As venture capitalists with a long history in healthcare — Mayfield was one of the original investors in Genentech and Amgen, among others — we know first-hand how difficult it is for even great entrepreneurs to disrupt this massive, highly regulated, life-or-death part of the economy. The needs and realities of the multiple stakeholders in the ecosystem — payers, providers, regulators — are entrenched and complex. And thanks to an explosion of rapidly-advancing innovations such as artificial medicine and genomic medicine, the challenges are greater than ever.

But so are the potential benefits, in everything from drug discovery to personalized treatments to more effective solutions to address the social determinants of health. Accenture predicts that AI could generate $150 billion in cost savings in the U.S. healthcare system by 2026.¹

To help unlock these benefits, we partnered with AWS to host a Health Innovator Summit at the JP Morgan healthcare conference in January. More than 300 innovators attended this invite-only event, including technology entrepreneurs, healthcare system executives, FDA CIO Amy Abernethy and AMA CEO James Madara. The gathering, which was also webcast live, provided a forum for these domain experts to step back from the bustle of the conference to discuss real-world ways to accelerate innovation. Our aim was to surface best practices and non-obvious insights from across the ecosystem. Based on the feedback so far, we succeeded. Many attendees said the event was the highlight of their week.

Here are some of the key takeaways from the sessions.

Fireside Chat with Dr. Amy Abernethy: The Role of the FDA in Enabling Healthcare Innovation

Real World Evidence will transform economics of drug development. The FDA’s use of real world data as evidence for drug approval and monitoring can significantly lower the costs and accelerate the speed of clinical trials.

The FDA is “building muscles” to make the most of real-world evidence. The FDA has released a crowdsourcing app called MyStudies that establishes a common interface and definition of the kind of real-world data the Agency wants innovators to collect and share. Another crowdsourcing app, called CureID, lets healthcare providers share results from new uses of drugs to treat difficult-to-treat diseases.

FDA announced the data challenge for adverse effects. To make the most of the data it collects from healthcare providers, patients and other sources, the FDA periodically issues data challenges to engage the world’s leading data scientists to work on a particular problem. Amy provided details on the most recent challenge, to find new ways to quickly and accurately identify adverse effects from FDA-approved products.


Thank You for Joining Us!
The UC is a leader in de-identifying.

Since it began this work in 2018, Dr. Butte’s team has manually de-identified 25,000 notes written by UCSF physicians and used the data to train a machine learning system to de-identify a total of 75 million. The UC has also hired former FTC staff to help be its first chief health data officer.

Find a business reason to mine your EHR data.

The UC system has saved millions of dollars by using EHR data to get all doctors to only prescribe generic Metformin. It will save millions more by forcing all campuses to standardize on particular drugs and treatment options.

There are more ways to leverage real-world data than you think.

Atul and a colleague just published an article in the Journal of Clinical Investigation that identifies 21 ways that real-world data is being used today, by pharmaceutical companies, payers, providers, patients and others.

Entrepreneurs Panel: The Secrets Behind Built-to-Last Companies

Create a decision-making framework.

You’ll need an empowered workforce, in which people at all levels of the organization are unafraid to use their expertise and learn. But have a detailed process when serious disagreements crop up, so everyone can disagree and come to a common course.

Think platform.

For years, startups that focused on developing a particular molecule or drug were rarely rewarded, often with lucrative acquisitions. Going forward, the biggest winners will be companies that establish platforms around breakthrough technologies that allow them to develop multiple products, and carve out a strategic spot in the healthcare ecosystem.

Get one in the boat.

Rather than aiming for the most revolutionary or profitable application of a technology, startups should de-risk by starting out with a project that is most likely to win FDA approval.

Overinvest in HR early.

All the panelists said their worst decisions involved people and culture, such as not hiring or firing a key executive at the right time, not providing enough support to young people starting their careers, or not thinking early enough about inclusion and diversity. They advised bringing in an experienced HR executive early on, and to hold off-rate to thoroughly debate and decide on the company’s core values.

Get smart, tough advisors.

You’re trying to create entirely new technologies, processes and business models, and there will be no lack of skeptics. You need advisors to be constructive skeptics, willing and able to think through unique opportunities and challenges, and who are not looking for the quickest liquidation event.

Innovation in Care Delivery for Critical Conditions: The Provider POV

Don’t follow the crowd.

Healthcare executives appreciate innovation that truly solves critical problems, such as cancer treatments. But some problems get far less attention from vendors, such as battling sepsis. While there is a clinical study for every 4,000 cancer deaths, there’s one for every 70,000 sepsis-related death.

High-tech needs to enable high-touch healthcare.

The new Stanford Hospital was designed so that technology is not front-and-center in the patient’s experience, said Lloyd Minor, dean of Stanford Medical School. While each patient gets an iPad with a variety of apps — everything from seeing your daily schedule of procedures, to ordering dinner — he stressed the importance of putting a convertible couchbed in every room so loved ones can sleep over.

Help hospitals give more control to patients.

Consumers are rapidly embracing the chance to take a more active part in their care via mobile apps. The number of hospitals that offer apps based on the FIHR interface will balloon from 340 in late 2019 to 1,400 by 2022, says Zak Kohane, chair of the Department of Biomedical Informatics at Harvard Medical School. He predicts that the largest pools of patient-controlled data will no longer be in hospital systems, but on mobile platforms such as Apple’s iOS.

Have reasonable expectations.

Managing a hospital is almost as complicated as managing a small city; so change takes time. In the fight against sepsis, for example, most hospitals are still focused on trying to get care workers to even wash their hands. Don’t expect technology to solve it all.

Enable lifelong learning.

Only half of medical students, and even fewer practicing physicians, feel prepared to leverage the benefits of AI and other emerging technologies. Universities need to change their curricula and expose students to other disciplines such as quantitative data science.

James Madara Fireside Chat with Chrissy Farr: The Role of the AMA in Reducing Barriers to Innovation

The AMA’s top three priorities.

The first is removing obstacles to care. The second is professional development of physicians and lifelong learning. Last but not least is helping to address chronic diseases, which now consume 85% of the $3.5 trillion the U.S. spends on healthcare each year.

Better EHRs are key to addressing doctor burnout.

The average physician spends two hours on paperwork for every hour with patients, and this will get worse should chronic diseases continue to become more prevalent. EHRs need to be better at sharing data between systems, if doctors are to be able to use data to improve care and outcomes.

Beware the AI hype.

AI and related technologies will have an important role, but won’t completely replace any specialties or sub-specialties. And doctors should be skeptical of what’s in the black box, and ask for explanations for how algorithms work before accepting their accuracy and efficacy.

Patient data should belong to the patients.

The digital health sector needs regulations so that patients can control who gets their data, and must give their permission for it to be used.

Doctors need to take a more active public role.

While lawyers and MBAs impact all aspects of the modern economy, doctors are more likely to spend their time focused on patients. By taking a more active public role, they can have a greater impact on the products and policies that affect an industry that is 20% of the GDP.

It was delightful to hear so many fresh perspectives that are bound to help the next generation of innovation get to consumers and patients faster. We thank all the participants for engaging in earnest, and for making the event such a success.

Regards,

Urvashi Parikh & Gamiel Gron, Mayfield
By creating a basic standard interface, we are clarifying the core components made it open source, so the larger community of innovators can run with it. Often don't know where to start. So we built the baseline MyStudies app and week. We want to encourage innovators to collect data on outcomes, but they data to identify new safety signals.

This particular challenge will be focused on using FDA industry to Congress. This particular challenge will be focused on using FDA

Today we have two announcements that are relevant to this conversation. On Jan. 17th, we announced a new precision FDA data challenge. These challenges have two main goals. First, we want to get the larger community of data, starting with one at Stanford.

It's extraordinarily exciting that the FDA is going to open up all of its clinical trials, starting with one at Stanford.

The 21st Century Cures Act has compelled the FDA to understand how we can responsibly control real-world evidence. It's been helpful to us to start building the muscles internally to use this data, and it lets us communicate to industry what you can do now and in the future.

It's true that the big incumbents have put a lot of money and other resources into this. But we are committed to making sure that everything we learn about real-world evidence is available in a transparent way across the playing field.

Unsheet Parikh
Small companies often bring first-in-class technology to market. What are you doing to help them get on the right path to get approval?

Unsheet Parikh
You announced another app last week, called CureID. What should we understand about it?

Amy Abernethy
It lets healthcare providers who are using antibiotics for novel uses tell us what they're doing, and it also helps us understand the degree to which physicians are acting to participate. While there hasn't been much press on CureID, the physician uptake has also been far greater than I would have expected.

Unsheet Parikh
Some of the largest real-world evidence initiatives have been with some of the big healthcare providers. What is the FDA doing to make sure that emerging companies have the same voice?

Amy Abernethy
The 21st Century Cures Act has compelled the FDA to understand how we can responsibly control real-world evidence. This has helped us to start building the muscles internally to use this data, and it lets us communicate to industry what you can do now and in the future.

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Ways for you to communicate with us, early and often. We have confer-

Unsheet Parikh
Nurturing the clinical trials, starting with one at Stanford.

Unsheet Parikh
It's extraordinary exciting that the FDA is going to open up all of its clinical tri-

Unsheet Parikh
The FDA has its skeptics. Yesterday, the New York Times editorial board

Unsheet Parikh
Our top-notch data scientists working with our data, to teach us how it can be used

Unsheet Parikh
Ways for you to communicate with us, early and often. We have confer-

Unsheet Parikh
Not everybody is up to date as to what's possible in 2020 and going forward.

Amy Abernethy
We have a tendency to get emotional about data. We tend to think there's good data and there's bad data. The truth is that all data has value and all data has warts. So you need to look at particular datasets and think about the challenges you need to solve. Can you marry it with other datasets to fill in gaps? Can you find new solutions to clean it up?

Audience Member
Late stage venture capital firms don't really have incentive to work on things like anti-fungals, anti-microbials, anti-virals, because of the way they are reim-

Audience Member
We realize that some of our current approaches don't work for everyone. For example, we regulate by product category. So we regulate food, we regulate cosmetics, we regulate drugs, devices, animal products. You get the point. However, in the digital health space, products develop much more quickly. We understand that the traditional product pathway may not always work. That's why you've heard us talk probably about a patient pathway. It's now a pilot program to regulate the companies that are developing the product as a way of making things more efficient.

Unsheet Parikh
You spent most of your career using data to improve clinical practice. What advice would you give to others who are doing the same?

Amy Abernethy
If you've got a new product, come talk to us, because staying away probably does you a disservice.

Amy Abernethy
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This is a really important, very hard problem to solve. The CARB-X initiative is a trans-governmental way of trying to deal with it. As for the FDA, each of the centers is doing its own things, and we’re also pulling people together to create a trans-FDA point of view. In the drug center, for example, the infectious disease team looked across the other therapeutic areas and said, “Wait a second. Over there in oncology, they’ve made really effective, efficient use of accelerated approval processes. What can we learn and bring back and use ourselves?”

Within the animal center for veterinary medicine, we’re thinking about how to provide better stewardship around reducing the use of antibiotics for treating animals. In fact, we saw a reduction of about 30%, although that seems to be flattening out. And within the devices center, we’re developing new diagnostics to better target antibiotics so we don’t just carpet-bomb people with antibiotics at scale. So the devices center is working with the CDC and others to create reference libraries for diagnostics.

The FDA has a lot of databases — shared, individual, submitted. Which databases will you use?

The first set of data that’s going to be used for the latest Challenge will be with what’s available in openFDA, because we already have the right sharing permissions in place.

But I’m very actively working on how we unlock the massive amounts of information that we maintain internally, while appropriately protecting confidential data from companies in a way that allows us to make better, data-informed decisions, and to showcase what’s possible. This is my core focus for the next year.

I realized as soon as I got to FDA that our mission is to protect and promote public health, and to promote innovation. If we forget that last part we can’t accomplish our mission.

— Amy Abernethy
The Largest Post-Market Study on the Drugs that Actually Work

Atul Butte, M.D., Ph.D., Director of the Bakar Computational Health Sciences Institute, UCSF & Chief Data Scientist, University of California Health System

We’ve all heard that the United States spends billions of dollars on electronic health record systems. For example, Sutter Health, our colleagues here in Northern California, has spent $1 billion. Partners, which is Mass General Hospital and Brigham and Women’s Hospital, has spent $1.2 billion. Kaiser has spent $4 billion.

But the critical narrative I hope you take home with you is that while the United States has spent hundreds of billions of dollars on these systems, it nearly zero on actually using any of that data. Maybe a patient gets readmitted or returns to the clinic, or a doctor looks up an old x-ray. Other than that, the average byte of data is probably never looked at again. And we’re paying doctors to type so much of it in, which probably makes this data the most expensive data in America. So I want to convince you that if we don’t use this data to improve the practice of medicine — in a safe, respectful way, of course — it will be a national tragedy.

With that, let me introduce you to the University of California. To me it’s the most amazing platform for real-world clinical data that exists. We have 10 campuses, three national labs, including Lawrence Livermore, which has one of the world’s fastest supercomputers. We have 250,000 employees, and we have self-funded health plans, so we’re actually also a payer for those employees and dependent that get care with us. We have a quarter million students a year, six medical schools, and 12 other health professional schools for disciplines such as veterinary medicine, nursing, dentistry and public health. The University of California trains half the doctors, medical students, employees and dependents that get care with us. We have a quarter million employees, and we have self-funded health plans, so we’re actually also a payer for those employees and dependents that get care with us. We have 200,000 employees, and we have self-funded health plans, so we’re actually also a payer for those employees and dependent that get care with us. We have 200,000 employees, and we have self-funded health plans, so we’re actually also a payer for those employees and dependents that get care with us.

Several years ago, a new umbrella organization was created, called UC Health, with the 10-year aspiration to become a single accountable care organization for the entire University of California. After a decision like this is made, a health system then needs to decide what exactly is going to be the care it delivers, which is then a great reason to pull all the clinical data together. You might have heard that it’s so hard to get electronic health record systems to talk to each other. Well it’s actually much easier to integrate these systems when you have a business reason to do it. For the University of California, the business reason is to get everyone acting together, in a high performing, high quality way. For example, what if UCSF takes care of kidney transplant patients one way, but UCLA does it another way? Or what if UC San Diego takes care of prostate cancer their way, but at UCSF we do it another way? There essentially should be a “UC Way” of doing things.

So where are we now? We have much of the system built, and we’re getting some of the first results. The number I love to start with is 15 million. That’s how many patients the University of California has treated in the last 15 years. That’s equivalent to 5% of the entire US population. It’s an enormous number.

A lot of this is very basic data, because fifteen years ago we didn’t have the Epic electronic health record system in place. If we count from when we deployed Epic in 2012, UC Health has seen between five and six million patients, in over 160 million encounters, and performed over 140 million procedures. And we’ve ordered 680 million medications, everything from Tylenol to CAR T cells. It’s essentially the master shopping list of everything we order for patients in the entire health system.

We have different types of health data worth noting. Claims data, or the bills we have been sending to payers for years, is not useless. You get the patient demographics, some disease codes, and perhaps some procedure codes. But electronic health record data is different. Suppose I tell you I love a restaurant that I went to in Napa Valley. Claims data would be as if I showed you the final receipt, so you could see what I paid, but you wouldn’t really know what I ordered, or any clue why I liked the restaurant. But with electronic medical record data, you can see exactly what I actually ordered. In healthcare terms, you get the results of lab tests, vital signs and every pulse rate and the pain scores and details about every medication and encounter.

Now how do we safely and respectfully use this data? First of all, we’ve got to de-identify the data. This has and will remain a hot topic in the press, because a lot of people don’t understand that we don’t just make up how to de-identify data. The rules are actually specified in federal law, and we have to ensure the users of this data don’t break the rules. But to keep a close eye on this, and to promote the right and safe and respectful way to use clinical data, the University of California just hired Coral Han as its first chief health data officer, who is joining us from the Federal Trade Commission.

Why is this data relevant to the pharma industry or the biotech industry? In any given year, the University of California spends billions of dollars on drugs for our patients. As you may have guessed, most of these drugs are biologics. But each of our medical systems often has a choice in these medications. So one can ask why did UCLA use this one and UCSF use that one? And why didn’t they even buy them together? And which is the one drug they both should purchase? Work like this is called comparative effectiveness studies, and now health systems would not even need a grant to do this kind of research. It’s going to be in their (and our) financial interests to do it. That’s the point of having real-world data.

In the first year and a half that we’ve been up and running, we’ve already saved the system millions of dollars. For example, in our own self-funded health plan, we noticed that many of our employees were getting prescriptions for brand name Metformin instead of generic Metformin. With the help of our primary care physician leads and pharmacists, we now save a million dollars a year, just for that one drug. And we’re working on more than a dozen others like this. This fruit is hanging so low, it’s almost spoiled.

How has this affected research and clinical trials? Here’s an example of how real world data overpowers pivotal study data. If you look at the original pivotal studies done on Humira over a decade ago, around 1,500 to 2,000 patients were treated in those studies. But we’ve now treated over 10,000 patients with Humira. So here’s my prediction: at some point, we as health systems are going to be able to argue that we might know more about these drugs than their originators, because we just keep collecting more and more data on all of these drugs, every day.

In the end, we’re enabling all of University California research faculty and staff, not just in the health system, to get to this data in a safe, respectful, and responsible way. So if you want to show how data can improve the US health care system, this will be an awesome reason to come work at the University of California.

I still run into people who don’t understand what an electronic health record is, never mind that we’ve spent hundreds of billions of dollars to acquire this data.

— Atul Butte
We find that when people go through these steps, in about 95% of cases they figure out what to do without needing a decision to be made for them. And when you do need help, you end up having a very efficient and productive discussion.

Konstantinos Alataris

At Nevro, it wasn’t so much about procedures or processes, but by a culture that was casually defined by the employees. You have certain people that create the space for a way of working in which everyone feels able to give their opinion. This is essential in a startup. Because if everyone from the CEO to the engineers isn’t engaged and aware of what the company is doing and how things are going, you’re not going to go anywhere. You should never be surprised if you’re at a start-up and it goes out of business. You should have known that was coming six months ago.

Anne Wojcicki

If everyone from the CEO to the engineers isn’t engaged and aware of what the company is doing and how things are going, you’re not going to go anywhere. You should never be surprised if you’re at a start-up and it goes out of business. You should have known it was coming six months before.

— Konstantinos Alataris

The Secrets Behind Built-to-Last Companies

Anne Wojcicki (Co-founder & CEO, 23andMe)
Konstantinos Alataris (Co-founder & CEO, Veroro; Founder & former CEO, Nevro)
Stéphane Bancel (CEO, Moderna)
Jeff Huber (Founding CEO & Vice Chairman, GRAIL)
Chad Robins (Co-founder & CEO, Adaptive Biotechnologies)

Anne Wojcicki

All of you have pioneered areas where there wasn’t a defined path forward. I find that the most important thing when you’re defining a path forward is how you make decisions. So what do you do to help you make major decisions?

Chad Robins

You have to be a good listener and take in as much information and data as you can, but there’s a lot of gut that’s involved. You have the best data in the world, but at the end of the day you have to make a call, because there is no perfect answer.

Anne Wojcicki

Do people below you feel like they’re empowered to make decisions?

Chad Robins

Absolutely. If you’re talking about company direction, the buck stops with you. But I believe decentralized decision making is the only way a company can grow and scale. You hire smart people and a lot of times just get out of the way and let them make their own decisions. They are the subject matter experts, certainly more than me.

One more point. I think empowered decision making should go all throughout the organization. You have to let people make decisions and also let them fail. You can’t have a culture where people are so afraid that if they make a wrong decision, that they can never do anything again either. People need to know they can fail and be okay.

I wish we’d had a conversation about company direction, the buck stops with you. But if everyone from the CEO to the engineers isn’t engaged and aware of what the company is doing and how things are going, you’re not going to go anywhere. You should never be surprised if you’re at a start-up and it goes out of business. You should have known it was coming six months before.

— Chad Robins

Jeff Huber

I completely agree that really good decision making starts with listening, because there’s no way that you can know everything in this business. There’s too much science, and too many issues related to business and healthcare. One of the first things we did at GRAIL was to put together a scientific advisory board — a real advisory board. If you look at the top 20 people in the world, probably 15 of them are on our advisory board, and we lean very heavily on them.

At both GRAIL and before that at Google, we use a decision-making framework when real disagreements come up. It’s a forum where we can make decisions. You have to write a statement of the problem, a statement of what you disagree about, and you need to show the pros and cons from all perspectives. And you need to agree that once a decision is made, it’s binding.

Stéphane Bancel

One of the most difficult things is to balance technology risk and biology risk, because if you try something with a new technology and with new biology and it fails, you will have no idea if it failed because the biology was incorrect or because the technology was not ready. And since our technology was so new, we decided not to be too cute to think we knew what application would work best. So we did six different applications, and chose to start with the one with the lowest biology risk.

That way if it failed, we could be 100% certain it was because of the technology. This led us to focus our first product on the flu, where there’s very little money to be made. In fact, many people in the biotech industry called us names.

But we weren’t solving for the drug. We were solving for our platform. Because if we could get one drug to the finish line, we would be able to create thousands of other drugs.

Anne Wojcicki

We all make bad decisions. What is the worst decision you’ve made, and how did you recover?

Stéphane Bancel

So I have two buckets of bad decisions. One is around hiring people. Hiring someone you’ve never worked with is really hard. We’ve learned that it’s better to promote somebody even if you don’t think they’re quite ready, and figure out how to provide the coaching and structure they’ll need to be successful. Because it’s very hard to find people who will fit our culture and our pace.

On the business side, I sometimes don’t move fast enough. If I could change one thing, I’d go back and create more vaccines earlier. If I’d done that a year or two earlier, we might be a bigger and very powerful company now.

Konstantinos Alataris

It’s also people for me. Sometimes everything points in the right direction.
Chad Robins
when we got to 120 to 150 people that we really invested in a process to understand our values and our culture. It was only then that we could have a meaningful statement of purpose.

Jeff Huber
My biggest mistake was failing to recognize the importance of having people from different cultures to operate as a team. We needed to have the best scientists in the world and make decisions quickly when they've never had a job in their lives. We've made mistakes by not having someone there to help people like that. And that takes a lot of work.

Anne Wojcicki
Yes, a lot of people were surprised. But even in our Series A document, we talk about the fact that drug discovery could become part of our business model. We're trying to get biology to operate as one team. We needed to make sure people from three different cultures could work together.

Stéphane Bancel
Another hot topic today is diversity and inclusion. People say, “Oh, it’s really hard to find women, it’s hard to find minorities.” What are you guys doing to change the numbers?

Chad Robins
I don’t believe it’s hard to find good women or good African-Americans or good whatever. There are great people everywhere and some of it is just a matter of not only where you look, but of being open to candidates that may not seem to have the requisite skills on paper, people who can bring a different point of view and skill set and set of experiences to the table. I don’t believe in hiring quotas, but I do believe in setting up a culture so that it happens naturally.

Stéphane Bancel
We have 50 or 57 people, and we wish we had a bit more female representation at the senior leadership level. One of our rules is that for the top three or four levels in the company, you must have a female candidate before you can make an offer. But you just have to work at it. There’s no other way around it.

Jeff Huber
I have a question for our moderator. 23andMe recently hit a major innovation milestone, with our first drug candidate license. How did you do that, since you had to ignore in order to make sure your companies lasted?

Anne Wojcicki
So that’s the last question, and it’s on moonshots. How do you guys support big ideas that you really have no idea if they can work? Do you try to cultivate them?

Chad Robins
As a platform company, there are certain investors that say we should spin things off, or capitalize on them in other ways. But given where we are in the life cycle, with our intellectual capital and shared resources and learning, I think breaking the company apart would kill us. So we’ve had to ignore some of those calls.

Stéphane Bancel
So this is the last question, and it’s on moonshots. How do you guys support big ideas that you really have no idea if they can work? Do you try to cultivate them?

Anne Wojcicki
One of the most important things, particularly in the sciences where there are so many skeptics, is persistence.

— Anne Wojcicki

Mayfield x AWS
DIVERSITY LEADS TO BETTER OUTCOMES

DIVERSITY INCLUDES CULTURE

HOW TO MAINTAIN AS YOU SCALE?

DESERVE LEADERSHIP

CONSCIOUS HIRING

TRAIN AGAINST DISCRIMINATION

Mandatory female candidates in your selection

MATERIAL AND FINANCIAL LEADERSHIP

DIVERSITY ACROSS THE CULTURE

CONSISTENCY ACROSS THE ENGINEERING TEAM

EXCELLENT DIFFERENT board members who always want to do the next thing and the next thing. So we’ve had multiple discussions about the fact that we need to earn our way to plural. We need to deliver the first moonshot before we worry about the next ones.

— Jeff Huber

We’ve got some really big opportunities, but it depends on the stage you’re at as to whether they are moonshots or just big meaty opportunities that are going to take some time. Either way, you have to have a patient set of investors, and a patient board that understands how data can be used for clinical decision making, because it’s hard to change medical practice.
I'm almost embarrassed to say this, though I don't think it's really different from other hospitals in the country, but the one thing we've done better in the last two years around sepsis is to get religious about hand washing. Honestly, that's what most hospitals are really trying to focus on.

— Lori Morgan
If you don’t do the whole thing, from admission to discharge, the hospital doesn’t save money and it doesn’t save a life. And if you’re the vendor, you should be in trouble if you don’t think of this.

— Jason Springs

Two years ago, it was used by a handful of hospitals. Three months ago, it was used in 340 hospitals. Today I just checked, and it’s 420 hospitals. In two years, it will be in 1,400 hospitals. This is more data than even all of the device access to from UC. It’s not just Fitbit data, which is nice, but actual clinical data. And we now actually think about how to liberate this data so patients or their surrogates can use it to act in the healthcare system.

So if I were to prognosticate where things are going next, I’d say that within a 10-year timeframe, the largest patient-controlled data pools are going to be in this new ecosystem where patients will expect decision support directly out of a device in their hand.

Sam Glick

Jason, somebody once said the challenge of working with hospitals is that the doctors blame the administrators, the administrators blame the doctors, and everybody blames Epic. You seem to have broken through some of that. How do you do it?

Jason Springs

Let’s be honest: any individual hospital, whether it’s 100 beds or 1,000 beds, is almost like a city. To get them to change, you need partnerships. Even before we were funded a year ago, we were talking with large academic medical centers. That’s where the guidelines are written. That’s where people figure out new types of practices.

We are announcing two partnerships soon. One is a clinical trial network specifically focused on figuring out how to deliver precision medicine to hospital patients—not just from a technology standpoint, which is only 10% of the problem, but the full suite of products and services that are required. Maybe it’s a test message that reminds someone to wash their hands or run a test, or to make sure they’ve got the right materials in the ICU to deliver that medicine you believe will save a life. Because if you don’t do the whole thing, from admission to discharge, the hospital doesn’t save money, and it doesn’t save a life. And if you’re the vendor, you should be in trouble if you don’t think of this.

If you think technology has a remarkable democratizing effect. For example, dermatologists collaborated with computer scientists to develop a deep learning algorithm that can diagnose a malignancy from a cell phone photo as accurately as the dermatologists.

And we’re starting to see innovation in the pathology realm. Radiology is ahead, because radiology images are digital to begin with. But it’s becoming possible to digitize pathological specimens that are analog. Not every community hospital has a pathologist, much less subspecialty-trained pathologists. So technology can really help address some of the disparities that have existed, although it won’t be effective on its own.

Lori Morgan

I’m going to pick a little bit about technology being democratizing. The number of rural hospitals that are closing, particularly across the South, is going to present quite a crisis in healthcare. Some of that is due to the cost of technology, whether it’s the latest CT scanner or PET scanner or EHR technology.

In fact, technology costs are probably one of the biggest drivers of hospital consolidation in the last 20 years. So while technology is democratizing in some ways, it would be really great if it came at a really good price point.

Sam Glick

How should we regulate AI?

Zak Kohane

The problem is that on the one hand, we want to regulate it like a drug, because it can in some cases be just as powerful as a drug. On the other hand, there are things about these technologies that are very un-drug-like. For example, anti-TNF monoclonals are not going to evolve so fast that they will work better or worse in humans ten years from now. But the data that we use to train machine learning models may not actually apply in ten years. This is called data shift, and drugs are not susceptible to it. But algorithms are.

This presents a huge problem. The FDA already has enough trouble just regulating devices and drugs. But think about having to do an ongoing refresh of regulations. So I think we need to have a kind of Consumer Reports that does ongoing assessments of AI regulations, because the healthcare system is more dynamic than biology.

Sam Glick

How should we deal with the black box problem? We all have doctors we think are great, in part because they can explain what they’re doing and can bring us along on that journey. AI doesn’t do that.

How do we avoid a world in which the hospitals who can afford innovative technologies are taking great care of people, and the rest are falling further behind?

— Sam Glick

To make a long story short, more students applied for our computationally-enriched medical course than any of the other specializations, despite the fact that it requires programming and accessing datasets through Amazon Cloud and through Jupyter Notebooks. Every year we have to turn people away.

Sam Glick

How do we avoid a world in which the hospitals who can afford innovative technologies are taking great care of people, and the rest are falling further behind? Sutter is an interesting example, because you serve some of the richest and some of the poorest people in California.

Albert Chan

Technology can be a great equalizer if it is done right, but you need to ask leaders who implement technology to actually show their report cards and develop KPIs based on real outcomes. I have a program at Sutter where informatics students and fellows can work on real world problems and figure out what it actually takes to implement new innovations. That is critical, because I don’t remember anywhere in my biomedical education learning about leadership or change management or communication.

Zak Kohane

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Zak Kohane
I disagree with your premise. I think the best doctor is the one who's done a procedure the most often, whether they can explain it to me or not. So if AI were to give us enough value, I don't think people would require that much explanation. But this is all in the future. Because AI right now is not really even as good as a good commonsensical medical student.

Lloyd Minor
It's also important to remember that social, behavioral, and environmental determinants of health account for roughly 70% of health outcomes. So, I agree that if I'm going to have a surgical procedure performed, I want someone with a lot of experience. But to address those determinants, we need to look at the healthcare delivery workforce — nutritionists, lifestyle coaches, and others — who are engaging in a meaningful way with patients. Technology can play a role in this, but this is ultimately how we're going to improve healthcare, particularly in the United States. For three consecutive years, life expectancy in the United States has declined. The last time that happened was during World War I and the Spanish flu. The opioid epidemic contributes to that, but the data strongly suggests that we need to relook at the roles in our healthcare delivery system.

Sam Glick
We're coming up on time here, so let's end with this: what's the one thing you'd do to make healthcare better?

Jason Springs
I'm doing it.

Lloyd Minor
Fix the electronic health record and get it to be more user-friendly, interactive, and engaging for both healthcare providers and for patients.

Zak Kohane
Get your data to flow with you across hospitals.

Lori Morgan
Make electronic health records more functional across the continuum of care, so doctors can spend more time with patients rather than staring at computer screens.
Evidence-Based Care, the Role of the AMA, and Reducing Barriers to Innovation

Dr. James Madara (CEO & Executive Vice President, American Medical Association)

Chrissy Farr (Health and Technology Reporter for CNBC.com)

Chrissy Farr
We’ve seen lots of data come out about physician burn-out. How do we get to a place where physicians can really do what they’ve been trained to do?

James Madara
We did a time and motion study showing that for every hour a physician spends with patients, they do two hours of administrative work at the office and another couple of hours at work at home at night. And we have an emerging tsunami of chronic disease that is going to require even more continuous care in the future.

Chrissy Farr
Are EHRs helping to address this problem?

James Madara
The EHRs we have currently are pretty good for claims and billing and risk mitigation, but not very good for organizing and using clinical data. Administrators may feel that there’s interoperability, but if you ask physicians, they don’t see it. There’s huge amounts of administrative complexity that has nothing to do with patient care.

Chrissy Farr
You’ve talked in the past about “digital snake oil” from technology companies that can’t back up their claims with evidence. Is this still a problem?

James Madara
Yes. An example is Instant BP, a blood pressure app that was one of the top five most downloaded apps from the Apple Store for two straight years. Well, a group at Johns Hopkins found that its results were wrong more than 50% of the time, for a condition that is the number one killer. That, I would submit, is snake oil.

Chrissy Farr
Can patients rely on App Store ratings to help with this problem?

James Madara
There are about 300,000 mobile health apps out there, and about 40,000 of those are patient-facing. A group investigators and clinicians and technologists from Harvard picked out about 150 they thought were best and which had good reviews. They found that none of the 150 were usable, or provided appropriate warnings when dangerous trends were detected.

Chrissy Farr
Will AI take over any specialties or sub-specialties?

James Madara
I think AI is going to play a major role in healthcare, but it doesn’t replace jobs. And you have to be careful to understand what’s happening in the black box. One project looked at whether AI could look at chest films and identify which lung cancer patients were going to need a lot more care than others. The answer came back that yes, the AI could do it. But when researchers studied the algorithm, they found that the people who would need more care were simply those that needed portable x-rays, because they couldn’t be moved to the radiology suite at the time. That wasn’t that helpful.

So you can be an optimist or a pessimist on AI, but I’d take a third choice: be an empiricist.

— James Madara

James Madara
We believe we need transparency, and an understanding that the data belongs to the patient, and the patient has to give permission to use it. And there needs to be data rights built into electronic transfer. Because while I may agree to release my data to my physician, I can’t be sure what will happen to it once the data moves elsewhere. The fact that Ascension and Google made this relationship through a business associate arrangement, which was legal to do, shows that regulation never keeps up with technology.

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— James Madara

Chrissy Farr
Do doctors need to take a more active voice on issues such as patient rights? Should they unionize?

James Madara
We believe physicians need to play a bigger role in their institutions. We don’t believe that physicians should be unionized. We don’t think that aligns with the best care for patients, or with our aspirations to improve the health of the nation.

Chrissy Farr
What would you most love to accomplish in the next 12 months that would make a big difference for doctors?

James Madara
The thing that needs to be addressed first is fragmentation of the healthcare system. That’s why issues around data — data liquidity, data portability, virtual record, social determinants of health — are going to be the hot spots over the next five or 10 years.

Note that all of these topics relate to pre-competitive needs. We’re in a national debate now about whether we’re going to have a single payer system or a public option or some other set of competitive rules. Who knows what will happen, but I do know this: if these pre-competitive needs are not corrected, it doesn’t matter what health system we end up with because it won’t work.

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