# *Patient Safety and High Performance Leadership Summit*
# *Issues in Governance, National Collaboratives, and H.I.T.:*
# *CPOE-HER Flight Simulator & Simulation*

## April 27, 2012
## Webinar Transcript

**Charles Denham:** So we started off today talking about the Institute of Medicine report, and it addressed a technology and a space that all of us are very interested in. There are some new concepts, and there have been some real champions of this concept of a CPOE Flight Simulator. What I thought maybe we might do is just start with David – the two Davids – and just describe what this is. We'll start off with what that is, and then really kind of broaden out to the EHR area. But the main thing was that one of the recommendations in the IOM report – so maybe, David, describe what the CPOE Flight Simulator is, and then what the recommendations are, and what the meaning is. As we go down the panel, we'll move then to Leah. We've teamed up with Leah, and they're using the CPOE Flight Simulator to help hospitals understand how they can improve, and help payers understand whose really getting the show on the road. So, David?

**David Classen:** So when you get into an airplane, if that airplane had a flight management system shut down in flight, you probably wouldn't be getting on that plane just by turning it back on again. Sully, is that probably fair to say? Yet you'll step into a hospital where the ICU system could have shut down and no one knows exactly why, and they turn it right back on and start operating it again. And what's interesting about HIT – healthcare information technology – is, we put these very complex systems into the hospital, we turn them on, and we do virtually no testing after we turn them on. These are highly complex, dynamic systems and things are happening all the time and we don't have any routine testing to see what happens as they operate. We don't even apply any routine testing if they crash and we have to reboot them all. Other industries would never operate that way. They think we're crazy.

So what David and I and a woman named Jane Metzger had done, along with Leapfrog, was to say, "Why don't we develop a test that will evaluate these systems in operation, in flight to see how they're doing? And why don't we pick an area that everyone agrees is really critical for safety, which is medication safety? Why don't we pick parts of medication safety we all agree should be routinely done? Shouldn't we really have safety checks turned on so if we try to order a medication that a patient's highly allergic to, it stops it? Shouldn't we have a system that checks whether, if we order a drug that will have a critical drug interaction with another drug a patient's on, it would stop it?" So a very simple idea. The problem is, as we look around in our IOM report to see if these kinds of tests were routinely used in health information technology across the world, we couldn't find anything but the tests we're going to talk about.

So we think it's an obvious, operation problem in these complex systems that there is no ongoing tests of them to see how effectively they're operating. That was one of the things that we said in the IOM report is [that] as we put all this technology in place, we need close deployment tests. We have a lot of tests before we turn them on and operate them, but we have very few, actually only one, after we turn them on. We think this should be an important part of the future, which is, we have to have some ongoing sense of how these systems are doing. I can just tell you an anecdote why it's important. I've been to several hospitals where they have very complex HIT systems that have lots of safety checks so that you can't order a certain chemotherapy drug to be given intrathecally into the brain. I routinely have gone into those systems and say, "Let's just try this test order and see what happens." And they all tell me, "Well, of course it would never go through our system." I can't tell you how many places I've been where we've put it in and it went right through the system. Why did it go right through the system? Because these are highly complex and dynamic systems; they have upgrades going on all the time and people don't know that maybe that upgrade had an impact that we didn't know about. So that's sort of the basis for why we developed this test. So what we developed over a number of years was a web-enabled test that would

allow hospitals to test their operational system for certain high-risk scenarios that you never want to happen. Patients that have particular problems, then get ordered drugs that would exacerbate those problems or harm them, you'd want to make sure your hospital always picked up those problems [inaudible].

**David Bates:** I came to this area in a couple of ways. One is through certification, and I was a commissioner for the certification commission for healthcare IT. The way this certification has been set up is when you certify an electronic record, you are asked to go through a whole bunch of steps, and they're all "yes" and "no." So do you have drug interactions? Yes. Do you have drug allergy checks? Yes. There's no check to see whether you have the right one. As David has noted, these systems are implemented in all different ways. We felt it was really important to try and figure out how they were working in actual use. Because it's not just what system you have, it's really how it's implemented as there's a lot of variability in the implementation.

We basically got some data from Leapfrog that looked to see how hospitals had done with this, and we built the test in a way that really reflects what harms people. We work closely with the Institute for Safe Medication Practices. They gave us a series of medication errors that had actually either harmed or killed someone, and then we took some entries from our own studies. Andy Seger's here and worked on this, and we took a lot of errors that commonly harmed people. So that's what was in the test. Then when hospitals took this test, we looked to see how they did, and about half the time they missed even the fatal errors. For the errors that either had the potential to harm someone or would have harmed someone, the range was from between ten to 82% – a huge variability. Furthermore, and most important – really important from my perspective – every vendor had implementations that were really good, and every vendor had implementations that were really poor. Again suggesting that it's not what the vendors give you, it's how you actually implement things. I think that having a test like this that is post-implementation is absolutely critical going forward. Certification is really helpful, it makes you add some functions that you didn't have, but it doesn't check to see, "Did you do it right?"

**Charles Denham:** Leah, Leapfrog and you've all been involved in this for years and working with the hospitals [which] many times are grudgingly [wanting] to participate in anything that kind of shows where they're not doing absolutely perfectly, but they're starting to get used to it, and this is really things really evolving over time. What's your take on the future for this kind of thing? Leah is the CEO of The Leapfrog Group.

**Leah Binder:** Well, the future has to go a certain way. I think that both Davids, Dr. Bates and Dr. Classen, are expressing it, and we have to incorporate the idea of monitoring the effectiveness of modern technology over time into the very essence of meaningful use, or whatever term evolves in the future to the idea of good use of technology, responsible safe use of technology. Monitoring technology over time is absolutely critical and essential, and it's unsafe not to do it, and it's shocking to us still that many hospitals don't. It is quite unfortunate, although Leapfrog is very pleased and proud to have this tool which was developed by these superb researchers on our survey. The hospitals can take the test – effectiveness of their survey – we're pleased and proud to have it, but we feel that it's actually quite, almost tragic that this is the only test. The deployment of technology for health information is considered national priority. It is a priority for safety, it's a priority for quality, and it's an absolutely critical next step in a healthcare system that has major problems with safety and efficiency. So given all that, why do we only have one way to actually test whether these systems are working?

Now Leapfrog's membership of purchasers and employers were … they were intrigued with CPOE because they were intrigued by the studies. Particularly Dr. Bates's study and others that suggested that it does cut medications to errors that have CPOE. The reason we wanted a tool like this was [that] the purchasers constantly ask, "All right, we know hospitals are putting CPOE in place, and we see that's there's research that says that's a good idea, but how do we know these systems are working?" It's a really simple question that a company like Boeing that belongs to Leapfrog knows from [its] own business. They don't assume that you plug the system in and it works. They don't assume that their engineers are smart enough to make sure it always works.

**Charles Denham:** Just so we have enough time for everybody, and I …

**Leah Binder:** Can I just say one more thing?

**Charles Denham:** Yeah, go ahead.

**Leah Binder:** So I need to say it because you asked me to do this. We are putting this out publicly today, and it's very good news about hospitals that have taken the test. That is that there has been significant improvement in the safety of their systems. So of the 250 or so hospitals that took the test in the last year, there were almost no fatal errors missed by the system. So that goes with what Dr. Bates said earlier. Compared to a third of the fatal errors were missed before, so this is very substantial in prevention. In addition, before, about half of all orders that would have resulted from adverse events, not just fatal errors across. Before, it was about half were missed by the system. Now we're announcing it's less than a third. I have a press release that is out on the counter if anyone wants to look.

**Charles Denham:** Great!

**Leah Binder:** But it's very, very good news. And there's one other thing that we've seen, and that is every hospital with – no exceptions, every hospital that has taken this test more than once has improved. So it goes without saying almost, but it's important to recognize when we actually have the data in front of us, the common sense is: monitoring systems improves their performance.

**Charles Denham:** Fantastic. Thank you. So, Sully, again – we will go all the way down the line, but this is, again, one of those things that is really shocking to people outside of industry that we're a $2.8 trillion industry, that we don't have verification systems for performance. The things that are hundreds of billions of dollars in expense, and so as we kind of go down the line, we'll kind of talk about the value of simulation and applying the things that we learn as pilots in simulation to actually stimulating conditions that complex systems then men can react to without having the error announced, without having the mistakes. So, Regina, you speak frequently on health information technology. Your thoughts?

**Regina Holliday:** Well, the first thing I have to tell you is that for 12 years I worked in a toy store selling toys here in Washington, DC. And [inaudible] speak about CPOE and CDF. And I said, "Sure," and I looked up what those things meant, since I didn't know. And then I went looking for the patient perspective in CMS's COE, and you want to know what I found? Absolutely nothing, because we've never been asked before about what we thought about those things. This led me to research this thing called Leapfrog. Now I had worked in toys for many years so I know exactly what Leapfrog is. It is a preschool toy. That was not The Leapfrog. But this one was wonderful too. And which brought me back to another thing which was the toy I sold for many years, and it's called the "20 Q-Ball." Now has anybody played the "20 Q-Ball"?

**Charles Denham:** Regina, I don't think your mike is on.

**Regina Holliday:** Oh, sorry. I'm very loud. Can you hear me? You still can't hear me.

**Charles Denham:** Pick it up from Leapfrog.

**Regina Holliday:** Can you hear me? Sorry. Okay, so I heard about this toy company called Leapfrog, and I was like, "That [inaudible due to microphone malfunction]." And so I know about this toy called the "20 Q-Ball" and I don't know if you've ever played with it. You've played the "20 Q-Ball"? Oh, yeah. So there's this toy that plays 20 questions with you. It retails for $13.99. It is loaded with a mathematical logarithm autotaxonomy, and a complete dictionary. Within 20 questions, it figures out exactly what you're thinking of, whether it be a loaf of bread, a cat, or the echidna, the only living relative of the platypus. That's pretty obscure, right? Okay, this toy can do this with you inside of just five minutes, and it has yes, no, maybe, sometimes, and unknown as answers. Simple, simple, simple. So I thought in my brain, what if we had CPOE for patients' computerized order entry? What if we had CDFs for patients? What if we had patients in the waiting room triaging, and they had this thing called "The Medical Q-Ball," and if we

can ask Kim to please stand up and come forward? Because guess what's seen on her vest? "The Medical Q-Ball." And guess what those questions floating around the air are? Those are every question that was not asked to my husband when he had kidney cancer. "Do you have blood in your urine? Do you have hypertension? Do you have bone pain?" Every single question that's on that "Q-Ball"; if he'd only been asked, we would have caught his kidney cancer before he died. See, so when we talk about these things, and triple checks and double checks, it is really important that we have these programs in place. But the most amazing double check you will ever run into is the patients themselves.

**Charles Denham:** So we have three aviation guys [who] all are very familiar with simulation, and this opportunity of simulating things that then can lead us to make good decisions without harming someone are really, really critical. Just share with us your thoughts. We only have so much time in the panel, but one of the things that we found – I think David Champion – this concept of CPOE Flight Simulator for a long time, and we've all been after it and supported it, and put it forward. It really is surprising that we don't have even patient simulators in terms of medications and that kind of thing, and that this is really the only outside sort of verification system, and yet, when I talked with guys in aviation, it's like an NTSB for healthcare. What do you mean we don't have it? You guys have more money than God in healthcare, and you don't have any of those things? So maybe, just share with the audience the experiences you guys have had to apply simulation. Maybe working with the Blue Angels and you all would simulate scenarios without even having any technology.

**David Champion:** Well, at the Blue Angels, obviously, they've all gone through the simulator training as part of their training for pilots. I'm not a pilot, I was the Flight Surgeon. But the core of our training was a lot of the briefing and debriefing constantly, and going through various scenarios when there's the opportunity to talk about it. In the medical world, the things like CPOE are critical for what we do now because the medical knowledge base has increased so much, nobody can keep up with it. I think with robust decisions for it, things like CPOE that are well thought-out, and well trained to us. A lot of programs have been rolled out with CPOE, and no investments and training the physicians and front-line workers, and CPOE systems. When those are well thought-out and well developed, it helps us tremendously [to] do things more efficiently, and much, much safer. There's not a single week that goes by that our CPOE system doesn't flag something that I didn't think of because I'm running around doing things, that it doesn't flag something and say, "Think twice about this," and I'd put "delete order" and move on.

**Charles Denham:** Do you all think it's … Jim, do you think it's reasonable that in the future, there might be a consumer CPOE system to cross-check what you had ordered for you?

**James Bagian:** Well, I think it's certainly possible. The big thing is, first, you have to have is what are your requirements? What are the standards? What are the guidelines? Because you can't build a simulator if you don't know what to expect the outcomes to be. You have to understand what are the input and the output, and sometimes we've lacked that. I think we're getting there. I think the reason you use simulators is do these things either happen to infrequently, to unpredictably, or they're hazardous to let happen in the real world. I think what we're talking about fits all those bills. We have to base it on good specifications or requirements. What are we trying to prevent is … to just point out, what questions should you ask? Why should we rely on memory? Memory is one of human beings' worst capabilities, and we shouldn't pride ourselves that we have a good memory. We use tools to help supplant the need for that. I think we're slowly in healthcare getting the points to realize that it's not a sign of weakness to have a checklist, or to refer to something. You should look it up, because therapies change. What we know from medical science changes, and I think many people try to think back to when they were interns some twenty or thirty years ago; you prided yourself on remembering things. Really, that's not really a badge of courage, that's stupidity in this day.

**Charles Denham:** Sully?

**Sully Sullenberger:** I think in terms of adopting new technology in aviation, there are several critical things to remember. Again, the end user needs to be involved in the development of the system from the outset. There needs to be an absolute minimum of false alarms. There needs to be not so much additional work load or complexity that there's reluctance to use it. It needs to be thought of as a part of

the team, as a tool that will help you. And I want to echo about the sentiment about the critical importance in training of effective briefing and debriefing. I recently had the amazing opportunity to just spend some time to work in one of the Harvard teaching hospitals and observed some recurrent training – the running of the code. The briefer, the facilitator, was so adept at setting the stage, briefing and then debriefing the event, allowing the team with their consent to view themselves on videotape and then erasing it, and then doing a scenario again. It was critically important that I can't emphasize how important the briefing and the debriefing are to effective use of medical simulation.

**Charles Denham:** I want to come back to David, and I think you probably have a comment, and then we're close on time. But the magnitude of medication error and harm and waste is still staggering. We all talk about how much better we are doing, but just give the audience that are not as familiar with how big a challenge … I mean, we still have a big challenge, and that's why these solutions and all these things we're working with consumers, as well as … compliant rate adherence is only fifty percent. Still, people only take medicines fifty percent of the time the way they were prescribed. So with this whole area of medication management, it's still a daunting problem, isn't it?

**David Bates:** It's still a huge issue: around ten in a hundred patients are harmed by medications when they are admitted to a hospital. But we now have an array of solutions which are pretty potent. We have computer order entry; bar-coding has been shown to work; we have smart pumps; we're getting other new technologies that are going to be helpful. I think as Farzad said earlier, "It's not if, it's how," and a tool like this tool really does work. If, as Leah described, if hospitals are to do something like this, and we're also building an outpatient version of this, it's possible to get iteratively better. I think it will make a big difference.

**David Classen:** And I would just echo what David said, that one of the things we emphasized in the report was the sociotechnical system and thinking that way. I've been involved in a couple of accident investigations where the system didn't warn the doctor this was a critical drug-drug interaction, and people weren't concerned about that because they were sure the pharmacist or the nurse would pick it up. It went right through the pharmacist and the nurse, because what people didn't realize is when you put these complex systems in, you change the milieu, not just for the doctor who does computerized order entry; you change the job description unknowingly for the pharmacist and the nurse. And what we found out in a couple of those accident investigations was that the pharmacist let the order he wouldn't have let pass before – because he thought the physician had seen the warning, acknowledged it, and overrode it, and they hadn't. And so if you think of the sociotechnical system when you automate things, you can change the safety net in ways that you never expected.

**Charles Denham:** I think this brings us back to the morning talking about an NTSB-like organization – not that there aren't great organizations like ISMP, and others around; but the issue that we're talking about is broadly across everything: top, bottom, across. Sully, I think you're seeing from us as somebody who is now advising us – and Sully now does advising to hospitals and organizations in safety and quality – that we have a long way to go. But it's the same journey we had in aviation. The more we hear the stories, the more we start looking back to the innovations we had in aviation, and it would be great if we didn't have to relearn those. Thank you very much for a great panel. Thank you.