

BACKGROUND

Clostridium difficile is the most common cause of acute infectious diarrhea in the hospital setting as well as in long-term care facilities (LTCFs), and disproportionately affects individuals who are >65 years old. Although the incidence of other healthcare-associated infections has declined, the incidence of C difficile infections (CDIs) has increased and is the most common hospital infection from 3,000 reported in 2000 to 14,000 reported in 2007. More than 90% of the cases are reported in persons aged 65 years and older.

Levindale Hebrew Geriatric Center and Hospital is a 330-licensed-bed facility. Levindale's geriatric center includes 126 comprehensive care (long-term care) beds, 35 sub-acute beds, 28 dementia care beds and a 21-bed respiratory care unit. The Specialty Hospital at Levindale consists of a 40-bed high intensity care unit and an 80-bed behavioral health unit. The facility is directly adjacent to a large 500-bed acute care trauma hospital in Baltimore, Maryland.

Burke 2 is a 21-bed licensed LTC respiratory care unit that has semi-private rooms and includes patients with ventilator support, wounds, tracheostomy's, hyperalimentation, G-tube feedings, indwelling urinary catheters, and vascular access.

It is estimated that 2.5 million hospital-acquired infections (HAIs) occur annually in the United States. These infections are considered preventable but are associated with 90,000 patient deaths and financial costs exceeding \$4.5 billion annually. [1] It is believed the primary causes of these patient injuries are poor technique and non-compliance to hand hygiene protocols. [2] In 2008, as a response to the American epidemic of HAIs, the Centers for Medicare and Medicaid Services, as part of the affordable care act, created new rules penalizing hospital reimbursement for costs associated with conditions not present on admission and diagnosed during the hospital stay.[3]

In a global review of guidelines, recommendations and strategies by Ballsells et. al. and printed in the Journal of Global Health, December 2016, [4] the importance and challenges associated with effective hand hygiene in the context of C. difficile were discussed. Special attention was drawn to limitations of disinfection hand with alcohol-based hand rubs (ABHR) as they are non-sporicidal and do not remove C. difficile spores from contaminated hands. The flash kill nature of alcohol has been shown to cause vegetative C-diff to sporulate. Guidance on best practices varied and included the preferential use of soap and water when caring for patients with CDI, especially during outbreaks, raising awareness and warning health care providers about the limitations of ABHRs [5,6,7].

OBJECTIVE

C. difficile Baseline: In 2016 there were six cases of Hospital-onset C. difficile on the unit. Surveillance is conducted utilizing CDC's NHSN surveillance definitions. The rate of infection was 9.18 per 10,000 resident days.

METHODS

A 12-month (2017), experimental, open label clinical trial of replacing chlorhexidine gluconate (CHG) with a novel skin formulation was conducted in a high acuity long term care unit. The primary measure was C difficile documented incidence through reported and confirmed cultures compared to baseline year (2016). Surveillance was conducted utilizing Center for Disease Control (CDC) National Healthcare Safety Network (NHSN) surveillance definitions.

A silver colloidal skin cleansing agent was introduced to the unit to assist with resident bathing, peri care and wound healing in December 2016. This agent was selected as an alternative to chlorhexidine gluconate due prolonged lengths of stay and skin integrity issues in this patient population. Education on the product and bathing / peri care protocol was performed from December – July 2017. All patients received twice daily applications under the guidelines of the University of North Carolina human studies subcommittee.

RESULTS

Due to recurring skin related adverse events associated with CHG the decision was made to replace CHG with a proven non-inferior CHG 4% alternative, with a low toxicity characteristic. In 2016 (baseline) 6,539 patients were admitted to the long-term care respiratory unit and the CDI rate was 9.18 per 10,000 resident days substantiated through confirmed and documented cultures. In 2017 (experiment), 6,959 patients were admitted to the unit and the infection rate was 2.87 per 10,000 resident days representing a 68% reduction. Antibiotic use and cultures decreased 41% and 30% respectively. There were no changes in culture policy 2016 to 2017. In 2017, two cases of hospital-onset C. Difficile occurred (One in June and One in December). The rate was 2.87 per 10,000 resident days, a 68% reduction compared to CY16.

Burke 2	Urine Cultures	Blood Cultures	Total Antibiotic Orders	Census
2016	107	171	224	6539
2017	108	120	134	6959

Burke 2	Gloves Ordered	Annual Unit Spend Gloves	Gowns Ordered	Annual Unit Spend Gowns
2016	3029	\$21,512.45	4911	\$24,315.94
2017	3238	\$20,805.90	3187	\$15,667.93

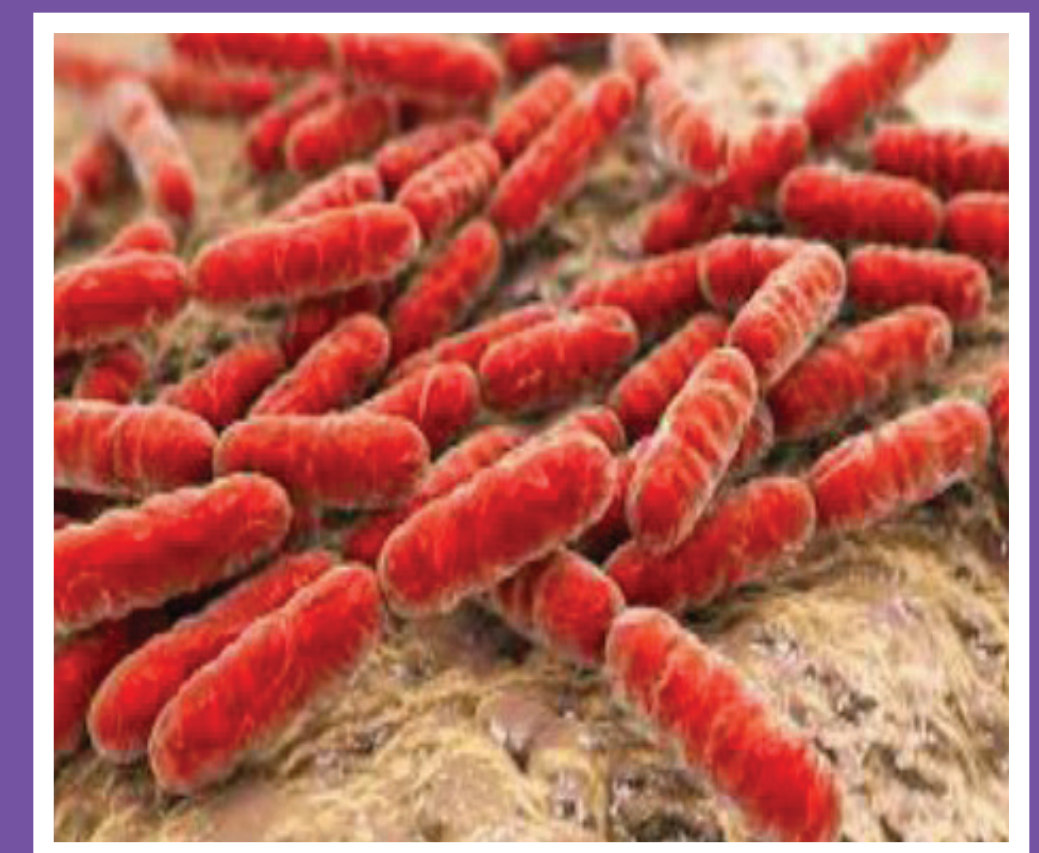
(The cost of gloves per box decrease by \$1 in 2017 by supplier.) The increase glove order in 2017 indicates Standard Precautions were followed after lifting Transmission-based Precautions.

CONSIDERATIONS

Hand hygiene interventions and compliance rates did not change over the 2016- 2017 nor did the patient population being served. One change that may also influence C. difficile acquisition was an increase from once daily to a twice a day patient room bleach cleaning protocol for C. difficile positive patients implemented in April 2016. Limitations: Small unit / Unique population being served.



Clostridium Difficile



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DISCUSSION

Intervention of twice daily treatments with silver colloidal cleansing wipes may prevent fecal oral transmission of C. difficile in a long-term care unit. Intervention of twice daily treatments with silver colloidal cleanings wipes may have assisted in reducing the number of positive cultures in a long-term care unit thereby preventing unnecessary antibiotic exposure, contributing to C. difficile infection. Recent trials have also shown the topical intervention to be effective with reduction on MMP9 protease levels and Biofilm activity in vivo which could correlate to these results concerning C. difficile. [8] Implementing the non-inferior 4% CHG alternative was effective in reducing C difficile incidence, antibiotic use, number of cultures and overall costs. CHG intolerance is clearly documented, forcing the use of basins and other regimens not shown to manage micro-debris and proven alternatives warrant further investigation.

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