CDC *Vital Signs* Town Hall Teleconference

Making Healthcare Safer: Stopping *Clostridium difficile* Infection
Transcript

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Coordinator: Welcome and thank you for standing by. At this time all participants are in a listen only mode. There will be opportunities to ask questions during today's call.

To ask a question at that time please press star then 1. Today's conference is being recorded. If you have any objections you may wish to disconnect at this time. I'll now turn the meeting over to Dr. Judy Monroe, Dr. Monroe you may begin.

Dr. Judy Monroe: Thank you. Well good afternoon everyone and I'm really glad all of you could join us today to discuss the latest *Vital Signs* report coming from CDC on stopping *clostridium difficile* or *C difficile* as we call it, the infections that we see in our inpatient and outpatient medical settings.

It was just a year ago when the first *Vital Signs* report on healthcare associated infections was released and that report showed how serious and costly and even deadly these infections can be.

Fortunately when we look at healthcare associated infections we see that most have actually declined in recent years, but this month's *Vital Signs* report highlights the fact that *C difficile* infections have not improved.

In fact they have climbed to historic highs and remain unacceptably high. As a physician and a public health professional I am particularly interested in this topic and excited to welcome all of the clinicians and medical educators that may be joining us on today's call.

This topic really provides an opportunity to highlight how public health and medicine can work together and make a really meaningful impact on patient care and safety.

We know that these infections can be prevented and within actually a relatively short period of time, so we're excited today as we're going to hear about three collaboratives that saw significant progress in less than two years by successfully engaging hospital staff from multiple disciplines in infection control and in prevention measures.

So without further delay I'm going to turn the teleconference over to Amanda Miller from the OSTLTS, that's the Office of State, Tribal, Local and territorial support, the OSTLTS communications team who will introduce our speakers and facilitate the discussion portion of today's meeting.

Amanda Miller: Good afternoon everyone and thank you for joining us today. Before we get started I want to remind you that you can download today's PowerPoint presentation and view bios for each of the presenters on the town hall teleconference website.

The web address http://www.cdc.gov/stltpublichealth/ and that is S-T-L-T public health, no spaces. There's a link directly to the town hall website under highlighted products and resources on the bottom right.

This site is also where we will add the audio recording and transcript for today's meeting and those should be available next week.

If you have any problems viewing the PowerPoint presentation, right click on the link and select Save As to download the presentation to your computer and this should eliminate any issues with your browser opening a large file.

There will be time for questions after our presentations today, but you can get in the queue to ask a question at any time during the teleconference, you'll press star 1 and record your name when prompted.

You will be announced into the conference by the operator Susan to ask your question in the second half of today's call. Now it is my pleasure to introduce our speakers.

I will introduce all of the speakers now and then each speaker will hand off to the next one after their presentation. Joining us today to provide a summary of this month's *Vital Signs* report is Dr. Clifford McDonald, a senior advisor for science and integrity in CDC's division of Healthcare Quality Promotion.

Then Dr. Brian Koll, a medical director and chief infection prevention at Beth Israel Medical Center will discuss a collaborative in the New York metropolitan region that has effectively reduced the incidents of hospital onset *C difficile* infections by 20%.

The Massachusetts Healthcare Associated Infection coordinator, (Eileen McHale) will introduce our next speaker, Dr. Susanne Salem-Schatz. Dr. Salem-Schatz is the program Director and improvement advisor for the Massachusetts coalition for the prevention of medical errors.

She will discuss how hospitals in the state reduced healthcare associated *C difficile* by 25% through a mixed methods learning collaborative. Chinyere Alu, a CDC public health prevention service fellow assigned to the Illinois Department for Public Health division of Patient Safety and Quality will be our last presenter today.

Alu will share results from the Illinois *clostridium difficile* prevention collaborative and their efforts to sustain improvements beyond the study period.

And now I will turn the call over to our first presenter, Dr. McDonald.

Dr. Clifford McDonald: Thank you Amanda, and I'm on Slide 4, transition to Slide 5, just giving an overview of the *Vital Signs*, answering the questions what are *clostridium difficile* infections, why are they important, where do they occur and the role of the hospitals, how can they be presented?

And what more can be done, transition to Slide 6, *clostridium difficile* and infections that it causes relate to an anaerobic bacterium, *clostridium difficile* does not grow in the presence of oxygen.

It is not normal part of our intestinal bacterial populations, it is instead spread through the fecal oral route between patients primarily.

It does form spores and these spores can be quite persistent in the environment and resist cleaning agents. The infection is caused by toxins that produce colitis, the spores are ingested and they pass down to the colon where they begin producing these toxins that colitis manifests most commonly as diarrhea.

But it may result in more severe disease and even deaths in some instances. We believe they are in most cases if not all cases two steps to infection with *clostridium difficile*.

First is antibiotics that alter the lower intestinal bacteria killing off normally protective bacterial populations, leaving the patient vulnerable.

After new acquisition then or transmission of the organism to the patient, they will develop disease. Now not everyone does, some go on and develop colonization that will last for a few months until the normal bacterial populations come back.

And they'll lose that colonization, another subset will go on developing infection. But we do believe that it's the sequence of events, antibiotics that lead to people to become vulnerable followed by the new acquisition of the organism.

Transition to Slide 7, why is *clostridium difficile* infection important right now and as alluded to already infections and deaths have reached and now remain at historic high levels, hospitalization has increased three fold from 2000 to 2009.

Deaths linked to *clostridium difficile* infection reached 14,000 in 2007 and in excess of a billion excess medical costs are related to *clostridium difficile* infections.

Much of this increase has been related to an epidemic strain that first emerged in the year 2000 which causes more cases and the greater severe disease.

Transitioning to Slide 8, *clostridium difficile* infections are largely healthcare related, this was a major finding of the *Vital Signs*.

But along with it we've identified that most in fact develop their symptoms first outside hospitals, 94% are healthcare related, 75% of these first have their manifestations or develop symptoms outside of hospitals.

This is primarily in nursing home patients, and others in the community who have had recent inpatient or outpatient exposures, 25% of all the cases do occur in people who have been in the hospital three days or greater and we call these hospital onset infections.

And you'll be hearing more about throughout this presentation, and post discharge *clostridium difficile* infections are common as alluded to and this may be because the most potent antibiotics are often used in hospitals and these have a lasting effect on patients.

Transitioning to Slide 9, we've also identified this important interdependence of hospitals and surrounding facilities in preventing *clostridium difficile* infections, 52% of *clostridium difficile* infections diagnosed in hospitals appear to be present on admission.

Several of these or a good proportion of these, 36% of this 52% or 19% overall are among patients who are recently discharged from the same hospital.

The other 48% of the pie of patients diagnosed in hospitals however are true hospital onset cases which are again the targets of these collaboratives you'll be hearing about.

The *clostridium difficile* infections that are present on admission are important because they are a potential source for intra hospital transmission and hence this inter dependence in reducing infections.

Slide 10 shows us the six steps toward preventing *clostridium difficile* infections that we tried to articulate in this Vital Sign. These include prescribing and using antibiotics carefully, a focus on early and reliable diagnosis, isolation of patients immediately in single patient rooms with a dedicated bathroom or toilet facilities.

The use of gloves and gowns for all contact with the patient and their environment, assuring adequate cleaning of the environment in augmenting this with EPA registered *C difficile* sporacidal disinfectants, and also notifying facilities upon patient transfer so we can put an end or interrupt this facility transmission of *clostridium difficile*.

Slide 11, highlights the fact that prevention is possible and you're going to be hearing about that, 71 hospitals showed a reduction in hospital onset *clostridium difficile* infection through programs in three states, Illinois, Massachusetts and New York.

This involved engagement of hospital leadership, implementation of prevention strategies, measurement and feedback of data resulting in this 20% overall reduction in *clostridium difficile* infections.

Slide 12 just highlights what can be done from a federal government perspective and we are committed to tracking and reporting through surveillance systems promoting prevention through programs and recommendations and offering our prevention expertise and laboratory and outbreak support.

States and communities meanwhile can encourage facilities to track and share data using NHSN, the National Healthcare Safety Network, develop regional prevention projects like those you'll hear about, provide technical assistance to facilities and standardize patient transfer forms.

Slide 13, what can be done by facility administrators? Certainly they can support better testing using better diagnostics and tracking and reporting of cases assuring adequate environmental cleaning by environmental services, notifying other facilities on patient transfer and participating in these types of regional prevention efforts.

Doctors and nurses can prescribe antibiotics more carefully, take an antibiotic time out 48 to 72 hours after prescribing an antibiotic and reassessing the patient whether they still need that antibiotic.

Ordering *C difficile* tests in the appropriate patient population and becoming aware of infection rates in their facility or practice and following control recommendations with every patient.

Finally patients on Slide 14 should be made aware that antibiotics can be lifesaving but are not without risk and should therefore be only used as directed by their doctor.

Patients should tell their doctor if they've been on antibiotics and developed diarrhea within a few months, they should wash their hands after using a bathroom and try to use a separate bathroom if they have diarrhea or be sure the bathroom is cleaned well if someone with diarrhea has used it.

With that I want to acknowledge these persons on Slide 15, and offer to hear from you if you want more information. Slide 16 provides you my email address, and with that I'll turn it over to Dr. Brian Koll.

Dr. Brian Koll: Thank you very much. I'm going to be talking about using a collaborative model intervention to prevent hospital onset *C difficile* infection in the New York Metropolitan region.

And I'm on Slide 18, and in terms of our collaborative, this really was a multi-pronged approach. The collaborative was organized by the Greater New York Hospital Association which was a trade association of nearly 250 hospitals in the area.

The United Hospital Fund which is an organization that is funds health services research, the New York State department of health, their hospital acquired infection reporting program which funded over five infection prevention demonstration projects throughout the state.

And lastly the individual hospitals and for our collaborative 47 hospitals started out, 35 submitted sufficient data for analysis and the breakdown of the hospitals is shown on the slide.

60% were major teaching hospitals, 37% were non-major teaching and 3% were non-teaching. I'm on Slide 19 now, this really was our process and in 2005 again greater New York hospital association and the United Hospital Fund had developed a collaborative model to reduce central line associated blood stream infections in the state, which was very successful.

The same model was used for the *C difficile* collaborative model. And that really consists of one, a steering committee that was composed of representatives from a variety of hospitals in the area.

And it was physicians, nurses, quality improvement folks and infection preventionists. There was a physician expert chair who was available not just to the steering committee but to the individual hospitals.

The data collection for the collaborative began in 2008 but prior to that in 2007 we have piloting of forms and we also had learning sessions.

We also had monthly teleconferences where hospitals were able to share their successes and challenges, site visits were made from members of the steering committee to really assist hospitals in implementation of practices to reduce *C difficile*.

And for all of our collaboratives one of the things that we have noted that in order to be successful in addition to having support from executive leadership there needs to be timely feedback of data so people can act upon their data.

Interdisciplinary teamwork, I think everyone on this call is familiar with that and what I have here on the side is something that we all learned that we really tried to advertise our teams.

And this is just one of the teams from one of my hospitals and you can see on the floor that they came up with a slogan called “Prevent an Infection, Save a Life, It Matters”.

And that really truly is the team on the floor, it was the physician leader, it was nursing champion, it was our infection prevention coaches. We had pharmacists on the team, nursing assistants and transporters.

In terms of data definitions for our collaborative we relied on definitions from Dr. McDonald, data collection was done, I'll discuss that in a minute and in terms of our prevention bundle again that also was based on what's been published in the literature.

We focused on practices related to environmental practices, and then also to what we will call an infection prevention bundle. We focused on what we thought we could first control.

We did not start with antibiotic stewardship. This pretty much is our bundle and in terms of the infection prevention bundle it's using soap and water for hand hygiene, contact precautions upon suspicion of *C difficile*.

So that really would be at the time that the test was ordered or when somebody developed diarrhea that we would look at signage and availability of gowns and gloves which was our personal protective equipment.

Many of us at the beginning of this were using shared rectal thermometers, the old sort of IBAC thermometers and as part of the collaborative pretty much we all got rid of sharing rectal thermometers and rectal thermometers if used were dedicated to patients with *C difficile*.

And also for many of us we don't have a lot of private rooms so we developed plans for patient placement hierarchy which is first private room, if a private room was not available it would then be cohorting and if cohorting was truly

impossible we then would have shared rooms where there was a patient with *C difficile* and a patient without.

However in rooms such as that bathrooms would not be shared and that gets to the next level of control which is dedicated bathrooms versus use of a commode.

And lastly we worked very closely with our transport department to ensure that precautions were maintained throughout the hospital.

In terms of environmental cleaning it was institution of a hypochloride based disinfectant. And use of the checklist for daily and terminal cleaning and in addition many of us went on to using visual clues such as Glo Germ or clean trace to really document the quality of cleaning.

To the right of the slide was a bundle checklist and on the bottom is the environmental checklist. We started off with paper forms and then we actually transitioned to Excel database where we entered them in our hospital and then the data went directly to greater New York hospital association where they were able to tabulate the data.

This is our timeline and our results so again we really started this in June of 2007 with formation of the steering committee. There was a practice survey that was done to really see the variation in practices related to *C difficile* so that we knew how best to approach and attack that so that we could standardize practices throughout the region.

You can see that beginning January of 2008 we started to pilot infection data collection forms, February it was the bundle data collection form and then in March the environmental data collection form.

Monthly calls started also the beginning of springtime of 2008, and just to get everyone oriented, the top line is hospital onset *C difficile* and you see that the rate dramatically decreased from about 13 per 10,000 patient days down to 8.

The next is going to be non-hospital, the third line going down is going to be community onset hospital associated, and the last is recurrent *C difficile*.

Overall the mean incidents of hospital onset *C difficile* decreased 20%, and in terms of our infection prevention bundles the mean scores range between 77% and 96% compliance. And what the environmental protocol scores range between 85% and 98% compliance.

I'm on Slide 22 now in terms of lessons learned, pretty much what we all appreciated was that regional efforts are very effective in motivating each and every one of us to change practices in our individual institutions and that there is strength in numbers.

That initially it was important to focus on what is controllable which means reduce the variability of infection prevention, environmental and disinfection practices.

And that it was very important to assure constituent use and monitoring of our prevention practice bundles and timely reporting back of data to end users. And all the collaboratives, it's very important to get administrative and clinical senior leadership support and for many of us this meant the board of trustees in addition to the chief executive officers, chief medical officers, chief nursing officers and presidents of our hospitals.

It was very important to get buy in and support from our front line staff, and for *C difficile* that meant our environmental services folks and our transporters and in terms of the importance of interdisciplinary team effort it really gets down to teaching, monitoring and enforcing practices, allowing the team members to problem solve and then to share and spread best practices.

The next steps, once we really focused on what was controllable, was really to begin now the next stage of this that was funded by New York State Department of Health which is an antimicrobial stewardship project.

And that went from October 2009 through April 2010 with the creation of a tool kit that is available for sharing.

And then also begin to focus on prevention efforts in our long term care facilities. And Slide 23 has our contacts from Greater New York Hospital Associations, Zeynep Sumer and Gina Shin, United Hospital Fund is Hillary Jalon and the New York State Department of Health Carol Van Antwerpen.

So I'm now going to turn it over, Slide 24 to Susanne Salem-Schatz from the Massachusetts coalition for the prevention of medical errors.

Dr. Susanne Salem-Schatz: Good morning, thank you very much. I'd like to first before starting acknowledge the 27 hospital teams that were involved in this work. IT was really their heart and soul that made any results that we had happen.

On Slide 25, an overview of the key features of the Massachusetts *C difficile* prevention collaborative which ran from the beginning of 2010 through 2011. If the teams were the heart of the change, probably the heart of the planning was the strong relationships between stakeholders throughout the state.

We're fortunate in Massachusetts to build on a strong history of collaborative improvement. Our team for the planning and implementation included representatives from the state Department of Public Health, our local QIO, experts in QI collaborative learning and consultants in organization development.

Hospitals were requested to show up with multidisciplinary teams including both usual suspects as well as those who may have been less likely to participate in quality improvement programs.

As they planned their changes, teams were coached to consistently ask who else needs to be part of this conversation and in that way we really encouraged them to create as wide a conversation and get as many people involved as possible.

Similar to New York we did give a common set of practice recommendations but we let the teams decide for themselves from each hospital where to start and which changes they wanted to begin implementing.

The structure of the program was similar to traditional learning collaboratives, with face to face meetings, conference calls and a plan for measurement and reporting.

But we added emphasis on content and activities to give teams strategies for engaging the front line and creating a sense of ownership for the improvement activities.

We talk a lot about the importance of front line buy in and front line ownership but we really wanted to make a concerted effort to provide training and skill development in that area.

Some of the strategies we used came from the approach known as positive deviance but we included others as well.

So we had a good balance promoting both the what, what are the identified best practices and the how, how can teams engage staff and learning for themselves what is keeping them from doing the right thing all of the time and how can they improve.

Moving to Page 26, from a post program survey the slide on the left, the chart on the left shows results about which kinds of changes the teams made.

And the most frequent areas that they made changes were in the areas of lab testing, environmental cleaning and disinfection and contact precautions.

The chart on the right shows the frequency with which different change strategies were employed. In our work we really emphasize active change strategies and one of our colleagues teaches that if education alone were enough to create change we'd all floss, exercise daily and always practice good hand hygiene.

While education will often be a part of the package, front line engagement and ownership along with shared data to monitor progress are features that we consider essential.

We were pleased that not one of the respondents to our post program survey reported using only education as a change strategy and that the next most frequent strategies included engaging staff and sharing data.

Slide 27 shows a picture of the results of our program, while we encourage teams to look at their data over time in a run chart form, similar to that on our title slide, we show here a pre-post clip of our impact.

And this slide we compare rates during a four month baseline period with the final four months of the collaborative. It's our intention to collect data for the first quarter of 2012 and then we'll have pre and post program numbers that we can compare.

At this point we see almost 100 fewer patients with *C difficile* during the most recent time period compared with baseline representing a 25% drop with rates decreasing from an average of 8.8% at baseline to 6.7 in the final four months of the collaborative.

I'm on Slide 28 and it's nice to have a simple table to show change like the previous one and while aggregate data can give us an overall summary of how things are moving, they also mask the individual progress and challenges of participating facilities.

Let me talk for just a minute about how we use data in our program. We asked teams to report hospital acquired *C difficile* rates monthly and fed those back in a run chart format.

The measurement approach really allowed us to track overall progress over time and identify who was having success that we wanted to be sure other teams learned about.

But we also put heavy emphasis on teams posting their run charts and using them as a visual reminder of progress and opportunities.

Run charts can highlight routines when things are not going as planned and also highlight unanticipated consequences of change. So 27 hospitals, 27 stories and just the one example we show in this picture here shows the path of a team that engaged their front line staff in developing and testing a new set of policies around C diff prevention.

And they were seeing progress over time, but we're concerned to see a midsummer spike when rates began to jump. They conducted a cause analysis which lead them to discover that *C difficile* tests were sometimes ordered unnecessarily and they hypothesize that the switch to the more sensitive PCR testing in July might be picking up colonized patients without active infection.

The change ordering policies is implemented in November and appears to have turned the rates back downward but they'll be watching this over time. So this is really just an example of how we like to see our teams using data to understand what's happening with their work and with their population.

Slide 29, we in Massachusetts have been in the business of running learning collaboratives for quite some time and this collaborative confirms some of our long held beliefs and offered some new insights and lessons as well.

The first, and this isn't news to anyone who's done this work is that improvement requires hard work time and is really supported by building on long term relationships and collaboration.

This includes relationships at the state wide level but also important are relationships and trusts that develop between collaborative participants.

And we saw teams turning to each other when looking for solutions both within the structured activities of the collaborative and outside of it.

Next we were reminded of the value of data shared with teams to motivate and track improvement and to solve problems as well as sharing results with the collaborative to facilitate the spread of good ideas.

And then we were reminded of the value of using an improvement framework which included aims, measures and small tests of change.

Teams could use these to enhance their own improvement process and then to share their stories with each other. And the ramp in the bottom picture on the right, is a picture presented by one of the teams that used the model for improvement to improve communication and adherence to contact precautions.

And this allowed them to share the steps that they tried before they implemented their final process. On slide 30 continued lessons, this work really reinforced for us the undeniable power of front line engagement. Front line staff at all levels are really in the best position to identify barriers to following preventive practices all of the time and can best find solutions that make the right thing to do really the easy thing to do.

We're reminded of the need to adapt changes locally, the picture on the left shows two different solutions to contact precaution signage that varies even within the own - the same institutions because the doors were different sizes.

So everybody really needs to think about we had best practices, we have things we're learning from other people how do we make these work in our own institutions?

Our teams taught us about the value of balancing serious messages with creative approaches to engage staff and to support a culture of quality.

The middle picture on this slide on the right is part of a hospital team with family members who died from *C difficile* and they shared these stories with their staff and with our collaborative teams with really tremendous impact.

In addition they created a humorous video with deadly serious messages about how to prevent infection with multi drug resistant organisms and they submitted this and won an honorable mention in the 3M infection prevention competition.

Then the bottom right picture here is one of our - one of several flash mobs that different hospital teams created to get the message out so people took a variety of both serious and more lighthearted approaches to get everybody involved in improvement in - on a very serious set of practices.

We're grateful for the funding that supported this work and for colleagues in other steps who were generous in sharing their experiences and tools and really believe our results showed the power of multi-disciplinary teams including front line staff who owned the problem, designing test solutions and track their progress with the data.

We think the collaborative structure allows an important structure for accelerating learning by sharing among teams, a strategy and data enhancing participants skills both in quality improvement and in creating a culture of engagement and patient safety.

I'd like to turn this over now to Chinyere Alu for her presentation from Illinois.

Chinyere Alu: Thank you. We're very happy to have this opportunity to share some of the results from the Illinois *clostridium difficile* prevention collaborative.

So on Slide 32, shows that the rates of *clostridium difficile* infections grew considerably within a ten year period, so a few years ago IDPH assessed the *C difficile* infection or CDI rates using the information from our hospital discharge data set.

And it's a database that contains ICD nine diagnosis codes for discharges from all of the acute care hospitals in Illinois.

And what we found was that the CDI rates in Illinois hospitals had more than doubled in just a ten year period from 4.5 cases to 9.2 cases per 1000 discharges.

So in response to this clearly growing problem IDPH partnered with our state's quality improvement organization known as ISMCIL to create and meet the Illinois CDI prevention collaborative.

The hospitals were invited to join the collaborative based on the CDI discharge rates as well as on their interest in participating.

So the collaborative kicked off in March of 2010 with 11 hospitals from the metro Chicago area. The second cohort of 9 hospitals from central and southern Illinois was added in October 2010 to accommodate more hospitals across the state.

The participation period for both of those cohorts ended in September of 2010, or I'm sorry of September 2011. Moving on to Slide 33, several goals

were established for the collaborative, however for today's presentation I'm going to focus on just a few of these.

The main goal was to decrease the hospital onset CDI incidence rate from baseline by 20% in the metro Chicago hospitals and by 15% in the central and southern Illinois cohort.

Another goal was to maintain high adherence rates for hand hygiene, gown and glove and environmental testing. In each cohort was expected to achieve a 90% adherence rate average for hand hygiene and contact precautions in an 85% rate adherence average for environmental cleaning during their respective participation periods.

Slide 34 outlines the approach that we took, we - IDPH and ISMCIL consulted with various stakeholder groups to test out the approach and hospitals were asked to return a participation form that was signed by the hospital executives.

This is one of the ways that the collaborative facilitated the engagement from the hospital leadership. Hospitals were also asked to establish a multi-disciplinary team with a designated project lead.

And all of the hospitals did establish those multi-disciplinary teams which typically included staff from infection prevention, quality management, environmental services or housekeeping, nursing and microbiology.

Based on CDC guidelines, IDPH and ISMCIL identified five CDI prevention strategies that constituted what we call a core bundle which the hospitals implemented.

Hand hygiene was one component, another was contact precautions which meant placing patients confirmed with CDI on contract precautions for the duration of the diarrhea.

A third component of the bundle was lab based alert for immediate notification of positive test results.

The bundle offer included education of hospital staff, the patients, the families and then fifthly environmental cleaning, which required using one to ten bleach solution or an EPA approved *C difficile* sporacidal solution to do terminal cleaning of the CDI patient room.

The hospital would also have an option of adding other strategies based on the gap analysis that they conducted as well as other needs that they identified in their facilities.

The hospitals are supported in implementing these strategies by - through technical assistance and also site visits were conducted. There are several sharing calls, webinars and face to face meetings that were held.

In terms of data collection, the hospitals reported their *C difficile* lab data as well as their adherence rates for hand hygiene and gun and glove use through CDC surveillance system and HSN.

They also completed a pre and post (unintelligible) assessment tool and as well as an evaluation after the collaborative and the - moving on to Slide 35, I will now present some of the results from the collaborative.

So this first graph here shows that the hospital onset CDI incidents rate per 10,000 patient for Chicago hospitals during their 19 month participation period.

The blue line are the actual CDI rates. And as you can see there are two hospitals switched, their methodologies are PCR which is a more accurate and sensitive test and may partially explain the increases in CDI that we see in July and September of 2010.

For analysis we decided to use a (Pathon) regression to model the monthly decreases in pool hospital onset CDI rates over time. So this model predicted decreases represented by the red trend lines, and just provides a better indication of the overall change in CDI rates because it takes into account all of the monthly data points.

So as you can see the model predicted hospital and CDI incidents decreased from 11.7 to 9.8 cases per 10,000 patient days which represents a 15% decrease and this was marginally statistically significant.

Now going forward one of the things that we are interested in is whether the decreases in the hospital onset CDI rates are sustained beyond the period of the collaborative.

So far we have been able to lift an additional two months of data that we have since the collaborative ended and from the set of their participation to the two months after the model predicted decrease for this group was 18% and was highly significant.

Moving on to Slide 36, this shows a hospital onset CDI incidents rate for the central and southern Illinois hospitals during their 12 month participation period.

One of the hospitals was excluded from the analysis due to non participation so again the red line shows that there was a large decrease and the model predicted CDI rate of 26%.

This was not statistically significant, however we do - we think that this may be due to the large spike that you can see in May and also their shorter participation period.

We are still in the process of evaluating the collaborative and we'll be looking at variables that may be associated with the changes that occurred in the CDI rates.

Moving on to Slide 37, the final results that I'll share today are for some of the CDI prevention practices. One of the challenges that was encountered during the collaborative period was that the hospitals didn't always report the data each month for hand hygiene, gun and glove use and particularly for environmental cleaning.

However the data that we do have show that adherence rates increased by the end of the collaborative period. For instance the hand hygiene adherence rates increased by 9% in the central and southern Illinois cohort.

In terms of the average adherence rate the highest was for hand hygiene. One of the cohorts average of 93% adherence rates during their participation period.

And then the lowest adherence rate was for environmental cleaning which was 78% and this is consistent with the feedback that we received from the collaborative hospitals indicating that more education and support is needed around environmental cleaning.

Transitioning to Slide 38, and just to wrap up, with some of the lessons learned I'll share just three of these, the first was that having multidisciplinary teams was important because they helped people to gain a better appreciation for the role of each discipline in preventing CDI and it also enhanced communication across the different departments.

As I already mentioned many of the collaborative hospitals identified environmental cleaning as an area of high interest and learning need.

And this is one of the things that informed IDPH's decision to create a video which highlights the role of environmental services in preventing CDI and what the collaborative hospitals did to involve environmental services, staff and CDI prevention.

This video is available on line at the link provided to www.notjustamaidservice.com, all one word. A second point that I'd like to make is that leadership support was important for sustain and change over time.

Many of the collaborative participants identified the leadership within their facilities as either factor that was very important to their success or that posed a challenge.

In addition the hospitals indicated that having state leadership from IDPH was helpful and strengthened their support for their prevention efforts.

The final point is the question of sustainability. Given that hospitals have many competing priorities how can we both the health departments and health facilities sustain the progress that we made in CDI prevention beyond the period of our specific collaboratives or interventions.

So the Illinois collaborative assisted the participating hospitals with strengthening their infrastructure for preventing CDI.

And we - you know we're really excited about the changes that have occurred during the collaborative period and we are interested in seeing what the hospital onset CDI rates look like over time, particularly between the hospitals that participated in this collaborative and those that did not.

So in terms of what the next steps are, besides just the evaluation last week we launched a state wide education initiative focused on *C difficile* prevention and that is engaged in both hospitals as well as the ones from their facilities.

I'd like to just wrap up, moving on to Slide 39 with just acknowledging everyone who contributed to making the collaborative possible and particularly Brandi Jordan who was the CDC public health prevention service fellow before me who lead this effort.

And I'd also like to thank the CDC for their assistance in our current evaluation efforts and I look forward to answering questions that you may have and I'll turn it back now to Amanda Miller.