



The Use of Medication Drawer Bin Liners As An Infection Control Strategy



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BACKGROUND

Nosocomial infections are a major problem in health care facilities. It is estimated that 1 in 20 patients (2 million per year) acquire infections during their stay in a hospital, long term care facility, psychiatric center, hospice or other similar facilities. Nosocomial infections from all microorganisms directly cause 19,000 deaths per year and additionally contribute to 58,000 deaths per year. This makes nosocomial infections the 11th leading cause of death in the U.S. Nearly \$5 billion is spent annually to identify, track and treat hospital-acquired infections.

In an effort to reduce this problem JCAHO has targeted nosocomial infections and is revising infection control standards which revisions should take effect as early as first quarter of 2005. They want to encourage healthcare organizations to take a more proactive role in infection control. As of January 1, 2004 JCAHO surveyors will be checking accredited organizations on efforts to reduce the risk of healthcare-acquired infections.

DBL Solution, through Health Care Logistics as exclusive distributor, is bringing to market a product that allows pharmacy to make a contribution to the minimization of nosocomial infections - the Daschner Bin Liner - DBL™.

The Daschner Bin Liner - DBL™ was designed "by pharmacists - for pharmacists" to specifically act as a method to eliminate the problem with conventional medication cassette bins/drawers that receive inadequate or no cleaning and become sites for the transmission of nosocomial infections.

Currently there are no standards or documented procedures for the cleaning and reusing of medication bins. Non-critical items such as medication cassette bins and drawers may receive at best a simple cleaning. Though this cleaning may remove some microorganisms, it is inefficient, and in most cases doesn't completely kill them.

Lack of adequate cleaning, however, does not hinder the use of the bin as a container for medication or patient care equipment. Underestimated is the interaction of patient care personnel with these bins/drawers. In the course of providing treatment to patients' invariably cross contact with critical, semi-critical and other non-critical patient care items leads to potential causes of nosocomial infections.

As patient medication drawers and storage bins are frequently reused without the necessary cleaning - the use of the Daschner Bin Liner insures that medication and other patient care equipment that is transported to the patient in a medication bin "reliably and repeatedly" minimizes the risk of nosocomial infections. Bin liners improve patient care by providing a more consistent, efficient and convenient method of maintaining clean patient medication drawers and medical storage bins.

STUDY COMMISSIONED

Pharmacy needs to be aware of the possible contamination of drug bins with microorganisms capable of causing nosocomial infection in patients who are compromised because drug bins used to transport and deliver medications to patients by nurses may contribute to the spread of nosocomial infections in an institution.

With this as a basis, Health Care Logistics commissioned a study in a 300-bed general med/surg hospital to investigate the degree of microbial contamination in dirty bins and compare this to the use of bin liners as an adjunct to minimize the potential for nosocomial infection spread.

METHODOLOGY

Fifty-five (55) drug bins used in the transport and administration of drugs to patients in a 300-bed general med/surg hospital were sampled for bacterial growth.

The drug bins were randomly sampled on medication carts on three active hospital units.

Twenty-five (25) bin liners were sampled from a batch of prototype liners using the same sampling procedure for both the drug bins and bin liners.

A hospital lab microbiologist, using a culture swab moistened with nonbacteriostatic saline, wet swabbed both the drug bins and bin liners and streaked both blood agar and EMB (eosin methylene blue) plates. Plates were incubated at 35°C and examined for growth at 24, 48, and 72 hour intervals.

The cultures were identified by standard means and reported and categorized. Select blood agar plates were photographed for a visual documentation of the relative amount of bacterial growth.

RESULTS

Overall, 84% of all the drug bins that were tested were contaminated with bacterial and mold growth as determined by the test swabbing procedures.

In contrast only 32% of the bin liners cultured were contaminated with bacteria and mold growth.

Of the 84% of the drug bins that were contaminated, 28 bins (50%) showed positive for 1 organism, 14 bins (25%) for 2 organisms and 5 bins (9%) for 3 organisms. Nine bins (16%) showed no growth. [see Table 1 below]

Table 1: Organism count in sampled drug bins

No Organisms	9	16%
1 - Organism	26	47%
2 - Organisms	14	25%
3 - Organisms	6	11%
	55	100%

Of the 32% of the bin liners that were contaminated, 6 liners (24%) showed positive for 1 organism, 1 liner (4%) for 2 organisms and 1 liner (4%) for 3 organisms. Seventeen bin liners (68%) showed no growth. [see Table 2 below]

Table 2: Organism count in sampled bin liners

No Organisms	17	68%
1 - Organism	6	24%
2 - Organisms	1	4%
3 - Organisms	1	4%
	25	100%

Comparably fewer bin liners were contaminated than drug bins.

[see Tables 3 & 4 below]

Table 3: Breakdown of organisms detected in the contaminated bins

Organism	# of bins	%
Staph/diphth	1	2%
Staph/bac	10	18%
Staph coag-neg	17	31%
Bac	3	5%
Diphth	2	4%
Diphth/bac/staph	1	2%
Mold - un "id"	1	2%
Alternaria	2	4%
Alt/bac/staph	3	5%
Pen/bac/staph	1	2%
Cladosporium	1	2%
Pen/bac	1	2%
Staph/pen/pseudo	1	2%
Diphth/alternaria	1	2%
Bac/pen/clado	1	2%
	46	84%

Table 4: Breakdown of organisms in contaminated bin liners

Organism	# of bins	%
Staph coag-neg	1	4%
Bac	3	5%
Diphth	1	4%
Diphth/bac	1	4%
Mold - un "id"	1	4%
Staph/bac/clad	1	4%
	8	32%

Identification of the representative colonies showed that most of the organisms cultured were associated with normal human skin microflora and environmental contamination.

Although most microorganisms identified were generally harmless environmental contaminants, some such as the coagulase-negative staph and pseudomonas are capable of causing serious infections. Patients who are compromised by AIDS or by transplantation or cancer therapy, and patients with an increased susceptibility to infection as a result of diabetes or severe burns are particularly at risk.

DISCUSSION

The results of this study identify an important problem - that being - a high level of contamination on drug bins circulating in the institution. The presence of nonpathogenic members of the skin and environmental bacteria, in relatively high numbers, indicates this poor degree of cleanliness. Dirty drug bins may be a source of transmission of drug-resistant pathogens and should undoubtedly receive more emphasis in infection control programs.

Although there is no direct proof that microorganisms from dirty bins can cause nosocomial infections in patients or pose a threat to health care workers, a strong and obvious relationship can be drawn from the results of this study which suggests that contaminated dirty bins could contribute to the nosocomial infection rate.

In this study, given the fact that some pathogenic organisms have been found in medication drawers/bins on the nursing unit, it follows that dirty drug bins can be one link in the complex chain that leads to nosocomial infections. If one breaks that link one weakens the chain. The avoidance of just one nosocomial infection could pay for the bin liners for thousands of patient stays.

The use of bin liners as an intervention to minimize the spread of nosocomial infections is a useful and practical infection control intervention. Bin liners improve patient care by providing a more consistent, convenient and cost effective method of maintaining clean patient medication drawers and medical storage bins.

Cost Comparison Between a Bin Cleaning Protocol versus a Bin Liner Replacement Program

In surveys conducted by DBL/HCL it was determined that no surveyed hospital had a "bin cleaning protocol" in place. Though respondents indicated that they had a "dirty bin" problem and from time to time initiated some procedure to clean the dirty bins – no hospital had a formal program or protocol to clean bins on an on-going basis.

We feel that this may change in the future in light of the results of this study we conducted that indicates that "dirty bins" can contribute to a nosocomial infection problem in an institution.

Given that assumption we considered what a hypothetical bin cleaning protocol for a typical 300-bed hospital would look like.

We took an average 300-bed hospital that performed a 24-hour unit dose cart exchange. In this case 300 bins would be in use and up on the nursing units and 300 bins would be in pharmacy being readied and filled for the next cart exchange. Considering 50 new admits per day, a bin cleaning program would mean having to wash approximately 100 bins per day and replace these dirty bins with 100 clean bins for the new admits.

The cleaning task would be given to a pharmacy technician with a base pay of \$13.00 per hour. It was estimated that it would take a technician 5 hours per day to clean the dirty bins or a \$65.00 per day expenditure. On a yearly basis (365 days) the basic cost of a "bin cleaning" protocol would be \$23,725.

Not considered in this cost are:

1. Pharmacy needs to have approximated 200 additional bins (1/3 of the total bins in use) in stock and available for replacement. There is a cost associated for these additional bins.
2. There is a need for dedicated space to accomplish this bin cleaning task. There is a cost associated for this area.
3. There is a need to use cleaning solutions or wipes (soap, bactericide, alcohol, acetone, etc) for cleaning and removing the label adhesive from the dirty bins. There is a cost associated with the necessary cleaning materials.
4. If harsh chemicals (detergents, bactericides, alcohol, acetone, etc) are used for the bin cleaning there is the potential to alter the integrity of the bins over time and potentially render them more susceptible to organisms with this repeated cleaning. There would be a cost with replacement of these altered bins.
5. The protocol needs to be maintained by a dedicated person(s).

One can easily see that the total cost of initiating a bin cleaning protocol is in excess of \$23,725.

If one considers the time, dedicated personnel and space needed to accomplish this task - costs quickly add up. This doesn't include the cost of the additional bins needed to be put into service to replace those that are being cleaned. When one considers what it would cost and the logistics behind a comprehensive bin cleaning program, the use of bin liners begins to make sense.

Now if we compare the cost of a "bin cleaning protocol" to what a corresponding "bin liner replacement" program would look like for the same hospital – the savings is significant. Given that the average price of a bin liner is \$0.28 and 100 bin liners would be replaced each day (2 each for 50 new admits); the yearly cost (365 days) of a bin liner replacement program would be \$10,220 or a \$13,505 plus savings over a bin cleaning protocol.

The cost of a bin liner is easily justified when one considers the cost to have an employee clean or wash bins. This cost can easily be spread amongst departments as both pharmacy and nursing have an interest in working with clean bins. This cost could also be easily incorporated into a patients admit kit at an additional \$0.56 per patient which is certainly nominal in comparison to what the cost of treating a nosocomial infection could be.

SUMMARY

The implementation of bin liners replacement program has the following advantages:

- immediately improves patient care by providing a more consistent, efficient and convenient method of maintaining clean patient medication drawers and medical storage bins
- used for storing and dispensing medications and other patient care supplies in a manner that reduces the risk of infection and cross contamination
- eliminates dirty patient medication cassette bins or drawers and minimizes the accumulation of pathogens
- minimizes contamination to and from patients; cuts down the chance of infection
- saves time! no cleaning involved: whenever a bin liner is contaminated or soiled it can be disposed of and replaced with another liner
- also eliminates unsightly and sticky label adhesive residue on bin from multiple gummed labels that are only partially removed after use
- quick and easy placement in bin with new patient admits; also allows for 'easy transport' of patient meds when patient is transferred to a different unit
- eliminates bin cleaning task, time and hassle
- frees up pharmacy time and improves pharmacy/nursing relations

Bin liners dramatically reduce the bacterial contamination of drug bins. The results of this initial study should highlight their value in an institutional setting. Bin liners employed as a strategy to reduce nosocomial infections in the institution help improve compliance because they are convenient, quick to use, and low cost in comparison to a bin cleaning program. Consequently, use of these products as part of an infection control program/strategy for pharmacy can have a significant impact on both health outcomes and health care costs.

Great ideas evolve out of need. The best solutions are great ideas that are easily and inexpensively implemented. Those are the solutions that last. The use of bin liners is a simple solution in response to a complex problem.

Health Care Logistics, as a partner with DBL Solution, is in the unique position to bring to market this product line that allows pharmacy to make a contribution to the minimization of nosocomial infections. It is HCL's goal to continually expand the bin liner product line beyond the initial introductory bin liner sizes as demand increases.

[Complete text of the drug bin/bin liner study cited in this Technical Bulletin is available upon request]

Contact us for product literature on our full line of bin liners!