

***Vital Signs Town Hall Teleconference***  
**How Three States Tackled Sepsis**  
**August 30, 2016**  
**2:00 pm ET**

Coordinator: Welcome everyone and thank you for standing by. At this time all participants will be on listen-only until the question and answer session of today's conference at which time you may press Star 1 to ask a question.

Today's conference is being recorded, if you have any objections you may disconnect at this time and I'd like to turn the meeting over to your host, Mr. Matthew Penn, sir you may begin.

Matthew Penn: Thank you so much. Good afternoon everyone, my name is Matthew Penn and I am the director of the public health law program within CDC's Office for State, Tribal, Local and Territorial Support and I'm so glad you could join us today. We're going to be discussing the latest vital signs report on How Three States Tackled Sepsis. But before we get started, let's go over some housekeeping details. First off, you can go online and download today's PowerPoint presentation so you can follow along with the presenters.

The Web site address is [www.CDC.gov/stltpublichealth](http://www.CDC.gov/stltpublichealth) for the Vital Signs Town Hall Teleconference's link or you can Google CDC Vital Signs Town Hall and click on the top link, that should get you there. You can also access the bios for today's presenters on the same Web page as well as the audio recording and the transcript which will be available next week.

There will be some time for questions after today's presentations but you can get in the queue at any time to ask a question just by pressing Star 1 on your

phone and say your name when prompted. Now back to our topic for today: How Three States Tackled Sepsis.

We're going to hear from four colleagues today; first we will hear from Dr. Anthony Fiore, Chief of the Epidemiology Research and Innovations Branch in the Division of Healthcare Quality Promotion in CDC's National Center for Emerging and Zoonotic Infectious Diseases. He will talk about the findings in this month's Vital Signs report.

Then Dr. Jim O'Brien will present. He is the Vice President of Quality and Patient Safety at Riverside Methodist Hospital, a part of the OhioHealth System. He will discuss the Ohio Hospital Associations statewide sepsis initiative.

He will then hand the call over to Dr. Marcus Friedrich, Medical Director of the Office of Quality and Patient Safety at New York State Health Department. He will discuss the development and implementation in New York States Sepsis Initiative.

Finally we will hear from Kelly Court, Chief Quality Officer at the Wisconsin Hospital Association and she will talk about the Wisconsin Hospital Sepsis Mortality Improvement Initiative. And without further ado, I will turn the call over to Dr. Fiore.

Anthony Fiore: Hello everyone and thank you very much for giving us an opportunity to talk about this very important topic. I'll be very brief because the stars of the show are the three representatives of three states where we can learn more about how the initiatives that they've done that have helped them tackle sepsis. So I'm moving to Slide, let's see, it would be Slide 5 now and titled: What is Sepsis?

And, in brief, sepsis is a complication that's caused by the body's overwhelming and sometimes life threatening response to an infection. And what this does is it leads to organ failure, tissue damage and ultimately can lead to death especially if not treated quickly. So sepsis is a medical emergency and we think of it really as being similar to suspected stroke or suspected heart attack or some really other urgent situation like that and so treatment needs to be done immediately.

So any infection that's getting worse and not treated can lead to sepsis and that's why urgent treatment really matters. Next slide please, it's Slide 6.

So, in our *Vital Signs* report we delve a little bit into the epidemiology of sepsis and there's a lot more information than what I'm going to give you hear in the *Vital Signs* report but in brief the findings were that sepsis most often occurs in persons that are over the age of 65 or infants that are less than one year of age or people with chronic diseases such as diabetes or weakened immune systems such as someone undergoing treatment for cancer.

Sepsis is most often occurs after someone has an infection of the lung, the urinary tract, the skin or the gut but it can occur really after any sort of infection, these are just some of the most common ones. The most common germs that cause sepsis are staphylococcus aureus, E. coli and some types of streptococcus. There are many others that viral diseases can also cause sepsis but the ones I've listed, the ones that are most common and of course these are common causes of infections in general but it's important to remember that even healthy people can develop sepsis from an infection especially if it's not treated properly.

Next slide please- that would be Slide 7. So a little bit more about what came out of the Vital Signs report, we found that sepsis begins outside of the hospital for nearly 80% of patients and that seven in ten patients with sepsis had recently interacted with the healthcare providers or had chronic diseases that require frequent medical care and the implication of this is that this is a real opportunity for preventing infections and recognizing infections early on and that potentially can save lives. So what we're asking providers to do is talk to their patients about infections and sepsis, educate their patients about how infections that can lead to sepsis can be prevented or how they can be recognized early and what they should do if they have an infection that does not appear to be getting better and they're concerned about sepsis.

So, just to summarize then what you can do to help stop sepsis and save lives, you can prioritize infection control and prevention, educate patients and educate providers about sepsis early recognition and appropriate antibiotic use, train healthcare providers and the frontline staff to recognize and treat sepsis quickly and appropriately, promote smoking cessation because people who smoke have much higher risk of pneumonia and I mentioned lung infections as a common precursor to sepsis, promote vaccination because vaccination prevents infections that can lead to sepsis and improve chronic disease management.

And finally so what we're going to learn about today is how other states and organizations that have worked to improve sepsis early on have learned to educate and encourage early recognition and treatment and so with that I want to turn it over to the first representative of one of the states that's taken an initiative on this and that's Dr. Jim O'Brien who's Vice President of the Quality and Patient Safety at Riverside Methodist Hospital which is part of OhioHealth.

So turning it over to Dr. O'Brien, thank you very much.

Jim O'Brien: Thank you Dr. Fiore. Again my name is Jim O'Brien, I'm a pulmonary critical care physician who works in an 11-hospital system here in Central Ohio and I want to share with you and have the great privilege to share with you some excellent work that's going on across the State of Ohio and being alleged by the Ohio Hospital Association.

If you go to Slide 11 you can see some of the background on the Ohio Hospital Association. It's actually the country's first state association for hospitals and celebrated its centennial last year. We have 220 hospitals and 13 health systems who are participating in this and you can see the mission is to collaborate with other hospitals to ensure a healthier Ohio.

So the focus here, and the long history of the Ohio Hospital Association has been built around improving patient safety and quality, there have been efforts around things like central line associated blood bloodstream infections and their focus now is largely on sepsis and then reducing perinatal mortality. If you go to the next slide, you can see some of the early work that led to a statewide initiative. This was an initial pilot project that went on through the Ohio Hospital Association that involves seven hospitals doing rapid cycle improvement to reduce mortalities from severe sepsis and septic shock and you can see that in a relatively short period of time these seven hospitals were able to realize that 15% relative reduction in mortality. And so this led to an interest from the larger organization about pursuing a statewide initiative.

If you go to Slide 13 you can see that this is part of the overall strategic plan that is directed by the board, the board is populated by the member hospitals to try and reach the goal of leading the nation in quality improvement on issues identified by OHA members and we feel like through the OHA that it's

very important that the membership itself is key in identifying what these projects are as opposed to them being things that are thrust upon them. We feel like we get greater engagement by having them involved in articulating what those problems are.

The objective that is initially put out in the board goal were reducing severe sepsis and septic shock incidence and mortality by 30% by the fourth quarter of 2018 and this was articulated initially towards the end of 2014 so this was seen as a four-year project. And the tactic was OHA coordinating a state-wide sepsis reduction collaboration to improve implementation of best practices specifically related to early identification and early treatment.

As we look back on how we rolled this out, if you look at Slide 14, early engagement included a kickoff meeting in June of 2015. This was during the annual meeting for the Ohio Hospital Association so many of the member organizations were represented and we were able to give the background on why the organization was embarking upon this.

We videotaped the multiple presentations that occurred that day and that's available online so that those that were not able to attend could also view this and therefore come to a shared mental model about why the Ohio Hospital Association was embarking upon this effort.

Additionally we had significant input from the board including an initial kickoff meeting with them teaching them about some of the very things that are represented in the Vital Signs report, namely that sepsis is an exceedingly common diagnosis, it's something that is for the most part present on admission for these patients and not necessarily directly tied to a hospital acquired infection although as Dr. Fiore mentioned, a large number of these patients do have chronic medical conditions or have encountered healthcare

recently. But there was a big initiative around educating those who were at higher levels within health systems and hospitals who may not be directly connected with the opportunity within their own hospitals about improving care for sepsis patients. And then finally I was honored to be asked to serve as the physician advisor on this project as it rolled out across the entire state.

If you look at Slide 15 it gives some high level of the methodologies that we employed related to this. First of all, philosophically we understood that our member hospitals were under an increasing burden for data collection to a number of reporting agencies. And what we didn't want to do was add on to that reporting burden and so we erred on the side of a minimal amount of data collection. We did this for monthly reporting around very specific process measures namely what's been articulated as the three-hour bundle which is the administration of antibiotics, administration of intravenous fluids, measurement of lactate and a collection of blood cultures within three hours of suspicion of sepsis.

This is something that is reported purely as a numerator and denominator for each of those process measures and then rolled up into an overall bundle. Mortality measures are leveraging off administrative data and so this is tied to data that winds up being reported through the state and we are able to collect that as opposed to having to collect that separately. We also have some regional quality collaboratives that are focused in areas that those hospitals want to work on. Central Ohio is focused on the recognition of hospital acquired sepsis, the northeastern region is focused on education of our EMS providers and the northwest is focused on the development of a standard sepsis case review tool to help to identify opportunities for improvement.

We additionally have monthly education and coaching calls, the themes of which are decided by the members and we wind up revisiting that after each

call and these are then archived at this URL that you can see so that those who are not able to attend the live performance can log in later and get the content. If you look at Slide 16 we highlight some of the challenges that we've encountered along the way. So one of the first things is you can see that our initial target was reducing incidence by 30%. We thought that this was going to be challenging and actually have found this to be the case because in fact as a result of this improvement effort we've uncovered cases of sepsis that previously existed but weren't called such and therefore we've actually seen our incidence rise so this has been a challenge in trying to educate the board around this.

We've also seen challenges as CMS rolled out the Sepsis Performance Bundle in October as well as ICD-10 implementation which has increased the burden of reporting for our member organizations but also some confusion around which diagnoses we're talking about. Then more recently in February with the Sepsis three definitions there were additional confusion about which patients we are working on.

Finally many of our member organizations are in the process of installing electronic medical records, this obviously draws their attention away from that to that installation and so we had challenges of balancing that as well as trying to work with various EMR's for efforts towards performance improvement for example identifying patients with sepsis for rapid care. And then we've realized as we've gone down this improvement journey that we've had to reach out beyond the hospital walls particularly to pre-hospital providers but then also those who provide post-acute care so that we can assure the best outcomes for our patients.

If you look at Slide 17 we've also been very intentional about engaging leadership support, we have asked for board action on gaining hospital

leadership commitment and the form of that has been a request out to all of the CEO's of member hospitals and currently we have 91 hospitals participating in this initiative to identify what sort of resources have been committed to this effort including the presence of a sepsis coordinator and what sort of work has been done around turnaround times related to laboratory testing.

Mike Abrams, the OHA CEO has also been very visible on sepsis and speaking out about the importance of this for Ohioans and then we've also identified physician champions who have served as co-chairs of those regional quality collaborative I mentioned earlier. If you look at Slide 18 you can also see some of the other collaborations that have occurred. I want to highlight the collaboration with Sepsis Alliance. I must disclose that I'm also serving on the board of directors of Sepsis Alliance which is the not-for-profit that is geared towards raising awareness of sepsis both in the medical community but also amongst the lay public to reduce mortality. And we have found them to be a useful partner in trying to transmit the efforts that OHA has been undertaking.

If you look at Slide 19 you can see some of the early improvement. This is in the three-hour bundle compliance. You can see that our initial efforts that got underway in August of 2015 started off with a baseline performance of around 32% that has risen to almost 80% by June of this year. You can also see the individual components with the greatest gains being seen in the fluid bolus administration. This is still the area that we wind up struggling the most with and I'll be interested to hear from the other states about how they've tackled this with specific targets being articulated and concerns from physicians about causing errors of commission as a result of what they term as volume overload for these patients, but you can see month over month improvement.

If you look at Slide 20 you can see the effect that seems to have occurred at the same time related to mortality. Again, thinking about August of 2015 when we truly kicked off the initiative around improving care with most of the preparatory work coming before then, you can see compared to our baseline of 2014 we've had a 9% relative reduction in mortality. I think one of the additional challenges we have in this is because we are using administrative data, it takes some time for these results to come back so you can see that we're currently operating about two quarters in arrears and we're trying to take efforts in order to improve this.

Based on those calculations though, just through 2015 we estimate that some 673 Ohioans were alive today as a result of this improvement effort who otherwise would have died had these hospitals not participated in this improvement.

I want to thank you for your time today and look forward to answering questions. But at this time I want to hand this over now to Marcus Friedrich who's going to lead us through the initiative that's been going on in New York State.

Marcus Friedrich: Thank you Jim and thanks for having me on the call today. I wanted to share with you New York State's approach to sepsis real quick and I want to start at Slide 24 if you may. So we in New York State build on existing national and state initiatives on sepsis care just to mention the surviving sepsis campaign, the Institute for Healthcare Improvement and the Stop Sepsis collaboration here in New York State and then of course the realization that was mentioned earlier that as sepsis has a very high mortality on morbidity, we did some preliminary data in 2012 on just administrative data and we found that the risk adjusted mortality in hospital or ranges from hospital to hospital from 15 to well over 30%, and then of course the tragic death of Rory Staunton the

teenager who died of sepsis here in New York City led us to advocate for greater awareness and a strong willingness to improve care and what I thought a goal worth pursuing here in New York State. Slide 25 please.

The key implementation themes are what I call humility. New York State as you might know has a long history of public reporting and we publically report stroke, PCI and cardiac surgery data and that gave us a guidance on also how to approach this with some humility and although we are coming close to answering a lot of questions we still have a lot of questions that we don't like, for example, our approach of mandating a sepsis protocol for each of our about 200 hospitals here in the state, the answer if that was the correct move is still out.

Then I want to highlight the collaborations of patient, family and consumer groups, of course clinicians and expert opinions and our hospitals and hospital associations in this state and national organizations such as the CDC, CNS and the surviving sepsis campaign and of course we had to pilot one of these hospital demonstration waivers where we included sepsis in one of our projects both were like 12 to 15 hospitals that was done in the early beginning of 2012.

So how did we approach this here in New York State? We decided that we would hop on exciting regulations in the state and we called them after Rory Staunton, Rory's Regulation here in memory of Rory Staunton and we had a three-pronged approach. We required hospitals to have a protocol for recognition and treatment of sepsis to report data back to us to the department and to train the staff on its use.

The data is reported quarterly to us and consists of about 70 variables including treatment, severity which we leaned heavily on literature and expert

opinion and of course comorbidities and it includes what Jim mentioned earlier, three-hour and six-hour bundles for adults and we designed one-hour bundles for children. Hospitals can correct the data in this database.

We thought that was crucial for having their input and so far we've collected about 100,000 cases of adults and about like 1500 pediatric cases and although we started in the first quarter of 2014 we started selecting or collecting the data in the second quarter of 2014 and this is an ongoing process. Raw mortality is 29%. I can report that we started at about 30.3% and we are down to 28% in at least the raw mortality in the first quarter of 2016 and we just completed the first audit of the data. IPRO is our partner in this and helping us to accomplish those goals.

Slide 27 please. These are our measures that we are specifically collecting from the hospitals. These are leaned on the entry of 500 measures and some of our experts here in the state thought that they might have not gone far enough and without going too much into details, the six-hour bundle you have to complete the three-hour bundle in completeness to be eligible for the six-hour bundle and then you see, you know, fluids, if the lactate is elevated, vasopressors, hypotension and reordered lactate.

Slide 28 please. And then we develop pediatric measures in the bundle that was leaned on to the ... criteria of the guide and then 29, these are - this is our data from the state. This is again not administrative data, this is clinical data reported to us from all of the hospitals and below you see the bundle completion rates for the three-hour bundle and then in red you'll see the six-hour bundle. The trend is going up and the improvement is visible there.

I come now to the reporting piece of it and maybe we can turn to Slide 31 please? So with the quarterly reports from the hospitals, these elements but we

also thought it was crucial that we report data back to the hospitals for collaboration; that is a big part of our initiative, meaningful data to the hospitals and this is constantly refined to better serve the needs of improvement initiatives. You see quarterly performance reports, demographics, protocol exclusions, treatment variables (and times zero) so every hospital gets every quarter and their data refined compared to a state benchmark that we are calculating and like what we hear from feedback this is incredibly useful for them to improve their care in the hospitals.

Thirty-two please, Slide 32. This is what we are currently working on. There was a mandate that was put into the regulations in 2014 that we should report publically on some form of risk adjusted mortality. We are using the first - the most recent four quarters of the data in 2014 and the objective was that we wanted to predict hospital mortality in our septic patients based on demographic comorbidities and admission characteristics but without use of treatment variables we thought that was very important and we have risk adjustment expert from Ohio State and from other states who are sitting on our Sepsis Advisory Committee and also experts who are expert in other fields.

Ed Hannan who works on the Cardiac Public Reporting and of course DOH staff and of course our Sepsis Clinical Advisory Group. And we identified 26 potential variables, 15 that we ultimately used. It was a complicated process. We are still refining. We haven't finished it but we are trying to release the data somewhat in the fall before the year ends and we calculate a standardized mortality ratio by dividing observed mortality by the expected mortality and then in Slide 33 you see - like I call it Version 1.0.

This is the last iteration of the model where we compare hospitals on a scale. In the middle you'll see the hospital who is very close to the expected

mortality. If you move to the left and pick like for example the first hospital with a medium of 2.2 that means this hospital - about twice as many deaths as expected from the hospital data occurring in this hospital but you see the huge confidence interval problems that, you know, the smaller - the graph, the smaller the scale is the more data that's being reported and then all of the way to the right you can see that these hospitals are doing much better than the expected mortality. And we are trying, you know, to learn from this. Again, the first step in public reporting is to report back to the hospitals, that's what we are planning to do in the next couple of months and get feedback from the hospitals and then try to publically report it on one of our Web sites.

Slide 34 please. Lessons learned. Involvement of stakeholder is key. This is I think what Jim also mentioned earlier in Ohio State. We cannot do it alone, we are certainly not content experts, we rely heavily on family organizations like the Rory Staunton Foundation, advisory groups, content experts, our partner at IPRO and risk adjustment experts and the Partnership of Patients with one of our hospital associations but improvement is possible and although it's a daunting task to tackle something with a 30% mortality in the state, you know, we feel that we make a slow improvement here in the states and we are encouraged by that.

Slide 35. Next step, what I mentioned the public reporting is on our agenda. We wanted to develop relevant outcomes, measures for children where we are still debating what are the right outcome measures, analysis and to connect the outcomes to protocol adherence measures that's been going on and then the next point is very important. The broader national and statewide trends, as you know that - there is some evidence that nationally the sepsis mortality is going down and the big question is states who are mandating sepsis reporting like New York State, if that curve is actually going down faster than in other states and this is being done right now, I think a team from CDC is also involved.

Updating the data dictionary is ongoing. We are now at Version 3.0 and we are planning to update our data dictionary which is on the IPRO Web site for everybody to take a look for other states who are interested in it and we are trying to update it in the beginning of 2017 again. This is like the alignment with other measures, I just want to call out the CMS core measures, SEP-1. This is on all our minds at the moment New York State hospitals are submitting data to us and submitting data to CMS and they are not 100% aligned and if we could align those it would help everybody survive the sepsis guidelines and new definitions ... that is on the horizon here. So that concludes my area, I want to turn it over to Kelly Court please. Thank you.

Kelly Court: Good afternoon everyone and I'm pleased to be able to tell the story of how Wisconsin Hospital Association has been working on sepsis over the last two years. So if we look at Slide 38 this is just a real quick snapshot of who WHA is. We have 136 hospitals in the state that belong to our hospital association and our primary purpose is around advocacy; both legislative and regulatory issues but really quality has become an important part of our advocacy work here in Madison and that includes quality measurement, public transparency of hospital quality results and then improvement and then we do also a lot of education.

If we look at Slide 39 our sepsis work really began as part of our work in the hospital, as a Hospital Engagement Network or a HEN. And the HEN's are funded by CMS under a project they called Partnership for Patients. And the HEN's are responsible for reducing readmissions by 20% and hospital acquired harm by 40% and then there's a number of areas of harm that we've been working on in sepsis and specifically sepsis mortality has been one of those.

Over the last year we've had 85 hospitals working with us on sepsis and our strategy for improvement is a combination of evidence-based practice which we've already heard about the bundles and the evidence that we can implement to improve sepsis but then more importantly what are the concepts of improvement? So the science of improvement for measurement in implementing those best practices and that's where kind of the rubber hits the road and the real hard work comes.

The hospitals are very transparent with each other and openly share and then we've also engaged the patient and family advisory committee which is where my story is a little bit different today than from Dr. O'Brien and Dr. Friedrich. On Slide 40 is pretty simple but aggressive. When we're aiming to reduce the sepsis mortality and that's for patients with severe sepsis and septic shock in our state by 40%. So if we look at Slide 41, this is face of a beautiful young woman. Her name is Katie. Katie was a 26-year-old woman recently married and healthy. In January of 2015 she developed some flu-like symptoms for several days. She had several contacts including a visit with her primary care physician and just really didn't start to feel any better. At the urging of her family she eventually was encouraged to go to the hospital ED department which she did, within a few hours she was in critical care and later that same day Katie died of sepsis.

So Katie died in January, on January 5 of 2015. Her mother contacted us here at WHA about three weeks later asking for help to prevent this from happening to anyone else and so we met with Katie's mom and tried to figure out what we could do together that was going to be effective. And so it was important for her to understand that most hospitals have protocols, they know about the bundles, they're measuring this and the real struggle is getting the protocol bundles implemented every time that it applies to a patient. So we had already called our campaign here in Wisconsin *Thinking Sepsis First*. So,

Katie's mom, Anne, joined our effort, she joined our association of patient and family advisory committee and she agreed to participate in all of our Webinars where we teach hospitals about sepsis.

So if we go to Slide 42, then we pivoted and we changed the name of our campaign to Think Katie First. So what we're doing with this is we're trying to engage not just the minds, which are understanding what a protocol and a bundle is but also engaging people's hearts and so if we can get an emotional response to why we're doing this, we can get some members of our healthcare community to think about it a little bit differently.

We really have three simple steps and these are the steps we've already heard about from Dr. O'Brien and Dr. Friedrich so that immediate and consistent risk awareness, as in an escalation and so we think that this is oftentimes where we're maybe not doing what we can do as quickly as possible so not everybody on the care team recognizes that this is a patient that might have sepsis and then we've got the immediate testing and treatment which is part of those bundles and then the evaluation and specific treatment so that's the second part of those bundles that we've already heard about.

So if we look at Slide 43 on the left hand of the slide there's that three-hour bundle that everybody knows about. But what we did on the right hand of the slide is we borrowed from the Minnesota Hospital Association a visual queue that they had created to help the staff have a visual reminder of what a septic patient may look like. So is the patient's temperature above 100? Is the heart rate above 100? Is the blood pressure below 100? And if those things are - if those three conditions or one of them is met then we should be thinking about sepsis.

So what hospitals in Wisconsin have done is they've printed this out, they've made it into posters and they're using that as a way for those frontline nurses and staff to be thinking about sepsis all of the time.

If we look at Slide 44, this is the IHI model for improvement. Many people use this, many organizations but we really think that this is part of the key to our success. We've got an aim which is at 40% reduction in mortality, we've been measuring sepsis mortality but also the hospitals are measuring compliance with the bundle because that's an important part of the evidence and then the change ideas are what can we change that's actually going to make a result in improvement and then we quickly move into PDSA and we think here in Wisconsin that when protocols and bundles don't get implemented it's because we haven't done enough, spent enough time, in that PDSA cycle. So, even though we know what the bundle says, can we get that lactate drawn and reported quickly? Do we know to do the fluid resuscitation aggressively enough and so we encourage teams with frontline nurses and pharmacists and physicians to be working in using small sets of change to try and get the components of those bundles and protocols implemented.

So if we look at Slide 45, our challenges here are similar to what we've already heard so it's, I guess, comforting to know that we're not unique but we've had to educate not just emergency departments but also in-patient and post-op teams because the focus sometimes is just on the ED but we have patients who are in in-patient units who can potentially become septic as well. We've also had clinician hesitation especially on the serialized lactate levels and in aggressive fluid resuscitation. And so we've had an ED physician become our champion for sepsis and his answer to the lactate level issue is that sepsis can be evolving over time and if we don't do those sequential lactates we may miss it and then his answer to the fluid resuscitation is if we don't do the aggressive fluid resuscitation these patients are going to die.

So if we put them into fluid overload we can intubate them, deal with the fluid overload, let the sepsis get resolved and then we can deal with the fluid issues at a potentially later time.

So we use data to identify our gaps, we've seen that already in the other two states. We think it's a very important part of our progress to measure how are we doing with the bundle, how are we doing with mortality? We talked about PDSA and good solid action plans so we encourage teams in the hospitals to be creating 30-day action plans and then following up to see if those things actually got implemented. Obviously physician education is important because they're a key component to the care plan for a septic patient and then can you engage patients and families? So can you create a heart with an appeal to the heart of this so every mortality number is a patient that has a face. Patients and families have a lot to offer in suggestions and they're very willing to help and we can get a lot of good information and partnership with them.

On Slide 46, this is the results we've had to date. So this is our mortality rate, we've had about a 20% drop in sepsis. You can see we're about halfway to our goal, we'll be continuing this work for the next couple of years until we get that rate down to where we want it with the goal of being less than 14%.

So with that I'm going to turn it back to Dr. Fiore.

Anthony Fiore: Thank you very much. Those were very good presentations and I think folks on the call could learn a lot from this. I think we are now at the question and answer stage. Matt do you take over now or...