

## 2016 HQI VANGUARD AWARD APPLICATION

### 1. COVER PAGE

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Title: **MAKING A *C. diff*ERENCE IN HOSPITAL ACQUIRED INFECTIONS AT  
PROVIDENCE HOLY CROSS MEDICAL CENTER**

Topic of Focus: Patient Safety

Statement of Support:

*I represent the entire Leadership of Providence Holy Cross Medical Center in promoting our hospital's commitment to patient safety, quality care, and satisfactory experience. To achieve positive outcomes, we recognize the need for multifaceted approaches to patient care grounded in a strong information infrastructure. Our efforts to reduce the incidence of C. diff infections in our hospital is illustrative, in particular our innovative decision tree to guide judgement with regard to the need for isolation precautions and testing. We wholeheartedly support this application for the 2016 Vanguard Award from the Hospital Quality Institute as an exceptional way to – as one of our Nurse Managers put it – “showcase the great work at Holy Cross.” - Robert P. Raggi, MD, JD, Chief Medical Officer*

## 2. EXECUTIVE SUMMARY

Although the incidence of most hospital associated infections has decreased in recent years, the rate of *Clostridium difficile* (*C. diff*) infections (CDIs) has been on the rise. At Providence Holy Cross Medical Center (PHCMC), we have significantly reduced our CDI rate through a comprehensive program that includes:

- prevention efforts anchored in hand washing initiatives, enhanced room and equipment sanitization standards – including the use of UV-C light – and review of antibiotic use at admission;
- surveillance for unnecessary antibiotic use, and the use of the “Diarrhea Decision Tree” to assess whether isolation and CDI testing should commence; and
- teamwork through an in-house *C. diff*. Task Force and Antimicrobial Stewardship Team, and a community-based Skilled Nursing Facility Collaborative.

These efforts have reduced CDI rates at PHCMC from nearly 11 at the end of 2014 to roughly 6 in Q1, 2016 – a pattern that continues to trend downward. Despite our successes, compliance with respect to such things as handwashing and the consistent use of our decision tools, remains a challenge. Key lessons we have learned are that our attempts to improve outcomes are sometimes limited by the tools available; and to not underestimate the importance of community collaboratives to meet your targets.

## 3. BACKGROUND AND RELEVANCE OF THE PROBLEM BEING ADDRESSED AND EFFORT UNDERTAKEN

*Clostridium difficile* (*C. diff*) is a Gram-positive bacterium that is a common cause of infectious diarrhea and the leading cause of hospital-care-associated infectious diarrhea. Annually, there are an estimated 500,000 *C. diff* infections (CDIs), with an associated 29,000 deaths. Roughly 25 percent of these cases have an onset of infection during hospitalization, further accounting for increased length of stay and increased associated excess costs. Although other Hospital Associated Infections (HAIs) have decreased in recent years, CDIs have continued to increase and now account for 12 percent of all HAIs annually, at an estimated cost of \$4.8 billion in excess.

There are a number of steps on the path toward a CDI. First, the patient must experience an alteration of gut flora. In the health care setting, this is largely associated with dispensed wide-spectrum antibiotics. Second, the patient needs to be exposed to a toxic strain of *C. diff*. Most commonly this transmission occurs through contact with a contaminated surface or infected, unwashed hands. Once a patient has acquired *C. diff*, their propensity to develop an infection is a function of a variety of clinical factors and their own immune response.

At Providence Holy Cross Medical Center (PHCMC), we have significantly improved our performance with respect to patient safety by implementing a comprehensive strategy to reduce the incidence of CDI cases. Our comprehensive strategy that addresses all the steps on this path includes:

- prevention efforts grounded in hand hygiene initiatives, room and equipment sanitation standards, and patient review for use of broad spectrum antibiotics at admission;
- surveillance for unnecessary antibiotic prescriptions, and the use of a decision algorithm to assess whether isolation and CDI testing should commence; and

- collaboration including creating in-house and community-based task forces, and data sharing across the institution.

#### **4. DESCRIBE THE EFFORT, INCLUDING THE SCOPE, PROCESS, STRATEGIES AND TACTICS UTILIZED, CHALLENGES ENCOUNTERED AND HOW THEY WERE ADDRESSED.**

At PHMC, we have in place a comprehensive program of prevention, surveillance and collaboration to minimize the number of hospital onset CDIs. Our prevention efforts are anchored in hand washing and room and equipment sanitation standards to contain transmission by such contacts. The hand hygiene protocol that we teach is based on the World Health Organization Guidelines on Hand Hygiene in Health Care. This standard differs from those promoted by the Centers for Disease Control and Prevention (CDC) in that it also includes detailed instructions on how to actually handwash with soap and water and handrub with alcohol-based formulations.

Our handwashing initiatives also include a “Speak Up for Safety” campaign. The premise of this campaign is to encourage the nurses to “speak up” when they observe a doctor or other practitioner has not washed his or her hands as required. The materials for this campaign include silly photos of employees and physicians with clean hands that are posted around the hospital. In this way the doctors admonish the staff to “remind me” when I don’t wash my hands; as such, the staff feels empowered to do just that.

We also further these hand hygiene efforts through patient and family education. This education includes a CDC produced video that is set to loop play on two channels (one English and one Spanish) of the television in each PHCMC hospital room.

Room and equipment sanitation is also a focus, and is most important as part of terminal room cleaning. To this end, one solution we have implemented is to contract an outside service that uses equipment that emits UV-C rays to effectively sanitize entire rooms and the equipment that is left in them, not just the surfaces touched with cleaning solution. Also, Environmental Services (EVS) has moved to systematize their cleaning and disinfection process for patient rooms, and Central Supply has assured that the cleaning of movable equipment meets high sanitation standards.

Also key has been the formal delineation of what is the responsibility of EVS and what is the responsibility of the nursing staff with respect to room and equipment sanitation, assuring nothing is left unaddressed. Standardizing the setup of each room has also aided in this effort. Other efforts in this regard include covering beds that have been moved into the hallways with clean sheets, and placing a “Dirty” sign on them. Similarly, there is now a formal protocol for sanitizing crash carts and defined roles for a code situation so the spread of any contaminants, including *C. diff*, is minimized.

Our prevention effort also include part of our Antimicrobial Stewardship (AMS) Program whereby a patient is reviewed for prior broad spectrum antibiotic treatment that may be linked with active CDIs and evaluated as to whether a specific antibiotic may be more appropriate. Procalcitonin levels are also used to inform whether antibiotic use is appropriate and can identify if the infection present is viral and antibiotics are not needed at all. The timely order of a probiotic like Culturelle® in the case where the risk for CDI is high is also a focus.

Our AMS efforts are also part of our surveillance. To this end, our Clinical Pharmacist assures that broad spectrum antibiotics are not unnecessarily prescribed and distributed to patients and advises the treating physicians of such via a “sticky note” in our EHR software. Surveillance is further accomplished using the “Diarrhea Decision Tree”, an education algorithm created, and periodically revised, by our *C. diff* Taskforce. The algorithm is based on that created by the CDC but it has been revamped to meet the specific needs of our institution and it was simplified because the complexity of the CDC model was challenging for some of the nursing staff to understand and effectively use in practice. This algorithm has also recently been incorporated into our EHR software which has prompted additional ease of use and effective decision-making by way of alerts that are triggered once 3 or 4 loose stools are documented.

The Diarrhea Decision Tree is a flow chart that directs a course of action, both on admission and at onset of loose stools once admitted, based on various criteria that support our goal of “early identification and prompt isolation”. For example, upon new onset of loose stools (defined as a 6 or 7 on the Bristol Stool Chart), enteric isolation is immediately initiated and a series of questions are answered to determine whether the treating physician should be contacted for an order to collect a stool sample. If a stool sample is ordered and tested, a positive result prompts isolation until discharge and a negative result prompts removal from isolation. (A copy of the Diarrhea Decision Tree is included as “Optional Supplementary Material”.)

Finally, at PHCMC we have created collaboratives both in-house and with our community, and we have identified Nurse Champions and Physician Champions to help improve these patient outcomes and secure the success of our efforts. In-house we have created an interprofessional “*C. diff* Task Force”. This task force is comprised of all key players – whether involved directly or indirectly – in minimizing hospital acquired infections: Nursing, Epidemiology, EVS, Central Supply, Pharmacy, Chaplains and Security. Our AMS Team is also a multidisciplinary group comprised of representatives from infectious disease, information systems staff, and infection control specialists.

With our community we have established a “Skilled Nursing Facility (SNF) Collaborative” that meets on a bimonthly basis to discuss both clinical issues – with a heavy focus on infection control – and business expansion. PHCMC is represented in this effort by the Chief Medical Officer, the Quality Improvement Department, and guest speakers from various PHCMC departments that are recruited based on the monthly topic.

These efforts are integrated into our operations through data sharing across entities. When a CDI is identified, an “HAI Notification” is immediately sent from the Infection Prevention Department to the Quality Department, the Quality Liaison that we have designated for the unit in which it occurs, and the Nurse Manager for that unit. In addition, a root cause analysis (RCA) is triggered, the results of which are brought to the attention of our Nurse Managers and Educators in order that they can re-educate the staff as necessary. A new addition to our RCA process is the mapping of “hot beds” – those used by a patient with CDI – from the time a patient is admitted until the time they are discharged. This analysis also includes an evaluation of beds present in any shared rooms. The goal of this tracking exercise is to investigate visually the path a hot bed takes and potentially identify further precautions that may be necessary to reduce transmission.

In addition, the “Infection Control Ticker” tracks all infectious disease measures by unit including CDIs; it is circulated weekly to everyone with a PHCMC email account. These data are also captured in our

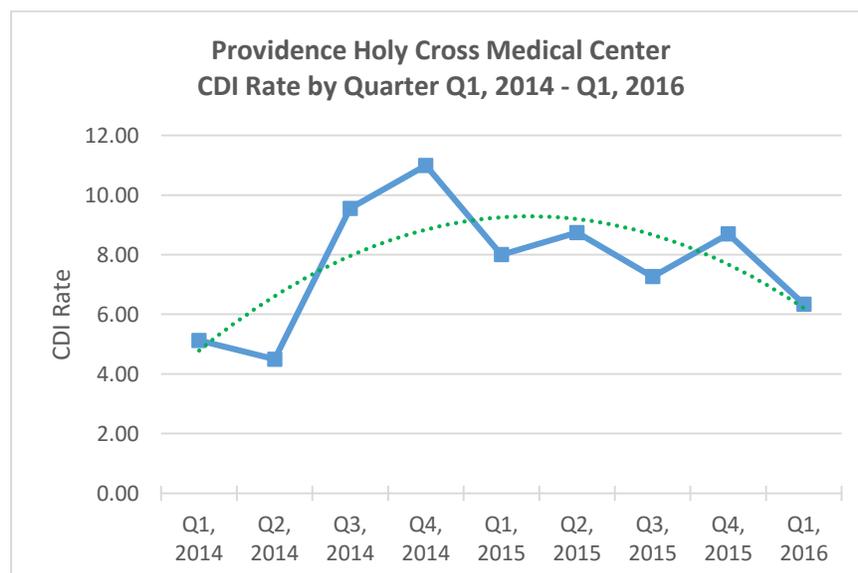
“Facilities Dashboard”. On this dashboard, our core quality measures – including CDIs – are summarized with our baseline (defined as where we were last year), current target, and current year-to-date scores. Each summary measure is highlighted in either red, yellow, or green for users to easily identify our strong points as well as, most importantly, areas of opportunity. Further detail on any measure can be easily retrieved by clicking on the measure of interest on the front page of the dashboard. The dashboard is circulated among our Senior Leadership and Nurse Managers on a monthly basis, in addition to being available on our PHCMC Quality Department SharePoint on our intranet for all users to download. With these data at their fingertips, our leadership and staff stay well informed and can effectively act and direct changes as necessary.

The implementation of these efforts has not been without challenges. Although we do believe that room sanitation using UV-C rays is effective, the equipment is not allocated to all rooms every day, largely due to cost. To this end, the equipment vendor is currently analyzing data pertaining the rooms that have been routinely sanitized with the ultraviolet light to demonstrate that the benefits to this technology outweigh the costs.

Another challenge we have faced is that clinical staff are not consistently using the Diarrhea Decision Tree or they are unable to determine if the patient has diarrhea. In cases where the Decision Tree is not used, there may be a delay in identification of a CDI (as tests are not ordered) and potentially a delay in isolation precautions, compromising the provision of optimal care for patients with this infection and increasing the risk of transmission to other hospitalized patients. To meet this challenge, Nurse Champions are commissioned to assure that clinical staff are taking (and potentially re-taking) an online class on CDIs and are assessed for competency in this topic.

## 5. DESCRIBE THE RESULTS OF THE EFFORT

The graph below captures PHCMC CDI rates for the 9 quarters from the first quarter of 2014 through the first quarter of 2016. Since the high of nearly 11 at the end of 2014, we have experienced a significant reduction in our CDI rates to roughly 6 in the first quarter of 2016.



## **6. DISCUSS THE SIGNIFICANCE OF THE RESULTS. HOW DO THE RESULTS DEMONSTRATE OUTSTANDING ACHIEVEMENT?**

The significance of this result can be illustrated by the fitted trend line superimposed on the graph of our CDI rates presented above. Our efforts have been successful in turning the upward trend we were experiencing into a downward trajectory – a trajectory we see continuing as we fine tune our procedures, policies, and protocols and integrate them into our culture in order to tackle CDI in our hospital.

## **7. DESCRIBE THE SUSTAINABILITY AND SCALING OF THE ACHIEVEMENTS**

Our efforts with respect to assuring CDI rates continue to decline at PHCMC are clearly sustainable and we are dedicated to assuring we continue to improve upon patient safety in this regard. The only element that could be in jeopardy is room sanitation using UV-C light since it is a contracted service that may receive scrutiny during budget review. To this end, we are investigating the benefit and costs associated with it; preliminary results suggest this equipment has been effective, thereby justifying the expense and its continued use.

PHCMC is a high volume hospital. As such, the question of scalability lies in questioning whether these efforts can be scaled downward and whether there are any notable losses in economies of scale when scaling down. Also, the key role played by our EHR system may limit the scalability of some of our efforts to facilities using paper charting. On balance, our efforts are scalable as they are largely people driven and we are not realizing any large economies of scale. In addition, contrary to some of our other safety and quality initiatives, there is not a heavy reliance on our EHR system; as such the policies and procedures we have outlined above can be easily adopted by facilities using paper charting. The use of the UV-C light sanitizing equipment is also scalable to whatever number of rooms a facility has to clean.

## **8. DESCRIBE KEY LESSONS LEARNED AND ANY ADVICE TO COLLEAGUES WHO MIGHT TRY TO UNDERTAKE A SIMILAR EFFORT**

One key lesson is to recognize that your attempts to improve your outcomes are at times restricted or limited by what tools are available to you. Currently we screen for CDI using a polymerase chain reaction (PMR) test. Although this test is deemed “highly accurate” it does so because it indicates all *C. diff* carriers not just individuals with active CDIs. To this end, we are anxiously awaiting the time we will be able to conduct enzyme immunoassay (EIA) tests in-house; we anticipate this equipment will be delivered by the fourth quarter of 2016 and play a key role in further reducing our CDI rates.

In addition, don't underestimate the importance of community collaboratives, in particular in the case of CDIs of which an estimated 75% are community acquired. Although a community acquired infection may not impact your statistics, it still plays a role in your cost of care and length of stays. Moreover, if the infection is not identified in a timely manner and documented as community acquired it will become part of your rates. Assuring your community partners have a strong infection prevention program can

only benefit your hospital in the long run. Similarly, don't overlook the role of non-clinical staff – like Chaplains and Security Personnel – when creating an in-house task force or council.

Finally, our advice to colleagues that wish to integrate the use of equipment that sanitizes with UV-C rays is advice that we received from one of our sister ministries. Although the cost of the service appears high, the direct and indirect costs of owning, running, servicing and assuring your equipment is calibrated correctly appears to exceed the cost of simply contracting the service.

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