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Best Practice Guideline

NOVEMBER 2024

Pressure injury management: Risk assessment, prevention and treatment

Fourth edition

RNAO
Registered Nurses' Association of Ontario
L'Association des infirmières et infirmiers autorisés de l'Ontario

Disclaimer

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Declaration of Conflict of Interest

In the context of RNAO best practice guideline development, the term "conflict of interest" (COI) refers to situations in which an RNAO staff member, or expert panel member's, financial, professional, intellectual, personal, organizational or other relationships may compromise their ability to conduct panel work independently. Declarations of COI that might be construed as constituting a perceived and/or actual conflict were made by all members of the RNAO expert panel prior to their participation in guideline development work using a standard form. Expert panel members also updated their COI at the orientation meeting, the recommendation build meetings and prior to guideline publication. Any COI declared by an expert panel member was reviewed by the RNAO best practice guideline development and research team and expert panel co-chairs. No limiting conflicts were identified by members of the expert panel. See "Declarations of Conflicts of Interest Summary" under the "methodology documents" tab on the BPG webpage.

Land Acknowledgement

We recognize that RNAO's office is located on the traditional and unceded territory of the Huron-Wendat, Haudenosaunee, and the territory of the Mississaugas of the Credit. This territory was the subject of the Dish with One Spoon Wampum Belt Covenant, which is an agreement between the Iroquois Confederacy and the Ojibwe and allied nations to peaceably share and care for the resources around the Great Lakes. We also acknowledge that Toronto is covered by Treaty 13 under the Toronto Purchase Agreement with the Mississaugas of the Credit. Today, this land is still the home to many First Nations, Inuit and Métis peoples from across Turtle Island and we are grateful to have the opportunity to work on this territory. By making a land acknowledgement, we are taking part in an act of reconciliation, honouring the land and Indigenous heritage which dates back more than 10,000 years. We encourage readers to learn about the land where you reside and the treaties that are attached to it. Land acknowledgements are an act of reconciliation and we must all do our part.

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Pressure injury management: Risk assessment, prevention and treatment

Fourth edition

Greetings from Dr. Doris Grinspun,

Chief Executive Officer, Registered Nurses' Association of Ontario

The Registered Nurses' Association of Ontario (RNAO) is delighted to present the fourth edition of the clinical best practice guideline (BPG) *Pressure injury management: Risk assessment, prevention, and treatment*. Evidence-based practice supports the excellence in service that health providers are committed to delivering every day.

We offer our heartfelt thanks to the many partners who made this BPG a reality. First, and most important, we thank the Government of Ontario that recognized in 1999 RNAO's capacity to lead a program that has gained worldwide recognition and is committed to funding it. We also thank the co-chairs of the RNAO expert panel for their invaluable expertise and stewardship of this BPG:

- Dr. Dimitri Beeckman, RN, PhD, FEANS, FAAN, Professor of Nursing Science, Ghent University, Belgium, and Örebro University, Sweden
- Dr. Corey Heerschap, RN, BScN, MScCH (WPC), PhD, NSWOC, WOCC(C), IIWCC, Clinical Nurse Specialist for Wound and Ostomy, Royal Victoria Regional Health Centre, Barrie, Ontario

Thanks to RNAO staff RN Amy Burt and Dr. Brenda Stade (guideline development co-leads), Glynis Gittens (guideline development project coordinator), RN Nafsin Nizum (associate director, guideline development and research), and the rest of the RNAO best practice guideline development and research team for their intense and expert work in the production of this BPG. Special thanks to the expert panel for generously providing their time, knowledge and perspective to deliver a rigorous and robust evidence-based resource that will guide the education and practice of millions of health providers. We couldn't have done it without you!

Successful uptake of BPGs requires a concerted effort from educators, clinicians, employers, policy makers, researchers and funders. Nurses, other health professionals and persons with lived experience, with their unwavering commitment and passion for excellence in patient care, provide the expertise and countless hours of voluntary work essential to developing new and next edition BPGs. Employers have responded enthusiastically by becoming Best Practice Spotlight Organizations® (BPSO®), joining more than 1,500 service and academic institutions in Canada and abroad, committed to implementing RNAO's BPGs. They have sponsored best practice champions, now numbering more than 150,000 – all eager to advance person-centred evidence-based care. BPSOs are also diligently monitoring and evaluating the impact of BPG implementation on patients, organizations, and health system outcomes.

We invite you to share this BPG with nursing and all other team members, client navigators and advisors in the wider health systems and communities in which you work. We have so much to learn from one another. Together we must ensure that the public have access to, and receives the best possible health and wellness services, always.

Dr. Doris Grinspun, RN, BScN, MSN, PhD, LLD (hon), Dr (hc), DHC, DHC, FAAN, FCAN, O.ONT.
Chief Executive Officer and Founder of the Best Practices Guidelines Program
Registered Nurses' Association of Ontario

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How to use this document

Throughout this document, terms that are bolded and are marked with a superscript G ([G]) can be found in the **Glossary of terms** in **Appendix A**.

This **best practice guideline**[G] (BPG) is a comprehensive document that provides guidance and resources for **evidence-based practice**[G]. It is not intended to be a manual or "how-to" guide; rather, it is a tool to guide best practices and enhance decision making for **nurses**[G], the **interprofessional team**[G], educators, **health service organizations**[G], academic institutions, and **persons**[G] and **families**[G]. This BPG should be reviewed and applied in accordance with the needs of individual health-service organizations, academic institutions or other practice settings, and with the preferences of with the preferences of persons at risk or living with **pressure injuries**[G] and their caregivers. This document provides evidence-based **recommendations**[G] and **good practice statements**[G] and descriptions of: (a) practice, education and organizational policy; (b) benefits and harms (c) values and preferences and (d) health equity considerations.

Nurses, members of the interprofessional team, educators and administrators who lead and facilitate practice changes will find this document invaluable for developing policies, procedures, protocols and educational programs to support service delivery. Nurses and members of the interprofessional team in direct care will benefit from reviewing the recommendations and supporting evidence.

If your organization or integrated system of care is adopting this BPG, the Registered Nurses' Association of Ontario (RNAO) recommends organizations establish change teams whose responsibilities include but are not limited to the following:

1. Conduct a gap/opportunity analysis: assess your existing policies, procedures, protocols and educational programs in relation to the good practice statements, recommendations and supporting discussions of evidence in this BPG, and identify any strengths, needs or gaps.
2. Note the recommendations and good practice statements applicable to your setting and that can be used to address existing priorities, needs or gaps within your organization(s).
3. Develop a plan for implementing recommendations and good practice statements, sustaining best practices and evaluating **outcomes**[G] by applying the Social Movement Action Framework (1) and/or the Knowledge-to-Action Framework (2).

Implementation science[G] resources, including the Leading Change Toolkit, are available online (3). A description of the Leading Change Toolkit can be found in **Appendix R**. For more information, see **Implementation Strategies** on page 79.

All RNAO BPGs are available for download, free of charge, from the RNAO website. To locate a particular BPG, search by keyword or browse by topic. Additional supplementary materials such as **evidence profiles**[G] and search strategies related to each recommendation can be found under the "methodology documents" tab on the BPG webpage.

We are interested in hearing your feedback on this BPG and how you have implemented it. Please share your story with us at RNAO.ca/contact.

The over two-decade journey of RNAO BPGs is documented in the following resource: Grinspun D, Bajnok I, editors. Transforming nursing through knowledge: best practices for guideline development, implementation science, and evaluation, Indianapolis (IN): Sigma Theta Tau International; 2018.

Purpose and scope

Purpose

RNAO's BPGs are systematically developed, evidence-based documents that include recommendations on specific clinical, healthy work environment and health system topics. They are intended for nurses, members of the interprofessional team in direct care positions, educators, administrators and executives, policy-makers, and researchers in health-service and academic organizations. **Persons with lived experience**[G] are encouraged to become familiar with the BPG to support their involvement in evidence-based decision-making related to their care. BPGs promote consistency and excellence in clinical care, administrative policies, procedures and education, with the aim of achieving optimal health outcomes for people, communities and the health system as a whole. RNAO aims to meet international reporting standards for clinical practice guidelines, including the standards outlined in the Appraisal of Guidelines for Research and Evaluation (AGREE II) Instrument and the Reporting Items for practice Guidelines in HealThcare (RIGHT) statement (4,5).

This BPG replaces and merges the RNAO BPGs *Risk Assessment and Prevention of Pressure Ulcers* (2005, with 2011 revision) and *Assessment and Management of Pressure Injuries for the Interprofessional Team* (2016) (6,7). These BPGs were merged because of overlapping clinical concepts (e.g., assessment) and to place a greater emphasis on prevention as a primary management strategy. The previous editions of these BPGs are among the most utilized and reported on in RNAO's data system, Nursing Quality Indicators for Reporting and Evaluation® (NQuIRE®). Additionally, RNAO's **Best Practice Spotlight Organizations (BPSO®)**[G] provided feedback that merging the two previous editions would streamline implementation and evaluation.

The purpose of this guideline is to provide nurses, members of the interprofessional team and other collaborators (i.e., administrators and policy-makers) with evidence-based recommendations for risk assessment, prevention, and treatment of pressure injuries. This guideline recognizes that people at risk of developing pressure injuries, or people who have developed pressure injuries and their caregivers, are experts in their health and decision making. It is clear that collaboration among the interprofessional team, persons with lived experience and caregivers is critical to achieving better health outcomes.

In October 2022, RNAO convened an expert panel to determine the purpose and scope of the fourth edition of this BPG and to develop **recommendation questions**[G] to inform the **systematic reviews**[G]. The interprofessional RNAO expert panel included persons with lived experience, nurses, occupational therapists, physiotherapists, and dietitians with knowledge and experience in all domains of practice: administration, education and research across a range of settings and sectors. They shared their insights on supporting and caring for persons at risk of or living with pressure injuries across the continuum of care (e.g., primary care, home and community care, acute care, rehabilitation and long-term care).

A comprehensive review and analysis were completed by the RNAO best practice guideline development and research team and the RNAO expert panel to determine the scope and priority recommendation questions for this BPG (refer to supplementary materials under the "methodology documents" tab on the BPG webpage).

Scope

To determine the scope of this BPG, the RNAO best practice guideline development and research team conducted the following steps:

- reviewed the previous RNAO BPGs: *Risk Assessment and Prevention of Pressure Ulcers* (2005, with 2011 revision) and *Assessment and Management of Pressure Injuries for the Interprofessional Team* (2016) (6,7);

- conducted an environmental scan of existing guidelines and standards on this topic;
- undertook a review of the literature to determine available evidence on interventions for persons at risk of or living with pressure injuries;
- conducted 26 key informant interviews with **health providers**[G], persons with lived experience, administrators, educators and researchers;
- held four discussion groups with health providers, managers, administrators, educators and students; and
- consulted with the expert panel.

This BPG provides evidence-based recommendations for nurses, members of the interprofessional team, and persons and their caregivers across all care settings and sectors. The recommendations address the prevention of pressure injuries for at-risk people, and the assessment and management of those living with pressure injuries. Overall, the scope includes:

- all domains of nursing practice;
- all health-care settings and sectors;
- all populations across the lifespan (e.g., pediatric, adult and older adult), including their caregiver/chosen family; and
- all types of pressure injuries, including **medical device-related pressure injuries**[G].

Topics outside the scope of this best practice guideline

The following conditions and topics are not covered within the scope of this BPG:

- diabetic foot ulcers
- venous or arterial ulcers
- **moisture-associated skin damage (MASD)**[G] including **incontinence-associated dermatitis (IAD)**[G]
- surgical wounds
- ostomy related wounds
- lacerations, abrasions and skin tears

Key concepts in this guideline

Essential caregivers: These individuals provide physical, social, psychological and emotional support, as deemed important by the person. This care can include support in direct care, decision making, care coordination and continuity of care. Caregivers can include family members, close friends or other support people who are identified by the person or substitute decision maker (8). They may also be called care partners.

Deep tissue pressure injury[G]: This is a local injury of persistent, non-blanchable deep red, maroon, purple discolouration or epidermal separation revealing a dark wound bed or blood filled blister (9).

Interprofessional team[G]: This type of team is comprised of multiple health providers (regulated and unregulated) who work collaboratively to deliver comprehensive and quality health services to persons within, between and across health-care settings (10). Key interprofessional team members supporting persons with or at risk of pressure injuries may include but are not limited to: nurses, personal support workers (PSWs) as they turn and care for people in LTC homes, general practitioners, physicians, dietitians, occupational therapists, physiotherapists and social workers. It is important to emphasize that persons and their caregivers are at the centre of the interprofessional team as active participants.

Health provider[G]: This term refers to both regulated workers (e.g., nurses, physicians, dietitians and social workers) and unregulated workers (e.g., personal support workers) who are part of the interprofessional team.

> **Regulated health provider:** In Ontario, the *Regulated Health Professional Act, 1991* (RHPA) provides a framework for regulating 26 health professions, outlining the scope of practice and the profession-specific controlled or authorized acts that each regulated professional is authorized to perform when providing health care and services (11) .
>
> **Unregulated health provider:** Unregulated health providers fulfill a variety of roles in areas that are not subject to the RHPA. They are accountable to their employers but not to an external regulating professional body (such as the College of Nurses of Ontario). Unregulated health providers fulfill roles and tasks that are determined by their employer. Unregulated health providers only have the authority to perform a controlled act, as set out in the RHPA, if the procedure falls under one of the exemptions set out in the Act (12).

Person[G]: A person is an individual with whom a health or social service provider has established a therapeutic relationship for the purpose of partnering for health. In this BPG person replaces the terms "patient," "client," and "resident" that are commonly used across health and social service organizations (13).

Pressure injury[G]: This is localized damage to the skin and/or underlying tissue, as a result of pressure or pressure in combination with shear. Pressure injuries usually occur over a bony prominence but may also be related to a medical device or other object (14).

> **Stage 1 pressure injury:** Intact skin with a local appearance of non-blanchable erythema (9). The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. It can be difficult to detect in individuals with dark skin but affected areas may differ in colour from the surrounding skin (9).
>
> **Stage 2 pressure injury:** Partial-thickness skin loss with exposed dermis (9).
>
> **Stage 3 pressure injury:** Full thickness skin loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. There may be undermining and tunnelling into adjacent structures (9).
>
> **Stage 4 pressure injury:** Full-thickness skin and tissue loss with visible fascia (i.e. the connective tissue that holds structures in place), muscle, tendon, ligament, cartilage or bone (9).
>
> **Unstageable (ungradable) pressure injury:** Full-thickness skin and tissue loss that is obscured by slough or eschar (i.e., dead tissue) so that the severity of injury cannot be confirmed (9).

Overview of methodology: Good practice statements and recommendations

Good practice statements and recommendations

This BPG includes both good practice statements and graded recommendations. RNAO BPGs are developed using the **Grading of Recommendations Assessment, Development and Evaluation**[G] (GRADE) methods. For more information about the guideline development process, including the use of GRADE methods and evidence profiles, refer to supplementary materials under the "methodology documents" tab on the BPG webpage.

Good practice statements

Good practice statements are actionable statements that should be done in practice (15). These are believed to be so beneficial that summarizing the evidence would be a poor use of the expert panel's time and resources (15). Moreover, researchers may no longer be conducting studies on the topic, or the alternative to the action may be unethical, or studying them may go against human rights (15,16). Given the high level of certainty that the benefits derived from the good practice statement outweigh the harms, they are not based on a systematic review of the evidence and they do not receive a rating of the certainty in their evidence or a strength (i.e., a rating of conditional or strong, which is further discussed below) (17). This does not diminish certainty in the evidence; while they may be supported by **indirect evidence**[G], there is a well-documented clear and explicit rationale connecting the indirect evidence to the statement (15). As such, good practice statements should be interpreted as strong recommendations as there is an underlying assumption that there is high certainty in the benefits of implementing the action (15). It is important to note that good practice statements are not made due to a lack of evidence, nor are they based on expert opinion.

Graded recommendations

Graded recommendations are also actionable statements; however, the recommendation statements are formed based on a direct or indirect link to a body of evidence found through the systematic review process (16). Recommendations are formulated as strong or conditional by considering the certainty in evidence, values and preferences of persons who are impacted by the recommendation, and health equity (see **Interpretation of evidence and recommendation statements** on page 15). The expert panel formulates recommendations using **Evidence-to-Decision (EtD) frameworks**[G] through a process of informal consensus facilitated by the RNAO best practice guideline development and research team. Since the recommendations are explicitly linked to the body of evidence, agreement is generally reached (18); if agreement cannot be reached, formal voting methods are used to determine the action and strength of the recommendations (18,19).

Despite the fact that good practice statements and recommendations are developed differently, both provide comprehensive guidance on an action/intervention that should (or should not) be done (16). Therefore, both good practice statements and recommendations should follow the same process for implementation (see **Implementation Strategies** on page 79).

Recommendation questions

Recommendation questions are priority areas of practice identified by the expert panel that require a systematic review of the evidence to answer. These recommendation questions inform the **PICO research questions**[G] (population, intervention, comparison, outcomes) that guide the systematic reviews and subsequently inform recommendations. Potential outcomes are brainstormed and prioritized by the expert panel for each recommendation question, and an individual systematic review is conducted for each recommendation question, in alignment with GRADE methods (20).

The following are the priority recommendation questions and outcomes developed by the RNAO expert panel that informed the development of the recommendations in this BPG. The outcomes are presented in the order of importance, as rated by the expert panel.

- **Recommendation question #1:** Should the use of health technologies be recommended or not for early detection and assessment of pressure injuries?

  Outcomes: Incidence rate of pressure injury, accuracy of predicting pressure injury development, pressure injury precursor signs and symptoms, health provider compliance with use of health technology, person/caregiver satisfaction
- **Recommendation question #2:** Should a specific repositioning frequency be recommended over another frequency for persons with pressure injuries or those at risk of developing them?

  Outcomes: Pressure injury incidence, pressure injury healing rate, worsening of pressure injury, pressure injury precursor signs and symptoms, person/caregiver satisfaction
- **Recommendation question #3:** Should **preventative care bundles**[G] be recommended or not for the prevention of pressure injuries?

  Outcomes: Prevalence or incidence rate of pressure injury, pressure injury precursor signs and symptoms, health provider compliance with care bundle, adverse events, person/caregiver satisfaction
- **Recommendation question #4:** Should the use of prophylactic dressings be recommended or not for the prevention of pressure injuries?

  Outcomes: Incidence rate of pressure injury, pressure injury precursor signs and symptoms, pain, quality of life, person/caregiver satisfaction
- **Recommendation question #5:** Should the use of health technologies be recommended or not for the treatment of pressure injuries?

  Outcomes: Healing of existing pressure injury, worsening pressure injury, health provider compliance with use of health technology, person/caregiver satisfaction, pain
- **Recommendation question #6:** Should the use of powered support surfaces (active or reactive) for the prevention and management of pressure injuries be recommended or not?

  Outcomes: Prevalence or incidence rate of pressure i®®njury, healing rate of existing pressure injury, worsening pressure injury, pressure injury precursor signs and symptoms, pain

Note: These priority recommendation questions are condensed versions of the more comprehensive PICO research questions developed by the RNAO expert panel to guide the systematic reviews. For more on the PICO research questions and the detailed process of how the RNAO expert panel determined the priority recommendation questions and outcomes, please refer to the supplementary materials under the "methodology documents" tab on the BPG webpage.

No recommendation questionswere identified that addressed the core education and training strategies required for curricula, or the ongoing education and professional development of nurses or the interprofessional team. Please refer to **Appendix D** for **education statements**[G] that educators, managers, administrators, and academic and professional institutions can use to support the uptake of this BPG.

Summary of recommendations and good practice statements

This BPG replaces and merges the RNAO BPGs *Risk Assessment and Prevention of Pressure Ulcers* and *Assessment and Management of Pressure Injuries for the Interprofessional Team* (6,7).

A summary of how the recommendations in this BPG compare to the recommendations in the previous editions of this BPG is available under the "methodology documents" tab on the BPG webpage.

RECOMMENDATIONS AND GOOD PRACTICE STATEMENTS	STRENGTH OF THE RECOMMENDATION
Foundational	
Good practice statement 1.0: It is good practice for organizations to implement an interprofessional approach for the assessment, prevention and treatment of pressure injuries. This approach includes shared decision making with persons at risk of or living with pressure injuries and their essential caregivers.	Not applicable*
Good practice statement 2.0: It is good practice for organizations and health providers to communicate and collaborate in a culturally safe and inclusive manner with persons and their essential caregivers in the assessment, prevention and treatment of pressure injuries.	Not applicable*
Good practice statement 3.0: It is good practice for health providers in collaboration with persons and their essential caregivers, to use a systematic approach in the management of pressure injuries, which includes assessment, prevention and treatment.	Not applicable*
Assessment	
Good practice statement 4.0: It is good practice for health providers in collaboration with persons and their essential caregivers to use a multicomponent approach to assess and reassess a person's risk of developing pressure injuries.	Not applicable*
Good practice statement 5.0: It is good practice for health providers to classify a pressure injury using a validated classification system. This classification system should not be used for monitoring pressure injury healing.	Not applicable*

Recommendation question #1: Should the use of health technologies be recommended or not for early detection and assessment of pressure injuries?	
Recommendation 1.0: The expert panel suggests that nurses and health providers use thermography as an adjunct to skin assessment for early detection of pressure injuries.	Conditional
Recommendation 1.1: The expert panel suggests that nurses and health providers use subepidermal moisture detection as an adjunct to skin assessment for early detection of pressure injuries.	Conditional
Prevention and treatment	
Recommendation question #2: Should a specific repositioning frequency be recommended over another frequency for persons with pressure injuries or those at risk of developing them?	
Recommendation 2.0: The expert panel suggests that nurses and health providers reposition persons at risk of pressure injuries every 2-4 hours.	Conditional
Good practice statement 6.0: It is good practice for nurses and health providers to select an appropriate support surface in collaboration with the person and their essential caregivers, by considering the following: ▪ individual risk factors ▪ contextual factors ▪ person's preferences; and ▪ comfort.	Not applicable*
Recommendation question #6: Should the use of powered support surfaces (active or reactive) for the prevention and management of pressure injuries be recommended or not?	
No recommendation was made. The expert panel determined that current evidence was insufficient to balance the benefits and harms of powered support surfaces compared to non-powered support surfaces. Choice of support surface should be individualized and in line with good practice statement 6.0.	Not applicable

Recommendation question #3 Should preventative care bundles be recommended or not for the prevention of pressure injuries?	
Recommendation 3.0: The expert panel suggests that nurses and health providers implement preventative care bundles for persons at risk of pressure injuries.	Conditional
Recommendation question #4: Should the use of prophylactic dressings be recommended or not for the prevention of pressure injuries?	
Recommendation 4.0: The expert panel suggests that nurses and health providers apply multilayer foam silicone dressings as a prophylactic measure for individuals at risk of pressure injuries, in addition to other preventative care strategies. These dressings should be applied to specific at-risk body locations, considering the potential for shearing, friction, and pressure.	Conditional
Recommendation question #5: Should the use of health technologies be recommended or not for the treatment of pressure injuries?	
Recommendation 5.0: The expert panel suggests that nurses and health providers, in collaboration with the person and their essential caregivers, consider using negative pressure wound therapy for treatment of pressure injuries if the person meets indications and there are no contraindications.	Conditional
Recommendation 5.1: The expert panel suggests that nurses and health providers, in collaboration with the person and their essential caregivers, consider using electrical stimulation for treatment of pressure injuries if the person meets indications and there are no contraindications.	Conditional

* Good practice statements are established, robust practices. They do not have a strength associated with them. For more information, refer to the **Overview of methodology**.

Interpretation of evidence and recommendation statements

GRADE provides a transparent framework and a systematic approach for rating the certainty of evidence and determining the strength of recommendations (20).

Certainty of evidence

The certainty of evidence (i.e., the level of confidence we have that an estimate of effect is true) for quantitative research is determined using GRADE methods (20). After synthesizing the evidence for each prioritized outcome, the certainty of evidence is assessed. The overall certainty is determined by considering the certainty of evidence across all prioritized outcomes per recommendation. GRADE categorizes the overall certainty of evidence as *high*, *moderate*, *low* or *very low* (see **Table 1** for the definition of these categories).

Table 1: Certainty of evidence

CERTAINTY OF EVIDENCE	DEFINITION
High	We are very confident that the true effect lies close to that of the estimate of the effect.
Moderate	We are moderately confident in the effect estimate: the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.
Low	Our confidence in the effect estimate is limited: the true effect may be substantially different from the estimate of the effect.
Very Low	We have very little confidence in the effect estimate: the true effect is likely to be substantially different from the estimate of effect.

Source: Reprinted with permission from: Schünemann H, Brozek J, Guyatt G, et al., editors. Handbook for grading the quality of evidence and the strength of recommendations using the GRADE approach [Internet]. [place unknown: publisher unknown]; 2013 [cited 2018 Aug 31]. Table 5.1, Quality of evidence grades. Available from: https://gdt.gradepro.org/app/handbook/handbook.html#h.9rdbelsnu4iy

Note: The assigned certainty of evidence can be found directly below each recommendation statement. For more information on the process of determining the certainty of the evidence and the documented decisions made by RNAO guideline development methodologists, please refer to the supplementary materials under the "methodology documents" tab on the BPG webpage.

Strength of recommendations

Recommendations are formulated as strong or conditional by considering the certainty in evidence and the following key criteria (see **Discussion of evidence** for definitions):

- balance of benefits and harms
- values and preferences
- health equity

According to Schunemann et al., "A strong recommendation reflects the expert panel's confidence that the desirable effects of an intervention outweigh its undesirable effects (strong recommendation for an intervention) or that the undesirable effects of an intervention outweigh its desirable effects (strong recommendation *against* an intervention)" (20). In contrast, "A conditional recommendation reflects the expert panel's confidence that the desirable effects probably outweigh the undesirable effects (conditional recommendation for an intervention) or undesirable effects probably outweigh the undesirable effects (conditional recommendation against an intervention), but some uncertainty exists" (20). **Table 2** outlines the implications of strong and conditional recommendations.

When the overall certainty of the evidence is high or moderate, expert panel members can be confident of the effects of the intervention of interest and will support a strong recommendation. In addition, expert panel members need to ensure that the benefits outweigh the harms, and that there is reasonable confidence and limited variability in the values and preferences of persons (21). However, when the overall certainty of the evidence is low or very low, there is uncertainty regarding the impact of the intervention of interest, and expert panel members should expect conditional recommendations (21).

Table 2: Implications of strong and conditional recommendations

IMPLICATIONS OF STRONG AND CONDITIONAL RECOMMENDATIONS		
POPULATION	**STRONG RECOMMENDATION**	**CONDITIONAL RECOMMENDATION**
For health providers	■ The benefits of a recommended action outweigh the harms. Therefore, most persons should receive the recommended course of action. ■ There is little variability in values and preferences among persons in this situation. ■ There is a need to consider the person's circumstances, preferences and values.	■ The benefits of a recommended course of action probably outweigh the harms. Therefore, the majority of persons could receive the recommended course of action. ■ There is greater variability in values and preferences, or there is uncertainty about typical values and preferences among persons in this situation. ■ There is a need to consider the person's circumstances, preferences and values more carefully than usual.
For persons receiving care	■ Most persons would want the recommended course of action and only a small portion would not.	■ The majority of persons in this situation would want the suggested course of action, but many would not.
For policy-makers	■ The recommendation can be adapted as policy in most situations.	■ Policy-making will require substantial debate and involvement of many others impacted by the change. Policies are also more likely to vary between regions.
For researchers	■ The recommendation is likely supported by high credible evidence or other convincing judgments that make additional research unlikely to alter the recommendation.	■ The recommendation is likely to be strengthened by additional research. An evaluation of the conditions and criteria that determined the conditional recommendation will help to identify possible research gaps.

Source: Adapted with permission from: Schünemann H, Brozek J, Guyatt G, Oxman A, editors. Handbook for grading the quality of evidence and the strength of recommendations using the GRADE approach [Internet]. [place unknown: publisher unknown]; 2013 Oct [cited 2020 May 11]. Table 6.1, Implications of strong and weak recommendations for different users of guidelines. Available from: https://gdt.gradepro.org/app/handbook/handbook.html#h.33qgws879zw

Note: The strength of each recommendation statement is detailed directly below it and in the **Summary of recommendations and good practice statements**. For more information on the process used by the expert panel to determine the strength of each recommendation, please refer to the supplementary materials under the "methodology documents" tab on the BPG webpage.

Discussion of evidence

The discussion of evidence that follows each recommendation includes the following main sections.

1. **Benefits and harms:** Identifies the potential desirable and undesirable outcomes reported in the literature when the recommended practice is used. Content in this section solely includes research from the systematic review.
2. **Values and preferences:** Denotes the relative importance or worth placed on health outcomes derived from following a particular clinical action from a person-centered perspective. Content for this section may include research from the systematic reviews and, when applicable, observations and/or considerations from the RNAO expert panel.
3. **Health equity:** Identifies the potential impact that the recommended practice could have on health across different populations, settings and/or the barriers to implementing the recommended practice in particular settings. This section may include research from the systematic reviews and, when applicable, observations and/or considerations from the RNAO expert panel.
4. **Expert panel justification of recommendation:** Provides a rationale for why the expert panel made the decision to rate a recommendation as strong or conditional.
5. **Implementation tips:** Highlights practical information for nurses and members of the interprofessional team to support implementation in practice. This section may include supporting evidence from the systematic review and/or from other sources (e.g., the RNAO expert panel).
6. **Supporting resources:** Includes a list of relevant resources (e.g., websites, books and organizations) that support the recommendations. Content listed in this section was assessed based on five criteria: relevancy, credibility, quality, accessibility and timeliness of publication (published within the last 10 years). Further details about this process and the five criteria are outlined in the supplementary materials under the "methodology documents" tab on the BPG webpage. The list is not exhaustive and the inclusion of a resource in one of these lists does not imply an endorsement from RNAO. Some recommendations may not have any identified supporting resources.

Best practice guideline evaluation

As you implement the recommendations and good practice statements in this BPG, we ask you to consider how you will monitor and evaluate their impact.

The Donabedian model, which informs the development of indicators for evaluating quality health care, includes three categories: structure, process and outcome (22).

Structure describes the required attributes of the health system or health service organization to ensure quality care. It includes physical resources, human resources, and information and financial resources.

Process examines the health-care activities being provided to, for and with persons or populations as part of the provision of quality care.

Outcome analyzes the effect of quality care on the health status of persons and populations, health workforce, health service organizations or health systems (22).

For more details, see the **Monitor knowledge use** and **Evaluate outcomes** sections in the Leading Change Toolkit (3).

The following indicators have been developed to support evaluation and quality improvements in health service and academic organizations. Consider **Tables 3** and **4**, which provide a list of process and outcome indicators along with their operational definitions, numerators and denominators. Given that there is a lack of good practice statements and recommendations related to health provider education, there are no associated structure indicators in this BPG. Each table also identifies if the indicator aligns with other indicators in local, provincial, national and/or international organizations. Alignment with organizations is determined by comparing the following criteria with the developed indicators: the operational definition; if the indicator is nursing sensitive; and the inclusion/exclusion criteria. Depending upon the level of alignment, an indicator may be described to have full, partial or no alignment with external organizations. Indicators may be adopted (in their current state) or adapted (modified) from organizations.

The following indicators will support quality improvement and evaluation. Select the indicators most relevant to the changes being made in practice, education and/or policy, based on BPG recommendations and good practice statements that are prioritized for implementation.

Table 3 provides a list of process indicators that support the evaluation of practice changes during implementation and corresponding process improvements. Process indicators are derived from BPG recommendations and good practice statements.

Table 3: Process indicators

RECOMMENDATION OR GOOD PRACTICE STATEMENT	PROCESS INDICATORS	ALIGNMENT WITH INDICATORS IN OTHER ORGANIZATIONS
Good practice statement 3.0	Percentage of persons with a pressure injury who received a pressure injury assessment ***Numerator:*** *Number of persons with a pressure injury who received a pressure injury assessment* ***Denominator:*** *Total number of persons with a pressure injury*	Adapted from Nursing Quality Indicators for Reporting and Evaluation® (NQuIRE®)
Good practice statement 4.0	Percentage of persons who received a multicomponent pressure injury risk assessment within 24 hours of initiation of care ***Numerator:*** *Number of persons who received a multicomponent pressure injury risk assessment within 24 hours of initiation of care* ***Denominator:*** *Total number of persons who received care*	Adapted from NQuIRE Full alignment with Accreditation Canada, Institute for Clinical Evaluative Sciences (ICES), Partnership for Quality Measurement (PQM) and Resident Assessment Instrument Minimum Dataset (RAI MDS)
Good practice statement 4.0	Percentage of persons who had a change in health status and who were assessed/reassessed for the risk of developing pressure injuries during their care ***Numerator:*** *Number of persons who had a change in health status and who were assessed/reassessed for the risk of developing pressure injuries during their care* ***Denominator:*** *Total number of persons who had a change in health status during their care*	Adapted from NQuIRE Full alignment with Accreditation Canada, ICES and RAI MDS Partial alignment with PQM

RECOMMENDATION OR GOOD PRACTICE STATEMENT	PROCESS INDICATORS	ALIGNMENT WITH INDICATORS IN OTHER ORGANIZATIONS
Good practice statement 6.0	Percentage of persons who are at risk for or have a pressure injury who have an appropriate pressure redistribution support surface ***Numerator:*** *Number of persons who are at risk for or have a pressure injury who have an appropriate pressure redistribution support surface* ***Denominator:*** *Total number of persons who are at risk for or have a pressure injury who received care*	Adapted from NQuIRE Partial alignment with RAI MDS
Recommendation 2.0	Percentage of persons who are at risk for a pressure injury who have been repositioned every 2-4 hours ***Numerator:*** *Number of persons who are at risk for a pressure injury who have been repositioned every 2-4 hours* ***Denominator:*** *Total number of persons who are at risk for a pressure injury who received care*	Full alignment with RAI MDS
Recommendation 3.0	Percentage of persons who are at risk for a pressure injury who have received a preventative care bundle ***Numerator:*** *Number of persons who are at risk for a pressure injury who have received a preventative care bundle* ***Denominator:*** *Total number of persons who are at risk for a pressure injury who received care*	New

Table 4 provides outcome indicators to assess the impact of implementing evidence-based practice changes. Outcome indicators are associated with outcome(s) of the research question(s) and/or reflections of outcomes of all recommendations and good practice statements.

Table 4: Outcome indicators

OUTCOME INDICATORS	ALIGNMENT WITH INDICATORS IN OTHER ORGANIZATIONS
Percentage of persons with a pre-existing pressure injury on initiation of care ***Numerator:*** *Number of persons with a pre-existing pressure injury on initiation of care* ***Denominator:*** *Total number of persons who received care*	Adopted from NQuIRE Full alignment with RAI MDS Partial alignment with National Database of Nursing Quality Indicators (NDNQI) and PQM
Percentage of persons with a pressure injury ***Numerator:*** *Number of persons with a pressure injury* ***Denominator:*** *Total number of persons who received care*	Adapted from NQuIRE Full alignment with ICES Partial alignment with Canadian Institute for Health Information (CIHI), NDNQI and PQM
Rate of persons who developed a new pressure injury ***Numerator:*** *Number of persons who developed a new pressure injury* ***Denominator:*** *Total number of care-days/care-visits*	Adopted from NQuIRE Full alignment with NDNQI Partial alignment with Agency for Healthcare Research and Quality (AHRQ), CIHI, ICES, Ontario Health, PQM and RAI MDS
Percentage of persons who develop one or more new pressure injuries ***Numerator:*** *Number of persons who develop one or more new pressure injuries* ***Denominator:*** *Total of number of persons who received care*	Adapted from NQuIRE Full alignment with PQM Partial alignment with ICES and NDNQI

OUTCOME INDICATORS	ALIGNMENT WITH INDICATORS IN OTHER ORGANIZATIONS
Percentage of persons with a pressure injury with signs of healing after 2 to 4 weeks of pressure injury identification ***Numerator:*** *Number of persons with a pressure injury with signs of healing after 2 to 4 weeks of pressure injury identification* ***Denominator:*** *Total number of persons with a pressure injury who received care*	Adopted from NQuIRE
Percentage of persons with a pressure injury that closed completely ***Numerator:*** *Number of persons with a pressure injury that closed completely* ***Denominator:*** *Total number of persons with a pressure injury who received care*	Adapted from NQuIRE
Percentage of persons whose pressure injury worsened ***Numerator:*** *Number of persons whose pressure injury worsened* ***Denominator:*** *Total number of persons with a pressure injury who received care*	Adapted from NQuIRE Partial alignment with CIHI, ICES, Ontario Health and PQM

Other RNAO resources for the evaluation and monitoring of BPGs:

Nursing Quality Indicators for Reporting and Evaluation® (NQuIRE®), a unique international data system housed at RNAO, allows BPSOs® to monitor and evaluate the impact of BPG implementation. The NQuIRE data system collects, compares and reports data on human resource structure indicators as well as guideline-specific, nursing-sensitive structure, process and outcome indicators. NQuIRE indicator definitions are aligned with available administrative data and existing indicators wherever possible, adhering to a "collect once, use many times" principle. By complementing other established and emerging repositories, NQuIRE strives to leverage reliable and valid measures, minimize the reporting burden and align evaluation measures to enable comparative analyses. The NQuIRE data system was launched in August 2012 to create and sustain evidence-based practice cultures, optimize the safety of persons, improve health outcomes and engage staff in identifying relationships between practice and outcomes to advance quality and advocate for resources and policy that support best practice changes (23).

RNAO Clinical Pathways™ are digitized recommendations and good practice statements embedded into electronic medical records through third party software. Currently, these clinical pathways are available to all Canadian Long-Term Care homes. The ability to link structure and process measures with specific outcome measures helps determine the impact of BPG implementation on specific health outcomes.

Background context

Pressure injuries

A pressure injury is localized damage to the skin and/or underlying tissue as a result of pressure or pressure in combination with shear. Pressure injuries, also called pressure ulcers or bedsores, usually occur over a bony prominence but may also be related to contact with a medical device or other object (14). The most common locations of pressure injuries are the sacrum, heels and trochanters (24). Pressure injuries develop through shear and pressure and sometimes through friction (25). The use of medical devices can lead to **mucosal membrane pressure injuries**[G]. Equipment, furniture, and everyday objects can also lead to tissue damage when in direct contact with skin through increased mechanical load and pressure (26).

Risk factors for pressure injury development include low body mass index (BMI), male sex, older age, anemia, hypoalbuminemia, diabetes, hypotension, low physical activity or immobility, existing pressure injuries, malnutrition and loss of sensation (25). Additional treatment related risk factors for pressure injury development include length of hospital stay or critical care admission. Skin microclimate is an indirect risk factor for pressure injury development, and refers to the temperature, humidity and airflow next to the skin surface (27). The skin should be prevented from overhydration or drying out, however the direct impact of microclimate on pressure injury development is unclear, as is the effect of "microclimate interventions" (27).

Estimates of pressure injury prevalence in Canada between 1990 and 2003 across all healthcare institutions studied was 26 per cent (95% CI, 25.2% to 26.8%) (28). Although 50 per cent of these were Stage 1 pressure injuries, this data is still disturbing (28). In Ontario, hospitalization rates for pressure injuries were 60 persons per 100,000 of the population in 2014-2015 (29). Of note, up-to-date Ontario and national statistics on pressure injury rates are lacking and there is a need for improved monitoring and reporting. Globally, pressure injuries comprise a large portion of wound care. According to Global Burden of Disease Study 2017, pressure injury incidence has remained relatively stable since 1990 and 2017, indicating a need for improvement (30).

Other types of chronic wounds include diabetic foot ulcers, venous ulcers and arterial ulcers. These wounds differ in their etiology and require different treatment and prevention strategies than pressure injuries (31). **Appendix P** offers an overview of chronic wounds. Moisture-associated skin damage may at times be mistaken for pressure injuries or co-exist with pressure injuries (32). In particular, incontinence-associated dermatitis in the sacral area may be difficult to differentiate from sacral pressure injuries at the bedside (33). **Appendix Q** distinguishes between pressure injuries and incontinence-associated dermatitis.

Complications and resource implications of pressure injuries

Pressure injuries are painful and can impact quality of life. Persons and their caregivers are aware that pressure injuries are painful and slow to heal, and that pressure injuries are often an indication of poor quality of care (34). Depending on the stage of the pressure injury, and whether there are complications, comorbidities or other factors, pressure injuries may take weeks, months or even years to heal (34). Some pressure injuries may be non-healable. Pressure injuries can lead to infection, longer hospital stays and can contribute to premature mortality (35).

Pressure injuries have a negative impact on psychological health (36–38). Studies found that persons with pressure injuries have reduced autonomy, increased sense of insecurity and decreased mental well-being (37). High depression scores were found, which were associated with decreased comfort, decreased enjoyment of food and activities,

while pain resulted in a decrease in functional capacity (38). Persons with pressure injuries depended heavily on family members or social services for their activities (38). Caregivers also experienced psychological burden. They demonstrated elevated levels of anxiety, depression and stress (36).

Pressure injuries are one of the most expensive adverse events in health care (39). The total net adjusted hospitalization cost of a hospital-acquired pressure injury in Ontario was $44,000 to $90,000 from 2002-2006, compared with $11,000 to $18,500 for a pre-admission pressure injury (40). A 2019 research report estimated that US hospital-acquired pressure injury costs could exceed $26.8 billion annually (41). About 59 per cent of those costs were attributable to Stage 3 and 4 full-thickness wounds (13.3 per cent of patients), which occupy significant clinician time and hospital resources (41). Any Stage 3 or 4 pressure injury acquired after admission to hospital has been designated as a "Never Event" by the Canada Patient Safety Institute (now Healthcare Excellence Canada) (42). Stage 3 and 4 pressure injuries can lead to serious complications such as infections of the bone or blood (i.e., sepsis) (42).

Avoidable and unavoidable pressure injuries

The vast majority of pressure injuries are avoidable. Given the impacts of pressure injuries, as well as the difficulty treating more complex and higher stage wounds, prevention of pressure injuries is vital. The development of most pressure injuries can be prevented through evidence-based practice.

Unavoidable pressure injuries are those that develop even when pressure injury prevention, assessment and treatment programs are followed properly (26). Unavoidable pressure injuries can occur in circumstances in acute care that render the delivery of pressure injury prevention unsafe, such as when organizations operate at crisis capacity, as during the COVID-19 pandemic (43). Additional risk factors for unavoidable pressure injuries can include hemodynamic instability, inability to provide or maintain appropriate hydration or nutrition, and end-of-life stages (44).

Equity, diversity and inclusion

Racial disparities exist with regard to pressure injury development and healing (45,46). In a review of pressure injuries in patients with dark skin tones, the study concluded that people with darker skin tones are more likely to develop higher stage pressure injuries across health settings (47). Considerations for skin tone are important across pressure injury prevention, assessment and treatment (14). Visual skin inspection alone is unreliable for assessing pressure injuries and pressure injury risk (48). Recently, the definition of Stage 1 pressure injury was expanded to include description of dark skin tones. Stage 1 pressure injuries are defined as intact skin with a localized area of non-blanchable erythema, which may appear differently in darkly pigmented skin (49). Presence of blanchable erythema or changes in sensation, temperature or firmness may precede visual changes (49). An over reliance on the presence of redness or erythema may lead to the development of higher stage pressure injuries in people with darker skin tones (48). Given the challenge of early detection in darker skin tones, prevention practices are needed as well as enhanced assessment and education of health providers (48). How pressure injuries heal may also look different in people with darker skin tones (48).

The social determinants of health (SDOH) are the non-medical factors that influence health outcomes. They are the conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life (50). SDOH may result in potential health disparities and inequities across racial and social groups. In Canada, Indigenous people including First Nations, Inuit and Metis people are disproportionately affected by SDOH such as racism, marginalization, poverty, dislocation and social exclusion (51). These factors, including limited access to care in some settings, may lead to disparities in pressure injury care among Indigenous persons. A recent study in the United States examined the course of pressure injuries in people with various risk factors (46). The study reported that pressure injury duration was longer in men, Black patients, and patients with evidence of detrimental SDOH compared with their counterparts. In the review of the impact of SDOH on pressure injury progression, this study found that detriments in SDOH related to food scarcity (as identified through ICD 10 codes) and Black race were both significant, independent predictors of longer pressure injury duration (46). SDOH history had the strongest correlation with pressure injury progression, indicating that social, upstream and person-centred factors need to be considered to adequately treat and prevent pressure injuries (46).

Conclusion

The purpose of this guideline is to provide nurses, members of the interprofessional team and other collaborators (e.g., administrators and policy-makers) with evidence-based recommendations for the management of pressure injuries, including risk assessment, prevention and treatment. This guideline recognizes that people with or at risk of developing pressure injuries and their essential caregivers are experts in their health and decision making. Therefore, collaboration among the interprofessional team, persons with lived experience and essential caregivers is critical to achieving better health outcomes.

Guiding principles

Guiding principles[G] are overarching concepts that denote a philosophy, belief, value, and/or standard of behavior that nurses, members of the interprofessional team, and health service organizations should apply to their practice. It is important that guiding principles are followed to improve health outcomes for persons, families, and populations. The following guiding principles were selected by the expert panel and are considered foundational to all recommendations and good practice statements in this BPG.

Person-centred care

Person-centred[G] care is an approach to care in which the person is viewed as whole. The process of coming to know the whole person is nurtured through the formation of a therapeutic relationship between the person, those who are significant to them, and health and social service providers. This approach to care involves advocacy, empowerment, mutual respect and an understanding of the person's right to be autonomous, to self-determine and to participate actively in decisions about their health (both illness and wellness) (52). Various terms exist to describe this concept (people-centred care, patient-centred care, person- and family-centred care), but all consider the person receiving care and services to be a central participant of the process.

The World Health Organization (WHO) describes integrated people-centred health services as putting the comprehensive needs of people and communities, not only diseases, at the centre of health systems, and engaging and empowering people to have a more active role in their own health (53). In the context of pressure injuries, person-centred care is about treating the whole person – not only the wound. People at risk of or living with pressure injury along with their essential caregivers have a key role to play in prevention, assessment and treatment of their pressure injuries. The Wound Bed Preparation paradigm is one example of a person-centred, wholistic approach to pressure injury treatment with an emphasis on patient comfort (54). Treatment for healable wounds focuses on moisture balance, active debridement and control of infection or inflammation (54). Treatment of non-healable or maintenance wounds emphasizes patient comfort, relieving pain, controlling odour, preventing infection, conservative debridement, and moisture management (54).

Shared decision making

Shared decision making[G] **(SDM)** is one way to operationalize person-centred care. SDM is an interpersonal, interdependent process in which health providers, persons and their caregivers collaborate in making decisions about a person's health (55). Briefly, SDM depends on knowing and understanding the best available evidence about the risks and benefits across all available options while ensuring that the person's values and preferences are taken into account (55).

There is strong evidence demonstrating the effectiveness of the use of SDM on health outcomes (55). Evidence is emerging that SDM may be promising within pressure injury prevention and treatment. In a recent systematic review, most of the studies found clinically significant results in decreasing pressure injury incidence with the use of SDM (56).

Recommendations and good practice statements

FOUNDATIONAL

GOOD PRACTICE STATEMENT 1.0:

It is good practice for organizations to implement an interprofessional approach for the assessment, prevention and treatment of pressure injuries. This approach includes shared decision making with persons at risk of or living with pressure injuries and their essential caregivers

Expert panel justification of good practice statement

An interprofessional approach that includes shared decision making for the prevention and treatment of pressure injuries is part of good practice. An interprofessional approach is care delivered by multiple health providers who work collaboratively to deliver comprehensive and quality health services to persons within, between and across health-care organizations and disciplines (10).

Many health providers work collaboratively as active participants in the prevention, assessment and management of pressure injuries. Key interprofessional team members supporting persons with or at risk of pressure injuries may include: nurses (including specialist wound nurses), personal support workers, physicians, dietitians, occupational therapists and physiotherapists. See Implementation tips for further details on roles of the interprofessional team. It is important to emphasize that persons and their essential caregivers are at the centre of the interprofessional team as active participants. The interprofessional approach promotes complementary roles, cooperative effort, and shared responsibilities within the health care team. Collective awareness of each other's knowledge, skills and abilities leads to better quality care. An interprofessional approach also includes shared decision making (SDM), which is a collaborative approach to making decisions about a person's health, considering their values and preferences (55).

The expert panel determined that this statement was necessary to communicate with nurses and health providers but not did require a systematic review of the evidence. This good practice statement aligns with the many organizations that support an interprofessional approach to care including Canadian Nurses Association (CNA), and the World Health Organization (WHO) (10,57,58).

Implementation tips

From the expert panel

- Ensure that each health provider is introduced to the person at risk of or living with pressure injury and that health providers explain their role to the person.
- Involve persons and/or essential caregivers in care planning, including the assessment, prevention and treatment of pressure injuries.
- Engage persons and/or essential caregivers in health teaching on pressure injury prevention for example by providing resources and quick reference guides (see **Appendix F** for an example).
- Provide information to persons and their essential caregivers on when to seek health services or referrals to specialist care.

To provide comprehensive, coordinated, and quality clinical care for people with pressure injuries it may be necessary to consult and collaborate with the following health providers (59):

- chiropodist (for specialized care of pressure injuries in the lower extremities);
- health-care professionals and clinics who have obtained advanced training in wound care;
- infection control specialist/microbiologist (for unresponsive, recalcitrant, or recurrent infection);
- nurse practitioner (for the assessment and management of pressure injuries, depending on individual practitioner knowledge, training, skill set, and role on the interprofessional team);
- nurse specialized in wound, ostomy and continence (for specialized care in wound, ostomy, and continence health concerns);
- occupational therapist (for pressure redistribution, mobility, activities-of-daily-living assessments, expertise in wheelchair seating prescription, shear prevention, and management) and occupational therapy assistants;
- personal support worker;
- pharmacist (for identifying and advising on medications that may affect activity levels);
- physiatrists (for care of persons with spinal cord injuries and work with rehabilitation personnel);
- physiotherapist (for pressure redistribution, mobility, adjunctive therapies, expertise in wheelchair seating prescription, and shear prevention and management) and physiotherapy assistants;
- physician (e.g. family doctor or medical specialist, for the assessment and management of pressure injuries, depending on individual practitioner knowledge, training, skill set, and role on the interprofessional team);
- prosthetist (related to prosthetic device refitting for individuals with pressure injury);
- registered dietitian (for the assessment and management of nutritional status);
- registered nurse, registered practical nurse (for the assessment and management of pressure injuries, depending on individual practitioner knowledge, training, skill set, and role on the interprofessional team);
- social worker (for psychosocial, psychosocial assessment/social supports, and disposition planning);
- speech language pathologist (for swallowing and communication); and
- surgeon (for surgical intervention, surgical debridement, flap closures, and vascular assessment).

Supporting resources

RESOURCE	DESCRIPTION
Araujo SM, Sousa P, Dutra I. Clinical decision support systems for pressure ulcer management: Systematic review. JMIR Med Inform. 2020 Oct 16;8(10):e21621. Available from: https://medinform.jmir.org/2020/10/e21621	■ Systematic review of clinical decision support systems used by nurses to facilitate clinical decision making for pressure injury management.
Norton L, Parslow N, Johnson D, et al. Best practice recommendations for the prevention and management of pressure injuries. [Internet] Wounds Canada; 2018. Available from: https://www.woundscanada.ca/docman/wc-institute/institute-library/bprs/2188-wc-bpr-prevention-and-management-of-pressure-injuries-1532r3e-final/file	■ Describes the wound prevention and management cycle which includes assembling an interprofessional team.
Stacey D, Lewis KB, Smith M, Carley M, et al. Decision aids for people facing health treatment or screening decisions. Cochrane Database of Systematic Reviews 2024, Issue 1. Art. No.: CD001431. DOI: 10.1002/14651858.CD001431.pub6. Accessed 29 April 2024. Available from: https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD001431.pub6/full	■ Cochrane systematic review of decision aids.

GOOD PRACTICE STATEMENT 2.0:

It is good practice for organizations and health providers to communicate and collaborate in a culturally safe and inclusive manner with persons and their essential caregivers in the assessment, prevention and treatment of pressure injuries.

Expert panel justification of good practice statement

Delivering care in a culturally safe and inclusive manner is part of good practice. Cultural safety is an outcome that is based on respectful engagement that recognizes and aims to address power imbalances inherent across the health system; it recognizes that people and their families are active members in their care (60). Cultural safety is possible in an environment that is free of racism and discrimination. The creation of a safer health-care environment leads to increased access to the health system and results in improved health outcomes (60). Although the term cultural safety was originally used with regard to Indigenous populations, the concept of cultural safety can be applied to all populations with cultures not considered the "dominant" culture in the country where they live.

Within all care, racism and discrimination can contribute to poor health outcomes. Within pressure injury care specifically, there are disparities in pressure injury outcomes in Black people and other people of colour compared with white people. There are challenges in the early detection of pressure injuries in people with dark skin tones, resulting in an incidence of higher stage pressure injuries (48). A cross-sectional nationwide study in the United States observed longer hospital stays for Black people and other people of colour with pressure injury compared to white people with pressure injury (45). In Canada, cultural safety and inclusivity is particularly important with respect to Indigenous communities whose members experience discrimination, poverty and exclusion which lead to disparities in health outcomes. The provision of culturally safe pressure injury management requires an expanded definition and understanding of Stage 1 pressure injuries beyond a focus on redness and the use of alternative strategies in the assessment and early detection of pressure injuries (48).

The expert panel determined that culturally safe care was foundational to all pressure injury prevention, assessment and treatment. The expert panel determined that this statement was necessary to communicate with nurses and health providers but did not require a systematic review of the evidence. This good practice statement aligns with the College of Nurses of Ontario (CNO) code of conduct. One principle states "nurses provide inclusive and culturally safe care by practicing cultural humility" (61).

Implementation tips

From the expert panel

- A trauma- and violence-informed approach to care can help promote cultural safety.
- Be mindful to use inclusive language. Use teaching materials that have inclusive imagery and language.
- Health providers are to work with people and their essential caregivers to identify any traditional or cultural practices that would support their assessment, prevention or treatment of pressure injuries.
- Health service organizations need to provide training to all health providers regarding culturally safe care, including education on various skin types, presentation and alternative strategies for skin inspection.
- Organizational equity, diversity and inclusion or other similar committees may be able to play a role in ensuring and advocating that pressure injury care is culturally safe.
- Implement alternative strategies beyond visual skin inspection to detect skin damage likely caused by pressure. See **Recommendation 1.0** and **Recommendation 1.1**.

For further information on pressure injuries among people with dark skin tones, see supporting resources and **Appendix I**.

Supporting resources

RESOURCE	DESCRIPTION
Black J, Cox J, Capasso V, et al. Current Perspectives on Pressure Injuries in Persons with Dark Skin Tones from the National Pressure Injury Advisory Panel. Adv Skin Wound Care. 2023 Sep 1;36(9):470–80. Available from: https://journals.lww.com/aswcjournal/abstract/2023/09000/current_perspectives_on_pressure_injuries_in.5.aspx	■ Provides current perspective from the National Pressure Injury Advisory Panel (NPIAP) on the literature surrounding pressure injuries in people with dark skin tones. ■ Includes considerations for assessment, prevention and treatment. ■ **Note:** This is is a resource for which there is a fee.
College of Nurses of Ontario. Code of conduct [Internet]. [cited 2024 May 31]. Available from: https://www.cno.org/Assets/CNO/Documents/Standard-and-Learning/Practice-Standards/49040_code-of-conduct.pdf	■ College of Nurses code of conduct which includes cultural safety.
Wounds International. Wound Care and Skin Tone Made Easy [Internet]. Wounds International; 2023 [cited 2024 May 31]. Available from: https://woundsinternational.com/made-easy/wound-care-and-skin-tone/	■ Five-page guide on pressure injury and skin tone. ■ Education: includes information on inclusive language and images to help guide health providers.

GOOD PRACTICE STATEMENT 3.0:

It is good practice for health providers, in collaboration with persons and their essential caregivers, to use a systematic approach in the management of pressure injuries, which includes assessment, prevention and treatment.

Expert panel justification of good practice statement

A systematic approach to the management of pressure injuries is part of good practice because it ensures consistency, thoroughness and effectiveness in care. A systematic approach is a methodological and organized way of treating, assessing and preventing pressure injuries. A systematic approach follows a step-wise, logical flow and often an established, evidence-based framework.

Examples of wound care frameworks include the Wound Bed Preparation paradigm, the Wound Prevention and Management Cycle and TIMERS (54,62,63). Each framework follows a systematic clinical workflow either in a step-wise or cyclical manner. Early steps in planning wound treatment in all frameworks are based on the causative factors of the wound, and consideration of the person's goals and whether the wound is healable or non-healable (54,62,63). All frameworks are person-centred (54,62,63). The involvement of persons and their essential caregivers in identifying goals of care and care planning can improve adherence.

The Wound Bed Preparation is a paradigm to optimize chronic wound treatment through a wholistic and person-centred approach. Treatment for healable wounds focuses on moisture balance, active debridement and control of infection or inflammation (54). Treatment of maintenance wounds emphasizes preventing deterioration, preventing infection, conservative debridement, and moisture management (54). Treatment of non-healable wounds emphasizes patient comfort, pain relief, prevention of infection and moisture management (54). The Wound Prevention and Management Cycle follows a cyclical five-step process that includes assessment/reassessment, setting goals, assembling the team, establishing and implementing a plan of care and evaluating outcomes (62). The cycle includes selecting interprofessional team membership based on a person's need. The TIMERS framework provides structured guidance on approaches to managing wounds and when adjunctive therapies should be considered alongside standard care (63). The framework includes: tissue viability (T), infection/inflammation (I), moisture balance (M), wound edge (E), repair/regeneration (R), and social- and patient-related factors (S). For further details of these frameworks, see **Appendix E**.

The expert panel determined that this good practice statement was necessary to communicate with nurses and health providers but does not require a systematic review of the evidence. Using a systematic approach to provide care is a core function of the nursing process (assessment, diagnosis, planning, implementation and evaluation).

Implementation tips

From the expert panel

Follow the guiding principles of person-centred care and shared decision making when using a systematic approach in the management of pressure injuries. Ask and assess what type of care is being received in home settings, if applicable.

- All health providers who have a role in the prevention, assessment or treatment of pressure injuries are to follow a systematic approach.
- A systematic approach to management of pressure injuries is to include management of pain. See supporting resources and **Appendix K** for further details.

- Assessment of pressure injuries within a systematic approach is to be guided by the use of a validated tool. See supporting resources and **Appendix M** and **Appendix N** for further details.
- Assessment of pressure injuries is to be clearly documented. Include the following:
  - pain (including location, causative factors, intensity, duration, etc.)
  - any person refusal of care or nonadherence to treatment plans
  - interventions used to promote healing, such as dietary supplements, vitamins, laboratory tests, repositioning, offloading, incontinence management, and care
  - conditions that negatively affect healing, such as impaired mobility and nutritional status
  - anticipated wound outcome

Supporting resources

RESOURCE	DESCRIPTION
Atkin L, Bućko Z, Conde Montero E, et al. Implementing TIMERS: the race against hard-to-heal wounds. J Wound Care. 2019 Mar 1;23(Sup3a):S1–50. Available from: https://www.magonlinelibrary.com/doi/full/10.12968/jowc.2019.28.Sup3a.S1?rfr_dat=cr_pub++0pubmed&url_ver=Z39.88-2003&rfr_id=ori%3Arid%3Acrossref.org	■ Describes the TIMERS framework for hard-to-heal wounds.
Holloway S, Ahmajärvi K, Frescos N, et al. Holistic management of wound-related pain: An overview of the evidence and recommendations for clinical practice. Journal of Wound Management [Internet]. 2024 Apr 1 [cited 2024 May 31];25(1). Available from: https://journals.cambridgemedia.com.au/jwm/10.35279/jowm2024.25.01/holistic-management-wound-related-pain-overview-evidence-and-recommendations-clinical-practice	■ Guidance on the wholistic management of wound-related pain.
Norton L, Parslow N, Johnson D, et al. Best practice recommendations for the prevention and management of pressure injuries. [Internet] Wounds Canada; 2018. Available from: https://www.woundscanada.ca/docman/wc-institute/institute-library/bprs/2188-wc-bpr-prevention-and-management-of-pressure-injuries-1532r3e-final/file	■ Describes the wound prevention and management cycle.

RESOURCE	DESCRIPTION
Sibbald RG, Elliott JA, Persaud-Jaimangal R, et al. Wound Bed Preparation 2021. Adv Skin Wound Care. 2021 Apr 1;34(4):183–95. Available from: https://journals.lww.com/aswcjournal/fulltext/2021/04000/wound_bed_preparation_2021.4.aspx	■ Describes the updated wound bed preparation framework (2021).
Smet S, Probst S, Holloway S, et al. The measurement properties of assessment tools for chronic wounds: A systematic review. Int J Nurs Stud. 2021 Sep;121:103998. Available from: https://www.sciencedirect.com/science/article/abs/pii/S0020748921001450?via%3Dihub	■ Provides an overview of available wound assessment tools. ■ Systematically identifies and summarizes assessment tools and investigates their measurement properties. ■ **Note:** This is is a resource for which there is a fee.
Wound source. Documentation in wound care. 2022. Available from: https://www.woundsource.com/blog/documentation-in-wound-care	■ Provides details on what to include in wound documentation.

ASSESSMENT

GOOD PRACTICE STATEMENT 4.0:

It is good practice for nurses and health providers, in collaboration with persons and their essential caregivers, to use a multicomponent approach to assess and reassess a person's risk of developing pressure injuries.

Expert panel justification of good practice statement

A multicomponent approach to assessing risk of developing pressure injuries involves conducting a comprehensive assessment that considers the individual's context and unique circumstances. This risk assessment goes beyond simply following a checklist or tool and employs clinical reasoning to draw conclusions about risk of pressure injury. A multicomponent approach by health providers to assess/reassess a person's ongoing risk of developing pressure injuries, in collaboration with their essential caregivers, allows multiple factors to be considered, enables a safer approach to providing care for the person and allows preventative interventions to be tailored appropriately (14).

Some literature has shown that diagnostic accuracy does not differ substantially among commonly used scales for pressure injury risk such as the Braden scale, the Norton scale or the Waterlow scale (64). Risk factors that predispose an individual to developing a pressure injury may also vary among patients in different clinical settings, and it may not be possible to design one risk assessment tool that will meet the needs of all patients in all clinical settings (65). While scales can serve as useful tools for organizing clinical thought process, they should not be viewed as substitutes for critical thinking. Rather, they should be an intrinsic/ extrinsic complement to a thorough head-to-toe skin assessment that concentrates on high-risk areas. Moreover, scales should be utilized alongside a profound understanding of both the causal and risk factors contributing to pressure injuries. Risk factors for pressure injuries that should be considered during a multicomponent risk assessment include: older age; patients with darker skin tones; lower body weight; cognitive impairment; physical impairments; and other comorbid conditions that affect skin integrity (e.g., urinary or fecal incontinence, diabetes, edema, impaired microcirculation, hypoalbuminemia and malnutrition) (14).

In essence, a multicomponent approach advocates for a wholistic evaluation that takes into account the whole clinical picture, integrating standardized scales with a hands-on comprehensive skin assessment and assessment of additional risk factors. The interpretation of the assessment outcomes, finally, involves nuanced clinical judgment. This approach ensures a more comprehensive understanding of each patient's individual needs and fosters more effective prevention and management strategies (14).

The expert panel determined that this good practice statement was necessary to communicate with nurses and health providers but did not require a systematic review of the evidence. The good practice statement aligns with the College of Nurses of Ontario (CNO) nursing assessment. According to the CNO an assessment is to be wholistic and consider multiple components including the person's "biological, social, psychological, cultural and spiritual values and beliefs" (66).

Implementation tips

From the expert panel

- Risk assessment and reassessment requires a structured approach which is wholistic and applies clinical judgment and reasoning.
- Persons and essential caregivers are to be involved in risk assessment for pressure injuries.
- Different risk assessment tools may be appropriate in different settings but should not be relied on as a stand-alone tool to complete risk assessment. Any risk assessment tool may need to be supplemented with assessment of additional risk factors and consideration of the whole person.
- Multicomponent risk assessment is to be documented.
- Risk assessment can be supported by a validated tool. See **Appendix G** for risk assessment tools.

Table 5: Implementation tips from the expert panel

COMPONENT OF MULTICOMPONENT APPROACH	DETAILS OF COMPONENT
Comprehensive skin assessment	Comprehensive skin assessment is a process by which the entire skin of every individual is examined for any abnormalities. It requires **looking** and **touching** the skin from head to toe, with a particular emphasis over bony prominences. Health technologies for assessment and early detection of pressure injuries can be used as an adjunct to comprehensive skin assessment, in particular for those with darkly pigmented skin (see **Recommendation 1.0** and **Recommendation 1.1**).
Assessment of additional risk factors	Risk factors include, but are not limited to: ■ age ■ diabetes ■ perfusion and circulation deficits ■ comorbidities and illness severity ■ history of pressure injuries ■ duration of hospital stay ■ nutrition status and malnutrition ■ hydration status and dehydration ■ certain medications ■ impaired mobility ■ moisture ■ impaired sensory perception ■ Assessment of the person's home including need for assistive devices
Interpretation of the assessment	Clinical judgment is to be used when interpreting results of risk assessment or reassessment.
Collaboration with person and caregiver	The health team is to collaborate with the person and their caregiver to assess/reassess a person's risk of pressure injury.

COMPONENT OF MULTICOMPONENT APPROACH	DETAILS OF COMPONENT
Timing of reassessment	Reassessment is to occur at the following times: ■ change in health status ■ during transitions in care (e.g. discharge or transfer between units) ■ when pressure injury prevention strategies have been changed (e.g. change in repositioning frequency, type of support surfaces) If there is no evidence of progress toward healing within two weeks, reassessment of the wound, plan of care and person is required.

Supporting resources

RESOURCE	DESCRIPTION
Black J, Cox J, Capasso V, et al. Current perspectives on pressure injuries in persons with dark skin tones from the National Pressure Injury Advisory Panel. Adv Skin Wound Care. 2023 Sep 1;36(9):470–80. Available from: https://journals.lww.com/aswcjournal/abstract/2023/09000/current_perspectives_on_pressure_injuries_in.5.aspx	■ Publication from National Pressure Injury Advisory Panel (NPIAP) outlining considerations for assessment, prevention and treatment of pressure injuries in persons with darker skin tones ■ Outlines technology for early detection. ■ **Note:** This is a resource for which there is a fee.
Wound source. Documentation in wound care. 2022. Available from: https://www.woundsource.com/blog/documentation-in-wound-care	■ Provides details on what to include in wound documentation.

GOOD PRACTICE STATEMENT 5.0:

It is good practice for health providers to classify a pressure injury using a validated classification system. This classification system should not be used for monitoring pressure injury healing.

Expert panel justification of good practice statement

As understanding of the etiology of pressure injuries has increased, several classification or staging systems have been developed and used. There are now two gold standard classification systems (see below). To assess the pressure injury, it is important to consistently use the same pressure injury classification system (14).

Classification allows for appropriate definition of the anatomic depth of the tissue damage of the pressure injury (68). A validated classification system also allows for comparison of data between hospitals or other health information systems, and the classification system improves the methodological quality of pressure injury research (14). The depth of detail in this description of each component also allows a better understanding of each stage. See **Appendix H** for an example of a classification system.

Classification systems should not be used for the monitoring of healing of pressure injuries or "back staging" (68). For example, a stage 4 pressure injury should not be reversed-staged to Stage 3, Stage 2 and Stage 1 as it closes. Back-staging pressure injuries can misrepresent the degree of tissue damage involved as stage 3 and stage 4 pressure injury closure is different from a biophysiological perspective. Full thickness wounds close through granulation tissue, not the same tissue components (such as muscle or subcutaneous).

The expert panel determined that this statement was necessary to communicate with nurses and health providers but did not require a systematic review of the evidence. This good practice statement aligns with the good practice statements on classification from the International Guidelines (European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP) and Pan Pacific Pressure Injury Alliance (PPPIA)) (14). It also aligns with the College of Nurses of Ontario (CNO) nursing assessment. The CNO states that an "evidence-based tool should be used when describing the patients' situation" (66).

Implementation tips

From the expert panel

- Two classification systems are considered gold standard for use: the NPIAP/EPUAP or World Health Organization (WHO) international classification of disease (ICD) systems.
- These systems are not tools to monitor healing. Classification systems are used only to stage or classify the initial wound.
- See **Good practice statement 3.0** and **Appendix M** for further details on wound assessment.

Supporting resources

RESOURCE	DESCRIPTION
ICD-11 for Mortality and Morbidity Statistics [Internet]. [cited 2023 Dec 14]. Available from: https://icd.who.int/browse/2024-01/mms/en#1644926300	■ World Health Organization's International Classification of Diseases 11th edition. ■ Includes staging for pressure injuries.
National Pressure Injury Advisory Panel. NPIAP Pressure Injury Stages [Internet]. National Pressure Injury Advisory Panel; 2016 [cited 2024 Jun 11]. Available from: https://cdn.ymaws.com/npiap.com/resource/resmgr/online_store/npiap_pressure_injury_stages.pdf	■ 2016 NPIAP pressure injury stages/classifications.

RECOMMENDATION 1.0:

The expert panel suggests that nurses and health providers use infrared thermography as an adjunct to skin assessment for early detection of pressure injuries.

Strength of the recommendation: Conditional

Certainty of the evidence of effects: Very low

Background

Considerations for skin tone are critical in pressure injury risk assessment. Visual skin inspection alone is unreliable for assessing pressure injuries and pressure injury risk (48). Presence of blanchable erythema or changes in sensation, temperature or firmness may precede visual changes (49). An over reliance on the presence of redness or erythema may lead to the development of higher stage pressure injuries in people with dark skin tones (48). Given the challenge of early detection in darker skin tones, the panel prioritized a recommendation question on technology for early detection and assessment which resulted in **Recommendation 1.0** and **Recommendation 1.1**.

Discussion of evidence:

Benefits and harms

For this recommendation, the intervention of interest is infrared thermography compared to standard care (no technology for early detection and assessment of pressure injuries). For the purposes of this BPG, infrared technology refers to technology used to detect skin temperature by capturing infrared radiation emitted from the skin surfaces. Areas at risk of developing pressure injury may have increased or decreased skin temperature compared with adjacent normal skin.

There was one systematic review (SR) of four non-randomized studies (NRS). The types of interventions included infrared thermography (thermal imaging). The populations included adults over the age of 18 years at risk of pressure injuries. For further details of the intervention noted in the literature, please refer to the Implementation Tips below.

Three studies in the SR reported on accuracy of predicting pressure injury development and found that there may be an increase in accuracy, but the evidence is very uncertain. In three studies where thermography was compared to visual inspection (i.e., using the Braden scale or Norton scale), thermography was more accurate in predicting pressure injury development (Stage I or deep tissue injury) (69). As reported in the SR, one NRS reported on incidence rate of pressure injury and found that infrared thermography may decrease the incidence of pressure injury but the evidence is very uncertain (69). An additional NRS reported a historical rate of hospital acquired pressure injury of 2.58 per month compared to zero during the study period (69).

The expert panel noted that pressure injury precursor signs and symptoms, health provider compliance with technology and person or caregiver satisfaction were critical outcomes that the systematic reviews should focus on; however, these outcomes were not measured in the literature.

There were no harms reported in the studies.

The overall certainty of the evidence for these outcomes was very low due to very serious risk of bias of individual studies as well as very serious imprecision related to the low number of events for all outcomes.

For more detailed information on the impact of the infrared thermography on the prioritized outcomes (accuracy of predicting pressure injuries development and incidence rate of pressure injuries), refer to the evidence profiles under the "methodology documents" tab of the website. See also **Appendix L** for emerging evidence on health technologies for pressure injury assessment and early detection.

Values and preferences

There were no values and preferences related to the intervention reported in the evidence or noted by the panel.

Health equity

From the expert panel:

The expert panel noted infrared thermography may have increased utility in early detection for those with darker skin tones. The technology may help to address the gap in identifying Stage 1 pressure injury in people with darker skin tones and inform preventative programs.

Expert panel justification of recommendation

The expert panel noted that there may be benefits to infrared thermography as an adjunct to skin assessment for early detection of pressure injuries. No harms were reported in the literature. However, the certainty of the evidence is very low. Additionally, the panel noted that availability and feasibility of the technology would vary depending on provider and setting. Therefore, the expert panel determined the strength of the recommendation to be conditional.

Implementation tips

From the expert panel

- Health service organizations adopting infrared technologies are to establish clear protocols for use and provide the necessary education to health providers.
- Organizations may consider training a small group of providers (champions or resource staff) on infrared thermography use. These individuals can be referred to by other providers and can operate the technology across the organization.
- Be aware of infection control and follow manufacturer's guidance and/or hospital policy related to proper cleaning of devices.
- Feasibility considerations regarding use of infrared technology include
  - Availability of the technology in the local market
  - Resources available
  - Financial implications
  - Impact on health provider time

Table 6: Implementation context and details from the evidence

KEY INTERVENTION	DETAILS FROM THE EVIDENCE
Type of infrared thermography (69)	■ external probe with infrared thermal imager attached to a cell phone ■ portable thermographic camera (two individual studies) ■ portable infrared camera with interface to software, server, and database

RECOMMENDATION 1.1:

The expert panel suggests that nurses and health providers use subepidermal moisture detection as an adjunct to skin assessment for early detection of pressure injuries.

Strength of the recommendation: Conditional

Certainty of the evidence of effects: Very low

Discussion of evidence

Benefits and harms

For this recommendation, the intervention of interest is subepidermal moisture (SEM) detection compared to standard care (no technology for early detection and assessment of pressure injuries). For the purposes of this BPG, SEM detection refers to technologies, called scanners or meters, used to measure the accumulation of fluid below the epidermis that occurs in the early stages of pressure injury development due to inflammation triggered by tissue and the resulting increased blood flow to the injured area (70). The device detects alterations in skin damage leading to increased loss of tissue moisture and excess moisture detected on the skin.

There was one SR of five NRS (70). The types of interventions included moisture meters and scanners (70). The populations included adults at risk of pressure injury. For further details of the intervention noted in the literature, please refer to the Implementation tips below.

As reported in the SR (70), four studies reported on accuracy of predicting pressure injury development, however there were no comparison groups and the evidence was very uncertain. Mean sensitivity was 72.07±23.05 per cent (ranged from 48.3 to 100 per cent) and mean specificity was 51.96±20.20 per cent (ranged from 24.4 to 83 per cent).

One study in the SR reported on incidence rate of pressure injury and found that there may be a moderate decrease in incidence rate of pressure injury but the evidence is very uncertain (70). In terms of absolute effects, for every 100 people who receive SEM detection, 12 fewer people will have a pressure injury (ranges from 13 less to nine less).

Another study in the SR reported on pressure injury precursor signs and symptoms and found that there may be a small decrease in pressure injury precursor signs and symptoms but the evidence is very uncertain (70). This outcome was measured as Stage 1 pressure injury. The RR was 0.11 (95% CI 0.01-1.01). In terms of absolute effects, for every 100 people who receive SEM detection, four fewer people will have a Stage 1 pressure injury (ranges from four less to no more or less).

The expert panel noted that health provider compliance with technology and person or caregiver satisfaction were critical outcomes that the systematic reviews should focus on; however, these outcomes were not measured in the literature.

There were no harms reported in the studies, however the low specificity of subepidermal moisture detection could lead to overdiagnosis and many false positives.

The overall certainty of the evidence for these outcomes was very low due to serious risk of bias in individual studies for all outcomes, very serious imprecision related to low number of events for some outcomes, and serious inconsistency noted for one outcome.

For more detailed information on the impact of subepidermal moisture detection on the prioritized outcomes (accuracy of predicting pressure injury development, incidence rate of pressure injury and pressure injury precursor signs and symptoms), refer to the evidence profiles under the "methodology documents" tab of the BPG webpage. See also **Appendix L** for emerging evidence on health technologies for pressure injury assessment and early detection.

Values and preferences

There were no values and preferences related to the intervention reported in the evidence or noted by the panel.

Health equity

From the systematic review evidence

One SR discussed that technologies used to perform SEM measurements may improve the identification of precursor signs and symptoms of pressure injury in people with darker skin tones (70). A critical way to promote health equity is to recognize the issue and adopt technology that can detect early-stage skin injury in persons with dark skin (70). However, persons with dark skin tones were not included in the samples and the need for further research was noted (70).

From the expert panel

SEM detection holds promise for enhancing early detection, especially among individuals with darker skin tones. This technology addresses a notable challenge in healthcare – the difficulty in identifying early signs of skin changes and alterations on darker skin tones.

Expert panel justification of recommendation

The expert panel noted that there may be benefits to subepidermal moisture detection as an adjunct to skin assessment. No harms were reported in the literature. However, the certainty of the evidence is very low. Additionally, the panel noted that availability and feasibility of the technology would vary depending on provider and setting. Therefore, the expert panel determined the strength of the recommendation to be conditional.

Implementation tips

From the expert panel

- Organizations are to establish clear protocols for use of SEM detection and provide the necessary education to health providers.
- Organizations may consider training a small group of providers (champions or resource staff) on SEM use. These individuals can be referred to by other providers and can operate the technology across the organization.
- Health providers are to be aware that skin redness is not the best indicator of pressure injury risk across populations and different skin tones.
- Be aware of infection control and follow manufacturer's guidance and/or hospital policy related to proper cleaning of devices.

Table 7: Implementation tips from the expert panel

SEM DETECTION CONSIDERATIONS	DETAILS
Feasibility considerations	■ availability of the technology in the local market ■ resources available ■ financial implications ■ impact on health provider time
Factors that may impact accuracy of the reading	The expert panel noted that individual factors may influence accuracy, in particular factors that impact inflammation such as: ■ person's age ■ co-morbidities (e.g., those affecting systemic edema).
Criteria for appropriate use	■ not to be used on broken skin ■ to only be used by health providers with knowledge, skill and judgement as well as training using the device
Interpretation of the values	Devices output a delta value. ■ Delta value less than 0.6 indicates the site is at lower risk of pressure injury. ■ Delta value greater than 0.6 indicates the site is at increased risk of pressure injury. Values should be interpreted by trained health providers using clinical judgment.

Table 8: Implementation context and details from the evidence

KEY INTERVENTION	DETAILS FROM THE EVIDENCE
Type of subepidermal moisture device	■ Delfin MoistureMeter D (Delfin Technologies, LTD, Greenwich, Connecticut) dermal phase meter ■ Sub-Epidermal Moisture (SEM) Scanner (Bruin Biometrics (BBI), LLC) ■ SEM Scanner (Bruin Biometrics Europe, Ltd, UK)

PREVENTION AND TREATMENT

RECOMMENDATION 2.0:

The expert panel suggests that nurses and health providers reposition persons at risk of pressure injuries every 2-4 hours.

Strength of the recommendation: Conditional

Certainty of the evidence of effects: Low

Discussion of evidence

For this recommendation, the intervention of interest is frequency of repositioning. For the purposes of this BPG, repositioning refers to turning people to change their body position in order to relieve and/or redistribute pressure. Repositioning reduces the duration of pressure on the tissues, decreasing tissue hypoxia (14). Repositioning has long been a fundamental component of pressure injury prevention in order to redistribute the pressure between the body and support surface (71). Repositioning reduces the duration of pressure on the tissues and consequently the theoretical risk of pressure injury (71).

There was one SR with five randomized controlled trials (RCTs), one additional RCT, and one NRS (71–73). The types of interventions and comparators included: two-hourly compared to four-hourly and three-hourly repositioning; three-hourly compared to four-hourly repositioning; four-hourly compared to six-hourly repositioning; three- or four-hourly compared to two-hourly repositioning; and five-hourly compared to three-hourly repositioning. All of these comparisons focused on two outcomes: pressure injury incidence, and precursor signs and symptoms (Stage I) (71–73). The populations included adults at risk of a pressure injury. No studies examined persons with pressure injuries. For further details of the intervention noted in the literature, please refer to the Implementation tips below.

Two-hourly compared to four-hourly repositioning

Three RCTs found that the evidence is very uncertain whether two-hourly repositioning compared with four-hourly repositioning decreases pressure injury incidence. The relative risk (RR) was 1.06 (95% confidence interval (CI) 0.80-1.41). In terms of absolute effects, there are no more or less pressure injuries per 100 people who receive two-hourly repositioning compared to four-hourly repositioning (ranges from three less to three more) (71).

Two-hourly compared to three-hourly repositioning

Two RCTs compared two-hourly repositioning to three-hourly repositioning, the evidence suggests that these repositioning schedules result in little to no difference in pressure injury incidence (RR 4.06, 95% CI 0.87 to 18.98 and RR 0.90, 95% CI 0.69 to 1.16) (71).

Three-hourly compared to four-hourly repositioning

One RCT found there may a be reduction in pressure injury incidence with three-hourly repositioning compared with four-hourly (RR 0.20, 95% CI 0.04 to 0.92) (71).

Four-hourly compared to six-hourly repositioning

One RCT compared four-hourly repositioning to six-hourly repositioning, four-hourly repositioning may improve pressure injury incidence, but the evidence is very uncertain (RR 0.73, 95% CI 0.53 to 1.02) (71).

Two or three or four-hourly repositioning compared

One RCT examined an alert system based on two, three- or four-hourly repositioning. No pressure injuries developed during the study period. However, before the intervention started the pressure injury incidence was 5.24 per cent (72).

Three-hourly compared to five-hourly repositioning

One non-randomized study examined three-hourly compared with five-hourly repositioning, and found that three-hourly repositioning may decrease pressure injury incidence but the evidence is very uncertain (OR 0.51; 95% CI, 0.27–0.97) (73). In terms of absolute effects, for every 100 people who receive three-hourly repositioning compared with five-hourly repositioning, one less person will have pressure injury (ranges from two less to no more or less).

Precursor signs and symptoms were measured in one non-randomized study. For three-hourly compared with five-hourly repositioning, three-hourly repositioning may decrease precursor signs and symptoms of pressure injury, but the evidence is very uncertain (RR 0.40; 95% CI; 0.17-0.90) (73). In terms of absolute effects, for every 100 people who receive three-hourly repositioning compared with five-hourly repositioning, one less person will have precursor signs of pressure injury (ranges from two less to no more or less).

The expert panel noted that pressure injury healing rate, pressure injury worsening rate and person/caregiver satisfaction are critical outcomes that the systematic reviews should focus on; however, these outcomes were not measured in the literature.

There were no harms reported in the studies.

When considering the overall magnitude of benefits across all studies, there may be little to no differences between two- three- or four-hourly repositioning but there may be important reductions compared to five- or six-hourly repositioning. However, the certainty in the evidence is low due to serious or very serious risk of bias, and imprecision in the studies.

For more detailed information on the impact of repositioning on the prioritized outcomes (incidence rate of pressure injuries and pressure injury precursor signs and symptoms) refer to the evidence profiles under the "methodology documents" tab of the website.

Values and preferences

From the systematic review evidence

One non-randomized study reported on the perspectives of long-term care residents on repositioning (74). The study concluded that there is a need for tailoring repositioning of persons, and there is high value in using feedback from residents on repositioning (74).

From the expert panel

The expert panel also emphasized the importance of involving people in planning their pressure injury care, including repositioning, and of encouraging person and essential caregiver collaboration regarding repositioning frequency.

Health equity

From the systematic review evidence

One study in the SR estimated that the cost of repositioning was $11.05 or $16.74 lower per resident per day for the three-hourly or four-hourly regimens, respectively, compared to the two-hourly regimen. The estimates of economic benefit were driven mostly by the value of freed nursing time. The analysis assumed two- three- or four-hourly repositioning was associated with a similar incidence of pressure injury, as no difference in incidence was observed between these strategies (71).

No additional information on health equity related to the intervention was reported in the evidence.

From the expert panel

The expert panel noted that while health provider staffing levels could be a barrier to repositioning frequency, a lack of health providers does not negate the need for repositioning. A lack of availability of devices for positioning may be a barrier. The expert panel reported no additional health equity considerations related to this recommendation.

Expert panel justification of recommendation

The expert panel noted that there may be benefits of repositioning to prevent pressure injury incidence and pressure injury precursor signs and symptoms at two-hourly, three-hourly and four-hourly intervals compared with five- or six-hourly repositioning. No harms were reported in the literature. However, the certainty of the evidence is low. There are also individual factors to be considered when planning and tailoring repositioning. As result, the expert panel determined the strength of the recommendation to be conditional.

Implementation tips

From the expert panel

- Health care teams are to collaborate with persons and/or essential caregivers when planning an individualized repositioning schedule/frequency within a two-to-four-hour interval.
- Provide health teaching to persons and/or essential caregivers on repositioning (benefits and techniques).
- While being mindful of caregiver burden and feasibility, caregivers need to be supported to assist with repositioning in the home and community.
- Persons at risk for pressure injuries can assist in their own repositioning, for example by having assistive devices such as overhead trapeze bars available.
- For people with hemodynamic instability, incremental positioning may be considered if full turning will not be tolerated.
- Health providers are to follow an individualized approach to repositioning based on a risk assessment. See good practice statement 4.0. Risk assessment and choice of repositioning frequency is to be documented.
- When planning repositioning for those at risk of or living with pressure injuries, health providers are to consider key factors such the person's mobility and overall health condition, the type of support surface, the location of pressure injuries (if present), pain, comfort and individual person and essential caregiver preferences. See further details below.

Table 9: Implementation tips from the expert panel

FACTORS TO CONSIDER WHEN PLANNING REPOSITIONING	DETAILS
Clinical assessment	▪ Base the determination of what repositioning frequency is appropriate within the two- to four-hourly timeframe on skin assessment and clinical observation. ▪ In people with dark skin tones, it may be difficult to detect early skin changes and abnormalities such as erythema (redness) or cyanosis (bluish discoloration). The use of technologies may be considered here to support assessment. See **Recommendation 1.0** and **Recommendation 1.1**.
Mobility	▪ Immobility and the degree of mobility must be considered for the individual. ▪ Immobility is considered to be a causal factor for pressure injury development in hospitalized persons. Assistance will be required if the person is unable to reposition themselves, or has impaired sensation and doesn't experience the discomfort associated with not repositioning themselves (71) .
Co-morbidities	People with the following co-morbidities may be at higher risk of pressure injuries and may require more frequent repositioning: ▪ malnutrition ▪ dehydration ▪ poor circulation □ conditions that may affect circulation include peripheral vascular disease, coronary artery disease, decreased cardiac output and diabetes ▪ cachexia (muscle wasting and weight loss) ▪ incontinence ▪ history of pressure injuries ▪ any conditions leading to low skin resilience such as cancer or frailty in old age (75)

FACTORS TO CONSIDER WHEN PLANNING REPOSITIONING	DETAILS
Support surface	■ Consider whether the support surface provides adequate pressure redistribution and decreased shear and friction when determining what repositioning frequency is appropriate within the two- to four-hourly timeframe (71). ■ Note that people on advanced pressure redistribution surfaces, such as those with low air loss, still require repositioning every two to four hours.
Person or caregiver perspective	■ The person and/or caregiver should be included in decision making regarding the number of times the person should be repositioned (to align with guiding principle of person-centred care). ■ Repositioning needs to align with the goals of care (for example palliative or non-curative care). ■ Pain and comfort expressed by the person, or communicated by the caregiver, may determine if a pressure injury is evolving and this may require further assessment by the health provider (76). ■ There may be additional considerations in terms of health teaching and support when repositioning is happening in the home setting, either through self-positioning or with caregiver assistance.
Existing pressure injuries	■ The location of the pressure injury (if present) should also be considered when planning repositioning.

Table 10: Implementation context and details from the evidence

ASPECT OF REPOSITIONING	DETAILS FROM THE EVIDENCE
Details of positions (71)	■ used 30-degree head of bed, tilt positions (alternating left/right/supine) ■ used a semi-Fowler's or lateral position in combination with an institutional mattress or a viscoelastic foam mattress
Details of cointerventions (71)	■ alternated air pressure mattresses in both groups of intensive care unit (ICU) participants ■ co-interventions such as the use of nutritional supplements, skin care, and allocation of pressure-relieving cushions during chair sitting were also used ■ strategies such as the use of high-density foam mattresses, positioning aids, skin protection, skin assessment/care, with documentation continued during the study ■ high-density foam mattresses were used as standard care for all trial participants

Supporting resources

RESOURCE	DESCRIPTION
Western NSW Local Health District. Pressure Injury Prevention - Repositioning [Internet]. 2021 [cited 2024 May 31]. Available from: https://www.youtube.com/watch?v=mF1cVJJIS4Q	■ Four-minute video outlining repositioning techniques and individual considerations for those requiring total to minimal to no assistance.

GOOD PRACTICE STATEMENT 6.0:

It is good practice for nurses and health providers to select an appropriate support surface, in collaboration with the person and their essential caregivers, by considering the following:

- individual risk factors
- contextual factors
- person's preferences; and
- comfort.

Expert panel justification of good practice statement

Support surfaces[G] are specialised medical devices designed to relieve and/or redistribute pressure on the body in order to prevent and treat pressure injuries (77). They are an essential tool for pressure injury prevention and treatment. Support surfaces can offer therapeutic functions including pressure redistribution, management of tissue load and microclimate (78).

Support surfaces can include mattresses, cushions and overlays. Powered support surfaces operate using electrical current and may be active or reactive. Active support surfaces are powered support surfaces, with the capability to change its load distribution properties, with or without applied load (77). Active support surfaces achieve pressure redistribution by frequently changing the points of contact between the surface and body, thus reducing the duration of the pressure applied to specific anatomical sites. Reactive support surfaces are powered or non-powered support surface with the capability to change its load distribution properties only in response to applied load (77). Reactive support surfaces distribute the pressure over a greater area, thereby reducing the magnitude of the pressure at specific sites. Additionally, support surfaces may be with or without low air loss. Low air loss is a feature where air is circulated beneath a water vapor permeable cover to control the humidity (microclimate) at the interface between the individual and the support surface (78).

There is uncertain evidence to support the choice of one type of support surface over another consistently (79,80). Instead, choice of support surface must consider risk factors, ease of use, pain management, sleep patterns and need for resources for turning and repositioning (79,80). When selecting a support surface, it is essential to include persons and their caregivers in order to ensure that it accords with their preferences and comfort.

Health Canada provides guidance related to support surfaces and entrapment (67). The guidance states that "if a powered air mattress is replacing a mattress on a bed system that meets the recommendations in the guidance with the original mattress, the resulting bed system with the new air mattress may now pose a risk of entrapment. When these products are used, Health Canada recommends that steps be taken to ensure that the therapeutic benefit outweighs the risk of entrapment (67)." Additionally, Health Canada states that industry and suppliers of powered air support surfaces should both warn and help health care organizations assess the potential risks, entrapment or falls (67).

The constant low-pressure devices do not meet Health Canada's guidelines and should only be used when the benefit of the surface outweighs the risk of entrapment and less risky options have been considered. Consider the risk of entrapment with all support surfaces, in particular overlays and constant low pressure (surfaces with the large air bladders).

Low air loss support surfaces (powered) can be associated with dehydration risk. Consult a registered dietitian regarding the potential for insensible fluid loss (fluid loss that is not easily measurable).

The expert panel determined that this statement was necessary to communicate with nurses and health providers but not did require a systematic review of the evidence. This good practice statement is in line with the good practice statement of The International Guideline on Prevention and Treatment of Pressure Ulcers/Injuries (European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP) and Pan Pacific Pressure The expert panel determined that this statement was necessary to communicate with nurses and health providers but not did require a systematic review of the evidence. This good practice statement is in line with the good practice statement of The International Guideline on Prevention and Treatment of Pressure Ulcers/Injuries (European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP) and Pan Pacific Pressure Injury Alliance (PPPIA)) on individualizing selection of support surfaces (14).

Implementation tips

From the expert panel

- Interprofessional collaboration – such as consultation with occupational therapy, physiotherapy and/or a wound care nurse – is necessary when selecting an appropriate support surface.
- Appropriate choice of support surface is most important for those people with decreased mobility and/or an inability to self-reposition.

Table 11: Implementation tips from the expert panel

ELEMENTS TO BE CONSIDERED WHEN DETERMINING CHOICE OF SUPPORT SURFACE	DETAILS
Individual factors	Individual causal factors to be considered include: ■ pressure injury risk ■ mobility including how the person transfers or repositions with independence or assistance (some transferring techniques may be affected by the support surface) ■ co-morbidities ■ need to address multiple support surfaces if person moves between settings ■ weight (follow manufacturer's guidance for minimum/maximum weight)
Contextual factors	Contextual factors to be considered include: ■ clinical setting (such as critical care) ■ need for transport of person (such as frequent diagnostic testing) ■ availability of support surfaces including cost and resources ■ access to a reliable power source (if not, non-powered may be best) ■ type of bed (not all beds are compatible with all support surfaces)
Person preference and comfort	■ persons' ability to rest and sleep comfortably ■ desire to maintain independence For example, if the person regularly shared a bed an overlay may be a better choice.
Potential for harm	When considering the type of support surface also consider the potential for harm: ■ entrapment risk: in particular for powered support surfaces and overlays as the space between the support surfaces and the bed rails on the bed frame may increase (81) ■ dehydration risk (with low air loss powered surfaces) (78)

Supporting resources

RESOURCE	DESCRIPTION
Health Canada. Adult Hospital Beds: Patient Entrapment Hazards, Side Rail Latching Reliability, and Other Hazards. 2008. Available from: https://www.canada.ca/en/health-canada/services/drugs-health-products/medical-devices/application-information/guidance-documents/guidance-document-adult-hospital-beds-patient-hazards-side-rail-other-hazards.html Government of Canada: Bed Rails in Hospitals, Nursing Homes and Home Health Care. Available at https://www.canada.ca/en/health-canada/services/drugs-health-products/medical-devices/activities/fact-sheets/bed-rails-hospitals-nursing-homes-health-care-fact-sheet.html	■ Guidance and fact sheet from the Government of Canada related to the use of hospital beds and bedrails.
National Pressure Injury Advisory Panel. Support Surface Standards Initiative (S3I): Terms and Definitions Related to Support Surfaces. 2019. Available from: https://learn.npiap.com/S3IDocuments	■ Document outlining standard terminology to describe support surfaces.
Wounds Canada. Integrated Therapeutic Support Surface Selection for Pressure Injury Prevention and Management. 2023. Available from: https://www.woundscanada.ca/docman/public/3093-wc-product-picker-surfaces/file	■ Document to guide appropriate selection of a support surface based on evidence and expert consensus.

RECOMMENDATION QUESTION #6:

Should the use of powered support surfaces (active or reactive) for the prevention and management of pressure injuries be recommended or not?

NO RECOMMENDATION WAS MADE.

The expert panel determined that current evidence was insufficient to balance the benefits and harms of powered support surfaces compared to non-powered support surfaces. Choice of support surface should be individualized in line with good practice statement 6.0.

Discussion of evidence

Benefits and harms

For this recommendation, the intervention of interest is powered support surfaces compared to non-powered support surfaces. For the purposes of this BPG, powered support surfaces refer to any support surface that requires external sources of energy (i.e., electrical current) to operate (77).

There were two network meta-analyses (NMA) of RCTs and one additional RCT that examined the effects of powered support surfaces for treatment and management of pressure injury (79,80,82). One NMA reported on pain (80). This outcome was measured indirectly as patient comfort. The types of interventions included powered active or reactive support surfaces compared to any non-powered support surfaces. The populations included adults at risk of or living with pressure injuries. For further details of the interventions noted in the literature, please refer to the Implementation tips below.

Active powered support surface vs non-powered support surface

When compared with non-powered support surfaces, active powered support surfaces may decrease incidence of pressure injury slightly. The RR was 0.63 (95% CI 0.42 to 0.93) (79). In terms of absolute difference, for every 100 people with an active powered support surface, there would be four fewer pressure injuries (ranges from one less to six less). As reported in one RCT (82), non-powered support surfaces (air surface) may decrease incidence of pressure injury when compared to an active powered surface but the evidence is very uncertain. The RR was 0.44 (95% CI 0.20- 0.99) (82). In terms of absolute difference, for every 100 people who receive non-powered support surface, seven fewer people will have pressure injuries (ranges from 10 less to no more or less).

Active powered support surfaces may result in little to no difference in healing rate but the evidence is very uncertain compared with non-powered surfaces. The RR was 0.97 (95% CI 0.26 to 3.58) (79). In terms of absolute differences, for every 100 people with an active powered support surface, there would be one less pressure injury completely healed (ranges from 30 less to 59 more).

Active powered support surfaces may worsen patient comfort compared to non-powered support surfaces. The RR was 0.80 (95% CI 0.69 to 0.94) (80). In terms of absolute differences, for every 100 people with an active powered mattress, 17 fewer patients would report being comfortable (ranges from five less to 27 less).

Reactive powered support surface vs non-powered support surface

When compared with non-powered support surfaces, reactive powered support surfaces may decrease incidence of pressure injury slightly. The RR was 0.46 (95% CI: 0.29 to 0.75) (79). In terms of absolute risk, for every 100 people with a reactive powered support surface, there would be six fewer pressure injuries (ranges from three less to eight less) compared to a non-powered support surface.

Reactive powered surfaces may increase healing rate compared with non-powered surfaces. The RR was 1.32 (95% CI 0.96 to 1.80) (79). In terms of absolute risk, for every 100 people with a reactive powered surface, 13 more pressure injuries would be completely healed (ranges from two less to 37 more).

Reactive powered support surfaces may worsen patient comfort compared to non-powered support surfaces. The RR was 0.27 (95% CI 0.11 to 0.67) (80). In terms of absolute risk differences, for every 100 people with a reactive powered support surface, 63 fewer patients would report being comfortable (ranges from 29 less to 77 less).

The expert panel noted that while worsening pressure injuries and precursor signs and symptoms were critical outcomes that the systematic reviews should focus on, these outcomes were not measured in the literature. The expert panel was also interested in exploring any support surface (including chairs and cushions). However, no studies were found that examined outcomes of interest with these other types of support surfaces. All studies explored mattresses as the support surface.

It is uncertain whether there is a difference in adverse event rates between powered support surfaces and non-powered support surfaces (79).

The overall certainty of the evidence for these outcomes was rated as low due to serious or very serious risk of bias of individual studies for two outcomes, indirectness for one outcome and serious imprecision for two outcomes.

For more detailed information on the impact of powered support surfaces on the prioritized outcomes (incidence of pressure injury, healing rate of existing pressure injury and pain), refer to the evidence profiles under the "methodology documents" tab of the BPG webpage.

Values and preferences

From the systematic review evidence

One qualitative study explored nursing home residents' experiences of static air surface (non-powered) compared to powered air surfaces (83). Support surface and choice of support surface had an impact on the daily lives of nursing home residents. Some residents described a preference for the study support surface (i.e., static air, non-powered) while others did not prefer one support surface over another (83).

Health equity

From the systematic review evidence

One RCT concluded that the support surfaces used by the intervention group (non-powered) had a lower financial cost than that used by the control group (active, powered) considering the total cost and lifespan of each support surface (82).

No additional health equity considerations were reported related to the intervention.

From the expert panel

The expert panel noted that powered support surfaces have limitations in rural or remote areas due to potential for power loss.

Expert panel justification

The expert panel noted that with powered support surfaces, compared to non-powered support surfaces, there may be slight benefits to the incidence of pressure injury, but there is little to no difference in healing rate and there may be decreased patient comfort. Additionally, it is uncertain whether there is a difference in adverse event rates between powered support surfaces and non-powered support surfaces. The certainty of the evidence is low and the panel feels a recommendation is too speculative.

The expert panel noted that additional harms to be considered, that were not captured in the body of evidence, include dehydration risk associated with low air loss in powered support surfaces and entrapment associated with some types of powered support surfaces (78,81). Non-powered surfaces also have a lower cost. Therefore, the expert panel determined that current evidence was insufficient to balance the benefits and harms of powered support surfaces compared to non-powered support surfaces and could not make a recommendation for or against powered support surfaces over non-powered support surfaces. Choice of support surface should be based on individual risk factors, contextual factors, person's preferences and comfort in line with **Good practice statement 6.0**.

Supporting resources

See supporting resources under **Good practice statement 6.0**.

RECOMMENDATION 3.0:

The expert panel suggests that nurses and health providers implement preventative care bundles for persons at risk of pressure injuries.

Strength of the recommendation: Conditional

Certainty of the evidence of effects: Very low

Discussion of evidence

For this recommendation, the intervention of interest is preventative care bundles compared to one intervention alone or standard care. For the purposes of this BPG, preventative care bundles refer to a group of evidence-based interventions that can ensure the delivery of a standardized method of care. When these interventions are performed together, they can result in a better outcome than if performed individually (84). Bundles were included if they were an integrated set of two or more interventions implemented together rather than a set of preventative care options, a guideline or focused only on education.

There was one SR and meta-analysis of 24 RCTs and five NRS (85–90). The types of interventions in the bundles included pressure injury risk assessment, skin assessment, skin care, nutrition management, activity management, participation in pressure injury education and others. The populations were persons at risk of pressure injury. The majority of studies focused on adults (86–90) while one study focused on children over the age of one month (85). For further details of the intervention noted in the literature, please refer to the Implementation tips below.

In the SR of the 24 RCTs, the results showed that the incidence of pressure injuries was lower in the care bundle intervention group compared with the control group (3.28 per cent vs. 14.84 per cent, odds ratio (OR) 0.19, 95 % CI: 0.14–0.26) (86). In terms of absolute risk difference, for every 100 people who receive the care bundle intervention, 12 fewer people will have a pressure injury (ranges from 12 less to 11 less).

Three NRS reported on health provider compliance (88,89,90). The care bundles may increase provider compliance, but the evidence is very uncertain. One study reported high level of compliance with the bundle at 78 per cent (87). An additional study reported that compliance was five per cent higher in the care bundle group compared with the control group (88). A third study reported that compliance was 85 per cent in the intervention group compared with 50 per cent in the control (90).

As reported in one SR, 13 RCTs reported on the person satisfaction outcome (86). Care bundles likely increase person satisfaction. Person satisfaction was 97 per cent in the bundle group compared with 84 per cent in the control group (86). The OR was 5.45 (95 % CI 3.76–7.90).

Precursor signs and symptoms of pressure injury were measured with an indirect outcome (incidence of Stage I pressure injury). Care bundles may decrease precursor signs and symptoms of pressure injury, but the evidence is very uncertain. Three non-randomized studies reported on this outcome (85,88,89). Stage 1 pressure injuries decreased post-implementation of a preventative care bundle compared with pre-implementation.

The expert panel noted that adverse events were important outcomes that the systematic reviews should focus on; however, these outcomes were not measured in the literature.

No harms were reported in the studies.

The overall certainty of the evidence for these outcomes was very low due to serious to very serious risk of bias and imprecision in some of the studies for all outcomes.

For more detailed information on the impact of preventative care bundles on the prioritized outcomes (incidence rate of pressure injury, pressure injury precursor signs and symptoms, health provider compliance with care bundle, person/caregiver satisfaction), refer to the evidence profiles under the "methodology documents" tab of the BPG webpage. See **Appendix F** for an example of a pressure injury preventative care bundle.

Values and preferences

From the expert panel

The expert panel emphasized a person-centred approach and tailoring strategies within the preventative care bundle to the individual.

Health equity

From the expert panel

The expert panel emphasized the particular importance of preventative care bundles for people with darker skin tones or in areas with greater populations of people with darker skin tones, given the increased chance of missing signs of early pressure injury in these individuals.

Expert panel justification of recommendation

The expert panel noted that there may be benefits to preventative care bundles for preventing incidence of pressure injuries, preventing precursor signs and symptoms, improving health provider compliance and improving person/caregiver satisfaction. No harms were reported in the literature. However, the certainty of the evidence is very low. Therefore, the expert panel determined the strength of the recommendation to be conditional.

Implementation tips

From the expert panel

- Consider the feasibility of implementing a preventative care bundle in the local context, taking into account use of any technologies and resource availability.
- Preventative care bundles are to be customized and contextualized to the person and practice setting while following guiding principles on person-centred care and shared decision making.
- When implementing a care bundle, educate people and caregivers on the purpose and components of the bundle.
- Implement care bundles systematically, ensuring consistent delivery and thorough evaluation.
- Order sets may assist in implementing preventative care bundles.
- Integrate feedback on the bundle's effectiveness into revisions and future planning, promoting continuous improvement in care delivery.
- Preventative care bundles may be tailored to medical-device related pressure injuries and include the use of tube stabilizers.

Table 12: Implementation tips from the expert panel

POSSIBLE COMPONENTS OF CARE BUNDLE	DETAILS OF CARE BUNDLE
Skin care and assessment	■ Inspect the skin regularly. ■ Note that darkly pigmented skin may need a closer examination. ■ Ensure skin is clean. ■ Ensure appropriate skin moisture balance. Skin should not be damp but dry skin should be moisturized.
Mobility, turning and repositioning	■ Encourage daily mobility. ■ For persons who are less mobile, reposition regularly. See also **Recommendation 1.0** on repositioning. ■ Positioning devices and offloading devices may support preventative positioning.
Nutrition	■ Ensure proper nutrition including adequate hydration. ■ Screen for malnutrition as appropriate. See **Appendix J** for an example of a malnutrition screening tool.
Support surface	■ Determine the appropriate support surface to reduce pressure. See also **Good practice statement 4.0** on determining support surfaces.

Table 13: Implementation context and details from the evidence

ASPECT OF CARE BUNDLE INTERVENTION	DETAILS FROM THE EVIDENCE
Specific components of care bundle	**Zhang et al. (2021)** ■ Risk identification: Use Braden scale (assess within 24 hours of admission). ■ Skin assessment: Use pressure injury staging tools to assess skin condition within four hours of admission (assessment included skin defect, location, depth, size, colour). ■ Patient repositioning: Assess at least every two hours and reposition the patient. ■ Skin care: Use pH weak acid or neutral cleansing liquid to clean the skin every day. Protect exposed or damaged skin with a dressing. Use skin protectant to prevent moisture related skin lesions if patient has incontinence. ■ Pressure reducing device: Use decompression or pressure redistribution equipment for at-risk patients. ■ Nutrition: Assess nutritional status withing 24 hours of admission and provide individualized guidance. **Yilmazer et al. (2022)** ■ participation in pressure injury education ■ pressure injury risk assessment ■ skin assessment ■ skin care ■ nutrition management ■ activity management ■ moisture management ■ support surfaces management **Aprea et al. (2018)** ■ training program for physicians, nurses, physiotherapists ■ skin care ■ pressure relief ■ assessment of risk for pressure injuries

Supporting resources

RESOURCE	DESCRIPTION
Frank, G., Walsh, K. E., Wooton, et al. (2017). Impact of a Pressure Injury Prevention Bundle in the Solutions for Patient Safety Network. P*ediatric quality & safety*, 2(2), e013. https://doi.org/10.1097/pq9.0000000000000013	■ Example of a pediatric pressure injury preventative bundle.
SSKIN and updated aSSKINg preventative bundles Whitlock J. (2013). SSKIN bundle: preventing pressure damage across the health-care community. British journal of community nursing, Suppl, S32–S39. https://doi.org/10.12968/bjcn.2013.18.sup9.s32 Young C. (2021). Using the 'aSSKINg' model in pressure ulcer prevention and care planning. *Nursing standard (Royal College of Nursing (Great Britain) : 1987)*, *36*(2), 61–66. https://doi.org/10.7748/ns.2021.e11674	■ Example of a pressure injury preventative bundle that has been widely implemented. ■ **Note:** This is a resource which is associated with a fee.

RECOMMENDATION 4.0:

The expert panel suggests that nurses and health providers apply multilayer foam silicone dressings as a prophylactic measure for individuals at risk of pressure injuries, in addition to other preventative care strategies. These dressings should be applied to specific at-risk body locations, considering the potential for shearing, friction and pressure.

Strength of the recommendation: Conditional

Certainty of the evidence of effects: Very low

Discussion of evidence

For this recommendation, the intervention of interest is prophylactic dressings for persons at risk of pressure injuries, to be applied on specific at-risk body locations, compared to no dressing. For the purposes of this BPG, a prophylactic dressing helps to prevent potential shearing and pressure and is an adjunct intervention to repositioning and support surfaces. Multilayer foam silicone dressings have a soft silicone adhesive, are self-adherent, and contain multilayer foam. Wound dressings with a silicone interface can also protect friable or newly healed tissue (91).

There was one SR of six RCTs and three additional RCTs (one of which included unpublished data) (92–95). The population included adults at risk of pressure injuries. For further details of the intervention noted in the literature, please refer to the Implementation tips below. This recommendation and proceeding discussion of evidence are focused on multilayer foam silicone dressings. The evidence for the other types of dressings was very limited in terms of certainty (very low) and there are many outcomes which were not measured in the literature. For details of other dressing types found in the literature (polyurethane foam dressing, Kang huier dressing, adhesive foam dressing and pressure ulcer preventative dressing) see evidence profiles under the "methodology documents" tab of the BPG webpage.

For the outcome of pressure injury incidence, a SR of six RCTs reported on this outcome (92). Silicone dressings may reduce pressure injury incidence compared to no silicone dressings (RR 0.25 [95% CI 0.16 to 0.41]). In terms of absolute effects, for every 100 people who receive the intervention, nine fewer people will have pressure injury (ranges from 10 less to seven less).

One SR of three RCTs reported on the outcome of precursor signs and symptoms (measured as Stage 1 pressure injuries) for persons with silicone dressings compared to no dressings (92). Silicone dressings may decrease precursor signs and symptoms but the evidence is very uncertain (RR 0.27 [95% CI 0.08 to 0.90]). In terms of absolute effects, for every 100 people who receive the intervention, seven fewer people will have pressure injury (ranges from 8.3 less to one less).

One RCT (unpublished data) reported on quality of life for persons with silicone dressings compared to no dressing (96). Silicone dressings likely result in little to no difference in quality of life. Mean quality of life score (SD) on day 14 was 0.40 (0.28) in the intervention group and 0.42 (0.27) in the control group.

Two RCTs reported on pain for persons with silicone dressings compared to those with no dressing (94,95). There may be little to no difference in pain between groups. In two RCTs, two patients in the intervention groups reported sacral pain; no patients in the control group reported sacral pain (93,94).

One RCT reported on person satisfaction for persons with silicone dressings compared to no dressing (93). Silicone dressings may result in increased satisfaction scores compared to the control group.

One RCT reported that there were 33 adverse device events among 28 patients (95). Most of the adverse events were mechanical skin injuries (i.e., skin tears or skin stripping, n = 11), pressure injury formation (n=3) and blister formation at the edge of or underneath the dressing (n = 3) (95). Heel dressings caused two patient falls, without significant harm, when the dressing was in direct contact with the floor (95). One study within an SR stated that no dressing-related adverse events occurred during the trial (92). None of the other trials in this SR provided adverse event data (92).

The overall certainty of the evidence for these outcomes was very low due to serious to very serious risk of bias and imprecision in the studies for all outcomes.

For more detailed information on the impact of prophylactic dressings on the prioritized outcomes (incidence rate of pressure injury, pressure injury precursor signs and symptoms, quality of life, pain, and person/caregiver satisfaction), refer to the evidence profiles under the "methodology documents" tab of the BPG webpage.

Extra care is needed when using dressings for people with urinary and/or fecal incontinence (i.e., liquid stool), in particular for sacral dressings due to risk of maceration.

Values and preferences

From the expert panel

The expert panel noted that a person's preferences and comfort should be considered when providing dressings for prophylactic use as some people may find them uncomfortable.

Health equity

From the systematic review evidence

One study within a SR provided cost estimates based on an assumption that participants would remain in hospital for 20 days and that costs for treating pressure injuries would not change during this time (92). The estimated average cost for the dressing group was AUD $70.82 compared with the no-dressing group of AUD $144.56 (92). Another study within a SR reported that the mean cost of the silicone dressing was USD $16.8 per patient stay (92). In this pragmatic RCT, an average of three silicone adhesive multilayer foam dressings on the sacrum were used per patient. At an average price of about EUR €10 per piece, this is about EUR €30 per patient (92).

From the expert panel

The expert panel noted the dressings are costly, but the silicone self-adherent dressing (the border of silicone on the multilayer dressing) allows for checking of the wound and reapplying (not replacing) it, which can reduce costs.

Expert panel justification of recommendation

The expert panel noted that there may be benefits to multilayer foam silicone dressings for individuals at risk of pressure injuries. Adverse events were minimal though not reported across all studies. However, the certainty of the evidence is very low. Multilayer foam prophylactic dressing is an adjunct intervention to other prevention strategies such as repositioning and support surfaces. Therefore, the expert panel determined the strength of the recommendation to be conditional. Evidence for additional types of dressings reported in the literature was very limited in terms of certainty and outcomes, therefore a recommendation about those dressings was too speculative.

Implementation tips

From the expert panel

- Health providers are to follow manufacturers guidance on dressing use, including cutting or shaping of the dressing.
- When selecting dressings for preventative use, it is crucial to consider the person's comfort and preferences as some dressing may be uncomfortable.
- Multilayer foam prophylactic dressings are an adjunctive intervention to preventative care strategies such as repositioning and support surfaces. See **Recommendation 3.0** for further details about preventative care bundles.
- Prophylactic dressings are not a replacement for daily skin assessment.
- Consider feasibility such as availability of the dressing in the local market and resource implications.
- Hands-on education (relevant, timely and repeated) for health providers is to accompany the intervention, including skin assessment and reassessment and how to apply and reapply the dressing to prevent injury. Include persons and caregivers in education whenever possible.
- Document skin assessments on application, reapplication and removal of dressing. The dressing should be dated.
- Be aware of the risk of skin tearing with dressing removal.
- Nurses and health providers are to inspect the skin beneath the dressing at least daily by lifting the dressing and reapplying (not replacing) it.
- Dressings can stay on up to seven days, or as per manufacturer guidelines, and changed when soiled or saturated.
- An ideal dressing:
  - is designed to reduce friction between the back of the dressing and the support surface and/or clothing
  - has five layers
  - is large enough to cover the pressure point or at-risk body locations
- Any yeast is to be treated and resolved before applying a dressing for prophylactic use.
- Ensure there are no contraindications to dressing use such as sensitivity or allergy to dressing components.

Table 14: Implementation context and details from the evidence

ASPECT OF DRESSING	DETAILS FROM THE EVIDENCE
Dressings – Co-interventions	**Moore et al., (2018)** ■ Across studies, both dressing and control groups continued to receive preventative care, including: □ a pressure mattress (static or alternating pressure) if Braden score was over 18 □ daily inspection of the skin in the various pressure points □ repositioning or turning every two to four hours □ management of possible incontinence, humidity control and prevention of skin damage and rubbing/friction during postural changes as per hospital procedure □ Skin, Surface, Keep turning, Incontinence and Nutrition (SSKIN) bundle or other pressure injury preventative bundles □ skin care ■ Dressing was changed every three days, or as needed. **Beeckman et al. (2021)** ■ Standard hospital protocols for prevention of pressure injuries were used in the standard of care and treatment groups, with the addition of the silicone foam dressings as the only variable in the treatment group. ■ The study nurse inspected the skin beneath the dressing daily, by lifting the dressing and reapplying (not replacing) it. **Liao et al., (2023)** ■ Routine nursing measures were given, including condition observation, nutrition, repositioning and health education.

Supporting resources

RESOURCE	DESCRIPTION
Resources and downloadables. International Skin Tear Advisory Panel (ISTAP). 2023. Available from: https://www.skintears.org/resources	■ ISTAP has resources on how to remove and reapply dressings and provide other care.

RECOMMENDATION 5.0:

The expert panel suggests that nurses and health providers, in collaboration with the person and their essential caregivers, consider using negative pressure wound therapy for treatment of pressure injuries if the wound and person meet indications and there are no contraindications.

Strength of the recommendation: Conditional

Certainty of the evidence of effects: Very low

Discussion of evidence

Benefits and harms

For this recommendation, the intervention of interest is negative pressure wound therapy (NPWT) compared to standard care or no technology for treatment of pressure injuries. For the purposes of this BPG, NPWT is a broad term used to describe a unique and versatile system that aids the optimization of wound healing through the application of sub-atmospheric pressure to help reduce inflammatory exudate and promote granulation tissue (97) ranging from open fasciotomy wounds and diabetic foot ulcers to closed surgical incisions. NPWT has undergone a significant evolution since the first modern-day recorded application of this concept in the 19th century. The most recent iteration of NPWT is courtesy of Argenta and Morykwas, who demonstrated its efficacy in their paper published in 1997. This type of NPWT system comprises a porous foam dressing upon which continuous or intermittent suction is applied through an electronically powered suction device to achieve a sub-atmospheric pressure of 125mmHg below ambient pressure. The system has seen widespread uptake and is now implemented routinely for open wounds, such as open fractures, fasciotomies, ulcers, and infected wounds. Termed Vacuum-Assisted Closure (often abbreviated to "VAC").

There were two SRs of nine RCTs (98,99). The types of interventions included NPWT. The populations included adults with Stage 3 and 4 pressure injury (99) and adults with stage 2 or higher pressure injury (98).

As reported in one SR (99), eight RCTs reported on the healing rate of pressure injuries and found that NPWT may increase the number of pressure injuries healed (RR 1.32 [95% CI 1.03-1.70]). In terms of absolute risk, for every 100 people who receive NPWT, 12 more people will have complete wound healing (ranges from one more to 26 more). An additional pilot RCT reported that the proportion of completely healed pressure injuries did not differ between intervention and control groups (98).

As reported in the SR (99), three RCTs reported on pain and found that NPWT may decrease pain but the evidence is very uncertain. The weighted mean difference in pain score was −2.39 (95% CI: −3.47 - −1.30).

The expert panel noted that worsening pressure injuries, health provider compliance with technology and person and caregiver satisfaction were critical outcomes that the systematic reviews should focus on; however, these outcomes were not measured in the literature.

There were no harms reported in the studies.

The overall certainty of the evidence for these outcomes was low to very low due to serious risk of bias of individual studies and serious imprecision for all outcomes as well as inconsistency for the pain outcome.

For more detailed information on the impact of NPWT on the prioritized outcomes (healing rate of pressure injury and pain), refer to the evidence profiles under the "methodology documents" tab of the BPG webpage.

Values and preferences

From the expert panel

The expert panel highlighted the need to emphasize person preference, comfort and feasibility of using a device when planning pressure injury treatment including the use of NPWT. The organization, health settings and the person and lifestyle may affect feasibility.

Health equity

From the systematic review evidence

Three studies reported that hospitalization cost related to the use of NPWT was much lower compared to the standard wound care group (standard mean difference (SMD) = −2.55, 95% CI [−4.07, −1.03]) (99). There were no additional health equity considerations related to the intervention reported from the evidence.

Expert panel justification of recommendation

The expert panel noted that there may be benefits to NPWT. No harms were reported in the literature. However, the certainty of the evidence is very low. Additionally, the expert panel noted indications and contraindications for use will vary among people with a pressure injury. Therefore, the expert panel determined the strength of the recommendation to be conditional. The term "consider" was chosen by the panel to emphasize that the decision to include NPWT in a plan of care should be made in collaboration with people with pressure injuries and their essential caregivers and only when indications are met and contraindications are considered.

Implementation tips

From the expert panel

- Eligibility for use of NPWT should be determined by trained health providers.
- Health providers must have the knowledge, skill and judgment to administer NPWT.
- Organizations are to offer education and training on the use of NPWT.
- Persons and essential caregivers are to be educated about NPWT, including risks and benefits, and to be informed that NPWT may not heal the wound.
- Caution is needed when the wound is over the bony prominence. The connector needs to be bridged to a non-weight bearing area to prevent further pressure injuries developing from the NPWT (which would be deemed device-related pressure injures).
- Bed rest should not be automatically ordered to implement NPWT and should be considered on an individual basis.
- Additional supportive treatments to optimize wound healing, such as repositioning and nutrition, are to continue during NPWT.

Table 15: Implementation tips from the expert panel

COMPONENT OF NPWT	DETAILS
Indications	NPWT should be used as an additional therapy once other treatment options have been exhausted. Pressure injuries that may be indicated for use of NPWT: ■ healable or curable ■ deep ■ free of necrotic tissue NPWT may also be considered for the person's comfort or to help a dressing stay in place.
Contraindications	NPWT should not be used when the underlying cause of the pressure injury has not been treated. Additional contraindications include: ■ malignancy in the wound as NPWT may lead to cellular proliferation; ■ untreated wound infection, untreated osteomyelitis, or a sepsis source in the wound vicinity, until treated; ■ presence of untreated coagulopathy, (e.g., wounds with active bleeding or difficult hemostasis, until stabilized); ■ unexplored sinuses/tunnels greater than 15 cm if the endpoint has not been determined; ■ inflammatory ulcers, (e.g., pyoderma, vasculitis); ■ areas with necrotic tissue and eschar, until debridement is initiated (more than 60 per cent of area debrided); ■ presence of non-sutured hemostatic agents, (e.g., spray wound sealant); ■ allergy or sensitivity to NPWT dressing products; ■ inability to obtain/maintain an airtight seal due to the location of the wound, incision, or skin graft; ■ insufficient peri-skin around the wound to maintain a NPWT seal; and ■ person disengagement in care.

Supporting resources

RESOURCE	DESCRIPTION
British Columbia Provincial Nursing Skin & Wound Committee. Negative Pressure Wound Therapy: Guideline, 2023. Available from: https://www.clwk.ca/get-resource/negative-pressure-wound-therapy-reusable-disposable-guideline/	■ Detailed guidance on use of NPWT. ■ Includes details about providing NPWT as well as considerations for implementing the intervention in community settings.

RECOMMENDATION 5.1:

The expert panel suggests that nurses and health providers, in collaboration with the person and their essential caregivers, consider using electrical stimulation for treatment of pressure injuries if the wound and person meet indications and there are no contraindications.

Strength of the recommendation: Conditional

Certainty of the evidence of effects: Low

Discussion of evidence

Benefits and harms

For this recommendation, the intervention of interest is electrical stimulation compared with standard care (no technology used for treatment of pressure injuries). For the purposes of this BPG, electrical stimulation is a method of wound treatment that delivers an electrical current to the skin using at least two electrodes (100).

Two systematic reviews (SR) were conducted, one included six randomized controlled trials (RCTs) and the other included eleven RCTs. The types of interventions included high voltage monophasic pulsed current in one SR and a variety of electrical stimulation in the other SR. The populations included adults with pressure injuries. In one SR all participants had Stage 2 to Stage 4 pressure injuries and in the other SR most participants had Stage 2 or Stage 3 pressure injuries (however, the severity was not reported in some studies in this SR). For further details of the intervention noted in the literature, please refer to the Implementation tips below.

Eleven RCTs from one SR reported on the number of existing pressure injuries healed and found that there may be a moderate increase in the number of existing pressure injuries healed (RR 1.99 [95% CI 1.39 - 2.85]) (100). In terms of absolute risk, for every 100 pressure injuries that received electrical stimulation, 15 more pressure injuries would be completely healed (ranges from six more to 28 more) (100).

Six RCTs from another SR reported on the number of pressure injuries that worsened. Electrical stimulation may reduce the number of pressure injuries that worsen but evidence is uncertain (RR 0.07 [95% CI 0.01-0.50]) (101). In terms of absolute risk, for every 100 pressure injuries that receive electrical stimulation for treatment, 12 fewer injuries will have increased in size (ranges from 13 less to seven less) (101).

The expert panel noted that health provider compliance with technology, person or caregiver satisfaction and pain were critical outcomes that the systematic reviews should focus on; however, these outcomes were not measured in the literature.

Within one SR, five studies stated that electrical stimulation had no adverse reactions and patients did not complain of any discomfort (101). One study reported minor and rare adverse reactions to treatment caused by contact dermatitis and one patient had a persistent red area or burn under the active electrode (101).

The overall certainty of the evidence for these outcomes was low due to very serious risk of bias of individual studies for one outcome and serious or very serious imprecision for all outcomes.

For more detailed information on the impact of electrical stimulation on healing rate of existing pressure injury and worsening of pressure injury refer to the evidence profiles under the "methodology documents" tab of the BPG webpage.

Values and preferences

There were no values and preferences related to the intervention reported in the evidence or noted by the panel.

Health equity

From the expert panel

Special consideration may need to be given to those populations (people with spinal cord injury, nerve dysfunction or cognitive impairment) that cannot feel or report pain in the same way as other people. See also Implementation tips below.

Expert panel justification of recommendation

The expert panel noted that there may be benefits to electric stimulation related to increased pressure injury healing and prevention of pressure injury worsening. Minimal harms were reported in the literature, although one study did report a burn related to the active electrode. The certainty of the evidence is low. The panel also noted that electrical stimulation should be used as an adjunct to other treatment and be considered along with individual and contextual factors. Therefore, the expert panel determined the strength of the recommendation to be conditional. The term "consider" was chosen by the panel to emphasize that the decision to include electrical stimulation in a plan of care should be made in collaboration with people with pressure injuries and their essential caregivers and only when indications are met and contraindications are cleared.

Implementation tips

From the expert panel

- The skill, competence and scope of practice of the provider must be considered. Electrical stimulation should only be applied by providers who have been trained and have the knowledge, skill and judgment to perform electrical stimulation.
- Involve persons and essential caregivers in care planning and discussions around risk/benefit.
- When appropriate, health teaching for people and their essential caregivers may be implemented related to electrical stimulation. This strategy may promote person engagement and self-management.
- Assess the person's the ability to feel or report pain when determining eligibility for electrical stimulation treatment.
- Organizations are to educate health providers to monitor any potential harms or adverse effects (e.g., burns).

Table 16: Implementation tips from the expert panel

COMPONENT OF ELECTRICAL STIMULATION	DETAILS
Indications	Pressure injuries that may be indicated for use of electrical stimulation: ■ healable or curable ■ when healing has stalled
Contraindications	The following contraindications are to be considered when determining candidates for treatment with electrical stimulation: ■ when stimulation of cell proliferation is contraindicated, (i.e., certain types of cancer); ■ where there are metal ions or topical preparation residues (i.e., povidone-iodine, zinc, silver, calcium, sodium chloride); ■ where the placement of electrodes could adversely affect a reflex center (i.e., the carotid sinus, heart, parasympathetic nerves, ganglion, laryngeal muscles, phrenic nerve); ■ where electrical current could affect the function of an electronic implant (i.e., over a cardiac pacemaker); ■ untreated osteomyelitis or immature bone; ■ over a pregnant uterus; ■ inflammatory ulcers; ■ over an active deep vein thrombosis or thrombophlebitis; and ■ in the presence of severe arterial insufficiency.

Table 17: Implementation context and details from the evidence

KEY INTERVENTION	DETAILS FROM THE EVIDENCE
Type of electrical stimulation	Arora et al. (2020) reported the following types of electrical stimulation: ■ active decubitus direct current treatment ■ transcutaneous electrical nerve stimulation (TENS) ■ asymmetric biphasic stimulation, symmetric biphasic stimulation and microcurrent stimulation plus standard therapy (three experimental groups) ■ monophasic pulsed electrical stimulation ■ high voltage monophasic stimulation (HVMS) and pharmacologic agents ■ high voltage monophasic pulsed current (HVMPC) and high voltage pulsed current (HVPC) ■ cathodal electrical stimulation ■ cathodal and anodal electrical stimulation ■ pulsed low-intensity direct current

Supporting resources

RESOURCE	DESCRIPTION
Nova Scotia Health. Electrical stimulation in wound healing. 2024. Available from: https://www.nshealth.ca/patient-education-resources/2384	■ Health teaching resource/handout regarding electrical stimulation.

Research gaps and future implications

The RNAO best practice guideline development and research team and the expert panel identified priority areas for future research (outlined in **Table 18**). The left-hand column of the table outlines the recommendation questions and outcomes, and the right-hand column outlines priority research areas identified by the expert panel based on the systematic reviews that were conducted for each question. Future studies conducted in these areas would provide further evidence to support high-quality and equitable support for persons at risk and living with pressure injuries. The list is not exhaustive; other areas of research may be required.

Table 18: Priority research areas per recommendation question

RECOMMENDATION QUESTION	PRIORITY RESEARCH AREA
RECOMMENDATION QUESTION #1: **Should the use of health technologies be recommended or not for early detection and assessment of pressure injuries?** **Outcomes:** Incidence rate of pressure injury, accuracy of predicting pressure injury development, pressure injury precursor signs and symptoms, health provider compliance with use of health technology, person/caregiver satisfaction	■ the impact of infrared thermography on pressure injury precursor signs and symptoms, health provider compliance with technology and person/caregiver satisfaction ■ the impact of subepidermal moisture detection on health provider compliance with technology and person/caregiver satisfaction ■ the impact of other health technologies for early detection and assessment on outcomes ■ the impact of health technology for early detection and assessment of pressure injuries for people with darkly pigmented skin
RECOMMENDATION QUESTION #2: **Should a specific repositioning frequency be recommended over another frequency for persons with pressure injuries or those at risk of developing them?** **Outcomes:** Prevalence/incidence rate of pressure injury, pressure injury healing, worsening of pressure injury, pressure injury precursor signs and symptoms, person/caregiver satisfaction	■ the impact of repositioning frequency on pressure injury worsening rate, pressure injury healing rate and person/caregiver satisfaction ■ the impact of different repositioning techniques on person outcomes and health provider compliance and time

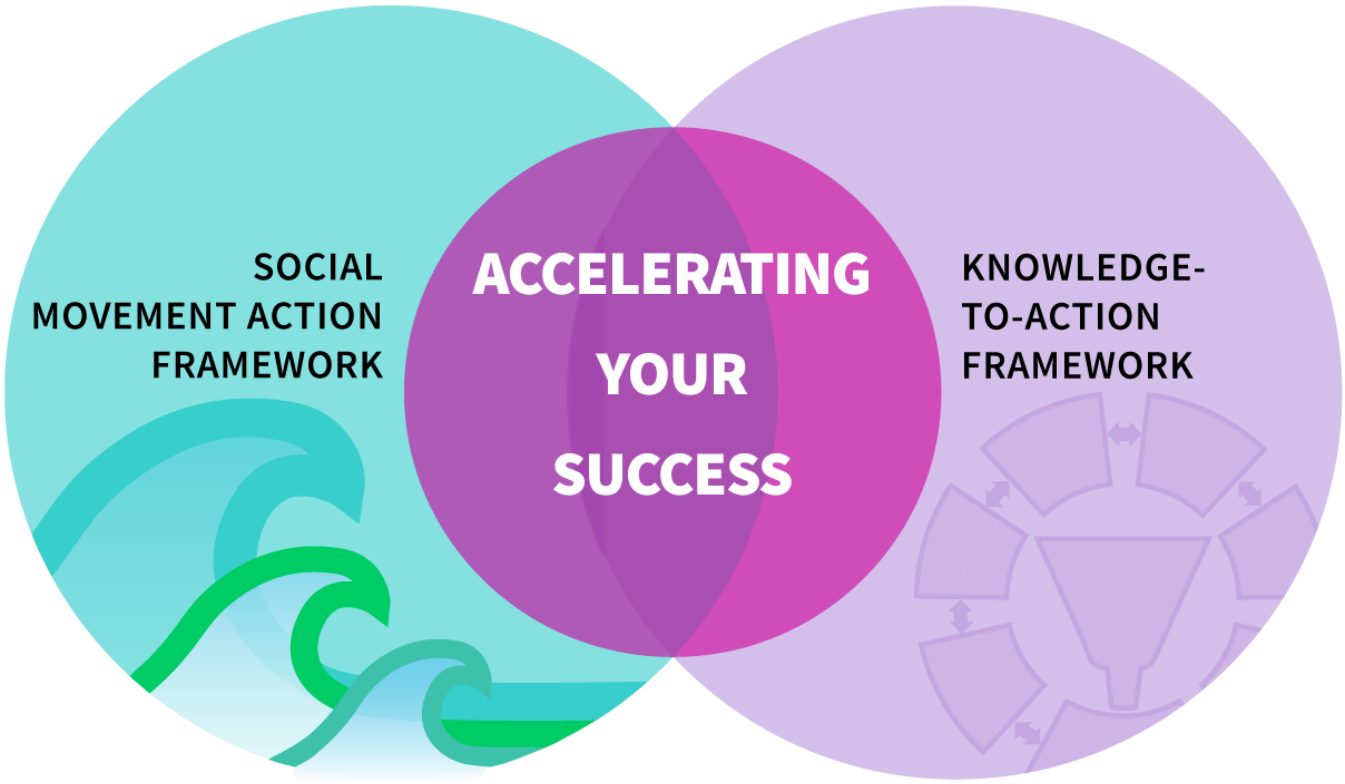
RECOMMENDATION QUESTION	PRIORITY RESEARCH AREA
RECOMMENDATION QUESTION #3: **Should preventative care bundles be recommended or not for the prevention of pressure injuries?** **Outcomes:** Prevalence/incidence rate of pressure injury, pressure injury precursor signs and symptoms, health provider compliance with care bundle, adverse events, person/caregiver satisfaction	■ the impact of preventative care bundles on adverse events
RECOMMENDATION QUESTION #4: **Should the use of prophylactic dressings be recommended or not for the prevention of pressure injuries?** **Outcomes:** Incidence rate of pressure injury, pressure injury precursor signs and symptoms, pain, quality of life, person/caregiver satisfaction	■ the impact of prophylactic dressings in non-acute health settings (community, primary care, outpatient) ■ qualitative studies examining the preferences, facilitators or barriers of prophylactic dressings on persons and families
RECOMMENDATION QUESTION #5: **Should the use of health technologies be recommended or not for the treatment of pressure injuries?** **Outcomes:** Incidence rate of pressure injury, pressure injury precursor signs and symptoms, pain, quality of life, person/caregiver satisfaction	■ the impact of negative pressure wound therapy on worsening pressure injuries, health provider compliance with technology and person/caregiver satisfaction ■ the impact of electrical stimulation on health provider compliance with technology, pain and person/caregiver satisfaction
RECOMMENDATION QUESTION #6: **Should the use of powered support surfaces (active or reactive) for the prevention and management of pressure injuries be recommended or not?** **Outcomes:** Prevalence/incidence rate of pressure injury, healing of existing pressure injury, worsening of existing pressure injuries, pressure injury precursor signs and symptoms, pain	■ the impact of powered support surfaces on worsening of pressure injuries and precursor signs and symptoms of pressure injury ■ impact of support surface on caregiver adherence to turning and repositioning schedule ■ impact of support surfaces on person and caregiver satisfaction/acceptance and activities of daily living

Implementation strategies

Implementing guidelines at the point of care is multi-faceted and challenging. It takes more than awareness and access to BPGs for practice to change: BPGs must be adapted for each practice setting in a systematic and participatory way to ensure that recommendations fit the local context (102). The Leading Change Toolkit (developed by RNAO, in partnership with Healthcare Excellence Canada), provides evidence-informed processes for this (see **Appendix R** (3).

The Leading Change Toolkit uses two complementary frameworks to guide evidence uptake and sustainability (see **Figure 1**). They can be used together to maximize and accelerate change.

Figure 1: The Leading Change Toolkit: Two complementary frameworks to accelerate your success



Source: Reprinted with permission from: Registered Nurses' Association of Ontario (RNAO), Healthcare Excellence Canada (HEC). Leading change toolkit [Internet]. 4th ed. Toronto (ON): RNAO; 2024. Available from: RNAO.ca/leading-change-toolkit

The Social Movement Action Framework (103,104) is descriptive and identifies the defining elements of a social movement for knowledge uptake and sustainability. It integrates a bottom-up, people-led approach to change for a shared concern (or common cause) in which change agents and change teams mobilize individual and collective action to achieve goals. The framework's elements – categorized as preconditions, key characteristics and outcomes – are dynamic, inter-related and develop spontaneously as the social movement evolves.

The Knowledge-to-Action Framework uses a process model of action cycle phases to systematically guide the adaptation of the new knowledge (e.g., a BPG) to the local context and implementation. This framework suggests identifying and using knowledge tools/products (such as guidelines) to determine gaps and begin the process of tailoring the new knowledge to local settings.

The Leading Change Toolkit is based on emerging evidence in health and social sciences that successful uptake and sustainability of best practice in health care is more likely when the following occurs:

- BPGs are selected for implementation through a participatory process led by change agents and change teams.
- The selected BPGs reflect priority areas for a shared concern that are credible, valued and meaningful, or an urgency for action.
- Others impacted by the change are identified and engaged throughout implementation to engage in individual and collective action.
- Receptivity for implementing BPGs, including environmental readiness, is assessed.
- Implementation strategies are tailored to the local context and designed to address barriers.
- Use of the BPG is monitored and sustained.
- Evaluation of the BPG's impact is embedded in the process to determine if the goals and outcomes have been met.
- There are adequate resources to complete all aspects of the uptake and sustainability of the BPG.
- The BPG is scaled up, out or deep, where possible, in order to widen its influence and create lasting health improvements.

RNAO is committed to widespread dissemination, implementation and sustainability of our BPGs. We use a systematic approach deploying various strategies, including:

1. The RNAO Best Practice Champion Network®, which powers the capacity of change agents to foster awareness, engagement, adoption and sustainability of BPGs. RNAO best practice champions are persons and organizations who are passionate about implementing evidence-based practices and mobilize others so together they improve care and health. Champions include nurses and other health professionals from all roles and health sectors, students, advocates, persons with lived experience, and caregivers.
2. RNAO Clinical Pathways™ are digitized recommendations and good practice statements embedded into electronic medical records through a third-party software. Currently, these clinical pathways are available to all Canadian Long-Term Care homes.
2. The BPSO® designation supports implementation at the organization and system levels. BPSOs focus on developing evidence-based cultures with the specific mandate to implement, evaluate and sustain multiple RNAO BPGs.

In addition, we offer annual capacity-building learning institutes on the implementation of practice change.

Information about our implementation strategies can be found at:

- RNAO Best Practice Champions Network®: RNAO.ca/bpg/get-involved/champions
- RNAO Clinical Pathways™: RNAO.ca/bpg/implementation/clinicalpathways
- RNAO BPSO®: RNAO.ca/bpg/bpso
- RNAO capacity-building learning institutes and other professional development opportunities: RNAO.ca/events

Appendix A: Glossary of terms

Adjunct (noun) or Adjunctive (adjective): Added to something else as a supplement rather than an essential part (105).

Best practice guidelines (BPG): "Best practice guidelines are systematically developed, evidence-based documents that include recommendations for nurses and the interprofessional team, educators, leaders and policy-makers, persons and their families on specific clinical and healthy work environment topics. BPGs promote consistency and excellence in clinical care, health policies and health education, ultimately leading to optimal health outcomes for people and communities and the health system" (106).

Best Practice Spotlight Organization (BPSO)®: A health service or academic organization that has partnered formally with RNAO over a three-year time period with a goal of creating evidence-based practice cultures through the systematic implementation and outcome evaluation of multiple best practice guidelines (BPGs) (107). Upon successful completion of the first three-year time period, sites are recognized as designated. Following the pre-designation period, BPSOs are required to achieve deliverables and are redesignated on a biennial basis. The BPSO designation was launched in 2003 as a knowledge translation strategy. BPSOs have been established across all sectors with sites in Ontario and throughout the world.

Caregiver/essential caregiver: A caregiver or essential caregiver provides physical, psychological and emotional support, as deemed important by the person. This care can include support in decision making, care coordination and continuity of care. Caregivers can include family members, close friends or other support people and are identified by the person or substitute decision marker (8).

Deep tissue pressure injury: Local injury of persistent, non-blanchable deep red, maroon, purple discolouration or epidermal separation revealing a dark wound bed or blood filled blister (9).

Education statements: Organizational approaches to the delivery of education in health service organizations and academic institutions to support evidence-based practice. Education statements are based on an analysis of educational recommendations across several BPGs on diverse clinical topics and populations. Education statements can be applicable to all clinical BPGs, and they can be contextually adapted within health-service organizations and academic institutions to support implementation of clinical recommendations.

Evidence-based practice: The integration of research evidence with clinical expertise and patient values. It unifies research evidence with clinical expertise and encourages the inclusion of patient preferences (109).

Evidence-to-Decision (EtD) frameworks: A table that helps guideline panels make decisions when moving from evidence to recommendations. The purpose of the Evidence-to-Decision framework (EtD) is to summarize the research evidence, outline important factors that can determine the recommendation, inform panel members about the benefits and harms of each intervention considered, and increase transparency about the decision-making process in the development of recommendations (20).

Evidence profile: Allows presentation of key information about all relevant outcomes for a given health care question (20). It presents information about the body of evidence (e.g., number of studies), the judgments about the underlying quality of evidence, key statistical results, and the quality of evidence rating for each outcome (20).

External reviewer: Individuals or groups who commit to reviewing and providing feedback on the draft RNAO best practice guideline prior to publication. External reviewers often include individuals or groups that are directly impacted by the guideline topic and recommendations (e.g., people accessing health services, people working in health service organizations, or people with subject-matter expertise).

Good practice statement: Good practice statements are directed primarily to nurses and the interprofessional teams that provide care to persons and their families across the continuum of care, including (but not limited to): primary care; home and community care; acute care; and LTC.

Good practice statements are actionable statements that should be done in practice (15). These are believed to be so beneficial that summarizing the evidence would be a poor use of the expert panel's time and resources (15). Moreover, researchers may no longer be conducting studies on the topic, or the alternative to the action may be unethical or studying them may go against human rights (15,16). Given the high level of certainty that the benefits derived from the good practice statement outweigh the harms, they are not based on a systematic review of the evidence, and they do not receive a rating of the certainty in their evidence or a strength (i.e., a rating of conditional or strong, which is further discussed below) (17). This does not diminish certainty in the evidence. While they are often supported by indirect evidence, there is a well-documented clear and explicit rationale connecting the indirect evidence to the statement (15). As such, good practice statements should be interpreted as strong recommendations as there is an underlying assumption that there is high certainty in the benefits of implementing the action (15).

Grading of Recommendations Assessment, Development and Evaluation (GRADE): A methodological approach to assess the certainty of a body of evidence in a consistent and transparent way, and to develop recommendations in a systematic way. The body of evidence across identified important and/or critical outcomes is evaluated based on the risk of bias, consistency of results, relevance of studies, precision of estimates, publication bias, large effect, dose-response, and opposing confounding (20).

When using GRADE, five components contribute to the assessment of confidence in the evidence for each outcome. These components are as follows:

1. Risk of bias, which focuses on flaws in the design of a study or problems in its execution.
2. Inconsistency, which looks at a body of evidence and assesses whether the results point in the same direction or if they are different.
3. Imprecision, which refers to the accuracy of results based on the number of participants and/or events included, and the width of the confidence intervals across a body of evidence.
4. Indirectness, whereby each primary study that supports an outcome is assessed and a decision is made regarding the applicability of the findings to the population, intervention and outcome outlined in the research question.
5. Publication bias, where a decision is made about whether the body of published literature for an outcome potentially includes only positive or statistically significant results (20).

Guiding principles: Overarching concepts that denote a philosophy, belief, value, and/or standard of behaviour that nurses, members of the interprofessional team, and health service organizations should apply to their practice when implementing recommendations and good practice statements.

Healable wound: A wound that has adequate blood supply, and can be healed if the underlying cause is addressed (110).

Health provider: Refers to both regulated (e.g., nurses, physicians, dietitians and social workers) and unregulated (e.g., personal support workers) workers who are part of the interprofessional team.

Regulated health provider: In Ontario, the *Regulated Health Professional Act, 1991* (RHPA) provides a framework for regulating 26 health professions, outlining the scope of practice and the profession-specific controlled or authorized acts that each regulated professional is authorized to perform when providing health care and services (11).

Unregulated health provider: Unregulated health providers fulfill a variety of roles in areas that are not subject to the RHPA. They are accountable to their employers but not to an external regulating professional body (such as the College of Nurses of Ontario). Unregulated health providers fulfill their roles and tasks that are determined by their employer. Unregulated health providers only have the authority to perform a controlled act as set out in the RHPA if the procedure falls under one of the exemptions set out in the Act (12).

Health service organizations: Organizations delivering health-care services to defined communities or populations. These include, but are not limited to, family health teams, home care organizations and hospitals.

Implementation science: Defined as "the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice, and, hence, to improve the quality and effectiveness of health services and care" (111).

Incontinence-associated dermatitis (IAD): A type of irritant contact dermatitis (inflammation of the skin) found in persons with fecal and/or urinary incontinence. Incontinence-associated dermatitis is known by other names such as perineal dermatitis and diaper rash. It is included within a broader group of skin conditions that are referred to as moisture-associated skin damage (MASD) (33).

Indigenous: Introduced and used in a global context following the international efforts of Aboriginal peoples to achieve a greater presence in the United Nations (UN). The UN broadly defines Indigenous persons as peoples of long settlement and connection to specific lands who practice unique traditions and retain social, cultural, economic and political characteristics that are distinct from those of the dominant societies in which they reside (112). Under the UN definition, Indigenous is generally understood to include the following: self-identification at the individual level and acceptance by an Indigenous community as a member; historical continuity with pre-colonial or pre-settler societies; strong links to territories and surrounding natural resources; distinct social, economic or political systems; and distinct language, culture and beliefs. Indigenous peoples form non-dominant groups within society and resolve to maintain and reproduce their ancestral environments and systems as distinctive peoples and communities (112).

The Canadian Constitution recognizes three groups of Indigenous peoples: First Nations, Inuit and Métis. These are three distinct peoples with unique histories, languages, cultural practices and spiritual beliefs (113).

Indirect evidence: As per GRADE methods, directness is judged based on the target population, intervention, and outcomes of interest (20). Evidence can be indirect if the populations differ from those of interest, the intervention tested differs from the intervention of interest, or the outcomes differ from those of primary interest (20).

See surrogate outcome.

Interprofessional team: A team comprised of multiple health providers (regulated and unregulated) who work collaboratively to deliver comprehensive and quality health services to persons within, between and across health-care settings (10). Key interprofessional team members supporting persons with or at risk of pressure injuries may include but are not limited to: nurses, personal support workers, general practitioners, physicians, dietitians, occupational therapists, physiotherapists and social workers. It is important to emphasize that persons and their caregivers are at the centre of the interprofessional team as active participants.

Maintenance wound: A wound with the potential to heal, but may not be healable, slow or erratic to heal because the cause or contributing factors cannot be easily mitigated, the person chooses other life priorities over adhering with optimal care or does not have the necessary resources to implement the ideal pressure management plan. Surgical options may not be possible due to comorbidities or lifestyle pressures that are known to result in a poor surgical outcome (114).

Medical device-related pressure injury: Pressure injuries that result from the use of medical devices, equipment, furniture, and everyday objects that have been in direct contact with skin. The increased pressure from these objects has caused soft tissue damage. The resultant pressure injury generally mirrors the pattern or shape of the device. Common devices that can cause pressure injuries include respiratory devices, tubes, drains, and compression wraps, splints or braces (115).

Meta-analysis: A systematic review that uses statistical methods to analyze and summarize the results of the included studies (116).

See systematic review

Moisture-associated skin damage (MASD): Skin damage caused by prolonged exposure to various sources of moisture, including urine or stool, perspiration, wound exudate, mucus, and saliva. MASD is characterized by inflammation of the skin, occurring with or without erosion or secondary cutaneous infection.

Moisture-associated skin damage is an umbrella term as multiple conditions may result in MASD; four of the most common forms are incontinence-associated dermatitis, intertriginous dermatitis, periwound moisture-associated dermatitis, and peristomal moisture-associated dermatitis (32).

Mucosal membrane pressure injury: A pressure injury found on mucous membranes with a history of a medical device in use at the location of the injury. Because of the anatomy of the tissue, these wounds cannot be classified using a staging system (117).

Non-healable wound: A wound which is physically unable to heal due to co-morbid health conditions, such as systemic disease (e.g. osteomyelitis that cannot be eliminated), poor circulation or cancer (114).

Non-randomized study (NRS): A quantitative study estimating the effectiveness of an intervention, where people are allocated to different interventions using methods that are not random (116).

Nurse: Refers to registered nurses, licensed practical nurses (referred to as "registered practical nurses" in Ontario), registered psychiatric nurses and nurses in advanced practice roles, such as nurse practitioners and clinical nurse specialists (11).

Outcomes: A dependent variable, or the clinical and/or functional status of a person or population, used to assess if an intervention is successful. In GRADE, outcomes are prioritized based on whether they are: (a) are critical for decision making, (b) important but not critical for decision making, or (c) not important. The use of these outcomes helps make literature searches and systematic reviews more focused (20).

Person: An individual with whom a health or social service provider has established a therapeutic relationship for the purpose of partnering for health. Replaces the terms "patient," "client," and "resident" that are used across health and social service organizations (13).

Person-centred: An approach to care in which the person is viewed as whole. The process of coming to know the whole person is nurtured through the formation of a therapeutic relationship between the person, those who are significant to them, and health and social service providers. This approach to care involves advocacy, empowerment, mutual respect and an understanding of the person's right to be autonomous, to self-determine and to participate actively in decisions about their health (both illness and wellness) (13).

Person with lived experience: Members of the community who have first-hand experience and knowledge of the topic of interest either as a person, unpaid caregiver, or advocate. Persons with lived experience are a diverse group with an array of backgrounds and experiences (118).

PICO research question: A framework to outline a focused question. It specifies four components:

- Patient or population that is being studied.
- Intervention to be investigated.
- Comparison or alternative intervention.
- Outcome of interest (20).

Pressure injury: Localized damage to the skin and/or underlying tissue, as a result of pressure or pressure in combination with shear. Pressure injuries usually occur over a bony prominence but may also be related to a medical device or other object (14).

Stage 1: intact skin with a local appearance of non-blanchable erythema (i.e. skin redness).

Stage 2: partial-thickness skin loss with exposed dermis.

Stage 3: full-thickness skin loss

Stage 4: full-thickness skin and tissue loss with visible fascia (i.e. the connective tissue that holds structures in place), muscle, tendon, ligament, cartilage or bone (9).

Preventative care bundles: A group of evidence-based interventions that can ensure the delivery of a standardized method of care. When these interventions are performed together, they can have a better outcome than if performed individually (74).

Qualitative research: An approach to research that seeks to convey how human behaviour and experiences can be explained within the context of social structures, through the use of an interactive and subjective approach to investigate and describe phenomena (119).

Quantitative research: An approach to research that investigates phenomena with tools that produce statistical measurements/numerical data (120).

Randomized controlled trial (RCT): An experiment in which the investigator assigns one or more interventions to participants who are randomly allocated to either the experimental group (receives intervention) and the comparison (conventional treatment) or control group (no intervention or placebo) (116).

Recommendation: A course of action(s) that directly answers a recommendation question (also known as a "PICO research question"). A recommendation is based on a systematic review of the literature and is made in consideration of its: (a) benefits and harms (b) values and preferences and (c) health equity. All recommendations are given a strength – either *strong* or *conditional* – through panel consensus.

It is important to note that recommendations should not be viewed as dictates, because recommendations cannot take into account all of the unique features of individual, organizational and clinical circumstances (20).

Recommendation question: A priority research area of practice, policy or education identified by expert panel members that requires evidence to answer. The recommendation question may also aim to answer a topic area around which there is ambiguity or controversy. The recommendation question informs the research question, which guides the systematic review.

RNAO Clinical Pathways™: RNAO Clinical Pathways are a digitized version of RNAO's Best Practice Guidelines that can be embedded in an electronic health record system to promote evidence-based, person- and family-centred care.

Shared decision making (SDM): An interpersonal, interdependent process in which health providers, persons and their caregivers collaborate in making decisions about a person's health (55).

Social movement for knowledge uptake and sustainability: Individuals, groups and/or organizations that, as voluntary and intrinsically motivated change agents, mobilize to transform health outcomes (121).

Support surfaces: Specialised medical devices designed to relieve and/or redistribute pressure on the body in order to prevent and treat pressure injuries (77). Support surfaces can include mattresses, cushions and overlays. Powered support surfaces operate using electrical current and may be active or reactive.

Systematic review (SR): A comprehensive review of the literature that uses clearly formulated questions and systematic and explicit methods to identify, select and critically appraise relevant research. A systematic review collects and analyzes data from the included studies and presents them, sometimes using statistical methods (116).

See meta-analysis

Unstageable pressure injury: Full-thickness skin and tissue loss that is obscured by slough or eschar (i.e., dead tissue) so that the severity of injury cannot be confirmed (9).

Appendix B: List of acronyms

Table 19: List of acronyms used in the BPG

LIST OF ACRONYMS USED IN THE BPG	
BPG	Best practice guideline
CI	Confidence interval
EPUAP	European Pressure Ulcer Advisory Panel
EtD	Evidence-to-decision (framework)
GRADE	Grading of Recommendations Assessment, Development and Evaluation
IAD	Incontinence-associated dermatitis
ICD	International Classification of Disease
ISTAP	International Skin Tear Advisory Panel
LTC	Long-term care
MASD	Moisture-associated skin disease
NMA	Network meta-analysis
NPIAP	National Pressure Injury Advisory Panel
NPWT	Negative pressure wound therapy
NRS	Non-randomized study
OR	Odds ratio
PPPIA	Pan Pacific Pressure Injury Alliance
RCT	Randomized controlled trial
RR	Relative risk

LIST OF ACRONYMS USED IN THE BPG	
SDM	Shared decision making
SEM	Subepidermal moisture
SMD	Standard mean difference
SSKIN	Skin, Surface, Keep turning, Incontinence and Nutrition
SR	Systematic review
WHO	World Health Organization

Appendix C: RNAO guidelines and other resources that align with this guideline

The following are some topics and suggested RNAO guidelines and resources from other organizations that align with this BPG.

Table 20: RNAO guidelines and other resources

TOPIC	RESOURCE(S)
Bladder and bowel health	■ Registered Nurses' Association of Ontario (RNAO). A proactive approach to bladder and bowel management in adults. 4th ed. Toronto (ON): RNAO; 2020. Available from: RNAO.ca/bpg/guidelines/proactive-approach-bladder-and-bowel-management-adults ■ Registered Nurses' Association of Ontario (RNAO). Supporting adults who anticipate or live with an ostomy. 2nd ed. Toronto (ON): RNAO; 2019. Available from: RNAO.ca/bpg/guidelines/ostomy
Diabetic foot ulcers	■ Registered Nurses' Association of Ontario (RNAO). Diabetic foot ulcers: Prevention, assessment and management. 3rd ed. Toronto (ON): RNAO; 2024. Available from: RNAO.ca/bpg/guidelines/diabetic-foot-ulcer
Transitions in care and services	■ Registered Nurses' Association of Ontario (RNAO). Transitions in care and services. 2nd ed. Toronto (ON): RNAO; 2023. Available from: RNAO.ca/bpg/guidelines/transitions-in-care
Implementation science, implementation frameworks and resources	■ Registered Nurses' Association of Ontario (RNAO), Healthcare Excellence Canada (HEC). Leading change toolkit [Internet]. 4th ed. Toronto (ON): RNAO; 2024. Available from: RNAO.ca/leading-change-toolkit
Incontinence-associated dermatitis	■ Beeckman D et al. Proceedings of the Global IAD Expert Panel. Incontinence associated dermatitis: moving prevention forward. Wounds International 2015. Available from https://multimedia.3m.com/mws/media/1048834O/incontinence-associated-dermatitis-best-practice-principles.pdf
Pain	■ Registered Nurses' Association of Ontario (RNAO). Assessment and management of pain. 3rd ed. Toronto (ON): RNAO; 2013. Available from: RNAO.ca/bpg/guidelines/assessment-and-management-pain **Note:** this BPG is currently under revision.

TOPIC	RESOURCE(S)
Palliative care	■ Registered Nurses' Association of Ontario (RNAO). A palliative approach to care in the last 12 months of life. Toronto (ON): RNAO; 2020. Available from: RNAO.ca/bpg/guidelines/palliative-approach-care-last-12-months-life ■ Registered Nurses' Association of Ontario (RNAO). End-of-life care during the last days and hours. Toronto (ON): RNAO; 2011. Available from: RNAO.ca/bpg/guidelines/person-and-family-centred-care
Person- and family-centred care	■ Registered Nurses' Association of Ontario (RNAO). Person- and family-centred care. Toronto (ON): RNAO; 2015. Available from: RNAO.ca/bpg/guidelines/person-and-family-centred-care **Note:** this BPG is currently under revision.
Pressure injuries	■ Fourie A, Ahtiala M, Black J, et al. Development of prone positioning and skin damage prevention digital education: the PRONEtect project. J Wound Care. 2023 Sep 2;32(9):570-578. doi: 10.12968/jowc.2023.32.9.570. PMID: 37682782 Review. □ PRONEtect resource: https://pronetection.com/ ■ Haesler E, editor. Prevention and treatment of pressure ulcers/injuries: clinical practice guideline: the international guideline. 3rd edition. Prague: Epuap, European Pressure Ulcer Advisory Panel; 2019. Available from: https://internationalguideline.com/2019 ■ Norton L, Parslow N, Johnston D, et al. Best practice recommendations for the prevention and management of pressure injuries. In: Foundations of Best Practice for Skin and Wound Management. A supplement of Wound Care Canada [Internet]. Wound Care Canada; 2017. Available from: http://www.woundscanada.ca/docman/public/health-care-professional/bpr-workshop/172-bpr-prevention-and-management-of-pressure-injuries-2/file

Appendix D: Education statements

Education statements for this BPG

RNAO has been at the forefront of creating BPGs since 1999, with its first BPGs being issued in 2001. From the outset, RNAO recognized the importance of individual and organizational approaches to the delivery of education on clinical BPG content to support evidence-based practice changes. As such, RNAO clinical BPGs included education recommendations directed to those responsible for the academic and in-service education of nursing students, nurses and the interprofessional team. These recommendations outlined core content and training strategies required for entry-level health programs, continued education and professional development.

An in-depth analysis of RNAO's educational recommendations was conducted in 2018. It included clinical BPGs published within a five-year period, as all clinical BPGs published within this period are based on a systematic review of the literature. It examined 26 education recommendations from nine different BPGs with diverse clinical topics and populations.

A rigorous thematic analysis showed similarities across BPGs. Thus, it was deemed appropriate to create standard education statements that would be applicable to all clinical BPGs to support evidence-based practice changes. The resultant two education statements and the associated discussion of the literature are described below. These statements can be contextually adapted within health service organizations and academic institutions to support tthe implementation of clinical recommendations for various guideline topic areas.

EDUCATION STATEMENT 1: ACADEMIC INSTITUTIONS INTEGRATE EVIDENCE-BASED GUIDELINES INTO CURRICULA FOR PRE- AND POST-LICENSURE NURSES AND OTHER REGULATED HEALTH PROVIDERS.

Discussion of Literature

The thematic analysis of the education recommendation statements in a number of BPDs found a second theme to be the foundation of evidence-based practice capacity building:

Health-service organizations use strategies to integrate evidence-based guidelines into the education and training for nurses and other health providers.

The following BPGs were analyzed:

- *Assessment and Management of Pain, Third Edition* (2013)
- *Care Transitions* (2014)
- *Person- and Family-centred Care* (2015)
- *Engaging Clients Who Use Substances* (2015)
- *Preventing and Addressing Abuse and Neglect of Older Adults: Person-centred, Collaborative, System-wide Approaches* (2014)
- *Primary Prevention of Childhood Obesity, Second Edition* (2014)
- *Delirium, Dementia and Depression in Older Adults: Assessment and Care, Second Edition* (2016)
- *Working with Families to Promote Safe Sleep in Infants 0–12 Months of Age* (2014)

Academic institutions should consider integrating BPG content into theoretical and practice-based courses for nurses and other regulated health providers, including social workers, physiotherapists, occupational therapists, dietitians and pharmacists in pre-licensure (e.g., diploma and undergraduate) and post-licensure (e.g., graduate) programs. Pre-licensure education establishes foundational knowledge that can be strengthened and augmented, as necessary, within health service organizations. Post-licensure education at the graduate level may include preparing nurses and other regulated health providers for advanced practice roles and functions within clinical practice, education, administration, research and policy (122). As such, the integration of guideline content into curricula will differ in terms of educational content and complexity, based on the overall educational objectives of the program. In both cases, integrating guideline content into curricula supports student learning consistent with evidence-based practices, with the goal of enhancing the health outcomes of persons and families.

To support the integration of evidence-based BPGs into curricula, the following approaches may be utilized: 1) developing multi-level guideline-related learning objectives and 2) designing BPG-related teaching and learning strategies. Both approaches are outlined below.

1. **Developing multi-level guideline-related learning objectives:** Guideline-related learning objectives at multiple levels of a program (pre-licensure and post-licensure) facilitate integration of guideline content into curricula.
   - At the program level, such integration broadens student knowledge, attitude, judgment and skill. For instance, a program-level outcome at the graduate level may include student awareness of elements of implementation science to support uptake and sustained use of guidelines in clinical settings (123).
   - At the course level, integration of guideline content supports student learning that is consistent with evidence-based practices within academic and practice settings. For example, course-level outcomes at the undergraduate level may include students being able to gain increased knowledge about guidelines, to select guidelines relevant to practice (and provide rationale for their selection), and to integrate guideline recommendations into plans of care for persons and families (123).

2. **Designing guideline-related teaching and learning strategies:** Teaching strategies should be tailored to address the program-level educational objectives and needs of learners, and to equip the learner to improve practice and promote positive outcomes (124). The various guideline-related teaching and learning strategies are outlined below.
   - **Lectures:** Educators can use lectures as a means of providing a broad understanding of guidelines, specifically the rigorous process of developing guidelines and their various Recommendations. Lectures can provide students with an understanding of the scope and strength of evidence that inform the recommendations (123).
   - **Interactive classroom activities:** Interactive learning activities within the classroom setting can support students to obtain additional information, participate in problem-solving and articulate knowledge gained. Examples include the following: assigning group work to help students learn how to navigate a guideline and become familiar with its recommendations; using case studies to provide students with opportunities to identify and apply guideline recommendations in care plans; and using videos and role playing to promote skills in articulating the rationale for selecting specific guidelines/recommendations in care plans (123).
   - **Simulation:** High-quality digital simulation within skills lab settings can ease the uncertainty of students related to clinical practice; it can also increase skill acquisition, self-confidence and satisfaction. Faculty trained in pedagogy can use simulation to teach students content related to safe and effective person- and family- centred care within a standardized clinical environment. Educators can also support students to incorporate guideline content into simulated practice sessions when teaching evidence-based practice (123).

- **Pre- and post-clinical conference discussions:** Focusing on a guideline at pre- and post-clinical conference discussions can support the critical thinking of students when they develop care plans, consider modifications based on guideline recommendations, articulate rationale for clinical decisions and evaluate the outcome of interventions. Students have the opportunity to evaluate if policies and procedures within the practice setting align with best evidence, and they can identify potential areas for practice change and consider how to initiate change (123).
- **Access to BPG-related resources:** Educators can promote and facilitate access to BPG-related links and resources (123).
- **Assignments and tests:** Students may be asked to incorporate guidelines into their learning plans or to write a reflective journal related to a guideline that is important to their area of practice. Tests or exam questions that demonstrate critical thinking related to guidelines can also be used. Overall, guideline-related assignments and tests can assist students to reflect upon guidelines, understand their application and critique them (123).
- **Preceptorship or mentorship in clinical placements:** Preceptors within clinical settings play an integral role in teaching practical skills that complement the theoretical learning of students. Preceptors are responsible for providing clinical teaching and supervision, and they perform formal student evaluation (125). Preceptors can support students to integrate guideline content into their learning objectives and clinical activities to promote evidence-based knowledge and practice.

EDUCATION STATEMENT 2: HEALTH SERVICE ORGANIZATIONS USE STRATEGIES TO INTEGRATE EVIDENCE-BASED GUIDELINES INTO EDUCATION AND TRAINING OF NURSES AND OTHER HEALTH PROVIDERS.

Discussion of Literature

The thematic analysis of the education recommendation statements in a number of BPGs found a second theme to be foundational to evidence-based practice capacity building:

Health service organizations use strategies to integrate evidence-based guidelines into the education and training for nurses and other health providers.

The following BPGs were analyzed:

- *Assessment and Management of Pain, Third Edition* (2013)
- *Care Transitions* (2014)
- *Person- and Family-centred Care* (2015)
- *Engaging Clients Who Use Substances* (2015)
- *Preventing and Addressing Abuse and Neglect of Older Adults: Person-centred, Collaborative, System-wide Approaches* (2014)
- *Primary Prevention of Childhood Obesity, Second Edition* (2014)
- *Delirium, Dementia and Depression in Older Adults: Assessment and Care, Second Edition* (2016)
- *Working with Families to Promote Safe Sleep in Infants 0–12 Months of Age* (2014)

Nurses and other health providers should continually seek new knowledge, identify opportunities for professional growth and pursue ongoing learning throughout their careers. Participation in education and training ensures congruence with evidence-based practices, enhances competence and improves care quality and individual outcomes (126). Integrating guideline content into education and training programs within health service organizations can improve evidence-based knowledge and skills for post-licensure nurses and other health providers.

Education and training programs should be based on the principles of adult learning, including that adults:

- have an awareness of learning needs/goals
- are self-directed and autonomous
- value and utilize prior life experiences
- have a readiness to learn
- are motivated to learn
- are presented knowledge and skills in the context of practical, real-life situations (127)

Furthermore, education and training should be appropriate to the health provider's scope of practice and their defined role. Education and training strategies may include the following:

- **In-service education sessions:** In-service education sessions can be planned by clinical experts within practice settings to support the utilization of a specific BPG or recommendations stimulating evidence-based practice among staff. The education may include one-on-one or group sessions, and it should address the needs of learners. It is recommended that the education sessions are followed with refresher or booster sessions to provide feedback and enhance staff learning (128,129).
- **Workshops/seminars:** Highly interactive workshops/seminars help nurses and health providers maintain practice based on best evidence when they incorporate a variety of teaching–learning strategies, including pre-circulated materials, small group discussions using case studies, and multimedia such as slide presentations and videos that integrate relevant BPGs/recommendations. RNAO's Best Practice Champions Workshop and BPG Learning Institutes are examples of programs that provide education on how to implement BPGs within practice settings (107).
- **Quality improvement:** Participating in quality improvement within workplace settings can support nurses and health workers to recognize sentinel events and examine ways to improve care. Meeting accreditation standards is an important quality improvement activity that bridges gaps between current and best practices and supports continued competence. Examples of strategies that nurses and other health providers can use to meet accreditation standards include the following:
  - participating in a unit-based guideline implementation process to promote patient safety, reduce risks, and improve care outcomes;
  - choosing guideline-specific recommendations to facilitate practice change; and
  - sharing knowledge and lessons learned from reviewing guidelines with the accreditation committee (130,131).

  Additional quality improvement opportunities include participating in incident reporting, patient safety initiatives and other health initiatives within areas of practice.
- **Post-licensure mentorship:** Post-licensure mentorship involves providing new graduates or less experienced staff with guidance for skill development and support for the growth of professional roles. Research suggests that working with mentors reduces stress and improves satisfaction for new staff during the transition process (132). Mentors can support integration of guideline content while teaching evidence-based practice.

EVALUATION

All educational strategies require evaluation to a) monitor the adoption of knowledge; and b) measure the impact on clinical outcomes.

RNAO has developed the *Practice Education in Nursing* BPG (133) to provide evidence-based recommendations that support the application of knowledge to various practice settings by student nurses. The BPG also assists nurses, nurse educators, preceptors and other members of the interprofessional team to understand the effective use of teaching–learning strategies in clinical settings.

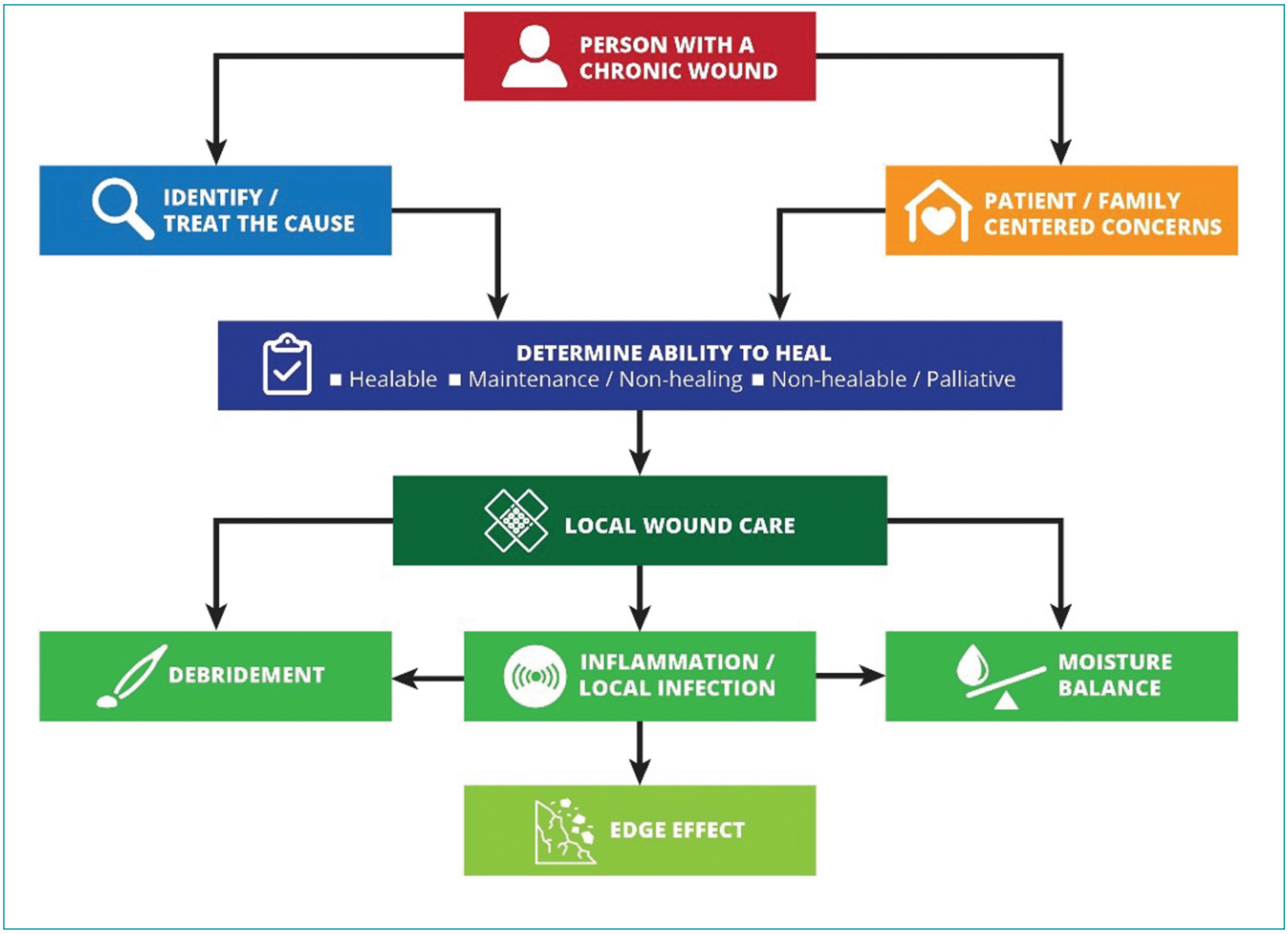
The Leading Change Toolkit (3) identifies many strategies to support the evaluation of health outcomes at the levels of the person, provider, organization and health system. Examples of evaluation strategies may include the following:

- pre- and post-tests for staff educational sessions
- staff focus groups/interviews
- observation of patient–provider encounters
- chart audits to determine the impact on person and family outcomes
- person and family satisfaction surveys or interviews

Appendix E: Example wound care frameworks

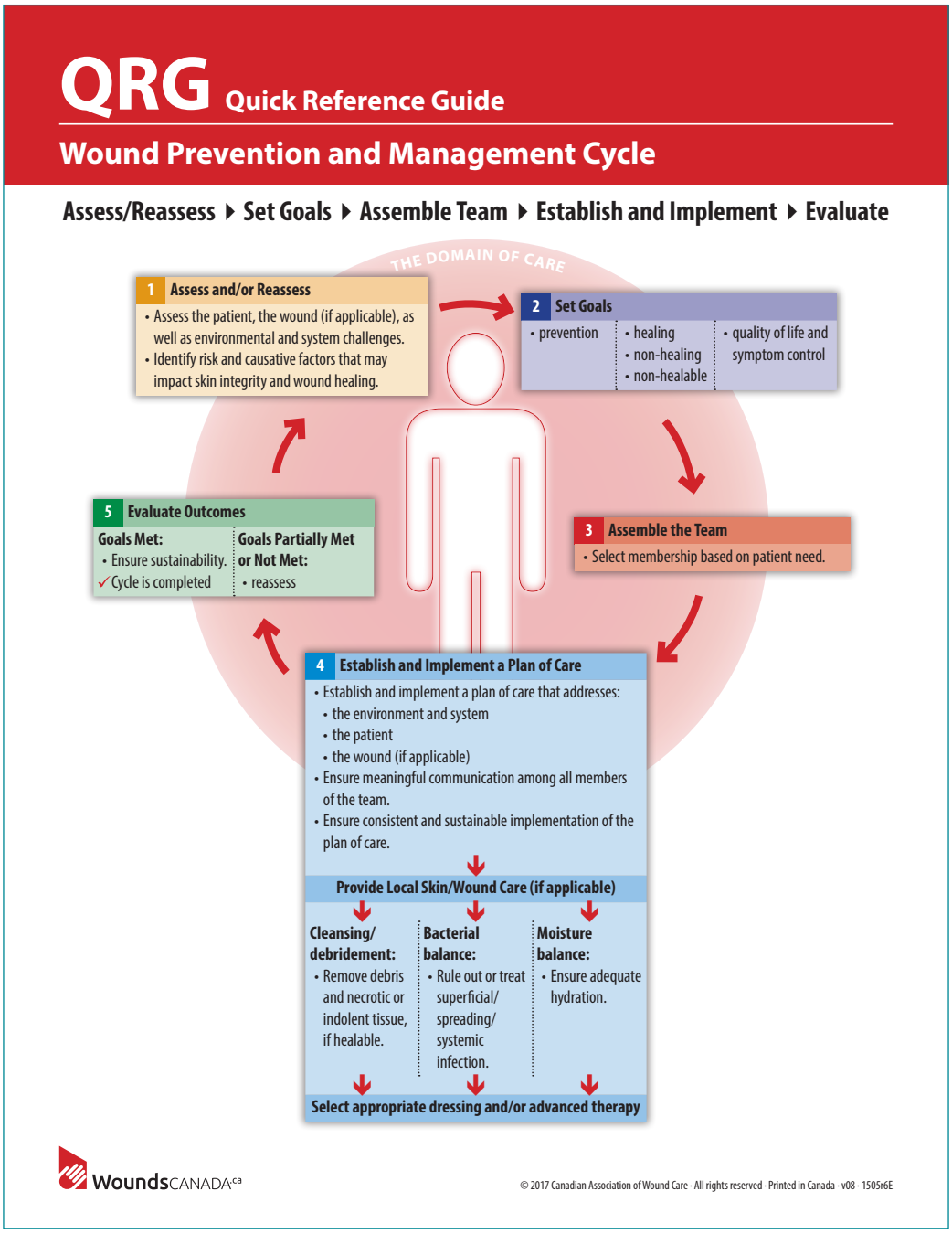
The following graphics illustrate two examples of wound care frameworks: the wound bed preparation paradigm and the wound prevention and management cycle.

Figure 2: Wound Bed Preparation paradigm



Source: Reprinted with permission from Sibbald RG, Elliott JA, Persaud-Jaimangal R, et al. Wound Bed Preparation 2021. Adv Skin Wound Care. 2021 Apr 1;34(4):183–95

Figure 3: Wound prevention and management cycle

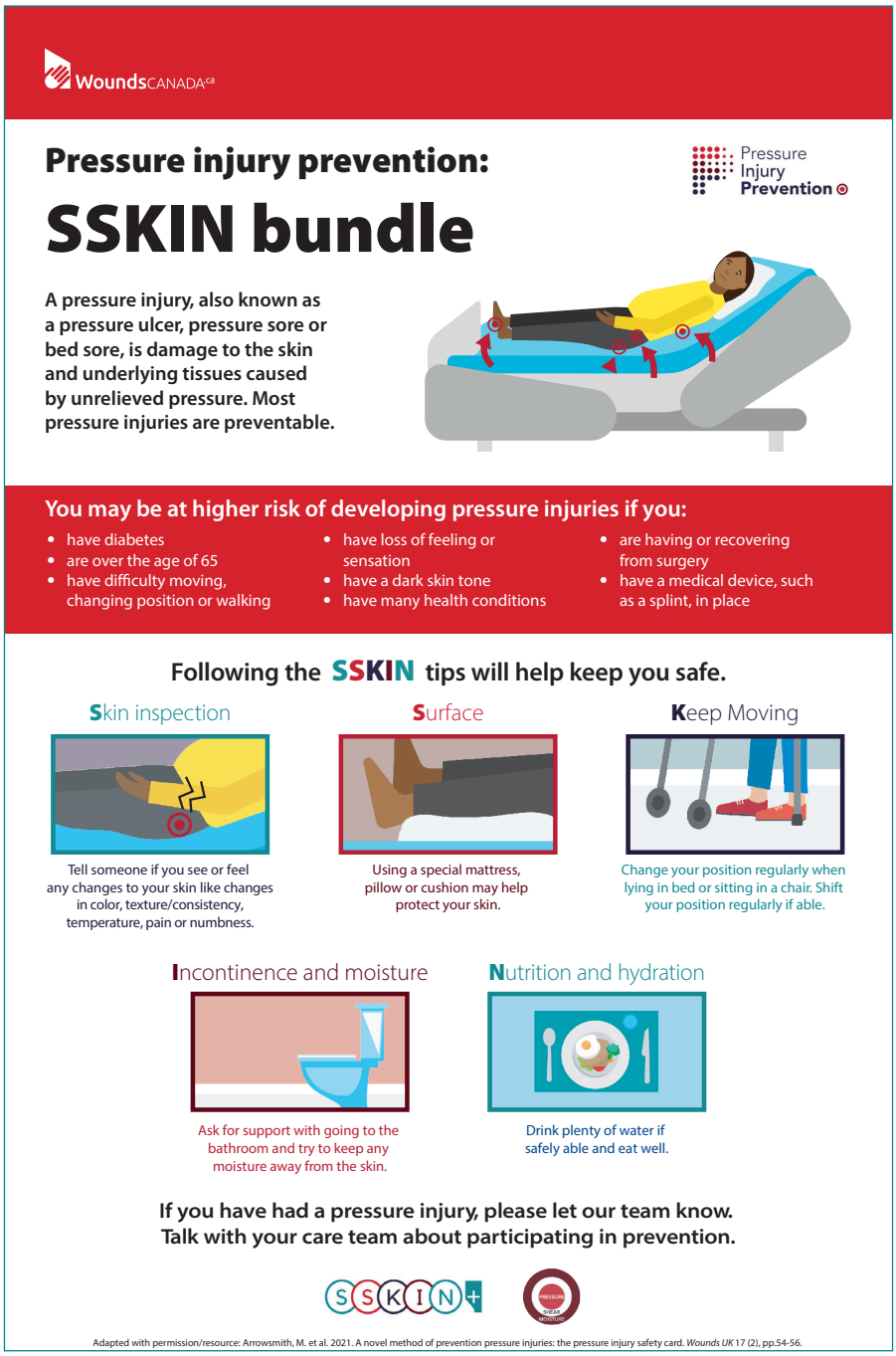


Source: Reprinted with permission from Orsted HL, Keast DH, Forest-Lalande L, et al. Best practice recommendations for the prevention and management of wounds. In: Foundations of Best Practice for Skin and Wound Management. A supplement of Wound Care Canada; 2017. 74 pp. Available from: https://www.woundscanada.ca/docman/public/health-care-professional/bpr-workshop/165-wc-bpr-prevention-and-management-of-wounds/file

Appendix F: Example preventative care bundle

The following is an example of a preventative care bundle which may be used to educate people and caregivers.

Figure 4: SSKIN bundle



Source: Source: Reprinted with permission from: Wounds Canada. Pressure injury prevention: SSKIN bundle [Internet]. North York (ON): Wounds Canada; [date unknown]. Available from: https://www.woundscanada.ca/health-care-professional/education-health-care-professional/11-patient-caregiver/741-sskin-bundle

Appendix G: Risk assessment tools

The following are examples of pressure injury risk assessment tools, however this list is not an exhaustive. These tools were identified, by the expert panel and **external reviewers**[G] or through the systematic review process. The most common, valid, and reliable wound assessment tools for use in adults are the following (not in order of importance):

- Braden scale;
- Norton scale;
- interRAI Pressure Ulcer Risk Scale (PURS) and
- Waterlow scale.

Table 21 below provides an overview of these validated pressure injury risk assessment tools and includes a comparison of the risk factors included in each tool, as well as validation studies and sources.

Table 21: Overview of validated pressure injury risk assessment tools

RISK FACTORS	BRADEN SCALE	NORTON SCALE	INTERRAI PRESSURE ULCER RISK SCALE (PURS)	WATERLOW SCORE
Components and comparison of risk factors included in tools				
Activity and mobility limitations	▪ mobility ▪ activity ▪ friction-shear	▪ mobility ▪ activity	▪ bed mobility ▪ walking	▪ mobility
Skin status	not included	not included	prior pressure ulcer	skin type (in visual areas, partial measure of skin status)
Perfusion and oxygenation	not included	not included	dyspnea	special risk (partial measure of perfusion)
Poor nutritional status	nutrition	▪ food intake ▪ fluid intake (modified scale)	weight loss of 5% or more in last 30 days or 10% or more in last 180 days	▪ appetite ▪ build (weight for height)
Increased skin moisture	moisture	incontinence	bowel continence	continence
Advanced age	not included	not included	not included	gender/age
Sensory perception	sensory perception	not included	frequency with which person complains or shows evidence of pain	neurological deficit
General health status	not included	▪ physical condition ▪ mental condition	not included	▪ major surgery/ trauma ▪ medications

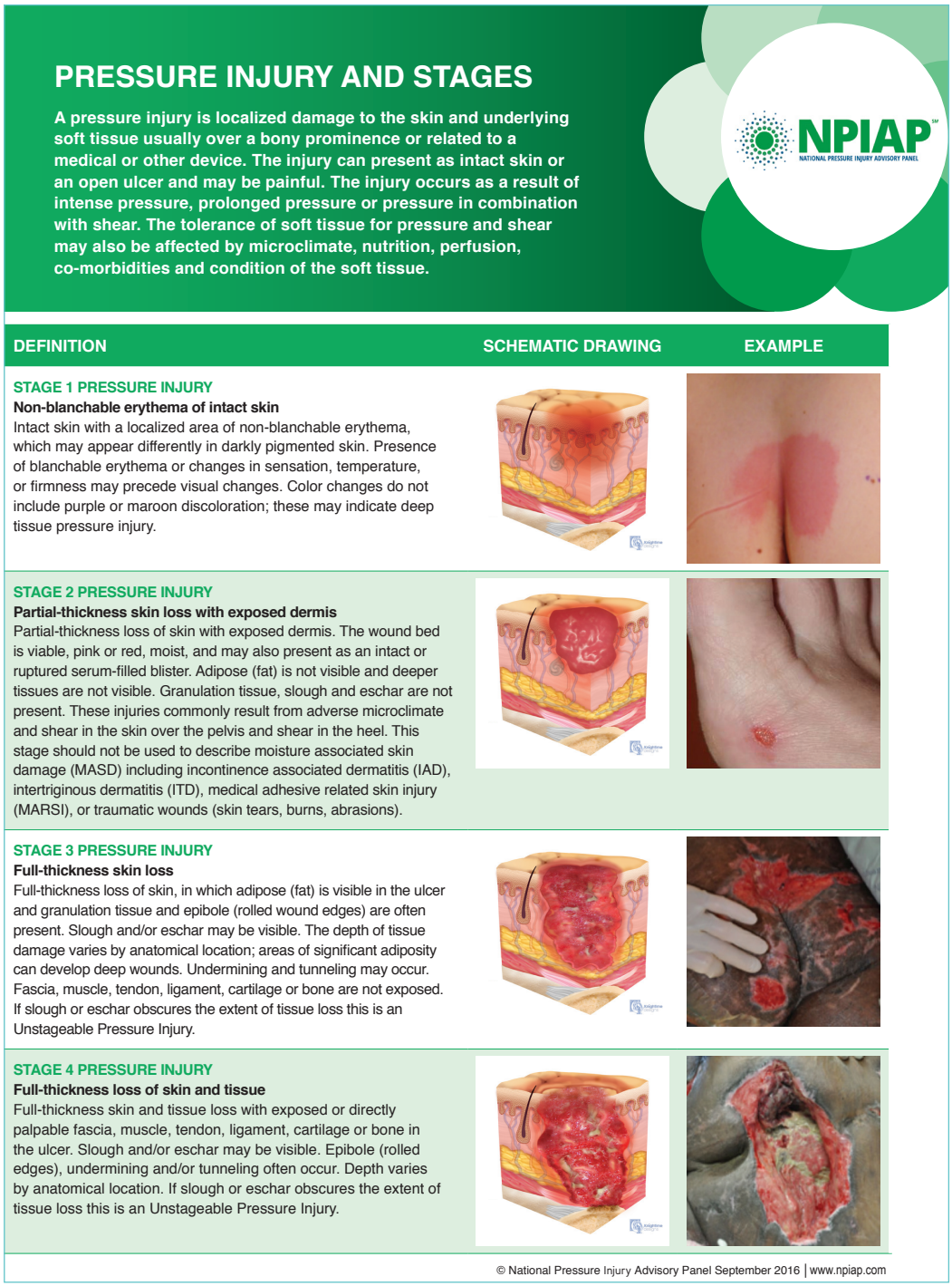
RISK FACTORS	BRADEN SCALE	NORTON SCALE	INTERRAI PRESSURE ULCER RISK SCALE (PURS)	WATERLOW SCORE
Further resources				
Validation studies	Bergstrom, N., Braden, B., Kemp, M., et al. (1998). Predicting pressure ulcer risk: A multisite study of the predictive validity of the Braden scale. Nursing Research, 47(5), 261–9. Kring, D.L. (2007). Reliability and validity of the Braden Scale for Predicting Pressure Ulcer Risk. J Wound Ostomy Continence Nurs, 34(4), 399–406. Garcia-Fernandez, E. P., Pancorbo-Hidalgo, P. L., & Agreda, J. J. (2014). Predictive capacity of risk assessment scales and clinical judgement for pressure ulcers: A meta-analysis. J Wound Ostomy Continence Nurs, 41(1), 24–34.	Garcia-Fernandez, E. P., Pan-corbo-Hidalgo, P. L., & Agreda, J. J. (2014). Predictive capacity of risk assessment scales and clinical judgement for pressure ulcers: A meta-analysis.J Wound Ostomy Continence Nurs, 41(1), 24–34	Carreau, L., Niezgoda, H., Trainor, A., et al. (2015). Pilot study compares scores of the Resident Assessment Instrument Minimum Data Set version 2.0 (MDS 2.0) Pressure Ulcer Risk Scale with the Braden Pressure Ulcer Risk Assessment for Patients in Complex Continuing Care. Advances in Skin and Wound Care, 28(1), 28–33. Poss, J., Murphy, K. M., Woodbury, M. G., et al. (2010). Development of the interRAI Pressure Ulcer Risk Scale (PURS) for use in long-term care and home care settings. BMC Geriatr, 10(67). doi:10.1186/1471-2318-10-67	Garcia-Fernandez, E. P., Pancor-bo-Hidalgo, P. L., & Agreda, J. J. (2014). Predictive capacity of risk assessment scales and clinical judgement for pressure ulcers: A metaanalysis. J Wound Ostomy Continence Nurs, 41(1), 24–34.
Website	https://www.in.gov/health/files/Braden_Scale.pdf	https://www.mdapp.co/norton-score-for-pressure-ulcer-risk-calculator-235/	https://ltctoolkit.rnao.ca/sites/default/files/resources/pressure_ulcer/AssessmentTools/AppedixkPUBPG.pdf	https://www.cgakit.com/waterlow-score

Source: Table adapted from Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline 2019. interRAI PURS Pressure Ulcer Risk Scale (PURS) from Canadian Institute for Health Information. interRAI Home Care (HC) Outcome Scales [job aid]. Ottawa, ON: CIHI; 2024

Appendix H: Example classification system

The following is an example of a validated classification system used to classify pressure injuries.

Figure 5: NPIAP pressure injury stages



PRESSURE INJURY AND STAGES

A pressure injury is localized damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device. The injury can present as intact skin or an open ulcer and may be painful. The injury occurs as a result of intense pressure, prolonged pressure or pressure in combination with shear. The tolerance of soft tissue for pressure and shear may also be affected by microclimate, nutrition, perfusion, co-morbidities and condition of the soft tissue.

NPIAP™ NATIONAL PRESSURE INJURY ADVISORY PANEL

DEFINITION	SCHEMATIC DRAWING	EXAMPLE
STAGE 1 PRESSURE INJURY **Non-blanchable erythema of intact skin** Intact skin with a localized area of non-blanchable erythema, which may appear differently in darkly pigmented skin. Presence of blanchable erythema or changes in sensation, temperature, or firmness may precede visual changes. Color changes do not include purple or maroon discoloration; these may indicate deep tissue pressure injury.		
STAGE 2 PRESSURE INJURY **Partial-thickness skin loss with exposed dermis** Partial-thickness loss of skin with exposed dermis. The wound bed is viable, pink or red, moist, and may also present as an intact or ruptured serum-filled blister. Adipose (fat) is not visible and deeper tissues are not visible. Granulation tissue, slough and eschar are not present. These injuries commonly result from adverse microclimate and shear in the skin over the pelvis and shear in the heel. This stage should not be used to describe moisture associated skin damage (MASD) including incontinence associated dermatitis (IAD), intertriginous dermatitis (ITD), medical adhesive related skin injury (MARSI), or traumatic wounds (skin tears, burns, abrasions).		
STAGE 3 PRESSURE INJURY **Full-thickness skin loss** Full-thickness loss of skin, in which adipose (fat) is visible in the ulcer and granulation tissue and epibole (rolled wound edges) are often present. Slough and/or eschar may be visible. The depth of tissue damage varies by anatomical location; areas of significant adiposity can develop deep wounds. Undermining and tunneling may occur. Fascia, muscle, tendon, ligament, cartilage or bone are not exposed. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.		
STAGE 4 PRESSURE INJURY **Full-thickness loss of skin and tissue** Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage or bone in the ulcer. Slough and/or eschar may be visible. Epibole (rolled edges), undermining and/or tunneling often occur. Depth varies by anatomical location. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.		

Source: Reprinted with permission from the National Pressure Injury Advisory Panel (NPIAP). Pressure injury and stages [Internet]. Schaumburg (IL): NPIAP. 2016. Available from: https://cdn.ymaws.com/npiap.com/resource/resmgr/NPIAP-Staging-Poster.pdf

Appendix I: Pressure injuries in people with dark skin tones

The following document from the Pan Pacific Pressure Injury Alliance outlines some considerations for risk assessment and treatment of pressure injuries in people with dark skin tones. Additionally, it includes classification based on the NPIAP/EUPAP classification system with examples of each stage in people with dark skin tones.

Figure 6: Pressure injury in people with dark skin tones

Source: Reprinted with permission from: Pan Pacific Pressure Injury Alliance (PPPIA). Pressure ulcers in people with dark skin tones [Internet]. [place unknown]: PPPIA; 2014. Available from: https://talleygroup.com/medias/documents/PPPIA-Pressure-Ulcers-in-People-with-Dark-Skin-Tones-Poster-A3L-0-1604484440.pdf

Appendix J: Example of malnutrition screening tool

Below is an example of a nutrition screening tool which can be used to identify those who may be at risk for malnutrition.

Figure 7: Canadian Nutrition Screening Tool

CANADIAN NUTRITION SCREENING TOOL (CNST)

Name:	Age:	Weight:	Room:

Identify patients who are at risk for malnutrition

	Date: Admission		Date: Rescreening	
Ask the patient the following questions*	**Yes**	**No**	**Yes**	**No**
Have you lost weight in the past 6 months **WITHOUT TRYING** to lose this weight? If the patient reports a weight loss but gained it back, consider it as NO weight loss.				
Have you been eating less than usual **FOR MORE THAN A WEEK**?				
Two "YES" answers indicate nutrition risk†				

* If the patient is unable to answer the questions, a knowledgeable informant can be used to obtain the information. If the patient is uncertain regarding weight loss, ask if clothing is now fitting more loosely.

Patients at nutrition risk need an assessment to confirm malnutrition

Nutrition screening using a valid tool can generate a significant volume of requests for nutrition evaluation. Subjective Global Assessment (SGA) is a simple and efficient first-line assessment of nutritional status that can be used following a positive screening and to help prioritize cases.

If a patient is malnourished (SGA B or C), an in-depth nutrition assessment, along with treatment, is required by a registered dietitian.

The Canadian Nutrition Screening Tool was rigorously validated and tested for reliability in Canadian hospitals. Non-expert raters completed the tool and it was compared to the SGA conducted by a dietitian or trained nutrition researcher.

† If a patient is not at risk, rescreen within a week. Only consider weight change in the past week.

Validation and reliability testing of the Canadian Nutrition Screening Tool was funded by an unrestricted educational grant of Abbott Nutrition Canada.

Canadian Nutrition Society / Société canadienne de nutrition

Canadian Malnutrition Task Force | le Groupe de travail canadien sur la malnutrition

THE IMPORTANCE OF NUTRITION SCREENING

Strategies to support adequate food intake

- Position patients properly for eating
- Assist patients in opening packages and containers
- Avoid scheduling tests or examinations during meal times
- Consider in-between meal snacks and supplements to support intake
- Clarify why the patient is not eating and find solutions to overcome these problems
- Determine if the patient has pain, is depressed, anxious or in need of medication and social support

Flag patients who are eating 50% or less of their hospital meals

Obtain measured weight of patients using a portable, digital chair scale at their bedside. Weight should be measured at admission and at least, weekly. Communicate discharge weight and nutritional status with the patient, family and formal service providers.

ENS/890A08–March 2014

Canadian Nutrition Society / Société canadienne de nutrition

Canadian Malnutrition Task Force | le Groupe de travail canadien sur la malnutrition

Source: Reprinted from: Canadian Nutrition Society. Canadian nutrition screening tool [Internet]. Ottawa (ON): Canadian Nutrition Society; 2014. Available from: https://nutritioncareincanada.ca/sites/default/uploads/files/CNST.pdf

Appendix K: Holistic management of wound-related pain

The following is a two-page summary of the European Wound Management Association (EWMA) guidance on holistic management of wound-related pain.

Figure 8: Summary of EWMA guidance on holistic management of wound-related pain

Holistic Management of Wound-Related Pain

www.ewma.org

The experience of wound-related pain is complex and needs to take into consideration the psychological and social factors that can impact on an individual's quality of life to ensure a holistic approach.

Pain is a multidimensional phenomenon that is predisposed by biological, psychological and social factors which influence how pain is experienced and how it should be managed (Love-Jones 2019, Faculty of Pain Medicine 2021). Additionally, individuals learn the concept of pain through life experiences (Linton & Shaw 2011, Craig & MacKenzie 2021). Pain, particularly chronic / persistent pain can also have adverse effects on function and on social and psychological well-being (overall quality of life), therefore understanding pain and its management is essential to providing effective pain management.

Assessment of wound-related pain is complex and multidimensional. Health care providers must determine what the most suitable assessment tool is for their patients and in doing so consider an individual's ability to assess their own pain. Unidimensional measures of pain intensity are not appropriate as stand-alone tools for pain assessment. Information from these scales must be considered in conjunction with a functional and sociopsychological assessment. The assessment of chronic pain requires the use of multidimensional tools that incorporate quality of life measures.

Management of wound-related pain needs to consider the impact of:

- Anticipatory pain
- Procedural pain (i.e. related to the nursing interventions and care – debridement procedures)

Interventions (as adjuncts to pharmacological approaches) might include:

- Physical activity / exercise – active and Physical activity – passive and repositioning
- Manage moisture to prevent maceration and reduce risk of pain from periwound skin irritation (dermatitis)
- A combination of non-pharmacological interventions may be needed
- Aromatherapy and music therapy may also be helpful in providing a distraction for anticipatory and procedural related pain
- Topical impregnated dressings and topical anaesthetics for pain relief
- Honey impregnated dressings appear to have an analgesic action related to its anti-inflammatory properties
- For individuals with leg ulcers social models of care and motivation enhancement programmes may be helpful.

Patient Education approaches for wound-related pain should include information on:

- Aetiology of the wound and causes of pain (based on OPQRST framework),
- Non-pharmacological and pharmacological methods for pain relief
- Ways and means of judging the effectiveness of interventions to manage wound-related pain
- Impact of pain on quality of life
- Patient education maybe include: the rationale and goals of treatment (particularly expectation setting)

Psychological approaches need to consider the factors associated with pain i.e., attention, cognitions, emotions, emotion regulation and overt behaviour. Interventions may include:
Distraction · ***Interceptive Exposure*** · ***Cognitive Restructuring*** · ***Cognitive Behavioural Therapies Activation*** · ***Relaxation*** · ***Positive Psychology Techniques*** · ***Coping Strategies***

References:

Craig KD., MacKenzie NE. 2021. What is pain: Are cognitive and social features core components. Paediatr Neonatal Pain. 3(3), pp. 106-118.

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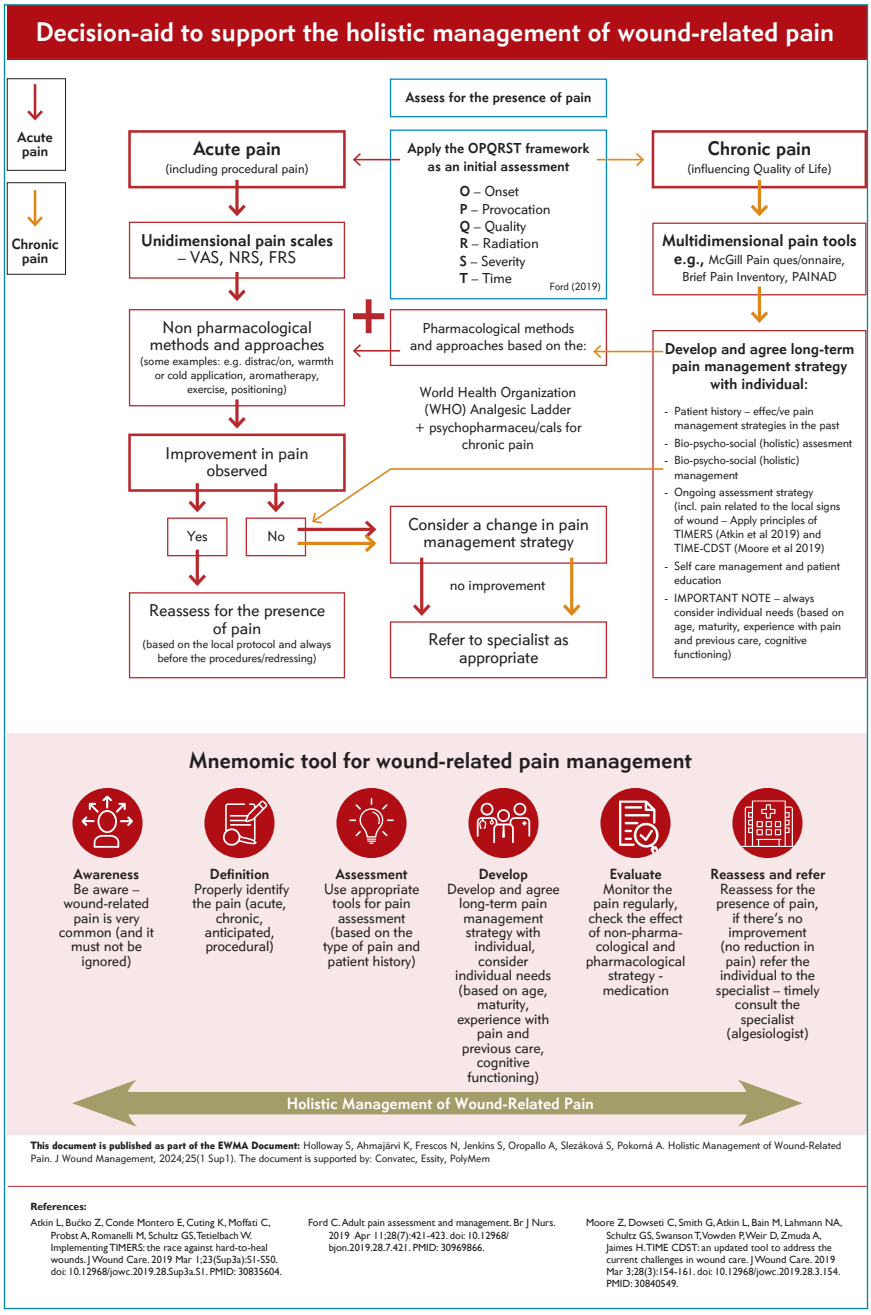


Source: Reprinted with permission from: The European Wound Management Association. Holistic management of wound-related pain. J Wound Management [Internet]. 2024; 24 (1 Sup 1). Available from: https://ewma.org/wp-content/uploads/2024/04/A4_Holistic-one-page_030424.pdf

Appendix L: Emerging health technologies for assessment and detection

Table 22 outlines additional or emerging health technologies which may be available for the assessment and early detection of pressure injuries. It does not represent an exhaustive list.

Table 22: Emerging health technologies for assessment and detection

TECHNOLOGY	DESCRIPTION	KEY REFERENCES/RESOURCES
Movement monitoring (including wearable devices)	Devices which may be wearable or integrated into support surfaces to monitor a person's movement to determine risk of pressure injury development. May also be used as a preventative intervention by encouraging movement.	Moore Z, Avsar P, O'Connor T, et al. A systematic review of movement monitoring devices to aid the prediction of pressure ulcers in at-risk adults. International Wound Journal. 2023 Feb;20(2):579–608. Crotty A, Killian JM, Miller A, et al. Using wearable technology to prevent pressure injuries: An integrative review. Worldviews Evid Based Nurs [Internet]. 2023; 20(4): 351-360.
Laser doppler	Laser doppler can be used to evaluate blood flow. Resulting images are analyzed for perfusion.	Scafide KN, Narayan MC, Arundel L. Bedside Technologies to Enhance the Early Detection of Pressure Injuries: A Systematic Review. J Wound Ostomy Continence Nurs. 2020 Mar;47(2):128–36.
Reflectance spectrometry	White light is applied to the skin's surface and reflectance is measured and converted to an erythema index based on an algorithm. This provides a proximity measure of perfusion based on erythema.	Scafide KN, Narayan MC, Arundel L. Bedside Technologies to Enhance the Early Detection of Pressure Injuries: A Systematic Review.J Wound Ostomy Continence Nurs. 2020 Mar;47(2):128–36.

TECHNOLOGY	DESCRIPTION	KEY REFERENCES/RESOURCES
Artificial intelligence and machine learning	There are many emerging technologies that use machine learning for pressure injuries. The majority of the technologies are focused on predictive models to identify risk factors, posture detection and recognition and image analysis for wound classification and assessment.	Jiang M, Ma Y, Guo S, et al. Using machine learning technologies in pressure injury management: Systematic review. JMIR med inform [Internet]. 2021; 9(3):e25704. Available from: http://medinform.jmir.org/2021/3/e25704/ Lau CH, Yu KH, Yip TF, et al. An artificial intelligence-enabled smartphone app for real-time pressure injury assessment. Front Med Technol [Internet]. 2022 Sep 23;4:905074. Available from: https://www.frontiersin.org/articles/10.3389/fmedt.2022.905074/full

Appendix M: Pressure injury assessment tools

The following list of pressure injury assessment tools is not exhaustive. The tools have been suggested as examples and were identified through the systematic review or by the expert panel. The most common, valid, and reliable wound assessment tools for use in adults are the following (not in order of importance):

- Pressure Ulcer Scale for Healing (PUSH);
- Photographic Wound Assessment Tool (PWAT) and
- Bates-Jensen Wound Assessment Tool (BWAT).

For a detailed, systematic analysis of all available assessment tools see the systematic review by Smet et al, 2021 (134).

Table 23: Pressure injury assessment tools

TOOL	REFERENCE	DESCRIPTION
Pressure Ulcer Scale for Healing (PUSH) version 3.0	Stotts NA, Rodeheaver GT, Thomas DR, et al. An instrument to measure healing in pressure ulcers: Development and validation of the pressure ulcer scale for healing (PUSH). J Gerontol A Biol Sci Med Sci 2001;56(12):M795-M9.	The Pressure Ulcer Scale for Healing (PUSH Tool) was developed by the National Pressure Injury Advisory Panel (NPIAP) as a quick, reliable tool to monitor the change in pressure injury status over time. Construct validity and responsiveness rated highly (134).
Photographic Wound Assessment Tool (PWAT)	Houghton PE, Kincaid CB, Campbell KE, et al. Photographic assessment of the appearance of chronic pressure and leg ulcers. Ostomy Wound Management. 2000;46(4):2030	The PWAT uses wound photographs to assess wound status. Can be used when bedside assessment is not possible. Reliability rated highly (134).
Bates-Jensen Wound Assessment Tool (BWAT)	Bates-Jensen BM, McCreath HE, Harputlu D, Patlan A. Reliability of the Bates-Jensen wound assessment tool for pressure injury assessment: The pressure ulcer detection study. Wound Repair and Regeneration. 2019;27(4):386-95.	The BWAT tool is widely used in wound care practice in Canada. It is used to fully describe a pressure injury or other type of wound.

Appendix N: Wound infection assessment tools

NERDS and STONEES are methods to systematically assess for superficial critical colonization (localized infection) and deeper and surrounding infection (systemic infection), respectively, in people with pressure injuries. The methods described below are suggestions that were identified through the systematic review and by feedback from the expert panel or external reviewers. Both kinds of infections must be treated in order to avoid delays in wound healing.

Table 24: Overview of NERDS© and STONEES© infection assessment tools

INFECTION ASSESSMENT TOOL	
NERDS©	
N- non-healing wound	This refers to wounds that have not healed, despite the implementation of appropriate wound care interventions (e.g., the cause of the wound was treated and person/caregiver concerns were addressed).
E- exudate	Increased exudate from a pressure injury indicates bacterial imbalance (in the absence of an autolytic debridement process), which in turn can cause peri-wound maceration.
R- red and bleeding	A red and bleeding wound surface and granulation tissue is indicative of bacterial imbalance.
D- debris	Yellow or black necrotic tissue and debris on the wound surface stimulates infection by acting as a food source for bacteria.
S- smell	The unpleasant smell from a pressure injury generally results from bacterial imbalance, tissue inflammation, and the release of bacterial by-products from tissue necrosis. Different bacteria produce different smells – for example, pseudomonas diffuses a sweet scent, while anaerobes produce a putrid smell.
Interpretation	A person must meet at least three of the above criteria to be considered for superficial wound infection treatment

INFECTION ASSESSMENT TOOL	
STONEES©	
S- size	An increased wound size may be due to (1) deeper and surrounding tissue damage caused by bacteria, (2) the cause of the wound not having been treated or (3) a local or systemic cause that is impairing wound healing.
T- temperature	Infection should be highly suspected if there is greater than a 3-degree temperature difference between the two mirror-image sites (e.g., the left heel and the right heel).
O- os (probe to or exposed bone)	Osteomyelitis should be highly suspected if a health-care professional can probe to bone or if the bone is exposed.
N- new or satellite areas of breakdown	Satellite breakdown refers to areas of skin breakdown that are separate from the main pressure injury. This may occur when (1) the cause of the wound has not been treated, (2) local damage is present or (3) there is an infection.
E- exudate	Increased exudate is indicative of increased bacterial burden and damage.
E- erythema and/or edema (cellulitis)	Erythema and/or edema is indicative of increased bacterial burden and bacterial damage. The bacterial burden and damage in turn causes inflammation, vasodilation (i.e., erythema), and leakage of fluid into the tissue (i.e., edema).
S- smell	Bacteria that invade tissue cause wounds to have a "foul" smell.
Interpretation	A person must meet at least three of the above criteria to be considered for deep and surrounding wound infection intervention.
Validation studies	Woo KY, Sibbald RG. A cross-sectional validation study of using NERDS and STONEES to assess bacterial burden. Ostomy Wound Manage. 2009 Aug 1;55(8):40–8.

Appendix O: Support surfaces: Terms and definitions

The following list includes standardized terms to use when referring to support surfaces. NPIAP developed these terms and definitions to allow for standard, and clear language when describing support surfaces. Key terms are listed below and the full publication can be accessed here: https://cdn.ymaws.com/npiap.com/resource/resmgr/s3i/Finalized_T&D_2024.pdf.

Table 25: Support surface terms and definitions

TERM	DEFINITION
Active support surface	"A powered support surface, with the capability to change its load distribution properties, with or without applied load."
Alternating pressure	"A feature of a support surface that provides pressure redistribution via cyclic changes in loading and unloading as characterized by frequency, duration, amplitude, and rate of change parameters."
Basic/standard hospital mattress ***The term "standard hospital mattress" should not be used without a full description. Commonly used mattresses have changed over time and no 'standard' exists.**	"A term used to describe the mattress provided within a facility and generally used as the comparative intervention in research trials investigating the effectiveness of pressure redistribution support surfaces. As such, the qualities of a standard hospital mattress vary according to historical and clinical context and are rarely reported in detail in clinical trials. In most cases it is assumed that a standard hospital mattress is a non-powered foam or spring-based mattress."
Gel	"A semisolid system consisting of a network of solid aggregates, colloidal dispersions or polymers which may exhibit elastic properties. Gels can range from hard to soft."
Low air loss	"A feature of a support surface that uses a flow of air to assist in managing the heat and humidity (microclimate) of the skin."
Non-powered	"Any support surface not requiring or using external sources of energy for operation." (Energy = DC or AC electrical current)
Overlay	"An additional support surface designed to be placed directly on top of an existing surface."

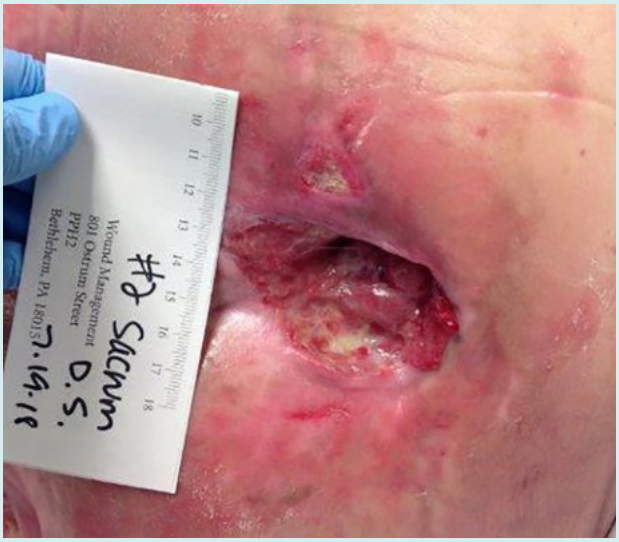
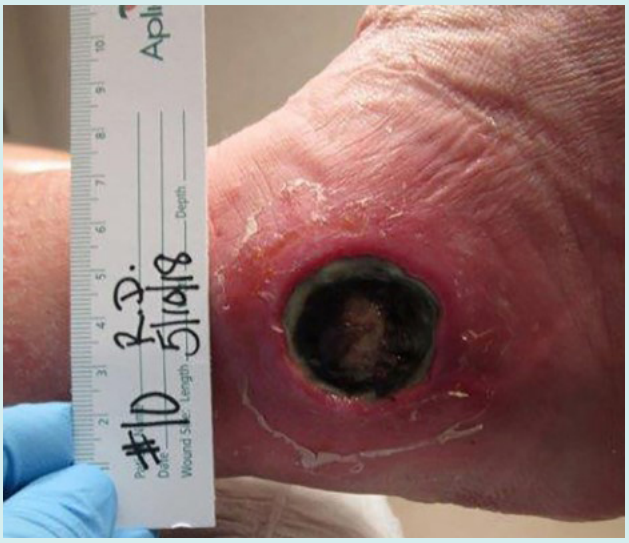
TERM	DEFINITION
Powered	"Any support surface requiring or using external sources of energy to operate." (Energy = DC or AC electrical current)
Reactive support surface *** May also be called constant/ continuous low pressure**	"A powered or non-powered support surface with the capability to change its load distribution properties only in response to applied load."
Support surface	"A specialized device for pressure redistribution designed for management of tissue loads, micro-climate, and/or other therapeutic functions. Support surfaces include but are not limited to mattresses, integrated bed systems, mattress replacements or overlays, or seat cushions and seat cushion overlays."

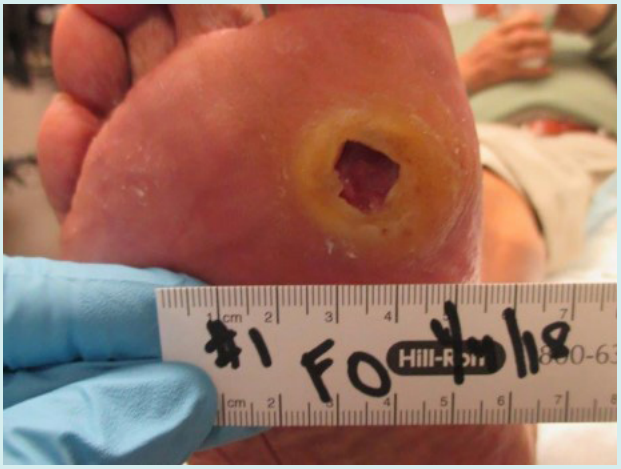
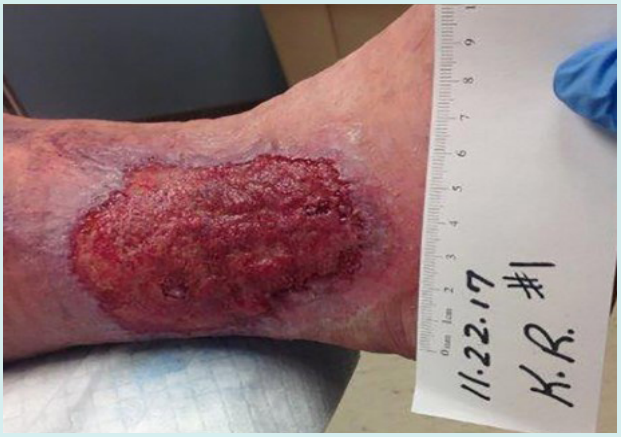
Source: National Pressure Injury Advisory Panel (NIPAP). Support surfaces standards initiative (S31): Terms and definitions related to support surfaces [Internet]. NIPAP; 2019. Available from: https://cdn.ymaws.com/npiap.com/resource/resmgr/s3i/Finalized_T&D_2024.pdf

Appendix P: Comparison of different types of chronic wounds

Table 26 compares different types of chronic wounds to assist health providers in differentiating wounds they may see in clinical practice.

Table 26: Comparison of different types of chronic wounds

WOUND TYPE	APPEARANCE	SAMPLE IMAGE
Pressure injury	Located over bony prominences, superficial to deep	
Arterial ulcer	Deep; eschar; punched-out, well-demarcated borders; deep structures may be exposed	

WOUND TYPE	APPEARANCE	SAMPLE IMAGE
Diabetic foot ulcer	Located on plantar aspect of foot, extensive callus formation, superficial to deep	
Venous ulcer	Shallow, no eschar; located over medial aspect of lower extremity (gaiter region)	

Source: Adapted with permission from: Bowers S, Franco E. Chronic Wounds: Evaluation and Management. 2020;101(3). Available from: https://www.aafp.org/pubs/afp/issues/2020/0201/p159.pdf

Appendix Q: Distinguishing between incontinence-associated dermatitis and pressure injuries

Table 27 below provides an outline of the distinguishing features of incontinence-associated dermatitis and pressure injuries. It may help health providers differentiate between the two types of wounds.

Table 27: Outline of incontinence-associated dermatitis and pressure injuries

PARAMETER	INCONTINENCE-ASSOCIATED DERMATITIS	PRESSURE INJURIES
History	Urinary and/or faecal incontinence	Exposure to pressure/shear
Symptoms	Pain, burning, itching, tingling	Pain
Location	Affects perineum, perigenital area; buttocks; gluteal fold; medial and posterior aspects of upper thighs; and lower back. Dermatitis may extend over bony prominence	Usually over a bony prominence or associated with location of a medical device
Shape/edges	Affected area is diffuse with poorly-defined edges/may be blotchy	Distinct edges or margins
Presentation/ depth	Intact skin with erythema (blanchable or non-blanchable), with/without superficial, partial-thickness skin loss	Presentation varies from intact skin with non-blanchable erythema to full-thickness skin loss Base of wound may contain non-viable tissue
Other	Secondary superficial skin infection (e.g. candidiasis) may be present	Secondary soft tissue infection may be present

Source: Reprinted with permission from: Beeckman D et al. Proceedings of the Global IAD Expert Panel. Incontinence associated dermatitis: moving prevention forward. Wounds International 2015. Available from www.woundsinternational.com

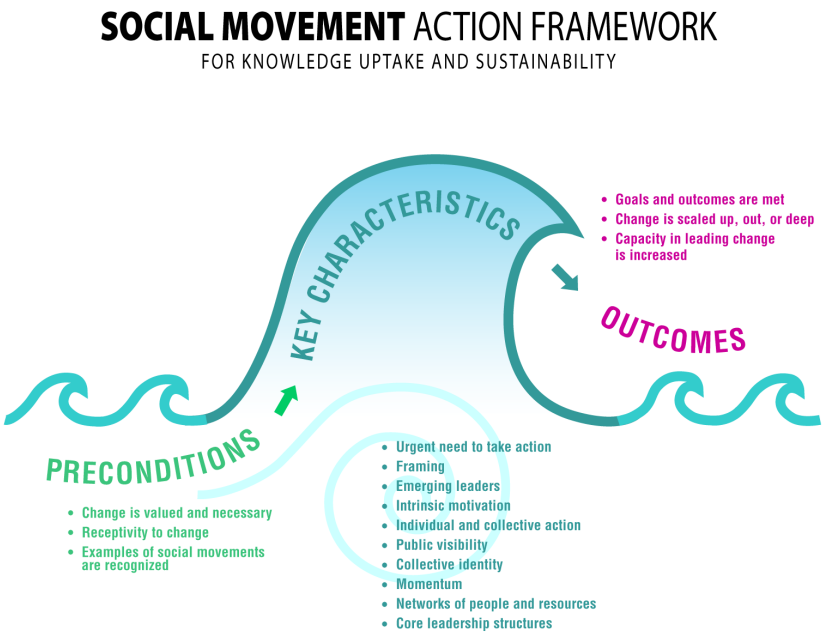
Appendix R: Description of the Leading Change Toolkit

Best Practice Guidelines (BPGs) can only be successfully implemented and sustained if planning, resources, organizational and administrative supports are adequate and if there is appropriate facilitation. Active engagement and involvement of formal and informal leaders (e.g., change agents and peer champions) are also essential. To encourage successful implementation and sustainability, an international expert panel of nurses, researchers, patient/person advocates, social movement activists and administrators has developed the Leading Change Toolkit (3). The toolkit is based on available evidence, theoretical perspectives and consensus. We recommend the Leading Change Toolkit for guiding the implementation of any BPG in health-care or social service organizations, including academic centres.

The Leading Change Toolkit includes two frameworks – the Social Movement Action (SMA) Framework (103,104) and the Knowledge-to-Action (KTA) Framework (2) – for change agents and change teams leading the implementation and sustainability of BPGs. Both frameworks outline the concept of implementation and its inter-related components. As such, either framework – the SMA or the KTA – can be used to guide change initiatives, including the implementation of BPGs. Using both frameworks serves to enhance and accelerate change (104).

The SMA Framework includes elements of **social movements for knowledge uptake and sustainability**[G] that have demonstrated powerful impact and long-term effects. Based upon the results of a concept analysis, the framework includes 16 elements categorized as preconditions (i.e., what must be in place prior to the occurrence of the social movement), key characteristics (i.e., what must be present for the social movement to occur) and outcomes (i.e., what will likely happen as a result of the social movement) (104,135). The three categories and elements of the SMA Framework are shown in **Figure 9**.

Figure 9: Social movement action framework

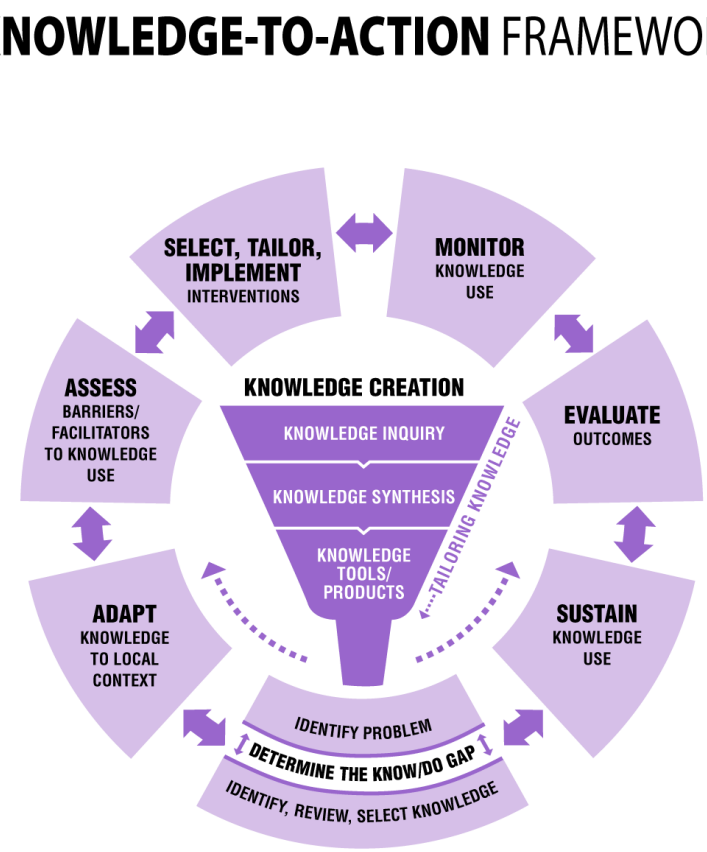


Source: Reprinted with permission from: Grinspun D, Wallace K, Li SA, et al. Exploring social movement concepts and actions in a knowledge uptake and sustainability context: a concept analysis. Int J Nurs Sci. 2022 Oct;9(4):411-21.

Grinspun D, Wallace K, Li SA, et al. Leading change through social movement. Registered Nurse Journal. 2020.

The KTA Framework is a planned cyclical approach to change that integrates two related components: the knowledge creation and the action cycle. The knowledge creation process is what researchers and guideline developers use to identify critical evidence results to create a knowledge product, such as an RNAO BPG. The action cycle is comprised of seven phases in which the knowledge created is implemented, evaluated and sustained (2). Many of the action cycle phases may occur or need to be considered simultaneously. The KTA Framework is depicted in **Figure 10** (3).

Figure 10: Knowledge-to-action framework



Source: Adapted with permission from: Graham ID, Logan J, Harrison MB, et al. Lost in translation: time for a map? J Contin Educ Health Prof [Internet]. 2006;26(1):13-24. Available from: https://journals.lww.com/jcehp/Abstract/2006/26010/Lost_in_knowledge_translation__Time_for_a_map_.3.aspx

It is a complex undertaking to implement and sustain BPGs to effect successful practice changes and positive health outcomes for patients/persons and their families, providers, organizations. The Leading Change Toolkit is a foundational implementation resource for leading this process.

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Letters of support and endorsement

European Pressure Ulcer Advisory Panel
www.epuap.org

Dr. Doris Grinspun, RN, BScN, MSN, PhD, LLD (hon),
Dr (hc), DHC, DHC, FAAN, FCAN, O.ONT.
Chief Executive Officer
Registered Nurses' Association of Ontario (RNAO)
500- 4211 Yonge St. Toronto, ON M2P 2A9

Dear Dr. Doris Grinspun

On behalf of the European Pressure Ulcer Advisory Panel (EPUAP), we are pleased to provide our formal endorsement of the ***Pressure Injury Management: Risk Assessment, Prevention, and Treatment, 4th Edition Best Practice Guideline*** developed by the Guideline Development and Research Team (RNAO).

As an organization dedicated to the prevention and treatment of pressure ulcers (with respect to the European terminology), we commend the team's commitment to a comprehensive and evidence-informed development process. We fully agree with the rigorous methodology employed, including the involvement of qualified experts and adherence to best practices in guideline development. This approach ensures that the recommendations are both scientifically sound and practical for implementation in clinical practice.

The ***Pressure Injury Management: Risk Assessment, Prevention, and Treatment*** guideline provides critical guidance that will benefit clinicians, healthcare organizations, and policymakers in their efforts to improve patient care outcomes. Its alignment with current research and best practices ensures its relevance and utility across diverse healthcare settings.

EPUAP is pleased to endorse the abovementioned guideline and supports its dissemination and implementation to advance pressure ulcer prevention and management globally. We look forward to the publication of this important resource on November 21st, in conjunction with **Stop Pressure Ulcer Day**.

Sincerely,

prof. Dr. Andrea Pokorná, Ph.D. EPUAP president
Masaryk University, Faculty of Medicine
Department of Health Sciences, Vice Dean for Healthcare Study Programmes and Information Technology

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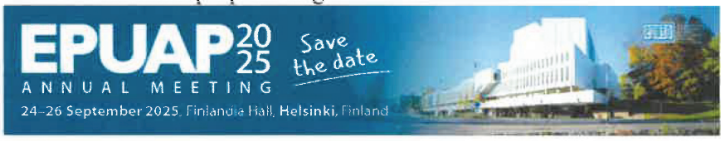

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Date Nov 15, 2024

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Dear Dr., Grinspun,

RNAO's best practice guideline – *Pressure Injury Management: Risk Assessment, Prevention and Treatment, Fourth Edition,* aligns seamlessly with Wounds Canada's vision of *A Canada where preventable wounds do not occur, and persons living with wounds receive the best possible care,* and we are pleased to extend our full endorsement.

Wounds Canada is the national voice of skin health and wound care in Canada and our work encompasses education, research, advocacy and awareness, and partnerships. We are known as the leading knowledge mobilization organization relating to skin health and wound management in Canada. In this regard we look forward to incorporating this new edition of RNAO's pressure injury guideline in our education, advocacy and knowledge translation resources and initiatives.

Pressure injuries, which are 70% preventable, remain a major challenge in healthcare often leading to significant physical, emotional, and financial burdens. RNAO's newly released pressure injury guideline identifies evidence-based best practices that support prevention as well as treatment based on person-centered care, comprehensive assessment, and early interventions. It serves as an invaluable resource for nurses and the broader interprofessional team, providing the tools and knowledge needed to implement evidence-based practices to drive positive outcomes.

Wounds Canada congratulates the Registered Nurses' Association of Ontario (RNAO) on the release of its updated *Pressure Injury Management: Risk Assessment, Prevention Best Practice Guideline* and acknowledges it as a significant milestone in advancing evidence-based practices in wound prevention and management.

Thank you,
Mariam Botros
Wounds Canada CEO

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