Optimizing Environmental Hygiene to Successfully Decrease Clostridium difficile Transmission

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Background

In light of the challenges involved in reducing healthcare onset Clostridium difficile infection (HO-CDI), we implemented a multifaceted hospital-wide intervention program to optimize environmental hygiene in our 197 bed regional referral hospital.

Methods

Following an 18 month period during which HO-CDI rates were monitored, we simultaneously replaced routine quaternary ammonium cleaning and disinfection of patient rooms with an environmentally non-damaging sporicidal peroxycetic acid/hydrogen peroxide disinfectant and implemented an educational program for environmental services staff which included ongoing objective monitoring of the thoroughness of disinfection cleaning (TDC) using a fluorescent marker system. We also evaluated cleaned environmental surface bioburden elimination with environmental cultures, terminal room cleaning efficiency and HO-CDI rates.

Results

During the 33 month intervention period, TDC rapidly improved from 81% to 92% and remained greater than 88% during the remainder of the study (P=.01) (Figure 1.) Bioburden elimination of cleaned surfaces improved from 24% to 84% (P=.03) with sporacide use. Efficiency of terminal room cleaning improved by 33% (36 minutes to 27 minutes) (P=.02). HO-CDI rates fell significantly during the intervention period from an average of 8.9 to 3.2 /10,000 patient days (P =.0001, 95% CI 3.48 to 7.81) (Figure 2.) as did months without documented CDI cases (P .02). No changes in potential confounders including antibiotic use patterns, intensive care unit days, prevalence density of CDI at the time of admission, hand hygiene compliance rates, isolation practices or overall patient days were identified.

Conclusions

In the context of a single site, quasi-experimental study design, this 44 month study documented a significant impact (P=.0001) of an objectively monitored hospital-wide sporicidal disinfection cleaning program on endemic HO-CDI. The program was also associated with significantly improved efficiency of cleaning and post cleaning bioburden elimination of cleaned patient zone surfaces. Assuming a continued incidence of HO-CDI without intervention, the program resulted in an average non-reimbursed cost savings of approximately $10,000/month during the intervention period.