### Introduction

The purpose of the Pressure Injury Prevention and Management Nutrition Guideline is to provide health professionals with an overview of the evidence-based nutrition recommendations for preventing and managing pressure injuries and to provide answers to commonly asked questions (refer to <u>Key Questions List</u>).

This information is intended as a general resource only and is not meant to replace the medical counsel of a physician or individual consultation with a registered dietitian (RD). It is the responsibility of the health professional to evaluate the situation of each patient in their care and apply the NG appropriately. Individuals who are at high risk of malnutrition or who have a medical condition that is impacted by nutrition should receive RD intervention.

Note: For purposes of this Nutrition Guideline, the single term patient will be used to refer to clients, patients, and residents.

#### **Referral to a Registered Dietitian**

To refer a patient to an RD in Alberta Health Services (AHS), visit <u>Referring Patients for</u> <u>Nutrition Services.</u>

Nutrition Guideline

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### **Summary of Key Recommendations**

- Patients with or at risk for pressure injuries should be screened for malnutrition using a validated nutrition screening tool, such as the Canadian Nutrition Screening Tool (CNST) or Pediatric Nutrition Screening Tool (PNST).
- Patients with or at risk of malnutrition should be referred to an RD for a comprehensive nutrition assessment.
- The presence of pressure injury can lead to a hypermetabolic or catabolic state, in which energy requirements are increased. The goal should be to provide adequate energy for weight maintenance (or weight gain in underweight patients).
- Protein intake above the recommended daily allowance (RDA) is required for wound healing as protein requirements are increased in the presence of pressure injuries.
  - Sources of protein include meat, fish, poultry, eggs, milk products, soy, nuts and seeds, beans, peas and lentils.
- Provide adequate hydration to maintain good skin turgor, and perfusion of oxygen and nutrients to wounded tissue for repair.
- Nutrition interventions should support optimal glycemic control.
- A well-balanced diet that meets the dietary reference intake (DRI) for vitamins and minerals is recommended. If overall intake is poor, a multivitamin supplement with minerals may be considered.
  - Known or suspected vitamin and mineral deficiencies should be corrected, especially vitamin A, vitamin C, and zinc.
  - Ensure nutrient intake from food and supplements doesn't exceed tolerable upper limits.
- There is insufficient evidence to support the use/supplementation of glutamine in patients with pressure injuries.
- Routine supplementation with arginine for wound healing is not recommended.
- There is insufficient evidence to support the use of omega-3 supplements for wound healing.

## **Key Questions**

#### What are pressure injuries?

A pressure injury is defined as a localized injury to the skin and/or underlying tissue, usually over a bony prominence, as a result of pressure, or pressure in combination with shear.<sup>1</sup> The injury can present as intact skin or as an open ulcer.

#### What causes pressure injuries?

- Pressure on the skin and tissues. This is the most common cause.
- Sliding down in a bed or chair, which can cause skin to fold over itself (shear force).
- Being pulled across bed sheets or other surfaces which can cause friction burns
- Excess moisture, such as from sweat, urine, or feces. Skin that is often wet is more likely to break down and form pressure sores.

## What are the risk factors for the development of pressure injuries?<sup>1,2</sup>

- Decreased mobility, for example, patients who are confined to a bed or chair, or patients with a decreased ability to change and control body position
- Poor nutrition status
- Increased skin moisture, for example, from sweat or incontinence
- Fragile skin
- Impaired blood flow to the extremities from vascular disease, diabetes or tobacco use
- Having an existing pressure injury

Additional factors that may increase the risk for the development of pressure injuries include increased body temperature, advanced age, impaired sensory perception, hematological measures, and general health status. For neonates and children, skin maturity, perfusion and oxygenation, and the presence of medical devices are other risk factors to consider.<sup>3</sup>

#### Why is preventing pressure injuries important?

Pressure injuries may result in decreased quality of life from associated pain, increased risk of infection, and decreased mobility and ability to participate in activities of daily life.

Pressure injuries impact the health care system as they prolong hospitalization and recovery resulting in increased costs and resources.

# What role does nutrition play in the prevention and management of pressure injuries?

Nutrition plays an integral role in the prevention and management of wounds.<sup>4</sup> Individuals who have poor nutritional status are more likely to have impaired wound healing, infectious complications, increased length of hospital stay, and higher mortality.<sup>4,5</sup> The primary goal of nutrition care is to provide adequate nutrition to support an optimal healing environment.<sup>5,6</sup> Emphasis is on meeting nutritional requirements with a well-balanced diet and use of nutrition support as required.

### Should nutrition screening be done on everyone?

All patients should be screened for malnutrition at admission, with significant changes to the wound, and when progress to healing is not observed.<sup>6,11</sup> A validated nutrition screening tool should be used to identify those at risk.<sup>6,7,11</sup> Nutrition screening tools may vary depending on the clinical setting:

- Adults greater than or equal to 18 years: Canadian Malnutrition Screening Tool (CNST)
- Children ages 1 month to 18 years: Pediatric Nutrition Screening Tool (PNST)
- Older adults in community greater than or equal to 55 years: Seniors in the Community: Risk Evaluation for Eating and Nutrition (SCREEN)<sup>©</sup>
- Older adults in continuing care greater than or equal to 65 years: Mini Nutrition Assessment–Short Form (MNA-SF)

Braden Scale for Predicting Pressure Sore Risk (greater than or equal to 18 years) or Adapted Glamorgan Pressure Ulcer Risk Assessment Scale (less than 18 years) are widely used to screen for pressure injury risk. Both contain a nutrition subscale which can also be useful to identify individuals at risk of malnutrition.<sup>7,8</sup> A score of 3 or less on the Braden Scale (Nutrition section) may indicate a patient is at risk.

# What should I do if my patient is screened at risk for malnutrition?

Patients identified as at risk for malnutrition should be referred to an RD for a comprehensive nutrition assessment.<sup>7,8</sup>

Poor oral intake is a major factor that contributes to malnutrition risk. Many factors that affect one's ability to eat can be modified.<sup>3,5</sup> Consider strategies to help people eat better at home and in hospital to improve nutrition, reduce the risk of developing pressure injuries, and facilitate wound healing if they occur.

- Encourage nutritionally dense foods high in calories and protein
- Liberalize diet restrictions to improve variety and choice
- Set up meal trays, open food packages, assist with meals
- Identify food preferences and assist with menu selection
- Support and encourage families to bring food from home
- Offer high-calorie, high-protein oral nutrition supplements
- Recognize impairments to dentition and swallowing
- Consider how access to food at home or food insecurity may be impacting nutritional status

Refer to appropriate team members to address identified concerns and to help provide support for patients and families both in the hospital and in the community.

### What are the energy needs of patients with pressure injuries?

The presence of a pressure injury can lead to a hypermetabolic or catabolic state, in which energy requirements are increased.<sup>4,9,10</sup> The goal is to provide adequate calories to promote weight maintenance (or weight gain in underweight individuals) and wound healing.<sup>7</sup> Monitor nutritional intake, wound status and weight, adjusting energy provision as needed.

### How does weight loss affect pressure injuries?

People who experience weight loss have an increased risk of poor wound healing.<sup>11</sup> Weight loss is associated with impaired immune function, decreased mobility, impaired muscle strength, lower functional status, and reduced anabolism. These are all factors which can impair wound healing.<sup>11</sup> Nutrients for weight restoration may also be competing with wound healing needs.<sup>11</sup> As weight loss is associated with reduced anabolism and increased risk for poor wound healing, individuals who are overweight or obese should be encouraged to maintain their weight and optimize nutritional intake during the wound healing process.<sup>3,11</sup> A shift in focus to weight loss strategies is more appropriate when wounds are healed.<sup>3</sup>

#### How does protein status affect pressure injuries?

Protein requirements are increased in the presence of pressure injuries. Protein intake above the recommended dietary allowance (RDA), achieving positive nitrogen balance, is required for wound healing.<sup>3,7</sup> Protein-energy malnutrition coupled with the metabolic needs of a wound can lead to a loss of lean body mass (or protein stores) and has been shown to impair wound healing.<sup>7</sup> A diet high in energy and protein is required to support tissue repair.<sup>3</sup>

Encourage patients to include protein at each meal to optimize intake. Sources of protein include meat, fish, poultry, eggs, milk products, soy, nuts and seeds, beans, peas and lentils. Additional protein supplements may be helpful if a patient is unable to meet the protein requirements necessary for healing through food alone.

Protein provision should be assessed on an individual basis. Long-term high levels of protein intake may be harmful to those with renal or hepatic dysfunction and can negatively impact hydration status.<sup>2,3</sup> Discuss with your RD for more information.

#### How does hydration status affect pressure injuries?

Adequate hydration is required for the perfusion of oxygen and nutrients to wounded tissue for repair.<sup>7,12</sup> For adults, current guidelines recommend a minimum of 6 cups (1.5 L) per day, with adjustments to meet the patient's individual needs.<sup>3,7,13-16</sup>

Fluid requirements can be highly variable depending on age, underlying medical condition, and clinical status.<sup>2</sup> Decisions regarding fluid management should consider all aspects of patient care in consultation with the medical team.

## Should patients with pressure injuries take oral nutrition supplements?

Individuals with a poor appetite may have difficulty meeting the nutritional goals required for wound healing. Encourage high-protein, high-calorie oral nutrition supplements if the individual is unable to meet nutrient needs through food.<sup>17</sup>

Consider enteral or parenteral feeding if unable to meet nutritional needs through oral intake despite interventions. Risks and benefits of nutrition support should be discussed with the patient, their family, and the medical team, including Goals of Care, and social and cultural considerations.<sup>2</sup>

### Should patients with pressure injuries take vitamin/ mineral supplements?

Vitamins and minerals play a role in several of the processes involved in wound healing, and deficiencies have been associated with poor wound healing.<sup>7</sup> Patients with pressure injuries should be encouraged to consume a well-balanced diet that meets the dietary reference intake (DRI) for vitamins and minerals.<sup>3,13,18</sup> If overall intake is poor, it may be difficult to meet vitamin and mineral requirements through diet alone. In this case, a multivitamin supplement with minerals may be considered.<sup>3,7,10,19</sup>

Correcting known or suspected vitamin and mineral deficiencies, especially for vitamin A, vitamin C, and zinc, is generally recommended across all ages.<sup>6,7,13,15,19</sup> Assessment for deficiency should consider usual and current intake, biochemical data, and physical exam findings.<sup>7</sup> To avoid adverse effects, supplementation should not exceed tolerable upper intake levels (UL), which includes an evaluation of intake from all nutrient sources. Notably, there are no clear evidence-based guidelines for repletion in the context of impaired wound healing. If vitamin and mineral repletion is required, the clinician should make a recommendation based on the individualized needs of the patient.

# Are there supplements that have effects on pressure injury treatment outcomes?

#### Glutamine

Glutamine is a conditionally essential amino acid during periods of significant stress, as seen in the presence of a pressure injury.<sup>3</sup> Glutamine plays a role in the immune response, is an important fuel source during the healing process, is a rate-limiting agent for protein synthesis, and acts as an anticatabolic agent.<sup>4,7</sup>

There is insufficient evidence supporting the use of glutamine for wound healing in patients with pressure injuries.<sup>9,13,15,20</sup>

#### Considerations

Glutamine may have some benefit for those with complicated wound healing including major trauma or for individuals with burns greater than 20% of body surface area.<sup>4,9,21</sup> Supplemental enteral glutamine is not recommended for other critically ill patients.<sup>21</sup>

#### Arginine

Arginine is a conditionally essential amino acid during periods of significant stress, as seen in the presence of a pressure injury. Arginine stimulates insulin secretion and is involved in collagen deposition and the formation of protein in cells.<sup>3,13</sup>

There is currently insufficient evidence to support routine supplementation of arginine for wound healing. However, there is growing research supporting the use of nutrition supplements or enteral formulas enriched with arginine, zinc, and antioxidants for malnourished adults, or for those at risk of malnutrition, with pressure injuries stage 2 or higher.<sup>2,3,13,18</sup> These products are currently not available for routine patient use.

#### **Considerations:**

Studies have shown contradictory results for the use of arginine during critical illness. Arginine can increase the production of nitric oxide, potentially leading to vasodilation and worsening of hypotension. Enteral formulas containing arginine should be avoided in critically ill patients with hemodynamic instability or uncontrolled sepsis.<sup>16</sup>

#### **Omega-3 EPA/DHA**

It is hypothesized that omega-3 fatty acids may have a potential benefit in the wound healing process because of their anti-inflammatory effects and their role in supporting immune function; however, this has not been adequately studied.<sup>10,22</sup>

There is insufficient evidence at this time to recommend the use of omega-3 supplements for wound healing.<sup>7,10</sup>

## Where can I get more information about diet for pressure injuries?

- For more information on eating well for wound healing, refer to <u>ahs.ca/NutritionHandouts</u> and search for 'Eating Well for Wound Healing'
- Nutrition handouts are available for patients on a variety of topics to help support their learning needs and nutrition goals. Visit ahs.ca/NutritionHandouts for more information.

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