Executive Summary Checklist

Clostridium difficile (C. diff) is a spore-forming, Gram-positive anaerobic bacillus that produces two exotoxins: toxin A and toxin B (CDC, 2012). It is a common cause of antibiotic-associated diarrhea (AAD), and it accounts for 15-25% of all episodes of AAD.

- Implement an antimicrobial stewardship programs to prevent and/or minimize infection rates in healthcare settings. Refer to APSS #3A.
- Maintain contact precautions for duration of diarrhea
- Comply with hand hygiene as described in APSS #2A
- Clean and disinfect equipment and environment, including equipment that comes into contact with the patient (e.g. blood pressure cuffs and pulse oximeters are not frequently cleaned between patients).
- Use a laboratory-based alert system for immediate notification of all positive test results
- Implement technologies that support proper surface cleaning and utilize as part of a defined environmental control best practice program (e.g. Clorox® Healthcare Bleach Germicidal Wipes or Xenex® UV Light Disinfection System)
- Educate healthcare providers, housekeeping, administration, patients and families about CDI
- Encourage continuous process improvement through the implementation of quality process measures and metrics.
- All CDIs should have a root cause analysis (RCA) completed by the unit where the infection occurred with multidisciplinary participation including nurses, physicians and infection prevention specialists.
- Implement all learnings from the RCA.
The Performance Gap

Clostridium difficile (C. diff) is a spore-forming, Gram-positive anaerobic bacillus that produces two exotoxins: toxin A and toxin B (CDC, 2012). It is a common cause of antibiotic-associated diarrhea (AAD), and it accounts for 15-25% of all episodes of AAD. Various diseases result from C. diff infection (CDI), including: pseudomembranous colitis (PMC), toxic megacolon, perforations of the colon, sepsis, and death (rarely). The clinical symptoms include watery diarrhea, fever, loss of appetite, nausea and abdominal pain/tenderness. Certain patient populations are at an increased risk for C. diff, including patients with: antibiotic exposure, proton pump inhibitors, gastrointestinal surgery/manipulation, long length stay in healthcare settings, a serious underlying illness, immunocompromising conditions and advanced age.

Clostridium difficile is shed in feces. Any surface, device, or material that becomes contaminated with feces may serve as a reservoir for the C. diff spores. The spores are primarily transferred to patients mainly via the hands of healthcare personnel who have touched a contaminated surface or item. It is important to note that C. diff spores are not killed by alcohol-based hand rubs (Oughton et al., 2009; Jabbar et al., 2010; Gerding et al., 2008). The WHO recommends washing hands with soap and water before gloving and after degloving (WHO, n.d.). CDI will resolve within 2-3 days of discontinuing the antibiotic to which the patient was previously exposed in approximately 20% of patients. The infection can usually be treated with an appropriate course (about 10 days) of antibiotics. After treatment, repeat C. diff testing is not recommended if the patients’ symptoms have resolved, as patients may remain colonized. The differences between C. diff colonization and infection are important to note:

- **Clostridium difficile colonization**
  - Patient exhibits NO clinical symptoms
  - Patient tests positive for Clostridium difficile organism and/or its toxin
  - More common than Clostridium difficile infection

- **Clostridium difficile infection**
  - Patient exhibits clinical symptoms
  - Patient tests positive for the C. diff organism and/or its toxin

Common laboratory tests used to diagnose C. diff infection include stool culture, molecular tests, antigen detection for C diff, toxin testing (tissue culture cytoxicity assay or enzyme immunoassay). The toxin is very unstable and degrades at room temperature, and may be undetectable within 2 hours after collection of a stool specimen. False-negative results occur when specimens are not promptly tested or kept refrigerated until testing can be done.

Leadership Plan

- Hospital governance and senior administrative leadership must champion efforts in raising awareness to prevent and manage CDIs safely.
- Healthcare leadership should support the design and implementation of an antimicrobial stewardship program
- Senior leadership will need to integrate surveillance and metrics to ensure prevention measures are being followed
- Leadership commitment and action are required at all levels for successful process improvement

Practice Plan

Establish and consistently implement Clostridium difficile infection (CDI) prevention guidelines that focus on the education of healthcare providers, patients, and families, surveillance, hand hygiene, contact and isolation precautions, and establishment of an antimicrobial stewardship program (CDC, 2012; WHO, n.d.). An example of an evidence-based approach is the Association for Professionals in Infection Control and Epidemiology Guide to Preventing Clostridium difficile Infections. This Guide can be accessed online (Carrico, 2013).
We have also listed key elements of CDI prevention below:

- **Surveillance**
  - Implement a facility-wide CDI surveillance method of both process measures and the infection rates to which the processes are linked.

- **Hand Hygiene** (Oughton, 2009; WHO, n.d.)
  - It is recommended that healthcare providers wash hands with soap and water before donning gloves and following glove removal when caring for patients with CDI. No agent, including alcohol-based hand rubs, is effective against C. diff spores.
  - Appropriate use and removal of gloves is essential when caring for patients with diarrheal illnesses, like CDI.

- **Contact/Isolation Precautions**
  - Use Standard Precautions for all patients, regardless of diagnosis.
  - Place patients with CDI on Contact Precautions in private rooms when available.
  - Perform hand hygiene and put on gown and gloves before entry to the patient’s room.
  - Use dedicated equipment (blood pressure cuff, thermometer, and stethoscope).
  - Remove gown and gloves and perform hand hygiene before exiting the room.
  - Educate the patient and family about precautions and why they are necessary and ensure that visitors are properly attired in personal protective equipment.

- **Environmental Infection Prevention**
  - Use EPA-approved germicide for routine disinfection during non-outbreak situations (EPA, 2014).
  - Ensure that personnel allow appropriate germicide contact time.
  - Ensure that personnel responsible for environmental cleaning and disinfection have been appropriately trained.
  - For routine daily cleaning of all patient rooms, address at least the following items:
    - Bed, including bedrails and patient furniture (including the bedside and over-the-bed tables and chairs).
    - Bedside commodes and bathrooms, including sink, floor, tub/shower, toilet.
    - High-touch surfaces like call buttons and TV remotes.
    - Communication devices such as walkie-talkies used by nurses to communicate with the nursing station as well as personal cell phones carried by healthcare personnel.

- **Antimicrobial Stewardship and CDI**
  - Implement a program that supports the judicious use of antimicrobial agents (CDC, 2016).
  - The program should incorporate a process that monitors and evaluates antimicrobial use and provides feedback to medical staff and facility leadership.

**Technology Plan**

*Suggested practices and technologies are limited to those proven to show benefit or are the only known technologies with a particular capability. As other options may exist, please send information on any additional technologies, along with appropriate evidence, to info@patientsafetymovement.org*

- Implement technologies that support proper surface cleaning and utilize as part of a defined environmental control best practice program
  - Such as Clorox® Healthcare Bleach Germicidal Wipes or Xenex® UV Light Disinfection System.
- Implement technologies that support proper hand hygiene and utilize as part of a defined hand hygiene best practice program such as product utilization and staff movement tracking, sensor bracelets, alcohol sensing technologies.
  - See APSS 2A for a list of hand hygiene technology suppliers.
Metrics
Topic:

Healthcare-associated Clostridium Difficile Infection Rate (CDiff)
Rate of patients with a healthcare associated CDI per 1,000 patient days

Outcome Measure Formula:
Numerator: Number of healthcare associated CDI based on CDC NHSN definitions
Denominator: Total number of patient days based on CDC NHSN definitions
* Rate is typically displayed as Infections/1000 Patient Days

Metric Recommendations:

Direct Impact:
All hospitalized patients

Lives Spared Harm:

\[ \text{Lives Spared Harm} = (\text{CDI Rate}_{\text{baseline}} - \text{CDI Rate}_{\text{measurement}}) \times \text{Patient Days}_{\text{baseline}} \]

Lives Saved:

\[ \text{Lives Saved} = \text{Spared Harm} \times \text{Mortality Rate} \]

Notes:
To meet the NHSN definitions, infections must be validated using the hospital acquired infection (HAI) standards (CDC, 2016). Infection rates can be stratified by unit types further defined by CDC. Infections that were present on admission (POA) are not considered HAIs and not counted.

Data Collection:
CDiff and patient days can be collected through surveillance (at least once per month) or gathered through electronic documentation. Infections must be monitored according to NHSN surveillance definitions. Denominators documented electronically must match manual counts (+/- 5%) for a 3 month validation period.

Settings:
Infection Surveillance will occur in any inpatient location where denominator data can be collected, which may include critical/intensive care units (ICU), specialty care areas (SCA), step-down units, wards, and chronic care units. Surveillance will NOT be performed in Neonatal Intensive Care Units (NICU), Specialty Care Nurseries (SCN), babies in LDRP, or well-baby nurseries. If LDRP locations are being monitored, baby counts must be removed.

Mortality (will be calculated by the Patient Safety Movement Foundation):
The PSMF, when available, will use the mortality rates associated with Hospital Acquired Conditions targeted in the Partnership for Patient’s grant funded Hospital Engagement Networks (HEN). The program targeted 10 hospital acquired conditions to reduce medical harm and costs of care. “At the outset of the PfP initiative, HHS agencies contributed their expertise to developing a measurement strategy by which to track national progress in patient safety—both in general and specifically related to the preventable HACs being addressed by the PfP. In conjunction with CMS’s overall leadership of the PfP, AHRQ has helped coordinate development and use of the national
measurement strategy. The results using this national measurement strategy have been referred to as the “AHRQ National Scorecard,” which provides summary data on the national HAC rate (AHRQ, 2015).

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**Conflicts of Interest Disclosure**

The Patient Safety Movement Foundation partners with as many stakeholders as possible to focus on how to address patient safety challenges. The recommendations in the APSS are developed by workgroups that may include patient safety experts, healthcare technology professionals, hospital leaders, patient advocates, and medical technology industry volunteers. Some of the APSS recommend technologies offered by companies involved in the Patient Safety Movement Foundation that the workgroups have concluded, based on available evidence, are beneficial in addressing the patient safety issues addressed in the APSS. Workgroup members are required to disclose any potential conflicts of interest.
References

CDC. (2016). Clostridium difficile Infection (CDI) Prevention Primer [Powerpoint Slides].
CDC. (2016). Identifying healthcare-associated infections (HAI) for NHSN surveillance.
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