CONVERSATIONS WITH MIKE MILKEN

Judy Faulkner

Founder and CEO, Epic

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Mike Milken: Judy, thank you for joining us.:

Judy Faulkner: My pleasure, Mike.

Let's go back to the 1970s. You began writing software code that eventually became Epic Systems, as a grad student at the University of Wisconsin. What were you hoping to create 41 years ago and what does Epic do today?

Back then when I was in graduate school, I worked with Dr. Warner Slack and his team of folks who were working on computers and medicine. At one point they asked me to build a system that would keep track of patient clinical information, and back then there was software for lab but not for clinical that we were aware of. They wanted to be able to design their own screens and define their own data elements.

They wanted a database management system. However, that was before Oracle or Sybase or dBASE. So I found a small system that was done at the Beth Israel – where Warner had moved, and that was a big help – and

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This interview has been lightly edited for clarity and readability.

developed Chronicles, which became the underlying infrastructure for Epic.

I think many of our listeners likely have used Epic Systems even if they don't realize it. Give us maybe a couple of specific examples if you could.

The electronic health record itself is called EpicCare, and the patient portal is called MyChart, so we're known for that. However, many of our customers rebrand it with their name. And the other thing we're very well known for is Care Everywhere, which is interoperability capabilities. We were the first to do that, and it is so that wherever you go, your record can go with you.

Judy, Epic has data on more than 200 million patients and I believe that you mentioned to me that that includes the very first patient identified in the United States. How are you gathering the data and how do you hope to use it to help us solve this tragedy of COVID-19?

Insights is a database that we have pulled together from those of our customers who have some of the highest numbers in COVID patients. Along with our customers, we are looking at that data to try to figure out:

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- What are the comorbidities?
- Who is most vulnerable?
- What treatments work in particular?
- Do some of the most common treatments that are being used now work?
- And is there anything else that seems to work?
- What if you give some of those treatments earlier on?
- What about later on?

So those are some of the questions that we're asking of the data there.

Another database we have, called **Pulse**, is keeping track of capacity per state so that for each state we have real-time data on:

- What beds are in use?
- What ICU beds are in use?
- What is available?
- What about ventilators?

[This is] so there could be load-balancing across different health systems.

And the last database we have is called **Cosmos**. And that is something that most of our customers are contributing to. It's not just for research. The other thing it's for is when you have a patient in front of you, and you are the physician and have to decide what's better for this patient – drug A, drug B, drug C, operation D, operation E, etc. – you're trying to *decide*. Only 10% – according to National Academy of Medicine – of the decisions are based on evidence-based medicine. The other 90% are best-guess in many ways. And so what Cosmos will do is it will come back to the say 12,000 people similar to your patient had Drug a, here's the results; 22,000 had drug B, here's a results; etc. We're bringing evidence-based medicine to the exam room. That's a huge part of what Cosmos is there for.

You have data on patients who've been using the anti-malaria, anti-lupus treatments. Is there anything that that data is telling you about its effectiveness related to COVID-19?

Right now, we're not sure that it is effective when we look at the data. However, we have seen it given at first, mostly to those who were pretty far along with the COVID virus. The real question is, what happens if it's given at the beginning of the illness? Or what happens to those people who were taking it, didn't have COVID when they were taking it, and then got it? We're trying to look at all those different areas there. So far, we haven't seen anything that says yes or no.

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Judy, I know for decades you've been partnering with hospitals, health systems, but now I see that you are partnering with the National Guard, the Army Corps of Engineers and other organizations. How did that evolve?

That evolved with Washington state, who contacted us about extending out to an alternative care facility (ACF) because Washington state mostly has Epic in the health systems there, and they wanted to use it for an alternative care facility.

What happened after that is we began getting calls from other states as well. We have installed Javits conference center in New York. We were told on Thursday at 5:00 PM that we should go ahead and install, and by Monday at 7:00 PM they were seeing patients with the implementation of EpicCare. It was really interesting because typically EpicCare takes months, in some situations years, to install, and we had three to five days to install it. Of course our first reaction was that's impossible. And our second reaction was, let's figure it out.

Judy, there's been a great disparity around the country. New York, New Jersey – a surge of patients. In other parts of the country, major healthcare systems in California and others, they prepared for a surge that has never occurred.

There certainly are hotspots that even if the surge hasn't occurred to the extent you're referring to, Mike, they're still in bad shape. I saw a video yesterday done by Montefiore with patients everywhere, coming in more than could be accommodated, more than they had people for, more than they had places for, and people dying.

And yet in other places, it hasn't been as bad as it was predicted to be. Yet when you look at the United States compared to every other country, as far as we know from the recordings that are being published, we are significantly having the highest number of deaths.

How about your 10,000 employees operating in this environment? What has been your experience in with employees getting the coronavirus?

We had one who was coming back from personal vacation and went to his apartment, got the coronavirus, very few symptoms, is doing well. Of our 10,000 employees and their families, that's the only one I am aware of.

We do have social distancing here. About 90% of our employees are working from home. The other 10% are here and because we have individual offices, it's really easy for people even when here to practice social distance.

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Judy, were you prepared for people to work from home? Where your systems in place already before this started?

Yes and no. Most of our staff have ability to work from home because they may need to access the systems on the weekends and the evenings, whatever necessity requires. So from that point of view, yes. However, we really find that better work gets done when people can run to each other in hallways, see each other at lunchtime, and ideas can be communicated. What I find fascinating is how many people have said that they thought working at home would be fun and they can't stand it.

Well, they probably like the interaction. And the fact that you've built these small communities at work has probably created some very close ties between them and

their fellow team members. You've created a culture – that's one of the things I wanted to bring up.

We do have a culture. It's a culture of ownership, it's a culture of working hard, of wanting to be "heroes helping heroes." That's one of the things you hear our staff say.

What you're seeing in places that have had surges of the coronavirus, is there a way to provide those experiences to the other health systems throughout the country that might see the surge later?

That's a good question. Can we work with those who have really learned from the surges and help those who haven't? That's a great idea, Mike. I think we should do that. The other thing that we're doing is looking for, in our data, which will be fascinating, what other health problems will there be because of the coronavirus and people didn't get the normal care that they should've gotten?

> *"What other health problems will there be because of the coronavirus and people didn't get the normal care that they should've gotten? ... What are we missing in the care of patients that will also harm us in the near future?"*

For example, what about mammographies not being done? How many breast cancers were seen last year this time, the previous year this time, compared to this year this time. What are we missing in the care of patients that will also harm us in the near future?

Also, the delay of elective treatment. I'm assuming you're measuring that also, whether it's orthopedics or others that have been delayed?

Yes it has, and of course the elective surgery loss has caused great financial hardship for many, if not most of our health systems. As well as being difficult for the patients who were waiting for those surgeries. So it's a big problem.

Well, I've noticed we had one health system declare bankruptcy last week in the first week of April. I think that these financial difficulties – those that prepared for a surge, their occupancy is at very low levels. I'm assuming you're seeing ... a lot more telemedicine today.

Oh, it's been amazing. One of our customers said that they did 3,500 telemedicine visits in 2019 and they did 3,200 yesterday. Someone else said they went in one day, they had 20 televisits and then a few weeks later they had 6,000 on a single day. And so we're seeing a huge number of televideo visits. What I found interesting is that some of the physicians are saying that they get to see the patient in the home for the first time and that's a plus.

Do you believe Judy, that as a result of this coronavirus / COVID-19 that we're going to see a permanent change in telemedicine and the way patients are treated?

Yes, I think that's going to stick. I don't think it's going to be nearly as high numbers as it is now, but I think people have used it, thought it's pretty neat – they don't have to get into their car and drive somewhere, park – and it will continue.

Judy, there was always a dream on whether you could get medical data that was useful, clinical, could you marry it with biological data? But if you had the clinical data, you could then analyze it. Instead of using intuition, you could find out those patients with *this* condition who were given *this* treatment had *this* outcome, and those that had a different treatment had a different outcome. Has Epic developed a new group that's attempting to analyze all this data since you have maybe as much data or more data than anyone in the world?

We have a group of data scientists who look at the data and try to figure out, what can we do with AI that will help patients stay healthier? So they look at it not as much for reporting on it, but figuring out what can be done to help. A really good example is with sepsis. ... This patient is going to be dying of sepsis if they don't do something quickly. The AI can figure that out and alert the physician and save many, many lives. Our data scientists tried to work on quite a few things like that.

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With the COVID-19 situation now we've brought in not just our data scientists but also our physicians, our masters in public health with epidemiology focus, and Ph.D.s in different areas of biological research to also be looking at the data and see what else we can find.

So Judy, I wish you the best and thank you for joining me today.

Thank you, Mike. It's been very nice to be speaking with you.