Good morning everyone. This is Rebekah Gardner of the U.S. Secretary of Homeland Security John Kelly need for care transitions for the New England QIO and we are delighted to welcome you to today's webinar entitled A Call to Action - Targeting Sepsis to Reduce Readmissions. We have a great panel of speakers to help us get there. Before we get started I will review housekeeping outings. This call will be recorded and the recording will be available at our website within a few business days. As you heard, the phone lines will be on mute while the speakers are talking. We will unmute the lines after the presentation to take questions. We will get instructions on how you can ask questions at that time. Although the lines will be muted during the presentation, we would like you to actively participate during the session by using the chat section -- function. Is on the right-hand side of your screen. My colleagues will be monitoring the chat window and responding to your comments in real time.

Please don't be shy, we would like to learn about your efforts and how we can best support you going forward. So let's start using chat right now by thinkers on the call. Using that chat window, you can type in your name and your role, your organization and the state you come from. So go ahead and tests drive the chat function right now on your own computer. These are today speakers; we will be introducing each one just before their presentation. I'm going to start us off. I'm a senior medical scientist at the New England QIO. I'm a associate professor at Brown University. Both an inpatient and outpatient setting. Harrop the QIN-QIO I provide clinical oversight of the care transitions work we do. Everyone on this call knows that readmissions matter. They matter to patients because they are so burdensome. They manager to payers because they are marker for the quality care transition in a facility. Over the past several years Medicare has given penalties to readmission rates. We can see the conditions for some medical diagnoses listed here included heart attack, heart failure, pneumonia and COPD. These are all really important conditions but many folks have wondered if another important diagnosis was missing from this list. One that might account for even more readmissions than the penalties that are currently being given. Given you are on this call; you know I am talking about sepsis.

There are hundreds of thousands of cases of sepsis admitted to US hospitals every year and the costs are phenomenal. Estimates of between 15-$24 billion. The human
toll that sepsis takes is pretty profound. Folks are much more likely to die while they are inpatient than other conditions. There's cognitive decline that occurs after an admission for sepsis. We know people suffer from mental health conditions like COPD after being cared for sepsis. They have functional limitations after discharge and a profound decrement in their quality of life. This table is from a research letter recently published by our colleagues in the Journal of American medicine. They look at an index a for sepsis compared to index is further conditions. They hypothesize that sepsis hospitalizations could lead to a higher readmission than hospitalizations for -- included in the hospital reduction program. So when they looked at hospital stays and ended up with the eventual readmission, 12% of those index submissions were index days for sepsis and as you can see it in this table, highlighted by the box, this is a higher proportion than the index heart attacks, heart failure, ammonia and COPD. This is important to point out because you recognize those of the diagnoses included in the [Indiscernible] reduction program. We also looked at the readmissions themselves and they found that when patients came back to the hospital after they were initially admitted for sepsis, -- that sounds like someone might have put us on hold.

Let me try and re-mute the line and see if that will help us Rebekah.

Hold on one second.

I think it went away.)

Let's keep going and if I have to re-mute, I can pick to this gives you a sometime to absorb the length of stay here that is sitting in front of you here. When they looked at the readmissions themselves, these authors found that when patients came back to the hospital after admitted for has dashed sepsis, the length of stay for readmission with longer compared to readmissions following the more commonly tracked conditions. And does readmissions cost a lot more. This is been demonstrated in other cities as well. There was a study in California where they looked at annual cost per readmissions after sepsis and those were more than double those following heart failure for example. Three and half times more expensive than those following acute [Indiscernible]. An important point about the methods of the study, usually I don't delve into methods I webinar like this. But I think we ought to spend 30 seconds talking about this. The study that folks have been quoting a lot. We need to look at a key factor related to their findings. When they identified index hospital stays for sepsis, they look for a sepsis diagnosis on any of the 10 discharge diagnosis fields. When they identified their other conditions, like heart failure and pneumonia, they only looked at a primary discharge diagnosis. You can see why that would lead them to identify a lot more
sepsis in this -- index days. Versus the other conditions where they only looking at the primary field. That's an important limitation. He did a sensitivity analysis to try to address this limitation. You can see that here in the third column. That uses a much tighter sepsis definition allows other conditions like heart failure and pneumonia to be pulled from any of those 10 discharge diagnosis fields. The results look pretty different and perhaps more in line with what was expected. But it doesn't change the fact that sepsis though accounts for a pretty high percentage of the readmissions regardless of how you do the analysis.

Higher than a lot of is probably would've expected. In the year following a severe sepsis admission, when folks are admitted and then leave, for the folks who survived to discharge, 44% then die in the year following their admission. And most are readmitted. This study by Prescott found 27% were readmitted within 30 days, 40% within 90 days in the most two thirds within the year. In fact, only 20% of sepsis survivors were alive and not readmitted in the year following their severe sepsis readmission. Similar numbers have been shown in other studies. Chang and his colleagues found readmission rates were also in the 20s. Between 20-27% which can be higher than certainly acute MI and higher than CHF or pneumonia. These folks tend to have a lot of time in the skilled care the Saudis after discharge. One third go to skilled care facilities and I'm not just talking about [Indiscernible] but acute rehab and L tax. They found patients 10% of the days alive after the discharge for that sepsis admission living in some sort of facility. And when they come back to the hospital, as it sounds like many inevitably do, have worse outcomes with readmissions. They are more likely to be put in ICU, transition to hospice and more likely to die. What sort of diagnoses do -- patients with sepsis can Beckwith, they usually come back with sepsis. Other common diagnosis is art CHF, pneumonia and renal failure. Comparing this group to match controls without sepsis, those who had sepsis for the index they were more likely to come back with sepsis renal failure and respiratory failure than non-respiratory patients. Those are highlighted with the blue arrows here where you can see the percentages.

The same authors wondered if some of the readmissions might be preventable. They noted that many of the sepsis patients came back with another infection of some sort. 12% in fact which was higher than for non-sepsis patients? When they looked at the readmission diagnosis and they classified them as amatory care sensitive, they found a high percentage met -- could've been avoided if the conditions were discovered earlier or putatively. The estimate was wide ranging from 22-42% depending on how they defined amatory care sensitive condition and what they included. They also noted that any intervention would have to happen quickly because a lot of the readmissions when the first couple of weeks after discharge. Which as you know is true for non-sepsis readmissions as well. We looked at what patients with sepsis are more likely to
come back. They did find that the severity of sepsis as it was coded and -- in claims was not a predictor. But younger age having Medicaid and certain comorbidities like malignancy were associated with higher risks. Different studies have conflicting findings about whether male gender or races have an impact. I would like to turn out to some of our New England data analyzed by advisors for Medicare claims. You have here on the red line at the top shows readmission rates following index day for sepsis in New England. The readmission could be for any reason but the index they had to be for sepsis.

The blue line just below that shows readmissions following index day for any condition. The rates are trended over time as you can see on the X axis from 2013 at two the fall of 2016. Readmission rates for sepsis are higher than for other conditions throughout this period there cure in the six New England states that range between 20-21%. This is somewhat consented -- consistent with national data although maybe a little lower. We found our care transition work all long that the northern states have different trends in outcomes than the southern states. This figure shows readmissions after a sepsis day. It's like we took that red line from the prior slide and broke it out into each of the different states. Itch line represents a different state. The southern aren't dark colors and the northern in light colors. You can see there's a difference in the rates that paralyzed the overall readmission rates. Southern New England tends to have higher readmission rates for sepsis and Massachusetts at the top and Vermont and the bottom and this is the time you want to be at the bottom. We also looked at what our sepsis patients come back with an it similar to national data.

This table has combined New England data for 60s for 2016 and shows the readmission diagnosis after sepsis are sepsis, heart failure and pneumonia and the proportions are slightly different depending on how we accounted for missing data. It gives you a sense the vast majority -- the highest proportion of anyone diagnosed that folks come back with is sepsis all of my comment readmission diagnoses. When you look ahead to addressing some of these findings as Maryanne and that will take us through citing work, keep in mind recent changes that will impact this work. New definitions for sepsis were recently released at the Society of critical care medicine Congress.

This was the first significant update since 2001. The new definition of sepsis is similar to how we with of defined severe sepsis before. And you can see the septic shock is somewhat similar to how was defined earlier. There are some big changes for example, there's no more severe sepsis. And we are no longer supposed use SIRS criteria to define sepsis. Wish would've called it before is now thought it was just a routine infection with a normal inflammatory response. We are supposed use things like SOFA and lactate to define sepsis as opposed to SIRS. Despite consensus about
these definitions, they are not widely used and the coding is not quite there in Medicare and it's not quite there. Other important changes coming are in the form of penalties in the hospital readmissions reduction program. Sepsis is now included but not as its own category. It is linked to pneumonia. So the principled discharge diagnosis of sepsis and there's a secondary diagnosis of pneumonia at admission, that won't count as ammonia Talley and that's new. One exception is if you carted the sepsis as, severe sepsis, which will member from the previous slide no longer exists.

That gives you a sense of the challenges we will face in this going forward. How do we find sepsis, how we cope for it, how were paid for it, how were penalized are all influx. In spite of this we are not afraid, we are not daunted and Mayanne and Matt walk us through how we can make a difference in the outcomes of our patients no matter how we define sepsis.

I would now like to introduce our next speaker. We will now hear from Maryanne Whitney. And she is an improvement advisor with Cynosure Health. She is the lead first sepsis and airway safety and sheet join Cynosure Health with over 25 years in nursing leadership expertise. She has experience in critical care, patient safety, sepsis mortality reductions. She earned her balance -- bachelor of sick -- nursing from San Jose State and her Masters in nursing trickle care. Mayanne you should have the ball and be ready to go.

[Silence]

Mayanne unmute yourself by pressing pound 6.

[Silence]

I'm sorry. I thought I had a muted.

No problem at all.

Sorry about that. Technical difficulties. I want to thank you again for having me. I look forward to sharing this information with you. Please, if you have any questions, just shot them -- they and I'm happy to respond. Let's get started. We will talk about strategic sepsis care. Rebekah did a nice job of summarizing the cost and harm that occurs with sepsis. One of the other things that recently came out with Society of critical care medicine and surviving sepsis campaign, sepsis is now recognized as a medical emergency which is wonderful news. I think it will give a sense of urgency that it needs in our hospitals. Recognizing it is the most costly reason for hospitalization. And more than 700 patients die daily from sepsis. That is one death
every two minutes. So it is a significant health burden to our hospitals. This is the same came all -- same table that Rebekah mentioned. I went to remind us, readmissions due to sepsis are higher than the other ones that we get penalized for. And today we will talk about you know, detection, treatment and how do we survive sepsis or help our patients survived sepsis once they are discharged from our hospitals? Early detection is key for all levels of our organization’s emergency departments, inpatient settings; I would encourage L tax in our nursing homes to begin screening for sepsis on a daily basis.

All of their patients, you can use early warning signs, the [ Indiscernible ] score and things like that, they maybe won't tell you who has sepsis or septic shock, but they will tell you who were as -- who is treated in your organization. We went to treat our elderly and high risk; they may have atypical signs of sepsis. They can often have an altered mental status -- which week quickly attribute to other causes in the elderly. But often that is their organ dysfunction. And they can be a frugal because they have a eight -- a frugal because they have a test time generating a fever.

We want to make changes in our organization to change culture to think sepsis first. And believe it's an emergency. Often sepsis is the default. Once we go through the other time sensitive diagnoses they come into emergency rooms with stroke and trauma and then we get to sepsis rather than thinking of sepsis first. I think we all find ourselves going down that path. This is just a little pictorial that I like where you have nine or 10 people resuscitating a patient and then you have nobody in the room of the patient with sepsis. In the bottom corner. Because it's often unrecognized. Some organizations have actually put visual reminders near patients to help the whole team understand that sepsis is an emergency. They will put a different color blanket on the bed or those kinds of things.

Mayanne? This is Lorraine. There's a question in the chat about what score your mentioned

The MuE score which is an early warning score. Some facilities to have electronic health records have been automated in their system and it is based on a multitude of patient indicators with the in the healthcare writer lines, and those kinds of things, and if there is a enough change in the MUE score it can alert caregivers to either activate a rapid response teams or understand the patient is getting sicker and it is MEUS. They're all kinds of records or with -- sepsis screening in your floats, it can be on paper and if the patient screens positive, we need to be doing something. The next step once patients identified we need to have clear steps for early implementation because it is a time sensitive it condition that needs to be treated early. What helps with that is developing a team so that everybody's role is clear about who does what
by wind, this is a good place to build in a concurrent review so we can get a sense of timing for each of the elements of the bundle and you can target where you need to work to improve. One of the suggestions I have is one of the things a lot of facilities that have good success -- they have alerts of some sort. Not just electronic alerts or maybe not even electronic alerts, but resource alerts. Where they call a sepsis alert or code sepsis overhead. This mobilizes resources. It gets the experts to the bedsides that are needed. It allows for consensus in diagnosis amongst the caregivers. It helps everybody to understand that it is time sensitive. And when they are called overhead, it keeps that level of awareness about sepsis and septic shock ongoing in your facility. It doesn't lose its glamour. It also helps take action for someone to give antibiotics within the first hour get labs drawn and start fluids.

I urge you to think, can you rapid response team be involved? Can they be your sepsis champion throughout your organization? They are typically a mobile group. A certain level of expertise. Once a patient screens positive for sepsis -- and that can be even though SIRS is not part of the sepsis definition going forward, it doesn't mean we can't use them for screening patients to know if they are sick. And that's really is what the systemic response system tells us or the SIRS criteria tells us this patient is not well. So that on top of an infection can still be used as a screening tool despite having the SOFA triggers that can be used as well.

Once a patient is identified as being sick with an infection, we need to measure that lactate. It should be something we send out, it should be done locally and returned quickly. Getting a blood culture prior to giving antibiotics and really one of the new recommendations -- and it's not new, but it also has a -- it now have a higher level of validity, is to give those broad-spectrum antibiotics within the first hour of recognition. And then giving fluid for hypertension or elevated lactate. And then if a patient does screen positive or has septic shock which would be had -- this patient to have hyper Tatian -- hypertension or lactate, you want to give as oppressors to maintain that that MAP of greater than 65. You went to reassess volume status and tissue perfusion. You no longer have -- need to have a central line. You want to remeasure the lactate, that -- that is they good indicator of resuscitation and points and treatment is making a difference for the patient. So once you have done all this fabulous treatment in your hospitals, you need to transition patients from multiple levels of care, it can be emergency room to a critical care unit, it can be medical -- emergency department to med service unit if they do have septic shock. It can be a rural’ s -- rural facility to a larger regional facility. When we transition them out to the hospital, the home hospital and nursing home. We really need to think about what we need to communicate about that sepsis presentation and treatment that we've accomplished with it -- ongoing risk factors in
patients, along the sepsis continuum -- what has been accomplished, what treatments have been done, what the timeframe is. And then try to begin to anticipate what could happen for this patient downstream. This is an example of a handoff tool for month of our facilities in our HTN. This can be used electronically or can be set up as an Excel spreadsheet where you put in the times and you -- it calculates the times for you and you put in the key elements of the bundle have been published. Let's talk about publications in sepsis that really put our patients at risk for return to our hospitals focusing on readmissions. Acute kidney injury is a large complication or I should say affects a large portion of the patients that come into our hospitals with sepsis and septic shock.

We need to be checking labs more readily when they are discharged. Do we need to maybe reevaluate the medications they are on if they are cleared by the kidneys to know there may be an excess of medication, or those kinds of things. And then keep an eye on the patients that were in ICU. They really do have a significant risk of the post intensive care syndrome. 50% of the patients with sepsis in ICU end up with weakness in bounds heading home. They have thinking and memory issues in the cognitive realm and they often will have PTSD creating issues for their mental health.

Also we need to keep an eye on healthcare associated infections is our patients transition out. And the antibiotics they are on, do we need to reevaluate those before they go home? I had a personal encounter not too long ago with a friend of my father who is in the hospital with pneumonia, on antibiotics, came home, developed severe diarrhea and was readmitted within a week with C diff infection and passed away. These things are real the matter where we are and we need to be alert to them and how do we teach our patients differently to be alert to the signs and symptoms.

There Of love new ideas and studies that has been released. Both of these are Australian studies. The first one compares usual care to early physical therapy. We know that early mobility in the ICU has great effects for our patients, decreasing delirium, decreasing length of stay. These studies really reinforce that. To have cognitive effect on quality of life. They had a trend towards reduced hospital anxiety. Unfortunately, the first study by [name unknown] did not look at readmissions or the cost of shortened length of stay. The other study that was released was [name unknown]. They work together these two scientists. They are looking at post-discharge multidisciplinary outpatient clinic to really screen patients and have targeted interventions for them. They are looking at the quality of life, readmissions and overall healthcare used for the patients that are discharged with pit -- sepsis. There's no data yet. Those studies don't progress. It's something to look forward to and forward as we look towards reducing readmissions related sepsis. These are some resources for you. I again want to thank you for having me participate in this.
Mayanne? This is Lorraine. There were questions in the chat I hope you could address.

Let's keep track of those and here for. I'm hoping we can open it up so all the panelists could answer those at the end. Is that okay? Payment sure. Great.

I am watching the chat. Mayanne thank you very much. I would now like to introduce Matt Schreiber. I am hoping Mayanne with advanced one slide and then pass the presenter ball to so he has control. While she is doing that, I will tell you Doctor Schreiber is vice president for Spectrum Health. About the not-for-profit health system based in Western Michigan. Is a leader known for designing and implementing large-scale clinical improvement strategies in quality and safety? He is responsible for his -- quality and infrastructure to meet the needs of the health system. Especially as healthcare reform evolves. He will be very busy over the next 6-12 months. He began his career as a rural primary care doctor with the inventory and inpatient settings. In 2004, he focused on the inpatient setting and became a adult hospice -- hospitalist. It looks like he is kept climbing since then. We are delighted to have him here. And presenting. As soon as Mayanne passes the presenter to -- control to him, we will have him get started.

Mayanne, to do that -- it looks like you figured it out. Thank you everyone.

All right. Good morning. And thank you to the QIO for the invitation. I never turn down an opportunity to talk to a whole bunch of people who have no choice but to listen. Because that's not something I get in my private life. So it's really important that I capture those opportunities in my professional life. I wanted to let you know I don't have any relationships to disclose with industry our research partners. In fact I'm not even sure I have a relationship with my own retirement account anymore.

My job is to present to you some of the information we know about reducing hospital readmissions in general. I think you heard in compelling argument about the special case of patients with a diagnosis of sepsis. The essential truth is, routine hospital care is an adequate. The process that we use generally does not work. And that is irrespective of really the index diagnosis itself. And so a lot of the things I will talk about today applied generally across all diagnoses because there really are process issues that your organization may need to look at. If anyone suffers from insomnia or has a burning urge to understand everything there is to know about the readmissions penalty program, I have given you a link here where you can essentially reviewed the direct feed from CMS in all its glory. What I would like to say -- on behalf of readmissions work, is that really the public and our payers see preventable hospital
readmissions as defective care. And I think we can all recognize that we do have a bit of a safety crisis in health care. Where we know that these defects in care have significant impacts our patients. And there's an ever increasing public awareness about this. In 1999, the Institute of medicine released its landmark report that said, somewhere between 44,090 8000 people lose their lives every year due to preventable medical error. We now know that out the number is probably somewhere in the neighborhood of 200,000 people per year and potentially as high as 500,000 people per year. What you may not know is that, if the CDC were to track deaths due to preventable medical error, among its most common killers, it would come in somewhere between third and sixth.

Ahead of other things we think of as common killers. All of this is to say that, there is great interest in readmissions because of its costs and quality implications. Those implications are increasingly visible to the public work not only are we going to need to improve the activity that we do, we will have to do it under the hot white light of public scrutiny. So in the end, what is it that we need to do in order to reduce hospital readmissions across all diagnoses? It sounds deceptively simple. All we need to do is to make sure that the hospital staff, the patient -- and this is really important, not just the patient, but the patient's main person who is responsible for their success -- in my case that would be my spouse. In other people's cases, it may be their daughter wore their neighbor. But all of those people have to note the following information. The key diagnosis, the key tests and treatments performed during their hospitalization, the ongoing treatment plan -- including what medications and follow-up appointments they need. The red flag symptoms or the common side effects or failure points associated with treatment plant. And they have to know who and how to contact someone if something isn't going according to plan. So the plan can be adjusted. The problem with discharges today is, essentially they are often unplanned, there's ever increasing pressure on reducing the length of stay for patients. Which means is not at all uncommon for us to wake up one morning and realize -- the patient is now ready for discharge. So we would like them to get out of the hospital before 11:00. Meanwhile, that information may have come to a surprise to the patients and their families. And so it can be difficult to operationalize a discharge. Because patients need to be sicker than they ever have been in order to even get into the hospital these days, the truth is, at the time of discharge, patients are not necessarily well. They are really well enough to continue their convalescence as an outpatient. This translates to having a lot of details still under activity or potentially dangling at the time of discharge. And because our system has become more fragmented in terms of, responsibility and who's responsible in the inpatient environment and in the -- outpatient environment, those are frequently different teams of people. It sets up the opportunity to have incomplete communication and a lot of
those details really not being known or adequately covered by the person who needs to know them. The net consequence of all of this complexity and fractionalization of responsibility is that, unsafe dischargers are in under recognized and significant issue that really hasn't gotten a lot of concerted attention until the penalty programs were introduced. One of the challenges we have in healthcare is when we decide to work on something; generally speaking, we do a pretty good job with it. But we spend a lot of our time trying to evaluate -- I wonder what problem it is we are going to try and solve? And then we spend the next biggest increment on how we define a dashboard that will tell us whether we have been successful.

We spend a small amount of time actually implementing behavior change. And most importantly, ensuring that behavior change is still being implemented in the way we intended weeks or months later. And then we spend another increment of our time trying to explain why the data that we collected doesn't really tell the full picture of what we were studying because the data doesn't reveal what we had anticipated in seeing. As it pertains to hospital readmissions, I don't want to spend a whole bunch of your time trying to figure out what you need to work on.

Here's the list. The top 10 evidence-based interventions that if you do them, they will work. So you just need to focus on which thing are we going to try to tackle. And how do we see it through to completion. And to focus most of your time and energy, not on what are we going to do? But how do we actually do it and how do we ensure that our organization continues to do it? In order to help you, I don't need to spend a whole bunch of time surfing the Internet can't figure out what evidence exists. Here are five evidence-based change packages you can use. If you look them up on the Internet, you will find more information than you can shake a stick at.

The issue about these change packages is, it's hard to note that if you take a few elements from each of them, how it will all play out together. Each one of these change packages was tested as a bundle unto themselves. So if you only do four out of the five things suggested, it's not clear from the evidence how that will pan out for you. But if you were to look up all of these different change packages, you would see an awful lot of similarities in the essential problems that they are trying to approach. There's a whole bunch of information out there.

You don't need to spend a whole lot of your time developing new forms and tools for your organization to use. Here is a listing for you can get all that kind of information downloaded for free for your organization so you can do the minor tinkering that you need to do in order to make it functional within your organization. If you wanted to do -- make the greatest impact by choosing only one thing to focus on in hospital readmissions, that one thing should clearly be, issues surrounding medication reconciliation. There's a ton of information out there that says, that issues surrounding medications and making sure that the medications are correct -- will have the biggest
impact, bar none, of all of the interventions on that hit list. With that said, medication reconciliation is not an entry level improvement project. It's a big monster. It takes a fair degree of sophistication and understanding. So if you think your organization isn't quite ready to tackle that one, you can make at least some headway in reducing hospital readmissions with other -- the other tactics a better are a little more digestible -- a little easier to execute, such as making sure you have hospital follow-up appointments, before the patient actually leaves the hospital.

This is just a nice graphic that sort of helps people understand the impact and the implications and challenges we have around getting medications. If you presume that patients leave the hospital with exactly the right prescriptions that they ought to have - - so that's the first column that says this is all the medicines the treating physicians want to their patients to take. There's a voltage drop of how many of those prescriptions actually make it to the pharmacy.

There's another voltage drop -- and when you look at of the medications that made it to the pharmacy, how many of them actually get picked up? Another significant voltage drop when you look at all the medications picked up from the pharmacy, how many of them were taken as the physicians actually intended them? And then another voltage drop down to, if you look at all the medications that were actually pick up were taken by patients and actually get to their first refill -- you see that only a small proportion make it all the way through. I just wanted to take a couple of minutes to talk about the special case of sepsis and the experience that our organization had as we tried to tackle sepsis.

At the facility I worked with in Atlanta for about 10 years, we had a very successful sepsis collaborative where we reduced will house mortality by 33.0% across the system. And we had a very useful social experiment in that, when we backed away from some of the interventions that we had done, we had our will house more Pat -- mortality creep back up to its native rate. And when we re-implemented to be had those improvement projects with our mortality declined by about 30%. Fly feel pretty good that we could see the things we implemented made a significant difference. And when we stop doing them, we lost that improvement benefit.

The first thing I would say about sepsis is, treating people aggressively, particularly with fluids in the early minutes and hours -- makes a huge difference. I would say, the majority of our mortality benefit probably accrued to diagnoses that were not sepsis. Said another way, we had to argue for a long time to get our emergency room physicians and our inpatient physicians to understand that fluids could be very beneficial for people. And we'd often have the discussion of, do you really want me to treat every 18-year old during flu season that comes into the emergency department
with two leaders of normal saline? And the answer is, yes! That when young otherwise healthy people come in when they are a febrile or tachycardia and you treat them with fluids -- they get better. Many of them did have the flu and they were never in the cards to go down the sepsis pathway, but actually they get better faster, have chortling that stays and can be discharged to the community at a much higher rate than if you never gave them fluids in the first place.

So I just want to reinforce that sort of counterintuitive to all of the focus on sepsis, when you give aggressive fluids in particular early on, you actually help a whole lot of people with a whole bunch of diagnoses -- not just with your sepsis diagnosis. The second thing I will tell you is that you set of a sepsis protocol irrespective of what is on your order set or protocol converters benefit to the population. It's really important that the protocol be implemented at the earliest point in time that patients can be identified and frequently in the emergency room setting, that is prior to the initial visit with the physician themselves.

Said another way, if we wanted to empower our sepsis protocol to be triggered by our automated prompts and by nursing assessments, such that patients were already receiving their fluids before the emergency room physician even made first contact with the patient -- by doing this, we set the default in the right direction so that people were getting aggressive fluids. And if the physicians felt like that was inappropriate, they had to take them off of the protocol, instead of forcing the physicians to recognize sepsis and then initiate a protocol. I would say use of our rapid response team in responding to sepsis -- no matter where it occurred, the in the emergency department or ICU, it was very useful because treating aggressively -- patients with sepsis is ready so.

To have been -- hands of the bedside that understand the implication of sepsis, was very useful for us. We found that by focusing on the emergency department first, we were able to make enormous headway on treating sepsis in general. In our facility. But once we had really find our protocol and her program in the emergency department, we found that a lot of the risk assessment tools to be used in the emergency department, could not effectively be used in the inpatient environment in the surgical population or any ICU population, because essentially, everyone who was an inpatient flag positively on the tool. The tool was too sensitive for the inpatient environment for it to be useful. So we had to develop a separate risk assessment tool that was a little less sensitive and more specific in the inpatient environment in order for automated alerting to really be a useful part of our paradigm.

I would also say that, not only is the follow-up lactate in six hours important as a marker to tell you are you headed in the right direction? But we found a lot of the
recurrence in the inpatient environment of sepsis -- that is, we got really good at giving people their national -- their initial bolus and they responded well, but we didn't do a good job of making sure that people got generous fluids over the first 24 hour period such that they were getting somewhere between 60-80 mL per kilogram over 24 hours. When we stopped giving people fluids aggressively, we saw they had a recurrence of their septic state and the subsequent decline. So using a follow-up lactate level in 24 hours to help you identify those patients that were backsliding, can be a very useful tool.

The last thing I will say is that, sepsis is a very time sensitive condition. Such that doing aggressive fluids and antibiotic treatments just don't have the same yield outside the one hour window. And it is also true that the mortality benefit to giving fluids and antibiotics actually accrues minute by minute such that giving it in 30 minutes makes a bigger impact than giving it in 60 minutes. Though there is a clear step wise decline in the benefit after 60 minutes. The point is, you really want to push the system to get antibiotics and fluids in as early as possible. Certainly within 60 minutes, but the sooner, the better. So with that, that concludes the information I wanted to share with you. I will pass the ball back to Rebekah and allow her to facilitate the questions and answers.

Thank you so much Matt. That was a really helped whole presentation. Eye wall briefly summarize key points because I want to spend the rest of our time have the panel answer questions. We saw from our data that sepsis is a top diagnoses for readmissions nationally as well as what we can see in our New England data. We know the approach to sepsis remains systematic early detections to increase survival. We also know unfortunately there is currently no evidence-based intervention to help folks once they leave the hospital after a sepsis diagnosis. We don't have any interventions outside of our standard interventions that Matt covered so nicely to prevent folks from coming back in. So we will go to sort of the universal precautions model he described we can use the current evidence-based interventions. We will recommend that folks implement care transition best practices.

As our speakers outline. We bet a lot of you are probably working on sepsis specifically and probably have some interesting data. We want to make sure folks do share what works if your facility or your organization or area is working on sepsis specifically. Now we get to the fun part of the morning. We would like to spend our time taking questions. We have a lot of questions on the chat. Suggest to get right to the questions and not spend any more time, I will keep the lines muted and take questions off chat so we can get through as many as possible. On that note, we have the first question that came through during Maryanne's presentation, one participant noted there were many different screening tools available and Howard do facilities
choose and should be used more than one, what would be the goal of using more than one and what would she recommend X eye wall give that question to Mayanne.

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Thank you. I think this was from Chris Mitchell. Whatever you use to screen for sepsis, it can be used, it can be SIRS, SOFA bash the underlying question is deception round -- sepsis from, does the patient have an infection? All of the screening tools we'll tell you that the patient needs attention. We need to pay attention to that. I would suggest that in the MEUS score you also have the -- it sort of an object -- organizational choice. I would also say using the SOFA that is a predictive easy to use assessment tool that can tell you if the patient is likely to have a bad outcome. So maybe paying attention to bed placement for those patients. Making sure they get in the ICU so they can get full treatment rather than staying out on the med unit where they may not have that ability. That is my method, whatever you used, if it's in the presence of infection, which is the key for sepsis. I hope that helps.

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Another quick question from the chat, whether or not antibiotic stewardship programs, might be impacting the treatment of sepsis because maybe folks are hitting barriers to timely initiation of antibiotics. Eye wall direct that question to.

There's definitely an interesting dynamic that is happening between trying to promote aggressive sepsis recognition treatment with broad's Bactrim a Anna Meiler. At least until cultural information is available. And antibiotics stewardship efforts and C diff and efforts to reduce C diff. obviously the more you use broad-spectrum antibiotics, the worse you’re anabolic’s -- your anabolic stewardship and C diff become. For me there's a practical point in the anabolic stewardship experience. Which is a lot of programs focus on the initiation moment of antibiotics? How do we restrict access to carbon paradigms and similar broad-spectrum antibiotics to ensure brutal -- better utilization. Most of the excess use of antibiotics really is in the length of treatment. So in your facility, how long are people treating patients with pneumonia with IV antibiotics? If is longer than five days, probably in most cases, anything more than five days is to match. And how often are we forgetting to narrow the spectrum of our antibody queues -- use with information becomes available through cultures and consultation etc.

I do think it's possible to hit the sweet spot of being aggressive, with diagnosing sepsis early and treating with broad-spectrum antibiotics. But on the flipside, you have to be equally aggressive at during the spectrum based on what kind of source you have. Is it a skin infection? A belly infection? As well as ensuring you get your blood cultures before antibody administration and responding when you have that information. And finally, by looking with a critical eye on, when is enough, enough. When is the variability of the treatment -- when we are treating patients?
Thanks. The next question was whether or not CMS is supporting or endorsing these new sepsis definitions we went over? So the answer is no. They are not. They published a letter in the Journal of American medicine after the new definitions were published saying they were not going to change their inpatient quality measures implemented the prior year. They said these definitions -- the old definitions were well understood. People like SIRS. It's practical. They have been field tested. And while they are open to folks doing some innovative thinking and pushing boundaries, until there is good clinical trial data to support those new definitions, they are sticking with the old ones. On that note someone asked, whether or not sniffed should be ordering lactate to evaluate for sepsis? Maryanne, if you could address that.

So I think in 1030 and in the healthcare setting, I really think that things like the SOFA will come of age because it doesn't include a lab draw. It is level of consciousness, respiratory rate and blood pressure. If you get two or more positive out of the SOFA, the patient is sick. And in the present of infection, that would be a time to call out for some help and assistance from another facility. I think SIRS can also be used. But I think screening in the [Indiscernible] or and L tax is one of the next best step to take so we capture the patient's early and they can come back to the emergency department sooner even though we are trying to avoid readmissions, but the early treatment will be key for them.

Thank you Maryanne. There a lot more questions in chat. Unfortunately since we are at the top of the hour, we won't answer those right now live. We will try to answer all the chat questions and make answers available so that if folks didn't get their question answered, they can get the answer to that question as well. I apologize for not being able to get to everyone's question. For -- with that, I will turn it over to Morgan to wrap things up with housekeeping and upcoming programs.

Hello everyone. This is Morgan. As you can see on the screen now, these are list of upcoming webinars that we will be having between now and the end of the month. Be on the lookout for information about those. Let's see. As you can see here, the New England QIN-QIO is now on social media, be sure to go on Facebook, LinkedIn and Facebook and like the New England QIO. As you -- close the webinar, please fill out the evaluation. We would greatly appreciate it. If you don't have time to fill it out right now, you will receive an email tomorrow with a link to the evaluation as well as the link to the event page on our website. As Rebekah mentioned, we will try and answer all the questions placed in chat and hopefully get those out in the email tomorrow. Within the next few business days, the recording and transcript will also be
added to the website. Again, be on the lookout for information about our upcoming webinars and thank you to all of our speakers and have a great afternoon.

[Event Concluded]