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Major article

Infection prevention needs assessment in Colorado hospitals: Rural and urban settings

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Background: The purpose of our study was to conduct a needs assessment for infection prevention programs in both rural and urban hospitals in Colorado.

Methods: Infection control professionals (ICPs) from Colorado hospitals participated in an online survey on training, personnel, and experience; ICP time allocation; and types of surveillance. Responses were evaluated and compared based on hospital status (rural or urban). Additionally, rural ICPs participated in an interview about resources and training.

Results: Surveys were received from 62 hospitals (77.5% response); 33 rural (75.0% response) and 29 urban (80.6% response). Fifty-two percent of rural ICPs reported multiple job responsibilities compared with 17.2% of urban ICPs. Median length of experience for rural ICPs was 4.0 years compared with 11.5 years for urban ICPs ($P = .008$). Fifty-one percent of rural ICPs reported no access to infectious disease physicians (0.0% urban) and 81.8% of rural hospitals reported no antimicrobial stewardship programs (31.0% urban). Through the interviews it was revealed that priorities for rural ICPs were training and communication.

Conclusions: Our study revealed numerous differences between infection prevention programs in rural versus urban hospitals. An infection prevention outreach program established in Colorado could potentially address the challenges faced by rural hospital infection prevention departments.

Infection prevention programs have experienced increased scrutiny during the past decade. This has been attributed to increased public awareness that health care-associated infections (HAIs) are preventable if health care providers consistently implement evidence-based practices.[1,2] The State of Colorado is a leader in increasing public awareness about HAI prevention. Colorado was among the first states to mandate public reporting of select HAIs by all hospitals, hospital units, ambulatory surgical centers, and outpatient dialysis clinics as a condition of licensure.[3] Colorado House Bill 06-1045[3] requires all acute care hospitals to report central line–associated bloodstream infections (CLABSIs) in intensive care units and surgical site infections for certain high-risk procedures through the Centers for Disease Control and Prevention National Healthcare Safety Network (NHSN). The federal government followed in 2008 with broader requirements that mandated all hospitals participating in the Medicare system report outcome rates for select surgical site infections, CLABSIs, and catheter-associated urinary tract infections. The program limits reimbursement for organizations that do not lower HAI rates.[4,5] This has placed pressure on infection prevention programs in the United States to conduct thorough HAI surveillance, institute evidence-based practices, and report accurate HAI data to the public.[6]

It has been suggested that a successful infection prevention program should consist of experienced personnel, including clinicians, epidemiologists, data analysts, statisticians, a plethora of resources, and electronic surveillance tools.[6] Multiple studies have reported reductions in HAIs when infection prevention programs incorporate evidence-based interventions, education, and real-time infection surveillance and feedback.[7-10] These studies were

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conducted in large, urban facilities. There is limited research on the influence of infection prevention programs in community hospitals and other alternative health care settings. As a result, guidance for the structure of small or rural hospital infection prevention programs is not readily available.

Infection prevention departments in small, rural hospitals have noted several challenges.[11-13] Stevenson et al[11] reported that almost all infection control professionals (ICPs) in small, rural hospitals in the western United States held multiple job responsibilities and dedicated just 25% of the week to infection prevention. Boyce[12] reported that surveillance and control activities in small rural hospitals focus on active problems rather than prevention. Lastly, rural hospitals often lack infectious disease (ID) specialists (ie, practitioners with expertise in epidemiology, data analysis, and statistics) and ICPs certified in infection control.[11-14]

The Health and Safety Data Services Program (formerly the Patient Safety Program) at the Colorado Department of Public Health and Environment (CDPHE) work extensively with Colorado hospital ICPs. During the introduction of mandatory public reporting in Colorado, it was recognized that many hospitals lack the resources to fully implement surveillance, data analysis, and electronic reporting of HAI outcome data. The greatest area of concern was the rural hospitals, which make up 55% of hospitals in Colorado. The purpose of our study was to conduct a needs assessment to determine the current state of infection prevention programs in Colorado and determine what resources CDPHE could provide to improve infection prevention programs in both rural and urban settings.

METHODS

Setting and participants

Colorado acute-care (ie, general, children's, or critical access) hospitals (n = 80) throughout the state were targeted for participation. Long-term acute care, psychiatric, and rehabilitation hospitals were not targeted because they serve a very specific patient population. The ICP registered as the primary contact for the NHSN reporting program for each facility was identified. If a hospital did not have an ICP, the Web-based online survey was sent to an individual who worked in quality improvement, employee health, or a member of the executive team. An invitation letter was sent to all potential participants introducing the project and included a link to an online questionnaire. CDPHE sent 2 reminder e-mail messages, 2 and 4 weeks after the initial invitation. One month after the initial invitation, the ICPs in rural hospitals were contacted by e-mail to request participation in a follow-up telephone interview. This study was reviewed by the Colorado Multiple Institutional Review Board and deemed nonhuman subject research.

Survey development

The survey was designed to collect information about infection prevention resources in Colorado hospitals. The questions were developed from 2 previous studies[11,12] along with input from Colorado ICPs from both rural and urban hospitals. The survey was reviewed by the members of the Colorado Health Facility-Acquired Infections Advisory Committee for content validity and clarity. Once a final draft was completed, the survey was trialed by 1 rural ICP and 2 urban ICPs. The questions addressed the following topics: infection prevention staff training and experience, amount of time spent on infection prevention, resources most desired by infection prevention staff, types of surveillance, and presence of an antimicrobial stewardship program. The survey took approximately 15 minutes to complete.

Follow-up interview

All hospitals that met the definition for rural (n = 44) (ie, located in a town with a population <20,000 people and >30 miles from the nearest city or designated as a critical access hospital) were contacted by CDPHE staff after the survey data had been reviewed. Participants were asked to schedule time for a 30-minute telephone interview to gain clarity on issues unique to rural settings. The interview questions included open-ended questions that addressed CDPHE resources, training priorities, and the possibilities for assistance from a dedicated rural ICP resource. Each interviewer followed a script to ensure all questions were addressed.

Data management

Data from the online survey and follow-up interviews were managed by CDPHE staff in Microsoft Excel (Microsoft Corp, Redmond, WA). The data was subsequently de-identified to permit analysis by the authors who are not employees of CDPHE. Following the execution of a data use agreement, data were securely transferred to the authors for analysis.

Statistical analysis

The de-identified responses from all facilities were evaluated and compared based on hospital status (rural or urban). Frequency and descriptive statistics were calculated in SAS version 9.3 (SAS Institute Inc, Cary, NC). Associations between categorical variables were made using χ^2 or Cochran Mantel-Haenstzel tests. Associations between numerical data were compared using the Scheffe test. P values $< .05$ were considered statistically significant. The open-ended interview questions were analyzed using an inductive qualitative approach. All data were reviewed, categorized, and manually coded based on content by a single member of the research team. Themes and subthemes were identified. Results were discussed and reviewed with the other members of the research team until consensus was reached.

RESULTS

Survey and interview responses

There were a total of 80 acute-care hospitals (44 rural, 36 urban) eligible to participate in the study. Completed surveys were received from 62 hospitals (77.5% response)—33 from rural settings (75.0% response) and 29 from urban settings (80.6% response). The contacts from 10 of the rural hospitals and 5 of the urban hospitals did not respond to repeated efforts for study recruitment and 1 rural and 2 urban hospitals did not have contact information available. The demographics of the respondents' facilities by average daily census and population can be found in Table 1. Of the 44 eligible rural hospitals, 30 (68.2% response rate) agreed to participate in the interview, with 3 respondents only participating in the interview portion of the study.

Infection prevention department staffing, responsibilities, and resources

Fifty-two percent of ICPs in the rural settings reported multiple job responsibilities (n = 17), whereas only 17.2% (n = 5) of the urban ICPs held >1 job responsibility (Table 2). Rural ICPs reported that along with traditional ICP responsibilities (ie, surveillance, outbreak investigations, and staff education), they worked in risk management (n = 7; 21.2%), quality (n = 5; 15.2%), employee health (n = 4; 12.1%), or compliance (n = 2; 6.1%). The median years of