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## Major Article

## The emerging role of the corporate or system-level infection prevention director for integrated delivery networks



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## Key Words:

System  
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Variation

**Background:** One position in integrated delivery networks (IDNs) that provides centralized oversight to optimize patient safety is the corporate-level infection prevention (IP) director. After noting variability in their roles, responsibilities, and IP programs, a national network of IDN IP directors planned a member survey to better understand common and variable elements. Nine network members volunteered to design a survey to describe the current role, responsibilities, and resourcing of all members of the corporate IP director group.

**Methods:** A 17-question survey was designed using the Survey Monkey multiple-choice format with a comment option. The questions were reviewed by the entire network to ensure content validity. The survey was delivered to all 72 network members by e-mail, and a 44% response rate was achieved.

**Results:** Survey responses revealed variation and commonalities relative to role structure, responsibilities, resourcing, and level of physician support for corporate IP directors. In addition, advantages of the position were described.

**Conclusions:** The results of the survey will serve as a foundation on which to build, supporting standardization and reliable design for the role, responsibilities, and resourcing of corporate IP directors, with the ultimate goal of improving patient safety.

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## BACKGROUND

In 2013, a network was founded by a small group of corporate- or system-level directors of infection prevention (IP) employed by multihospital integrated delivery networks (IDNs). The original goal for

founding the network was to create a forum for knowledge sharing among this specialized group of clinical leaders. As of October 2018, the group has grown to include corporate IP directors for 108 IDNs across the United States. According to SK&A in Irvine, California, a leading provider of US health care reference information, there are at least 801 IDNs in the United States.<sup>1</sup> This suggests that there is ample opportunity for the national corporate IP director network to continue growing in membership.

Since its inception in 2013, efforts to formalize and organize the network have been under way, including writing a charter, establishing a regular meeting schedule (ie, every other month by phone and/or Web), developing a strategic plan and communication strategy, and launching a Web site. All directors are active members of the Association for

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Infection Control and Epidemiology (APIC), but the group itself is not affiliated with APIC. For the purpose of this article, corporate- or system-level IP leaders or directors will be referred to as “corporate IP directors” and multihospital systems will be referred to as “IDNs.”

To better understand hospital-based IP programs in the IDNs represented by the members of the network, in 2014 a survey was designed and directed to the hospital-based IPs in each of the group’s IDNs. One key finding from that survey was that there is an absence of standardization and reliable design in these hospital-based IP programs, including the resourcing and role of the physician. The network used the survey findings and experience of members to author an article proposing a best practice model for the design, resourcing, and daily priorities of an IP program for a 300-bed hospital, building on the foundation provided by the APIC IP competency model. The article is titled “Reliable Design of IP Programs.”<sup>2</sup>

Also highlighted by the 2014 survey findings was a concern regarding the crisis facing the IP profession related to the loss of many of the most experienced, knowledgeable, and Board of Infection Control and Epidemiology CIC-certified IPs. This loss was suggested by survey respondents to be owing to retirement and job dissatisfaction, with the increasing focus on surveillance and data as a result of mandatory reporting of infection rates. This may result not only in a loss of competent clinicians but also in a loss of institutional memory, increasing the risk of repeating errors and missed opportunities to reduce infection risk.

The overarching goals of the corporate IP director network in 2018 are to support the profession and science of IP, build strong alliances with health care executives and infectious diseases physicians, establish the value of corporate IP programs, and support reliable design and resourcing of corporate and hospital-based IP programs. In support of these goals, a second survey was designed in 2016. This time the survey focused on the corporate IP directors and their programs instead of the hospital-based IPs and programs. This article will review the findings of that survey.

## METHODS

During 2015 meetings (every other month by phone), the corporate IP director network members discussed the variability in their roles, responsibilities, and the IP program. A conclusion was reached that efforts to support standardization and reliable design of the corporate IP director role and program would be beneficial. This conclusion mirrored that made after the 2014 survey, which had focused on frontline hospital IP programs. In both cases, the conclusion was based on the advantages described in published studies relative to standardization and reliable design within IDNs, including leveraging of best practices, cost containment, reducing duplication of effort, and optimizing resources.<sup>3–9</sup> As a first step, 9 members of the national network volunteered to design a survey to better understand the role, responsibilities, and resourcing of the corporate IP director. At the time of the 2016 survey, network membership consisted of 72 corporate IP directors. The 2016 survey goal was to determine the demographics of the IDNs, the commonalities and variabilities in the role and responsibilities of the corporate IP directors, and the structure of their corporate IP programs, as well as to identify best practices.

When finalized, the survey was composed of 17 multiple-choice questions, each with a comment option. The questions were reviewed by the entire network of expert corporate IP directors to ensure content validity. The survey was administered using the Survey Monkey online tool (Survey Monkey, San Mateo, CA) and was delivered to each of the 72 network members by e-mail. No institutional review board approval was required because no patient information was requested by the survey. A total of 4 months was provided for network members to complete the survey, during which time several reminders were sent by e-mail. A 44% response rate (32 of 72 members) was achieved.

## RESULTS

### *Demographics of IDNs: Bed size, services, and geographic territory*

The 2016 corporate IP director survey assessed the size of the IDNs according to the number of hospitals in each. The responses revealed that the number of hospitals per IDN was relatively evenly distributed among 3 groups (Table 1).

More than one-half of the respondents (66%) reported that the IDN’s hospitals are located in multiple states, and 41% indicated that the hospitals are located within 1 day’s drive to the corporate headquarters or a regional center location. A small percentage (3%) reported that all system hospitals are located within a 10-mile radius. Round-trip travel time for corporate IP directors to visit off-campus locations ranged from 20 minutes to 4 hours, with an average of 58 minutes. The number of miles traveled per site visit ranged from 4–280, with an average of 49 miles.

In addition, the survey drilled down to determine the number of beds, types of facilities, and number of employees and providers for each IDN (Table 2).

These demographics represent diverse and wide-ranging services, as well as bed size and the type and scope of patient care provided. Beyond basic medical surgical and intensive care units, patient care services included behavioral health, orthopedics (including joint replacement), cardiac, neurology, neurosurgery, stroke, trauma, transplant (solid organ and bone marrow), dialysis (chronic and acute), oncology (adult and pediatric), and burn (adult and pediatric) care. Pediatric specialty care services included the neonatal intensive care unit, the pediatric intensive care unit, and fetal surgery. Other distinct services included extracorporeal membrane oxygenation, telemedicine, home care, long-term care, and high-risk maternal health.

### *Corporate IP director position*

The survey revealed a range from 11–43 years of IP experience for the 32 responding corporate IP directors, with an average of 25 years. The highest level of education was reported to be a master’s degree in education, public health, and/or business administration. CIC certification by the Board of Infection Control and Epidemiology for the corporate IP director was required in 72% of the IDNs.

Reporting structure for the corporate IP directors was varied and included reporting to the Enterprise Executive Director, the Senior Director for IP, the Vice President (VP) or Senior VP of Quality, the Chief Medical Officer, the VP of Operations, the Executive Director of Clinical Practice, or the National Medical Director of Patient Safety and Risk Management.

The 2 primary role types reported were authoritative (defined as hospital-based IPs report directly to the corporate IP director or dotted line/shared authority with the formal right to some part of the individual’s time and attention and input on goal setting) and consultative/advisory (the corporate IP director has no direct line authority over hospital-based IPs and must exercise influence without authority). The majority of respondents (75%) reported having direct line or dotted line authority over hospital-based IPs.

**Table 1**  
Number of hospitals in IDNs

No. of hospitals in IDN	No. of IDNs	Average no. of hospitals/IDN
1. >20 hospitals (21–72)	10	32
2. 10–19 hospitals	9	13
3. 1–9 hospitals	13	6

IDNs, integrated delivery networks.

**Table 2**  
Number of beds, types of facilities, number of employees, and number of providers

No. of beds, employees, and types of facilities in IDNs	No. of IDNs with >20 hospitals (n = 10)	No. of IDNs with 10–19 hospitals (n = 9)	No. of IDNs with 1–9 hospitals (n = 13)
No. of hospitals within the IDNs with >500 beds	15	11	9
No. of hospitals within the IDNs with 350–500 beds	34	14	6
No. of hospitals within the IDNs with 100–350 beds	128	61	10
No. of hospitals within the IDNs with <100 beds	130	36	7
Lowest no. of licensed acute care beds within the IDNs	6	25	20
Highest no. of licensed acute care beds within the IDNs	886	1,315	1,040
Lowest no. of ICU beds within the IDNs	113	165	2
Highest no. of ICU beds within the IDNs	1,072	700	288
No. of IDNs with academic teaching hospitals	8	8	12
No. of IDNs with CAHs	7	7	6
No. of IDNs with specialty hospitals (ie, obstetrics, pediatric, and oncology)	6	5	4
No. of IDNs with ambulatory surgery centers	8	9	7
No. of IDNs with ambulatory clinics	9	9	9
Highest no. of ambulatory clinics within the IDNs	750	400	1,000
No. of IDNs with LTAC or acute rehabilitation units	6	8	7
Lowest no. of nonphysician employees within the IDNs	5,000	6,800	600
Highest no. of nonphysician employees within the IDNs	189,302	35,000	25,000
Lowest no. of physicians and other providers (eg, nurse practitioner) within the IDNs	0	650	0
Highest no. of physicians and other providers (eg, nurse practitioner) within the IDNs	18,652	6,300	2,100

CAH, critical access hospital; ICU, intensive care unit; IDNs, integrated delivery networks; LTAC, long-term acute care.

Some of the elements of the corporate IP director role that were common among survey respondents were as follows:

- (84%) Coordinates annual risk assessment and sets annual IP goals, priorities, and strategies for the IDN
- (81%) Coordinates annual evaluation of HAI prevention performance for the IDN
- (78%) Represents the IDN with external agencies (eg, public health department) or professional organizations (eg, APIC)
- (77%) Directs changes to the electronic medical record to support infection prevention practices
- (75%) Has direct reporting responsibility or a consultative/advisory relationship with hospital-based IPs
- (62%) Provides assessment of local or regional IP team performance
- (59%) Leads review and provides oversight for infection prevention regulatory compliance (eg, Centers for Medicare and Medicaid Services, The Joint Commission)
- (59%) Provides lectures and training on IP topics to external audiences, such as local APIC meetings, clinical workshops, national APIC conferences, and Society for Healthcare Epidemiologists of America conferences
- (56%) Provides training for hospital-based IPs and regional IP teams.

Very few (12%) reported having the responsibility for oversight of employee health services.

There were 2 primary differences in the corporate IP director role when comparing large- and medium-sized IDNs (>10 hospitals) to small IDNs (<10 hospitals):

- (1) Corporate IP directors in small IDNs reported spending more face-to-face time with hospital-based IPs than medium and large IDNs.
- (2) Performance improvement projects involving change of product and/or practice was reported to be easier in small IDNs compared to medium and large IDNs.

#### Corporate IP programs

A total of 37% of the responding corporate IP directors indicated that their IDNs were organized by regions, and 21% reported that the regions have a regional IP leader. Of the IDNs organized by regions, the respondents reported that there was less willingness to work

toward organization-wide standardization of practices. The corporate IP director in these regionally organized IDNs reportedly serve as advisors, with less hands-on involvement, providing tools and support such as Web site coordination and protocol development.

Corporate IP department staffing ranged from 1 full-time equivalent (FTE) to 49 FTEs, with an average of 14 FTEs. A minority of the respondents (4) reported that there were no FTEs dedicated to data analysis, whereas the rest reported a range of 1–4 data analyst FTEs.

Only 37% reported having a dedicated physician FTE for the corporate IP program. Although there is no standard requirement or role description for the physician partner for IP programs in the United States, there have been published guidelines.<sup>10</sup> The 2015 Society for Healthcare Epidemiologists of America white paper states in part, “The physician health care epidemiologist (HE) is a key leader in any successful IP program, with the ability to influence stakeholders to facilitate improvements in practice.”<sup>10</sup> Increasing regulatory pressure to deliver on goals for reduced infection rates adds weight to the requirement for physician partnership with IP programs and antibiotic stewardship programs at the hospital and corporate levels, to assist with elevating practice to meet standards.<sup>11</sup> The survey did not inquire about the benefits or advantages of physician engagement/support for the corporate IP program, but there has been concurrence within the network that this is important to influence executives and other physicians when improvements in product(s) or practice are recommended by the IP department. In addition, a physician can potentially provide valuable assistance for the corporate IP director in analyzing data, assessing risks, and setting program goals. The corporate IP physician can also support hospitals within the IDN that may lack a physician partner for the hospital-based IP program. This support may take the form of coordinating organization-wide standardized order sets, including practices such as prompt removal of indwelling devices; prompt discontinuation of postoperative antibiotics; providing centralized support during outbreak investigations, including post exposure prophylaxis for patients and staff; and supporting system-wide risk management-related communications.

The IDNs represented by 95% of the respondents to this survey reported using HAI surveillance software, and centralization of the infection surveillance software was reported by 67% of respondents. The centralization of infection surveillance was identified by respondents as a strategy for reducing diversion of expert hospital-based IP time. Although to our knowledge there has been no published comparative

**Table 3**  
Infection surveillance software

Type of software	No. of responses and total responses (%)
Cerner ( <a href="https://www.cerner.com/solutions/infection-control">https://www.cerner.com/solutions/infection-control</a> ) Accessed October 19, 2018	3 (8.3)
EPIC ICON module ( <a href="https://www.epic.com/software">https://www.epic.com/software</a> ) Accessed October 19, 2018	5 (16.7)
Home-grown system	2 (5.6)
MedMined ( <a href="http://www.bd.com/en-us/offerings/brands/medmined">http://www.bd.com/en-us/offerings/brands/medmined</a> ) Accessed October 19, 2018	6 (19.4)
Premier SafetySurveillor ( <a href="https://ss.premierinc.com/">https://ss.premierinc.com/</a> ) Accessed October 19, 2018	2 (5.6)
Sentri7 ( <a href="http://www.pharmacyonesource.com/products/sentri7/infection-prevention/">http://www.pharmacyonesource.com/products/sentri7/infection-prevention/</a> ) Accessed October 19, 2018	2 (5.6)
Theradoc ( <a href="https://www.theradoc.com/technology/infection-prevention/">https://www.theradoc.com/technology/infection-prevention/</a> ) Accessed October 19, 2018	7 (25.0)
VECNA ( <a href="https://www.vecna.com/tag/infection-control-software/">https://www.vecna.com/tag/infection-control-software/</a> ) Accessed October 19, 2018	3 (8.3)
None	2 (5.6)
Total	32 (100.0)

study of centralized and decentralized infection surveillance in IDNs, the use of infection surveillance software in place of manual infection surveillance is now commonly employed by many IP programs to reduce the time required for data collection and reporting, as well as reducing human errors, including those associated with inter-rater reliability.<sup>12,13</sup> With the advent of these systems, surveillance has become more of a clerical function that can be delegated to data analysts, leaving expert IPs time to analyze and act on the resulting data reports. The types of infection surveillance software systems reportedly in use by the IDNs represented by survey respondents are summarized in Table 3.

#### Hospital-based IPs and IP programs

Hospital-based IP department staffing was reported to be in a range of 1-78 FTEs per hospital and 3-24 part-time employees per hospital. Most reported having additional FTEs, such as analyst or clerical FTEs. In addition, the survey revealed that the CIC credential is required for hospital-based IPs in 25 of 32 IDNs (78%).

#### Reported benefits of the corporate IP director position

In addition to survey findings, several corporate IP directors have offered the following anecdotal improvement stories to illustrate the value of a corporate IP director/team. Permission to include these stories has been obtained from each individual.

**Trinity Health Care (93 hospitals in 22 states), Russ Olmsted:** The National Healthcare Surveillance Network (NHSN) team within our corporate IP department in Trinity Health Care integrated delivery network (IDN) provides access to published infection rate data for system executives, managers, and frontline staff as needed. In addition, the team provides centralized clinical analytics enabling provision of actionable data to regional and local clinical teams. The corporate IP director is invited to report to the system's board of directors on a composite HAI standardized infection ratio (SIR), with target goals and benchmarking for the IDN. The corporate IP structure additionally ensures standardized *Clostridium difficile* infection (CDI) testing, prevention, and control efforts, in addition to supporting reliable design of the IDN's programs for antibiotic stewardship (ASP), catheter-associated urinary tract infection (CAUTI) prevention, catheter-related bloodstream infection (CRBSI) prevention

bundle, hand hygiene compliance, and environmental cleaning. In the last 12 months, 29 of 50 hospitals improved HAI scores over the prior 12 months to achieve or exceed the threshold.

**Mountain States Health Alliance, now Ballad Health (21 hospitals in 2 states), Jamie Swift:** A corporate/system-wide approach to antibiotic stewardship (ASP) was undertaken in order to ensure the greatest success. Each of the 13 system facilities convened an ASP committee, all reporting directly to a corporate ASP committee. As a result, system-wide alignment with the recommended core elements of the ASP was accomplished. This approach avoided duplication of effort and false starts with each facility trying to implement an ASP on their own. All metrics are regularly reported and tracked by the corporate committee to determine progress and opportunity areas. Key program strategies implemented included:

- System-wide definition and acceptance of metrics
- System-wide adjustment to the electronic health record (EHR) requiring an approved indication for use on all antibiotics and antifungals, as well as a 48-hour time-out
- System-wide development of standardized reports to monitor metrics and 48-hour time-out documentation
- System-wide approach to outpatient antibiotic stewardship
- Marketing campaign at the system level
- 1-day symposia offered to all providers throughout the system, featuring speakers nationally known in their work for antibiotic stewardship, including Dr. Srinivasan from the Centers for Disease Control and Prevention (CDC).

**Cone Health (4 hospitals in North Carolina), Melissa Morgan:** A system-wide assessment of *Clostridium difficile* infection (CDI) prevention efforts was undertaken in 2016, which included:

- Support and compliance monitoring for hand hygiene compliance
- Ultraviolet (UV) light disinfection as an adjunct to environmental cleaning
- Polymerase chain reaction (PCR) testing
- A nurse-driven CDI case identification protocol.

At facilities where the CDI rate was reported to be above target, a root cause analysis was performed. These deep dives determined that the nurse-driven case identification protocol, in combination with PCR testing, was resulting in many false-positive cases. A system decision was made to eliminate the nurse-driven case identification protocol and change the laboratory testing methodology to a 2-step process. Hand hygiene per protocol with compliance monitoring, in addition to UV light disinfection as an adjunct to environmental cleaning, continued as usual. Over the course of 12 months, CDI rates decreased by 84%.

**University of Michigan Health System Sporidical Disinfectant for *Clostridium difficile* infection (CDI) Reduction (11 facilities in Michigan), Amanda Valyko:** A system-wide approach to the improvement of environmental cleaning for reduction of hospital onset CDI was undertaken in 2016. The project focused on the use of a sporidical hydrogen peroxide (HP)/peroxyacetic acid product for all daily, discharge and common area cleaning. Over the course of a 9-month period, the hospital onset CDI rate decreased by 19%. To proactively address staff concerns with product smell, air sampling was performed to validate that the level of HP was within permissible limits.

**Northwest Medical Surveillance Central Line-Associated Bloodstream Infection (CLABSI) (4 hospitals and 100 ambulatory facilities in Chicago, Illinois), Christina Silkaitis:** The hospital infection preventionists (IPs) are responsible for CLABSI case finding in this multifacility system. The corporate IP director provides training regarding surveillance methodology and in this project used negative predictive value of

blood cultures to validate the CLABSI data reported by hospital IPs. Blood cultures (#452) system wide for a 3-month period met CLABSI criteria, and a random sample of 60 were reviewed. The study revealed that a total of 3 CLABSIs had been misidentified (not consistent with the National Healthcare Safety Network definition) as secondary infections. The use of blood cultures was judged to be a simple, effective audit tool to monitor CLABSI surveillance system wide, in the absence of a centralized database.

**Advocate Aurora Health (27 acute care hospitals, pediatrics, critical access, and 500 sites of care in Illinois/Wisconsin), Linda Stein:** Using a transformational approach to enhance clinical outcomes, this system embarked on a new design for infection prevention (IP) that includes streamlining workflows of the hospital-based IPs. Using a remote National Healthcare Safety Network system surveillance team, data collection and reporting includes public health department, communicable disease reporting, and trending of facility process/outcome measures. There is routine training provided to facility-level IPs in performance improvement principles to better support and enhance the delivery of evidence-based practices at the bedside and across the continuum of care setting.

## DISCUSSION

The 2016 survey results captured variation and commonalities relative to roles, responsibilities, and program structure for the corporate IP directors. Future efforts to support more standardization and reliable design in the corporate IP director role and program may be beneficial (eg, development of a best practice corporate IP role description, template corporate IP program plan, and template corporate IP training plan). This would also serve to support optimal resource utilization and consistent application of evidence-based practice.

In addition to the anecdotal improvement stories, the survey also captured a number of perceived benefits of the corporate IP director role. These include real-time support of hospital-based IP departments during site visits and/or on the phone, such as assisting the IP in assessing risk after a gap in disinfection or sterilization, or in the event of an outbreak investigation. The corporate IP director role also has been reported by network members to help with reducing duplication of effort among the hospital IP programs in the system by centralization of functions and standardization of practices, including training and ensuring optimal regulatory survey readiness (eg, Centers for Medicare and Medicaid Services). These advantages have anecdotally resulted in reduction of HAIs within IDNs. This effect was reported by 1 of our members, Maureen Spencer, during a 2013 APIC conference session presentation, where she described a 42% overall reduction in HAI (all categories) from 2010–2012 in the multihospital system under her leadership as corporate IP director.<sup>14</sup>

There are organizations that rank hospital systems according to their effectiveness in preventing infections. One is Truven Health, which in 2018 added a new composite measure of HAI prevention performance, combining the rates for 6 HAI types: methicillin-resistant *Staphylococcus aureus* bloodstream infection, CLABSI, catheter-associated urinary tract infection, CDI, surgical site infections following colon surgery, and surgical site infections following an abdominal hysterectomy.<sup>15</sup> Of the 15 top performing hospital systems for this composite measure, 8 are represented in the national corporate IP director network. This would appear to suggest an advantage in corporate or system-level IP leadership. However, more study is needed to specifically compare HAI-related process and outcome metrics in hospital systems that have a corporate IP director/team and those that do not.

## Limitations

Although there was a 44% response rate for this survey, those responses represent only 32 corporate IP directors of the total membership of 72 in 2016. In 2018, the total number of corporate IP director network members is 108 and growing monthly. The American Hospital Association 2018 Fast Facts on US Hospitals indicates that there are currently more than 5,000 community hospitals in a network or a system.<sup>16</sup>

## CONCLUSIONS

As health care delivery in the United States continues to evolve, the emergence of large IDNs continues as well. Within these IDNs, oversight of key clinical areas such as IP is often centralized to create alignment, optimize cost containment, and improve outcomes (eg, reduce infection rates).

The results of the 2016 survey of the national corporate IP director network have described common and divergent role and program characteristics, as well as benefits of a corporate IP director/team. This will serve as a foundation on which to build, working toward supporting standardization and a reliable design for the role, responsibilities, and resourcing of corporate IP directors for the ultimate goal of improving patient safety.

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