

## ENVIRONMENTAL SCAN

# Non-Pharmacological Interventions for the Prevention of Pressure Injuries: An Environmental Scan

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## Summary

- Survey respondents reported using a range of non-pharmacological interventions for pressure injury prevention in various patient populations and care settings.
- A variety of policies and guidelines are used among jurisdictions represented by survey respondents but it was reported that there is difficulty keeping up-to-date with new guidelines and implementing them into practice.
- Improvements in knowledge transfer and communication among front-line staff and other health care professionals may improve patient care and pressure injury prevention.
- It was reported that there is a lack of education and resources available for front-line staff to properly assess and prevent pressure injuries in patients.
- Patient-related factors, including the patient's age, the degree of mobility, and the type of injury, impact the type of non-pharmacological pressure injury intervention used within a care setting.
- Funding and reimbursement for non-pharmacological pressure injury interventions remain challenging across represented jurisdictions, particularly facilities that are publicly funded.

## Context

A pressure injury (or pressure ulcer) is defined as “localized injury to the skin and/or underlying tissue usually over a bony prominence, as a result of pressure, or pressure in combination with shear.”<sup>1</sup> Pressure ulcers are often classified into four categories (stages 1 to 4) that reflect the severity of the wound; these stages are based on the National Pressure Ulcer Advisory Panel guidelines.<sup>1</sup> Stage 1 refers to early stage wounds that are represented by intact skin with non-blanchable redness of a localized area, while Stage 4 captures wounds that have progressed to the most advanced stage, characterized by full thickness tissue loss with exposed bone, tendon, or muscle.<sup>1</sup>

Recent data are lacking on the prevalence of pressure injuries in Canada. In a report published in 2013 by the Canadian Institute for Health Information, the prevalence of pressure injuries in a variety of health care settings ranged from 0.4% in acute inpatients to 14.1% in continuing care.<sup>2</sup> Additionally, a Canadian study<sup>3</sup> reported that the prevalence of hospital-acquired pressure injuries could be as high as 27.6% in intensive care units. These injuries are challenging to treat once they develop and affected patients often bear the impact through prolonged hospital stays and decreased quality of life.<sup>4,5</sup> Furthermore, the economic burden resulting from pressure injuries is substantial, with an estimated US\$11 billion in annual cost in the US.<sup>5</sup> In the Canadian context, one study conducted in Ontario regarding acute-care patients aged 65 years and older estimated that the total adjusted net cost of hospital-acquired pressure injuries per patient varied between C\$44,000 for a Stage 2 pressure injury, and C\$90,000 for a Stage 4 pressure injury.<sup>6</sup>

A variety of established and novel non-pharmacological options exist to aid in prevention efforts. Examples of established approaches include risk assessment instruments, patient repositioning, support surfaces, dressings, skin care, and nutritional supplementation.<sup>7-9</sup> Some newer interventions include prophylactic dressings,<sup>10</sup> electrical stimulation technologies,<sup>11,12</sup> and pressure sensing and monitoring systems,<sup>13</sup> among others. Wound care or interprofessional teams, which are comprised of a variety of health professionals,

including dietitians, consultants, or occupational therapists, have been implemented in various care settings.<sup>14,15</sup> Given the large number of interventions available and emerging, there is uncertainty about comparative benefit and harms, patient preferences, and value to the health care system of the various interventions for prevention of pressure injuries. It is possible that conducting further health technology assessment work could be useful to inform clinical strategies and other decisions regarding the use of non-drug options for preventing pressure injuries.

CADTH conducted initial scoping of this topic for a potential Health Technology Assessment.<sup>1</sup> The feedback received from Canadian jurisdictions indicated that there was interest in this topic area; however, given the breadth of the topic, further information was needed to help define the scope of the proposed review and to prioritize the topic. Therefore, this Environmental Scan was conducted to identify the interventions, settings, and patient populations that are of interest to the jurisdictions in the context of an evaluation of non-pharmacological options for the prevention of pressure injuries. In addition, this Environmental Scan aims to provide a standalone product for engaged jurisdictions that highlights key issues and challenges and potential future directions in this area of care.

## Objectives

The key objectives of this Environmental Scan were to:

1. identify the non-pharmacological interventions for preventing pressure injuries that are currently in use, being considered for use, or being considered for discontinuation of use in different care settings in Canadian jurisdictions
2. identify the relevant settings of use for non-pharmacological interventions for preventing pressure injuries
3. identify the relevant patient populations for use of non-pharmacological interventions for preventing pressure injuries
4. identify key issues and questions Canadian jurisdictions are facing related to the use of non-pharmacological interventions for preventing pressure injuries.

## Methods

The findings of this Environmental Scan are based on responses to the *CADTH Non-Pharmacological Prevention of Pressure Injuries Survey* (Appendix 1) and a limited literature search. Table 1 outlines the criteria for information gathering and selection.

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<sup>1</sup> A health technology assessment evaluates the clinical effectiveness and cost-effectiveness of a clinical intervention, along with the ethical, legal, and social implications the intervention may have on patient health (or the health system).

**Table 1: Components for Information Screening and Inclusion**

	Inclusion	Exclusion
<b>Population</b>	Patients (of any age) who are at risk of pressure injuries	NA
<b>Intervention</b>	Non-pharmacological interventions for preventing pressure injuries (alone or combined with other prevention approaches) that are approved or in use in Canada	Non-pharmacological approaches that are not available or in use in Canada
<b>Settings</b>	<ul style="list-style-type: none"> <li>• Primary and secondary care</li> <li>• Acute care</li> <li>• Rehabilitation</li> <li>• Long-term care</li> <li>• Home care</li> <li>• Urban, rural, and remote health care settings</li> </ul>	NA
<b>Types of Information</b>	<ul style="list-style-type: none"> <li>• Identification of pressure injury prevention strategies (i.e., types of interventions, interventions being used or considered, interventions considered for discontinuation)</li> <li>• Parameters of technology assessment needs (i.e., type of care settings, patient population, conditions of interest)</li> <li>• Evidence and information needs (i.e., specific issues or questions to be addressed)</li> </ul>	NA

NA = not applicable.

## Initial Consultations

Early consultations with experts in the field occurred during the scoping phase of this project. These consultations supported the development of the survey for this Environmental Scan and were not used to generate data for the report but to inform the information gathering approach. A clinical academic researcher and nurse practitioner involved in research and clinical practice related to pressure injury prevention were consulted in November 2018, prior to the conduct of the survey. These consultations informed the survey questionnaire by providing key information on the scope of technologies, care settings, and patient populations, as well as any key issues or knowledge gaps facing policy decision-makers regarding pressure injury prevention.

## Survey

The survey was conducted from November 28, 2018, to January 8, 2019. The survey questionnaire consisted of 16 questions with a combination of dichotomous, multiple choice (nominal data), and open-ended questions. The questions were developed in order to inform the following key areas:

- types of non-pharmacological interventions in use or being considered for use or discontinuation across Canadian jurisdictions for preventing pressure injuries
- guidance and strategies being implemented for the prevention of pressure injuries
- relevant settings and patient populations in which non-pharmacological interventions for pressure injuries are used
- key challenges or barriers jurisdictions face relating to the use of non-pharmacological interventions for preventing pressure injuries.

Survey questions were internally peer reviewed by two researchers to address any clarity or content issues prior to distribution. The survey was distributed electronically using Survey Monkey to 132 jurisdictional respondents and stakeholders involved with pressure injury prevention implementation, policy, management, and decision-making.

The survey targeted the following type of respondents representing different geographical settings (e.g., rural, urban, and remote), health care settings (e.g., secondary, tertiary, long-term, primary care), and health care roles (e.g., front-line staff, educators, decision-makers):

- health care organizations and health care facilities
- providers of non-pharmacological pressure injury interventions (e.g., nurses, consultants, and clinicians)
- professional organizations related to non-pharmacological pressure injury interventions.

Participants were identified with the support of CADTH's Implementation Support and Knowledge Mobilization team via stakeholder and expert suggestions. Contacts were also asked to forward the survey link to their colleagues or to suggest further respondents. Due to this secondary distribution, CADTH could not determine the total number of respondents invited to participate. Initial survey contacts who did not respond within the first deadline of December 24, 2018, were sent an email reminder to fill out the survey by January 2, 2019.

All respondents gave explicit permission to use the provided information for the purpose of this report. Information regarding the respondents and their represented jurisdictions and organizations is presented in Appendix 2.

## Literature Search

### Research Questions

The literature review component of this Environmental Scan aims to address the following research questions:

1. What are the non-pharmacological interventions for prevention of pressure injuries in use in Canada and other countries?
2. What care settings are non-pharmacological interventions for prevention of pressure injuries used?
3. What are the populations for use of non-pharmacological interventions for prevention of pressure injuries?
4. What are current issues and questions regarding adoption and use of non-pharmacological interventions for prevention of pressure injuries?

### Search Methods

A focused literature search was conducted using the following bibliographic databases: PubMed, EBSCO's CINAHL, and the Cochrane Library. Grey literature was identified by searching relevant sections of the Grey Matters checklist (<https://www.cadth.ca/grey-matters>). Methodological filters were limited to retrieve health technology assessments, systematic reviews, meta-analyses, and guidelines. The search was limited to English-language documents published between January 1, 2013, and September 11, 2018. Regular

alerts updated the search until project completion; only citations retrieved before March 1, 2019, were incorporated into the analysis.

### Screening and Study Selection

One author screened the literature results to select articles for full-text review using the selection criteria shown in Table 1. Additionally, reference lists of relevant or included papers were also scanned to identify any other studies that were not found in the literature search.

### Synthesis Approach

Survey responses were abstracted by question. Only feedback from respondents who gave consent to use their survey information was included in the report. Feedback was excluded when information on a respondents' occupation was absent or when greater than 75% of the survey was incomplete. Disaggregated jurisdictional data were used to identify any notable similarities or differences existing between jurisdictions regarding availability of, concerns about, and access to non-pharmacological interventions for pressure injuries. Rather than analyzing jurisdictional-specific data, responses were pooled and a pan-Canadian approach was used to report on availability, concerns, or issues relating to the use of non-pharmacological pressure injury interventions. Quantitative survey questionnaire responses were summarized by question and presented according to the objectives of the report. Feedback from open-ended survey questions was incorporated in relevant sections of the report. Additional information that was identified through the literature search was also included in relevant sections of the report. Articles identified from the literature search and subsequent alerts were screened for selection, and those that met the inclusion criteria (Table 1) were summarized within sections of the report to give context and relevance to the survey responses. Feedback was solicited on a draft of the report through an open call to the public, survey respondents, and key stakeholders or individuals who were referred by respondents from the survey (Appendix 1). Feedback received informed the revision of the draft report.

## Findings

The findings presented are based on two consultations with wound care professionals (November 15 and 20, 2018) survey results from key respondents received by January 8, 2019, and a limited literature search.

### Literature Search

The main database search identified 1,022 citations and the monthly search alerts identified another 27 citations. Of these, 72 papers were retrieved for full-text review. Additional references were identified through the grey literature search, the reference lists of other papers, and further targeted searches that were of potential relevance to the objectives of this report. Ultimately, 34 publications were deemed relevant to the context of the report and included.

### Summary of Survey Results

Upon survey closure, 48 survey responses were received. Of these responses, three duplicates and one incomplete response were excluded. Of the 44 survey respondents, five reported that

they did not currently work in any capacity with non-pharmacological interventions for pressure injury prevention, and were directed to the end of the survey. Ultimately, 39 respondents were included in the overall analysis.

## Survey Respondent Characteristics

Attempts were made to obtain responses from all provinces and territories. Survey responses were received from the following provinces: British Columbia (five respondents), Alberta (two respondents), Manitoba (19 respondents), New Brunswick (one respondent), Nova Scotia (one respondent), Newfoundland and Labrador (three respondents), Ontario (one respondent), Prince Edward Island (four respondents), and Saskatchewan (three respondents). No responses were received from the remaining provinces and territories. The largest proportion of respondents represented nursing (e.g., registered nurses, clinical nurse specialists, nurse educators, wound care leads, skin and wound consultants). Other respondent occupations included occupational therapists, wound care coordinators, physicians, academics, and individuals in administrative managerial or coordinator positions relating to wound care.

Almost all of the survey respondents worked in a publicly funded organization (36 respondents) while only a few respondents worked for a not-for-profit organization (two respondents). One respondent did not report on the type of organization they worked for, and none reported working for a private organization.

Most respondents noted that they worked in an urban geographical setting (24 respondents), while some respondents worked in a rural setting (six respondents), and one respondent mentioned they worked remote settings. In addition, a few respondents recorded that they work in both urban and rural settings (six respondents), while two respondents work in both rural and remote settings. Demographics and characteristics of the survey respondents, including further information on occupation and setting of work, are presented in Appendix 2.

## Concurrent Context of Non-Pharmacological Interventions

The non-pharmacological pressure injury interventions that are currently used, under consideration for use, or being considered for discontinuation by respondents and their representative jurisdictions are summarized in Appendix 5. The non-pharmacological interventions were categorized into the following: dressings, support surfaces and overlays, seat cushions, absorbent pads and wipes, heel and foot elevators or boots, and other types of interventions.

## Interventions Currently In Use

The majority of non-pharmacological interventions for pressure injury prevention described within the survey were reported to be in current use by a proportion of survey respondents.

### *Dressings*

More than half of the respondents currently use some type of dressing for pressure injury prevention in patients. More than half (67%) of the respondents currently use silicone dressings, followed by dressings with Safetac<sup>2</sup> (54%), prophylactic dressings (49%), gauze dressings (39%), and other types of dressings (39%), while the lowest number of respondents reported using silver dressings (33%).

<sup>2</sup> Safetac is an adhesive aimed at causing less pain at removal and often used in wound dressings.



## ***Support Surfaces***

The majority of respondents currently use some sort of support surface for patient care, with almost all using active support surfaces (82%), more than half using foam mattresses (69%) and/or reactive support surfaces (67%), more than a third (41%) using other types of support surfaces, and the lowest number of respondents (21%) using Australian sheepskin overlays.

## ***Seat Cushions***

Almost all respondents currently use a type of seat cushion, with the highest number of respondents reporting using wheelchair (90%) and gel seat (72%) cushions, followed by memory foam cushions (56%), gel-enhanced cushions (51%), and other seat cushions (49%).

## ***Absorbent Pads and Wipes***

Many respondents currently use incontinence pads (77%), followed by high-absorbent diapers pads (64%) and barrier wipes (46%). Other absorbent wipes or pads (21%) were not widely used among respondents.

## ***Heel and Foot Protectors***

The majority of respondents currently use heel-protector boots (82%) for patient care, followed by approximately half using heel elevators (51%), and less than half using heel-lift suspensions (44%) mechanisms. Both egg-crate heel lifts (8%) and repose boots were not widely (8%) used among respondents and their care settings for patient care.

## ***Other Non-Pharmacological Interventions***

Almost all of the respondents currently use screening or assessment tools (97%), body repositioning techniques (95%), nutrition interventions (90%), and multidisciplinary wound care teams (74%). More than half of the respondents currently use debridement (i.e., for preventing infection or worsening of the wound) and spacing devices for patient care (69% and 62%, respectively). A small number of respondents currently use massage therapy (10%), electrical stimulation (10%), and hyperbaric oxygen therapy (3%). Epidermal moisture scanners were not reported to be in use by any respondents. Other interventions reported by respondents to be in current use included pressure mapping, exercise programs, healing touch, and Momentum software for wound tracking.

## **Interventions Under Consideration**

Survey respondents were asked which non-pharmacological interventions they were currently considering for pressure injury prevention:

- Electrical stimulation was under consideration by the highest number of respondents (26%), followed by multidisciplinary wound care teams (18%), silicone dressings (13%), active support surfaces (10%), hyperbaric oxygen therapy (10%), prophylactic dressings (8%), Australian sheepskin overlays (8%), reactive support surfaces (8%), other support surfaces (8%), debridement (8%), and massage therapy (8%).
- A smaller proportion of respondents (between 3% and 6%) are currently considering the use of silver dressings, dressings with Safetac, foam mattresses, wheelchair and seat cushions, gel-enhanced cushion, pillows and memory foam cushions, incontinence pads, high-absorbent diaper pads, egg-crate heel lifts, heel elevators, heel-left suspension boot, repose boot, risk assessment tools, epidermal moisture scans, nutritional interventions, body repositioning, ultrasound, and spacing devices for medical equipment.

- None of the survey respondents reported that they were considering the use of gauze dressings, barrier wipes, and heel-protector boots as interventions for pressure injury prevention.
- Overall, the majority of non-pharmacological interventions for pressure injury prevention included in the questionnaire were not reported to be under consideration for future use by respondents.

## Interventions Being Discontinued or Considered for Discontinuation

Survey respondents reported a variety of reasons why certain interventions were being considered for discontinuation (Appendix 6).

Hyperbaric oxygen therapy, electrical stimulation, barrier wipes, alternating and low air loss bed surfaces, air beds, support and active surfaces, sheepskin overlays, off-loading boots, and various cushions were reported by respondents as being considered for discontinuation. Reasons for discontinuation of these interventions included a lack of funding or reimbursement, perceived ineffectiveness of the intervention, or that the intervention was deemed too costly.

Respondents perceived silver dressings, soaker pads, and Prevalon<sup>3</sup> heel-protector boots to be ineffective interventions for pressure injury prevention in patient care. Additionally, respondents reported that these interventions were being considered for discontinuation as a result of appropriate alternatives being available. Another respondent noted that they were discontinuing hyperbaric oxygen therapy due to the lack of evidence-based outcomes on this intervention.

Other reasons for discontinuing an intervention included lack of funding by specific program leaders for barrier wipes and inefficient sanitization techniques or laundering services for reusing medical sheepskin between patients. A lack of education – though it was not specified whether this applied to staff or patients – was noted as a reason for discontinuation of medical honey, Promogran<sup>4</sup> dressings, and negative pressure wound therapy. Moreover, two respondents reported discontinuing the use of electrical stimulation and air beds as a result of the lack of staff knowledge and training opportunities for these interventions. Finally, soaker pads were being considered for discontinuation by some respondents as there was a perceived risk of shearing injury to patients when using the intervention.

## Relevant Settings of Use

Data on the care settings for which survey respondents worked in are summarized in Appendix 3. Almost all respondents (90%) reported that they work in long-term care in some capacity, with nursing homes having the highest number of respondents (49%), followed by continuing care (28%), and assisted living (13%). Secondary or tertiary hospital settings were reported by the second-highest number of respondents (80%), and more than a third of respondents working in acute care (39%), followed by respondents working in intensive care (21%), pediatric care (15%), and operative care (5%). Less than half of respondents worked in community or home care (33%), while other respondents worked in rehabilitation facilities (21%), primary care (10%), auxiliary hospital settings (5%), corporate services (3%), transitional care (3%), patient safety (3%), for a regional health authority (3%), and in wellness program settings (3%).

<sup>3</sup> Prevalon heel protector boots are used to minimize friction and force while keeping the foot and heel elevated.

<sup>4</sup> Promogran dressing consists of collagen and oxidized regenerated cellulose intended to promote a moist environment and allow for better wound healing and skin integrity.

## Relevant Patient Populations

Data regarding patient populations for whom respondents reported that non-pharmacological interventions for pressure injuries are typically used are reported in Appendix 4. Almost all of the survey respondents reported that these interventions were typically used in patients with immobility (95%), as well as geriatric patients (90%), patients with neurological conditions (87%) or chronic diseases (85%), and malnourished patients (82%). In addition, more than half of respondents noted that spinal cord injury patients (72%) and patients with medical devices or restraints (72%) typically require these interventions, followed by immunocompromised patients (62%) and surgical and post-operative patients (51%). Notably, the two patient population groups for which the lowest number of respondents reported the use of non-pharmacological pressure injury prevention interventions were pediatric patients (28%) and palliative care patients (5%).

## Key Jurisdictional Issues and Questions

### Currently Used Policies, Guidelines, and Frameworks

Of the 39 survey respondents, 30 (77%) noted that their organization follows a policy, framework, or guideline relating to the use of non-pharmacological pressure injury prevention interventions, while nine (25%) respondents did not state whether their organization used any guidance from these types of documents. The various documents submitted and referenced by survey respondents are listed in Appendix 7.

Some respondents indicated that they use regional or jurisdictional pressure injury guidelines, policies, or frameworks developed by the Winnipeg Regional Health Authority, Alberta Health Services, Manitoba Health, Manitoba Health Seniors and Active Living, Northern Health Region Authority, Prairie Mountain Health, Eastern Health and the BC Provincial Interprofessional Skin and Wound Committee. Two respondents indicated that their long-term care facility had its own protocol or guidelines for preventing ankle, heel, and foot pressure injuries. One respondent reported that their organization refers to best practice guidelines created by the Registered Nurses Association of Ontario. Another respondent stated that their work setting uses an online platform, Connecting Learners with Knowledge, for sharing resources with other professionals or workplaces while keeping up-to-date with guidelines and other tools on wound care and pressure injury treatment or prevention.

Other respondents stated that they used some form of pressure injury prevention guidelines incorporating the Braden Scale. One respondent stated that their practice has implemented a policy for the prevention of pressure injuries from medical devices, while another respondent reported that they have a policy set in place for the use of hyperbaric oxygen therapy in adults and pediatric patients. Additionally, two respondents, one working in pediatric care and the other an occupational therapist, noted policies are currently being developed in their care setting but none have been finalized.

Stakeholder feedback noted that jurisdictions or care settings may seek guidelines or protocol regarding pressure injury prevention from Wounds Canada, the European Wound Management Association, and Pressure Ulcers to Zero, although survey respondents did not specifically reference these organizations or guidelines.

### Patient-Related Factors Influencing Care

Survey respondents indicated that patient age, type of injury or surgical operation, clinical contraindications, level of mobility, history of pressure injury, nutritional intake, length of hospital

stay, and co-presentation with an acute illness were all patient-related factors that could influence which type of non-pharmacological intervention for preventing pressure injuries was used.

### Patient Age

As reported by one respondent, all patients are potentially at risk for pressure injuries, although some patient populations may be at higher risk than others. Older patients were noted to be at greater risk of developing a pressure injury due to decreased mobility, physical frailty, the presence of comorbidities, increased tissue dehydration, and age-related skin changes. These factors could be exacerbated if the patient is living alone and unable to independently reposition. Younger age was also noted as a factor influencing care. One respondent who works with pediatric populations explained that there are a limited number of products approved for neonatal care (e.g., incompatibility of skin care products due to fragile skin) and the sizing of sleep surfaces or positioners tends to skew toward adult populations, making them too large for newborns or younger children.

### Injury Type

The type of injury, illness, surgery, or operation, and the resultant recovery time in hospital were also indicated as influential factors in determining which interventions were chosen to prevent pressure injuries. Respondents acknowledged that the type of injury or location of injury on the body may limit the number of options available for non-pharmacological pressure injury interventions. For instance, if the number of “turning surfaces” or restricted resting positions (e.g., head of bed needing to remain at greater than 30 degrees for tube feeding) may limit the interventions available for use. In addition, the type of surgery or operation (e.g., knee, hip, spine, cardiovascular) could reduce patient mobility and extend length of stay in hospital while increasing the likelihood of developing a pressure injury. Neurologic diseases (e.g., multiple sclerosis, Parkinson disease), chronic diseases that affect ambulatory faculties, (e.g., diabetes), and acute injuries or illnesses affecting cognitive and verbal functioning (e.g., stroke) or physical positioning (e.g., broken limbs) were all variably noted as influential factors in navigating which interventions were chosen and for whom. In addition, one respondent stated that injury type can often influence whether a patient is compliant with certain pressure injury interventions compared with others. While frequent body repositioning may prevent the development of a pressure wound, a patient may not be compliant or refuse this technique as it might be uncomfortable with their injury.

### Nutritional Deficiencies

Approximately half of the survey respondents answered that nutritional deficiencies can increase the risk of pressure wounds and influence which preventive interventions are chosen. Several respondents reported that dietitians are often consulted for those patients who are malnourished or require supplementation but front-line staff is often not involved in the development of dietary guidelines or protocols. On the other hand, one respondent mentioned that some care settings do not provide access to dietetic services, which could result in overlooking nutrition as an important factor for pressure injury prevention. Another respondent reported that a comprehensive nutrition care plan may be required to help restore and maintain adequate nutrition, but did not state whether this involved a dietician or another health care professional. Moreover, as noted by one respondent, the Braden subscore determines whether a patient is at nutritional risk for developing a pressure injury and whether nutritional modifications are required for prevention.

## Clinical Contraindications

Clinical contraindications for certain interventions were indicated by some respondents as playing a role in the choice of intervention. While respondents tended to describe clinical contraindications in the context of injury type or restriction to body positioning, one respondent indicated allergies as a potential problem with pressure injury prevention interventions. Another respondent noted that comorbidities can influence care decisions and whether a patient is more susceptible to pressure injuries. In addition, the same respondent stated that diaphoresis may cause more damage to the patient's skin due to excessive moisture, with some interventions being more effective in preventing pressure injuries than others when excessive sweating is apparent in patient. Two others reported that cognitive impairment or misunderstanding of the technology were potential clinical contraindications as they may result in a potential reduction of compliance and the subsequent effectiveness of the intervention. Several respondents indicated that a history of pressure wounds could influence which preventive intervention is chosen for the patient. Awareness of previous pressure wounds was noted to allow for avoidance of previously failed interventions. This is important as nearly all respondents indicated that a history of pressure wounds increases the likelihood of future wounds.

## Mobility

The majority of respondents acknowledged that decreased mobility often leads to the need for more treatment and greater preventive measures. In some situations, respondents acknowledged that they may consult with occupational therapists or physiotherapists to treat the patient with decreased immobility more appropriately.

## Other Patient-Related Factors

Although gender was included in the survey, the majority of respondents left this option blank and one indicated that it was not a factor for the selection of intervention. Three further comments indicated a disappointment that psychosocial factors and patient choice are rarely taken into consideration when choosing preventive measures. More specifically, one of the respondents noted that cognition, dementia, depression, and delirium all contribute to a patient's ability to be involved in the care decision-making process and determining the optimal pressure injury intervention. Additionally, one respondent reported that spinal cord injury patients are at higher risk of developing pressure injuries although staff are often more vigilant about pressure injury preventive measures in these patients compared with others.

## System-Related Factors Influencing Care

When asked to detail what system-related factors could influence the choice and utilization of a particular preventive intervention, respondents indicated the following: patient transitions across care settings, implementation feasibility, funding and reimbursement practices, availability of guidelines or evidence, coordination between providers, and the accessibility of a treatment or intervention.

## Patient Care Setting Transitions and Level of Coordination

The transfer of patients from one setting to another was noted as a factor that could require consideration in decision-making around the selection of appropriate interventions. In part, this is may reflect the requirement for communication across care settings. In addition, the selection of interventions during care setting transitions may rely on factors ranging from the availability of equipment and ability to communicate across care settings, and the level of knowledge of the various health care professionals involved with skin or wound care. Furthermore, pressure injury prevention practices may be outdated or inconsistent among care settings, with one respondent acknowledging that some care settings may still use nasal prong

oxygen on pressure wounds, which can cause more discomfort to the patient. That being said, several respondents acknowledged that communication between care settings is limited or non-existent in the lead-up to transition, which could have effects on care as the availability of equipment, provider knowledge, and the use of prevention guidelines can vary across settings. Similarly, some respondents indicated that there can be a lack of clarity among physicians and nurses regarding who is responsible for skin care and wound management in patients. Even when roles and responsibilities may be acknowledged, several respondents mentioned that limited communication among staff, or the failure to make use of allied health professionals' expertise, can impact care timelines. Consequently, one respondent stated that patients are often not involved in the decision-making process when it comes to their own care, with front-line staff and management responsible for providing optimal and consistent care for a patient (which includes pressure injury prevention). Another respondent reported that although staff regularly reassess a patient's risk for pressure injury once they are transitioned to another care setting, an action plan often does not follow, which ultimately puts the patient more at risk for pressure injuries if the proper care is not taken.

### **Cost, Funding, and Reimbursement**

In general, there was consensus among respondents that funding and reimbursement of interventions for pressure injury prevention is difficult to obtain, particularly in those health care settings relying on public funding from provincial and regional health authorities. Moreover, it may not be feasible for some organizations or care settings to hire specialists in wound care management and pressure injury prevention. Due to budget restrictions, interventions that are deemed too costly may be cut from funding. For example, one respondent working in pediatric care noted that air-fluidized support surfaces are expensive and only approved for single patient use, which makes them costly as a preventive measure within a multi-patient care setting. Multiple respondents emphasized that patients and caretakers are often burdened with covering the costs of certain non-pharmacological interventions or that these interventions are only covered during a patient's time in the hospital or care facility. Two respondents indicated that the cost of certain interventions (e.g., custom orthotics) may be prohibitively expensive for some patients. Another respondent noted that it can be difficult to demonstrate when an injury has been prevented, so funding sources that require proof of effectiveness can be difficult to access.

### **Guidelines**

Moreover, respondents mentioned that while there are a large number of lengthy guidelines available, they may provide conflicting information or be outdated. In some settings or care facilities, as indicated by one respondent, there may be a single individual responsible for maintaining up-to-date knowledge on current best practice guidelines, which can be a difficult task. This resonates with what other respondents indicated as a lack of knowledge sharing about guidelines across care settings was noted by several respondents.

### **Geography and Resource Availability**

Non-pharmacological interventions may not be accessible if the health facility is in a remote or rural location. Similarly, one respondent suggested that some products may be difficult to order to a site due to the geographic setting, though it was not indicated whether this comment was in relation to a rural, remote, or urban site. Respondents also mentioned that even if a non-pharmacological intervention is accessible, resourcing and staff shortages may disrupt the proper usage and effectiveness of a pressure injury intervention. Another respondent noted that some health care professionals (e.g., nurse specialists) receive more extensive training in wound care management compared with other staff, but are often not fully utilized in current

practice even though they could potentially improve overall pressure injury prevention. One respondent recommended that it may be useful in some care settings to have a designated lead or supervisor assigned to pressure injury prevention and proper use of non-pharmacological interventions to have consistency throughout the workplace.

## Other System-Related Factors

One respondent stated that there is lack of up-to-date data on the overall prevalence and incidence of pressure injuries in specific jurisdictions. This type of data may help decision-makers recognize and understand the ongoing need for pressure injury interventions and proper funding.

## Current Policy and Clinical Practice Issues

When asked to detail some of the current policy or clinical practice issues affecting non-pharmacological pressure injury prevention, participants noted that an absence of policies, limited availability of standardized guidelines, and varied educational or skill levels in clinical practice could all affect preventive measures.

One respondent acknowledged that pressure injuries are often not recognized by front-line staff and management as a serious health or patient safety concern. Care providers might focus more on the patient's injury or surgery and neglect pressure injury prevention protocol or policies as they may be less critical.

Two respondents noted that various forms of pressure injury prevention practices and levels of policy implementation can have a detrimental effect in the prevention of pressure injuries; these respondents called for standardization. For example, one identified an absence of long-term care policies in their jurisdiction. Where policies, procedures, and guidelines are in place, however, it was noted that they may not be updated to align with current best practice recommendations.

In addition to being potentially out-of-date and promoting less effective measures, one respondent indicated that some current policies or guidelines could be creating a negative feedback loop, hindering funding for new technologies. This is similar to how the difficulties accessing funding were articulated in the previous responses to systems-related factors. Funders often require evidence that an injury has been prevented in order to provide future financial support for an intervention. One participant suggested that current policies implying that all pressure wounds are preventable when some are unavoidable imposes an unattainable funding standard and impedes the provision of appropriate care. Without implicating current policy as the source of the problem, a second respondent articulated a similar concern where limited funding mechanisms require demonstration of effectiveness before access is granted. They indicated that this could prevent a site from proactively building stores of equipment and supplies. Interpretation of evidence was also noted as difficult across disciplines where the rarity of high-quality evidence supporting prevention strategies could make uptake of certain interventions difficult.

Several respondents indicated the importance of providing ongoing educational support (e.g., online wound modules, education days, and wound symposiums) and knowledge-sharing strategies. As education and skill level can vary across sites and occupations, so can familiarity with pressure wound prevention strategies and interventions. This could be exacerbated, as two respondents indicated, within systems where there are a limited number of pressure wound specialists. One respondent noted the absence of a wound care clinician in their area and noted that staff education is generally low. Even when the absence of specialists or a lack of staff education or skills is recognized, one respondent noted that closing the gap is difficult in the context of competing priorities, funding constraints, and variable rates of staff turnover.

As such, another participant stressed the importance of including allied health professionals, like occupational therapists, in prevention strategies. Two further respondents noted the importance of automatically screening patients for signs of early pressure injury, particularly in children who have undergone multiple surgeries.

## Knowledge Gaps and Evidence Needs

Much like the responses on policy and clinical practice issues, respondents noted the relative dearth of comparative evidence in the literature on pressure injury prevention, low levels of wound management education, and poor uptake and awareness of current policies or guidelines as demonstrative of knowledge gaps and evidence needs related to non-pharmacological prevention of pressure injuries.

Nearly a third of responses received reiterated concern with the absence or limited amount of evidence on the comparative effectiveness of technologies, risk assessment tools (particularly in geriatrics), intervention protocols, and ideal staffing levels (e.g., the ratio of wound care consultants to patients). For instance, interventions like silicone dressings and dressings with Safetac<sup>5</sup> were noted as common treatment strategies once pressure injuries developed, but without clear evidence backing their use as effective preventive measures, it is unclear whether they are worth utilizing prior to the development of a pressure injury. This was noted as problematic as injury prevention has the long-term potential to save both time and money, in addition to the commonly accepted value of reducing harm to the patient.

Similarly, low awareness about or education on pressure wounds and limited training opportunities were noted by several respondents as problematic components of injury prevention. Exacerbating difficulties associated with the previously noted absence of evidence, several respondents indicated that the identification and description of the early stages of pressure wounds — as well as the differentiation between which types of pressure injuries — can be difficult. As one respondent from Manitoba noted, this increases the importance of consulting pressure wound experts. However, they also noted that while long-term care or home care providers may seek help, acute-care providers may be less inclined to do so as there may be no wound care specialist in house.

Furthermore, where risk assessment tools are supported by evidence and indicated in practice guidelines, respondents noted that first-line providers may still fail to use the appropriate tools. Respondents also articulated difficulty keeping staff abreast of existing practice guidelines and building familiarity with new products on-site (e.g., due to switching vendors). As some respondents indicated, this could be a result of limited opportunities or truncated timelines for properly training (e.g., mentorship opportunities) and educating health care assistants and support staff as well as clinical staff. This could, as other respondents indicated, also be the result of lacking a clear strategy for or sustained effort to share and implement new evidence-based knowledge.

From a national perspective, one respondent stated that there are a lack of provincial and national databases for tracking the prevalence and incidence of pressure injuries. These databases may facilitate the need for a set target for reducing pressure injuries in specific patient populations as well as monitoring the use and effectiveness of non-pharmacological interventions across jurisdictions or care settings.

<sup>5</sup> Safetac is an adhesive that is clinically proven to cause less pain at removal and often used in wound dressings.



## Limitations

The findings of this Environmental Scan present an overview of the current context of non-pharmacological interventions for pressure injury prevention across jurisdictions in Canada, based on the perspective of a limited number of stakeholders working in the field. One focus of this report was to identify the non-pharmacological pressure injury prevention interventions that are currently in use, being considered for future use, or under consideration for discontinuation by stakeholders representing a variety of care settings.

Approximately half of the survey respondents represented Manitoba and not all provinces and territories had representatives who responded to the survey. A response rate of 33% was obtained and therefore the survey results may not accurately represent views of all Canadian jurisdictions or local contexts. Though most of the respondents answered all survey questions, a few respondents did not answer the open-ended questions relating to policy issues and patient and system-related factors influencing pressure injury prevention. As a result, the findings reflect limited perspectives and should be interpreted accordingly.

While the overall objective of the survey was to focus on pressure injury prevention measures, some responses reflected perspectives on treatment rather than prevention. This was apparent in cases where interventions such as debridement, which is aimed at treating active wounds, were noted to be in use for prevention. It is unclear whether these interventions are actually in use for prevention, or rather, are being used to prevent negative sequelae of pressure injuries. In addition, when asked about factors that influence the choice of intervention, many responded with information on what factors influence the development of pressure injuries. In both cases, some of the responses may not directly address the intended scope of the Environmental Scan.

Occupation-wise, the highest proportions of respondents were clinical nurse specialists and wound care consultants. The perspectives of the respondents who completed the survey may not reflect the views of all health care practitioners and those working in different contexts. The majority of respondents worked in urban settings compared with rural or remote settings, and in long-term care compared with other occupational care settings. Thus, the findings may not be representative of all care settings.

Although a literature search was conducted for this Environmental Scan, much of the literature identified related to the clinical effectiveness of non-pharmacological interventions for pressure injury prevention, which, alongside a critical appraisal of the evidence, was outside the scope of this report. The literature review undertaken may not have identified all the relevant evidence on the current availability and access to non-pharmacological pressure injury interventions in Canada. For instance, there was limited literature identified on the use of new or emerging interventions (e.g., hyperbaric oxygen therapy, electrical stimulation), relevant use or care settings, and the feasibility of utilizing pressure injury interventions for patient care. Additionally, there was a lack of literature identified on the implementation of policies or guidelines within specific care settings (e.g., acute care, pediatric care) for pressure injury prevention.

Overall, due to the complex nature of pressure injury prevention across care settings and jurisdictions, it is challenging to understand the relevance or impact of the survey results on a local level. The generalizability and transferability of the survey findings may be limited and should be interpreted based on the local context of care.

## Conclusion

Although there are a variety of non-pharmacological interventions for pressure injury prevention available, the prevalence of pressure injuries remains high and prevention is a relevant concern in Canada.<sup>2,3</sup>

The survey identified a variety of non-pharmacological interventions for pressure injury prevention that are currently being used, under consideration for future use, or under consideration to be discontinued.

Patient-related factors including patient's age, type of injury, nutritional status, and hospital length of stay all influence care decisions and the type of pressure injury interventions in use. For instance, body repositioning may be an inappropriate intervention for elderly patients who have limited mobility and tend to be frailer compared with younger patients, although stakeholder feedback indicated that micro turns or smaller tilts (30 degree tilts) may be practical options for high-risk populations, including elderly patients who cannot tolerate full 90 degree turns or other repositioning techniques. Moreover, system-related factors including funding, reimbursement, or treatment accessibility all significantly impact care decision-making and the type of pressure injury interventions available. Many respondents stated that funding or reimbursement plays a significant role in determining the availability of interventions for pressure injury prevention; the level of impact may depend on the care setting and organization, and on whether patients are responsible for absorbing the costs of an intervention. Some non-pharmacological interventions, including dressings and cushions, are considered inexpensive due to low product cost or the potential for multi-patient use, and are available in a variety of care settings. Other interventions may be considered too costly to implement broadly as one respondent stated that Australian sheepskin overlays are difficult and costly to sanitize between patient uses.

The survey sought to understand the barriers or challenges influencing care. Respondents reiterated the lack of education or resources available for front-line staff on the optimal use of interventions for pressure injuries. However, no relevant literature was identified on strategies to improve staff knowledge and awareness of pressure injuries.

Additionally, many respondents noted that proper communication and knowledge transfer among front-line staff is essential for effective pressure injury prevention, particularly when patients are transferred from one type of care setting to another. One study<sup>16</sup> noted that it is challenging to provide proper documentation and record keeping for pressure injury prevention, but processes like patient transfer stickers (specifying the date, time, and location of pressure injury wound) may promote better communication and assessment among staff and care settings while reducing the severity of pressure injuries.<sup>16</sup> Moreover, an Ontario-based hospital reported an overall reduction in the rate of hospital-acquired pressure injuries following the adoption of a policy for documenting patient information, including the status of pressure injuries, on standardized forms. Similar policies may be useful for other facilities to adopt, but it is unclear whether they would have the same impact in non-hospital settings.<sup>17</sup> Improving communication among health professionals and involving providers from multiple disciplines (e.g., dietitians and occupational therapists) in the development of guidelines or protocols for pressure injury prevention may support better patient care. Additionally, wound care management systems or software may be helpful tools to improve overall efficiency and coordination among front-line staff for pressure injury prevention.<sup>18</sup> Online notifications to staff about incomplete pressure injury assessments or higher-risk patients through a software system may improve staff compliance and efficiency while providing better patient care and reducing the amount of pressure injuries.<sup>18</sup>

Survey feedback revealed that there are many guidelines and protocols available for pressure injury prevention, but that it is difficult for front-line staff and management to implement and adhere to emerging guidelines or put protocols into practice. Other jurisdictions, including the US, have developed resources to guide the implementation of care recommendations in practice. One example is the guide to implementing pressure injury prevention programs developed by the Agency for Healthcare and Research Quality, which provides tools for hospital leaders.<sup>19</sup> Similarly, Health Quality Ontario released recommendations for adoption alongside its Quality Standard on Pressure Injuries.<sup>20</sup> It is possible that supports like these may be useful for facilities attempting to change their approaches to providing care for pressure injuries.

Through this Environmental Scan, a variety of policy issues and barriers relating to pressure injury prevention were identified. Further research that focuses on educational needs and resources for front-line staff and improving knowledge transfer across care settings may help address knowledge gaps and challenges, while ultimately enhancing patient care for pressure injury prevention.

To complement this Environmental Scan, CADTH has completed a variety of Rapid Response reports regarding the use of different non-pharmacological interventions for pressure injury prevention, which are available free of charge on the CADTH website.<sup>21-25</sup>

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## Appendix 1: CADTH Non-Pharmacological Interventions for Pressure Injuries Survey

1. For which jurisdiction do you work? (Select one option.)
  - Alberta
  - British Columbia
  - Manitoba
  - New Brunswick
  - Newfoundland and Labrador
  - Northwest Territories
  - Nova Scotia
  - Nunavut
  - Ontario
  - Prince Edward Island
  - Quebec
  - Saskatchewan
  - Yukon
  - Federal
  
2. Are you currently involved in any capacity with non-pharmacological interventions for the prevention of pressure injuries? (If no, go to the end of the survey.)
  - Yes
  - No
  
3. What is your profession or role? In addition to your occupation or title, please describe your role as it relates to non-pharmacological interventions for the prevention of pressure injuries. (Free text.)
  
4. Do you work in one or more of these geographical settings? (Select all that apply.)
  - Urban
  - Rural
  - Remote

(Please self-identify based on your local understanding of the criteria for remote. As an example, Health Canada defines various levels of remote, ranging from "remote isolated = no scheduled flights or road access and minimal telephone or radio service" through to "non-isolated remote = road access and less than 90 km away from physician services.")
  
5. What type of organization do you work for? (Select all that apply.)
  - Publicly funded
  - Private
  - Not-for-profit
  - Other (free text; please specify):

6. Do you work in one or more of these health care settings? (Select all that apply.)

**Secondary or tertiary hospital setting:**

- Acute care
- Intensive care
- Pediatric care
- Operative care

**Long-term care:**

- Assisted living
- Continuing care
- Nursing home
- Auxiliary hospital setting
- Primary care
- Home and community care
- Rehabilitation facility
- Other (free text; please specify):

## A. Context of Use of Non-Pharmacological Prevention Strategies for Pressure Injuries

7. In your context, for which of the following patient populations are non-pharmacological interventions for pressure injury prevention typically used? (Select all that apply.)

- Geriatric patients
- Spinal cord injury patients
- Pediatric patients
- Surgical or post-operative patients
- Immunocompromised patients
- Patients with limited mobility
- Patients with neurological conditions
- Patients with medical devices or restraints in contact with tissue
- Malnourished patients
- Patients with chronic diseases (e.g., cardiovascular disease, diabetes)
- Other (free text; please specify):

8. What non-pharmacological interventions for the prevention of pressure injuries are **currently** utilized in your jurisdiction?  
(Select all that apply.)

**Dressings:**

- Silver dressings
- Silicone dressings
- Prophylactic dressings
- Gauze dressings
- Dressings with Safetac
- Other dressings

**Support Surfaces/Overlays:**

- Foam mattress support surfaces
- Reactive support surfaces (air-fluidized)
- Active support surfaces (alternating pressure)
- Australian sheepskin overlay
- Other support surfaces/overlays

**Seat cushions:**

- Wheelchair cushions
- Gel seat cushions
- Gel-enhanced cushions
- Memory foam cushions
- Pillows
- Other seat cushions

**Absorbent pads and wipes:**

- Incontinence pads
- High-absorbent diaper pads
- Barrier wipes (pre-moistened)
- Other absorbent pads or wipes

**Heel/Foot:**

- Heel elevators
- Heel-lift suspension boot
- Egg crate heel lift
- Heel-protector boots
- Repose Boot
- Multidisciplinary wound care team
- Screening and risk assessment tools
- Nutrition interventions
- Body repositioning



- Cushioning or spacing devices to prevent injury from medical devices (e.g., nasogastric tubes)
- Epidermal moisture scanner
- Hyperbaric oxygen therapy
- Electrical stimulation
- Debridement
- Massage therapy
- Other (free text; please specify):

9. What non-pharmacological interventions for the prevention of pressure injuries **are being considered or are of interest but are not currently used** in your practice or jurisdiction?

**Dressings:**

- Silver dressings
- Silicone dressings
- Prophylactic dressings
- Gauze dressings
- Dressings with Safetac
- Other dressings

**Support Surfaces/Overlays:**

- Foam mattress support surfaces
- Reactive support surfaces (air-fluidized)
- Active support surfaces (alternating pressure)
- Australian sheepskin overlay
- Other support surfaces/overlays

**Seat cushions:**

- Wheelchair cushions
- Gel seat cushions
- Gel-enhanced cushions
- Memory foam cushions
- Pillows
- Other seat cushions

**Absorbent pads and wipes:**

- Incontinence pads
- High-absorbent diaper pads
- Barrier wipes (pre-moistened)
- Other absorbent pads or wipes

**Heel/foot:**

- Heel elevators
- Heel-lift suspension boot
- Egg crate heel lift
- Heel-protector boots
- Repose Boot
  
- Multidisciplinary wound care team
- Screening and risk assessment tools
- Nutrition interventions
- Body repositioning
- Cushioning or spacing devices to prevent injury from medical devices (e.g., nasogastric tubes)
- Epidermal moisture scanner
- Hyperbaric oxygen therapy
- Electrical stimulation
- Debridement
- Massage therapy
- Other (free text; please specify):

10. What non-pharmacological interventions for the prevention of pressure injuries **are being considered or have been selected for discontinuation of use** in your practice or jurisdiction?

None

Please specify the intervention. (Free text.)

Please specify your reason for discontinuation or potential discontinuation: (Select all that apply.)

- Lack of funding for intervention
- Manufacturer discontinuation of intervention or product
- Ineffective intervention
- Appropriate alternatives available
- Other (free text; please specify):

11. Are there any policies, frameworks, or guidelines in use in your jurisdiction to guide the use of non-pharmacological intervention options for the prevention of pressure injuries?

Yes (Free text; please provide the title and year of the document; option to upload.)

No

Do not know

## B. Challenges and Knowledge Gaps

12. Of the following **patient-related** factors, which of them influence care decisions regarding the use of non-pharmacological interventions used for the prevention of pressure injuries? (Please select all those that apply and describe how they influence care decisions.)
- Age  
How does this factor influence care decisions? (Free text.)
  - Gender  
How does this factor influence care decisions? (Free text.)
  - Type of injury  
How does this factor influence care decisions? (Free text.)
  - Clinical contraindications  
How does this factor influence care decisions? (Free text.)
  - Level of patient mobility  
How does this factor influence care decisions? (Free text.)
  - Acute illness  
How does this factor influence care decisions? (Free text.)
  - History of pressure injuries  
How does this factor influence care decisions? (Free text.)
  - Nutritional deficiencies  
How does this factor influence care decisions? (Free text.)
  - Anticipated length of hospital stay  
How does this factor influence care decisions? (Free text.)
  - Type of surgery or operation  
How does this factor influence care decisions? (Free text.)
  - Other (free text; please identify the factor and describe how it influences care decisions):
13. Which of the following **system-related** factors regarding the use of non-pharmacological interventions for the prevention of pressure injuries do you currently face in your jurisdiction?
- Patient transition across care settings  
How does this factor influence care decisions? (Free text.)
  - Implementation feasibility  
How does this factor influence care decisions? (Free text.)
  - Funding or reimbursement  
How does this factor influence care decisions? (Free text.)
  - Availability of guidelines or evidence  
How does this factor influence care decisions? (Free text.)

Level of coordination between multiple providers

How does this factor influence care decisions? (Free text.)

Treatment or intervention accessibility

How does this factor influence care decisions? (Free text.)

Other (free text; please specify challenges or barriers and how they influence care decisions):

14. What are the current policy or clinical practice issues in the area of non-pharmacological pressure injury prevention?  
(Free text.)

15. What are the current knowledge gaps or evidence needs in the area of non-pharmacological pressure injury prevention?  
(Free text.)

### **C. Engagement and Feedback**

16. Are there any other individuals or stakeholders who we should engage to provide insight on this topic?  
(Free text; please specify name, occupation, and contact information.)

## Appendix 2: Information on Survey Respondents

**Table 2: Jurisdictional, Organizational, and Geographical Representation of Respondents**

Province or Territory (Number of Respondents) <sup>a</sup>	Organizations Represented by Survey Respondents <sup>b</sup>	Setting (Number of Respondents) <sup>c</sup>	Type of Organization (Number of Respondents) <sup>d</sup>
Alberta	Alberta Health Services University of Alberta	Urban (1) Rural (0) Rural (1) Remote (0)	Publicly funded (2) Not-for-profit (0) Private (0)
British Columbia (5)	Fraser Health Authority Northern Health Authority Public Health Services Authority-Sunny Hill Thompson Rivers University	Urban (2) Rural (0) Urban and Rural (3) Remote (0)	Publicly funded (5) Not-for-profit (0) Private (0)
Manitoba (19)	Deer Lodge Centre Health Sciences Centre Health Sciences Centre-Child Health Interlake-Eastern Regional Health Authority Northern Health Region Misericordia Health Centre Prairie Mountain Health Selkirk Mental Health Centre Seven Oaks General Hospital Winnipeg Regional Health Authority Winnipeg Regional Health Authority –Palliative Care	Urban (15) Rural (2) Urban and Rural (2) Remote (0)	Publicly funded (19) Not-for-profit (0) Private (0)
New Brunswick (1)	New Brunswick Association of Nursing Homes	Urban (0) Rural (0) Remote (0) Rural, Urban and Remote(1)	Publicly funded (0) Not-for-profit (1) Private (0)
Newfoundland and Labrador (3)	Labrador-Grenfell Regional Health Authority Eastern Health Authority	Urban (1) Rural (2) Remote (0)	Publicly funded (3) Not-for-profit (0) Private (0)
Nova Scotia	Wounds Canada University of Sydney	Urban (1) Rural (0) Remote (0)	Publicly funded (1) Not-for-profit (0) Private (0)
Northwest Territories	No respondents		
Nunavut	No respondents		

Province or Territory (Number of Respondents) <sup>a</sup>	Organizations Represented by Survey Respondents <sup>b</sup>	Setting (Number of Respondents) <sup>c</sup>	Type of Organization (Number of Respondents) <sup>d</sup>
Ontario (1)	St. Michael's Hospital Self-employed/Consultant	Urban (1) Rural (0) Remote (0)	Publicly funded (1) Not-for-profit (0) Private (0)
Prince Edward Island (4)	Health PEI Home Care	Urban (2) Rural (1) Urban and Rural (1) Remote (0)	Publicly funded (3) Not-for-profit Private (0) Not reported (1)
Quebec	No respondents		
Saskatchewan (3)	Saskatchewan Health Region <sup>e</sup>	Urban (1) Urban and Rural (1) Rural (1) Remote (0)	Publicly funded (1) Not-for-profit (0) Private (0) Publicly funded and not-for-profit (1) First Nation Community (1)
Yukon	No respondents		

<sup>a</sup> In response to the survey question "For which jurisdiction do you work?"

<sup>b</sup> In response to the survey question "What is your profession or role? In addition to your occupation or title, please describe your role as it relates to non-pharmacological interventions for the prevention of pressure injuries."

<sup>c</sup> In response to the survey question "Do you work in one or more of these geographical settings?"

<sup>d</sup> In response to the survey question "What type of organization do you work for?"

<sup>e</sup> Saskatchewan Regional Health Authorities amalgamated into one health entity, Saskatchewan Health Region.

## Appendix 3: Representation of Care Settings Among Survey Respondents

**Table 3: Represented Care Settings Among Survey Respondents**

Type of Care Provided <sup>a</sup>	Total Number of Respondents
<b>Secondary or Tertiary Hospital Setting</b>	
Acute care	15 (39%)
Intensive care	8 (21%)
Pediatric care	6 (15%)
Operative care	2 (5%)
<b>Long-term Care</b>	
Assisted living	5 (13%)
Continuing care	11 (28%)
Nursing home	19 (49%)
Auxiliary hospital setting	2 (5%)
<b>Other</b>	
Primary care	4 (10%)
Home and community care	13 (33%)
Corporate office	1 (3%)
Rehabilitation facility	8 (21%)
Transitional care	1 (3%)
Patient safety	1 (3%)
Wellness programs	1 (3%)
Regional health authority	1 (3%)

<sup>a</sup>In response to the survey question “Do you work in one or more of these health care settings?” Survey respondents were able to choose more than one answer for this question.

## Appendix 4: Patients Populations Typically Using Non-Pharmacological Interventions for Pressure Injury Prevention

**Table 4: Patient Populations Represented by Survey Respondents**

Type of Patient Populations <sup>a</sup>	Total Number of Respondents
Geriatric patients	35 (90%)
Spinal cord injury patients	28 (72%)
Pediatric patients	11 (28%)
Surgical/post-operative patients	20 (51%)
Immunocompromised patients	24 (62%)
Patients with limited mobility	37 (95%)
Patients with neurological conditions	34 (87%)
Patients with medical devices or restraints	28 (72%)
Malnourished patients	32 (82%)
Patients with chronic disease	33 (85%)
Palliative patients	2 (5%)

<sup>a</sup> In response to the survey question “In your context, for which of the following patient populations are non-pharmacological interventions for pressure injury prevention typically used?” Survey respondents were able to choose more than one answer for this question.



## Appendix 5: Context of Non-Pharmacological Pressure Injury Interventions

**Table 5: Non-Pharmacological Pressure Injury Interventions Currently In Use, Under Consideration for Use, and Under Consideration or Selected for Discontinuation by Respondents**

Non-Pharmacological Pressure Injury Interventions	Number of Respondents Currently Using the Intervention <sup>a</sup>	Number of Respondents Considering the Intervention <sup>b</sup>	Number of Respondents Discontinuing the Intervention <sup>c</sup>
<b>Dressing</b>			
Silver dressings	13	1	1
Silicone dressings	26	5	0
Prophylactic dressings	19	3	0
Gauze dressings	15	0	0
Dressings with Safetac	21	2	0
Other dressings	15	2	0
<b>Support Surfaces and Overlays</b>			
Foam mattress support surfaces	27	1	0
Reactive support surfaces (air-fluidized)	26	3	0
Active support surfaces	32	4	2
Australian sheepskin overlay	8	3	2
Other support surfaces and overlays	16	3	0
<b>Seat Cushions</b>			
Wheelchair cushions	35	2	1
Gel seat cushions	28	2	0
Gel-enhanced cushion	20	1	0
Memory foam cushion	22	1	0
Pillows	12	2	
Other seat cushions	19	1	1
<b>Absorbent Pads and Wipes</b>			
Incontinence pads	30	2	0
High-absorbent diaper pads	25	1	0
Barrier wipes (pre-moistened)	18	0	2
Other absorbent pads and wipes	8	1	3

Non-Pharmacological Pressure Injury Interventions	Number of Respondents Currently Using the Intervention <sup>a</sup>	Number of Respondents Considering the Intervention <sup>b</sup>	Number of Respondents Discontinuing the Intervention <sup>c</sup>
<b>Heel and Foot</b>			
Heel elevators	20	1	1
Heel-lift suspension boot	17	1	1
Egg-crate heel lift	3	2	0
Heel-protector boots	32	0	0
Repose boot	3	1	0
<b>Other</b>			
Multidisciplinary wound care team	29	7	0
Screening and risk assessment tools	38	2	0
Nutrition interventions	35	2	0
Body repositioning	37	2	0
Cushioning or spacing devices to prevent injury from medical devices	24	2	0
Epidermal moisture scanner	0	2	0
Hyperbaric oxygen therapy	1	4	1
Electrical stimulation	4	10	1
Debridement	27	3	1
Massage therapy	4	3	0
Other	0	1	3

<sup>a</sup> In response to the survey question “What non-pharmacological interventions for the prevention of pressure injuries are currently utilized in your jurisdiction?” Survey respondents were able to choose more than one answer for this question.

<sup>b</sup> In response to the survey question “What non-pharmacological interventions for the prevention of pressure injuries are being considered or are of interest but are not currently used in your practice or jurisdiction?” Survey respondents were able to choose more than one answer for this question.

<sup>c</sup> In response to the survey question “What non-pharmacological interventions for the prevention of pressure injuries are being considered or have been selected for discontinuation of use in your practice or jurisdiction?” Survey respondents were able to choose more than one answer for this question.

## Appendix 6: Responses for Discontinuing Non-Pharmacological Pressure Injury Interventions

**Table 6: Reasons for Discontinuation of Pressure Injury Intervention From Survey Respondents**

Type of Intervention	Number of Responses <sup>a</sup>	Reason for Discontinuation
Silver dressings	1	Ineffective intervention Appropriate alternative available
Soaker pads	3	Ineffective intervention Appropriate alternatives available Risk of shearing injury with use
Barrier wipes	1	Lack of funding Appropriate alternative available
Support surfaces	1	Lack of funding
Active surfaces	1	Lack of funding
Australian sheepskin	2	Lack of funding Inability to properly sanitize/laundry between patients
Pre-moistened wipes	1	Financial impact by program leaders
Negative pressure wound therapy	1	Lack of education
Promogran	1	Lack of education
Medical honey	1	Lack of education
Off-loading boots	1	Lack of funding
Wheelchair cushions	1	Lack of funding
Prevalon boots	1	Ineffective intervention Appropriate alternatives available
Hyperbaric oxygen therapy	1	Lack of funding Lack of evidence-based outcomes
Debridement	1	High infection rates
Electrical stimulation	1	Lack of funding Lack of staff training and management support
Air beds (various types)	1	Lack of funding Lack of education and belief patient do not have to be turned on air beds

<sup>a</sup>In response to the survey question “What non-pharmacological interventions for the prevention of pressure injuries are being considered or have been selected for discontinuation of use in your practice or jurisdiction?” Survey respondents were able to choose more than one answer for this question.

## Appendix 7: Policies, Frameworks, and Guidelines for the Use of Non-Pharmacological Pressure Injury Interventions Reported by Survey Respondents

Please note that some of the policies or guidelines provided and mentioned by survey respondents did not have available links or were not able to be publicly identified and referenced. Protocols or assessment guides that are in the public domain (e.g., Braden Scale) were referenced with other available literature when references were not provided.

### Regional or Jurisdictional Policies or Guidelines

- [Conservative Sharp Wound Debridement \(CSWD\) in adults & children](#). (*Evidence informed practice tools*). Winnipeg (MB): Winnipeg Regional Health Authority; 2019.
- Regional wound and skin best practice guidelines. Winnipeg (MB): Winnipeg Regional Health Authority; 2018. (Web link not available.)
- [Wound bed preparation](#). (*Evidence informed practice tools*). Winnipeg (MB): Winnipeg Regional Health Authority; 2016.
- [Silver based dressings](#). (*Evidence informed practice tools*). Winnipeg (MB): Winnipeg Regional Health Authority; 2018.
- [Guideline: Prevention of pressure injury in adults & children](#). Vancouver (BC): BC Provincial Interprofessional Skin & Wound Committee; 2017 Nov [revised 2018 Feb].
- Wound prevention and management: Pressure ulcer prevention and treatment. Brandon (MB): Prairie Mountain Health; 2015. (Web link not available.)
- Risk assessment for skin breakdown and/or pressure ulcers using the Braden (Adult) and Braden Q (Pediatric). Eastern Health; 2014. (Web link not available.)
- Pressure ulcers: Prevention and treatment guidelines. Prince George (BC): Northern Health Authority; 2017. (Web link not available.)
- [Pressure ulcer prevention and treatment - clinical practice guideline](#). Winnipeg (MB): Winnipeg Regional Health Authority; 2012.
- Medical device-related pressure injuries in adults and children [draft]. (*Evidence informed practice tools*). Winnipeg (MB): Winnipeg Regional Health Authority; 2019. (Web link not available.)

### Workplace-Specific Guidelines or Policies

- Pressure relieving ankle-foot orthosis application and monitoring. Winnipeg (MB): Deer Lodge Centre; 2012. (Web link not available.)
- [Skin and wound community practice board](#). CLWK; 2019.
- Guidelines for implementing Soft AFO (Heel Boot). Winnipeg (MB): Misericordia Health Centre; 2017. (Web link not available.)
- Braden Scale Guidelines and Assessments
- [Procedure/documentation: Braden Risk & skin assessment – adults](#). Vancouver (BC): BC Provincial Interprofessional Skin and Wound Committee; 2017, Braden Scale and Pressure Ulcer Risk Scale (PURS).<sup>26,27</sup>

### Other

- Best Practice Recommendations for the: Prevention and Management of Wounds<sup>28</sup>
- Skin integrity and medical devices. Winnipeg (MB): Seven Oaks General Hospital; 2017. (Web link not available.)
- McNichol L, Watts C, Mackey D, Beitz JM, Gray M. [Identifying the right surface for the right patient at the right time](#). J Wound Ostomy Continence Nurs. 2015 Jan; 42(1): 19–37.
- Navarro P, Bornstein S. [Hyperbaric oxygen therapy for difficult wound healing in Newfoundland & Labrador](#). St. John's (NL): Newfoundland & Labrador Centre for Applied Health Research, Memorial University; 2012.

- [Risk assessment and prevention of pressure ulcers](#). Toronto (ON): Registered Nurses Association of Ontario; 2012 [supplement 2005; revised 2011; evidence boosters 2017].
- [Best practice recommendations for the prevention and management of pressure injuries](#). (Foundations of best practice for skin and wound management). North York (ON): Wounds Canada; 2018.
- QID Pressure Ulcers to Zero Collaborative. [Final report: Pressure ulcers to zero collaborative: Phase 3 \(November 2016-February 2018\)](#). Dublin (IRL): Health Services Executive; 2018.