The Science of Patient Safety

**Plexus Institute** hosts the **Health Quality Network**, a Learning Network of people who want to explore new ideas, approaches and methodologies to address quality issues in service delivery, and improve the experience of patients and their families. Anyone with an interest is invited to participate in monthly calls and discussion.

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The following is the transcript of a call held February 29, 2012. It was facilitated by Plexus Associate, Joelle Everett, featuring a conversation about the Science of Patient Safety with Dr. Peter Pronovost and Dr. Jeff Cohn.

**Joelle Everett (Joelle):** I'm very happy this morning to welcome lots of callers from around the country and particularly our guest callers today. We have two distinguished physicians, Dr. Peter Pronovost and Dr. Jeff Cohn.

**Peter J. Pronovost**, MD, PhD, FCCM, is a practicing anesthesiologist and critical care physician and a professor in the departments of Anesthesiology & Critical Care Medicine, Surgery and Health Policy and Management who is dedicated to finding ways to make hospitals and health care safer for patients. He is Senior Vice President for Patient Safety and Quality and Director of the Armstrong Institute for Patient Safety and Quality, Johns Hopkins Medicine.

He has developed a scientifically proven method for reducing the deadly infections associated with central line catheters. His simple but effective checklist protocol virtually eliminated these infections saving 1,500 lives and $100 million annually across the State of Michigan. The checklist protocol is now being implemented across the United States, state by state, and helped reduce these infections by 60%. Several other countries are also implementing the program.

Peter has chronicled his work helping improve patient safety in his new book, **Safe Patients, Smart Hospitals: How One Doctor’s Checklist Can Help Us Change Health Care from the Inside Out**. In addition, he has also published more than 400 articles related to patient safety and the measurement and evaluation of safety efforts. He serves in an advisory capacity to the World Health Organizations’ World Alliance for Patient Safety.

The winner of several national awards, including the 2004 John Eisenberg Patient Safety Research Award and a coveted MacArthur Fellowship in 2008, known popularly as the “genius grant.” Peter was named by *Time* magazine as one of the world’s 100 “most influential people” in the world for his work in patient safety.

Peter regularly addresses Congress on the importance of patient safety, prompting a report by the U.S. House of Representatives’ Committee on Oversight and Government Reform strongly endorsing Peter’s ICU infection prevention program.
Jeffrey Cohn, MD, MHCM, is the Chief Quality Officer and Patient Safety Officer for the Albert Einstein Healthcare Network in Philadelphia, PA. He was the Principal Investigator at Einstein in the RWJF-sponsored Positive Deviance and Prevention of MRSA Transmission initiative. Jeff is now the executive sponsor of Einstein’s organization-wide CUSP implementation initiative. He serves as the Board of Trustees Chair of Plexus Institute.

Jeff graduated from Jefferson Medical College in 1980. He received his Internal Medicine training at Albert Einstein Medical Center from 1980-1983. He was a fellow in Hematology/Medical Oncology at Emory University from 1983-1985 and did an Oncology research fellowship at Johns Hopkins from 1985-1986. Dr. Cohn served as the Community Co-Chair on the Lymphoma Steering Committee of the Eastern Cooperative Oncology Group from 1991-2002. He received a Masters in Healthcare Management from the Harvard School of Public Health in 2005.

Jeff Cohn (Jeff): And Joelle, just to add, I think my daughter has nominated me as one of the most influential members of my family. So, you know, it doesn't quite jive with Peter's recognition, but it's up there.

Peter Pronovost (Peter): Much more important.

Joelle: Harder to come by, too – I know that what we're calling the science of safety is a relatively new field of inquiry and I'm really curious, Peter and Jeff, what it was that led you down that trail.

Peter: Well, for me the effort into this began pretty ignobly. My father died of a misdiagnosis at the young age of 50. I was a fourth-year medical student at the time and became convinced that patients deserve better. Then I started training and got my PhD in outcomes research. I had to look Cyrell [sp?] King, the mother of Josie King, in the eye after Josie died at my hospital from a catheter infection. She asked me if I could tell her that care was any better; that care was safer, and she didn't want to hear the 1,000 things that we were doing. I probably seemed like I was playing whack-a-mole. She wanted evidence. And I couldn't give it to her. At the time our infection rates were sky high and I was one of those doctors hurting people from infections, and I, like I think most doctors and nurses, certainly didn't want to, but I was. I didn't know any better. I hadn't really applied the science of safety. So we started applying this science.

I don't know if any of you read the, New York Times piece on Sunday about the magic behind Bell Labs - how it had interdisciplinary researchers. In many senses that is what I think the safety science is. We draw upon sociologists and anthropologists because so much is driven by social norms and what we accept as inevitable harm. We draw from human factors and systems engineers, from clinicians and health services researchers, from patients and families, from biostatisticians and informaticians, and so it's a rich, diverse science, and I think together we're much more likely to get significant improvement than we will alone. And Jeff, I know you've been working a lot on safety and CUSP (Comprehensive Unit-Based Safety Program) and doing amazing work with Plexus Institute using Positive Deviance, among other things. I suspect you have your own views of what the science of safety is.
Jeff: Yeah. I've been pursuing what for the first five, six years of my career in performance improvement and patient safety was a relatively traditional pathway using good, solid tools like, Institute for Healthcare Improvement (IHI) methodologies. Then we became a participant in the Plexus Institute’s Robert Wood Johnson sponsored initiative to use a methodology called “positive deviance” along with other innovative approaches to reduce MRSA (Methicillin-resistant Staphylococcus aureus). We used a bunch of different approaches to try to create an environment where innovation and change can occur. That has been an amazing project for us with results that I think are pretty spectacular: 70-plus percent sustainable reduction in hospital-acquired MRSA infections. And so we're very proud of the work. But it’s work that to date has not really been published. When I try to think of a way to publish the story, to capture what really happened here, it’s hard to do. I don't believe we really built a strong methodology for capturing that in to the design of the work that we did. And so I think that really opened my eyes to the challenges that we face in the world of performance improvement and patient safety. How do we really learn enough such that we can transfer that knowledge out into the world, we can share the story in a meaningful way?

Peter: Yep. Jeff, this work has been so hard to get published for a variety of reasons. I think what the field often needs to know is both whether something worked and why. And my experience is if you focus on either one of those alone, it's not likely to be very impactful, right? So you can publish a very dry paper about WHAT the results were, but no one'll be able to replicate it. On the other hand if you don't have any data and you just tell people the story of what you did and why you think it worked, but there's no real method, that isn’t adequate either. In other words, these projects always need what I might call an adaptive, that is a culture change piece, AND a technical piece.

It’s interesting that we started the work to reduce catheter-associated infections at Hopkins and then put it in Michigan and then we spread it state by state across the whole US. Literally, these catheter infections are down by 60 percent and ICU catheter infections, particularly, are down by 60 percent across the US. It’s the only infection that has moved nationally, and we've put them in all of Spain and England with between 50 and 60 percent reduction in both countries. And the lay press picked up this notion that it's this somehow magical checklist, like it's Harry Potter's wand. And I think that way oversimplifies it because for these projects I see that there are really three legs of the stool. There's the measurement of infections that I think is an important piece both for accountability and learning. There's the checklist of evidence-based practices and surfacing the barriers to them. But there's then the perhaps most powerful piece, this culture change piece, that really centers around social norms of clinicians. A switch goes off that these infections are no longer acceptable - that they're largely preventable, and I could do something about it. And, I think that last piece is what is so bedeviling because there's too many other types of harm that we haven't made move yet. We still say our patients are sick or they have big operations and to some extent we don't know to what degree harm is preventable. And so we're opting on the side that most of it isn't. I think we would serve patients and society much better if we opted on the side that most of it is preventable and let's see how low we could go.

My own journey in this was really aided by our collaboration with some sociologists, Charles Bosk at the University of Pennsylvania and Mary Dixon Woods. We published in the Milbank Quarterly in June about why did this Michigan project work when so many others didn't? And
their insights through interviews and stories are really powerful because uniformly it was the change in the social norms, with appropriate use of valid data, but that there wasn't anything particularly magic about a checklist. Yes, you have to specify what work needs to be done, but I think that in the absence of this cultural change is not likely to be very enduring.

Jeff: So as we delve into this work, I have a question. Early in the article, you and your co-authors talked about research in patient safety. I know at least in my institution we got a bunch a people who have joined us on the phone today who are, in their day-to-day job, in the performance improvement coach, coordinator, facilitator role. And so for people who maybe don't think of themselves as researchers, but where their reason to be in their career is to try and support positive change in their organizations, how does that align with what you define as a researcher in patient safety?

Peter: That’s a great point. When I look around at people who do this as a career, and I mentor people, there's a continuum of people who are what I call researchers. That is, they typically put a lens on what gets implemented, but they aren't really in the mess. And then there's the kind of pure administrative or the pure implementation type hat does very little evaluation and really sees themselves as just getting the work done. And, and then there's the spectrum of people who fall somewhere in between; that they try to evaluate and implement and it's messy stuff. What we've been trying to do at Hopkins and the whole point of my institute is to merge those two worlds - to bring the researchers to perhaps be a little more applied and get into our health system, and for the administrators to be more rigorous, to up our game, to make sure that, at the end of the day, we could say with confidence whether things are safer or not. And again, it may sound trite, but that little girl's mother who asked me if her child was likely to die haunts me every day because I think she deserves an answer.

So many in the quality improvement field have been driven by this mantra that I think was really misguided, to say the data are for quality and not for research. Because if you unpack that statement, what it's saying is, “Please give me a license to make biased inferences.” Because the data don't know what they're being used for. And that doesn't mean you're going to collect 1,000 variables, but it does mean if you're going to say MRSA is lower, you need to have some confidence about how sure you are in that inference. Or if you're going to say you reduced catheter infections, you're going to need to make a way to measure those infections or if we can't measure that we're going to be transparent about saying we just didn't have the resources to do this. I try to find that sweet spot between those two extremes. There are such different cultures. It's a different world I navigate, because my researcher colleagues can't handle the mess. I mean, they literally go berserk when I start telling them that every hospital in Michigan has a different checklist, right? There's variation in how you implement interventions and I tell 'em well, if you standardize it, you will kill it. It won't work. You gotta let it go. And, on the other hand, to work with our operations people you say there's value in measuring and knowing if things worked or not so we can learn.

I kinda think that I'm moving away from researcher and operations person to what I might call a learner - that we’re trying to link those two worlds into this concept of what it means to be a learning healthcare system. Some of you may be aware of the IRB [Institutional Review Board] challenges with spreading our Michigan project. Even something as basic or as foundational as
one of the things we're working on is a moral framework for being a learning healthcare system, because even so much of the ethics of quality improvement and research was again in this belief that we could draw a very clean box around research and put it over here on the side, and circumscribe it from daily practice, and that's research and that's where we look at risks, but in the reality, research has been intertwined with practice and now not only that it needs to be if we're going to be learning. How are we going to, you know, evaluate these EHR systems or the national protocols or all these things that we have going, and have a moral obligation to know whether they're actually improving things and they're good stewards of resources, so we have to start thinking about what are the protections or what are the, the moral obligations to make sure that we actually have a learning health system, and don't put up barriers to learning while at the same time being very cognizant about the, uh, historical abuses of, uh, patients that occurred in research when they weren't protected. So this is an exciting area, and you know, we're finding our way like I suspect many healthcare systems are.

Jeff: So, that “finding our way” sentiment is a good segue to the next question I had. Plexus is doing a weekly book club discussion of a book by Michael Quinn Patton about developmental evaluation - applying complexity concepts to innovation. The basic premise of this book is that there are certain types of challenges that exist in organizations and communities for which, at least going into the challenges, there's not already knowledge in the world about how to solve these challenges or even maybe even how to begin. We would call this the zone of complexity.

And so it's all going to be about learning and then evolving the model as you go on to match the data that's starting to come in. So, I think that a lot of the challenges that we face in healthcare are those kind of challenges and there's nothing that we can really hang our hat on that's got solid enough evidence to say that we can create something on the technical side that's a practice that should be implemented broadly.

Peter: I think you're absolutely right that that is most of what we have in healthcare. I mean, there are certain things like DVT (Deep Vein Thrombosis) and some infections where there are clear practices. Most of the time we're not that certain but for me that highlights the importance of what I would call theory informed interventions or evaluations. Because even though we may not have RCT-level data (Randomized Control Trial), we have hunches or pathophysiologic reasoning or organizational theory or complexity theory about what might be the pathway for doing something and the impact that it may have. And those theories often guide and should guide both the intervention and the evaluation so that while you may not have an outcome measure all along, or an ultimate outcome measure, we COULD measure along our theory of change. We could see, okay, I am working on this and these are the things that I would expect. Then, importantly, after you do what I call mess it up, you reflect and you refine your theories, and revise your intervention. Because, there's 1,000 moving parts in this, so you're never going to tease out the individual components and I believe you're going to rely on a lot on theory.

I'll give you a couple examples, Jeff, that I think illustrate some of these concepts. In some of our work on infections, the scientific community really strongly criticized us because we didn't do a randomized design and we had this multi-faceted intervention. How do we know which component was important? We had CUSP and we had a five-item checklist. My response was that we originally were planning a randomized design. But nobody in Michigan wanted to get...
randomized to the control so my option was either don't do it or accept what the community wants - which is that they all want to do it - and just do a time series. I thought the moral obligation was to do the time series. And regarding how many components the intervention should be, my response to them was that, unless a component was risky or costly, I don't really care if it alone was really important. All this composite was based on good theory of change and in our belief that culture's important. Evidence-based practice is kind of combined together and if I were to study them individually, we'd still be going on in Michigan and, and, as you know, each year these infections kill as many people as breast cancer and to me that was an unacceptable cost of trying to tease out individual components. In other words, that value of information was way too expensive to be worth it.

But we often don't do good theory-informed evaluations. I'll give you an example, and you may be seeing this at your place, Jeff. You know, we're putting in Epic (healthcare informatics) across our health system like so many healthcare systems are. Our CFOs are trying to pay for it and so we did an exercise about how much money using an electronic health record is going to save us and we've been talkin' about this for a while. I got in front of the group and I said, could somebody write down what their theory of change is? I mean, help me understand how on EARTH do you think putting in this EHR (Electronic Health Record) system at the end of the day is either going to save lives or save dollars because there's a whole lot of distance between A and B that I'm not sure we're clear about. And that kind of theory-informed thinking hasn't really occurred in healthcare. Now we all had projections, but can you really unpack it and say okay, well, it might do it because we may reduce over utilization and here's the theory of change related to how that might happen? And so I think you're absolutely right. There's a lot of things that we're not going to have a lot of a priori empiric evidence about, but I think we COULD have theories and hunches.

Jeff: Right. My thinking is very much aligned with what you're describing. And in our MRSA work, we took the same sort of approach as you described in the CUSP and Michigan work to say, we can't discard any idea that comes up from the folks that are in the work on the front lines as long as it is within the boundaries of science and doesn't seem to pose a real risk to people because we can't tell a priori what is going to be the solution, and what’s not likely to be a solution. But if at the end of the day the way you connect people and have them working on something makes them all feel is important, it winds up getting you to where you want to go. That's what you're trying to accomplish.

Peter: Absolutely. I think having a theory to guide you really facilitates learning because, in the absence of theory, at the end of the day it's hard to develop generalizable knowledge because you're gonna say okay, well, things got better, but I don't know what happened, right? And that I think would put challenges in the way of spreading it across your health system or outside of your system, having at least some way of linking these moving parts.

I'll give you an example, Jeff. As you know, I think these local unit-based CUSP teams are really magical. I wouldn't think of doing a quality improvement project to prevent any type of harm without coupling with it a CUSP team. Now do I have good evidence for that? Well, you know, not really except that we think local culture and input from the local clinicians is really, really important as the Plexus Institute has been screaming for years. I would say if you don’t get that
input you're wasting your time. It won't stick, it won't sustain, it won't be wise, and so, you know, I think you're absolutely right. We are just finding our way a lot of times in this work.

Jeff: Yeah. And I guess what will be a challenge for some that are within healthcare and consider themselves researchers, is to recognize that there are lots of things that qualify as theories that may make some people uncomfortable just because it's not very familiar to them. Like, if we have a theory of change that's based on relationships and social networks, that's not something that we in healthcare are very familiar with. And yet, you know that, for certain types of complex problems this may be just as valid a theory as something more traditional.

Peter: Or more valid.

Jeff: Yeah.

Peter: I think this Michigan work was all about social norms. You know, you're absolutely right and that's been part of the frustration that I've had with academic medicine. It's not just in the US; it's around the world that they have a very myopic view of what science is. Science is finding genes and finding drugs. I mean, essentially we have an enormous amount of basic science and some clinical research science, but the social sciences are so underrepresented that they don't even know the language. And, it's really viewed as second-class science. I mean, again, I say this with all humility. I mean, so much of our journey at Hopkins was to try to get what I call the safety science as respected as “legitimate” science. And it's been hard. We now have promotion criteria for people who do improvement work that you can document to a portfolio of work even if it doesn't get published. We had some visitors from the Middle East who were thinking of collaborating and they wanted to know what IS research at Johns Hopkins? And one of the leaders who was talking about research, specifically said and we want to meet this Pronovost guy who's doing safety research. And so they had this slide that said basic research with a box around it, an arrow, and clinical research, and that was IT on the slide. And then a separate slide with my picture on it. You know, I chuckled and I said, don't you think your conceptual model of research needs another slide that might say health? You know, another arrow with a box that says health delivery research and then a final box that says health, which is what we're trying, trying to do in this? And they could not conceptualize that what I did was research. They thought it was important and it wasn't that they were dismissing it, but it didn't fit their mental model of research is these first two boxes. And, in part, that's NIH's (National Institute of Health’s view of research. Separating AHRQ (Agency for Healthcare Research and Quality) from NIH was a real strategic challenge because it separates what is considered research and what’s not.

And so, Jeff, you're absolutely right. So much of it is social sciences and theories. I'll give you this example that I often say which is that healthcare is unique among the high-risk industries - that is, industries that have the potential to kill their customers - in that they kill the most customers and use lawyers rather than experts in safety to investigate the failures.

I think, how could that happen? Uh, because we haven't viewed human factors as a science in healthcare yet. You know, we have risk management, who are mostly lawyers, maybe some
nurses investigate, but very few, if any, have any kind of formal training. And I think to make progress we're going to have to start embracing much more of the social sciences.

**Jeff:** Joelle, what do you think about using this as a time to open this up to others on the call?

**Joelle:** I think that would be great. I know we've got lots of good people who probably have good questions. Who has questions that they would like to ask of Peter and Jeff?

**Kristin:** Hi. This is Kristin. I have a question for Peter and Jeff. I'm curious what you think are the skills that are needed in healthcare to embrace this multidisciplinary approach of combining the sciences? I just share with you that I come at this as a person who works in the field of leadership development and has done a lot of work in the areas of collaboration. I’ve found in my work in healthcare institutions working with leaders, both clinical leaders as well as administrators, that from my standpoint there seems to be a real lack of knowledge around theories of change and how change happens. But if you were to pinpoint skills, like a wish list of skills that you think if people had these skills at the top that they would enable the kind of work that's needed throughout the organization, what would you say is important?

**Peter:** Yeah, I could take a stab at that in part because we're in the throes of this right now. I'll take a step back. The model, and I think Plexus will like this that we're using to create what I'm calling a quality management infrastructure is really based on this concept of a fractal. You know, a geometric shape where it’s all part of a whole, but it has units of the exact same shape. And so we're building quality infrastructure in units with our CUSP teams and departments at a hospital and a health system level and articulating those skills. At the unit level, we've just finalized a certificate. It's a certificate that has both what I would call technical and adaptive skills, so some influencing and leading change skills as well as technical skills of finding hazards. The unit level leaders have a component of LEAN (six sigma), a component of human factors, a component of implementation science, teamwork, and then leading change and it's about 40 hours. Our department level adds to that more skills of evaluation. What we've found is that it's really hard to teach evaluation short of, frankly, getting some kind of public health degree to really understand. It also has much more of the influencing and leading change skills because so many people graduate from medical school and nursing school thinking leadership is “I tell you what to do.” And then at senior leaders level, as you said, there's a huge need for much more skills in understanding theories of change, of influence, of leadership. In my travels around the country, there are very few CEOs with an understanding about their roles in this and how they drive change and, importantly, create accountability within their organizations.

I just had this piece in *Academic Medicine* where I had written about the need to train clinicians in leadership and influencing skills. There was a rebuttal saying well, yes, we have those clinicians who we identify as leaders early on who are getting pulled off into a separate class. And I said, I think we're missin' the boat. Every physician will need these skills as a core competency. They need skills about how to work as a team, how to influence a group, and I don't think we're producing people with those kinds of skills and so I think there's a lot of work to be done in this area.
Jeff: The, the only thing I would add to the list that Peter put out there is that I think it's really critical for people in leadership roles to have the ability to embrace complexity or embrace the situations where you have to say, We don't know and we're going to have to try different approaches. Plexus Institute utilizes a number of what we call liberating structures and, I think when people in leadership positions know this is not a time for us to use a protocol or a policy, but rather to explore together and learn together, that’s a critical skill in driving organizational change.

Peter: Yeah, Jeff. That's, a really critical role because if I were to say, how would you characterize hospitals' efforts in the last decade for safety and quality - and there have been tremendous efforts - although the empiric evidence says they haven't made much difference, it's largely I think because we believe safety lives at the level of a policy or practice. So very well intentioned people write policies that are often unwise or often unknown by the local people and are almost never implemented. One of the beauties of this CUSP team where we partner an executive with frontline staff is to hope they get a better ground of truth; that they really understand deeper what the barriers are. They find that people do care, but they're working in this very complex system, and as you said, not everything lends itself to a simple checklist; that there's going to have to be iterative learning and then be comfortable with that. It's a great question.

Keith McCandless: Hi. I have a question. So there's a project in Canada that's a super bug project and we're at a point where we've been trying to meld quality improvement science, which is a combination of a whole variety of things, but, in the Canadian version is heavily influenced by liberating structures and positive deviance. It's very difficult in part because the quality improvement safety professionals almost everywhere, Peter, are more along the lines of your researchers, who are a little distant from the unit, really don't like the messiness, and so don't know how to approach a unit. And I think the challenge I feel all the time is, and the way I kind of got into this in part guided by Monique Sternin and other people, was walking onto a unit with a coach and it was a very direct way of introducing people to what the work is and what skills you need and, so I still haven't found a good replacement for that. We're doing these big national projects with all these hospitals all over the country, and we're trying to do it over the Internet with WebEx and extract the leadership skills and the methods and then tell them what it is. And so I'm wondering how much success you've had with helping people who really learned a different way of, of doing safety and quality improvement work to make that switch?

Peter: Yeah, so, yeah. Great question and I work with a lot of your colleagues and you're absolutely right. And it was my training in clinical outcomes research, so what we know is clinical investigation, right? So kind of at a distance, evaluation is quantitative, very little qualitative. A couple of thoughts. I think you're absolutely right. Canada has a really rich tradition in evidence-based medicine and that lens, I'm sure, frames the work. So one way we've got clinicians comfortable with the messiness is in these large national projects is by helping them realize that this choice between whether it's top down and all standardized, or bottom up and all local, is really a false choice; What we say is, and I don't know that this is right, but our approach is we standardize the measurement, at least the, the empirical, quantitative measures that we have, if there are any. We make widely known the science or evidence-based practices, if again, there is science. But then we strongly encourage local innovation and variation in
identifying their local barriers to implementing the evidence and to implementing how do they make sure that they change their system so that patients actually receive these evidence-based practices.

And, you know, many of the researchers, they can't deal with that mess, right? They say, Peter, you have to standardize this intervention. And the way we, at least how I've, wooed some to our side is using their own language. To say that most of these things have really benefitted from qualitative research as well as quantitative - by going to interview clinicians or do observations and find out what the barriers are, and if the barriers vary. Almost certainly the interventions to overcome those barriers are going to have to be local. Now that doesn't mean the evidence-based practices are going to change. I mean, if there ARE evidence-based practices then they are informed by the literature if you're doing more of an implementation science or a knowledge transfer program or a knowledge translation program. But there's going to have to be huge variation and I pull the researchers along by saying that our task isn't to only understand whether something works, but also WHY. Right? And that WHY is almost always in a story of understanding the local context and norms. So there has to be a focus on that and we've been successful in getting the more quantitative people who I think are approaching it in the same model to realize that there's a value in these mixed-method approaches and they're much more likely to be effective when they're informed by local wisdom.

One last point is that I think healthcare has to shift its mental models, and it's been really hard for them. Most physicians and most researchers are trained in what I would call a feed forward research system. That is going from basic to clinical to health services to outcomes. And we all want to tease out what the independent effect of A versus B is on this outcome. And I think that mindset is in part why we haven't had a lot of progress in safety. What we were trying to do in OUR work is flip that to a feedback system, and we said our goal is to get these infections down as quickly and as rapidly as possible. And I'm going to give up knowing which lever drives that. I'm going to pull as many levers as I can, based on theory about leadership. I’m going to get buy-in as needed so I'm going to engage the executives, and social pressure is important so I'm going to publicly report these infections. Local culture's important so I'm going to do CUSP. And I'm not going to know which of those levers really did it, but they're all based on some sound theory and they will allow me to drive these infections down. Now, not every researcher sees that. I mean, they still say, no, Peter, I still need to know if is the public reporting piece or is it the pay-for-performance piece that really did this, or the leadership piece. Much like you were all saying, I said, you know, this is too complicated. I can't, I'm not gonna be able to tease that out. But I have enough theory to know that leadership engagement is really important so I'm going to do things to pull that lever. Why would I ever leave that off the table if my goal is really to get harm down? So that is a hard switch but I think researchers are really motivated by having their work have an impact and so when they can see that the potential to really save lives or, or reduce patient suffering they tend to become much more engaged.

Sharon Benjamin: Hi. This is Sharon. In working in healthcare around healthcare institution-acquired infections between hospitals and long-term care, one of the things that we're seeing are the enormous gaps between what's happening in the hospital and what's happening in the related institutions. The unit of analysis seems to me to be the patient because the patient, they're,
frequent fliers, they're moving back and forth between institutions, so what, Peter, do you and Jeff think about CUSP applied across institutions?

**Peter:** Yeah, I'll be brief and then I know Jeff's been doing this. He’s done a lot of work using the theory of complexity around how the notion of creating unit-based teams or, even organizational teams, is that once you have this building block of an infrastructure, you can connect them in whatever ways meet your need. So this matrix of connecting them in a variety of different ways; it may be along a product line, like cardiovascular services. It may be, as you said, about rehab and inpatient. And so I think you’re spot on about the potential to link these in any ways that need them. What I see as the benefit is that so many times if you do these interventions you bring senior leaders together who don't have that ground truth or there's no infrastructure locally of the people who actually do the work and it often dies on the vine or it stays at a policy level. Whereas, you need the leadership support, but the people who are convened are the people who are actually on the front line, both delivering care in the homecare setting and in the hospital setting. Have them connect and work together. So I think this is almost like Legos. Having these CUSP teams allows you to link them organically in any way that is addressing a need of a patient.

**Jeff:** Yeah, I'm thinking something similar. I remember a number of years ago we implemented a number of projects, which, in retrospect, were very much like CUSP. We called it clinical microsystems at the time. Dartmouth was talking about this model and one of the things that the theory of the clinical microsystems stated was that the first step is for the unit itself to become more self-aware of the processes that it owns and become a high-performing microsystem on its own. And then it can start to interact with other microsystems in its own organization or other very similar microsystems across organizations; one Emergency Department to another ED, you know, one cardiac cath suite to another, and then eventually disparate microsystems across institutional boundaries will be self-evolved enough to be able to speak the same language. So, you know, when I think about the unit characteristics of a skilled nursing facility versus, the various units in an acute care hospital, there are things in common, but a lot of things that are different and so I think it won't happen automatically from the beginning. People are going to have to become much more self-aware of what they themselves and others are dealing with at a unit level before we can get 'em together to be productive. That's just my bias.

**Henri Lipmanowicz:** This is Henri. You were talking, Peter, about the necessity for changes in social norms on several occasions, so I was wondering whether you could tell us some stories about some of the things that were directly aimed at influencing social norms.

**Peter:** Yeah, so great point, and I think that it's probably best summarized in that Milbank article. There's a June issue of the Milbank Quarterly if you can get it, but I'll share with you some insights. When we would bring these teams together from states, I could literally watch the evolution go on and my team laughed because the meetings are kind of part religious revivals and part science. Healthcare has so disempowered our frontline staff from giving them any authority to make change or any resources to frankly do anything. First I thought it was just a Hopkins phenomenon, but I see it all over the place. They just don't think they have the authority to do anything. They're like this cog in the wheel and they care deeply, and as we go through our day together, we spend a lot of time talking about how the main barrier to them reducing...
infections is whether or not they truly believe they can do it. And, and if they do, they're smart enough to figure out the checklist. There's no magic in that and they'll sort it out. But if they keep listening to that voice that we all have - that self-doubt of who am I to think I could really change - the doctors in my hospital or infection rates in my hospital, won’t change. So that's kind of one - this belief systems about their own empowerment.

The second is really generating local leadership. So from the beginning, we say okay, here's a way to measure. It's not really our way, it's the CDC way, and here's what we know about the evidence. But that's not enough. These programs will fail without your local leadership driving, finding the barriers, putting a team together, figuring out locally so you really have to own it. So in other words, there was this perception that the interventions were done with the clinicians rather than over the clinicians, right? And the biggest death knoll for these efforts is coming in and saying, “We know how to solve your problem and here's the Johns Hopkins checklist, go use it.” I mean, it would fail miserably ... Right? We say we're struggling with you. We don't really know how to do this, but we have confidence in you, that you can figure it out in your local environment. We give them tools to go find barriers to infections. We encourage them to address both the head and the heart; that is, we ask them to show their current infection rates. If they have compliance with practices, to show those, but at the same time to tell stories of people who are harmed. We tell stories of other hospitals that made tremendous progress who are just like them. We use a mixture of what I want to call hard and soft edges.

So there's a lot of the camaraderie and teamwork, but there are times when there need to be some harder edges. But there’s a risk. As you probably know, most quality improvement programs have relatively poor data quality. I mean, indeed, you know, there's some studies that would say they average about 60 to 80 percent missing data and, and it's really hard to make an inference that things are better if you have that much missing data. I mean, there's just frankly nothing you could do about it except you have to say you have a lot of missing data. In our first two months in Michigan, our first month we had like 65 percent missing data and part of the condition of working together was they would commit to do data. So we got together with the CEO of the state hospital association and sent every hospital CEO a memo and then we did a call with them and said if you wanna stay in this program, you have to have less than 10 percent missing data and if you don't do that you're out of the program. And that was really risky because at the time, you know, many of them were involved with IHI and no one talked about data quality and it was whatever they do, they get and, and, and so. There was enormous risk with requiring that, but I said, if at the end of the day you're going to tell your citizens that care is safer, you need to have infection rates. You can't do it with this much missing data or you're wasting everybody's time. So either be accountable for the citizens in your own hospital or you can go do your own thing, But don’t be a drain on this community. And amazingly, nobody dropped out and we ended up with 5 percent missing data, which is really remarkable for a voluntary data collection effort across 103 intensive care units.

Using or knowing when to use a little bit harder edges and using data in a way that is learning. Data has to be used judiciously and the clinicians have to believe it's valid. These are all strategies that we use to change the social norms. But, as I mentioned, the deepest one was that belief system of the clinicians that this was their problem and they could do something about it. So a lot of it was kind of the revival or inspirational strategy. To say, you know, yes, you are
empowered, you can do something about it. Because too often people just felt so disempowered in healthcare.

**Joelle:** I'm sure that we've only just touched the surface on the questions that everyone is carrying. And if there's something that you'd like more discussion on, I would invite you to go to plexusinstitute.org. Follow the links to get to the health quality forum. If you haven't explored the web site before, you will need to sign in very quickly. And post your questions in the health quality forum and get some conversation with some of these other good people on the line. Next month's call will be on the 21st of March and we will have a couple of guests from a very effective support program for cancer patients that's going on in Washington State. So, stay tuned. Jeff and Peter, thank you so much for coming today. And I wonder if each of you would like to just have one last word.

**Peter:** Mine would just be one of thanks for having me and thanks for all your great work. I learn a ton from the Plexus Institute and I think your method and approaches are spot on and hopefully will be more widely embraced in healthcare, so keep up the great work.

**Jeff:** And, I’m just so grateful for Peter, for you joining us and I look forward to potentially finding ways that Plexus and, the Armstrong Institute might be able to explore these complex adaptive spaces together.

**Peter:** Yeah, so maybe we should set up a call about that because I think you're right. There's a lot of opportunity.

**Jeff:** Great. Will do.