ABSTRACT

Background: Considerable evidence exists on how to prevent hospital-acquired pressure injuries (HAPIs). However, processes employed to implement evidence play a significant role in influencing outcomes.

Problem: One Australian health district experienced a substantial increase in HAPIs over a 5-year period (by almost 60%) that required a systemwide practice change.

Approach: This article reports on the people, processes, and learnings from using the Promoting Action on Research Implementation in Health Services (PARiHS) framework taking into account the evidence, context, and facilitation to address HAPIs.

Outcomes: Applying this approach resulted in a significant decrease in pressure injuries and positive practice change, leading to improved patient outcomes in a shorter time frame than previous strategies.

Conclusion: Processes guided by the PARiHS enhanced the effectiveness of translating evidence into practice and positively assisted clinicians to promote optimal patient care. This approach is transferrable to other health care settings.

Keywords: evidence-based practice, hospital-acquired pressure injury, PARiHS, pressure ulcer

Globally, hospital-acquired pressure injuries (HAPIs) are one of the most common, potentially serious hospital-acquired complications that have a significant impact on patients.1-3 Patients with pressure injuries (PIs) report pain and discomfort, sleep disturbance, and inability to undertake daily living activities.4,5 PI prevention strategies—including prompt assessment, early identification, and interventions—are based on over 3 decades of research and upheld by international guidelines.6 Critical appraisal of more than 550 peer-reviewed studies on PIs from 1998 to 2012 led to the development of the first collaborative international guidelines for the identification, staging, prevention, and management of PIs.6 Application of these guidelines to ensure PI prevention can be challenging due to the complexity at the patient, unit, or organizational level, contributing to the occurrence of HAPIs.7,8

Over a 5-year period (from 2010 to 2014), in one local health district in Sydney, Australia, the HAPI incidence increased significantly. With the increase in HAPI, the district executive prioritized the implementation of preventive interventions, based on current PI international guidelines. Examples of interventions included mandatory training in PI prevention, education initiatives, compliance with policy (including clinicians signing a statement to ensure they had
read and understood the policy), and replacement of basic mattresses with memory foam mattresses. However, despite these interventions, the HAPI incidence continued to increase; over 5 years, it increased by 57% from 2010 to 2014—0.93 to 1.46 per 1000 occupied bed days. In light of the previous unsuccessful attempts to reduce HAPI across the local health district, the authors, along with the district director of nursing (DDON), employed a new approach informed by implementation science. The aim of this article is to share insights of the people, processes, and learnings from using the Promoting Action on Research Implementation in Health Services (PARiHS) framework to address a significant clinical problem—HAPIs, in our local health district in Australia.

**OPTIMIZING EVIDENCE-BASED PRACTICE**

Various factors relating to health services are known to influence the uptake of evidence-based guidelines and practice change. These include the context in which the intervention is being implemented, the involvement of key stakeholders, stakeholders’ knowledge, the way this knowledge aligns with stakeholders’ openness to change, and the availability and quality of evidence. These factors can constitute facilitators or barriers to implementation of best evidence.

Implementation science is the study of how to design and evaluate methods that enable interventions to be effectively translated into practice. It takes into account the context, as well as internal mechanisms, such as staff, setting, policies, and practices. Research in this field suggests that implementation is contingent on factors known to influence the success and sustainability of interventions or strategies. These include leadership, organizational practices, and clinician skills and abilities. Only a few published studies have used implementation science to guide processes to reduce HAPI.

**PARiHS FRAMEWORK**

The PARiHS framework was developed to address the complexity of implementing research into practice and assist in explaining why uptake of evidence is either successful or unsuccessful through 3 core elements—context, evidence, and facilitation. The framework proposes that successful implementation is highly dependent on the interplay of factors between the evidence (research, clinical practice, patients’ experiences, and local information), implementation context (setting, culture, leadership, and evaluation), and facilitators (enablers that encourage and facilitate evidence into practice). Elements of the PARiHS framework are ranked at either a high or low continuum, which depicts implementation outcomes. Successful implementation is likely to occur when implementation elements are toward a high continuum. For example, the evidence from both local data and research is robust and has been systematically collected and evaluated; the context is conducive to change and has strong leadership; and facilitation comprises positive enablers and drivers to help implement practice change.

There are several implementation frameworks used to address evidence-into-practice gaps. The PARiHS framework was chosen for the HAPI project, as it was familiar to the authors and had previously been used in this district with success. The PARiHS was prospectively applied to collect information on all the factors influencing implementation. This framework was used as a guide to provide evidence-based care in an increasingly complicated health system.

This following discussion provides insight into the people, processes, and learnings from prospectively applying the PARiHS framework taking into account its key elements—context, evidence, and facilitation—to reduce HAPIs. Interventions and strategies implemented to address factors influencing translation of evidence into practice were mapped to the PARiHS (see the Supplemental Digital Content, Figure 1, available at: http://links.lww.com/JNCQ/A556). The interventions were monitored closely (monthly auditing) by skin integrity nurse leaders and local ward wound champions. Results were then reported and discussed at local and district skin integrity committees.

**Context**

The PARiHS framework facilitates the identification of local contextual barriers. The context influences the way evidence is implemented. The local health district context in this program comprises 3 tertiary hospitals, 1 single subacute aged care and rehabilitation hospital, and 5 community health centers. The district is located in a high-density urban setting that provides primary, secondary, and tertiary care to a local population.
of 700,000 people and employs over 5,000 nursing and midwifery staff. The breakdown of beds per hospital is one 800-bed quaternary hospital, one 500-bed tertiary hospital, one 250-bed tertiary hospital, and one 100-bed aged care and rehabilitation hospital. All patients at risk of developing a HAPI or reported as having a HAPI were included in the project. Wards identified as having a high incidence and prevalence of HAPIs over a number of years were a focus and included intensive care services, cardiovascular services, aged care, orthopedics, emergency departments, perioperative, neurosciences, rehabilitation, colorectal, and palliative care. All nurses working on those units, as well as executive and nurse leaders, were key stakeholders in the program.

Prior to the HAPI project, the approach to reduce HAPIs was a top-down, simplistic approach—an assumption that if staff were given appropriate resources and education, the HAPI incidence and prevalence would reduce without the need to recognize the real barriers to preventing HAPIs. With the increasing incidence and prevalence of HAPIs, the DDON elected to take a districtwide approach, as the strategies previously employed had not reduced HAPIs. Therefore, a district PI lead was appointed to lead the project, and a taskforce was established to support this change. This taskforce provided overarching governance, leadership, and strategic direction for this project and facilitated the methods employed by the lead author to reduce HAPI incidence and prevalence. Chaired by the DDON, the PI taskforce included the director of nursing (DON) from each hospital, executive and governance nurses, wound nurse consultants, a senior academic lecturer, and an occupational therapist. This conveyed a clear message that HAPI prevention was a key priority for the district and demonstrated that the context comprised strong leaders who were ready for change.

The taskforce met monthly to discuss strategy and share progress. Accountability of all nurses was a core principle reinforced at taskforce meetings. In addition, to address each hospital’s gap in skin integrity nurse leaders, each facility either employed or allocated local skin integrity/wound leaders to assist in ongoing measures in the prevention of HAPIs. Lastly, subcommittees to the taskforce were formed to operationalize elements of the project.

Evidence

The HAPI project initially aimed to determine factors contributing to the occurrence of HAPI. The first study undertaken was a prospective review of all HAPIs reported across the district, which identified numerous issues at the patient, unit, and organizational level. This included incorrect diagnosis and assessment of HAPIs, inaccurate staging of HAPIs, difficulties with application of and access to PI equipment, inconsistent provision of information to patients, inconsistent PI documentation and communication, and skin care not in line with evidence-based practices. These findings prompted further investigation to gain an understanding of the barriers and facilitators to PI prevention and management. The studies helped the taskforce understand what led to the increase in HAPIs.

The local evidence gathered also helped determine whether assumptions about the cause for the HAPI increase were correct. For example, the first recommendation of the taskforce was to mandate PI prevention and management education modules based on the belief that nurses needed to improve their knowledge in this area and required support and education. However, the question arose as to the relationship between nurses’ knowledge and attitudes and the increase in HAPI, and whether other factors were involved. Consequently, a study on nurses’ knowledge and attitudes was conducted. Findings from this study revealed nursing knowledge and attitudes were not associated with the increase in HAPIs.

Subsequent studies identified further barriers and facilitators to HAPI prevention and guideline implementation, and these findings were used to facilitate innovative approaches to prevention. By examining each aspect of HAPI, previously unknown factors were identified and addressed. For example, an observational mixed-methods study undertaken on incontinence-associated dermatitis suggested a gap in nursing knowledge regarding the identification, prevention, and management of this and its association with HAPIs. This informed the development of an intervention to address this knowledge deficit. The intervention entailed the formation of an incontinence-associated dermatitis working committee consisting of nurse leaders in specialty areas such as aged care, intensive care, continence, skin integrity, emergency department, and cardiovascular care. Another
example was the in-depth interviews conducted with nurses.\textsuperscript{18} These interviews identified several barriers and facilitators that provided an understanding of which measures support and enable facilitation of practice improvement.

District data on HAPI incidence and prevalence were collected prospectively over the course of the project to monitor progress and as part of ongoing national quality standard measures. Yearly point-prevalence data were collected, analyzed, reported, and tabled at local skin integrity meetings and the district PI taskforce meeting. Monthly district HAPI incident reports were also tabled at the relevant committees. The district PI lead monitored HAPI prevalence, incidence, and the coded data on HAPI rates on a monthly basis. Furthermore, an economic evaluation was conducted with a health economist to determine the cost of HAPI in our health district and the impact of strategies implemented to reduce HAPI.\textsuperscript{23}

All recommendations made by the taskforce were underpinned by strong evidence, derived from local data and international guidelines. Following the analysis of results from each study, initiatives were implemented to target the areas identified that required attention. Every initiative took the clinical context into consideration. Members of the district taskforce and subcommittees reported on outcome measures and progress of implemented initiatives and other aspects that could impact the uptake of initiatives.

The taskforce’s ability to respond to the project findings and work through issues to achieve consensus was essential to its success. Findings presented to the taskforce were based on the findings of local studies\textsuperscript{17-22} and data, as well as observations of nursing practice issues in relation to skincare, resources, barriers, enablers, and subcommittee progress. When data on results of a facility were to be presented, the lead author ensured that these data were discussed with the respective facility DON prior to being presented and tabled at the taskforce. This was an important, respectful communication strategy, which ensured that the facility DON was informed and had an opportunity to comment on the data before it was presented.

Of note, there was a strong desire from the district executive for a rapid solution to PI occurrence. Understanding these higher-level challenges, the pressure experienced at an executive level, and how change could be implemented in a timely manner was essential to facilitate the progress of the HAPI project. Effective strategies to address this urgency included regular meetings with the DDON, discussions with the taskforce, and methodically working through issues and priorities to make progress.

Finally, collaborating with university academics and health economists, district health information coders, and health information managers helped ensure correct documentation and implementation of strategies that were not only cost-effective but had positive outcomes.\textsuperscript{23} The lead author formed strong collaborative relationships with key PI international researchers to ensure strategies were based on up-to-date evidence and ensure PI care in the local health district was current.

**Facilitation**

This project determined the factors that would help facilitate practice change. This included the appointment of a PI lead, the need for a nurse leader with skin integrity expertise at each hospital, other stakeholders to be involved in the project such as medical officers from PI high-risk areas, occupational therapists, and specialty nurse consultants, for example, infection control and continence and ward nurse wound champions. Subcommittees of the taskforce were formed and chaired by the district PI lead. The subcommittees included nurse leaders from district specialty areas such as emergency departments, perioperative, intensive care services, and skin integrity. A peer-working group was also formed, comprising the senior skin integrity nurse leaders from each hospital. The subcommittees met every 1 to 2 months to operationalize elements of the HAPI project, share evidence, provide guidance and tailor strategies to each clinical setting to ultimately enhance translation of evidence into practice.

Units identified as high risk or with a high incidence of HAPI established their own ward nurse wound champions to guide, support, and embed practice change. Support was required for staff in identifying, classifying, and reporting HAPI; utilizing equipment; skin care and implementing PI preventive interventions. Nursing staff responded to bedside one-on-one education, empowerment, and encouragement—cornerstones in the element of facilitation in the PARIHS. Positively enabling and educating staff meant that there was greater engagement and ownership.
Evaluations were conducted throughout the HAPI project through monitoring and feedback of staff uptake of initiatives. Feedback to nursing staff or senior nurse leaders of each ward was provided face-to-face, either by members of the taskforce or by nurse skin integrity experts. Importantly, feedback became a communication and educational opportunity for staff. For example, when there were issues with PI assessment, nursing staff would be educated at the bedside and discuss processes for PI assessment and reporting with the unit’s nurse leader. This was conducted in a nonpunitive, transparent, and compassionate manner, with questions and a discussion at the bedside involving the patient, junior and senior nurses (and other disciplines) about PI prevention, skin condition treatments, and equipment use. This provided a clinically supportive opportunity to reinforce the “positives,” such as acknowledging good work when PI assessment was completed correctly and when appropriate interventions were put in place. Initiatives that were implemented were championed and continued to progress and succeed. This was consistent with the PARiHS framework in that if facilitation and context were strong and hence on a high continuum, evidence would be implemented successfully in practice.9,24

The education conducted at the bedside was carried out by either the nurse wound champion of each unit or skin integrity expert of each facility. A structured approach that included a schedule of each study and implementation strategy was developed and communicated to the wards via each facility DON. Monthly feedback to the relevant wards with data and measures of performance was provided.

Consultation occurred with senior executives and nurse leaders across the local health district, partnerships were formed with state working parties, and collaborations were developed with international leads. Each ward was supported to implement change, taking into account the context and evidence. For example, our previous study on HAPI17 identified that medical devices, specifically in intensive care, required close examination because a considerable number of PIs were attributed to a medical device. Therefore, a medical device study was conducted.21 On examination of the intensive care setting, PI strategies implemented had a different focus to medical ward-based strategies. Challenges with PI prevention in intensive care patients were slightly different from those faced on a medical ward. These included inability to frequently reposition due to potentially fatal hemodynamic instability occurring in critically ill patients23 and the high number of medical devices used.21 Therefore, PI strategies in intensive care were adapted to these challenges.

In line with facilitation in the PARiHS framework, communication and engagement was a critical component of the HAPI project. Communication ensured the alignment and execution of strategies not only at the district taskforce level but also at a clinical and professional level. The peer-working group, led by the lead author, remained engaged and committed throughout the process. Interactions were underpinned by mutual respect and each member was motivated to change practice. Positive changes were commended. For example, if a ward achieved a HAPI prevention goal, the success was recognized and celebrated by all members and tabled at the taskforce.

One goal, upon commencing the HAPI project, was to engage with nurses and nurse leaders of each unit and provide them with clear information about the effect of practice on patient outcomes, as well as afford them the authority and responsibility to influence others. We ensured that unit champions and hospital senior skin integrity leaders were committed to not only drive practice change but also help understand the reasons for the HAPI increase. It was important to recognize and reward staff and units. Therefore, a process was instigated in which units that demonstrated a high standard of PI care or substantially reduced HAPI rates received recognition from the senior executives.

**OUTCOME**

As a result of the processes undertaken in the HAPI project, the HAPI incidence per 1000 occupied bed days declined in each quarter, from 1.46 in the fourth quarter of 2014 to 0.71 in the fourth quarter of 2017, decreasing by 51.4% over the duration of the study period (see the Supplemental Digital Content, Figure 2, available at: http://links.lww.com/JNCQ/A557). The yearly PI point-prevalence data showed a significant reduction in the HAPI prevalence rate by 71.6% (from 6.7% in 2014 to 1.9% in 2017) (see the Supplemental Digital Content, Figure 3, available at: http://links.lww.com/JNCQ/A558). An economic evaluation conducted during the
study period demonstrated a yearly cost saving of $837,387 (costs reduced by 23.1%). Furthermore, observation and ongoing feedback provided by senior skin integrity leads at taskforce and committee meetings indicated positive practice change in preventive measures and skincare.

**DISCUSSION**

Providing evidence-based care in an increasingly complicated health system is a challenge and may be fraught with elements that lead to inevitable failure. However, there is a growing appreciation that the implementation of initiatives, practice change, and successful transfer of knowledge relies on a process that takes into account the context and methods required to change and sustain practice. Applying the PARiHS framework was critical to understanding translation of evidence in a complicated health system and to assist in carefully mapping elements that could potentially influence implementation outcomes. The PARiHS framework provided guidance to successfully address a significant clinical problem.

Implementation of evidence is influenced by the quality of leadership and the governance structures in place in an organization. A hallmark of leadership and governance at this local health district was evidenced by the DDON’s response to form a PI taskforce and formalize PI prevention and management as a key clinical priority. Accountability enforced through the district taskforce meant that someone was responsible for each measure and initiative. This stance, combined with the empowerment of staff, facilitated progress and practice change because it meant that everyone was responsible for HAPI prevention.

While there was a formalized approach taken by the health district through the formation of a PI taskforce, success in facilitating practice change and influencing others often depends less on formal structures and more on informal networks. Importantly, it was pivotal to determine the factors that would help facilitate practice change. Therefore, an informal networking approach was established with key specialists and skin integrity leaders through the development of subcommittees and a peer-working group, chaired by the lead author, to ensure stakeholder engagement and investment at all levels.

The subcommittees and peer-working group helped reveal key insights into the mechanisms within each context that had led to the increase in HAPI. This provided greater insight about the different approaches required for individual units and approaches that were most effective to achieve successful outcomes.

It was a challenge and key learning experience to address a clinical imperative expeditiously while also ensuring that every step was carefully undertaken to close the evidence-to-practice gap. Closing this gap requires timely processes that may not directly align with an organizational time frame. The PARiHS framework helped to facilitate this and map elements to develop strategies.

Several studies have used an implementation science approach that considers the clinical context and methods required to successfully change and sustain practice. This approach assists in exploring the factors that lead to the successful uptake of PI programs and examines the reasons why certain programs fail or succeed. Similar to their studies, the HAPI project attributes the successful uptake of strategies and improvement in patient care to key processes, including identifying barriers and enablers, ensuring the intervention is tailored to wards, ensuring stakeholder buy-in, and involving leadership, monitoring, and ongoing feedback to and from key stakeholders.

Finally, the PARiHS framework proposes that successful implementation is likely to occur in settings where there is strong research evidence (either from local data or the literature); the context is conducive and receptive to change (eg, strong leadership and transparent decision-making processes); and there are appropriate mechanisms of facilitation in place (such as an enabling environment, education, and sustained partnerships). The PARiHS framework helped explicate the reasons for the increase in HAPIs and barriers to PI prevention, which assisted with implementing change. By using this approach, previously unknown factors were identified, which provided essential information to guide subsequent investigation efforts and implementation strategies. Furthermore, the additional support garnered from key stakeholders across the local health district by the lead author enabled the creation of strong collaborative relationships to move this project to completion and sustain it into the future. The HAPI project has provided valuable insights on addressing an important clinical problem in a complex health environment.
CONCLUSION

The HAPI project used the PARiHS framework to substantially decrease the HAPI rate and affect positive practice change in a shorter time frame than previous attempted strategies. The PARiHS framework guided the research processes and, with the learnings, enhanced the effectiveness of translating evidence into practice. The involved clinicians were motivated to engage and take ownership, especially when they understood the effects of their nursing practice at a patient, unit, and organizational level. This project provides an exemplar to inform health policy and decision-makers and can be transferred to other settings.

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