Commentary

Competency in infection prevention: A conceptual approach to guide current and future practice

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- Competence
- Competency model
- Professional development
- Career stages

Professional competency has traditionally been divided into 2 essential components: knowledge and skill. More recent definitions have recommended additional components such as communication, values, reasoning, and teamwork. A standard, widely accepted, comprehensive definition remains an elusive goal. For infection preventionists (IPs), the requisite elements of competence are most often embedded in the IP position description, which may or may not reference national standards or guidelines. For this reason, there is widespread variation among these elements and the criteria they include. As the demand for IP expertise continues to rapidly expand, the Association for Professionals in Infection Control and Epidemiology, Inc, made a strategic commitment to develop a conceptual model of IP competency that could be applicable in all practice settings. The model was designed to be used in combination with organizational training and evaluation tools already in place. Ideally, the Association for Professionals in Infection Control and Epidemiology, Inc, model will complement similar competency efforts undertaken in non-US countries and/or international organizations. This conceptual model not only describes successful IP practice as it is today but is also meant to be forward thinking by emphasizing those areas that will be especially critical in the next 3 to 5 years. The paper also references a skill assessment resource developed by Community and Hospital Infection Control Association (CHICA)-Canada and a competency model developed by the Infection Prevention Society (IPS), which offer additional support of infection prevention as a global patient safety mission.

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The conceptual model (Fig 1) is presented as a circular diagram. At its center is patient safety, the aspirational goal for everything else that moves outward from it.

The infection preventionist (IP) specific core competencies are defined by the Certification Board of Infection Control and Epidemiology (CIC). The major content areas for the core competencies are described in Table 1 and correspond to the content outline of the certification in infection control (CIC) examination.1

These evidence-based competencies are reflective of current practice and are updated at least every 5 years through extensive survey research of actively practicing, certified IPs.2 The Association for Professionals in Infection Control and Epidemiology, Inc (APIC)/Community and Hospital Infection Control Association (CHICA)-Canada professional and practice standards, published in 1999, identified similar competencies.3,4 This white paper is meant to serve as an ongoing platform upon which the assessment of IP knowledge and skills are based; it is a critical element in understanding the IP role as it exists now.5

Extending outward are 4 specific domains that represent the areas that the APIC has identified for future-oriented competency development: leadership, infection prevention and control, technology, and performance improvement/implementation science. Focusing on these 4 strategic developmental domains enables the IP
to build on the core competencies thereby advancing his/her career from novice to expert. Progress within the domains is not expected to occur simultaneously nor be maintained at similar levels at all times. For example, the IP may demonstrate advanced competency in technical skills but be less proficient in performance improvement methods or be an experienced leader yet have basic technological skills. For examples of how to self-define the IP career stages, see Table 2.

It is also important to acknowledge that the 4 future-oriented domains are not mutually exclusive. Just as they are linked to the core competencies, they are also linked to one another. However, to help clarify the model, this description emphasizes their unique aspects as well as the areas of intersection.

To understand better the 4 domains and their implications for practice, a brief description of each is provided. These descriptions serve as an overview; additional details and specific content for each will be developed by the APIC in the future. Member involvement in this process will be encouraged to assure that the elements of the conceptual model that are based on expert consensus reflect the dynamic nature of the evolving IP role.

**DOMAIN 1: LEADERSHIP**

IPs’ leadership is based on influence rather than authority, and this influence is a consequence of skills in the 5 content categories described below:

- **Collaboration**

As team member, facilitator, or leader of multidisciplinary improvement efforts, the IP serves as champion for a safety culture where prevention of health care-associated infections (HAIs) is everyone’s responsibility. Managing competing agendas and priorities, while encouraging integration of prevention activities into the work of every department, takes a skilled negotiator. Team and consensus-building skills are critical: Effective team building requires situational awareness, relationship management, networking, marketing, and verbal and written communication skills. Influence and persuasion are especially important aspects of the IP’s role in driving change through partnerships.
Followership

Effective teams need leaders, and, in turn, these leaders need followers. IPs serve a supportive (follower) role when interdisciplinary teams are formed to prevent infections. This followership role allows the IP to provide expertise and exert influence in the absence of direct or traditional authority. Attributes of effective followers include strong critical thinking skills, passionate commitment to the mission, active engagement, positive energy, and a willingness to challenge leaders and offer constructive criticism. By illustration, Grint stated that, "the power of leaders is a consequence of the actions of followers rather than a cause of it."
Table 2
Descriptions and examples to assist with self-definition of IP career stage

<table>
<thead>
<tr>
<th>Novice IP</th>
<th>Proficient IP (all in column 1 plus)</th>
<th>Expert IP (all in columns 1 and 2 plus)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conduces surveillance: standardized, basic case finding methods and application of HAI definitions</td>
<td>Can apply and expand surveillance principles to diverse populations</td>
<td>Identified as expert in specialty areas such as public health, outpatient settings, research, or consulting</td>
</tr>
<tr>
<td>Is learning to use NHSN</td>
<td>Skilled at using NHSN and may validate NHSN surveillance conducted by others</td>
<td>Has the ability to confer with the CDC and other stakeholders in ongoing development of NHSN</td>
</tr>
<tr>
<td>Performs manual record/chart review, data abstraction, and data collection</td>
<td>Independently performs electronic surveillance, applies data mining principles, and can integrate both manual and electronic findings for comprehensive reporting</td>
<td>Expert in e-surveillance, use of EMR/other technology</td>
</tr>
<tr>
<td>Conducts infection rate calculations and basic statistical analysis (mean, median, ratio, rate)</td>
<td>Uses more advanced statistical tools (SIR, P values, standard deviation, odds ratio)</td>
<td>Applies principles of information management to emerging technology</td>
</tr>
<tr>
<td>Is able to do graphic data display and report generation and dissemination</td>
<td>Able to interpret research data and apply findings to current practice</td>
<td>Applies statistical methods in study design and research activities (sampling, power, hypothesis testing)</td>
</tr>
<tr>
<td>Benchmarks/compares rates</td>
<td>Possesses understanding of endemic vs epidemic rates, common or special cause variation</td>
<td>Integrates comparative analysis into high level, strategic understanding of facility’s quality, safety, and risk mitigation programs</td>
</tr>
<tr>
<td>Possesses basic knowledge of epidemiology and outbreak investigation; can assist with investigations but usually does not lead them</td>
<td>Uses comparative analysis to support institutional accrediting, regulatory compliance, and others</td>
<td>Can design and conduct complex studies/investigations, including across institutions</td>
</tr>
<tr>
<td>Uses literature review as an essential tool</td>
<td>Collaborates with the local/state health department, as needed</td>
<td>Collaborates with CDC on specific events, publishes results</td>
</tr>
<tr>
<td>Uses data to identify needs for change and can propose basic intervention/improvement projects</td>
<td>Develops and/or uses more complex data display tools (control charts, affinity diagrams, scatter plots)</td>
<td>Adds to the body of published literature</td>
</tr>
<tr>
<td>Is learning the essential skills of PI and IS</td>
<td>Understands and/or uses more complex data display tools (control charts, affinity diagrams, scatter plots)</td>
<td>Highly skilled at reviewing, interpreting, and applying research findings</td>
</tr>
<tr>
<td>Understands and performs basic team/project facilitation and application of PI/IS skills</td>
<td>Independently uses PI and IS tools and methods; can choose and utilize approaches appropriate to stakeholder needs and project timelines</td>
<td>Uses principles of influence, leadership, and change management</td>
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<tr>
<td>Understands adult education principles, can design educational programs, and has effective presentation skills</td>
<td>Has experience with presenting to large audiences (internal and/or external)</td>
<td>Effectively negotiates for optimum collaboration and resource allocation for IPC initiatives</td>
</tr>
<tr>
<td>Develops policies and procedures based on understanding of regulatory/accreditation requirements</td>
<td>Has experience with presenting to large audiences (internal and/or external)</td>
<td>Designs, facilitates, or leads multidisciplinary team projects; is a recognized expert in PI/IS with successful outcomes</td>
</tr>
<tr>
<td>Participates in committee agenda planning and facilitation, IPC program risk assessment/plan</td>
<td>Participates in local, regional, national policy review, advocates for legislation (eg, comments on pending IPC legislation, meets with legislators)</td>
<td>Is a recognized expert, experienced in presenting to national and/or international audiences</td>
</tr>
<tr>
<td>Participates in committee agenda planning and facilitation, IPC program risk assessment/plan</td>
<td>Participates in local, regional, national policy review, advocates for legislation (eg, comments on pending IPC legislation, meets with legislators)</td>
<td>Serves as a role model; coaches others</td>
</tr>
<tr>
<td>Participates and leads goal planning activities, program assessment, budget development, or staff management; can make effective business case for needed resources</td>
<td>Participates and/or leads goal planning activities, program assessment, budget development, or staff management; can make effective business case for needed resources</td>
<td>Actively influences local, regional, national IPC agenda, writes policy, standards, or guidelines and lobbies for/against legislation</td>
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<td></td>
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<td>Consults with accrediting bodies and other stakeholders regarding development of standards, measures, and metrics</td>
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<td></td>
<td></td>
<td>Participates or facilitates strategic planning activities related to IPC or patient safety/quality, recognized as organizational/community or national leader</td>
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</table>

EMR, electronic medical record; IPC, infection prevention and control; IS, implementation science; PI, performance improvement; SIR, standardized infection ratio.

NOTE. Early career/novice: The novice IP is employed in a health care setting where infection prevention is the primary—although not always the sole—focus of the role. The novice is often earning or has earned a baccalaureate degree and is developing a basic skill set and knowledge base but is not yet prepared to sit for the certification exam (CIC). Novice IPs are actively acquiring fundamental infection prevention and control skills with emphasis on learning how to do surveillance and effective reporting, basics of epidemiology and statistics, adult education principles, policy development, and committee planning and support. They are working to understand and shape their role as an organizational patient safety leader.

Mid-career/proficient: The proficient IP has earned an undergraduate degree and is often pursuing post-baccalaureate education. The proficient IP may have management or supervisory responsibility. This IP has earned certification and may serve as mentor for those pursuing the credential. Proficient IPs have a diverse skill set, demonstrate critical thinking, and function successfully in team-based, collaborative situations. They have further developed and are refining their leadership skills and are effectively managing their IPC program. Proficient IPs are highly skilled and professionally confident in their roles as preventionists and patient safety advocates.

Advanced/expert: The advanced IP is earning or holds a graduate degree. His or her professional activities may showcase expertise in leadership, management, education, consultation, advanced analysis, strategic planning, and multiple other competencies appropriate to the specific type of role. The expert IP also promotes certification, mentors others, and demonstrates the value of the credential through advanced knowledge and skills. The expert IP is an accomplished, recognized leader and patient safety champion in their own organization, whose collaborative influence may reach beyond their employer/business to regional, national, and international audiences.

- Program management

Alignment of the infection prevention program’s goals with the organizational strategic priorities and annual operating plan is an important responsibility for every IP. Whether in a formal or informal managerial role, the IP must oversee daily prevention activities and the budget and allocate personnel and other resources while constantly balancing workload with patient-focused priorities. Concurrently, the IP must remain sensitive to the organization’s culture and “emotional intelligence” (EI), as well as to the many competing priorities that can impact desired clinical and operational outcomes. The program and staff must be able to rapidly respond to shifts in regulatory and accreditation requirements or emerging science through a nimble adaptive management style.
Innovation applies to many aspects of leadership, including the ability to effectively and efficiently manage the infection prevention and control (IPC) program.

Preventionists must also understand the economic environment, the impact of changing payment trends, quality-based incentives, and how HAIs specifically erode the organization’s financial health. This knowledge provides the basis for making the business case for improved or continued support of a patient-focused IPC program.

Planning, both strategic and operational, is a necessary skill to keep the program goals high on the organizational priority list. A key element of planning is the ability to forecast the need for new services that will change the workload and proactively identify resources required for success. Resources can be program staff or partners, access to key decision makers, technology, or other infrastructure that will help organize, drive, and complete work. Effective program management also involves the ability to create action plans with explicit time lines for deliverables and responsible parties accountable for certain tasks.

- Critical thinking skills

Critical thinking is a process or method of understanding the problems or questions at hand, as well as challenging assumptions and considering alternative perspectives. In the context of IPC, this domain is about being proficient at understanding, utilizing and synthesizing scientific evidence, including methods for translating evidence into practice. This is an intellectual competency that focuses on goals, outcomes, and organization-wide impact of prevention initiatives. Judgment, reflection, complex reasoning, and analysis—from professional insight and wisdom—are all necessary aspects of this skillset.

Interpersonal skills. Critical thinking links with EI, another characteristic of effective leaders.7 EI is defined as self-awareness and the ability to manage the emotions of self and others toward effective partnerships. It includes having social skills and an empathetic approach to people and being able to inspire, influence, and develop others. The IP’s ability to think critically, coupled with keen interpersonal skills, support all other aspects of successful leadership.

- Communication

The ability to influence, serve as a role model, demonstrate accountability and integrity, and communicate the value of infection prevention to a diverse audience to achieve desired outcomes are all required for leadership competency. Communication (verbal and written) may, in fact, be the most critical element of successful organizational leadership. Effective communication takes into account the audience's informational needs, their cultural background, and knowledge of the subject. Being concise, accurate, and timely in communicating critical information is a skill taught in conjunction with the science of safety and a much-needed competency for IPs.

Understanding barriers to effective communication is as important as knowing how to communicate well. Barriers may be physical, psychological, attitudinal, cultural or linguistic, or because of the volume and complexity of information being shared. Careful audience assessment and calibration of the message accordingly is an important strategy for reducing barriers to effective transfer of information. The art of influence and persuasion is also directly linked to communication competencies.

**DOMAIN 2: IPC**

IPC competencies are the foundation of the IP’s development. IPs are subject matter experts in the epidemiology and natural history of infectious processes and pathogens, recognition of clusters and risk factors for infection, and methods for breaking the chain of infection. The core competencies identified by CBIC are essential. Simultaneously, the dynamic nature of the profession requires additional focus in the following areas:

- Epidemiology and surveillance

The ability to apply surveillance definitions and methodologies (ie, from the Centers for Disease Control and Prevention’s National Healthcare Safety Network [CDC NHSN] or McGee et al8 for long-term care surveillance) is essential to the development of collection tools and gathering of relevant surveillance data. The IP’s proficiency at understanding and selecting appropriate benchmarks for comparison, as well as literature review, supports a proactive approach to setting infection reduction targets and thresholds upon which they may need to react (eg, if rates are higher than internal baseline measures or external benchmarks).

IPs must appropriately select, calculate, and explain rates (eg, incidence, prevalence) and ratios (eg, standardized infection ratio). IPs generally review a basic data set, often displayed on run charts, to establish general impressions of a measured process or outcome. Information is the result of further processing of data, beginning with univariate analysis (eg, calculation of mean, median) and comparison against benchmarks. Run charts may be further interpreted using “runs rules” to identify trends and “special cause” variation, which could indicate the need for further investigation. More advanced analysis may employ the use of statistical process control charts where processes (or outcomes) are described with upper and lower control limits in addition to univariate descriptive statistics.9,10 Statistical concepts such as power should be understood when determining adequate sample size to establish statistical significance between/among comparison groups. IPs must also know when and how to use hypothesis testing.

- Risk assessment

The IP leads the organization in application and evaluation of basic institutional risk criteria such as that used in hazard vulnerability analysis (eg, current magnitude of the problem, current ability to control the problem, risk to patients) for specific situations and uses relevant data and methods to align the infection prevention plan with the results of the risk assessment. An example would be evaluating risk for *Clostridium difficile* infection in an institution. The organization should assess whether this is a high priority area for them by comparing the rate of incident infections provided by the IP with an internal or external benchmark and would then decide whether additional risk reduction strategies might be appropriate. These could involve changes in isolation practice, testing methods, or collaboration with facilities in the catchment area of the institution on risk reduction. Conversely, the organization could decide that the rate is low enough that current processes are appropriate and could give this topic a low priority in the assessment. When interventions are planned, the IP must make sure that they are measurable, appropriate, objective, and valid.

- Risk reduction and infection prevention

IPs are involved in reducing infection risk throughout various health care settings. This includes consultative input into the physical design of patient care environments and establishing specifications for protective measures during construction and renovation. IPs also play a key role in the evaluation of new procedures and clinical technologies for patient care. In addition,
IPs monitor conformance with care processes that are correlated with decreased infection risk. Understanding and blending institutional processes and systems with validated risk reduction and error prevention strategies are crucial for improving patient care and employee safety.

- Use and interpretation of diagnostic tests

The IP must be familiar with complex testing methods that include polymerase chain reaction, probe-based tests for nucleic acid sequencing, molecular typing, and interferonγ release assays for tuberculosis detection. They must be able to articulate the advantages and disadvantages (especially in terms of test sensitivity and specificity) of diagnostic tests for potential use in their setting.

- Antimicrobial stewardship

Antimicrobial stewardship (AS) is an interprofessional effort that involves optimal, prudent antimicrobial use for patients across the continuum of care: acute, inpatient, long-term care, and outpatient settings. The goal of AS programs is to improve the therapeutic use of antimicrobials through education of clinicians, guidelines, computer decision support, and de-escalation based on culture results. IPs can support AS programs by helping to provide surveillance for syndromes of interest, implementing interventions to guide the delivery of evidence-based practices, and translating data from antibiograms and antibiotic utilization along with infection rates for health care personnel, nursing units, and administrators.11

- Education

The IP remains a resource for patients and staff in the area of education. However, new approaches will be needed to meet the learning needs of an increasingly diverse workforce. Proficiency in the use of age-adjusted interactive learning techniques, simulation-based training, clinical decision support tools, and “just in time” education will be significant additions to existing training competency.

- Research

The IP must be able to critically evaluate research and apply the findings to their practice setting. The ability to understand and interpret research methodologies, including interrupted time series, retrospective case-control, cluster randomization, and prospective longitudinal studies, is important. In addition, IPs who have the resources, time, and inclination should participate in research, present abstracts on results, and subsequently author manuscripts for publication in peer-reviewed professional and scientific journals.

**DOMAIN 3: TECHNOLOGY**

Surveillance of HAIs requires systematic data collection, collation, analysis, and dissemination of key findings to providers to improve performance. The rapid escalation in the demand for HAI data highlights the critical need for IPs to use and advocate for standardized, validated, and reproducible data. Managing these critical data will increase demands on the IP (ie, the “burden of surveillance”) especially because this is typically accomplished by manual processes. Even so, an important caveat to use of electronic patient and laboratory data is illustrated in the sentiments of a preventionist using advanced surveillance technology, “...a surveillance system itself does not reduce infections...neither do the infection preventionists (alone)”. (Patient care) practices reduce infections. Technology allows us to get out on the floors and work with (patient care teams) more...”12

To address growing demands for procurement of HAI data as efficiently as possible, better IP knowledge and skills in use of surveillance technology and health informatics will be necessary. While this is a highly dynamic domain, IPs must be prepared to address the following that include but are not limited to:

- Information technology support

Professional and practice standards and elements of board certification in infection prevention assume preventionists will have access to information technology (IT) hardware and be proficient in use of associated applications (eg, word processing, spreadsheets, presentation and communications applications, the health system intranet). To accomplish surveillance, the preventionist also needs access to key clinical and administrative databases such as patient information (eg, electronic medical record [EMR]) and laboratory information systems, admission/discharge/transfer (ADT), patient bed assignment/management (eg, “bed boards”), surgery information system, and, possibly other correlate databases such as pharmacy (eg, utilization of antibiotics) and radiology (eg, verification of presence of a central line in chest X-ray reports). IPs often will need to request assistance from IT professionals for access to and reports from these and other databases. Therefore, they need to clearly communicate these requests and clarify throughout the development of reports to make sure the output is understood when received and as intended. Once received, it will be important to validate automated reports both initially and periodically thereafter to verify consistency of report accuracy. By illustration, tabulation of device days may vary considerably by data source used (eg, finance report, EMR, manual tally by unit personnel), so validating report accuracy and integrity is important. In the United States, this importance escalates with state-specific requirements and recent federal pay-for-performance incentives, wherein reimbursement is tied directly to patient outcomes, including HAIs. This effort has resulted in mandatory reporting of certain HAIs to the CDC’s NHSN.13

Effective use of the NHSN will necessitate valid data input, and IPs will need to complete training in the use of NHSN prior to sending data to the NHSN. This network will continue to be the centralized technology platform for collection, analysis, and reporting of HAI data in the United States. Technology is also increasingly being used to collect data on adherence with infection prevention processes via a portable device (eg, hand hygiene and isolation precautions) or more advanced infrastructure that automates observation entirely.14-16

- Surveillance technology

More advanced analytical tools are increasingly important to support surveillance. These include data mining services that use interfaces among laboratory information systems, ADT, pharmacy, and other health information databases. Such tools can detect clusters of epidemiologically important pathogens, create automated alerts of newly detected multidrug-resistant organisms, and improve efficiency and scope of review and analysis of large quantities of data.17 Some surveillance technology can also provide decision support to clinicians regarding use and selection of antimicrobial agents.18 Vendors for these applications have also collaborated with the NHSN to support seamless, automated transfer of data into the NHSN. This capability is beginning to be used but still requires considerable collaboration among the vendors, the IP, and the IT professionals to realize full functionality.
With the transition from manual methods, the IP must be prepared to understand and convey to partners the meaning of a fully automated transmission of HAI data done seamlessly by computer. This direction will likely have substantial impact on the process of surveillance, but effective use of these data will be dependent on the IP's skills and understanding of the strengths and limitations of output from automated HAI detection systems or their proxies. The benefit of this emerging use of IT is reallocation of the preventionist's time from data entry to intervention strategies aimed at prevention in collaboration with direct care team members. Preliminary evidence indicates that EDWs can be used for algorithmic detection of HAIs, such as central line-associated bloodstream infection and ventilator-associated complications.19 The challenge for IPs and health care epidemiologists is to assure automated surveillance provides meaningful information upon which actions to improve care and safety can be taken.20

- EMR and EDW

Currently, only 12% of health systems in the United States have a fully functional EMR as defined by key attributes such as computerized provider order-entry and clinical care documentation. There are national initiatives to transition all clinical documentation, such as laboratory testing and imaging reports, to a common electronic platform spanning the spectrum of care. IPs will need to be involved as early as possible in the evaluation and selection of an EMR vendor to assure that it provides meaningful use as defined by the needs of the HAI surveillance program. Use of EMR can include automated collection of device-days for all patient units, alerts to clinicians of continued presence of devices such as urinary catheters, real-time management of patients in isolation precautions, and names of personnel needing post-exposure follow-up from possible occupational exposure to infectious disease.21,22 EDW can serve as a repository of data from a range of databases and information systems that can be queried for impact of certain infections on resource utilization (eg, length of stay), effectiveness of infection prevention and therapeutic interventions, algorithmic detection of possible HAIs, syndromic surveillance for public health or national security reasons, data validation, and identification of possible surgical site infections coded in claims data systems.

DOMAIN 4: PERFORMANCE IMPROVEMENT AND IMPLEMENTATION SCIENCE

Performance improvement encompasses all of the systems, projects, and team activities an organization implements to achieve its goals. These goals include the prevention of HAIs for patients, visitors, and staff.

Implementation science (IS) is “the scientific study of methods to promote the systematic uptake of clinical research findings and other evidence-based practices into routine practice and hence to improve the quality (effectiveness, reliability, safety, appropriateness, equity, efficiency) of health care. It includes the study of influences on health care professional and organisational behaviour.”23 Therein, Eccles et al23 aptly describe the work of IPs. IS provides a conceptual basis for translating evidence into practice, addressing gaps between theory and practice, and serves as a useful clinical model to accomplish improvement in safety, quality, and effectiveness of patient care.

Performance improvement (PI) methods and the principles of IS must be fully integrated into prevention program operations. If PI and infection prevention functions are separated within an organization, there must be sufficient coordination and communication between them to maintain successful partnerships. To accomplish performance/process improvement aimed at reduction of HAIs, the following 5 elements are required:

- Identification of need for PI

The IP is skilled at identifying timely and relevant improvement opportunities, using measures and data to support improvement projects, and creating a PI charter outlining the scope of activity to be initiated.

- Assembly of PI team

The IP has sufficient knowledge, skill, and experience to function in several key PI roles: team leader, facilitator, or team member. Selecting team members best able to help achieve desired outcomes is one of the most critical aspects of improvement work. Equally important is the selection of a clinical champion and executive sponsor whose responsibilities include removal of barriers and allocation of resources.

- Tools and methods

The IP has sufficient knowledge, skill, and experience to use and apply the organization’s preferred PI tools (eg, PDSA [Plan, Do, Study, Act], Lean, Six Sigma), as well as principles of IS, to infection prevention activities.

- Implementation

The IP has sufficient knowledge, skills, and experience to effectively utilize a well-described conceptual model that uses the 4 core elements of engagement, education, execution, and evaluation to move research into prevention practices.24 Key IS skills for the IP to master include identification and critical analysis of scientific evidence, synthesis of interventions with the greatest benefit, identification of barriers to successful implementation, and innovative approaches to remove barriers.

- Measuring success

Performance measurement is important to establish baseline performance and ensure that all patients are receiving the targeted interventions and that interventions are sustained over time. The IP proficiency in measurement includes baseline analysis (comparison against appropriately matched benchmarks), selection of goals with challenging but achievable targets, and process and outcome measurement appropriate to the improvement project. The IP must demonstrate the ability to evaluate the achievement of project goals and relate those achievements to concrete improvements in clinical outcomes. In turn, the business case for infection prevention, the support of regulatory or accreditation compliance, or other outcome reporting requirements follow naturally.

COMPETENCY AND CERTIFICATION

Achievement and maintenance of certification in infection prevention and control (CIC) is one of the APIC’s and CHICA’s strategic priorities for all professionals engaged in IPC. The CIC credential denotes mastery of fundamental knowledge required for competent performance of current infection prevention practice.

Board certification in infection prevention is critical to professional development. It represents the bridge between the novice and the proficient professional. Although this transition is not readily quantified by years of practice, experience remains an
important teacher and source of skill development as the IP progresses along the professional development path.

The certification examination is based on the core competencies summarized in the Examination Content Outline in the CBIC Candidate Handbook. The core competencies comprise the most fundamental aspect of the model. The future-oriented domains are included only to the extent that they correlate to the current research-based findings used to identify the core competencies.

**USING THE CONCEPTUAL MODEL**

IPs who use organizational-specific competency definitions or worksheets (eg, position descriptions) can begin by comparing the existing tools with this model (refer to Fig 1). In doing so, they can determine to what extent they are similar or different and can assess if APIC’s future-oriented domains are identified. If they are not, a discussion with leadership on how they can be included may prove useful. The competency model provides an excellent tool for discussion among all institutional stakeholders and can be a practical resource in helping educate others about the overall aspects of the IPs expanding role.

At the same time or in conjunction with annual goal-setting activities, IPs can perform a self-assessment of individual knowledge and skills and compare it to the domains and categories described herein. The IP will quickly identify areas in which further education or skills development are needed and can integrate these domains into their own plans for professional development.

The model can also serve to help inform and guide new IPs. It can be used as a general map for career planning and help direct those with less experience into areas where future knowledge and skills will be most needed and valued.

Competency is a broad and complex topic, which is relevant to all IPs. Describing a model, endorsed and accepted by its constituents, is inherent to the definition of the professional role. The competencies were developed by IPs active in the field—working in diverse settings in the United States and internationally—who serve on boards, leadership committees, and multidisciplinary task forces focused on prevention of HAIs. The APIC views the model as part of the Association’s long-standing efforts to define and advance the profession. Future efforts will build on the initial phase of development described in this white paper.

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