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Major Article

A systematic approach to quantifying infection prevention staffing and coverage needs

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Background: This article describes a large nonprofit health care system's approach at quantifying the actual number of infection preventionist (IP) and relative support staff required to build and sustain effective infection prevention programs.

Methods: A list of all physical locations within the organization requiring infection prevention coverage were identified via survey, including department-level detail for 34 hospitals, 583 ambulatory sites, and 26 in-home and long-term care programs across 5 states. Required IP activities for each physical location were also tallied by task. Type of activity, frequency (times per year), hours per activity, and total number of locations in which each activity should occur were determined. From this, the number of hours per week of infection prevention labor resources needed was calculated.

Results: Quantitative needs assessment revealed actual labor need to be 31%-66% above current benchmarks of 0.5-1.0 IP per 100 occupied beds. When aggregated across the organization, the comprehensive review results yielded a new benchmark of 1.0 infection prevention full-time equivalent per 69 beds if ambulatory, long-term care, or home care are included.

Conclusions: Size, scope, services offered, populations cared for, and type of care settings all impact the actual need for IP coverage, making the survey benchmarks available in the literature invalid. A comprehensive assessment of health care organization composition and structure is necessary prior to determining the IP staffing needs for that organization.

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BACKGROUND

Although the practice of hospital infection prevention and control (IPC) has roots beginning in the first half of the 18th century,¹ it was not until recent decades that the role of the infection preventionist (IP) was considered critically important in the health care environment. The professional organization for IPs, the Association for Professionals in Infection Control and Epidemiology, was founded in 1972 by a small group of infection control nurses who recognized the growing need. The group now serves >15,000 members across 48 countries.² This number in itself highlights

the rapid growth and development of the field over the last 4 decades.

The rise of infection prevention as a career field was further accelerated by the 1999 release of the Institute of Medicine's report, *To Err Is Human: Building a Safer Health System*.³ This report shed light on the many health care-associated errors occurring within the United States, particularly those related to infection. In the decade and a half after this report, awareness of the need for robust IPC programs has grown substantially. Most recently, the inclusion of health care-associated infections in the Centers for Medicare and Medicaid Services' Hospital-Acquired Conditions and Value-Based Purchasing programs⁴ and associated financial penalties for poor performance has turned the spotlight squarely on the hospital IP. In addition, increased state reporting requirements and initiatives, movement from targeted to whole-house surveillance, and expansion of IP scope outside of the hospital walls has left the hospital IP without the resources necessary to ensure safe practices within their facility. With this awareness has come the need for

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guidance on how to effectively determine staffing needs for IPC programs, across all care settings.

In this article, we describe a large nonprofit health care system's approach at quantifying the actual number of IPC team members required to build and sustain effective IPC programs.

METHODS

Providence Health & Services is a large, not-for-profit, Catholic health care organization comprised of 34 hospitals, ≥580 physician clinics, long-term care facilities, senior services, in-home services, supportive housing, and many other health and educational services. Providence Health & Services is divided into 9 regions across 5 states (Alaska, California, Montana, Oregon, and Washington) and includes 2 affiliates, Swedish Health System and Kadlec Regional Medical Center. The organization has a system office located in Renton, Washington, that provides the regions with support and centralized services.

In February 2016, the system infection prevention (SIP) team received a request to conduct a system-wide assessment of IPC staffing ratios. The SIP team conducted an assessment for each of the 9 regions using the following steps (in order): literature review, review of current state, regional assessment meetings, quantitative needs assessment, and staffing model development. Each step is subsequently detailed.

Step 1: Literature review

The SIP team began the assessment by attempting to identify current staffing benchmarks. A comprehensive literature review was conducted and 6 sources were identified and reviewed. Staffing ratios suggested in these 6 sources included data gathered through historical survey and data gathered through quantitative modeling of a hypothetical care setting. The ratios ranged from 0.5–1.0 IP per 100 beds.^{5–10} The most recent document found was a survey published in 2011,⁹ and substantial changes to the role and scope of infection prevention have occurred since that time. In addition, many of the sources focused on current program composition, not identification of an ideal program staffing model. Those sources that did attempt to identify an appropriate staffing ratio using a quantitative method were outdated. These sources did not offer the level of detail necessary to determine the actual number of IPC staff needed to run an effective program.

Step 2: Review of current state

The SIP team collected information regarding all physical locations within the health system via survey. An electronic survey was sent to the infection prevention lead at each hospital, long-term care facility, and ambulatory clinic. A separate survey format was used for each of these 3 care settings. Each survey requested information specific to that care setting, including demographic information about the facility and a comprehensive list of all departments and settings which required infection prevention coverage. Responses were received from 100% of locations.

The SIP team compiled the results of the survey into a spreadsheet. The infection prevention leader within each region verified the contents of the spreadsheet and ensured that all physical care locations within that region were accounted for. Care settings were identified that did not fall into the 3 outlined categories of hospitals, long-term care, and ambulatory clinics, including assisted living, infusion pharmacies, rehabilitation facilities, lab draw stations, ambulatory surgery centers, and in-home services. Each of these additional location types were added to the spreadsheet.

Each IPC team member within the region also completed a comprehensive survey regarding distribution of time among their current work activities. Participants were asked to respond with current state rather than ideal state to allow the SIP team to better understand which tasks were being prioritized at each facility and which tasks were not being conducted.

Step 3: Regional assessment meetings

The SIP team scheduled full-day, on-site meetings within each region to conduct a comprehensive, quantitative needs assessment based on the information gathered via survey. Key stakeholders were invited at the discretion of the regional IPC leader, but generally included hospital or regional clinical leadership (chief nursing officer or chief medical officer), quality and patient safety, all IPC department employees, representatives from ambulatory care settings and long-term care settings, representatives from in-home care settings, and any other key stakeholders with significant infection prevention ties. At the beginning of each regional assessment meeting, participants were provided with the current staffing levels and a graphical depiction of the current staffing model for their region. Participants were also provided with an estimate of attributable costs associated with health care–associated infections for the region, including Value-Based Purchasing penalties assessed, if applicable.^{11,12} This background information was provided to ensure that all participants had a working knowledge of current staffing models for the region and the risk to patient and institution caused by health care–associated infections. Although a numerical association between health care–associated infection rates and staffing ratios could not be identified in the literature, the SIP team assumed that this association exists.

Step 4: Quantitative needs assessment

Using the information collected via survey and compiled into spreadsheets, a comprehensive list of all physical locations within each care setting that required IPC oversight was presented to participants. The list was reviewed during the meeting with all key stakeholders, at which time edits and additions were made. This was a critical step to ensure that the subsequent list was fully inclusive of all care settings within the scope of the IPC program in that region.

Once the list of physical locations was finalized, the team was asked to consider the IPC-related activities that should occur at each physical location. The team was instructed to consider those activities that should occur within an ideal IPC program.

In hospital and long-term care settings, isolation-rounding to influence was identified as a priority activity in inpatient and emergency department care settings. This involves the IP being physically present in the patient care department to ensure isolation is being carried out as intended and to answer any patient-specific questions that caregivers might have. This is seen as an important opportunity for collaboration and trust building with caregivers.

In all non-homecare settings in which care is provided to a patient, or patient supplies and equipment are stored, environment of care (EOC) rounding was identified as a priority activity. EOC rounding is a formal inspection of a patient care area. During EOC rounds, IPs review the safety of the physical environment while monitoring patient care and disinfection and sterilization practices. [Table 1](#) provides an example of how these data were collected and quantified.

Once the type of IPC activities required were identified, the team was asked to consider the frequency in which each activity should occur. Although some variance occurred between sites, most regions determined that IPC teams should conduct brief rounding on

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