

The Relationship Between Different Types of Sharps Containers and *C. difficile* Infections Rates in Acute Care Hospitals



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BACKGROUND

- ✧ Sharps disposal containers are ubiquitous in healthcare facilities.
- ✧ However, there is paucity of data on the potential for environmental contamination of these containers and their role in transmission of pathogens.
- ✧ The potential for sharps containers to become a source of pathogen transmission within the healthcare setting is an issue that has been raised^{1,2} but not systematically studied.
- ✧ This is especially important given that contamination of the hospital environment has been shown to be an important component of pathogen transmission.

OBJECTIVES

- ✧ To describe the use of different types of sharps containers in a national sample of hospitals.
- ✧ To assess the relationship between the use of reusable vs. single-use sharps containers and rates of *C. difficile* infections.

METHODS

- ✧ Cross-sectional survey of 2,056 hospitals with ≥ 100 beds conducted in December 2013 to collect data on the use of sharps disposal containers.
- ✧ Survey linked to 2012 Medicare Provider Analysis and Review (MedPAR) dataset containing facility characteristics and *C. difficile* infection rates as identified by ICD-9 codes.
- ✧ Differences in *C. difficile* infection rates between hospitals using reusable vs. single-use sharps containers examined using bivariate and multivariable negative binomial regression models.

FINANCIAL SUPPORT AND CONFLICT OF INTEREST

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RESULTS

Hospital Characteristics, N = 539

	N (%)		N (%)
Geographic Region		Ownership Status	
Northeast	76 (14.1)	Non-profit	362 (67.2)
Midwest	133 (24.7)	For profit/Physician owned	112 (20.8)
South	217 (40.3)	Government	65 (12.1)
West	113 (21.0)	Urbanicity	
Bedsizes		Metropolitan (≥ 1 million)	281 (52.1)
100-199	218 (40.5)	Metro (250K – 1 million)	98 (18.2)
200-299	135 (25.1)	Metro (<250 K)	78 (14.5)
300-499	126 (23.4)	Non-Metro	82 (15.2)
≥ 500	60 (11.1)	Teaching status	Mean (SD)
Teaching status		Major + Minor	202 (37.5)
Major + Minor	202 (37.5)	None	337 (62.5)
None	337 (62.5)	Discharges (continuous)	5208 (3572)

Multivariable analysis examining relationship between type of sharps disposal container used and *C. difficile* infection rates

	Coeff	SE	p-value	IRR
Single Use Sharps Container†	-0.1395	0.0474	0.003	0.870
Geographic Region				
Midwest	0.0257	0.0697	0.714	1.026
South	-0.0915	0.0655	0.163	0.913
West	0.1328	0.0710	0.061	1.142
Beds (continuous)	-0.0003	0.0001	0.001	1.000
Ownership status				
For profit/Physician owned	-0.2377	0.0540	<0.001	0.788
Government	-0.1313	0.0658	0.049	0.877
Urbanicity				
Metro (250K – 1 million)	-0.1910	0.0559	0.001	0.826
Metro (<250 K)	-0.2558	0.0622	<0.001	0.774
Non-Metro	-0.1427	0.0659	0.030	0.867

†Reusable is the comparison group

RESULTS

- ✧ Completed surveys received from 604 hospitals (30% response rate).
- ✧ 539 hospitals provided data on the type of sharps containers used in Fiscal Year 2012 (27% response rate).
- ✧ Participating hospitals were predominantly non-for-profit (67%) and non-teaching (63%).
- ✧ The majority of respondents reported their primary role was in environmental safety (56%); a third were infection preventionists (31%).
- ✧ The majority of hospital utilized reusable sharps containers (72%) in FY 2012.
- ✧ Use of single-use vs. reusable sharps containers differed significantly by region, bedsize, ownership, annual discharges and urbanicity (p-values <0.05).
- ✧ In bivariate regression, hospitals using single use sharps containers had significantly lower rates of *C. difficile* infections vs. hospitals using reusable sharps containers (Incidence Rate Ratio [IRR] = 0.846, p-value = 0.001).
- ✧ This relationship persisted in multivariable regression (IRR = 0.870, p-value = 0.003] after controlling for other hospital characteristics.

CONCLUSIONS

- ✧ This is the first study to show a link between the use of single-use sharps containers and lower *C. difficile* infection rates and further work is needed to replicate this finding.
- ✧ Future studies should investigate the potential for environmental contamination of reusable sharps disposal containers with *C. difficile* and other micro-organisms and the role that sharps containers may play in pathogen transmission.

REFERENCES

1. Neely AN, Maley MP, Taylor GL. Investigation of single-use versus reusable infectious waste containers as potential sources of microbial contamination. *Am J Infect Control* 2003; 31:12-7.
2. Runner JC. Bacterial and viral contamination of reusable sharps containers in a community hospital setting. *Am J Infect Control* 2007; 35:527-30.