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Major Article

Leadership experiences of infection prevention and control professionals: Findings from the Leadership Evaluation and Development for Infection Preventionists (LEAD-IP) study

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Background: Leadership competencies among infection preventionists (IPs) are essential to improving patient safety and reducing health care-associated infections. The Advanced Leadership Certification in Infection Prevention and Control (AL-CIP) recognizes IPs demonstrating advanced leadership, yet little is known about the experiences of certified professionals or how the credential supports leadership development.

Methods: The Leadership Evaluation and Development for Infection Preventionists (LEAD-IP) study used an observational nested cohort design. Secondary data from all AL-CIP applicants across two 2025 certification cycles were analyzed. A nested cohort representing 18% of certified professionals completed a structured 60-minute qualitative interview. Data were analyzed using Braun and Clarke's inductive thematic analysis.

Results: Thirty AL-CIP-certified leaders participated. Seven themes emerged: transition from task-based to systems-level leadership; use of data and structured improvement models; communication and psychological safety as core leadership tools; persistent structural barriers; intentional inclusivity of under-represented teams; proactive risk management; and strengthened leadership identity, confidence, and professional growth through AL-CIP.

Conclusions: AL-CIP-certified professionals described leadership roles requiring systems thinking, data literacy, inclusive engagement, and anticipatory risk management. AL-CIP reinforced leadership confidence and credibility and supported career advancement. These findings highlight the value of leadership-focused training and certification in strengthening the infection prevention and control workforce.

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BACKGROUND

Health care-associated infections (HAIs) remain a substantial and preventable source of morbidity, mortality, and health care costs. In the United States, an estimated 1 in 31 hospitalized patients acquires an HAI annually, contributing to more than 722,000 infections and 75,000 deaths.[1] Effective infection prevention and control (IPC) programs can reduce HAIs by up to 70%, underscoring the critical role of infection preventionists (IPs) in promoting patient safety.[2-4] IPs lead surveillance, outbreak response, performance improvement, education, and regulatory compliance activities across health care settings.[5,6]

Despite the centrality of the IPC workforce, no standardized national orientation, competency framework, or leadership training

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pathway exists for IPs in the United States.[5-7] IPs enter the field from diverse educational backgrounds and often assume responsibilities through informal training, variable mentorship, and inconsistent access to professional development resources. This variability contributes to differences in competency attainment, leadership preparedness, and readiness for foundational certification, such as the Certification in Infection Control (CIC).[6,7] Recent research has highlighted wide variation in IPC onboarding and training across Texas, further reinforcing the need for structured professional development pathways.[8]

To address gaps in leadership development, the Certification Board of Infection Control and Epidemiology (CBIC) established the Advanced Leadership Certification in Infection Prevention and Control (AL-CIP).[9] This portfolio-based credential evaluates strategic leadership, systems improvement, mentorship, education, advocacy, and professional engagement—representing the first formal mechanism to assess advanced leadership competence among IPs. Although adoption of the AL-CIP is increasing nationally, no empirical studies have described the competencies emphasized within leadership portfolios or the lived leadership experiences of certified professionals.

The Leadership Evaluation and Development for Infection Preventionists (LEAD-IP) study was designed to address this evidence gap by analyzing AL-CIP applications and conducting qualitative interviews with newly certified professionals. This study provides foundational insight into advanced IPC leadership roles, challenges, strategies, and professional identity formation.

METHODS

Study design

The LEAD-IP study used an observational, nested-cohort design. The study evaluated leadership competencies among applicants to the AL-CIP, administered by the CBIC.[9]

Recruitment and enrollment

Primary cohort

The primary cohort included all individuals who submitted complete AL-CIP portfolios during the January to February and July to August 2025 certification cycles. Eligibility required an active CIC or LTC-CIC credential. Data from these applications were provided to the research team by CBIC for secondary analysis. Cohort 1 included 141 applicants, of whom 90 were certified (63.8%), and cohort 2 included 114 applicants, of whom 78 were certified (68.4%).

Nested cohort

CBIC distributed standardized email invitations to certified individuals from each cycle. Recruitment targeted 10% to 20% of each certified group, with enrollment closing upon reaching the target range. Individuals opted to participate into the study. Sixteen individuals (18%) enrolled from cohort 1 and 14 (18%) from cohort 2. All participants in the nested cohort completed electronic informed consent.

Study procedures

Primary cohort data

Deidentified demographic and portfolio data were securely transferred from CBIC. No direct interaction occurred with primary cohort members.

Nested cohort interviews

Participants completed a one-time, approximately 60-minute, structured qualitative interview conducted virtually via Microsoft Teams.[10] To support transparency and protect participant confidentiality, interviews were not audio-recorded. A single trained member of the research team conducted all interviews to maximize standardization of interview delivery and documentation. During each interview, the interviewer recorded detailed analytic notes using a standardized note-taking template aligned with the interview guide. Notes were expanded immediately following each session and subsequently synthesized into deidentified transcripts for qualitative analysis. To promote the accuracy of the documented responses, the interviewer used real-time clarification and periodic summarization during interviews to confirm key points. Formal member checking (ie, returning transcripts or notes to participants for review) was not performed.

The interview guide corresponded directly to the Institutional Review Board (IRB)-approved 34-item LEAD-IP instrument, which included demographic items and open-ended questions exploring leadership behaviors, communication strategies, change navigation, risk management, and professional development. Instrument items were drafted based on AL-CIP competency domains and subdomains, with prompts structured to elicit applied examples of leadership and professionalism in infection prevention practice (eg, strategic vision, communication, advocacy, and professional development). The Leadership domain examined strategic vision, communication approaches, change management strategies, risk assessment practices, and advocacy activities, eliciting examples of how IPs influence organizational direction, navigate barriers, engage multidisciplinary teams, and apply improvement frameworks. The Professionalism domain explored accountability for IPC outcomes, approaches to inclusivity in decision-making, engagement of underrepresented teams, ongoing competency development, and the perceived impact of AL-CIP certification on professional growth and leadership trajectory. Together, these domains provided a comprehensive view of how certified IPs conceptualize and enact leadership within complex health care environments. Participants were informed that responses were confidential and deidentified and that the research team had no role in CBIC certification decisions or portfolio evaluation. Interview prompts were delivered using neutral language to reduce social desirability bias.

Data management

Study data were collected and managed using REDCap[11] electronic data capture tools hosted at UTHealth. Study IDs replaced identifiable information, ensuring that analytic files contained only deidentified data.

Data analysis

Descriptive statistics summarized quantitative demographic and credentialing data.[12] Qualitative data were analyzed using Braun and Clarke's 6-phase inductive thematic analysis, including familiarization, coding, theme development, iterative refinement, definition, and synthesis.[13] A structured codebook was developed through team consensus.[13] Researcher triangulation and maintenance of an audit trail enhanced analytic rigor, and recurrence of patterns across participants supported thematic saturation.[13]

Ethical considerations

This study was approved by the IRB of the affiliated academic institution (HSC-SPH-25-0620).

Table 1
LEAD-IP study participants' demographics

Characteristics	Frequency (n (%))
Age	
31-39	5 (16.7%)
40-49	15 (50.0%)
50-59	6 (27.3%)
60-69	3 (10.0%)
70+	1 (3.3%)
Gender	
Female	25 (83.3%)
Male	5 (16.7%)
Race/Ethnicity	
Asian	3 (10.0%)
Hispanic	1 (3.3%)
Non-Hispanic Black	2 (6.7%)
Non-Hispanic White	22 (73.3%)
Other/Multiracial	2 (6.7%)
Highest education degree	
Associate's degree	1 (3.3%)
Bachelor's degree	1 (3.3%)
Master's degree	5 (16.7%)
Doctoral degree	20 (66.7%)
Professional degree	3 (10.0%)
Employment	
Employed full-time	28 (93.3%)
Employed part-time	1 (3.3%)
Unemployed	1 (3.3%)
Years of leadership experience	
3-5 y	4 (13.3%)
6-10 y	6 (20.0%)
10+	20 (66.7%)

LEAD-IP, Leadership Evaluation and Development for Infection Preventionists.

RESULTS

AL-CIP certification applicants represented an internationally distributed cohort of IPC professionals, with most individuals in mid-career age ranges. The majority were 35 to 54 years old, with additional representation from those under 35 and 55 to 64, and a smaller group aged 65 to 75. Participants were predominantly female, and most identified as White; the remaining participants represented a range of other racial and ethnic identities. Roles reflected senior IPC and health system leadership, including director, system director, manager, consultant, vice president, chief infection prevention officer, and hospital epidemiologist.

The 30 AL-CIP-certified professionals who completed qualitative interviews were predominantly mid-career, with most aged 40 to 49 and two-thirds reporting more than 10 years of IPC leadership experience (Table 1). The interview sample was primarily female (83%) and non-Hispanic White (73%), with the remaining participants representing a range of other racial and ethnic identities. Professionals represented multiple countries—including the United States, Canada, Qatar, and Saudi Arabia—and worked in health care systems, public health agencies, and academic institutions. Most held advanced degrees (67% master's; 10% doctoral or professional), and nearly all were employed full-time (93%). Demographic characteristics were highly similar between participants 1 to 16 (cohort 1) and 17 to 30 (cohort 2). Both cohorts were predominantly female, non-Hispanic White, employed full-time, and master's educated, with most reporting more than 10 years of IPC leadership experience. No notable demographic differences were observed.

Theme 1: Transition from task-based to systems-level leadership

Participants described a clear shift from completing discrete IPC tasks to adopting a systems-level leadership perspective that emphasizes strategic alignment, interdepartmental coordination, and upstream problem-solving. This evolution reflected a broader professional maturation as IPs moved into more advanced leadership positions. As one participant noted, *"I've shifted from fixing tasks to understanding how systems interact."* Another explained that leadership increasingly required *"thinking upstream—policies, workflows, departments intersecting."* This reframing enabled participants to influence organizational direction and anticipate systemwide implications of IPC decisions.

Theme 2: Reliance on data and structured improvement models

Data literacy and evidence-based decision-making emerged as central leadership competencies. Participants described using dashboards, audits, and quality improvement frameworks to communicate risk, advocate for resources, and drive organizational accountability. One IP emphasized, *"Data drives my conversations now—dashboards help tell the story."* Another highlighted how structured metrics guide leadership engagement: *"I rely on metrics to influence leadership decisions."* These approaches reinforced leaders' credibility and enabled more strategic, measurable IPC interventions.

Theme 3: Communication and psychological safety

Participants repeatedly described communication as foundational to leadership effectiveness. Transparent dialog, trust-building, and creating psychologically safe environments were essential to mitigating risk and encouraging early reporting of concerns. As one participant shared, *"I lead with transparency, so staff feel safe bringing concerns."* Another noted, *"Open communication builds trust and early issue reporting."* These relational competencies were viewed as critical for sustaining collaboration and strengthening frontline engagement.

Theme 4: Structural barriers limiting IPC leadership

Despite advanced leadership capability, participants reported persistent operational challenges that constrain IPC performance. Staffing shortages, competing priorities, and insufficient protected time limited their ability to fully enact systems-level leadership. As one IP described, *"Staffing shortages and competing priorities constantly limit what IPC can do."* Another explained, *"There's never enough time for proactive IPC work."* These barriers mirror national workforce pressures and underscore the need for sustained organizational investment in IPC staffing and infrastructure.

Theme 5: Intentional inclusivity and engagement of under-resourced teams

Inclusive leadership was a pronounced theme, with participants emphasizing efforts to involve traditionally marginalized or overlooked groups such as environmental services, outpatient clinics, and behavioral health units. Many described intentional strategies to elevate frontline voices and ensure equitable participation in IPC decision-making. One participant shared, *"Bringing EVS and outpatient teams into conversations changed everything."* Another noted, *"I intentionally include voices historically left out."* These practices fostered shared ownership of IPC initiatives and improved implementation success.

Theme 6: Proactive risk stewardship in evolving public health threats

Participants characterized IPC leadership as requiring continuous situational awareness and proactive risk assessment, particularly in dynamic or high-acuity environments. This included monitoring environmental hazards, responding to emerging pathogens, and

prioritizing mitigation strategies based on system vulnerabilities. One IP reported, *"I'm always scanning for emerging risks—construction, pathogens, vulnerabilities."* Another described anticipating risk before it escalated: *"I identified risks others missed and started mitigation sooner."* These practices highlight the anticipatory nature of advanced IPC leadership.

Theme 7: Leadership identity formation and professional growth through AL-CIP

A defining outcome of AL-CIP certification was the strengthening of leadership identity, confidence, and career clarity. Participants described the certification process as validating their expertise and elevating their visibility within and beyond their organizations. As one expressed, *"AL-CIP helped me see myself as a leader, not just an IP."* Another noted, *"It boosted my confidence and clarified my career direction."* These reflections indicate that AL-CIP contributes meaningfully to professional development and positions IPC leaders for broader organizational influence.

DISCUSSION

This study provides the first in-depth examination of leadership competencies demonstrated by AL-CIP-certified IPs across multiple countries. Findings show that certified professionals enact leadership through systems-thinking, data-driven decision-making, inclusive engagement, and proactive risk stewardship—competencies increasingly recognized as essential for effective IPC programs. Prior work highlights that IPC roles have expanded considerably over the last decade in response to organizational complexity and emerging infectious threats, requiring leaders to operate with broader strategic influence.[1,2,4,14]

Participants' transition from task-oriented responsibilities to systems-level leadership reflects the broader evolution of IPC roles in contemporary health care. This aligns with literature demonstrating that system-focused leadership enables greater coordination, resource allocation, and organizational alignment to reduce HAIs.[13,14] Their emphasis on data literacy and structured improvement models reinforces prior evidence that IPC programs must demonstrate measurable outcomes and transparently communicate risk. Leaders described using dashboards, audits, and performance indicators to justify resources and track improvement—behaviors consistent with high-reliability organizational principles.[15–17]

Interpersonal leadership competencies also emerged as central to IPC effectiveness. Participants emphasized communication, trust-building, and psychological safety as prerequisites for successful practice change. This finding aligns with foundational leadership theory, including Edmondson's influential work demonstrating how psychological safety promotes team learning, reporting of concerns, and reliable safety outcomes.[18] Additional health care studies show that relational leadership strengthens organizational culture and improves adherence to IPC practices.[19]

Despite advanced leadership capabilities, participants described persistent structural barriers—staffing shortages, competing priorities, and limited protected time—that constrained proactive IPC work. These challenges mirror national reports documenting burnout and resource limitations among IPs, particularly during and after the COVID-19 pandemic.[20,21] Leaders described adaptive strategies to navigate these constraints but viewed them as sustained pressures requiring continued system-level investment rather than temporary obstacles.

Intentional inclusivity emerged as a distinct leadership competency. Participants highlighted efforts to engage environmental services, outpatient clinics, and other under-represented teams in IPC decision-making. Prior studies confirm that inclusion of frontline and ancillary departments strengthens adherence to IPC practices and improves organizational culture, supporting distributed and equity-focused leadership models.[22,23]

Proactive risk stewardship also emerged as a hallmark of advanced IPC leadership. Participants described continuous monitoring of construction risks, emerging pathogens, and operational vulnerabilities—behaviors consistent with modern risk management frameworks and increasingly important as health care systems face dynamic infectious threats.[24,25]

A notable contribution of this study is the identification of leadership identity formation as a meaningful outcome of the AL-CIP credential. Participants described strengthened confidence, enhanced visibility, and greater clarity in their leadership trajectory. This reflects broader leadership literature emphasizing reflection, competency development, and professional identity formation as critical components of leadership growth.[26,27] As health care systems face evolving public health challenges, structured leadership development and credentialing may play an essential role in strengthening the IPC workforce and organizational resilience.

Strengths and limitations

This study applied rigorous qualitative methods, including trained interviewers, structured IRB-approved procedures, real-time analytic note-taking, and Braun and Clarke's 6-phase thematic analysis, which collectively strengthen analytic credibility and dependability. A key strength is that this work represents a novel contribution and the first known study to systematically collect and analyze the lived leadership experiences of IPC leaders. The cohort reflects international representation—including participants from the United States, Canada, Qatar, and Saudi Arabia—and diverse IPC leadership backgrounds spanning health care facilities, public health organizations, and academic settings, enhancing transferability of findings.

This study has several limitations. Interviews were not audio-recorded, which may limit the granularity of verbatim responses despite the use of detailed field notes. The nested cohort was not evenly distributed between cohorts and included variation in gender, race/ethnicity, and years of leadership experience, which may influence thematic emphasis or comparability. Because participants self-selected into the nested cohort, response bias is possible, and findings may not reflect the experiences of AL-CIP applicants who did not participate. Because participants were newly certified through AL-CIP and interviewed shortly after earning the credential, responses may have been influenced by social desirability bias or confirmation bias (eg, emphasizing perceived benefits to justify the effort required to obtain certification), potentially contributing to more favorable perceptions of AL-CIP and related leadership development experiences. To mitigate this risk, interview questions were delivered using standardized, neutral phrasing, and participants were reminded that responses were confidential, deidentified, and would not affect certification status. Additionally, the interviewer was not involved in CBIC portfolio review or AL-CIP decision-making. Despite these measures, the potential for positive response bias should be considered when interpreting findings. Lastly, results reflect experiences at a single point in time and may evolve as the AL-CIP credential gains broader recognition.

CONCLUSIONS

AL-CIP-certified IPs described advanced leadership competencies characterized by systems thinking, data-driven practice, inclusive engagement, and anticipatory risk management. Despite persistent organizational barriers, leaders reported adaptive strategies that support IPC program resilience, influence organizational decision-making, and sustain effective prevention initiatives. These findings

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reinforce the importance of intentionally developing leadership competency in IPC through structured onboarding, succession planning, and integration into graduate-level public health and health care curricula. The AL-CIP credential was perceived as meaningful in validating leadership identity, enhancing professional credibility, and supporting career advancement. Collectively, these results underscore the value of leadership-focused credentialing and formal development pathways to strengthen infection prevention leadership pipelines and improve health care quality and safety across settings.

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