

reason for nonfunctioning touchless HHDs, but these occurrences were related to management and were therefore not reported as dispenser defects.

In a cross-sectional survey-based study, Kohan et al⁵ described a defect rate of 2% (4 of 166) in mechanical HHDs after having been in use for 16 months; the authors concluded that mechanical HHDs, even from the same manufacturer, may differ considerably in their design and may not function similarly.⁵ Although well-functioning HHD systems may be seen as a basis for adequate hand hygiene compliance and careful evaluation of newly introduced products is important to guarantee cost-effective allocation of financial resources in healthcare institutions, defect rates of touchless HHDs have not been reported in the literature previously.^{1,6,7}

Our study has 2 main limitations. First, we investigated defect rates of touchless and mechanical HHDs from a single manufacturer, which may limit the generalizability of the study results. Second, the definite cause of device or pump malfunctions could not be determined.

In conclusion, we observed a significantly higher defect rate among touchless HHDs than among mechanical HHDs. The ease of use of touchless HHDs for visitors should be balanced with the additional resources required for maintenance. Mechanical HHDs may be better suited for healthcare workers due to their high reliability, low maintenance requirements, and battery-free function. An evaluation of touchless HHDs from other manufacturers is warranted.

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Exploring the Role of the Bedside Nurse in Antimicrobial Stewardship: Survey Results From Five Acute-Care Hospitals

Antimicrobial stewardship programs (ASPs) have been shown to improve antimicrobial prescribing and patient outcomes,^{1–3} and interest in including a wider range of disciplines in ASPs has grown.⁴ Because of their bedside responsibilities, acute-care nurses have been identified as potential ASP team members.⁵ We conducted the first large-scale survey of US nurses at several acute-care hospitals to explore their knowledge, attitudes, and practices in antimicrobial stewardship activities and to identify opportunities for additional nursing involvement in ASPs.

Acute-care nurses at a 2,200-bed, 5-campus academic hospital system with active ASPs in New York City were invited to participate in a web-based, anonymous, 31-question survey regarding principles of antimicrobial stewardship (see supplementary material). Nurses were eligible if they worked primarily in inpatient settings or emergency departments (EDs) or if they did not routinely administer antibiotics (eg, behavioral health). Likert scale, multiple choice, and free-text responses were utilized. Proportions for categorical variables were calculated using χ^2 tests or Fisher exact tests as appropriate. Subgroup analyses assessed differences across respondent groups. *P* values < .05 were considered statistically significant. The study was approved by local institutional review boards with waivers of written consent.

Of the 3,458 nurses who received the survey invitation, a total of 451 eligible nurses completed the survey for a response rate of 13%. The included respondents worked in the following settings: 180 (40%) in medical-surgical areas, 175 (39%) in intensive care units, 51 (11%) in EDs, and 45 (10%) in

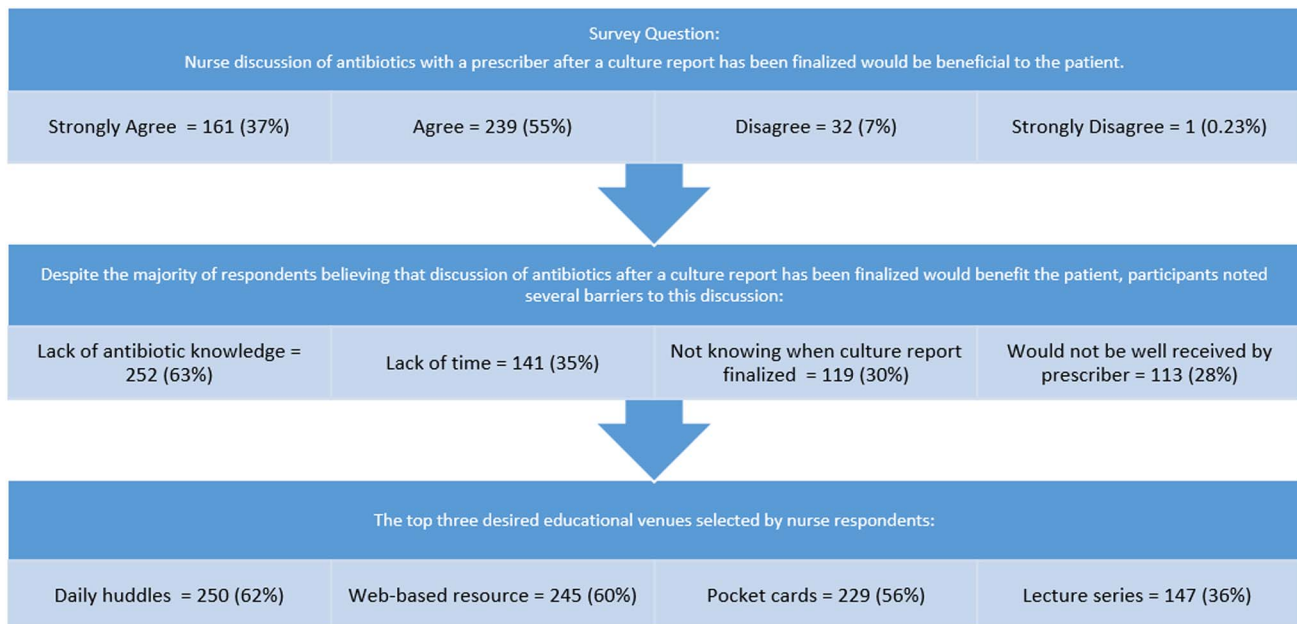


FIGURE 1. Survey results indicated that gaps in knowledge regarding antimicrobial stewardship present barriers to nurse-driven antimicrobial stewardship behaviors.

step-down units. Overall, 32% of the respondents routinely cared for pediatric patients. More than half of the respondents ($n=247$, 56%) had 6 years of nursing experience, 40% ($n=180$) had 1–5 years of experience, and 5% ($n=24$) had <1 year of experience.

Most respondents ($n=288$, 62%) were unfamiliar with the phrase “antimicrobial stewardship.” Nurses with master’s degrees or higher were more likely to be familiar with the phrase than nurses without master’s degrees (57% vs 32%; $P<.01$), as were those with >5 years of experience (44% vs 33%; $P<.05$). Of the 163 respondents familiar with the term, 138 (85%) identified the correct definition of antimicrobial stewardship, and 145 (89%) felt that nurses had a role to play in stewardship. Nurses with master’s degrees were less likely to agree that nurses play a role in stewardship compared to nurses without master’s degrees (65% vs 95%; $P<.01$). Across different care settings, there were no differences in proportions of respondents familiar with the phrase “antimicrobial stewardship” ($P=.60$) or the proportions who believed nurses play a role in stewardship ($P=.24$). Nearly all respondents ($n=398$, 97%) reported a desire to know more about their role in antimicrobial stewardship and identified preferred venues for stewardship education (Figure 1).

Among the 292 respondents who routinely obtain blood cultures, 73 respondents (25%) reported that they obtain 2 sets of blood cultures through 1 peripheral site, and 70 respondents (24%) reported that they obtain 2 sets of blood cultures from a patient’s central line, when available. Compared to respondents who cared for adult patients, those who cared for

pediatric patients reported being more likely to obtain both blood cultures through 1 peripheral needle stick versus 2 sticks (61% vs 4%; $P<.005$) and being more likely to obtain both sets from a central line, when available (36% vs 17%; $P<.005$). There were no differences in blood culturing practices across other settings.

Nearly all respondents ($n=403$, 97%) answered that when a patient reported a medication allergy, they routinely asked the patient to describe the allergic reaction. More than half of the respondents ($n=234$, 55%) correctly identified a medication intolerance in a hypothetical scenario.

Most respondents ($n=305$, 71%) reported initiating discussions with prescribers regarding antibiotic orders (eg, dose, route, and/or appropriateness), and 364 respondents (85%) reported that dedicated time for discussing antibiotics with the prescribing team would be helpful.

Following a finalized culture report, 400 respondents (92%) reported that initiating discussions with a prescriber about whether antibiotic orders needed to be changed (eg, antibiotic time-out) would benefit their patients. However, only 63 respondents (16%) thought such a practice could be implemented without difficulty. The most commonly perceived barriers are listed in Figure 1.

To our knowledge, this is the largest study to assess US acute-care nurses’ knowledge, attitudes, and practices regarding stewardship activities. As in previously published studies, most bedside nurses at our institution were unfamiliar with the term “antimicrobial stewardship.”⁶ However, despite unfamiliarity with this term, nurses reported active engagement in discussions with prescribers about antimicrobials,

wanted to learn more about their role in stewardship, and identified venues to receive this education. Nurses with master's degrees were less likely to believe that nurses might play a role in ASPs, perhaps due to greater familiarity with the current state of ASP, and perhaps, therefore, they were less likely to think "outside the box" regarding a nursing role. Nonetheless, most nurses felt that they played a role in antimicrobial stewardship.

The strengths of this study include the large number of nursing respondents across different hospitals and patient care units. The study also has several limitations. The survey had a relatively low response rate, and because responses to the survey were voluntary, respondents may not be representative of all nurses at our hospital system. Similarly, responses obtained from nurses in our institution may not be generalizable among all nurses.

This study illustrates a need to educate nurses on general principles of antimicrobial stewardship, and our findings point to multiple areas for nursing-targeted interventions that merit additional research. Nurses could ensure or facilitate acquisition of proper allergy histories, blood culture techniques, prioritization of antimicrobial administration, and antimicrobial de-escalation. Given the number of bedside nurses in practice, such interventions have the potential to substantially lower inappropriate antimicrobial utilization.

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SUPPLEMENTARY MATERIAL

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To Be a CLABSI or Not to Be a CLABSI—That is the Question: The Epidemiology of BSI in a Large ECMO Population

Extracorporeal membrane oxygenation (ECMO) patients are at a higher risk of hospital-acquired infections (HAIs) than other critically ill patients.¹ Because nearly all patients on ECMO have ≥ 1 concurrent central venous catheters (CVCs), bloodstream infections (BSIs) in ECMO patients are often counted as central-line-associated bloodstream infections (CLABSIs) and thus contribute to penalties from the Centers for Medicare and Medicaid Services (CMS). We aimed to determine the incidence of BSI and CLABSI in ECMO patients at one of the largest ECMO centers in the United States.

We cross-referenced the ECMO patient registry and microbiology databases to identify patients who had positive blood cultures following ECMO cannulation at Duke University Hospital between January 1, 2014, and December 31, 2016. Duke University