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**C. difficile Prevention: A Multi-Faceted Approach**
**Great 8+ QIO Group Educational Webinar**
Presented by Susan M. Kellie, MD, MPH, Clinical Lead, New Mexico HAI LAN

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[Please stand by for real time captions] Good afternoon and welcome to the C-diff prevention multifaceted approach conference call. My name is held on all be your operator for today. At this time all participants are in a listen only mode. Later we will conduct a question-and-answer session. Please note this conference is being recorded. I would now like to turn the call over to Ms. and Timmins you may begin.

Thank you so much my name is the quality manager here in New Mexico and I am delighted to bring you clinical lead on all things HAI related Dr. Susan Kelly to present C-diff prevention and how it needs a multifaceted approach. Dr. Kelly is an infectious disease expert she works at both the University here at the VA and has a lot of experience not only clinically but in the teaching and working with quality improvement. She has a long relationship with us here and I think you will enjoy the presentation. Thank you.

Thanks and then welcome everybody. I will talk a bit today about a multifaceted approach to see difficile. Here in New Mexico we have been working on C. difficile for about two years now in a lot of different areas. In my own hospital we are working on bringing in new test being part of the national see different improvement project across the VA. We have transitioned a lot of clients in New Mexico to testing and we also work on the project in North Western New Mexico working on transitions of care and in all of these projects it's become clear to me that you cannot work hard enough on helping people to understand C-diff and the unique aspects of the disease. A lot of the issues that we have surrounding C-diff relate to lack of understanding about the carrier the disease state how people move between carrier and see state best treatment and best diagnosis so I will highlight some of the things we have learned as we go through this basic background. So first of all important to know that diarrhea is very common with antibiotic therapy but C. difficile is implicated in 20 to 30% of cases of patients with antibiotic associated diarrhea so for many years people have felt that C. difficile occurs only when you been antibiotic but now we are also seeing C. difficile infection in patients on patient with the immunosuppressive drug which are becoming more commonly used and we also see patients cropping up in the community with no apparent antimicrobial exposure. The antibiotics in general can cause diarrhea based on the effect of the antibiotics they change the bowel flora or
some components and antibiotics can direct a cause diarrhea. So people have been thinking of C. difficile is an antibiotic associated diarrhea but that's only part of the disease.

So the organism is an anaerobic spore forming gram-positive rod and one of the tricks to learning the difference between vegetative and spore form is people think vegetative form seems like I'm vegetating on my sofa not doing anything and in fact in microbiology that needs a organism is dividing and during this dividing period it is in fact sensitive to oxygen and disinfecting agents but when it goes into the spore form it is very resistant to most disinfecting agent except bleacher hydrogen peroxide. The other big misconception and language thing that we hear all the time is C. difficile culture in this organism cannot be cultured from stool in the labs. A test for it either in direct late looking for evidence of the talks and or direct Lee using PCR test that looks right at that part of that Thierry LCN a bit include the toxins.

So the other issue is that many physicians think of C. difficile present in patients in the general population and then they come into the hospital and get antibiotics and develop C-diff diarrhea. While it is true that there is a lot of C. difficile there in the population patients who come into the hospital already colonized with C-diff are less likely to get sick from the hospital train -- strain of C. difficile there are strains of C-diff in the hospital that tend to be multi-drug-resistant and toxigenic so it is not simply a colonized person from the community getting hospital treatment with antibiotics. They also have to acquire the C-diff in the hospital for the most part.

There is a wide spectrum of disease. There is some diarrhea and what constitutes diarrhea is very variable in definitions but it needs to be understood as 2 to 3 liquid bowel movements in a 24-hour period. Then you can go all the way to pseudomembranous colitis as you can see in the picture with the cobble stoning of fact sitting on the pink colonic be Xhosa and then you can develop a toxic megacolon where you have essentially a large bowel obstruction and then you can develop a picture of sepsis and death. Part of the problem is physician understanding of guidelines is that we also have guidelines for sepsis that say start antibiotics immediately and keep them rot spectrum and so forth however at the sepsis picked jury is all from C-diff heart of the treatment is to take away antibiotics.

So rates of C. difficile have been going at this is the slide everyone shows. Just recently in the conference which is going on in Denver they have pointed out that rates of C. difficile among hospitalized patients have doubled and then the last 10 years going from 2010 to 2011 here again it's a very similar picture and this is a population-based rate that you see in the rate that they are seeing now in patients as reported net study was a Perth as in hospital days.

As we all know death have been increasing as well and C. difficile is moving up as a leading cause of death for older people and most of the deaths do occur in people who are 65 years and older.

Here in New Mexico I like to make the point that the deaths that we saw with C. difficile used to be a fairly rare event and this is death certificate data here is showing now they are steadily seeing bits between 50 and 60 deaths a year with C. difficile coded as a primary cause of death and sewer population [ Indiscernible - low volume ] so you are probably seeing a lot more deaths.

So what is pushing this? Part of it is this strain which was described back in 2005 when it appeared in a large outbreak in French Canada and this is the map one map 10 pointy seven strain. It is resistant which makes it an ideal strain for flourishing in today's healthcare
environment where Tran for are used. Suddenly C. difficile went from being a nuisance disease with a low mortality of about .5% to a much more life-threatening condition with an average mortality with this strain of about 6%.

Also in that New England Journal they describe what is going on with this compared to other strains of C. difficile and it has an element there TCD are and TCD three so these are changed so you get a tremendous up regulation of the generation of toxins. Toxin A and toxin B and you can see in comparison at the bottom chart -- in comparison to the strains of C. difficile we've seen in the past other toxigenic extremes but this map -- map one ramps up toxin production and this is where sometimes we are seeing patients get extremely sick extremely fast and we suspect this strain of C. difficile is present irksome hospitals are using a PCR that can tell them if this strain is present. It's hard to know if that helps you in the clinical arena it is really more useful as an epidemiologic tool to know how dangerous the C-diff C. difficile is. We are also seeing with this strain in previously low risk populations so part of the C. difficile is related to the host which is often an older patient immuno compromised but at least one death occurred in a pregnant woman that was reported by CDC and they went looking and found quite a lot of C. difficile in previously low risk rubes. So they went ahead and investigated this a little more systematically. I'll show you that flight in the second. This is to point out that really almost every state has reported nap one and I'd be surprised if the deep South and Nevada on this map did not have map one by now because the map is five years old and it is also spread across Canada.

The high mortality is one aspect of this and then there is also what is called hyper spore relations which means that the high rates for formation contaminating the environment.

So this is the CDC going out and looking at some C. difficile cases in depth revealing charts to see if patients have been in the hospital or even having outpatient visit and they found that 75% of healthcare associated cases -- people who went to their doctor's office have on set out by the acute care hospitals. When they asked carefully it was reassuring that only about 7% of the patients that they were reviewing had no healthcare exposure. So this may not be as widely disseminated in the community as was feared when you take a good history.

Soda put this in this here in New Mexico and elsewhere in the West in fact in Tarik disease is quite common and probably relate to having poor water supplies in some areas. It is not uncommon and so we're trying to put this in perspective for some of our participants in the community and look at the home and Ella and the rate per hundred thousand population in the community. You can see six per hundred thousand for Shigella and then 1600 thousand for salmonella and then Campylobacter is eight team low-fat -- [ Indiscernible - low volume ]

We are lucky here that we have the program which is population-based did the DB knowledge he in Bern Otello County for us and we are able to find our rate per hundred thousand population per year as 163*C. difficile is tenfold that and you can add it together and it's fivefold greater than all pathogens put together.

So what else is going on with C. difficile it's not just antibiotics and so proton pump inhibitors now have a warning in the package that they can do a risk for C. difficile complicated it's not just related to inhibition of acid which can kill organisms in the stomach it relates to the proton pump affects on Bylund fax that those have on the G.I. floor as well. So immuno suppressant drugs to a lesser extent age over 70 there is a recently reported Association with C. difficile and dialysis patients also have double risk of C. difficile. Antibiotics that seemed to be most strongly associated are pseudomembranous cephalosporins and clindamycin. So how can we improve the
situation. If we look abroad to the UK and these are data that goes through March of this year and this is their rate per 100,000 that days so they started out at 19 and now they’re down to 17 which corresponds to our rate if you can think of our reported rate in the most recent data was eight per 10,000 bed days they started out at nine and now they are down to 1.7 so they actually managed to decrease C. difficile. Habit they do it? They grounded out [laughter]. There is no matter Jake way -- magic way for this no drug solution probiotics are not the answer vancomycin is not the answer but they actually reduced C-diff you have to cover all bases and keep at it in a very systematic way which is what they did in the UK with great results.

So what we used when we went ahead and did our collaboratives and our interfacility collaborative focus most recently we went to the UK website and we realized their whole approaches verifications centered so they look at the patient we try to teach to look at the patient as they go through the whole process of care and there are multiple health professionals that have a role in diagnosing and treating the C. difficile preventing C. difficile in patients and then preventing the spread of that. So we want clean hospitals we want antimicrobial stewardship we want providers to diagnose and treat the C. difficile especially to work on the recurrences prompted diagnoses and to treat the C. difficile according to guidelines. We want the labs to offer the best available testing and then nurses need to understand the infection control and recognize changes in their patients and then the infection prevention this are doing surveillance and teaching the appropriate precautions and tracking rate and giving feedback.

This is a summary again nothing malty disciplinary aspect of control of C. difficile that we just discussed. It's really a critical elements that more than eight groups are involved because he also have to educate the patient visitors and you also need to have a lot of partnership between your pharmacy microbiology and clinicians in your hospital and then look at your communication discharge so that you are able to alert long-term-care facilities to the patient's status and have them go to the appropriate room in the long-term-care facility and also just for that facility to realize they need to think twice about giving them an antibiotic again.

So one of the things we did was massive physician education. One of my fellows developed this trifold and we have dated all the physicians with in services at all of our resident readings and so on the current treatment of C. difficile and when it was appropriate to use lake myosin for severe disease and then if the patient was having multiple leader relapses how to approach that went to consult infectious disease and surgery.

Some of the core knowledge areas that we went out and discussed were the syndrome risk stratification understanding guidelines using the best therapy preventing transmission and managing transitions of care. Some of this was by a survey that we did on our residents and attending Zener University hospital that was published in the American Journal of infection control I think it was December of 2012 and people have been interested in that survey because one of the things we found is that for the donations C. difficile was all kind of the same and they were not food into a risk stratifying the patient treating differently based on the risk stratification and more recently issued American gastroenterological Society guidelines have been even more detailed clinical stratification.

The clinicians perspective out there is that they want to yes no answer is my patient have C. difficile or not they don't like ambiguity and they don't like having to communicate to patients about some of these difficult situations like yes you just had the difficile you're not having diarrhea now it is not cured it is not gone from you and your risk for relapse.
So one of the things I realized going out and talking to a lot of physicians in the community is that they tend to have nieces in the brain where they will file information away and the difficile have gotten files in the same context as pathogens so I think this is why sometimes doctors are still asking for still cultures. We have even had people out there asking for susceptibility testing for C. difficile which is not performed in the lab setting because they're frustrated with multiple relapses and there is also still a tendency to want to test for cure because people are thinking about dealing with Shigella and Salmonella where often you do want to send its dual especially if the patient is working in a healthcare setting or in a food prep setting her round high risk people like elderly or neonates.

So understanding that mindset is helpful in designing and teaching. One of the things we also have to address was how to rollout new tests in a way that was cost-effective and so as labs were looking at the idea of the guidelines the end lined assay is fast and easy but it is not the best test is recommended. So PCR is very sensitive and specific and however is expensive and a lot of labs have gone to an in between strategy that uses both talks and screening and in antigen screening for glutaraldehyde dehydrogenase and then if there are disparities then go to the PCR to resolve the disparity and put in the test results to the clinician. One of the biggest things is working with the lab and your clinician to limit unnecessary testing and hence keep down the cost and everyone will be happier.

So test of cure quacks this is in the community and is often requested by nursing homes that are receiving patients and so when you do a test for toxin like an EEI a you should really only do that if the patient has diarrhea because the toxin will create diarrhea. Once they do not have diarrhea they are unlikely to have a too positive toxin test. Then on the flip side you have the antigen test that test for the presence of the organisms but not the toxin so you might have diarrhea of another cause the patient is still positive on PCR and they will get through this and then sometimes you go back and see them the next day they are better and it's probably not C. difficile it was probably the prep they got further CAT scan. The other problem is asymptomatic carriage, and then may be prolonged. Patients may carry C. difficile for three months and some in the unit compromise patient space carry the same strain prep to six months. That is the maximum time to be shown it could be longer. So risks of colonized nations very with the patient. A new study dish showed that 9% of asymptomatic patients coming into a hospital I think this was in the Ohio area were carrying C. difficile on the PCR test that tests for the toxin be Jean -- toxin be Jean and risks to increase your risk of colonized nations are hospitalized patients in treatment within the biotics chemo proton pump inhibitors are H2-blockers. So patients come in colonized it clear that you have to be cleaning everywhere but when you know the patient's was C. difficile you need to use a cleaning treatment that has spores so limited data show that you can reduce the C. difficile transmission if you are cleaning properly. We know that being in the C. difficile occupied room increases your risk of C. difficile it doubles your risk essentially. So we worked a lot and we have had some wonderful cleaning staff who have done great presentations and one of the biggest issues is in gauging your cleaners and training your cleaners using checklists. Another great way of going into the room is working left right and working around the room systematically in that way you can help people be fur on the cleaning.

Communication with nursing staff is a huge issue one of the problems is that when the patient gets discharged assignment comes down in what you have to do is make sure when the patient is just charged that the correct signage and that forms the cleaners what to use or that there is some other way to communicate with the cleaners that they have to do the cleaning with bleach. So just to make sure everyone has the correct signage. We use the contact precautions to sign Mayor Brown so everyone gets the message. Contact precautions to means you have to use[
Indiscernible - low volume] so key decisions in healthcare in general this is a very big focus for
joint commission right now. Who cleans what with what for how long when do we use the
different products for C. difficile and how do we communicate that monitor cleaning here

So a checklist to ensure a culture of reliability. Sometimes people are resistant to checklist and I
tell them that we are expecting our physicians are people with multiple[ Indiscernible - low
volume] to put in a central line with five or six steps in here you have your cleaners who
actually have to hit many more point as a cleaner room. They need a checklist to or at least a
very systematic replicable approach to cleaning and his health care providers get interrupted
cleaners get interrupted as well they need to accommodate the patient so if you get interested you
need something to put you back on track.

Some of the things people are doing as training tools is UV marking and I initially thought the
room had to be really dark to see these. But the UV marks now can be seen in pretty normal light
maybe not bright light that if you can turn down the lights that works pretty light -- well. ATP
monitoring this is really fun to use and not that expensive. It is so impressive when you use it for
training as we have done at the VA. You have a swab a little manual holder and you swab the
surface. It picks up live or dead organic material and put that in the ATP reader and you get a
number and what is most remarkable is that when you he first started doing this for cleaning
checking at the VA worry getting numbers in the 4000s into thousands range and then the
cleaners had to go back and reclaim. After working with to specified cleaners for some time we
just focused on C. difficile they got to the point where they consistently generate numbers on the
first reading that would be 100 or less so this tool basically enables them to see what previously
had been invisible to them and train them to clean in a way that they would generate a good
number on the first reading and not have to reclaim. -- Re-cleaned so this is risk of C diff based
on the prior occupants so you can see there was no C. difficile that is the solid line on the top.
The risk of C. difficile by the end of the hospital stay would be 4.6% and before the risk was
11% so it is pretty hairy when you go into a hospital you are doomed to C. difficile based on the
room that you're going into. At the Russian roulette.

So EMS personnel need to be involved in the overall and the team care of patients and so we
started to use in different language surrounding cleaning. People are talking about things like
hygienic cleaning practice and so EMS staff understands what they are doing is scientific they
like the training tools especially the ATP numbers they can see them coming down and then the
more education they get about personal protective equipment and so forth the better because
some managers have told us that the staff are very concerned about going into a room that have
patients on isolation precautions and they are worse the -- worried about personal safety and the
better they know the better they can be and managing that an understanding that they can control
their exposure through good rectus is.

This is the CDC checklist for the high touch areas. This is been a revolution in cleaning between
evidence-based training now where people used to focus on having beautiful floors and so forth
and dustbunnies not being on the stairs but those were not the floors and stairs were not killing
the patient's. It was the bedside overbid table and the call button and the telephone.

So some of the pitfalls are that you may have separate groups cleaning different things in the
area. We almost always do. Who cleans electronics is another big bugbear in healthcare. We
actually found at the VA that the joint commission survey or came through in the phone at the
volunteers desk was filthy. Nobody was cleaning it and as it turned out phones were supposed to
be cleaned by the user. All the phones at the desk said many times patients are powering phones
so were putting up the alert everyone has to clean their phone at their desk especially when they're in a patient care area where the patient's the use the phone. You have to make sure that you provide the right chemicals that are EPA approved. Sometimes if you provide a very concentrated chemical to your Ward nursing staff will tend to use it more concentrated and that can be an issue with your equipment. So always clean from the manufacturer’s instructions and then minimize contamination bucket solutions cross-contamination by Raikes and our best environmental services preventer here gives a very convincing case as to why everyone should be using microfiber for many reasons including EE find workplace injuries because it is much lighter than using mops.

So antimicrobial stewardship is another whole issue. CMS surveys are currently being piloted that will look at the measures of antimicrobial also is and. There is no doubt that it will reduce your C. difficile and it will reduce resistance and your gram-negative Epogen so the way to focus on antimicrobial stewardship is really on patient safety. People are often looking at antimicrobial stewardship to save money and you may save money initially but then you pretty much save what you can save and then what you are doing from then on is presenting increases of cost because you have prevented the need to use broader and broader more big gun antibiotics.

So this is an illustration of fluoroquinolone use. Fluoroquinolone restriction alone if you want to focus on one thing is very useful in bringing down C. difficile and at the VA I had one of my fellow students study and just with one person using to intervention periods she had her C. difficile went down and the rates were statistically significant dropped both times which is very hard to achieve in a relatively small hospital when you're making intervention for short period of time. So fluoroquinolones are very easy to restrict because they are so grossly overused in patient care. So it's a great inning to start your focus on and you'll get some mileage straightaway.

Here are some more antimicrobial stewardship this was with the introduction of a health record and they did a much broader kind of review of 49 different antibiotics and they were able to decrease their usage by almost 30% and their bursa and C. difficile both drop significantly.

So some of the biggest challenges are still hand hygiene and we have installed some electronic sensors at the VA and as I suspected we have very low rates of hand hygiene adherence so I think the electronic hand hygiene monitoring is the way of the future and it will help your infection prevention work converting your healthcare workers to a belief in hand hygiene practice. The other biggest challenge of managing transition care so just to talk a bit more about the hand hygiene adherence having these electronic data is really helpful because you've ended just as steady stream of data that you need to get back information to the healthcare workers and say this is how you are doing. We know you want to do better how can we help you do better on your hand hygiene? Silly Lane, Larson recently reviewed hand hygiene adherence and observation in a paper in the American Journal of infection control and she is over the actual physical observation of healthcare workers now. She's more interested in getting the information electronically which is more accurate and really informing healthcare workers so they can do what we know deep down they want to do is healthcare professionals they want to take care of the patients in hand hygiene is part of that.

So skin contamination of C. difficile is really common and you have to show your workers data like this that can convince them that yes if you touch that patient without a glove on or they are not in contact or cautions their skin is heavily contaminated and their environment is contaminated in you will carry that out of the room to the next patient and you have to get it off your hands.
Hand hygiene behavior you know we only wash our hands when we think they are dirty and so we have to learn in the hospital that we have to do -- cleaner hands of certain way because it is what scientifically known to work so you are actually having to fight people in here and habits that they have grown up with so it doesn't feel very rational to healthcare workers to be doing this constant hand hygiene so you have to convince them of that rationale with a lot of education. It's hard to do that when you are spending all of your time watching them not do hand hygiene.

So soap and water is preferred for C. difficile. This study demonstrates that pretty well. You want a decent [Indiscernible - low volume] so you can see that the warm water intervention comparing water and plain soap with no hand hygiene and water and planes soap with alcohol-based hand rub you can see that alcohol-based hand rub has about the same effect on C. difficile: the count is no hand hygiene whatsoever so you really need to be washing the sports off the hands. Going to cold water this is not quite as good the antibacterial soap does not really add that much. One interesting thing is if you are in a situation where you absolutely have no running water which sometimes happened healthcare or the patient is sitting in the bed and cannot wash their hands and antiseptic hand wipe will actually reduce the C. difficile somewhat so it is actually better than nothing.

This is more of the same so warm water and Excel this is a different method that you can see the water and so it is better than the alcohol-based hand rub so it's really hard with healthcare workers to say you just taught us how did you all this alcohol-based hand rub and now you're telling us that has to be soap and water and then you get into the issues of adequate thanks which is common -- thanks -- [Indiscernible - low volume] fig about where you're going to place the patients in the rooms with the best sinks for your hand hygiene to help -- In the right way. So hand hygiene is the slowest idea in medicine. So anesthesia invented 1846 was picked up on pretty quickly for obvious reasons the patient stop screaming. It is very gratifying. Surgical antisepsis took about a generation and patient stop dying. Penicillin was very gratifying especially in World War II a lot of uptake there. Oral rehydration therapy for infant diarrhea did take a lot of pushing with community healthcare workers and then hand hygiene even in developed countries we are still working on it hundred and 60 years later so this is from ideas from a great editorial on slow ideas in medicine in the New Yorker not long ago.

How do we spread these ideas? We go door to door and talk to individuals with simple messages so we still need to talk to them about C. difficile and why we have to do the appropriate hand hygiene. Community-based teachers make the learner perform that task. I know how to wash my hands oh really? So when you see how they wash their hands they do it for about 3 second and they do not get the back of the hands in the back of the thumbs and once you point out to them that it really takes 15 seconds that is a whole new procedure they need to learn. And then to be constantly supportive he talks about healthcare workers or community health workers going on to talking to them about safe childbirth practices and trying to could educate community midwives and not being critical but all the things supportive to get them to uptake the new ideas.

So breaking the cycle of this constant readmissions for C. difficile is another challenge. You have got an acute-care episode of C. difficile patient goes out oftentimes on a proton -- proton pump inhibitor and maybe it was not necessary. It was started in ICU and was Ongoing. Or nursing homes tell us we have always Asians come in on proton pump inhibitors and we don't know why. They were not on it when we sent them to the hospital. Then maybe there is a fully in place -- a fully in place -- antibiotics get started and then they relapse in the end up back in acute-care.
So this data is from emerging infections program 2010 and it shows that those first few weeks after discharge are really critical for the on scent of healthcare related C. difficile so this may be occurring at home or in long-term care. These epidemiologists go out and look at every case reported and they also call about 10% of the patients to get a more precise information when they were last in the hospital so you can see the risk of relapse in that first post hospital period is very high.

So what works? What we have seen is involving clinicians in developing regional transfer forms. We have some very enterprising infection preventive who hold community meetings with long-term care providers even funeral homes and other services. We have hospital services and they basically discussed these issues once a month so that the hospitals are aware of readmissions for C. difficile and are aware of the barriers and communication. As we develop regional transfer forms we want to make sure that there is a place on those forms for tracking all multidrug pathogens. The infection prevention people in acute-care hospitals really have to be teaching the people at the lower levels of care just what these Intel and the kind of infection prevention practices that need to occur because otherwise you will get into an issue where you have a long-term care facility saying we do not take those patients because we don't know how to take care of them and this is really just a knowledge deficit or they have never heard of that organism before.

Without all wind up then we'll have time for a little bit of discussion. We can share some of the things that we have been doing in New Mexico. Thank you everybody.

Any questions out there?

If you would like to ask a question please press*one on your touchtone phone. If you are using a speakerphone you need to pick up the handset first before pressing the numbers.

We have a question from Kathy from the New Mexico behavioral Center. Is going at.

I am wondering why the probiotic is not an effective implement and I will go back on speaker. In fact I am trying to think -- recently the probiotics have been around for a while and I will give you a couple of perspectives on it. One is that there is limited evidence that probiotics in outpatient settings decrease antibiotic related diarrhea. The probiotic debate has really been shaped all lot by the probiotic industry and in fact even the name probiotic kind of skews your attitude toward the supplements that they are uniformly helpful and nine. -- The nine. Recently in Britain they decided let's do a perspective randomize controlled pragmatic clinical trial that means we will actually do this clinical trial in patients in the hospital that are receiving a variety of treatment and will look at patients that are over 65 and we Willis signed them to probiotic or not. They found absolutely no decrease in C. difficile in those patients who were getting probiotics as they said let's not call them probiotics, let's call them just anti-microbial preparations. The evidence is not there that it is going to decrease C. difficile and exact leave those patients who are at most risk for C. difficile and severe consequences which would be your older people who are in hospital. To me I am looking at the cost of what we are spending on probiotics in the hospital now and we are thinking about whether or not we should even use them. One thing that concerns me about probiotics is the safety has not been all that well examined and there was a huge review done by the RAND Corp. Corporation that was commissioned by HR Q and they determined that the type of research done had not been enough to really inform us about the safety because so much of it was in the outpatient setting. Also
there was a study done in Europe called the row patria study where they gave probiotics to patients with severe pantry at Titus in the ICU and the mortality rate was higher in the patients who got the probiotics and when they did autopsies they found that they had a necrotizing small bowel process so we certainly did not use them in patient who are in critical care who might not be perfuming their small bottle and maybe they would cause some kind of bowel overgrowth so I think there is a lack of good convincing evidence that probiotics are a worthwhile intervention in inpatient care. Really cannot tell you about nursing homes with older people they are in patients to me and maybe a little bit helpful in the community to prevent antimicrobial diarrhea.

Thank you.

Are there other questions out there?

[ Indiscernible - low volume ] what percentage of the population that colonizes C. difficile?

We know that 9% of patients coming into the hospital are caring toxigenic strains and we may have 10 to 20% of people in the population who are colonizing C. difficile altogether but many of the strains are not toxigenic strains so there are probably more than 40 strains human strains of C. difficile out there not all of them are toxin -- toxin producers and then I saw another question here about where can I find more information on alert Anne Timmins Angie -- hand hygiene detection? There is a whole review issue of American Journal of infection control within the last year that focused exclusively on hand hygiene. The papers going back now to 2004 if you look at the American Journal of infection control they will have papers and one of the papers I like the most is actually from John Hopkins that was in critical care medicine by an author called Swoboda and she is in infection prevention must and they actually found that they put badges on their employees and they also had a voice -- if the employee edict not do hand hygiene in interning the room there was a voice remember to do hand hygiene so with that they stop their hand hygiene with every room in tree and ask that go from 24% to 35% and they had a significant drop in their healthcare associated infections with that very modest increase in hand hygiene so there is a number of corporations out there that you can look at the website -- there is the high green is another system they are all varying levels of expense but it seems like having an active voice message is probably the most effective. Other questions?

Gastroenterology guidelines? It is the American Society for gastroenterology. If you go to their website they have a new guideline. I will say that their guidelines have clinical stratification. One thing they do have in there is that after the patient relapses a couple of times they recommend going to the fecal micro mode of transport pretty quickly and that now has some issues because it will require FDA investigational new drug application so make sure your clinicians who might be doing that are aware of that. What other chat things are going on here?

What type of precautions are in patients and for how long?

We put them in what we call contact cautions to which is the brown sign that instructs people to do soap and water hand hygiene after all patient contact and that they wear a gown and gloves.

Database to calculate mortality rates?

I would have to go back to that study. It probably is the -- in the national Hospital discharge database and just one caveat there is that it is coding based. The actual death certificates will be somewhat different those are already on ICD 10 and so you can usually find your state and in New Mexico we have a system that is run by our Department of Health and you can go on your
Department of Health website and look for the vital statistics data for your state and you can put in the ICD 10 code for C. difficile and see how many deaths you had and we have it broken down by county so I would expect every state does have that data available. He could speak to your state Department of Health for that. So copy of the Dr. handout trifold? We do have it available and we have it delocalized so health insight has that. It is very helpful in doing your teaching. -- Regional transfers sheets, New Jersey has regional transfers sheets. The CDC on the website has this a jested regional universal transfer sheet. We have a group of clinicians working on one now New Mexico. I am trying to think where it is, I think it is on the CDC website in the C. difficile area we can dig that up and send it to everyone. -- -- -- I am going through that chat question. What is the ICD 10 code for C. difficile? My slide here has an inaccuracy. It's as ICD-9, that code which I think is zero is 047 actually the ICD 10 code is 804.7 that is the ICD 10 code. It says on the slide at the ICD-9 but it actually the ICD 10 and the transcript should read a is an Apple zero 4.7 so have fun with that on your state's database. Any other questions out there?

We have to questions on the phone. One is from Maryland from the Minnesota Hospital Association. These go ahead here

I am wondering what kind of a time lag you may look at if you're going to do some effective work on antimicrobial stewardship what the time light might be expected before you with the a decrease in your rates?

You know what we did when we had this intensive intervention we actually saw a change from one three-month period to the next. The thing about C. difficile is that can fool you a little because it has a big seasonal variation where the rates will go up in the winter time and then down in the summer. It's very consistent but you can see a change within three months. What we specifically looked at was reducing our use of respiratory low vowel back and moxifloxacin and actually have higher risk of C diff than simply ciprofloxacin so many times people are using a respiratory quinolone that has the expanded coverage when they could be using a Cipro for instant people love levofoxacin no use it for everything and says the problem. When we analyzed our for cuddle in use we found that 89% of the time when our physicians were purse writing they could've used a plane for quinolone such as Cipro. You don't need a respite story source of quinolone to treat respiratory infections or combined with something else if they want to do that. Pseudomonas it's not necessary or for intra-abdominal infections so have your pharmacist look at respiratory quinolones and all quinolone use. Often there is a tremendous duplication of therapies going on when the floor quinolones are comp lying to the medications and levofoxacin is quite expensive so they enjoy saving some money Byrum reducing the levofoxacin use.[ Inaudible - static ] another question?

This comes from Jessica from the University of Nebraska. Please go ahead.

I'm sorry I'm from New Mexico. Can you hear me on the phone okay? My question is and I just went in the chat room is with the educational brochure that you have available have you guys showed measured behavioral change among providers using that material?

What we were able to show the one thing that we analyzed was our testing and we did this educational piece in the course of switching our hospital from an EIA toxin test to a combination antigen toxin backed up by PCR and what we were able to show is that we reduced our duplicate negative testing by about 50% -- sorry reduced our duplicate testing to almost nothing. Our yield on testing went from 9% positive to 20% positive. So we stopped ordering C-DIFF C. difficile
times three we stop doing test of cure we worked with the lab so they would not do repeat test within a week and we actually broadened a superior test that was more expensive we reduced the test per -- the cost for positive test from about $134-$70 so that is the outcome that we looked at. It was really not based on physician knowledge we had a lot of administrative controls in there as well but we were able to show that we are implementing the test and a much more effective way.

[ Inaudible - static ] the awareness of risk stratification did improve and that is my observation that with the testing change it was really marketed that all of this duplicate testing basically we were able to make it go away. Now if you just make your lab say no it does not work and people get angry and they will work around that anyway so if you are going to have your lab do that you have to do all the education that goes along with it.

Okay thank you.

Any other questions?

We shown no further questions on the phone.

Okay. In a long-term care facility you would if it is not possible to separate rooms and provide separate bathrooms?

That is a tough one. You may have to patient side-by-side with C. difficile. One of who gets better and the other is still continuing to heavily contaminate the room. When you cannot separate people you need contact precautions and the best you can do is a really aggressive teaching about zonal care so that people are not going from patient to patient without changing and doing the appropriate hand hygiene. The other thing we realize about long-term care is that sometimes the patient with the diarrhea are really debilitated they are not going to the bathroom on their own so often in the long-term care they will be using a bit site, load and so that is one way to keep them out of the bathroom if the bathroom has to be a communal bathroom so that they are not contaminating the bathroom all the time. In that case you would have to be doing bleach cleaning daily if you had a patient who did not have C. difficile but we try to avoid that situation. I know what happens. Any other questions on the chat?

Thank you everybody I think we are done. Unless people have more questions and we are ready to share all of our materials here.

We have one last question. It is from body from the Wyoming [ Inaudible - static ] center.

In my good to go? I have a question if you have a patient who has chronically loose stools and has had them for years that are on C. difficile related and they come down with the CDI how would you go about treatment plans assessing their C. difficile status if the only way to assess effectiveness is through toxin because it is very difficult to discern when it is diarrhea versus loose deals when they've gone back to their baseline at that point.

This is a difficult clinical question. Clearly in these settings there is some kind of change in the patient's status and make you suspect C. difficile in the test you are doing was positive soap resume it bleed the patient had a hole in -- higher volume of Stiller decreased white blood the account and you really have to know are they back to their usual pattern of was still? Most patients who have had C. difficile once will know when they get it again if they are cognizant and with the program. They will often have abdominal pain, cramping and they will be able to
realize a change in the pattern. The kind of patient that you are describing, they could be still having diarrhea after a course of treatment and if toxin is still there but they are back to feeling pretty normal it could be a false positive this is one of the problem with the toxin EIA. PCR will be positive in the glutamate testing which is contained in the C. difficile test that will be positive for some time so it is really a clinical assessment so with the lab tries to stress with speaking to physicians is the lab is here to confirm your clinical diagnosis. Some tests are undoubtedly best in others in terms of false positives and false negatives but I do not know there is much point in doing test of cure there. Where will -- where we have sometimes looked at the so little more is when we have chronically ill patients like children who have to be in the hospital, they have short got to have had C. difficile and always have diarrhea and there is a pressing need for them to be out of the room and be doing activities. They need to get out of there and sometimes we will repeat the PCR just to see if they are still carrying to know how much of a threat they are to be around our other sick kids who might he oncology can. That is where we have to look to the PCR in a patient that we are worried about ongoing carriage because we are worried about the transmission to other patient and being in a group situation with long-term hospitalized sick patients.

Thank you.

Any other questions?

We shown no further questions.

Okay. Thank you.

Thank you so much everybody.

Ladies and gentlemen this concludes today's session we thank you for your participation. You may now disconnect.

[Event concluded]