A Multifaceted Interprofessional Approach for the Prevention of *Clostridium difficile* Infections (CDI)

Janet Leatherwood, MSN, RN, NEA-BC; Sally Shen, MSN, RN, NEA-BC; Firas Zabaneh, MT(ASCP), CIC, CIE; Shannon Wiggins, MPH; Victor Tarson; Sarfraz Aly, MD; Nicolas Daoura, MD; Anna Floyd, MPH, CIC; Nichelle Everett, R. Ph; Tamika Simon, MT (ASCP);
Jeffery Jackson, MD; Patricia Lewis, PhD, RN, NEA-BC; Mary Harris, MSN, RN, CCRN-K; Diane McGraw, MSN, RN, CPHQ
Houston Methodist System Quality and Patient Safety in collaboration with Houston Methodist Sugar Land Hospital

**Background and Purpose**

**Background:** CDI is one of the most common healthcare onset (HO) infections in the United States. *Clostridium difficile* is a gram-positive, spore forming, toxin-producing bacterium that causes a wide range of illnesses from mild diarrhea to life-threatening colitis. Since 2015, the Houston Methodist (HM) hospitals have experienced a steady, upward trend in healthcare HO CDI, similar to the trend identified nationally.

**Purpose:** This project was initiated to identify potential factors which may have contribute to the trend; and to create and implement a sustainable CDI prevention program to reduce the impact on patient outcomes and added cost to the organization.

**CDI Prevention Bundle**

**Elements of the bundle:**
- Early recognition of the disease
- Prompt isolation and testing
- Appropriate hand hygiene (soap and water) and PPE utilization
- Patient, visitor, and staff education
- Daily patient bathing/shower and linen changes
- Dedicated patient care equipment
- Proper cleaning and disinfection
- Comprehensive antimicrobial stewardship

**Interdisciplinary Team**

The team was led by the Chief Nursing Officer (CNO) and includes:
- System Infection Prevention
- System Process Engineering
- Infection Preventionists
- Managers/Nurses from Emergency, Medical/Surgical, Critical Care units
- Physicians (Infectious Disease and Intensivists)
- Dietitians
- Pharmacists
- Environmental Services leadership
- Information Technology leadership
- Laboratory Medicine leadership

**CDI Algorithm**

The CDI algorithm was developed with several goals to identify selected patients for the bundle.

1. Patients in whom the clinical criteria for *C. difficile* infection (CDI) are satisfied.
2. Patients who have an isolate identified as *C. difficile* in a specimen from another site.
3. Patients who have a culture positive for *C. difficile.*
4. Patients who have positive PCR testing and have no other likely source.

**Testing & Specimen Selection Algorithm**

Specimen selection algorithm for the diagnosis of *Clostridium difficile* infections (CDI).

- In the event of illness, testing should be considered for inpatients and outpatients who meet the following criteria:
  - *C. difficile* infection is a significant increase in the number of *C. difficile* spores per gram of stool or a significant increase in toxin A or B levels.
  - Patients with other GI conditions who are at risk for CDI:
    - Hospitalized patients
    - Immunocompromised patients
    - Patients with a history of CDI infection
    - Patients on immunosuppressant medications
  - Patients with a history of antibiotic use in the past 8 weeks
  - Patients with symptoms suggesting CDI

**Methods**

- Formation of a CDI Prevention No Harm Team governed by a charter which outlines goals and strategies
- Retrospective review of the CDI HO events
- Development of various tools to assist staff in the implementation of the CDI prevention bundle
- Utilization of Lean-Six Sigma methodology to implement improvements related to environmental cleaning practices and PPE use
- Development and implementation of standardized isolation signs
- Staff education related to the CDI algorithm and testing/specimen selection algorithm

**Project Outcomes**

HMSL HO CDI SPC Chart

**Cost Factors**

The average HO CDI cost to the organization is $11,285 per patient. This cost is not reimbursable by the Centers for Medicare and Medicaid (CMS) and CDI is reportable to CMS.

A 50% reduction in current mean of 9 CDI per month is annualized to an estimated savings in lost revenue of $972,000.

**References**