

Geographical Mapping *Clostridium difficile* Case Locations: A System for Understanding Transmission Patterns within the Hospital

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Issue: *Clostridium difficile* is a major cause of healthcare-associated infections (HAIs) in the United States. The impact of *Clostridium difficile* infections (CDI) on patients can include severe disease, increased length of stay, increased healthcare costs, surgical intervention, recurrent disease, and death. Park Nicollet Methodist Hospital (PNMH) is a 426 bed community hospital with an average daily census of 238. In spite of implementing numerous interventions to prevent HAI CDI, rates of HAI CDI were not decreasing as expected. In order to gain a better understanding of CDI transmission patterns in the hospital, a system was developed to map CDI activity in each patient care unit.

Project: Beginning in January, 2011, a system for mapping all cases of CDI in the hospital was implemented. Blueprints of patient care units, obtained from the PNMH Engineering and Facilities department, served as maps of the physical layout of each unit. All CDI cases were plotted on nursing unit maps with a colored dot. A unique colored dot corresponded with each week of the month. Each time a patient was moved to a different room, the new location was plotted on the nursing unit map. Additional markings identified HAI CDI as hospital onset or community onset. Each nursing unit map displayed one month of data. Maps were updated daily by Infection Prevention & Control Service (IPCS) staff. CDI surveillance recommendations by McDonald et al., (2007) were used to determine HAI CDI cases and PCR technology was used to test liquid stool for *Clostridium difficile*. All patients with CDI were managed with Contact Isolation plus healthcare worker hand hygiene with soap and water after care of patients with CDI. Information on unit-specific rates of HAI CDI was shared with nursing leadership and staff on a monthly basis.

Results: From 1/1/11-8/31/11, 235 CDI cases were plotted on nursing unit maps. Time requirement for IPCS staff to update maps was approximately 10 minutes per day. No cases HAI CDI were identified in patients in rooms previously occupied by a CDI case. Cases of HAI CDI were identified in patients who were geographically near (i.e. next door, across the hall) from a known CDI case. Patients with CDI were moved to other rooms an average of 1.8 times during their hospital admission.

Lessons Learned:

- Results of mapping showed that there did not appear to be CDI transmission directly related to previous room occupants with known CDI.
- HAI CDI in patients whose rooms were geographically close to known CDI cases suggests lapses in infection prevention practices may have had a role in CDI transmission.
- Patients with CDI often had room changes during hospitalization
- The CDI case mapping system yielded good unit-specific information for IPCS to share with nursing leaders and staff.

- The CDI case mapping system requires time and attention to details of each patient's move. Continued use of this system has helped IPCS identify opportunities to streamline the work of mapping CDI cases at PNMH