CONCISE COMMUNICATION

Survey of Infection Control Programs in a Large National Healthcare System

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In light of consumers' and regulators' increasing focus on infection prevention, infection control practices and resources were surveyed at 134 hospitals owned by the Hospital Corporation of America. Infection control practices and resources varied substantially among hospitals, and many facilities reported difficulty acquiring the data they needed to report infection rates.

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In recent years, the detection and prevention of healthcare-associated infections (HAIs) have become central pillars in quality improvement programs.[1] In addition, consumer groups, as well as regulatory and legislative groups, have taken a vested interest in HAI prevention.[2,3] Initiatives addressing infection control, which necessitate timely and accurate detection and reporting of data on HAIs, have increased demands on hospital infection control programs. As a part of a project to evaluate different strategies for reducing HAIs, we assessed infection control practices in a large national cohort of hospitals.

METHODS

Setting. This survey was conducted as a part of a national collaborative trial examining strategies to reduce the rates of ventilator-associated pneumonia (VAP) and central venous catheter (CVC)-related bloodstream infections (BSIs) in intensive care unit (ICU) patients. This voluntary collaborative study was conducted in hospitals owned and operated by the Hospital Corporation of America (HCA). The HCA network currently includes 167 facilities in 21 states. The study was approved by Vanderbilt University's institutional review board, which waived the need for written informed consent.

As a part of the collaborative study, hospitals were surveyed before enrollment about various quality and safety characteristics, including their ICU safety culture, ICU practices, and details about their infection control program. These data were to be used during data analysis for the main collaborative trial. This article describes the findings from the survey of infection control practices to illustrate the variability in infection surveillance and prevention in a large healthcare system.

Infection Control Surveillance Survey (ICSS). The ICSS, a 98-item instrument created for this study, included a combination of data entry, multiple-choice questions, and free-response questions to collect details about the administration of the infection control program, infection control resources and staffing, methods used for HAI surveillance, and HAI data feedback practices. The ICSS was iteratively refined by a multidisciplinary research team that included statisticians, content experts, and clinical specialists. The ICSS was distributed to infection control contacts (predominantly infection control practitioners [ICPs]) at each HCA hospital by e-mail in September 2005. The individuals who responded to the ICSS were not deidentified because these data were needed to randomize each hospital for the primary study.

Data Management and analysis. Frequency analyses were performed to identify missing data and data outliers. Response distributions for all multiple-choice items were calculated as percentages. For specific survey queries, questions that were left blank were not included in the data analysis; hence, denominators differ for responses to specific survey questions. Analyses were conducted using Stata statistical software, version 7.0 (Stata).

RESULTS

Surveys were completed for 134 (80.2%) of the HCA facilities. The median total number of beds for the study hospitals was 219 (range, 12-836 beds); the median number of ICU beds was 22 (range, 0-159 beds; Table). Infection control surveillance was routinely conducted at most facilities, with a median of 2 (range, 0-10) types of ICU under surveillance. The types of ICU under infection control surveillance differed among hospitals, with combined medical-surgical (at 108 of 134 hospitals [81.0%]), cardiac (52 of 134 [38.8%]), and medical (51 of 134 [38.1%]) the most common ICU types noted.

Staffing of infection control programs varied among hospitals as well. Of 134 facilities, 104 (77.6%) had only 1 ICP; among these 104 ICPs, 73 (70.2%) held full-time positions (ie, 75% or more of time their time was spent on infection control duties). A single ICP (full or part time) staffed a median of 191 beds, 20 of which were ICU beds (Table). Only 75 (56.0%) of the 134 facilities that responded had an ICP who was certified in infection control and epidemiology. Almost all infection control programs conducted surveillance in accordance with the Centers for Disease Control and Prevention (CDC) definitions for BSI (130 of 133 [97.7%]); a similarly high number used the CDC definitions for VAP (129 of 132 [97.7%]).

Manual medical record review was the method most commonly cited for denominator capture, used at 81 (70.4%) of 115 hospitals for ascertainment of CVC–days and in 65

TABLE. Characteristics of Hospitals in a Large National Healthcare System That Responded to an Infection Control Program Survey

Characteristic	Value
No. (%) of hospitals that responded	134/167 (80.2)
No. of beds per hospital, median (range)	219 (12-836)
No. of ICU beds per hospital, median (range)	22 (0-159)
Number of ICU types under surveillance	
0	6/134 (4.5)
1	34/134 (25.4)
2	28/134 (20.9)
3	16/134 (11.9)
4	11/134 (8.2)
5	10/134 (7.5)
>6	29/134 (21.6)
No. of beds per ICP, median (range)	
Overall	191 (12-836)
Stratified by facility bed total	
<100 beds	73 (12-98)
101-300 beds	178 (70-298)
301-500 beds	304 (129-450)
>500 beds	294 (245-836)
No. of ICU beds per ICP, median (range)	
Overall	20 (0-102)
Stratified by facility ICU bed total	
1-20 beds	10 (2-20)
21-50 beds	28 (11-49)
>50 beds	49 (17-102)
Groups to which HAI reports were provided	
Institutional committees	122/125 (97.6)
Hospital administration	121/126 (96.0)
ICU nursing leadership	122/128 (95.3)
Respiratory therapists	83/121 (68.6)
ICU front line nurses	77/116 (66.4)
ICU physicians	61/112 (54.5)
Support staff	39/112 (34.8)
Intervals at which HAI reports were submitted	
Yearly	1/134 (0.7)
Semiannually	4/134 (2.9)
Quarterly	86/134 (64.2)
Monthly	31/134 (23.1)
Not noted	12/134 (9.0)
Facility reported months with missing data[a]	
For BSI rates	29/126 (23.0)
For VAP rates	17/130 (13.1)

NOTE. Data are proportion (%) of hospitals that responded, unless otherwise indicated. Questions that were left blank were not included in the data analysis, so denominators vary. BSI, bloodstream infection; HAI, healthcare-associated infection; ICP, infection control practitioner; ICU, intensive care unit; VAP, ventilator-associated pneumonia.

[a] Because of incomplete denominator data.

(56.5%) of 115 hospitals for ascertainment of ventilator-days. Other methods for denominator capture included bedside rounds (used by 34 of 109 hospitals [31.2%] for CVC-days and by 30 of 108 [27.8%] for ventilator-days) and mining the electronic medical record (used by 31 of 103 hospitals [30.1%] for CVC-days and by 37 of 105 [35.2%] for ventilator-days). Infection control software was used by less than one-third of sites (39 of 128 hospitals [30.5%]).

Difficulty in obtaining the denominator data needed to determine BSI rates was reported by 60 (47.6%) of 126 facilities; these difficulties resulted in months for which BSI rates could not be reported in 29 (23.0%) of 126 hospitals. A total of 37 (28.9%) of 128 programs reported having difficulty obtaining the denominator data needed to determine VAP rates; 7 (13.1%) of 130 hospitals reported that there were months in which VAP rates could not be reported because of incomplete denominator data.

Nearly all ICPs provided HAI reports to senior hospital leaders, nurse management of the ICU, and institutional committees. Feedback of data was less frequent for front line healthcare workers, such as nurses, physicians, respiratory therapists, and support staff.

DISCUSSION

As essential components of any healthcare facility, ICPs perform an increasing number of functions, including HAI surveillance, education on HAI prevention, policy development, and development of and participation in quality improvement projects.[4] Recently, organizations such as the Institute for Healthcare Improvement and the Centers for Medicare and Medicaid Services have placed programs designed to reduce or prevent the occurrence of HAIs at the forefront of their quality improvement efforts and mandates,[1,5] and to date, 36 states have enacted legislation that mandates public reporting of facility-specific HAI data.[2]

With this growing demand for HAI data, it is important to review the available resources for, duties of, and constraints encountered by members of a hospital's infection control program. In our survey of a large national hospital system, striking variation was found among hospitals with respect to infection control surveillance practices, resources, data collection, and reporting. Median ICP staffing levels in the study cohort (a ratio of 1 ICP to 191 beds) were lower than recommended by the landmark Study on the Efficacy of Nosocomial Infection Control (which recommended a ratio of 1 ICP to 250 occupied beds),[6] but the level in the study cohort did not meet the more recently proposed benchmark of 1 ICP to 102 hospital beds.[7]

With regard to the collection and dissemination of HAI data, these data were almost universally reported to unit leadership and hospital administration. Data was less frequently presented to front line clinicians, whose actions and practices help drive infection rates. Targeting feedback to these key personnel is important when working to reduce the rate of HAIs. Data collection also must be efficient, to ensure timely data reporting. In our study, numerous data sources were necessary to detect HAIs and collect denominator data. Furthermore, in nearly one-quarter of hospitals, ICPs could not fully report infection rates because of incomplete denomi-

nator data. As demand for these data continues to increase, the limitations of HAI surveillance and data collection processes will become increasingly visible.

This study has some limitations. The study population consisted of hospitals that were part of a larger healthcare system owned by a specific corporation, which could limit generalizability of the study findings. Because infection control staffing was assessed by the percentage of time spent on infection control duties and not by funded full-time equivalent data, a full evaluation of infection control staffing was not established. Precise details on specific infection control activities were not queried, limiting the ability to compare practices across each hospital's infection control programs. Nonetheless, these results provide insight into the variability in infection control practices that may be found throughout healthcare systems in the United States. As the interest in the detection, reporting, and prevention of HAIs increases, it is essential that hospitals reexamine the process of HAI surveillance and the resources devoted to infection control programs.

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