



Major Article

Cleaning the grey zones of hospitals: A prospective, crossover, interventional study



Makeda Semret MD, FRCP(C)^{a,b,*}, Alina Dyachenko MSc^b, Leila Ramman-Haddad BSc(N)^b, Eric Belzile MSc^b, Jane McCusker MD, DrPH^b

^a McGill University, Montreal, Quebec, Canada

^b St Mary's Hospital Centre, Montreal, Quebec, Canada

Key Words:

Environmental cleaning
VRE
MRSA
Clostridium difficile

Background: Environmental cleaning is a fundamental principle of infection prevention in hospitals, but its role in reducing transmission of health care-acquired pathogens has been difficult to prove experimentally. In this study we analyze the influence of cleaning previously uncleaned patient care items, grey zones (GZ), on health care-acquired transmission rates.

Methods: The intervention consisted of specific GZ cleaning by an extra cleaner (in addition to routine cleaning) on 2 structurally different acute care medical wards for a period of 6 months each, in a crossover design. Data on health care-acquired transmissions of vancomycin-resistant enterococci (VRE), methicillin-resistant *Staphylococcus aureus*, and *Clostridium difficile* were collected during both periods. Adjusted incidence rate ratios (IRRs) using Poisson regression were calculated to compare transmission of pathogens between both periods on both wards.

Results: During the intervention VRE transmission was significantly decreased (2-fold) on the ward where patients had fewer roommates; cleaning of GZ did not have any effect on the ward with multiple-occupancy rooms. There was no impact on methicillin-resistant *S aureus* transmission and only a nonsignificant decrease in transmission of *C difficile*.

Conclusions: Our data provide evidence that targeted cleaning interventions can reduce VRE transmission when rooming conditions are optimized; such interventions can be cost-effective when the burden of VRE is significant. Enhanced cleaning interventions are less beneficial in the context of room sharing where many other factors contribute to transmission of pathogens.

Crown Copyright © 2016 Published by Elsevier Inc. on behalf of Association for Professionals in Infection Control and Epidemiology, Inc. All rights reserved.

Hospital infections are a major cause of morbidity and mortality in health care. A significant proportion of hospital-associated infections are attributed to cross-infection via the hands of health care personnel or to contact of contaminated environment surfaces. It is well known that surfaces in patient rooms are frequently contaminated with pathogens such as *Clostridium difficile*, vancomycin-resistant *Enterococcus* (VRE), methicillin-resistant *Staphylococcus aureus* (MRSA), and others¹⁻³ that survive on inanimate surfaces and are associated with hospital outbreaks. Environmental cleaning is therefore a fundamental principle of preventing infection in hospitals; however, there is little consensus on best prac-

tices for cleaning hospital environments.^{4,5} The effect of overall environmental cleaning on health care-acquired infections has been difficult to assess experimentally because of the numerous potential confounders inherent in such studies. Outside of outbreaks, most studies assessing cleaning have focused on methods and monitoring strategies with surface contamination as the primary outcome, rather than transmission rates.^{4,6,7} With limited evidence on the effectiveness of specific cleaning interventions to reduce the risk of hospital infections, many institutions rely on their own standards for cleaning. Hospitals facing overcrowding, understaffing, and budget constraints may allocate insufficient resources to environmental cleaning, and several studies have shown tremendous variation in cleaning within object categories, within hospitals, and between institutions.⁸ Furthermore, cleaning responsibilities often overlap between different departments, which in turn creates cleaning gaps.^{9,10} Not only is environmental cleaning poorly monitored and suboptimal in many institutions, but also it is actually not done at all on a number of surfaces colloquially referred to as grey zones

* Address correspondence to Makeda Semret, MD, FRCP(C), St Mary's Hospital Centre, Rm 1203, 3830 Lacombe St, Montreal, QC H3T 1M5, Canada.

E-mail address: makeda.semret@mcgill.ca (M. Semret).

This project was fully funded by St Mary's Hospital Centre and the St Mary's Research Centre.

Conflicts of Interest: None to report.

(GZs). The specific items that fall into that category vary from institution to institution, and within institutions over time. These are generally equipment and clinical materials used by numerous service providers, whose cleaning has not been clearly assigned to a specific category of health care worker but is left to individual users. Although some of these items are rarely in direct contact with patients (eg, patient charts and computers), others may be important contact surfaces (eg, mobile blood pressure equipment) and therefore potential sources of transmission of hospital pathogens.

In our institution, an acute care hospital in Canada with low-moderate rates of transmission of health care-acquired pathogens, environment cleaning is already a well-established practice and an integral part of our infection control program. However, as in other institutions, many items fall into the GZ category and are not routinely cleaned. We sought to specifically analyze the influence of cleaning GZs, in addition to routine cleaning, on health care-acquired transmission rates. Although the specific GZ items might vary from institution to institution, we believe an analysis focused on the influence of a GZ cleaning intervention presents a unique opportunity to assess the role of cleaning of hospital environments on patient outcomes.

METHODS

This study was reviewed by the institutional review board and found to be ethically acceptable.

Study setting and baseline transmission rates

St Mary's Hospital Centre is a 280-bed acute care, university-affiliated, community-based teaching hospital servicing a diverse population of adult patients in Montreal, Quebec, Canada. The study was conducted between September 25, 2013, and October 8, 2014.

Two acute-care medical wards (A and B) were selected for the study. At the time of the study, the overall hospital VRE incidence rate was about 3.5 out of 1,000 patient-days, with the majority of transmissions occurring on the wards included in this study. Of note, during the 3 years preceding the study, incidence rates for VRE on ward A had increased from 0.4/1,000 patient-days to 1.5/1,000 patient-days, and for ward B from 0.4/1,000 patient-days to 5.7/1,000 patient days. Incidence rate for MRSA was 1.8/1,000 patient-days and for *C difficile* 0.8/1,000 patient-days at the time of the study; these rates were similar between the 2 wards and fairly constant during the 3 years preceding the study, with MRSA incidence stable between 1.6 and 2.8/1,000 patient-days and those of *C difficile* 0.6 and 1.5/1,000 patient-days on both wards.

Overall compliance rate for hand hygiene ranges between 58% and 65% in our institution on both wards, based on 3 audits performed during the 4 years preceding this study.

GZ cleaning intervention

The GZ surfaces identified for each of the wards are listed in Table 1. Most items were routinely in use on both wards, but some were unique to a single ward; for example, items associated with cardiac telemetry (only used on ward B), oxygen tanks (only on ward A, because all rooms in ward B had wall-mounted oxygen supply systems), and roll boards used to mobilize elderly patients (on ward B). Items in direct contact with patients were cleaned daily (between patients), whereas those in frequent contact with health care workers (but not in direct patient contact) were cleaned weekly.

All surfaces were cleaned by a specific GZ cleaner using the following procedures: wiping with a wet rag (soaked in a solution containing soap and water) to remove organic debris if present, then disinfected using a freshly prepared solution of a quaternary

Table 1

Items listed as grey zones on each ward, and cleaning frequency

Grey zone item	Frequency of cleaning	Grey zone item in use on ward(s)
Laundry hampers in rooms	Daily (between patients)	A, B
Mobile sphygmomanometer	Daily (between patients)	A, B
Portable blood pressure	Daily (between patients)	A, B
Rolling walker	Daily (between patients)	A, B
Manual scale	Daily (between patients)	A, B
Patient lift	Daily (between patients)	A, B
Foot stool	Daily (between patients)	A, B
Leads for cardiac monitor	Daily (between patients)	B
Shower chair	Daily (between patients)	A, B
Suction gauge	Daily (between patients)	A, B
Oxygen tanks	Daily (between patients)	A
Roll board	Daily (between patients)	A
Clean linen cart in hallway	Weekly	A, B
Clean linen bins in hallway	Weekly	A, B
Cart for patient charts	Weekly	B
Utility cart	Weekly	B
Laundry cart	Weekly	B
Printer for cardiac monitor	Weekly	B
Code red monitor	Weekly	A

ammonium-based product (Ecopure EP66, Avmor, Canada). The disinfectant was applied with a spray or a cloth and left for 10 minutes following the manufacturer's protocol. The cleaner was recruited from the existing pool of housekeeping staff and trained to specifically clean the listed GZ areas. He worked each weekday from 8 a.m.–4 p.m. There was no GZ cleaning on weekends, evenings, nights, holidays, and sick days.

Screening and infection control policy

On both wards, our policies for surveillance and control of MRSA, VRE, and *C difficile* call for the following: patients are routinely screened for MRSA and VRE upon admission if they are considered at risk for any of the following reasons: admission to any institution during the previous 6 months, positive on prior screens, close contact with a positive case, or employment as a health care worker. All inpatients were screened during weekly surveillance screens and at discharge. No screening is performed for *C difficile*, but all patients with diarrhea are tested for the presence of *C difficile* in stool samples. Patients identified as positive for any health care-acquired pathogens are kept in isolation or placed in cohorts with other patients harboring the same organism, with application of contact precautions. Our policies additionally call for adherence to hand hygiene measures, with antiseptic solutions available beside each room, and at least a single sink in each hallway of the ward. Environmental cleaning is routinely performed as follows: floors in patient rooms and hallways are mopped and bathrooms are cleaned with the hospital disinfectant daily. Patient rooms are cleaned and disinfected using the hospital disinfectant described above (EcoPure) upon discharge of the patients, but undergo terminal cleaning using a bleach-based product if the room was occupied by a patient with a confirmed case of VRE or *C difficile*. In cases of a discharge from a room occupied by 2 or more patients, the areas near the bed of the discharged patient undergo cleaning and disinfection.

Ward setting

Each ward selected for this study had similar nurse-patient ratios, but important differences in terms of bed capacity, infrastructure, type of patients, and certain patient care items. Ward A, with a capacity of 49 beds, was built in the original hospital edifice in 1940 and has not undergone significant renovations. About half of patients on that ward receive active medical care, whereas the others await long-term placement and receive little active care. Patients are housed in quadruple-, triple-, and double-occupancy rooms with

Download English Version:

<https://daneshyari.com/en/article/5566298>

Download Persian Version:

<https://daneshyari.com/article/5566298>

[Daneshyari.com](https://daneshyari.com)