



Maryland Patient Safety Center's Call for Solutions 2017

Solution Title:

The impact of progressive collaboration and probiotic implementation for inpatients in the battle against hospital acquired *Clostridium difficile*.

Program/Project Description, including goals:

Health care-associated infections (HAIs) place a substantial burden on healthcare systems. While many HAIs are declining in number, the rate of the infectious anaerobic bacteria, *Clostridium difficile*, cases remain high. *Clostridium difficile* infections (CDI) are the cause of 14,000 deaths of Americans a year and annually cost the national health care system \$1.3 billion dollars (CDC, 2012). The number of laboratory identified Hospital-onset *Clostridium difficile* infections (HO-CDI) in Maryland were 20% higher than the national baseline (CDC, 2016). Like other community hospitals in Maryland, LifeBridge Health Northwest Hospital strives to make an impact in the health of our patients with the prevention of HO-CDI. Improving patient safety by sustaining a reduction of CDI rates to below the Maryland Hospital Association (MHA) rate of 7.5 per 10,000 patient days through improved infection control measures and multi-disciplinary collaboration.

Process:

Monitoring of HO- CDI cases occurs during daily surveillance and tracking using *Clostridium difficile* LabID National Healthcare Safety Network (NHSN) criteria. Defect analysis was performed for all HO-CDI cases. All findings were discussed in the following venues:

- a. Unit specific apparent cause analysis included an infection preventionist, unit manager, front line staff members who took care of the patient, a pharmacist, provider, and other team members as applicable. Data was also shared with transportation, Environmental Services (EVS) and other professions as needed.
- b. Monthly Infection Reduction Committee meeting that includes all unit managers and clinical leads, pharmacy manager, quality staff and EVS manager.
- c. Infection Control Committee meetings that include Infectious Disease lead physician, Chief Medical- Quality Officer, Director of Environmental Services, Director of Nursing, Director of Quality & Risk Management, Pharmacy, Laboratory Services, Dialysis, Facilities and others.

Defect analysis based on the Association for Professionals in Infection Control and Epidemiology (APIC) and CDC guidelines took place for all cases of HO-CDI from 2015 through 2016 year-to-date with multidisciplinary team approach. The following contributing factors were identified:

1. Antibiotics
Nearly all patients (approximately 90%) were on antibiotics.
2. Isolation
Personal Protective Equipment (PPE) and hand washing non-compliance noted during observations. Possibility of ~~le~~transmission of CDI from nearby CDI patient rooms.
3. Environmental cleanliness
Appropriate terminal cleaning utilizing adjunct hydrogen peroxide vapor mist, SteraMist, was not performed consistently.
4. Testing
CDI laboratory testing was not always ordered appropriately. Issues noted included test for cure, testing patients on laxatives, testing patients with one episode of diarrhea without GI symptoms.

Baseline Data:

HO-CDI average rate for 2015 was 8.02 cases per 10,000 patient days. CDI rate 2016 Quarter 1 of 2016 was a rate of 8.51 cases per 10,000 patient days. “Clean Collaborative” data April 2016 was an average RLU of 157.82 and a 42% compliance rate for high touch in-patient rooms and 7% compliance rate for public areas.

Goals:

To sustain a reduction of HO-CDI rates below the MHA goal of 7.5 cases per 10,000 days, the following goals were established:

1. Track and monitor all positive CDI inpatients to assure measures were in place to prevent transmission. Document and communicate results to nursing, EVS and pharmacy to promote accountability.
2. Increase cleanliness within inpatient rooms utilizing the Maryland Patient Safety Clean collaborative resource of quantifiable validation to assist Infection Prevention and EVS in determining areas of improvement to reduce environmental transmission of CDI. The Hygiena Luminometer provides a quantitative adenosine triphosphate (ATP) reading in relative light units (RLU). The facility utilizes this monitoring system to test 17 high-touch surfaces in inpatient rooms and to communicate all test results to EVS leadership to stimulate improvements in EVS staff competency.
3. Provide protection against the proliferation of CDI through implementation of probiotics therapy administered within 24 hours of broad spectrum antibiotic exposure. The Northwest hospital Pharmacy goal is to decrease rates of missed probiotic orders to less

than 5% within the first quarter of implementation. In order to determine if the pharmacy specific goal was reached, data was tracked daily and compiled weekly. The tools used included:

- SafetySurveillor real-time, patient-specific antibiotic reports
 - Manual review of patients' electronic medical records for high offending agents
 - Rolling weekly graph of pharmacist compliance with protocol
4. Incorporate antimicrobial stewardship principles into the pharmacy workflow to improve de-escalation of antibiotic use within the early portion of the treatment course.

Increase compliance with contact precautions practices through weekly monitoring audits for increased accountability. Compliance is recorded, tracked, and presented to leadership and nursing weekly to provide opportunities for re-education on units with CDI huddle.

Solutions:

Surveillance: The Infection Prevention and Control department (IP&C) monitor real time CDI test results reported through the electronic surveillance software (SafetySurveillor). When a positive CDI toxin results is reported, infection preventionist provide immediate communication through email to EVS leadership team, unit nursing managers and pharmacy. When a patient is suspected to have CDI_[RJM1], nursing staff will place patient on CDI contact precautions until symptoms have resolved for 48 hours. If otherwise not ordered, the patient is placed on CDI contact precautions by the IP&C. The nursing staff immediately places a brown CDI contact precautions door sign illustrating use of gloves, gowns and hand washing. Sodium hypochlorite solution (bleach) is used to disinfect all shared patient care equipment, and CDI education is provided to patient, family and visitors.

Improve cleanliness: The Infection Prevention and Control department utilized the Clean Collaborative quantitative test results to provide a benchmark to validate the processes of terminal disinfection by EVS for inpatient rooms upon patient discharge. The collaborative Infection Preventionist (IP) swabbed 17 high-touch surfaces within inpatient rooms on 5 units; Subacute, ICU, Geriatric-Respiratory, Surgical-Orthopedic, and Medical Oncology. Results were communicated to front-line staff in real-time to provide feedback on cleaning processes. Results were also reported to EVS leadership to improve best management practices for disinfection and cleaning.

EVS Training and Coaching:

- On a daily basis within the start of shift huddles for the day, evening, and night shift discussed the trends of failing test points and provided coaching to our staff members in a group setting.
- EVS senior leadership utilize the information from the Clean Collaborative as a coaching tool for operations managers to improve the quality of their inspections within patient rooms and public areas.
- EVS management coach staff on the proper techniques regarding disinfection of specific areas and highlight missed high touch areas/frequent failing test points. One-to-one re-

training and coaching moments take place with staff that score below **desired**^{[RJM2][K3][K4]} goals.

- EVS management reward high performers and reinforce positive behaviors with certificates, and meal tickets; in addition to public recognition of high performing staff members in front of peers and hospital clients within huddles and meetings.
- Infection Prevention and Control department presents at EVS monthly staff meetings to share and celebrate our clean collaborative wins with the entire team.

Communication: Northwest Hospital worked to initiate change in the culture of communication through face to face positive feedback, education, and acknowledgment. The current digital age of communication has provided an immediate route of sharing information in a unilateral control model. This one directional communication can lead to misunderstanding, conflict, and defensiveness; whereas, face- to- face communication provides an expression of feelings, emotions, and exchange of ideas that are better understood and interpreted through a mutual learning model (Schwarz, 2005, pp. 40-42). This concept was implemented throughout Northwest Hospital. Infection Preventionist gives face -to -face feedback to EVS staff in a positive, enthusiastic and motivating manner. This format allows staffs to explain barriers and challenges inhibiting improvement. The EVS leadership team provides education and retraining to front line staff in addition to recognition of outstanding achievements. The IP&C team awarded certificates of achievement and to EVS staff who accomplished a passing test result for all 17 high-touch surfaces. In-turn, EVS staff takes pride in their hard work and is motivated to improve their performance.

HO-CDI rates and Clean Collaborative results are tracked, graphed and presented at on-going leadership meetings; Infection Prevention and Control committee meetings, Infection Reduction committee meetings, Quality Council, and monthly EVS staff meetings allowing for opportunities for open communication and sharing of ideas between interdepartmental hospital personnel.

Accountability: The Infection Prevention and Control department conducts compliance audits and communicates PPE compliance on all contact precaution patient rooms and CDI precautions rooms two to three times weekly. Observations are conducted to ensure healthcare personnel follow hospital policies for CDI precautions include displaying the specific door sign indicating special contact precautions for CDI. Compliance is recorded and real-time **education**^[RJM5] or reward is provided for based on findings. Compliance rates are communicated through weekly Nursing audit reports and Quality pillar presentations from the IP&C department to hospital wide leadership.

Utilization of the activated ionized hydrogen peroxide system, SteraMist, is monitored by the IP&C after patients with CDI are discharged. Close communication and collaboration with EVS leadership occur to promote the sharing of barriers and exchange of ideas for improvement. EVS leadership developed a door sign that is placed after a CDI contact room is terminally cleaned with bleach to ensure SteraMist disinfection is completed before a new patient enters the room. This provides an additional indicator to nursing that complete CDI disinfection is required.

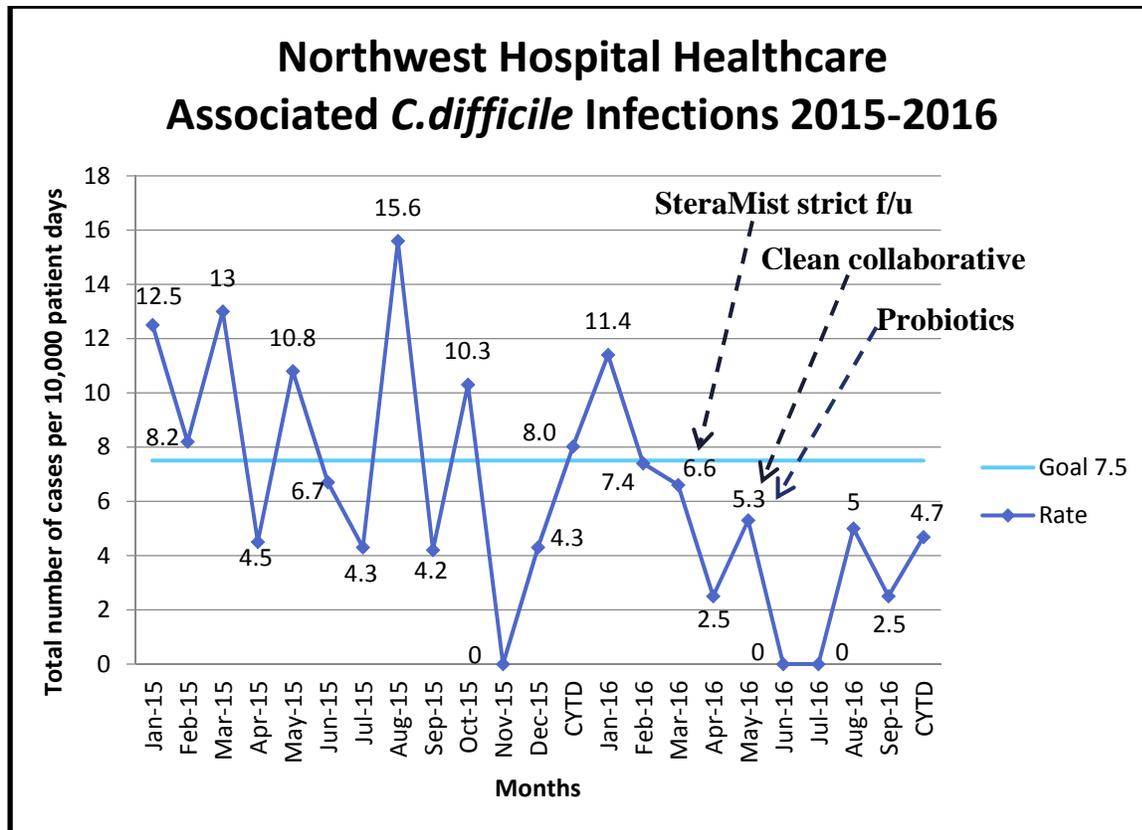
Probiotic therapy: In May of 2016 Northwest Hospital Pharmacy, with support of a multidisciplinary team, initiated the Probiotic Implementation Program. All patients aged 18 and above who receive Piperacillin/Tazobactam, Clindamycin, Ciprofloxacin, Ceftriaxone, and Cefepime receive probiotic therapy. Exclusions include patients:

- Who are NPO
- Currently undergoing chemotherapy or radiation therapy
- With white blood cell counts less than 4000mcg/L
- With one time antibiotic orders

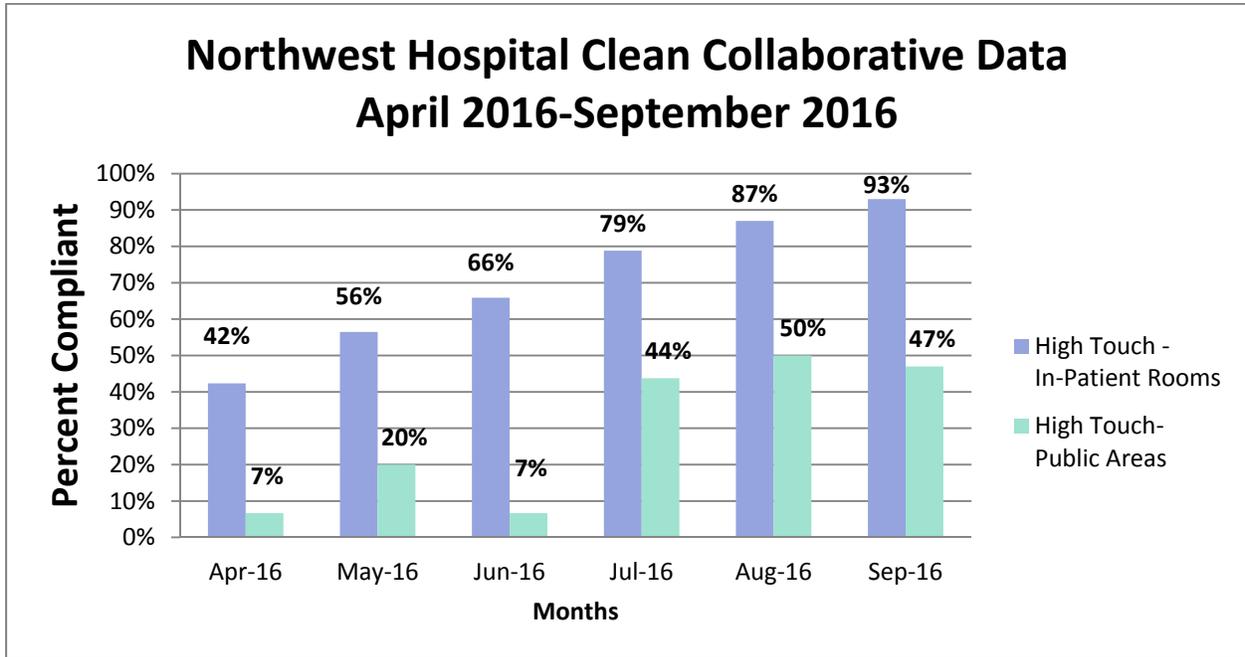
After a long and careful investigation, the probiotic, Floranex, was chosen for all patients, except for those with nasogastric tubes, percutaneous endoscopic gastrostomy, and jejunostomy; who receive the probiotic, Culturelle. Daily reports of antibiotic use are generated using the program SafetySurveillor. Each patient’s chart is then reviewed to see if the pharmacist initiated probiotics when the order for the antibiotic was approved. Reminders are sent to pharmacists who do not follow the probiotics protocol. Nursing staff is educated on proper administration of the Floranex and Culturelle.

Measurable outcomes:

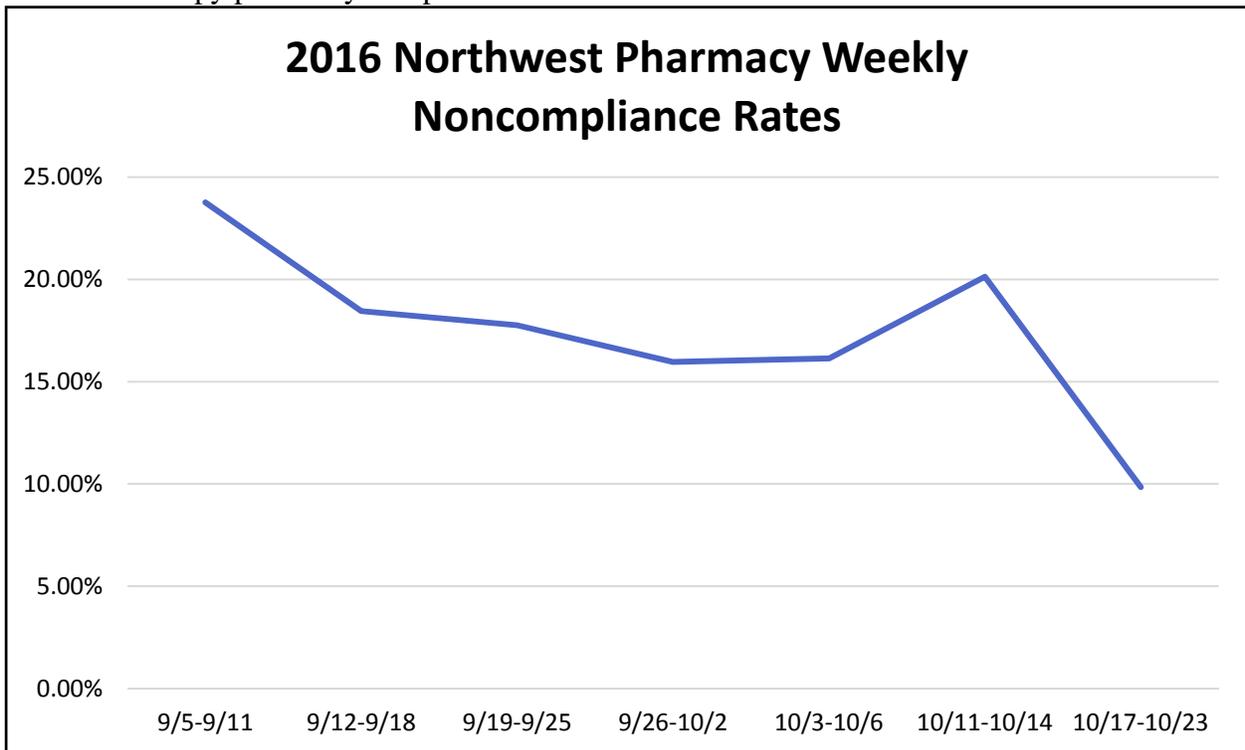
Clostridium difficile infections rate (measured per 10,000 patient days): 2016 Q2=2.60, Q3=2.54. The change in baseline from January 2015 thru March 2016 as compared to the CDI collaboration period of April 2016 thru September 2016 resulted in a 68% reduction.



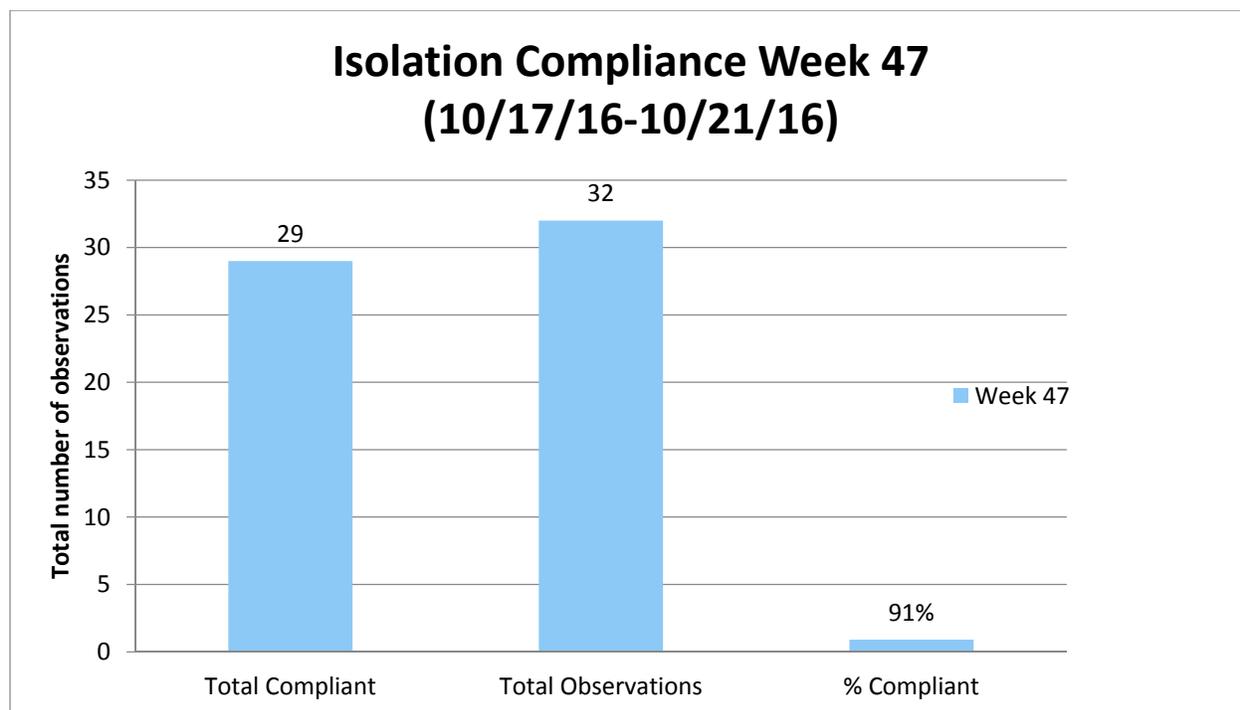
The Clean Collaborative data for September 2016 average RLU reading 35.45 and a 93% compliance rate [RJM6].



Probiotic therapy pharmacy compliance:



Weekly monitoring of staff compliance for Quality pillars for CDI contact precaution.



Sustainability:

Northwest Hospital utilizes a process of monitoring performance improvements through data analysis and monthly review with frontline staff, multidisciplinary leadership, Infection Prevention and Control, Quality & Risk Management. Actions and recommendations are forwarded to the medical staff via the Medical Executive Committee (MEC). Deficiencies in processes are identified and reviewed openly to develop tangible solutions. An Infection Prevention report is presented monthly to the Multidisciplinary Performance Improvement Committee (MDPI).

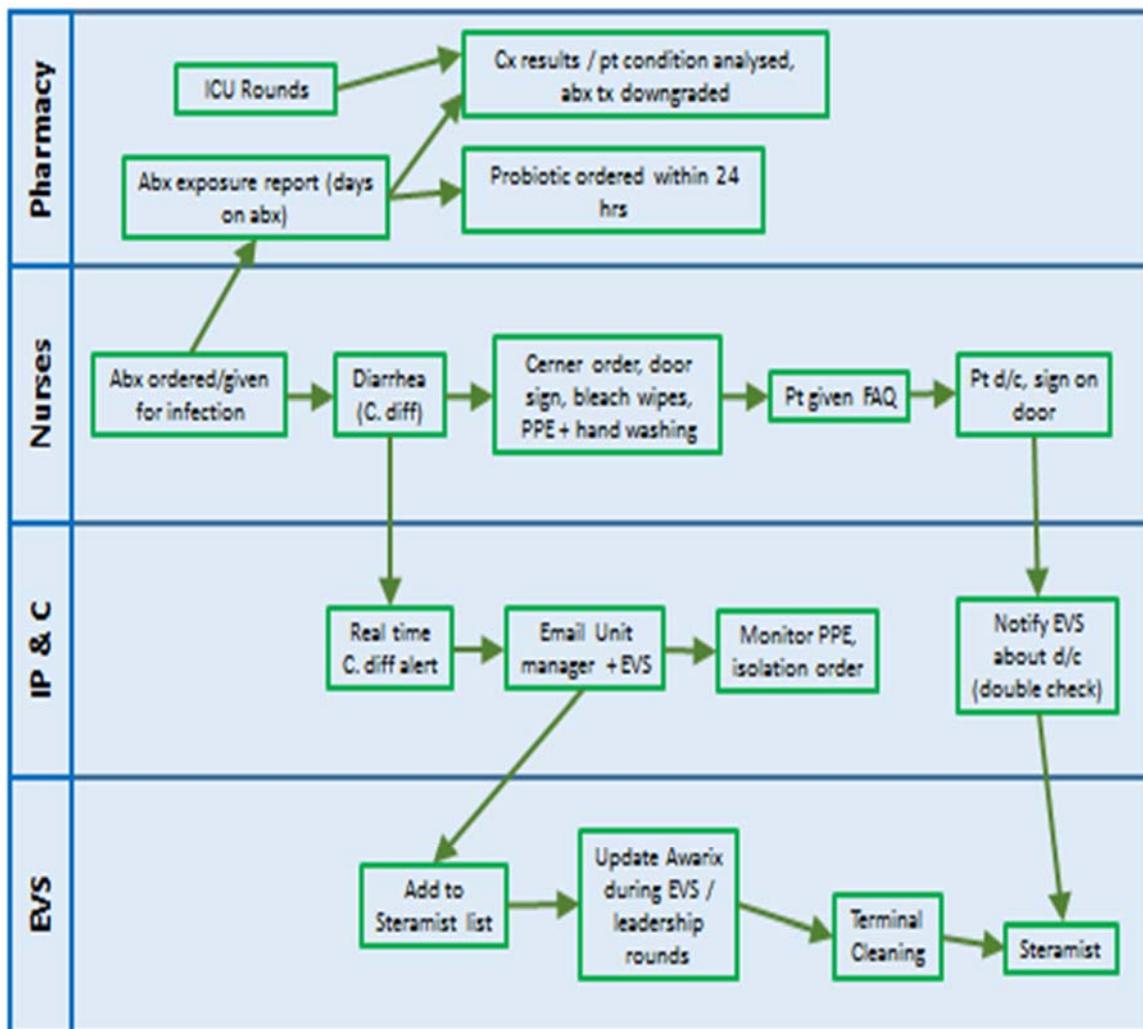
In order to guarantee these efforts are sustained in the pharmacy, daily surveillance is used to ensure adherence to protocols. In the pharmacy, many computers have reminder notes attached to which antibiotics orders should prompt a probiotics order. Many pharmacists have taken ownership in the probiotics program and even get excited when the rate of missed probiotics orders drops below 5%.

Eventually, only trends in HO-CDI infections and quantity of probiotics ordered will be observed. This will occur once ordering probiotics for the specified antibiotics becomes second nature to pharmacists. The decentralization of the pharmacy will allow for more focused monitoring by each pharmacist. Trends in CDI rates will be observed to evaluate the need for inclusion of newly identified offending antibiotics. CDI prevention remains a top priority for almost every department in the hospital. Continue to hard wire best practice.

Role of Collaboration and Leadership:

The core component to the success of this work was multidisciplinary collaboration and proactive communication. Data alone is insufficient to motivate or drive change. Shared accountability and the coming together of individual departments, with the comradery of working toward a common goal, energize individuals and promote a team environment. The experience within each team member provided diverse perspectives and contributions. The multidisciplinary nature of this collaboration led to shared accountability, collaboration, and hospital-wide support which drove positive change within Northwest Hospital.

Flow of collaboration algorithm:



Partners and Participants:

The multi-disciplinary collaboration included Infection Prevention and Control, Environmental services, Pharmacy, Nursing, Quality/Patient Safety leadership, Infectious Disease lead physician, Chief Medical-Quality officer and Laboratory Services.

Initiating the probiotics protocol would not have been successful without the support of the medical staff at Northwest. Lead physicians included Dr. Ronald Ginsberg, Dr. Dalia Salahuddin, Dr. Kinjal Sheth, Dr. Jamie Barnes, Dr. Mirza Baig, and Dr. Michael Ballo. Each of these physicians helped to encourage their teams to play an active role in the prevention of CDI infection and use of appropriate antimicrobial stewardship.

Leadership support:

Leadership was aware of the challenges Northwest Hospital had previously experienced with preventing HO-CDI and their support with the Clean Collaborative engagement and probiotic implementation fostered the necessary inter-departmental collaboration needed to improve outcomes.

Collaboration thrived as a result of leadership investment in supportive relationships, and created an environment of open employee interaction with leaders and colleagues. Mentoring was integrated into everyday activities to provide a venue for the breaking down of barriers and allow an open exchange of ideas. This created a culture of teamwork, and shared accountability between frontline staff and leadership. Nursing leadership provided the support for frontline staff to attend defect analysis meetings for all HO-CDI cases allowing for education, coaching, and increased situational awareness.

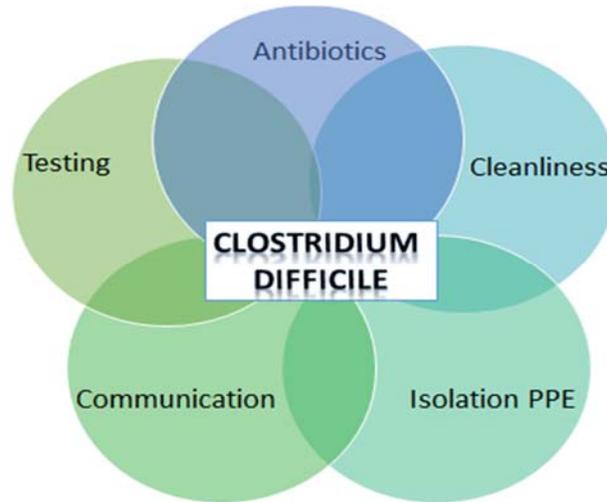
Innovation:

Each individual working within the hospital played an essential role in providing excellence in patient care and outcomes. If leadership implements improvement measures without frontline buy-in and multidisciplinary collaboration, expectations of departments can often feel unrealistic, ineffective and insensitive. Northwest Hospital's culture of collaboration created an atmosphere to achieve high levels of cooperation and teamwork toward one common goal of improving patient outcomes in the reduction of HO-CDI. Innovation processes included:

1. Early CDI detection followed by proactive response through rigorous surveillance.
2. Environmental services leadership collaboration with Infection Prevention and Control to provide training, coaching and recognition to reduce environmental reservoir as a source of transmission.
3. Change in the culture of communication through face-to-face communication.
4. Quality outcomes pillar communication and presentation which audits of infection control practices to increase accountability of healthcare personnel.
5. Northwest Hospital Pharmacy is the first among the LifeBridge Health Hospitals to implement probiotic therapy within 24 hours of exposure to broad spectrum antibiotics

and to maintain a rate of less than 5% for missed probiotic orders. By doing so, the hospital hopes to set a standard which can be spread to other hospitals within the system and beyond it, as well.

6. Utilization of Antibiotic Stewardship to reduce the use of broad spectrum antibiotics.



Culture of safety:

Northwest hospital strives for continuous cultivation of safety practices. Our excellence is measured by ongoing results and obligation to create new and improved patient outcomes with each admission. Growth and transformation will result in a climate of safety that will continue to prevent hospital acquired infections such a CDI.

While the idea of antibiotic stewardship and CDI prevention is not novel, initiating a successful probiotics protocol is evident. Working together with the patient and their family, as well as medical staff, ensures that patient safety and prevention of CDI is a top priority of the hospital.

Patient and Family Integration:

The key is not only to provide education, but to provide reminders with posters, signs, printed information that is easily visible in the patient's room. This assures available information is continually utilized.

Patients are educated about CDI, needed precautions, and the prevention of repeated CDI infections. *Clostridium difficile* FAQs (CDC) are given to patients to reinforce information and to facilitate family education. Education is also given to use a door sign as a reminder of needed precautions: washing hands with soap and water, gown, gloves (all this is pictured on the CDI contact precautions sign). Family education about hand hygiene was emphasized during staff members hand hygiene education through review of real life case scenarios. Hand hygiene is included on the posters located in every patient's room to facilitate education and to serve as a reminder for patient and families.

Related Tools and Resources:

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Schwarz, R., Davidson, A., Carlson, P., McKinney, S., et al^[RM7]. (2005) The skilled facilitator fieldbook: Tips, tools, and tested methods for consultants, facilitators, managers, trainers, and coaches. San Francisco: Jossey-Bass, A Wiley Imprinting.