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Original Study

Telephone Survey of Infection-Control and Antibiotic Stewardship Practices in Long-Term Care Facilities in Maryland

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A B S T R A C T

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Background: Multidrug-resistant organisms are an emerging and serious threat to the care of patients. Long-term care facilities are considered a reservoir of these organisms partly because of the over-prescribing of antibiotics. Antibiotic use is common in long-term care facilities. Antibiotic stewardship programs have been shown to reduce antibiotic consumption in acute-care facilities. The purpose of our study is to investigate existing infection-control practices and antibiotic stewardship programs in long-term care facilities in Maryland.

Methods: We telephoned the infection-control personnel in 231 long-term care facilities in Maryland between February 2014 and July 2015 and reached 124 facilities (59%).

Results: Among the 124 facilities surveyed, there were 14,371 beds and 337 infection-control personnel with basic infection-control training. Close to 20% of facilities use silver- or antimicrobial-impregnated urinary catheters. Most facilities (97%) track urinary tract infections. Although all report to the health department in the case of an outbreak, only 63 (50.8%) report directly to the Centers for Disease Control and Prevention. About 80% of facilities isolate patients with *Clostridium difficile*, methicillin-resistant *Staphylococcus aureus*, and vancomycin-resistant *Enterococci* with acute infections only. Eighty percent of facilities have basic guidance on choice of antibiotic, and 27% have a restricted formulary. Only 25% of facilities have an antibiotic approval process. Thirty-five percent of facilities have training for antibiotics prescribing. However, 17% of facilities did not know whether such training existed.

Conclusions: Antibiotic stewardship programs in long-term care facilities are still in early development stages, but our results demonstrate that the majority of facilities are collecting data on prescribing antibiotics, and a surprising number have antibiotic approval and antibiotics prescribing training.

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Approximately 1.3 million people live in nursing homes and more than 700,000 live in residential care facilities in the United States.¹ About 1.6 to 3.8 million infections occur in long-term care facilities (LTCFs) in the United States per year with an associated annual cost exceeding \$1 billion.² Antibiotic prescribing in LTCFs is common, ranging in annual prevalence from 47% to 79%.³ Up to 25% to 75% of antibiotics prescribed in LTCFs are considered inappropriate.⁴ Antibiotic stewardship programs and infection-control programs have significantly reduced antibiotic utilization in acute-care settings.⁵ There is a large disparity between infection-control personnel in

acute vs LTCFs.⁶ A 2003 Maryland survey study shows that acute care facilities had 1.2 full-time equivalent (FTE) positions per 200 acute care beds, whereas only 0.3 FTE positions per 200 LTCF beds.⁶ Ninety percent of acute care infection-control personnel have taken a basic infection-control course, whereas only 3% of long-term care infection-control personnel have taken a basic infection-control course.⁶

The type of care delivered in acute hospitals vs LTCFs is different as well. Acute hospitals deploy high technology, acute intensive care with the goal of recovery, while LTCFs administer low technology, chronic care that functions as a home for many of the residents.⁷ Antibiotic prescribing in acute hospitals is not the same as those in LTCFs because of the unique context of long-term care: variations in knowledge and practices among healthcare professionals, complex patient population, and restricted access to physicians and diagnostic tests.⁸ The practice of antibiotic stewardship in LTCFs is emerging. One effective antibiotic stewardship program involved the development of

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an infectious disease consult team for a LTCF, which was conveniently attached to a large urban Veterans Affairs medical center.⁹ However, because of financial and geographic limitations, it is not practical to have a consult team in all LTCFs. The purpose of our study is to investigate existing infection-control practices and antibiotic stewardship programs in LTCFs in Maryland.

Methods

A review of the literature was performed, and a survey was developed focusing on infection-control practices without referencing individual facility rates (Appendix A). All 231 Maryland LTCFs names, number of beds, and phone numbers were obtained from the administrator for the Maryland Medical Director Association. Each facility was contacted by phone, and the infection-control personnel were asked a series of questions after obtaining verbal consent. Each facility was contacted up to 3 times from February 2014 to July 2015.

Results

Two hundred thirty-one LTCFs in Maryland were identified and contacted. Nine facilities declined participation, 1 facility was closed, 5 had the wrong telephone number, and 7 reported no infection-control personnel. One hundred twenty-four of the remaining 209 facilities (59% response rate) consented to participate. Among the 124 facilities, there were 14,371 beds and 337 infection-control personnel with basic infection-control training.

Furthermore, 90.3% of the facilities have a central line protocol, whereas close to 6% do not accept patients with central lines (Table 1). All facilities surveyed have urinary catheter protocols. Close to 20% of facilities use silver- or antimicrobial-impregnated urinary catheters. Ninety-seven percent of facilities track urinary tract infections (UTIs). Although all LTCFs report to the health department in the case of an outbreak, only 51% report directly to Centers for Disease Control and Prevention or National Healthcare Safety Network. Close to 80% of facilities isolate patients with active *Clostridium difficile*, methicillin-resistant *Staphylococcus aureus*, and vancomycin-resistant *Enterococci*. About 10% of the facilities indicate that they cannot individually isolate patients (they can only isolate by cohorts) because of the lack of private rooms. In addition, geographic restriction for the residents is impractical. Twelve to 13% of facilities do not isolate or cohort patients with *Clostridium difficile*, methicillin-resistant *Staphylococcus aureus*, or vancomycin-resistant *Enterococci*.

Eighty percent of facilities already have antibiotic guides, and 27% have a restricted formulary (Table 2). Antibiotic guidelines varied in complexity and could be as simple as providing sensitivities to organisms with cultures. Twenty-five percent of facilities have an antibiotic approval process, mostly done by the medical director. Antibiotic approval means a list of restricted antibiotics that require approval prior to prescribing, according to the infection-control personnel. It was not confirmed with separate conversations with

facility providers on how antibiotics approval was obtained when the medical director, or the person doing the approval, was unavailable. Of the facilities, 35.5% state that they have training for prescribing antibiotics. Those who provide training for antibiotics prescribing vary; typically by the medical director, then the infection-control personnel, followed by nurse educator, pharmacist, and corporate or a hospital-based consultant. However, 17% of facilities infection-control personnel did not know whether such training existed.

The facility design was also found to be different in LTCFs. Many infection-control personnel reported that there are no private rooms in their facility. Even when there are individual rooms, the facility is a long-term home to the residents, and restriction of movement is not practical or humane. Several infection-control personnel told us that not only do they monitor infection rates, antibiotic use, but also provide feedback to the prescribers. Some infection-control personnel specifically mentioned using the McGreer criteria¹⁰ as educational material for antibiotics prescribing. However, the McGreer criteria were not designed, for prescribing antibiotics. Instead, the criteria were designed for tracking and making comparisons among facilities.¹⁰ Others mentioned that on a corporate level, there is infection tracking and the ongoing development of antibiotic stewardship programs.

Discussion

Our study shows that antibiotic stewardship programs in LTCFs in Maryland are still in early development stages. However, our results demonstrate that the majority of facilities are collecting data on antibiotic prescribing. A surprising number have antibiotic approval processes and education on appropriate antibiotic prescribing practices. Maryland requires at least 0.5 FTE positions per facility with education and training in infection surveillance, prevention, and control to be responsible for each facility's infection-control program.¹¹ As part of the infection-control program required by the state of Maryland, the facility should maintain a record of infection, obtain surveillance data, analyze patterns of infection, and have a communication mechanism in place with the administrator, director of nursing, and the medical director.¹¹ The infection-control personnel should also train employees about infection-control and hygiene but does not explicitly include antibiotic stewardship or antibiotic prescribing.¹¹ Maryland's regulations for infection-control mirrors that of federal regulations in terms establishing an infection-control program that must investigate, control, and prevent infections as well as maintain a record of infections.^{11,12} Federal regulations specifically requires that "when the infection-control program determines that a resident needs isolation to prevent the spread of infection, the facility must isolate the resident."¹² The facility should isolate infected residents only to the degree needed to isolate the infected organism, with the least restrictive method possible.¹² This supports the majority of facilities surveyed that isolate only active infections, not colonization or previous infections as per many hospital infection-control policies.

Table 1
Infection-Control Practice

	Yes	%	No	%	Do Not Know	Others
Have CL protocols	112	90.3	5	4.0	0	7 (5.6%) do not accept CLs
UC protocol	124	100.0	0	0.0	0	NA
Use impregnated UC	24	19.4	95	76.6	5 (4.03%)	NA
Track UTIs	120	96.8	4	3.2	0	NA
Report infections to CDC/NHSN	61 to CDC, 2 to NHSN	50.8	All to health dept for outbreaks		1 (0.81%)	NA
C. diff isolate	95	76.6	15	12.1	0	14 (11.3%) cohort only
VRE isolate	96	77.4	16	12.9	1 (0.81%)	11 (8.9%) cohort only
MRSA isolate	96	77.4	16	12.9	1 (0.81%)	11 (8.9%) cohort only

CL, central line; CDC, Centers for Disease Control and Prevention; C diff, *Clostridium difficile*; MRSA, methicillin-resistant *Staphylococcus aureus*; NHSN, National Healthcare Safety Network; UC, urinary catheters; VRE, vancomycin-resistant *enterococcus*.

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