.

topic of our show. And to your question, I would And to your question, I would actually offer it because if you don't, actually offer it because if you don't, they're going to get it from a third they're going to get it from a third party, and it's not going to be party, and it's not going to be integrated.

integrated. integrated. And we don't can't necessarily trust And we don't can't necessarily trust that third party. We don't know them. that third party. We don't know them.

So, why not get it from your trusted So, why not get it from your trusted healthcare institution with the healthcare institution with the parameters that Dr. Weiss mentioned parameters that Dr. Weiss mentioned already.

already. already. So, So, So, of course you would offer it. And any of course you would offer it. And any organization that doesn't, I think, is a organization that doesn't, I think, is a foolhardy. You know how how I believe. I foolhardy. You know how how I believe. I I think uh I think uh you own the relationship, you want to be you own the relationship, you want to be that trusted partner, then you need to that trusted partner, then you need to allow them all the different tools that allow them all the different tools that are available to them, but in a safe are available to them, but in a safe way.

>> So, >> So, Dr. Weiss, uh Dr. Weiss, uh now Isha brought up a very important now Isha brought up a very important point. She said, "What to do next?" And point. She said, "What to do next?" And that's where, you know, data converts that's where, you know, data converts into knowledge. And then uh and that's into knowledge. And then uh and that's always at advises all the startups, always at advises all the startups, including me. Thank you for

all your including me. Thank you for all your advices over the time, is where startups advices over the time, is where startups fail in terms of implementation. And fail in terms of implementation. And this is where the core problem is, is this is where the core problem is, is that how do you convert data into that how do you convert data into knowledge? And then where does AI comes knowledge? And then where does AI comes in? Because, you know, 23andMe or who in? Because, you know, 23andMe or who cares what the company is. Maybe it's cares what the company is. Maybe it's going to come from a new next generation going to come from a new next generation sequencing startups. And by the way, the sequencing startups. And by the way, the cost, FYI, has gone to less than $100.

cost, FYI, has gone to less than $100. Many companies are doing it, FYI. We're Many companies are doing it, FYI. We're not endorsing any company, FYI, etc.

not endorsing any company, FYI, etc. etc. But long story short, Dr. Weiss, in etc. But long story short, Dr. Weiss, in your opinion, your opinion, what is the core best way to implement what is the core best way to implement it what Ed suggested?

it what Ed suggested? >> Yeah, I mean, it's a fascinating >> Yeah, I mean, it's a fascinating discussion. And you know, some of the discussion. And you know, some of the EHRs have genomic modules in there to EHRs have genomic modules in there to help out with this. And I know of other help out with this. And I know of other ones, other healthcare systems that have ones, other healthcare systems that have developed their own series of alerts and developed their own series of alerts and processes to help with genomics. So, processes to help with genomics. So, let's just break it down for a second.

let's just break it down for a second. So, let's take cancer genomics off the So, let's take cancer genomics off the table, right? If you know, when a tumor table, right? If you know, when a tumor is found, you get a biopsy, and you're is found, you get a biopsy, and you're going to do some sequencing to see what going to do some sequencing to see what that that tumor is susceptible to. Now, that that tumor is susceptible to. Now, let's take that off for for right now, let's take that off for for right now, because I that's proven. That's a a because I that's proven. That's a a precision medicine and oncology that has precision medicine and oncology that has great data and great efficacy. And and great data and great efficacy. And and the number of medications and approaches the number of medications and approaches are going to expand significantly. They are going to expand significantly. They already have. Let's look at there's already have. Let's look at there's either genetic testing, genetic either genetic testing, genetic screening, like a widespread genetic screening, like a widespread genetic screening, or the pharmacogenetic stuff screening, or the pharmacogenetic stuff that's out there. And there are a couple that's out there. And there are a couple of healthcare systems out there that do of healthcare systems out there that do widespread testing of both. And I think widespread testing of both. And I think that's where things come in. And and that's where things come in. And and certainly within your healthcare system, certainly within your healthcare system, if you are doing that kind of testing, if you are doing that kind of testing, you can help trigger the need for either you can help trigger the need for either additional tests or in some way, shape, additional tests or in some way, shape, or form use that information to tell the or form use that information to tell the provider about certain characteristics.

provider about certain characteristics. For instance, if you are uh a For instance, if you are uh a metabolizer, you find out that from a metabolizer, you find out that from a genetic point of view that you are a genetic point of view that you are a quick metabolizer quick metabolizer of coding, which can lead to uh of coding, which can lead to uh morphine, can be leads to overdoses, you morphine, can be leads to overdoses, you may change your approach on the pain may change your approach on the pain medication side. There is medication side. There is If there's all kinds of genetics on If there's all kinds of genetics on statin use, you may have a healthcare statin use, you may have a healthcare system that would say before you get a system that would say before you get a statin or a certain statin, you get the statin or a certain statin, you get the genetic the pharmacogenetic testing genetic the pharmacogenetic testing involved to make sure you are optimizing involved to make sure you are optimizing the treatment. I know some healthcare the treatment. I know some healthcare systems that have done that, and then I systems that have done that, and then I also know some healthcare systems that also know some healthcare systems that have looked through family histories.

have looked through family histories. And if there's a whole series of family And if there's a whole series of family histories out there, they ask for the histories out there, they ask for the kind of genetic testing that's kind of genetic testing that's available. Now once again, for available. Now once again, for prevention. You think for instance, if prevention. You think for instance, if you have a history of early breast you have a history of early breast cancer, if you have a history of ovarian cancer, if you have a history of ovarian cancer, other types of cancers like a cancer, other types of cancers like a multiple endocrine neoplasia syndrome, multiple endocrine neoplasia syndrome, you if you that's in your family, you you if you that's in your family, you should get genetic testing. And that's a should get genetic testing. And that's a really well-defined really well-defined pathway that can be done for genetic pathway that can be done for genetic >> Um let me let me hone into it. And by >> Um let me let me hone into it. And by the way, Dr. GBD needs to talk about the the way, Dr. GBD needs to talk about the medical-legal consequences of having, medical-legal consequences of having, you know, insurance premiums on a you know, insurance premiums on a patient that is going to develop 10 patient that is going to develop 10 years from now years from now >> [laughter] >> [laughter] >> [laughter] >> some cancer. So, I'll put that question >> some cancer. So, I'll put that question to Harvey and bank it to him. But in the to Harvey and bank it to him. But in the meanwhile, I would Here's my problem, meanwhile, I would Here's my problem, right? And this is where the real crux right? And this is where the real crux I don't know if you remember. Let's just I don't know if you remember. Let's just talk about this Apple Watch, right?

talk about this Apple Watch, right? Apple Watch was able to do screening for Apple Watch was able to do screening for AFib. The cardiologist calls went AFib. The cardiologist calls went through the roof.

through the roof. It was insane. Like, we do not have the It was insane. Like, we do not have the capacity for a screening tool to convert capacity for a screening tool to convert into a diagnostic tool. And that's where into a diagnostic tool. And that's where I'm asking you that when you had any I'm asking you that when you had any screening tool at a systemic level, then screening tool at a systemic level, then we need to figure out who goes through we need to figure out who goes through the diagnostic chain, prognostic chain, the diagnostic chain, prognostic chain, management chain. Right? So, going from management chain. Right? So, going from screening tool to diagnostic tool, screening tool to diagnostic tool, how do you proceed how do you proceed at a national level? And then, Dr. GBD, at a national level? And then, Dr. GBD, if you you are actually or were, I don't if you you are actually or were, I don't know, Singapore health ministry health know, Singapore health ministry health ministries, you know, advisor, how would ministries, you know, advisor, how would you advise Ed, who's sitting at, I don't you advise Ed, who's sitting at, I don't know, X hospital system, or Isha, who's know, X hospital system, or Isha, who's actually doing pediatrics actually doing pediatrics on a regular basis, how she would on a regular basis, how she would incorporate that without causing a incorporate that without causing a >> So, I'll I'll jump into that. I mean, >> So, I'll I'll jump into that. I mean, and and it's a great question. Um, you and and it's a great question. Um, you know, you we shouldn't be screening know, you we shouldn't be screening unless we have some way of helping to unless we have some way of helping to provide some kind of therapy. I mean, provide some kind of therapy. I mean, why screen unless you can do something why screen unless you can do something about what you got? So, I think about about what you got? So, I think about some of the screenings that are out some of the screenings that are out there. Like, once again, if you've got a there. Like, once again, if you've got a strong family history of breast cancer strong family history of breast cancer and and and in ovarian cancer, screening for, you in ovarian cancer, screening for, you know, the bracket gene can actually lead know, the bracket gene can actually lead a patient to have, uh, a patient to have, uh, you know, to think about surgical you know, to think about surgical options to help do preventative care.

options to help do preventative care. So, I I think about, you know, once So, I I think about, you know, once again, how do you put that in place, again, how do you put that in place, right? I mean, some of that is you do right? I mean, some of that is you do widespread genetic testing and then widespread genetic testing and then create a list of patients who need that create a list of patients who need that kind of surgical oncology, you know, kind of surgical oncology, you know, prophylactic kind of preventative kind prophylactic kind of preventative kind of care, or do you wait until a patient of care, or do you wait until a patient is seen in your clinic and flag the is seen in your clinic and flag the provider on how to proceed. I think both provider on how to proceed. I think both of those are different pathways and ways of those are different pathways and ways that you can proceed on on this entire, that you can proceed on on this entire, um, you know, uh, you know, on this um, you know, uh, you know, on this entire way that you you do a genetic entire way that you you do a genetic caring for genetic testing. And I I caring for

genetic testing. And I I think there are different options out think there are different options out there.

there. there. >> Yeah, I'm going to jump >> Yeah, I'm going to jump >> And go ahead, yeah. >> And go ahead, yeah. >> Uh, so, two things real quick. Number >> Uh, so, two things real quick. Number one, on the insurance comment, one, on the insurance comment, I'm playing devil's advocate when I say I'm playing devil's advocate when I say this, who's to say that when I call my this, who's to say that when I call my insurance company, they don't have an insurance company, they don't have an algorithm that's extracting saying, "Oh, algorithm that's extracting saying, "Oh, this guy's actually pre-diabetic. Oh, we this guy's actually pre-diabetic. Oh, we caught Parkinson's. Oh, we're he's going caught Parkinson's. Oh, we're he's going to be having a heart attack in 10 to be having a heart attack in 10 years." years." years." And they're already not putting me into And they're already not putting me into another uh bucket without anyone another uh bucket without anyone knowing.

knowing. knowing. Second, I'm not trying to freak people Second, I'm not trying to freak people out, but the technology's there. So, and out, but the technology's there. So, and I know there's some nefarious people I know there's some nefarious people that and unscrupulous cuz I could see that and unscrupulous cuz I could see them. Now, obviously, you're like, "Oh, them. Now, obviously, you're like, "Oh, but HIPAA compliance and this and that." but HIPAA compliance and this and that." I'm like, "No, if someone wanted to do I'm like, "No, if someone wanted to do something like that, an insurance something like that, an insurance company with billions and billions, they company with billions and billions, they could pull it off and do it under the could pull it off and do it under the under the radar and get away with it, under the radar and get away with it, unfortunately.

When genetic testing helps clinical decisions

" unfortunately." unfortunately." That being said, let's flip it on its That being said, let's flip it on its head. The question is should we know head. The question is should we know what we don't know, right? And if we what we don't know, right? And if we don't if we can't do anything about it, don't if we can't do anything about it, should we even bother knowing about it?

should we even bother knowing about it? I'm going to change everyone's I'm going to change everyone's perspective here, or at least attempt perspective here, or at least attempt to.

to. to. If If If AI is exponential, AI is exponential, if our ways of thinking is locking us if our ways of thinking is locking us and limiting our thought pattern, and limiting our thought pattern, then why not pause for a second and take then why not pause for a second and take this as an idea. What if this as an idea. What if us, the providers and health care us, the providers and health care professionals, had the information professionals, had the information and let the patient opt in or not if and let the patient opt in or not if they want that information. Meaning, they want that information. Meaning, we know the answer of XYZ, but I don't we know the answer of XYZ, but I don't want you stressing about it. Now, let me want you stressing about it. Now, let me tell you why this idea would work tell you why this idea would work because because because that fact that technology is that fact that technology is exponential, right, guys? So, if exponential, right, guys? So, if discoveries, in my opinion, are going to discoveries, in my opinion, are going to be massive in the next 5 years, where be massive in the next 5 years, where maybe it doesn't matter today, but maybe it doesn't matter today, but literally, maybe in 6 months, a year, we literally, maybe in 6 months, a year, we have a cure for XYZ, or we now can have a cure for XYZ, or we now can develop CRISPR technology or develop CRISPR technology or personalized medicine, personalized medicine, then wouldn't it pay to have that then wouldn't it pay to have that already and know person X has this already and know person X has this syndrome. Hey, this research clinical syndrome. Hey, this research clinical trial's out. Let me put him on this trial's out. Let me put him on this clinical trial for this disease that's clinical trial for this disease that's >> Well, I want to go back to how we >> Well, I want to go back to how we describe describe describe these technologies. And we've used the these technologies. And we've used the word tool, and I think that's what we word tool, and I think that's what we need to sometimes come back to and need to sometimes come back to and remind ourselves that it's a tool, and remind ourselves that it's a tool, and it's one of many tools that we have to it's one of many tools that we have to take care of our patients. Um and you take care of our patients. Um and you know, and I'll tell you from my clinical know, and I'll tell you from my clinical experience, there's a a panel that can experience, there's a a panel that can be done that identifies for patients who be done that identifies for patients who have ADHD, um what medication may best have ADHD, um what medication may best fit their genetic profile, right? And fit their genetic

profile, right? And although it's it's often useful as a although it's it's often useful as a starting point, I will tell you, like, starting point, I will tell you, like, the best way to navigate that situation the best way to navigate that situation is seeing what the patient responds best is seeing what the patient responds best to, honestly, you know? And it it's nice to, honestly, you know? And it it's nice to have it as a tool, but there's no to have it as a tool, but there's no better tool than your ongoing clinical better tool than your ongoing clinical relationship, right? And so I think as relationship, right? And so I think as these technologies refine, they will these technologies refine, they will become more and more useful to us in become more and more useful to us in different ways. But we need to also different ways. But we need to also remember it's still a tool and offering remember it's still a tool and offering it, you know, more um it, you know, more um in a more widespread way in a more widespread way is is beneficial in my opinion because is is beneficial in my opinion because it allows people to have more access and it allows people to have more access and potentially more power over their health potentially more power over their health and it allows us as to be better suited and it allows us as to be better suited to help our patients. But it's still a to help our patients. But it's still a tool and as it improves it can become a tool and as it improves it can become a stronger tool in some ways, but it's stronger tool in some ways, but it's still just one of many things that we still just one of many things that we use to make those decisions.

use to make those decisions. >> Yeah, Isha, I love what you just said. I >> Yeah, Isha, I love what you just said. I mean, yeah, I mean pharmacogenetic mean, yeah, I mean pharmacogenetic testing testing testing you right, it can be useful. But you right, it can be useful. But individualized individualized individualized uh you know, effects vary. And that's uh you know, effects vary. And that's part of the problem with genetic part of the problem with genetic testing. Sure, I mean, you may find testing. Sure, I mean, you may find something that steers you in a certain something that steers you in a certain way, but you're right, it's the way, but you're right, it's the relationship with the patient and how relationship with the patient and how they take the medication, you know, all they take the medication, you know, all the rest of their genes that play a role the rest of their genes that play a role in there. So in there. So >> And what we don't know yet. I mean, >> And what we don't know yet. I mean, there's still so much that we as a there's still so much that we as a medical community are learning about medical community are learning about what causes certain genes to be what causes certain genes to be expressed and all how a lot of different expressed and all how a lot of different things, you know, play together.

things, you know, play together. Um so to go back to your worried, well, Um so to go back to your worried, well, concerned, you know, you could have concerned, you know, you could have somebody who spends their whole life somebody who spends their whole life worrying about a rare, potentially worrying about a rare, potentially life-threatening condition that may life-threatening condition that may never express itself.

never express itself. >> And that's exactly that I I think that >> And that's exactly that I I think that the struggle I think we have from a the struggle I think we have from a genetic screening point of view. Like genetic screening point of view. Like pharmacogenetic testing, yeah, there's pharmacogenetic testing, yeah, there's cool stuff out there and there's a nice cool stuff out there and there's a nice slide that I put together that kind of slide that I put together that kind of goes through some of the goes through some of the more common pharmacogenetic testing more common pharmacogenetic testing that's out there for some medications that's out there for some medications that are are very commonly used and and that are are very commonly used and and really cool stuff out there, right? But really cool stuff out there, right? But that at the same time, the genetic that at the same time, the genetic screening, what are we screening for?

screening, what are we screening for? Why screen for anything unless we can Why screen for anything unless we can prevent it? Why or, you know, in some prevent it? Why or, you know, in some way, shape, or form, or treat it any way, shape, or form, or treat it any better way? And Harvey, you know, I better way? And Harvey, you know, I appreciate your opinion that we should appreciate your opinion that we should get to all this stuff now in preparation get to all this stuff now in preparation for the future, but we don't know how for the future, but we don't know how long it will be until we can actually long it will be until we can actually treat some of these things. We don't treat some of these things. We don't know what's going to be preventive out know what's going to be preventive out there. I mean, look, I I have a a friend there. I mean, look, I I have a a friend of mine whose wife is an ED doctor. Her of mine whose wife is an ED doctor. Her father died of early-onset Alzheimer's father died of early-onset Alzheimer's disease. And there's genetic testing for disease. And there's genetic testing for her version of or her family's version her version of or her family's version of of Alzheimer's disease. She did not of of

Alzheimer's disease. She did not get it because the way she figures it get it because the way she figures it is, there's no medication out there to is, there's no medication out there to prevent it. If I get the genetic testing prevent it. If I get the genetic testing and I find out that I'm positive, I'm and I find out that I'm positive, I'm more worried about every single memory more worried about every single memory lapse I have.

lapse I have. All I can do is maximize the life that I All I can do is maximize the life that I have, live it to the fullest, you know, have, live it to the fullest, you know, take care of my myself, my body, my take care of my myself, my body, my friends, my family.

friends, my family. There To me, the genetic testing makes There To me, the genetic testing makes sense when we first begin to think about sense when we first begin to think about a treatment plan or preventive plan.

a treatment plan or preventive plan. Until then, Until then, >> So, I I'll I'll push push back on it, >> So, I I'll I'll push push back on it, Alan. So, let me let me give you the Alan. So, let me let me give you the So, antibiotics was amazing, right? You So, antibiotics was amazing, right? You have, you know, infection, antibiotics, have, you know, infection, antibiotics, done. Then we went into chronic done. Then we went into chronic management, which is diabetes, management, which is diabetes, hypertension, cancers, all of that, hypertension, cancers, all of that, which includes multimodal therapeutics.

which includes multimodal therapeutics. Multimodal therapeutics may include, you Multimodal therapeutics may include, you know, medications, surgery, all of know, medications, surgery, all of those. Uh including now what we call those. Uh including now what we call biologics, immunotherapy, etc. And then biologics, immunotherapy, etc. And then the question really becomes is that that the question really becomes is that that the research arm, right? I mean, you the research arm, right? I mean, you have to as just thinking about have to as just thinking about Alzheimer's example or even Parkinson's, Alzheimer's example or even Parkinson's, it is it is annoying how hard it is to it is it is annoying how hard it is to create an inclusion exclusion criteria create an inclusion exclusion criteria and then go through that. Having that and then go through that. Having that genetic testing in itself will prove genetic testing in itself will prove very useful for doing clinical research very useful for doing clinical research in the first place, too. Because then we in the first place, too. Because then we can say, "Hey, you are potentially, you can say, "Hey, you are potentially, you know, exposed to this. Let's continue to know, exposed to this. Let's continue to monitor you for a select group of monitor you for a select group of people." As you suggested, Harvey, that people." As you suggested, Harvey, that okay, these are people that you should okay, these are people that you should be on it. So, that's That's something be on it. So, that's That's something that, you know, we are actually that, you know, we are actually you know, interested in in in sort of you know, interested in in in sort of discussing that. However, the question discussing that. However, the question really becomes is that that the the really becomes is that that the the ethical part, the privacy part, and then ethical part, the privacy part, and then of course the the insurance part. So, it of course the the insurance part. So, it just a little pushback on let's say just a little pushback on let's say look at it, Alan Dr. Weiss, as as an look at it, Alan Dr. Weiss, as as an angle from research rather than just, angle from research rather than just, you know, is there treatment present now you know, is there treatment present now or not? I mean, the whole point was to or not? I mean, the whole point was to get the treatment, but for the treatment get the treatment, but for the treatment we need the we need the you know, the clinical trials step as you know, the clinical trials step as well.

well. well. >> So, I I'm all for great research. Don't >> So, I I'm all for great research. Don't get me wrong. Like, and I think this is get me wrong. Like, and I think this is a fascinating area. But, I also think a fascinating area.

Balancing prevention, research, and patient anxiety

But, I also think about the fact that forget the genetic about the fact that forget the genetic testing and let's think about just testing and let's think about just lifestyles, right? We can tell patients lifestyles, right? We can tell patients lose weight, don't smoke, don't drink, lose weight, don't smoke, don't drink, be active to help prevent diseases. And be active to help prevent diseases. And that that the research shows that kind that that the research shows that kind of advice has almost no effect on a lot of advice has almost no effect on a lot of patients. You throw genetic testing of patients. You throw genetic testing in and there's no study out there yet in and there's no study out there yet which has shown that throwing genetic which has shown that throwing genetic testing in there alters their

lifestyle testing in there alters their lifestyle in such a way to help improve their risk in such a way to help improve their risk for developing those diseases. And to for developing those diseases. And to me, you know, I I right now I think this me, you know, I I right now I think this is a big thing. Like, we have we're is a big thing. Like, we have we're spending a lot of money in the health spending a lot of money in the health system, right? Our health care system, right? Our health care challenges cost and quality. And right challenges cost and quality. And right now in the face of those, do we need to now in the face of those, do we need to do widespread genetic testing for all do widespread genetic testing for all patients or do we going to need to do patients or do we going to need to do small studies of proof for, you know, small studies of proof for, you know, like you're saying, let's find out about like you're saying, let's find out about Parkinson's. Let's find out that if Parkinson's. Let's find out that if somebody who has genetics for somebody who has genetics for Parkinson's, if changing your lifestyle Parkinson's, if changing your lifestyle in some way helped prevent in some like in some way helped prevent in some like something else, right? I I just I think something else, right? I I just I think that question is out there and I think that question is out there and I think we need to study it rather than do the we need to study it rather than do the >> Huh.

>> Huh. Um Um Um No, I No, I concur with your assessment. Uh Harvey, concur with your assessment. Uh Harvey, what do you think, Isha? I mean, uh I what do you think, Isha? I mean, uh I still feel a little bit more optimistic still feel a little bit more optimistic about especially the cost curve is now about especially the cost curve is now down enough in my opinion.

down enough in my opinion. Uh I mean, next generation sequencing Uh I mean, next generation sequencing can be done in less than 24 hours for can be done in less than 24 hours for less than $100. Uh less than $100. Uh thoughts? What do you think, um Harvey thoughts? What do you think, um Harvey and Isha?

and Isha? >> Yeah, to your point, if our >> Yeah, to your point, if our pharmaceutical medications now can cost pharmaceutical medications now can cost 10 times less, meaning if I had to 10 times less, meaning if I had to develop a drug to cure let's pretend my develop a drug to cure let's pretend my macular degeneration, and instead of me macular degeneration, and instead of me paying $2 billion to develop it, it cost paying $2 billion to develop it, it cost $200 million, and then fast forward uh $200 million, and then fast forward uh with all the advancements now if we with all the advancements now if we could get it down to less, then two could get it down to less, then two things will happen. It's getting closer things will happen. It's getting closer to personalized care. Second, to personalized care. Second, unfortunately, companies are not going unfortunately, companies are not going to spend money if they they the to spend money if they they the denominator is small, meaning if only denominator is small, meaning if only like 100,000 people have that disease in like 100,000 people have that disease in the whole planet, is the pharmaceutical the whole planet, is the pharmaceutical company going to dump $200 million?

company going to dump $200 million? But, if we're bringing that cost curve But, if we're bringing that cost curve down down down where it doesn't cost down down down where it doesn't cost that much, then we're getting closer to that much, then we're getting closer to personalized medicine solutions, and personalized medicine solutions, and that's what I'm saying, guys. In the that's what I'm saying, guys. In the next 5 years, we're going to start next 5 years, we're going to start seeing an uptick of all these things seeing an uptick of all these things where like, what the heck is going on?

where like, what the heck is going on? Uh oh god, I'm going blank. There's a Uh oh god, I'm going blank. There's a big investor that's putting a lot of big investor that's putting a lot of money into genomics in this whole money into genomics in this whole industry cuz her goal is to invest in industry cuz her goal is to invest in companies that are curing diseases, companies that are curing diseases, which is interesting.

which is interesting. >> Well, and I think if there's an >> Well, and I think if there's an exponential increase in how these exponential increase in how these technologies are developing in their technologies are developing in their usefulness, we need to think about the usefulness, we need to think about the way we talk to patients about it. You way we talk to patients about it. You know, we can't use our know, we can't use our previous methods of how we counsel previous methods of how we counsel patients in a landscape that's totally patients in a landscape that's totally changing. And I think one important changing. And I think one important you know, thing to reinforce with our you know, thing to reinforce with our patients is risk doesn't mean patients is risk doesn't mean you're definitely going to see this you're definitely going to see this happen to you. You know, and I think happen to you. You know,

and I think that's that's that's um um um that's kind of a a nuanced thing to try that's kind of a a nuanced thing to try to navigate because we want to to navigate because we want to reinforce, you know, these healthy reinforce, you know, these healthy habits, but at the same time we don't habits, but at the same time we don't want to create a culture where people want to create a culture where people are living in fear. Almost like creating are living in fear. Almost like creating a scenario that brings them closer to a scenario that brings them closer to that problem because they're like, well, that problem because they're like, well, I have the risk factor for this this and I have the risk factor for this this and this. Like, why should I even bother this. Like, why should I even bother eating healthy? Like my genetics are all eating healthy? Like my genetics are all messed up. You know, I could see some of messed up. You know, I could see some of it swing that way, but I think over it swing that way, but I think over time, as you guys have said, I mean time, as you guys have said, I mean these thing tools are going to be more these thing tools are going to be more and more useful in terms of actually and more useful in terms of actually being able to to treat and manage being able to to treat and manage patients better. But for now, I mean the patients better. But for now, I mean the question still remains how widespread do question still remains how widespread do we make this? And I think you know, it we make this? And I think you know, it depends on the person. If if it's more depends on the person. If if it's more easily accessible, I think that's a good easily accessible, I think that's a good thing because then individuals can make thing because then individuals can make that choice whether to that choice whether to you know, want to have that that you know, want to have that that knowledge. And we have to be able to knowledge. And we have to be able to counsel them appropriately.

counsel them appropriately. But I think just the potential But I think just the potential possibilities of what this could possibilities of what this could you know, help us with in the future is you know, help us with in the future is is amazing. And so I think there's that is amazing. And so I think there's that argument for the research side of argument for the research side of things, too. It's like, well, we in things, too. It's like, well, we in order to see all those benefits, we have order to see all those benefits, we have >> I want to share a quick story. Daniel >> I want to share a quick story. Daniel Kraft a couple of months ago, he's a Kraft a couple of months ago, he's a friend of mine, he spoke about friend of mine, he spoke about uh uh uh CRISPR technology CRISPR technology helping a patient that basically was helping a patient that basically was able to able to uh climb a mountain and then obviously uh climb a mountain and then obviously as a sickle cell physicians we know they as a sickle cell physicians we know they would have a hard time with the oxygen would have a hard time with the oxygen and the stress, but because their that and the stress, but because their that person's genetics had changed so much, person's genetics had changed so much, they now could go up and eat, you know, they now could go up and eat, you know, they goes mount- I forget which mountain they goes mount- I forget which mountain it was, but it was one of the top ones it was, but it was one of the top ones and I thought interesting, you know, and I thought interesting, you know, like it gave this person another life like it gave this person another life right now, you know, and that to me right now, you know, and that to me makes that's gold. That's that's where I makes that's gold. That's that's where I want to see this technology head, change want to see this technology head, change lives.

>> So don't get me wrong. I'm I'm all for >> So don't get me wrong. I'm I'm all for changing lives. And I'm not resisting changing lives. And I'm not resisting this because I don't think the potential this because I don't think the potential is there.

is there. I mean I I I think the potential is I mean I I I think the potential is absolutely there. We're going to see absolutely there. We're going to see this, right? And we're already starting this, right? And we're already starting to see to see some CRISPR technology devoted to I mean some CRISPR technology devoted to I mean I there's there's you know, very rare I there's there's you know, very rare diseases that we are using this diseases that we are using this technology to help improve. That's technology to help improve. That's fantastic. And and we absolutely need to fantastic. And and we absolutely need to pursue that and we need to pursue ways pursue that and we need to pursue ways of helping both identify patients at of helping both identify patients at risk and ways of changing them.

risk and ways of changing them. I just think though that the widespread I just think though that the widespread genetic screening is probably premature genetic screening is probably premature until we have those solutions out there.

until we have those solutions out there. Once again, you know, in we all talked Once again, you know, in we all

talked about this in medical school that, you about this in medical school that, you know, we don't want to screen unless know, we don't want to screen unless there's something we can do about the there's something we can do about the the the screening right now. I hate to the the screening right now. I hate to create the worried well and that's part create the worried well and that's part of the the struggle that I think we have of the the struggle that I think we have to have is yeah, we could we could see to have is yeah, we could we could see who's at risk, but if we can't do who's at risk, but if we can't do anything about them, that anxiety may anything about them, that anxiety may >> And this is I don't again, I'm going to >> And this is I don't again, I'm going to push back and give you another example.

push back and give you another example. Let's say a patient comes in with Let's say a patient comes in with concussion, right? And then concussion, right? And then I I recommend getting a DTI. It's I I recommend getting a DTI. It's expensive. It used to be expensive. Now expensive. It used to be expensive. Now it's $500 cash out. But I have that it's $500 cash out. But I have that information now within the next 3 days information now within the next 3 days because the first 3 days the patient because the first 3 days the patient doesn't even understand like, you know, doesn't even understand like, you know, he's dealing with a hip fracture or bone he's dealing with a hip fracture or bone fracture or something. I mean, that fracture or something.

CRISPR, personalized medicine, and future therapies

I mean, that concussion is part and parcel of it. And concussion is part and parcel of it. And then we realize that it is now causing then we realize that it is now causing depression, anxiety, some of those depression, anxiety, some of those things that we don't even know that's things that we don't even know that's going to develop, you know, chronic going to develop, you know, chronic headaches, etc. But if I had the DTI headaches, etc. But if I had the DTI information from the beginning, I'm a information from the beginning, I'm a little bit more informed on the little bit more informed on the management itself.

management itself. Now, could the question is should I Now, could the question is should I implement DTI as a as a core screening implement DTI as a as a core screening process? I agree with you, we should process? I agree with you, we should not. We should have a selection process.

not. We should have a selection process. No doubt about it in that the regard. Uh No doubt about it in that the regard. Uh but this is where the core question but this is where the core question comes in in the age of exponential comes in in the age of exponential growth specifically for AI where growth specifically for AI where physicians where patients themselves can physicians where patients themselves can actually have actually have change from data to change from data to data to data to uh trans- data to uh trans- data to uh you know, knowledge.

uh you know, knowledge. And let's say today is not the day, but And let's say today is not the day, but how soon Dr. Weiss do you think that how soon Dr. Weiss do you think that given both the given both the because it was very different 10 days because it was very different 10 days ago. Like, sorry, 3 months ago.

ago. Like, sorry, 3 months ago. When the AI was not good enough to tell When the AI was not good enough to tell me and simplify it for me that this is me and simplify it for me that this is what I need to do.

what I need to do. Ed is not here, but he's very open about Ed is not here, but he's very open about it that he had a widow maker. And then it that he had a widow maker. And then uh we know that we can do passion C S C uh we know that we can do passion C S C testing and then what if we actually had testing and then what if we actually had you know genetic testing as well that you know genetic testing as well that you know he's you know he's very grateful that he's here but I mean very grateful that he's here but I mean that's one of the things that we need to that's one of the things that we need to think about think about as highly productive members of the team as highly productive members of the team community community community can potentially and it may not be now can potentially and it may not be now and that's fine. I agree with you now is and that's fine. I agree with you now is not the time but let's just focus the not the time but let's just focus the attention to when.

attention to when. >> Well so >> Well so when is it interesting aspect right? I when is it interesting aspect right? I

think the when think the when is going to depend on the solution is going to depend on the solution itself and not just the solution but itself and not just the solution but what is the target like how big of an what is the target like how big of an audience and what's the cost involved.

audience and what's the cost involved. So when I mean we're going to see So when I mean we're going to see something I think it's less about AI something I think it's less about AI doing this than finding the solutions to doing this than finding the solutions to these genetic problems and genetic these genetic problems and genetic predisposition but I also think it's predisposition but I also think it's going to depend a lot on what those going to depend a lot on what those solutions are when they come and I it's solutions are when they come and I it's I don't think the AI aspect of this is I don't think the AI aspect of this is as important as finding the solutions as important as finding the solutions preventative and treatment for these preventative and treatment for these conditions themselves. So AI may help us conditions themselves. So AI may help us find some of those drugs. I'm not sure find some of those drugs. I'm not sure that AI is going to really help us that that AI is going to really help us that much in the interpretation of the much in the interpretation of the genetic testing.

genetic testing. And that's that's the part of it. I mean And that's that's the part of it. I mean I I keep thinking back and I know that I I keep thinking back and I know that I'm pushing back on that stuff but you I'm pushing back on that stuff but you know there's a study out there that know there's a study out there that looked at back pain.

looked at back pain. And if you look at patients with the And if you look at patients with the same symptoms same physical exam half of same symptoms same physical exam half of them get imaging and half don't. The them get imaging and half don't. The ones who have imaging ones who have imaging have longer pain because there's have longer pain because there's something about the mentality of getting something about the mentality of getting imaging it seems to confirm the chronic imaging it seems to confirm the chronic aspect of this from a like a mental aspect of this from a like a mental emotional point of view. I think about emotional point of view. I think about that study and what does that mean if we that study and what does that mean if we do this from a genetic point of view?

do this from a genetic point of view? And I I think that's where we need to And I I think that's where we need to have, before we start doing widespread have, before we start doing widespread genetic testing, we have all have to genetic testing, we have all have to have all of that information available have all of that information available to us to help patients make the right to us to help patients make the right kind of decisions on whether or not to kind of decisions on whether or not to pursue it.

pursue it. >> Issa, what do you think? I mean, now you >> Issa, what do you think? I mean, now you deal with not just the patient, but the deal with not just the patient, but the parent. And the parent is uh more parent. And the parent is uh more worried. I mean, I mean, if you gave me worried. I mean, I mean, if you gave me any information about genetic testing any information about genetic testing about myself or about my daughters, uh about myself or about my daughters, uh I'll be worried about my daughters more I'll be worried about my daughters more so than me. So, so than me. So, he he brings up a very important point, he he brings up a very important point, and of course Harvey brings another and of course Harvey brings another point that, you know, we don't point that, you know, we don't [clears throat] have to share some of [clears throat] have to share some of this information with the patients until this information with the patients until the opportune time happens. So, what are the opportune time happens. So, what are your thoughts on both of those?

your thoughts on both of those? >> Well, I think, you know, I go back to >> Well, I think, you know, I go back to again what we learned in medical school, again what we learned in medical school, which is before you start ordering a which is before you start ordering a bunch of tests, like you should know bunch of tests, like you should know what you're ordering. You should what you're ordering. You should understand what you're going to do. You understand what you're going to do. You know, don't get a lab test done that you know, don't get a lab test done that you don't know how to handle, right? And so, don't know how to handle, right? And so, um um um I I think a lot of what Alan is saying I I think a lot of what Alan is saying is kind of resonating from that is kind of resonating from that standpoint because even with AI, standpoint because even with AI, I mean, if if we don't know, the I mean, if if we don't know, the information's not there. I mean, information's not there. I mean, there's only so much we're so limited in there's only so much we're so limited in how we can counsel patients. And I think how we can counsel patients. And I think we have to take that responsibility very we have to take that responsibility very seriously. You

know, can you imagine seriously. You know, can you imagine like knowing that your child has a risk like knowing that your child has a risk factor for something that there's no factor for something that there's no treatment for, no cure for, and in fact treatment for, no cure for, and in fact your doctor doesn't even know what the your doctor doesn't even know what the risk is that your child will develop risk is that your child will develop that condition? You know, it it's like that condition? You know, it it's like all the things that we don't know are all the things that we don't know are then almost like a burden that we are then almost like a burden that we are putting on putting on patients. And I don't know how to feel patients. And I don't know how to feel about, you know, Harvey's um about, you know, Harvey's um suggestion of like we don't share that suggestion of like we don't share that information with them or they can opt in information with them or they can opt in or out. I mean, that's a really tough or out. I mean, that's a really tough spot, you know, and and how do you have spot, you know, and and how do you have those discussions about what you choose those discussions about what you choose for their treatment plan without for their treatment plan without bringing the patient into the discussion bringing the patient into the discussion on why you're going the route of one on why you're going the route of one medication or one treatment over the medication or one treatment over the other. I think that's very intricate and other. I think that's very intricate and and kind of hard to navigate.

and kind of hard to navigate. >> Yeah, I see your point. But it's that >> Yeah, I see your point. But it's that shared uh shared uh treatment plan and you're right. If I treatment plan and you're right. If I knew XYZ, but at the same time knew XYZ, but at the same time you're not going to do anything that you're not going to do anything that your patient doesn't want to do. And I your patient doesn't want to do. And I know that puts you at a bit at a bit of know that puts you at a bit at a bit of a quandary, but big picture I I I see a quandary, but big picture I I I see your point, but at the same time your point, but at the same time uh it's about being transparent and I'm uh it's about being transparent and I'm you got to remember I'm looking at it at you got to remember I'm looking at it at the glass half full thinking, "Man, I the glass half full thinking, "Man, I know technology will uh find the cure know technology will uh find the cure now." The question is is it going to now." The question is is it going to find it in our lifetime? Will it find it find it in our lifetime? Will it find it in that in time for that patient's in that in time for that patient's pathology to catch it beforehand?

pathology to catch it beforehand? >> Right. >> Right. >> Right. >> But again, I again, even there, I still >> But again, I again, even there, I still think I really think radical things are think I really think radical things are going to happen. I I really think 5 going to happen. I I really think 5 years from now we're going to be talking years from now we're going to be talking about this because this will be the about this because this will be the mainstay therapy because this will be mainstay therapy because this will be the standard. This we have so much the standard. This we have so much options.

options. options. >> And I and I I love I love your optimism. >> And I and I I love I love your optimism. And I and I and I, you know, hope to see And I and I and I, you know, hope to see that. I I just keep thinking back to the that. I I just keep thinking back to the patient in the exam room who's like, patient in the exam room who's like, "Hey, Dr. Castro, why do you recommend "Hey, Dr. Castro, why do you recommend this medication? It has worse side this medication? It has worse side effects and I mean I I feel pretty good.

effects and I mean I I feel pretty good. So, why would why would I take this So, why would why would I take this medic or do this drastic treatment? Like medic or do this drastic treatment? Like that seems extreme." Versus my friend that seems extreme." Versus my friend who has the same condition is on this who has the same condition is on this medication. They don't have any side medication. They don't have any side effects. You know, it's like how do you effects. You know, it's like how do you even even even >> No, no, I think >> No, no, I think I think Harvey's point was more about it I think Harvey's point was more about it the screening stage and not the the screening stage and not the management stage.

management stage. So, screen everyone, do not disclose. So, screen everyone, do not disclose.

Medical-legal concerns and data privacy

When the management becomes available, When the management becomes available, then disclose and then then disclose and then >> But, don't we take >> But, don't we take risk factors when we decide treatment risk

factors when we decide treatment plans? You know, don't we think about plans? You know, don't we think about what they what they >> you're saying that that that information >> you're saying that that that information is going to bias your treatment plan is going to bias your treatment plan >> How are you going to How are you going >> How are you going to How are you going to keep that separate? How are you going to keep that separate? How are you going to compartmentalize to compartmentalize that information from what you're, you that information from what you're, you know, how you're treating the patient?

know, how you're treating the patient? That's See, it gets into all the And I'm That's See, it gets into all the And I'm so glad we're having this discussion so glad we're having this discussion because there is no because there is no right answer here, right? It's like what right answer here, right? It's like what I tell my kids, it's like the most I tell my kids, it's like the most important thing is that we're critically important thing is that we're critically thinking about it because that's what's thinking about it because that's what's going to help us create the solutions.

going to help us create the solutions. >> Yeah, I mean, I >> Yeah, I mean, I And I And I want to jump in and and I And I And I want to jump in and and I And I agree with you on this. And And And I agree with you on this. And And Harvey, I appreciate the optimism there.

Harvey, I appreciate the optimism there. And I I love the optimism. But, you And I I love the optimism. But, you know, I also think back, you know, 20 know, I also think back, you know, 20 years ago people talked about the demise years ago people talked about the demise of radiology and how of radiology and how AI was going to cause, you know, AI was going to cause, you know, decrease the number or the need for decrease the number or the need for radiologists. And how radiologists would radiologists. And how radiologists would be put out of the jobs. And I look at be put out of the jobs. And I look at that and I go, "Okay, there are more and that and I go, "Okay, there are more and more tools out there for radiologists.

more tools out there for radiologists. And yet, none of them have replaced the And yet, none of them have replaced the need for radiologists. We need more need for radiologists. We need more radiologists now than we have than ever radiologists now than we have than ever before. And so, yeah, man, there There's before. And so, yeah, man, there There's great tech. There's great things coming.

great tech. There's great things coming. But, you know, these like until But, you know, these like until something comes, I'm not sure we should something comes, I'm not sure we should start doing like spending more money in start doing like spending more money in an expensive healthcare system until we an expensive healthcare system until we have a some way of treating these have a some way of treating these things. So, I That's my pushback.

things. So, I That's my pushback. >> So, my pushback on the expensive >> So, my pushback on the expensive healthcare system healthcare system >> quick. Sorry. I'm going to I'm going to >> quick. Sorry. I'm going to I'm going to jump in real [clears throat] quick. I jump in real [clears throat] quick. I agree with you.

agree with you. But, sometimes you have to spend money But, sometimes you have to spend money to save money. If I could catch a to save money. If I could catch a disease and prevent it from even disease and prevent it from even happening, then I've saved money. If I happening, then I've saved money. If I can cure the disease like sickle cell can cure the disease like sickle cell before it even manifests, then I'm before it even manifests, then I'm saving that person. And then from the saving that person. And then from the financial side we're talking, but what financial side we're talking, but what about the emotional state? How much about the emotional state? How much money is that worth?

money is that worth? >> So, well and here's my pushback to your >> So, well and here's my pushback to your pushback. pushback. pushback. Um and and here's the way I look at it Um and and here's the way I look at it and I and I agree with you.

and I and I agree with you. But when you talk about But when you talk about sickle cell, and sickle cell is a great sickle cell, and sickle cell is a great example, there's good genetic testing example, there's good genetic testing for sickle cell and the genetic for sickle cell and the genetic treatments are coming and I think that's treatments are coming and I think that's great. And I and having, you know, dealt great. And I and having, you know, dealt with that

disease for a long period of with that disease for a long period of time, I I I cannot wait for, you know, time, I I I cannot wait for, you know, solutions to that. But at the same time, solutions to that. But at the same time, just doing genetic testing for the sake just doing genetic testing for the sake of genetic testing, that's where I push of genetic testing, that's where I push back because we don't have solutions out back because we don't have solutions out there. We don't have treatments, there's there. We don't have treatments, there's no preventative option. Until we have no preventative option. Until we have those available, why should we do that those available, why should we do that testing?

testing? testing? And and that's my pushback. And and that's my pushback. >> I I agree with you. >> I I agree with you. Yeah, I know I feel bad. Yeah, I know I feel bad.

My thing too, and you guys are going to My thing too, and you guys are going to laugh at this. We know unfortunately laugh at this. We know unfortunately there's some individual physicians that there's some individual physicians that don't keep up. They don't even know don't keep up. They don't even know CRISPR. Like, what? What is this CRISPR CRISPR. Like, what? What is this CRISPR thing? You know, like and that's sad thing? You know, like and that's sad that they have a license and they don't that they have a license and they don't know. And so to pushing you back on the know. And so to pushing you back on the pushback on the pushback, I'm going to pushback on the pushback, I'm going to say say say uh by not having that information, maybe uh by not having that information, maybe that doctor won't even know that there's that doctor won't even know that there's already a treatment. And that's again already a treatment. And that's again the next phase where I think AI could be the next phase where I think AI could be an awesome digital twin, have the an awesome digital twin, have the information. I'll tell you a real story.

information. I'll tell you a real story. I trade in my own digital twin, I trade in my own digital twin, genomics, wearables, all that stuff. And genomics, wearables, all that stuff. And then fast forward, I have it scraping then fast forward, I have it scraping clinical trials, world health clinical trials, world health medications, and just anything that's medications, and just anything that's out there. And then it takes that out there. And then it takes that information, it takes my genomics and information, it takes my genomics and everything digital twin, puts it everything digital twin, puts it together, and I get a treatment plan together, and I get a treatment plan once a week saying, "Okay, Harvey, once a week saying, "Okay, Harvey, here's the latest and greatest, blah here's the latest and greatest, blah blah blah, and you can do this, this, blah blah, and you can do this, this, and that. Obviously, as a doctor, I can and that. Obviously, as a doctor, I can look to see, okay, this is look to see, okay, this is hallucinating, this is BS, this is hallucinating, this is BS, this is right, but I'm creating a different type right, but I'm creating a different type of healthcare that I think all of us of healthcare that I think all of us >> I'm not going to push back cuz I don't >> I'm not going to push back cuz I don't know where we are on the pushing and the know where we are on the pushing and the pushing, but I'm just going to make a a pushing, but I'm just going to make a a comment. Um comment. Um >> [laughter] >> [laughter] >> [laughter] >> so, this kind of brings me to um >> so, this kind of brings me to um the universal newborn screening the universal newborn screening protocols. Are you guys familiar with protocols. Are you guys familiar with the newborn screens that, you know, are the newborn screens that, you know, are state mandated and And so, these are all state mandated and And so, these are all conditions that conditions that do have potential treatments, and if you do have potential treatments, and if you catch them early, then it can catch them early, then it can vastly change that child's life. And in vastly change that child's life. And in some cases, save their lives. So, for some cases, save their lives. So, for things like that, where, hey, we have a things like that, where, hey, we have a pathway to follow, we have a way to help pathway to follow, we have a way to help you, universal screening, I mean, it's you, universal screening, I mean, it's incredible because that, you know, to incredible because that, you know, to Harvey's point of maybe not everybody, Harvey's point of maybe not everybody, and it is hard to keep up with the and it is hard to keep up with the exponential increase in information. So, exponential increase in information. So, yes, maybe not everybody is an expert on yes, maybe not everybody is an expert on genetics, right? But, having some type genetics, right? But, having some type of delineation of, hey, these are the of delineation of, hey, these are the things that maybe we screen a wide net things that maybe we screen a wide net for and try to catch because we can do for and try to catch because we can do something about it. And if we get some something about it. And if we get some false positives or, you know, if if a false positives or, you know, if if a few things slip under the cracks, okay, few things slip under the cracks, okay, fine. We'll take that risk. But, to cast fine. We'll take that risk. But, to cast a huge net, a huge net, a wide net for everything, and not even a wide net for everything, and not even know what to do with what you catch yet, know

what to do with what you catch yet, that's where I think And And Alan, that's where I think And And Alan, correct me if I'm wrong, but I think correct me if I'm wrong, but I think that's kind of more the the question is that's kind of more the the question is like, we are all for screening like, we are all for screening widespread screening for the things that widespread screening for the things that have treatments or are very close to have treatments or are very close to having treatments, absolutely. But, for having treatments, absolutely. But, for the things that we don't even know what the things that we don't even know what we're going going we're going going or what that means, that's where it gets or what that means, that's where it gets tricky.

tricky. tricky. >> Yeah, I I >> Yeah, I I and I I agree with you, Isha. I mean, I, and I I agree with you, Isha. I mean, I, you know, we do widespread screening, we you know, we do widespread screening, we create the word well, right? And that create the word well, right? And that has its own anxiety consequences, health has its own anxiety consequences, health care issues because we can't do anything care issues because we can't do anything about them. And I think that's actually about them. And I think that's actually going to cause higher costs than the going to cause higher costs than the $100 or or so that we spend for genetic $100 or or so that we spend for genetic screening across the board. At the same screening across the board. At the same time, you know, I I think for the time, you know, I I think for the patients who are at risk for things that patients who are at risk for things that we can treat, absolutely do that kind of we can treat, absolutely do that kind of testing. You know, you you got a family testing. You know, you you got a family history of breast cancer, your bracha history of breast cancer, your bracha stuff that you can do. That's great.

stuff that you can do. That's great. There's preventative ways of helping out There's preventative ways of helping out with that. Right now, I mean, it's we with that. Right now, I mean, it's we have to choose our targets right now is have to choose our targets right now is what I'm saying until we have those what I'm saying until we have those therapies that are out there for either therapies that are out there for either >> Okay, uh presumably >> Okay, uh presumably we do have we do have By the way, just a little rant of mine, By the way, just a little rant of mine, I apologize. We spent $7 trillion on I apologize. We spent $7 trillion on imaginative mass weapons of mass imaginative mass weapons of mass destruction.

destruction. destruction. And uh we have so much fraud and abuse. And uh we have so much fraud and abuse. Okay, if we do that, our health care Okay, if we do that, our health care expenditure can come into control. And expenditure can come into control. And people forget that. I mean, I love you people forget that. I mean, I love you as to that. I love Texas as to that.

Universal newborn screening and practical implementation

I love Texas as well, but I just uh as well, but I just uh always a reminder that we we can improve always a reminder that we we can improve expenditures significantly and spend expenditures significantly and spend more money more money on the patients than somewhere on the patients than somewhere Let Let's talk about this medical legal Let Let's talk about this medical legal aspect a little more. Um aspect a little more. Um and then And there are and then And there are seven stakeholders, but let's just talk seven stakeholders, but let's just talk about three of them.

about three of them. The the health care entity, hospitals, The the health care entity, hospitals, hospital systems, clinics, e-health, hospital systems, clinics, e-health, etc.

etc. etc. Then there is the physician, Then there is the physician, which is another stakeholder, and then which is another stakeholder, and then there is the patient that is the there is the patient that is the stakeholder.

stakeholder. stakeholder. And uh And uh and presumably, according to Isha, like and presumably, according to Isha, like we do infant, you know, monitoring, we we do infant, you know, monitoring, we actually somehow actually somehow find a place to be in this position.

find a place to be in this position. But But But Isha, would you Isha, would you we offered it and not made it mandatory, we offered it and not made it mandatory, would you apply it in your clinic, or would you apply it in your clinic, or would you say, "Uh-uh, I will not do it would you say, "Uh-uh, I will not do it because of X medical legal

reason?" because of X medical legal reason?" >> I think if I I want my patients to feel >> I think if I I want my patients to feel like they have power over their health.

like they have power over their health. And so if I have a patient who says, And so if I have a patient who says, "Hey, I would really like to do this "Hey, I would really like to do this testing because I want to know all my testing because I want to know all my risk like that that's something I I risk like that that's something I I choose I want to know." Then I would choose I want to know." Then I would absolutely support them. I just think we absolutely support them. I just think we have to be careful in how we counsel have to be careful in how we counsel patients and help them understand that, patients and help them understand that, you know, we may find out information you know, we may find out information that we don't know what to do with and that we don't know what to do with and you know, make sure that they understand you know, make sure that they understand like what's going to happen next, right?

like what's going to happen next, right? And say, "Hey, we may find some And say, "Hey, we may find some information that could be really useful information that could be really useful and help you, you know, make some and help you, you know, make some healthy changes and that's great, but we healthy changes and that's great, but we may also find some information where you may also find some information where you may have to see a specialist who also may have to see a specialist who also doesn't know, you know, what's going to doesn't know, you know, what's going to happen next." So there it might open you happen next." So there it might open you up to a lot of unknowns and if that's up to a lot of unknowns and if that's something that you choose and you want, something that you choose and you want, you know, you want to know because it you know, you want to know because it will help you feel more in control of will help you feel more in control of your health, absolutely. I'm not here to your health, absolutely. I'm not here to to stop anyone from doing anything that to stop anyone from doing anything that empowers them or makes them feel empowers them or makes them feel empowered over their health. I just empowered over their health. I just think we need to be careful in how we think we need to be careful in how we >> I'm going to >> I'm going to So, let me ask by show of hands and then So, let me ask by show of hands and then I'll I'll give you my the story. Um I'll I'll give you my the story. Um how many of you guys, if you were how many of you guys, if you were offered genetic screening, widespread offered genetic screening, widespread genetic screening, genetic screening, would you take it?

would you take it? >> I would. >> I would. >> Okay. >> Okay. >> Okay. So, I was offered it at one point and I So, I was offered it at one point and I said no to it because I know my family said no to it because I know my family history is, I know what I need to do to history is, I know what I need to do to prevent those things in my family prevent those things in my family history. I I I decided not to. Um so, I history. I I I decided not to. Um so, I and I was offered to it offered when I and I was offered to it offered when I was at the at the clinic clinic. And I was at the at the clinic clinic. And I think about like other things that we do think about like other things that we do where we don't have solutions where we where we don't have solutions where we don't have knowledge. I I at one point don't have knowledge. I I at one point you could put down your credit card and you could put down your credit card and get a CAT scan. And depending on how get a CAT scan. And depending on how much money you paid, you could much money you paid, you could get a CAT scan of your entire body depending on scan of your entire body depending on how many slices you want. And I I think how many slices you want. And I I think we all remember this, right? And and I we all remember this, right? And and I had a patient who did that and they had a patient who did that and they found something on his thymus gland.

found something on his thymus gland. He had it biopsied. He was so nervous He had it biopsied. He was so nervous about it. He got it biopsied. about it. He got it biopsied.

The biopsy came in as negative, but The biopsy came in as negative, but somehow he went through, you know, somehow he went through, you know, surgery. They cracked him open, took out surgery. They cracked him open, took out the thymus. It was completely normal. He the thymus. It was completely normal. He went through all of that for nothing, went through all of that for nothing, right? But he was anxious. And he right? But he was anxious. And he actually came to me and said there was a actually came to me and said there was a little spot on my lung, should I have little spot on my lung, should I have that out afterwards? And I'm like, that out afterwards? And I'm like, "Dude, did you not learn?" I I look at "Dude, did you not learn?" I I look at genetic testing right now in the same genetic testing right now in the same kind of way. We don't have definitive kind of way. We don't have definitive

information yet. That we don't have information yet. That we don't have enough knowledge to know what we're enough knowledge to know what we're doing and we do a really good job of doing and we do a really good job of creating the worried well any time when creating the worried well any time when anxiety and false issues are out there anxiety and false issues are out there that could cause worse things for that could cause worse things for patients patients patients than the what we're trying to do. So, than the what we're trying to do. So, the intervention may be and that the the intervention may be and that the testing itself may cause more problems.

testing itself may cause more problems. Until we know that for sure that the Until we know that for sure that the testing makes a difference, testing makes a difference, >> No, >> No, um um um it's the same thing. I think we're going it's the same thing. I think we're going to go in circles, but uh to go in circles, but uh from a medical legal perspective, uh from a medical legal perspective, uh Harvey, am I missing anything?

Harvey, am I missing anything? >> Hm, >> Hm, >> Hm, >> [clears throat] >> [clears throat] >> [clears throat] >> that's a good one. >> that's a good one.

Well, obviously, you know, we've talked Well, obviously, you know, we've talked about it, but but you're right. Number about it, but but you're right. Number one, are are we protecting the patient?

one, are are we protecting the patient? Are are these databases being purchased Are are these databases being purchased like 23andMe to some insurance companies like 23andMe to some insurance companies and then turn around and and under the and then turn around and and under the table denying people XYZ? Is that table denying people XYZ? Is that already going on with uh as we know, already going on with uh as we know, there's voice analytics, there's video there's voice analytics, there's video analytics, uh and and it's really not analytics, uh and and it's really not hard to do.

hard to do. So, you know, what's going to hold in So, you know, what's going to hold in the future? Uh the future? Uh my public service announcement is take my public service announcement is take care of yourself.

care of yourself. I truly think AI is making some huge I truly think AI is making some huge quantum leaps and there are some quantum leaps and there are some therapies that will be offered and therapies that will be offered and hopefully your pathological state or hopefully your pathological state or whatever badness has happened to you whatever badness has happened to you hasn't got to a point that our hasn't got to a point that our technology can't correct. And I think in technology can't correct. And I think in our lifetime we will see things. Uh our lifetime we will see things. Uh the future of my grandkids, I know they the future of my grandkids, I know they will live to 120, who knows, 200 years, will live to 120, who knows, 200 years, who knows. Uh but they will live longer who knows. Uh but they will live longer than the average USA uh time. And and than the average USA uh time. And and and I really think that's where we're and I really think that's where we're headed.

>> With that said, um >> With that said, um I believe you're you guys are absolutely I believe you're you guys are absolutely right. I think uh right. I think uh this is an evolving field. It has uh a this is an evolving field. It has uh a lot to do with social sciences as well lot to do with social sciences as well as medical sciences.

as medical sciences. How we uh also educate people not to get How we uh also educate people not to get anxiety because of additional testing. anxiety because of additional testing.

People could be different. People could be different. And I I understand completely what uh And I I understand completely what uh Isha Dr. um Isha Dr. um uh Weiss is saying in both in terms of uh Weiss is saying in both in terms of widespread testing and also uh making widespread testing and also uh making sure that it is not sure that it is not added. And as I said, uh at some point added. And as I said, uh at some point in time with every new technology and in time with every new technology and every new startup, implementation is every new startup, implementation is where the crux of the matter comes in.

where the crux of the matter comes in. Again, thank you so much for joining us. Again, thank you so much for joining us. I'm grateful. We're going to bring Dr.

I'm grateful. We're going to bring Dr. Weiss again. Weiss again. And then uh next time we're going to And then uh next time we're going to talk about only talk about only um population health and AI. And this um population health and AI. And this will crystallize from a higher level, will crystallize from a higher level, not just the genetics, but radiology, not just the genetics, but radiology, all these other new testing, home all these other new testing, home monitoring, all of these comes in monitoring, all of these comes in uh at the level of what we call how we uh at the level of what we call how we how we are truly converting information how we are truly converting information to data to now with the use of data AI, to data to now with the use of data AI, data into knowledge, and what would be data into knowledge, and what would be the next steps. So, again, I'm very the next steps. So, again, I'm very grateful Dr. Weiss you came in. I'm grateful Dr. Weiss you came in. I'm grateful to everyone and my besties Isha grateful to everyone and my besties Isha and Harvey. See you guys next week.

and Harvey. See you guys next week. >> Awesome. Thank you, guys. >> Awesome. Thank you, guys. >> Thank you. >> Thank you.