

Assessing long-term sustainability of a large-scale infection prevention and control routine practice improvement initiative in ambulatory care units located at cancer care centres and acute care hospitals

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ABSTRACT

Background: Alberta Health Services' provincial Infection Prevention and Control (IPAC) program implemented a quality improvement initiative to promote the use of routine practices and discontinue use of contact precautions for patients with an antimicrobial-resistant organism. The initiative was implemented in two phases: Phase 1 in ambulatory care areas at cancer care centres in 2016, and Phase 2 ambulatory care areas at acute care hospitals in 2017. The aim of this evaluation was to assess long-term sustainability of the initiative and document lessons learned.

Methods: One-on-one, structured interviews with frontline staff from a sample of initiative areas were performed by IPAC staff. A focus group interview with those IPAC staff was also performed. Responses were independently reviewed by two IPAC staff not involved in the initiative and coded using thematic analysis.

Results: Interviews were performed with 115 frontline staff representing 67 initiative areas. The initiative was sustained in 42% (28/67) of the areas sampled, with sustainability higher for Phase 1 areas (67%, 8/12) than Phase 2 areas (36%, 20/55). Identified themes included differences between Phase 1 and Phase 2 planning and implementation, importance of engagement at various levels, resource issues, process issues, and the use of champions and educators.

Conclusions: The themes from this evaluation suggest factors that affect the sustainability of routine practices in ambulatory care settings and highlights the crucial role of project planning in the roll out of such large-scale initiatives. Collaboration between IPAC and area leadership also improved sustainability and was increasingly important as the complexity of the initiative increased.

KEYWORDS

Ambulatory care, evaluation, infection prevention and control, quality improvement, routine practices, sustainability

INTRODUCTION

The spread of antimicrobial-resistant organisms (AROs) is a significant problem in healthcare (Public Health Agency of Canada (PHAC), 2021; PHAC, 2023; World Health Organization, 2021). Infections with AROs were responsible for the deaths of 5,400 Canadians in 2018 (Council of Canadian Academics, 2019); thus, prevention of ARO transmission in hospital settings is necessary to reduce morbidity and mortality.

In 2014, the need for research evaluating the effectiveness of infection prevention and control (IPAC) interventions to prevent ARO transmission was identified (Institute of Health Economics, 2014). In 2015, a literature review of recommendations on type of precautions required in ambulatory care settings and a survey of cancer care centres in Canada was performed to understand current practices for managing patients with AROs (Ayano, 2015). The literature review recommended routine practices in

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ambulatory care settings for patients with AROs and additional precautions for patients with active gastrointestinal or respiratory symptoms or open, draining wounds (Ayano, 2015). However, the survey found most cancer care centres used contact precautions for patients with AROs (Ayano, 2015).

Routine practices are defined as: "IPAC practices for use in the routine care of all patients at all times in all healthcare settings and are determined by the circumstances of the patient, the environment, and the task to be performed." (PHAC, 2017, p. 8). When implemented consistently and correctly, routine practices can limit infectious disease transmission. However, current literature suggests that these practices are not consistently implemented (Jessee & Mion, 2013; Rebmann & Carrico, 2017; Gilbert & Kerriage, 2019). Support for the planning and implementation of IPAC routine practices quality improvement initiatives, especially in ambulatory care settings, is sparse (Johnson *et al.*, 2017; Thompson *et al.*, 2016).

Based on these findings, Alberta Health Services' (AHS) Cancer Care Alberta approached the provincial IPAC program and proposed an initiative to transition frontline staff practice from use of contact precautions for patients with AROs, to use of routine practices in all ambulatory care areas.

The initiative was implemented in ambulatory care areas at all cancer care centres in 2016 (Phase 1), followed by implementation in select ambulatory care areas at acute care hospitals in 2017 (Phase 2). Therefore, the aim of this quality improvement evaluation was to assess if routine practices were still in place two to three years after implementation, document lessons learned, and provide recommendations for future initiatives.

METHODS

Study setting

AHS is the single provincial health authority in Alberta, Canada (AHS, 2024). AHS is organized into geographic zones which enable local decision-making while facilitating collaboration and delivery of care across the province (AHS, n.d.).

Within AHS, Cancer Care Alberta is a provincial program that delivers clinical services. During Phase 1, the initiative was implemented in all 22 ambulatory care areas at 17 cancer care centres throughout 2016. During Phase 2, the initiative was implemented in 313 ambulatory care areas at 26 acute care hospitals throughout 2017. AHS ambulatory care services are clinical services delivered through 106 acute care hospitals by zones. Areas were selected based on availability of IPAC staff and frontline staff readiness to participate.

Study design

An evaluation of the initiative was conducted in 2019 using thematic analysis of qualitative data collected from frontline staff interviews and an IPAC staff focus group interview. The purpose of the one-on-one, structured frontline staff interviews was to assess the ability of areas to maintain routine practices after implementation. The purpose of the focus group interview was to explore IPAC staff experiences during implementation, understand factors that influenced sustainability, and document

lessons learned. This evaluation was identified as quality improvement and Institutional Review Board approval was not needed. However, participants' confidentiality was protected. All data were stored on a secure network in a password-protected folder only accessible to IPAC staff. All results were reported at a group level.

Participants and sampling

Frontline staff participating in interviews were recruited using convenience and snowball sampling strategies (Creswell, 2012). The convenience sample was based on frontline staff availability to participate and the snowball sample was based on additional recommendations from frontline staff. IPAC staff participating in the focus group interview were recruited using a convenience sampling strategy (Creswell, 2012). These sampling strategies considered both frontline and IPAC staff availability, as well as the time elapsed between initiative implementation and evaluation.

Developing and performing interview tools

Frontline staff interviews were conducted using an interview guide which consisted of nine open-ended questions. The questions focused on understanding how patients were assessed for signs and symptoms of infection, use of point-of-care risk assessment (PCRA), use of resources and tools, current practices used if a patient was identified as symptomatic, and if those practices were the same for all patients. Following two pilot interviews, the guide was revised for clarity. IPAC staff involved in the initiative performed the interviews in person, and indicated whether the initiative was sustained.

The focus group interview was conducted using a question guide consisting of eight open-ended questions. The questions focused on understanding the actions of IPAC staff during implementation, resources available for support, what did and did not work, and thoughts on why the initiative was or was not sustained. The focus group interview was performed online and recorded using Skype for Business 2015. Participants were invited to send written responses via email.

Understanding interview data

Analysis of interview data included coding, inductive generation of thematic categories, and integration of emerging themes (Creswell, 2012; Miles *et al.*, 2014). Two IPAC staff with qualitative research training, not involved in the initiative, independently reviewed all interview responses. Thematic analysis of the first 10 frontline staff interviews was conducted to generate themes. These themes were used to develop a data dictionary describing properties of emerging thematic categories for each interview question. The data dictionary was then used to guide coding of subsequent interviews. Through this process, a definition of sustainability for the initiative was developed. Sustainability was defined as:

- No difference in the way inpatients and outpatients were assessed and managed;
- No difference in the way patients with known or unknown ARO colonization were managed; and

- No information that led reviewers to question routine practices in the area, such as mixed responses from staff. IPAC staff recorded whether the initiative was sustained. If discordant responses from frontline staff in the same area were recorded, the initiative was not considered sustained.

Both reviewers independently identified and documented emerging themes after listening to the recording of the focus group interview and reviewed IPAC staff email responses. Differences in coding between reviewers were discussed until consensus was reached.

Frontline staff interviews were coded into Microsoft Office Excel 2013, while the focus group interview was coded into Microsoft Word 2013. The concept of saturation was used as a guiding principle to assess appropriate sample size (Hennink et al., 2017; Hennink & Kaiser, 2022).

RESULTS

Frontline staff interviews

Frontline staff interviews were performed in 67 areas involved in the initiative. Of these, 55% (12/22) were from Phase 1, and 18% (55/313) were from Phase 2. In total, 115 frontline staff were interviewed.

To determine sustainability in an area, responses were summarized into four themes: 1) how frontline staff assessed patients for signs and symptoms of infection; 2) what tools and resources were used; 3) how patients were encouraged to communicate signs and symptoms of infection; and, 4) how patients identified with an infection were managed. Areas could use multiple approaches.

Assessing patients for signs and symptoms of infection

Frontline staff reported assessing patients for signs and symptoms of infection in 94% (63/67) of represented areas. Most commonly, frontline staff asked patients about symptoms or patients reported symptoms 41, followed by visual assessment 34, clinical assessment 32, and review of documentation, including patient history using clinical information systems or charting 17.

Assessing patients for signs and symptoms of infection – tools and resources

Frontline staff that assessed patients reported using at least one tool in 83% (52/63) of represented areas. The most common tools were screening tools or assessment forms 21, followed by IPAC resources such as algorithms, manuals, or website 20, equipment such as stethoscope or thermometer 14, frontline staff expertise 9, posters 5, and alert(s) in clinical information systems or charting 3. When asked about the use of PCRA algorithms developed as part of the initiative, more than three-quarters of areas represented (78%, 52/67) did not use or no longer used the algorithms as a part of their practices.

Encouraging patients to communicate signs and symptoms of infection

Frontline staff reported encouraging patients to communicate signs and symptoms of infection in 91% (61/67) of areas represented. The most common approach was to verbally ask

patients 41, followed by posters or signs that reminded patients to self-report 28, education sessions 10, and tools such as assessment forms 4.

Managing patients identified with an infection

Based on frontline staff responses, practices on the management of a patient with signs and symptoms of infection were classified as “Clinical Management” or “Patient Management”. Clinical management described management of the infection. Patient management described management of the environment and patient using IPAC practices. Most areas – 90% (60/67) – indicated either clinical or patient management upon identifying an infection, however, four areas were classified as “Both”, while three areas were classified as “None”.

Sustainability

Based on emerging themes, the two reviewers reassessed 28% (19/67) of interviews. Of those, 74% (14/19) were because IPAC staff did not select a sustainability option, selected more than one sustainability option, or selected “Cannot determine”. For five areas, IPAC staff determined the initiative to be sustained, but responses from frontline staff did not align with the definition of sustainability.

Less than half of areas (42%, 28/67) were considered to have sustained the initiative with sustainability greater for Phase 1 (67%, 8/12) than Phase 2 (36%, 20/55). Most commonly, the reason for unsuccessful long-term adoption of the initiative was that patients with known AROs were placed on additional precautions as per historical practices, and lack of frontline staff clarity between the difference in management of patients with known AROs based on setting (i.e., additional precautions used for inpatients and routine practices for outpatients).

Focus group interview with IPAC staff

Twelve IPAC staff participated in the focus group interview. Five themes were identified, including differences between Phase 1 and Phase 2, importance of engagement, use of champions and educators, resource issues, and project process issues.

Differences between Phase 1 and Phase 2

Key differences between Phase 1 and Phase 2 affected the sustainability of the initiative and included whether change was initiated by program leadership, level of engagement by program leadership and frontline staff, and complexity of the initiative.

In Phase 1, Cancer Care Alberta initiated discussions with IPAC. This engagement resulted in leadership-supported change from both programs and collaboration on the development of resources. Upon resource completion, Cancer Care Alberta leadership circulated memos with key messages. Frontline staff’s willingness to participate varied across Cancer Care centres depending on the degree of readiness to implement change, receptiveness to the messaging, and the change itself. IPAC staff reported that Phase 1 implementation included formal education offered to frontline staff and informal, ad hoc follow-up. The amount of dedicated time available to IPAC staff

to provide education, the number of sessions provided, and number of frontline staff reached varied.

In Phase 2, IPAC initiated a shift in initiative focus from managing patients with AROs to performing routine practices, specifically to using the PCRA. Collaboration on development of resources did not occur due to logistical challenges in managing implementation of a province-wide initiative in a zone-based program without a unifying provincial structure. Therefore, Phase 1 resources were adopted for implementation in Phase 2 without input from affected frontline staff.

The presentation of the initiative to local ambulatory care leadership by IPAC staff was identified as a barrier to successful engagement. Consequently, support at the local level varied. IPAC staff relied on informal education methods such as huddles or just-in-time education. As in Phase 1, the ability of IPAC staff to engage in the initiative varied. This resulted in challenges to comprehensive delivery of messaging to all frontline staff in an area.

Importance of engagement

IPAC staff identified the importance of engaging program leadership. When it occurred, engagement improved participation in the initiative and ability of IPAC staff to implement designed interventions. In addition, IPAC staff identified that the timing of program leadership messaging affected the degree of frontline staff engagement. The degree of engagement also depended on comfort and familiarity with the concept of routine practices and readiness to participate, which was often influenced by competing priorities.

Use of champions and educators

Implementation was easier in areas where frontline staff were already applying routine practices and when they had champions or educators who offered more support to frontline staff and created a single point of contact for IPAC staff. Once frontline staff had a conceptual understanding of routine practices, they were more willing to integrate routine practices into current practices as it allowed more autonomy.

TABLE 1: SUMMARY OF LESSONS LEARNED FROM LARGE-SCALE IMPLEMENTATION OF ROUTINE PRACTICE

General	Specific
Identify clear rationale for these initiatives	<ul style="list-style-type: none"> • Make explicit underlying assumptions and expectations. • Develop clear goals and measurable outcomes. • Integrate goals and outcomes with deliverables and initiatives.
Engage with program leadership at provincial and local levels	<ul style="list-style-type: none"> • Provide support throughout the project. • Assist with messaging. • Identify champions or educators to assist with planning and implementation.
Include change management and project management expertise	<ul style="list-style-type: none"> • Assign and/or consult a designated change manager. • Assign and/or consult a designated project manager. • Ensure planning and operationalization of project processes. • Ensure the availability of tools and resources needed such as training, software, administrative assistants, analysts, evaluation, or patient engagement consultants.
Enhance support for IPAC staff	<ul style="list-style-type: none"> • Build infection control professionals' capacity in change management and project management. • Develop resources and tools in support of infection control professionals. • Develop timelines that are appropriate for the complexity of introducing the initiative into an area.
Enhance support for frontline staff	<ul style="list-style-type: none"> • Understand current practices in areas. • Focus on introducing or enhancing routine practices, specifically the PCRA. • Refocus resources and training from targeting knowledge solely to targeting awareness, desire, knowledge, ability, and reinforcement.
Consider involvement of patients	<ul style="list-style-type: none"> • Enhance involvement of patients if one of the goals is to improve patient experience.
Enhance monitoring and evaluation	<ul style="list-style-type: none"> • Build in ways to support and evaluate sustainability. • Consider evaluating the quality of routine practices.

Resource issues

IPAC staff viewed resources developed for frontline staff positively as these supported education by providing consistent messaging, however, several issues were identified. While a PowerPoint presentation could be tailored to an area, it was not always a practical tool for the type of learning needed. Some IPAC staff reported that frontline staff thought the PCRA algorithms were lengthy and this may explain their low usage.

Process issues

In Phase 1 and Phase 2, the working groups were identified as valuable since they created structure for IPAC staff and facilitated opportunities to discuss process issues and solutions. For example, regular meetings facilitated accountability for completing work. This was important given the complexity of the work and workload involved while balancing other priorities.

IPAC staff were frustrated by the lack of structure, specifically undefined roles and responsibilities and lack of clarity around expectations which in turn impacted implementation. Having clear roles, responsibilities, and expectations were seen as essential by IPAC staff. While Phase 2 implemented tracking mechanisms that had not been used during Phase 1, these were often incomplete. IPAC staff felt these gaps were due to a lack of planning, which not only affected the quality of the initiative, but the evaluation.

DISCUSSION

While the initial intention for the initiative was to enhance the use of routine practices by frontline staff, the focus and approach changed from patients with AROs to all patients. This shift combined with limited planning and the lack of application of learning from Phase 1 to Phase 2 resulted in varied sustainability in areas. Factors explaining the degree of sustainability between Phase 1 and Phase 2 include engagement with an area, complexity of the initiative, and availability of supports.

Program leadership support in areas resulted in greater collaboration, communication, and frontline staff participation. This support was essential for communicating key messages with sensitivity to the timing of delivery and the readiness and practice needs of an area. The positive impact of collaborative efforts described above align with findings from other studies conducted in a variety of acute care settings (Pharande, *et al.*, 2018; Rondinelli *et al.*, 2020). Houghton *et al.* (2020) found that healthcare providers' response to IPAC is often influenced by the level of support received from leadership and that there is a need for clear communication and IPAC training. The importance of frontline ownership has contributed to successful IPAC interventions to improve hand hygiene compliance in inpatient settings (Freeman *et al.*, 2016; Kamanga *et al.*, 2022). Our evaluation further supports these findings. Also, the involvement of champions or educators in the planning and implementation process were essential to support frontline and IPAC staff.

The difference in complexity associated with the scale

and scope of the phases highlights the need for interventions that address area-specific readiness and practice needs. Intervention design must be informed by an area's clinical practice and culture, as it has been shown that healthcare culture has influence on the success of IPAC initiatives (Houghton *et al.*, 2020; Pharande *et al.*, 2018). Complex initiatives require adaptability, flexibility, and responsiveness to achieve sustainability. Interventions need to respond to patient-and-staff mix, comfort and familiarity with routine practice concepts, and readiness to participate in an initiative. Competing priorities have also been identified as a barrier to change (Goedken *et al.*, 2019; Jeanes *et al.*, 2018). Planning and designing for change need to occur before implementation, including the impact on IPAC staff.

Consideration should be given to resources developed, their purpose, and how to incorporate these into practices. Though IPAC staff felt that the PCRA algorithms developed were helpful, this did not align with frontline staff perspectives. The focus on the development of knowledge resources was insufficient to facilitate practice change, particularly in Phase 2, due to limited ambulatory care program involvement regarding their learning needs and inconsistent delivery of education due to competing priorities for both frontline and IPAC staff. Education design should target learning, not just acquisition of knowledge, by creating learning environments that support intended outcomes. Interventions should be multimodal and focus not only on knowledge, but on other elements of change management including awareness, desire, knowledge, ability, and reinforcement. Interventions that target frontline staff understanding of benefits and rationale for change and its impact on their practices supports the incorporation of changes into area culture and training processes. Spending time understanding area practices as well as developing tools to help and support champions or educators and IPAC staff in implementation is essential to success.

Due to the complexity of the initiative, more resources needed to be invested including designated staff to focus on change and project management at provincial and local levels. Change and project management plans support clearer accountability, communication, roles and responsibilities as well as balance between initiative workload and other priorities. Limited resources and lack of clarity resulted to frontline staff inability to define routine practices. Ambiguity in IPAC best practice has been identified as a barrier in the context of when and how to complete hand hygiene (Jeanes *et al.*, 2018; Jeanes *et al.*, 2020).

An example of a system wide IPAC improvement initiative was a hand hygiene compliance project by Staines *et al.*, 2018. This project included a baseline practice assessment, 18-month implementation phase, and 18-month consolidation phase. This initiative centred on sustainability of improved outcomes and utilized a multi-modal approach. Our study revealed that successful collaboration with leadership, organizational culture, investment of additional funding for reviews and marketing, and creation of a demand for education by area leadership are consistent with findings from this project.

As shown in Table 1, our study highlights the need to develop clearer goals with measurable outcomes; engage program leadership; incorporate change and project management strategies; assess the scope of projects for feasibility and impact; enhance frontline and IPAC staff supports; involve patients; and ensure monitoring and evaluation plans are in place before proceeding with implementation.

Although most of the IPAC quality improvement initiatives described in the literature is from acute care and focuses on hand hygiene, behavioural factors associated with implementing IPAC best practice in healthcare are limited. Therefore, adapting successful quality improvement frameworks and integrating learnings from the literature will help support the success of future initiatives. Assessments of local area needs and gaps should be completed prior to implementation of IPAC quality improvement initiatives, thereby facilitating tailored approaches that are sensitive to local issues and barriers.

The main limitation of this study includes a lack of clear description of expected outcomes and design for evaluation and sustainability upfront. Frontline staff and IPAC staff turnover during the two to three years between implementation and evaluation reduced the number of people who participated and remembered details. Therefore, the evaluation relied on descriptive analysis to understand sustainability and incomplete or missing information in documentation. Also, the quality of routine practices was not evaluated. Despite these limitations, our findings provide huge evidence that IPAC programs need to find ways to maintain engagement and competency to deal with the emergence and re-emergence of infectious diseases in healthcare settings. Themes arising from this evaluation identify factors that affect the sustainability of routine practices improvement initiatives and contributes to the body of evidence in this area.

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