SURVEY OF HOSPITAL NURSING ROLES IN ANTIMICROBIAL STEWARDSHIP

BACKGROUND

Antibiotic/antimicrobial-resistant infections have repeatedly been recognized as an imminent and growing public health threat. Each year in the United States at least two million people become infected with bacteria that are resistant to antibiotics, at least 23,000 of these people die as a direct result of antibiotic-resistant bacteria, and many more die from other conditions that were complicated by an antibiotic-resistant infection [1]. The primary strategies for preventing antibiotic resistant infections are: (a) reducing the transmission of healthcare-associated infections caused by antibiotic-resistant bacteria, and (b) preserving antibiotic efficacy by promoting the judicious use of antibiotics, formally known as Antimicrobial Stewardship.

Hospitals were the first healthcare facility type to widely adopt the implementation of an Antimicrobial Stewardship Program (ASP). The Centers for Disease Control and Prevention (CDC) have outlined necessary components of a ASP [2]. While the CDC had previously listed nurses as key support for an ASP, their significant contribution had been largely unrecognized. Bedside registered nurses (RNs) are not usually represented in ASPs. This gap has been recognized in recent literature [3]; however, summarizing the intersection of nursing roles with antimicrobial stewardship has been based largely on experience. To objectively identify these opportunities, a survey was sent to the Directors of Nurse Education in all of Los Angeles County (LAC) acute care hospitals. Data was collected online via Google Forms from November 2015 until January 2016.

METHODS

An online survey was created in Google forms for nurse education directors or their designees who could best speak to nurse education and competency. The invitation link for all 93 LAC Acute Care Hospitals (ACHs) was sent in November 2015, and responses were received by mid-January 2016. The Institutional Review Board (IRB) of the LAC Department of Public Health (DPH) designated this survey as IRB-exempt. Question formats included multiple choice, select all that apply, or fill in with text. A single question with several subparts comprised the bulk of the survey. Each subpart listed a different activity or knowledge component related to antimicrobials, which respondents identified as "mandatory/required," "optional/offered," or "not offered" for bedside RNs in their hospital. We combined responses of "mandatory/required" and "optional/offered" to identify topics that hospitals include in bedside RN knowledge and competency. Additional questions included policies related to antimicrobial administration and orders as well as communication of results.

RESULTS

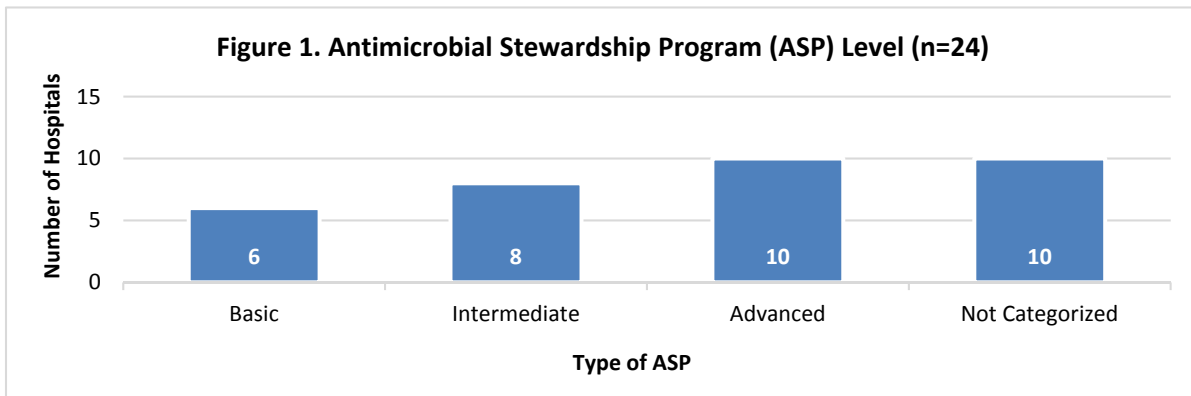<u>Respondent Hospital Characteristics</u>

The rate of response to this survey was 36.6%. The 34 hospitals represented in this survey comprise approximately one-third of the hospitals in LAC. In most cases, the survey was completed by the self-identified Director of Nursing Education (n=19, 56%); however, additional surveys were completed by nurse education designees such as Clinical Nurse Specialists of Bedside Nurse Educators (n=9, 26%), Directors of Nursing or Chief Nursing Officers (n=4, 12%), or other nurse administrators (n=2, 6%). Out of
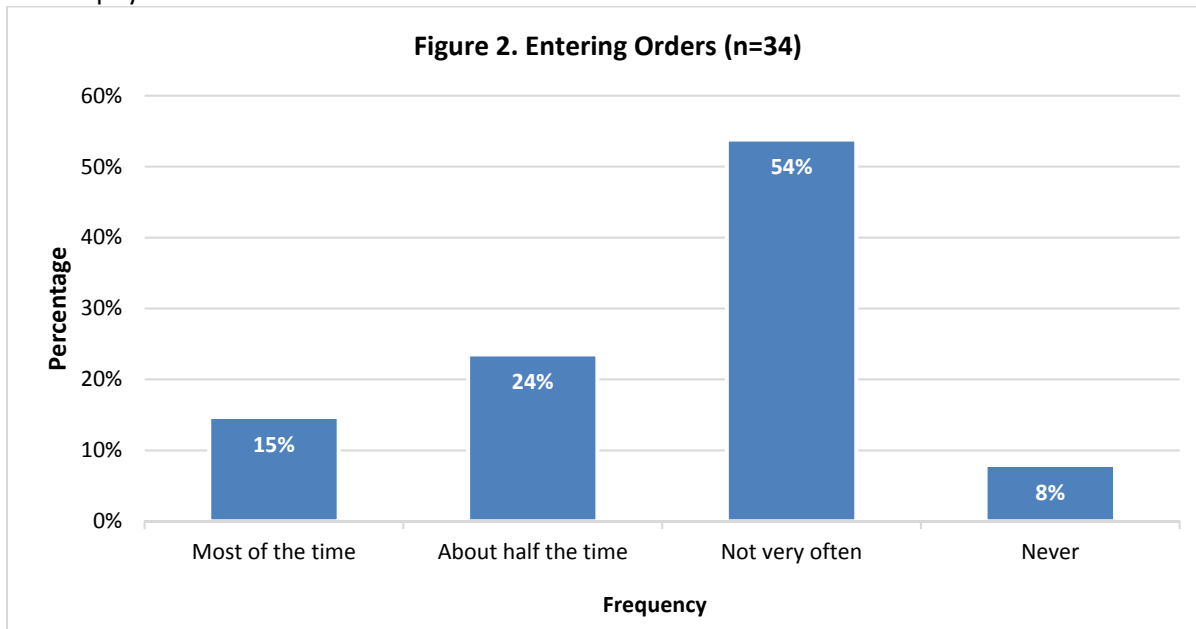
the 34 hospitals that completed the questionnaire, 24 of them had additionally completed a different survey [**4**] describing their ASP. Based on the results of that survey, it was possible to categorize the respondents' ASPs level of basic, intermediate and advanced using the California Department of Public Health (CDPH) criteria [**5**].

Hospitals that had a basic ASP accounted for n=6 (18%) of the respondents; n=8 (24%) had an intermediate ASP; and 10 (29%) had an advanced program. The remaining 10 (29%) were unable to be categorized as they had not completed the second survey sent in November 2015 (Figure 1).

Respondents were asked about the structure of their ASP (Figure 1) as well as facility norms related to medication orders (Figure 2) and results communication (Figure 3).

Figure 1. Antimicrobial Stewardship Program (ASP) Level (n=24)

Type of ASP	Number of Hospitals
Basic	6
Intermediate	8
Advanced	10
Not Categorized	10

Question: "At your facility, how often do bedside registered nurses take phone and/or verbal orders from the physician for antimicrobials?

Figure 2. Entering Orders (n=34)

Frequency	Percentage
Most of the time	15%
About half the time	24%
Not very often	54%
Never	8%

Question: "To whom are critical microbiology laboratory results reported?" *(Select all that apply)*

Figure 3. Whom to Report Microbiology Results (n=34)
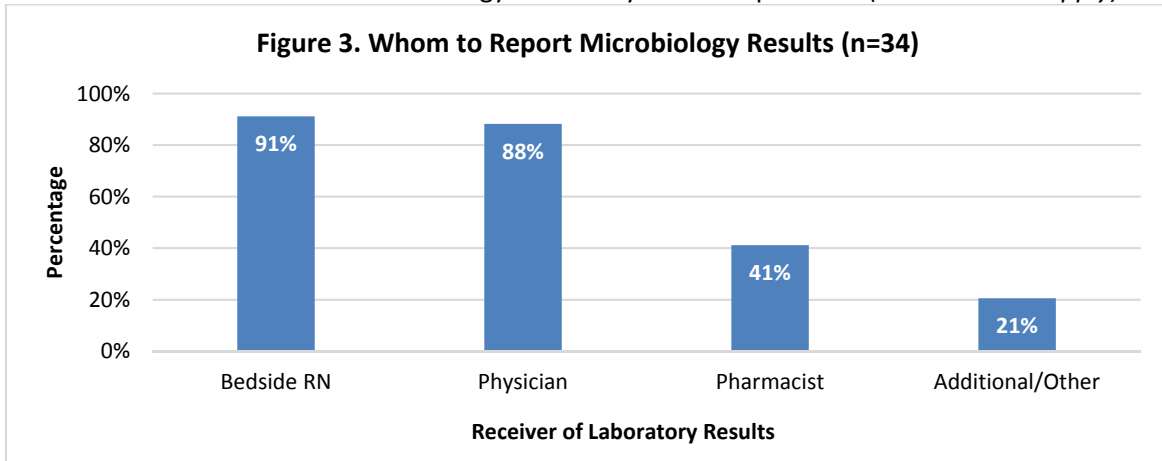

Competency and Education Series

In a select-all-that-apply question, respondents identified how bedside RNs participate in antimicrobial stewardship at their hospital. Overall, 5 hospitals (15%) reported no bedside RN participation in antimicrobial stewardship. In 3 hospitals (9%), at least 1 bedside RN is on the ASP committee; however, in 19 hospitals (56%), nursing leadership represents them and no bedside RNs are on the ASP committee. Bedside RNs participate in quality assurance for antimicrobial treatment in 9 responding hospitals (26%), and in 3 hospitals (9%), they participate on subcommittees that promote antimicrobial stewardship knowledge on their respective units. Finally, in just 1 hospital (3%), bedside RNs have an antimicrobial resistance/multidrug-resistant organisms advisory group.

Figure 4. Competency and Education Series
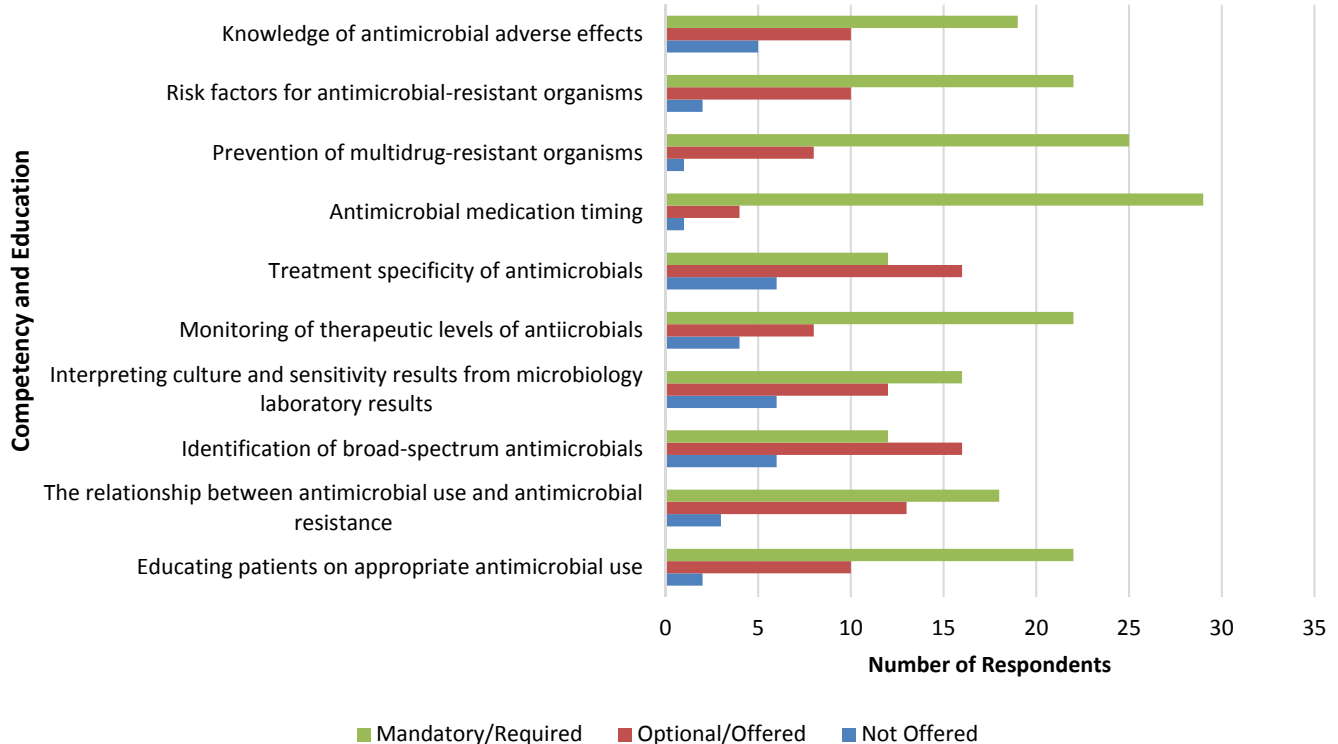
DISCUSSION

Bedside RNs have an important role in the administration and evaluation of antimicrobial treatment. Respondents to the survey reported that bedside RNs are trained to recognize broad-spectrum antibiotics, to understand culture/susceptibility results, to monitor therapeutic level of antimicrobials, and to assess antimicrobial treatment for appropriateness (Figure 4).

When an antimicrobial (such as penicillin) is inappropriately listed as an allergy, other antimicrobials may also become eliminated as medication options, reducing the prescriber's choices for optimal treatment. A total of 97% of the hospitals represented in this questionnaire require bedside registered nurses (RNs) to appropriately assess allergies. By incorporating allergy assessment into their patient assessment, bedside RNs may be able to verify allergies and potentially increase antimicrobial medication options available to that patient [6].

Literature suggests that bedside RNs have been shown to influence prescribing; with increased awareness, that influence can be redirected to more judicious use of antimicrobials [7]. Respondents demonstrated that bedside RNs may have frequent opportunities to clarify the indication of a treatment prior to ordering or administering antimicrobials because bedside RNs often take phone and/or verbal orders from physicians for these medications. Although these opportunities may exist, it is not known how common a practice this is among bedside nurses.

Antimicrobial use can be narrowed down to a more optimal treatment by assessment of the patient and available information. Bedside RNs reportedly are expected to interpret culture/susceptibility results, monitor therapeutic levels of antimicrobials, and have knowledge of treatment specificity.

Bedside RNs are typically the center of communication for results critical such as microbiology lab results. In some cases, the bedside RN is the sole member of the patient care team notified of such results, and it is their responsibility to communicate critical information to other members of the patient care team.

LIMITATIONS
The rate of response to this survey was 37% (n=34). Although the survey questions were specific, a nurse education director unfamiliar with antimicrobial stewardship may have misinterpreted questions related to competency in antimicrobial administration and/or evaluation [**8**].

CONCLUSION
Bedside RNs are the frontline staff who administer antimicrobials, and they access the same information that ASPs use to optimize antimicrobial treatment. By empowering bedside RNs, ASPs can potentially achieve increased compliance to and adherence with antimicrobial stewardship activities across all disciplines.

PREVIOUS PRESENTATION OF STUDY RESULTS:
This information was previously published in the journal *Infection Control and Hospital Epidemiology* and is available through Cambridge core at the following hyperlink: http://dx.doi.org/10.1017/ice.2017.166. Preliminary findings were presented at the local Coastline Chapter of the Association of Professionals in Infection Control and Epidemiology (APIC) on March 10, 2016 in Torrance, California.

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