



## KEY POINT SUMMARY

### OBJECTIVES

The study focused on the effects of physical proximity on the likelihood of nosocomial infections including CDAD and AAD.

### DESIGN IMPLICATIONS

Even though the study focused on one type of HAI's, it demonstrated that physical separation between patients might be one environmental measure for HAI prevention.

Providing single patients rooms and isolation rooms may be examples of physical separation.

Attention should be paid to environmental design aspects that may potentially impact pathogen transmission routes. Further research is needed to examine which design features are more effective in reducing transmission of specific pathogens.

## The Role of Physical Proximity in Nosocomial Diarrhea

Chang, V. T., Nelson, K.  
2000 | *Clinical Infectious Diseases*  
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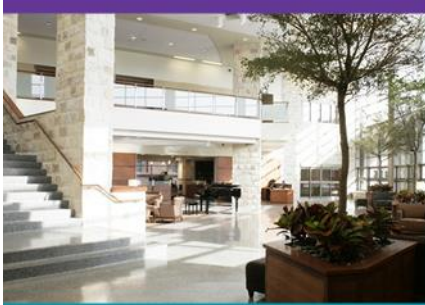
### Key Concepts/Context

Physical proximity is considered as a risk factor of nosocomial transmission of infectious diseases. Patients in close vicinity of a patient with a specific infectious disease are likely to contract the pathogen through contact transmission (e.g. direct physical contact with the infectious patient, contaminated environmental surfaces, and contaminated hands and gowns of staff members) and airborne transmission (e.g. contaminated air). This is often what happens during nosocomial outbreaks that occur in spatial clusters. However, the relative importance of physical proximity had not been rigorously examined before this study due to small sample sizes and the lack of patient's location data.

*Clostridium difficile*-associated diarrhea (CDAD) is a common nosocomial infection. *Clostridium difficile* is a bacterium causing diarrhea (watery bowel movement) and life-threatening symptoms commonly affecting older patients in hospitals and long term care settings usually after the use of antibiotics which kill competing bacteria. Antibiotic-associated diarrhea (AAD) is a type of diarrhea in response to the use of antibiotics.

### Methods

In this retrospective observational study at a 305-bed community hospital in Maryland, analyses were conducted on selected data from medical records of all patients who stayed > 2 days in the study period (six months of 1987). Potential risk factors of CDAD and AAD including age, length of stay, antibiotic exposure, intensive care, OR use, and physical proximity to patients with CDAD or to patients with AAD nosocomial diarrhea were extracted from the medical records and entered into multivariate logistic regression analyses. Physical proximity was defined by mapping patient rooms and examining whether or not a patient was roommate or neighbor of another patient with diarrhea (i.e. neighbor exposure), or



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stayed in the room where the patient with diarrhea previously stayed (i.e. sequential exposure).

## Findings

Among the 2859 patients in the study sample, 68 patients were diagnosed with CDAD, 54 with AAD, and 8 with other nosocomial diarrhea. Physical proximity was a significant independent risk factor for acquisition of nosocomial CDAD and AAD when controlling for other risk factors. Staying in the same room with infected patients or staying in the adjacent rooms significantly increased the chance of developing CDAD and AAD. Other significant risk factors included antibiotic exposure, age, and length of stay.

## Limitations

There were several limitations of this study:

- Physical proximity may be more relevant to certain subtypes of CDAD. However this retrospective study was limited in the availability of examining the detailed relationships between physical proximity and CDAD subtypes due to the lack of relevant data (e.g. isolates of *C. difficile*).
- Individual contribution of the multiple risk factors may be not linear as assumed by the regression analysis model. This might have obscured the effects of physical proximity.
- There might be biases in identifying and reporting cases of CDAD and AAD. The data depended on medical and nursing staff's decisions in submitting stool samples. Mild cases of diarrhea that occurred after discharge might never have been reported and captured by the medical records. In addition, there were still controversial around the diagnosis and definition of CDAD and ADD.
- Based on the study, it was not clear how the pathogens were transmitted to patients in physical vicinity of infected patients. The roles of transmissions through inanimate surfaces, hand-to-hand transmission by staff, and air transmission needed further research.