

NUTRITION IN PRESSURE INJURY PREVENTION



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Introduction

There is a relationship between nutritional status and pressure injuries (PIs). Being at risk of PIs is often associated with being malnourished or at risk for malnutrition.¹⁻⁴ Nutrition interventions play a role in the prevention and treatment of PI because malnutrition is a recognized risk factor for PI development⁵⁻¹⁰ and for PI severity.¹¹⁻¹⁷

Macronutrients and micronutrients are required by all organ systems, including the skin and tissues, for growth, development, maintenance, and repair. When organ systems do not receive appropriate nutrients for these processes, malnutrition results. Malnutrition is a condition in which a deficit, excess or imbalance of energy, protein, and other nutrients causes measurable adverse effects on tissue, body structure and function, and on clinical outcomes. Adult malnutrition usually occurs along a continuum of inadequate or increased intake of nutrients, and/or impaired absorption, transport and utilization of nutrients. Individuals may also have hypermetabolic and/or hypercatabolic and inflammatory conditions. One of the primary markers of declining nutritional status is unintended weight loss;¹⁴ however, it is important to note that malnutrition can occur in individuals at any weight profile.¹⁸

The recommendations and good practice statements focused on nutrition assessment and management in this section of the guideline are relevant to all individuals at risk of PIs. However, nutritional status is influenced by the individual's clinical profile and social determinants of health;¹⁹ and an holistic approach to screening, assessment and care planning is fundamental to addressing nutrition.

Nutrition Screening and Assessment

Clinical question: What are the general considerations when deciding if an individual at risk of pressure injuries requires nutrition interventions?

N1: It is good practice to conduct nutrition screening for individuals at risk of a pressure injury.

(Good practice statement)

N2: It is good practice to conduct a comprehensive nutrition assessment for individuals at risk of a pressure injury who are screened to be at risk of malnutrition. Use the findings to develop an individualized nutrition care plan.

(Good practice statement)

Supporting information

Screening, assessment, individualized care and care evaluation are recognized as components of best practice process in the delivery of health care. A two-step approach to nutrition assessment is undertaken that includes an initial risk screening, followed by a comprehensive assessment when indicated by the outcome of the nutrition screening.

Nutrition screening

Implementing nutrition screening is associated with a reduction in PI rates and decreased hospital length of stay.²⁰ Nutritional interventions are implemented faster when nutrition screening is used to identify individuals who are at nutritional risk.²⁰ In general, any member of the healthcare team can complete nutrition screening. Some widely used nutrition screening tools are provided in Table 1 and Table 2.

Nutrition assessment and planning

Individuals at risk of PIs who are screened as having malnutrition or being at risk of malnutrition, should be referred to a registered dietitian/nutritionist or an interprofessional nutrition team for a comprehensive nutrition assessment.²¹ A comprehensive nutrition assessment (see Table 3) involves a systematic process of collecting, verifying, interpreting and documenting data related to the individual's nutritional status.²² In many jurisdictions, specific qualifications and/or training are required to conduct the comprehensive nutrition assessment. Local referral pathways should be implemented.

The comprehensive nutrition assessment should be used to develop a nutrition management plan that includes interventions targeted to the individual's needs.²² In many jurisdictions, specific qualifications and/or training are required to develop a nutrition management plan. Local referral pathways should be implemented.

Implementation considerations

Nutrition screening

- Conduct nutrition screening for all individuals on admission to a healthcare setting.⁸ Any member of the healthcare team may complete nutrition screening of adults²³ (guidance for children/neonates is below), but completing education and training before conducting screening is suggested.²⁴
- Use a simple, valid and reliable nutrition screening tool that is appropriate for the individual's circumstances (e.g., demographics, clinical context and social determinants of health).^{23,25} Review the tool's descriptors and instructions to ensure it is implemented accurately.²⁴
- Re-screen nutrition status with each significant change in the individual's clinical condition.

Nutrition assessment

- Establish local referral pathways to ensure there is a registered dietitian/nutritionist or a member of the interprofessional nutrition team to conduct nutrition assessment and planning.
- Refer individuals at risk of a PI for a comprehensive nutrition assessment if they have been screened as being at risk of malnutrition based on the results of a nutrition screening tool and/or have had a significant change in their clinical condition. A registered dietitian/nutritionist or a member of the interprofessional nutrition team can perform a comprehensive nutrition assessment.^{8,26-30} When relevant, also consider referral to a speech pathologist for a dysphagia and swallowing assessment. Components of a comprehensive nutrition assessment are summarized in the resources.
- Monitor for signs and symptoms of dehydration (e.g., vital signs, thirst, urine output, elevated serum sodium, calculated serum osmolality, skin turgor and dryness, etc.) This is a particular consideration when the individual is using an air fluidized or low air loss full body support surface that can increase insensible fluid loss.

- Monitor and evaluate nutrition status regularly^{8,31,32} (e.g., using weekly weight recordings³³ or according to local policy) and adjust the nutrition care plan accordingly.³¹

Nutrition planning

- Ensure the individual has a nutrition plan developed by an appropriately trained member of the healthcare team in consultation with the individual and their informal carer. Ensure the plan is consistent with care goals, priorities, cultural, religious and personal preferences and dietary practices.³⁴
- Ensure the individual has a nutrition plan developed by an appropriately trained member that is informed by nutrition and hydration guidelines specific to the individual's demographics and clinical context.^{25,35-44} Table 4 provides an overview of some widely used nutrition/dietary guidelines.

Additional considerations in individuals with dark skin tones

- Ensure the comprehensive assessment undertaken by an appropriately trained member of the healthcare team includes an evaluation of hydration status. Individuals with darker skin tones are at risk of dry skin and pruritus due to a thick stratum corneum. Dry skin should not be used as a single marker for dehydration in the absence of other markers.⁴⁵

Additional considerations for children and neonates

- Facilitate a comprehensive nutrition assessment for critically ill children and neonates on admission.⁴³ Refer children and neonates to a pediatrician, registered dietitian/nutritionist or other qualified health professional to conduct age-appropriate nutrition screening and assessment. Note that pediatric nutrition screening tools may not accurately screen for nutrition risk in critically ill children, therefore screening should be performed by a clinical expert.⁴⁶
- Facilitate nutrition assessment at least weekly for critically ill children and neonates.^{43,47}
- Measure and document body weight, height/length and head circumference (in infants aged less than 3 years). Use z-scores for BMI for age to screen for children and neonates at the extreme.⁴³ Use anthropometric measurements and growth charts to determine if the child is developing within expected growth patterns^{42,48} and adjust and correct measurements for gestational age for premature infants.⁴⁹
- Consider the influence of edema and fluid shifts in critically ill children.^{42,50}

Table 1: Nutrition screening tools for adults

The following tools are established and widely used for screening nutrition status in individuals with or at risk of PIs, or in all adults.

- Canadian Nutrition Screening Tool (CNST)⁵¹
- Malnutrition Screening Tool (MST)⁵² Mini Nutritional Assessment full version (MNA®)^{2,3,52}
- Malnutrition Universal Screening Tool (MUST)^{2,3,52}
- Nutrition Risk Screening (NRS) 2002^{23,52-55}
- Rapid Screen^{23,53-55}
- Short Nutrition Assessment Questionnaire (SNAQ)^{23,54,55}
- Seniors in the Community: Risk Evaluation for Eating and Nutrition (SCREEN-II AB)^{23,56}
- Subjective Global Assessment Tool

Table 2: Nutrition screening tools for children

The following tools are established and widely used for screening nutrition status in children with or at risk of PIs, but might not adequately screen critically ill children.⁴⁶

- Paediatric Nutrition Screening Tool (PNST)⁵⁷
- Paediatric Yorkhill Malnutrition Score (PYMS)^{11,58}
- Screening Tool for the Assessment of Malnutrition in Pediatrics (STAMP)⁵⁹
- Screening Tool for the Risk of Impaired Nutritional Status and Growth (STRONGkids)⁶⁰
- Subjective Global Nutritional Assessment for Children (SGNA)⁵⁰

Table 3: Comprehensive nutrition assessment performed by a registered dietitian

Refer to

- Include the following in a comprehensive nutrition assessment:
 - Food history, adequacy of nutritional intake and weight history⁶¹
 - Anthropometric measures (e.g., height, weight and body mass index [BMI])^{61,62}
 - Clinical condition (e.g., physical and mental health, cognition, etc.) and medical tests/procedures⁶¹
 - Nutrition-focused physical assessment that includes muscle wasting, edema, hydration status, micronutrient deficiencies, and functional status (e.g., handgrip)⁶¹
 - Ability to swallow, eat and drink independently⁶¹⁻⁶⁴
 - Personal, family, cultural, ethnic and religious dietary practices and preferences.^{34,61,63,65}
- Consider evaluating biochemical data based on the individual’s medical conditions. Consider evaluating electrolytes, creatinine, serum osmolality and blood urea nitrogen to evaluate hydration status.⁶⁶ Serum albumin, prealbumin and other laboratory values may be useful in establishing overall prognosis but do not correlate well with clinical observation of nutritional status.^{29,30,67-71}
- Include evaluating c-reactive protein (CRP) to assess the potential impact of inflammation whenever evaluating micronutrients.⁷²
- Do not rely on serum protein level as an indicator of nutritional status. Serum protein level may be affected by inflammation, renal function, hydration, and other factors, reducing its utility.^{25,29,30,67,70,73}

Diet and Nutrition for Individuals at Risk of Pressure Injuries

Clinical question: What are the general considerations when addressing the individual’s nutrition needs?

N3: It is good practice to encourage individuals at risk of a pressure injury to consume a balanced diet that includes nutrient dense food and adequate hydration.

(Good practice statement)

Supporting information

For most individuals, nutritional requirements can be met with a healthy oral diet. Dietary/nutrition guidelines outline recommended dietary intake based on individualized circumstances (e.g., medical condition, lifestyle, demographics, geographic context, etc.).^{25,32,36-39,41,43,44,72,74-79}

Water is an important requirement needed to transport vitamins, minerals, glucose and other nutrients through the body, and to eliminate waste products. In healthy individuals who are adequately hydrated, water released from food and metabolism accounts for 20% or more of total water intake.⁸⁰

Table 4: Dietary/Nutrition Guidelines

The organizations below have developed dietary/nutrition guidelines for different populations. Select a guideline appropriate to the individual’s clinical condition, demographics, and geographic/clinical setting.

- National Academies of Sciences, Engineering and Medicine (NASEM)³⁷
- Academy of Nutrition and Dietetics⁷⁴
- European Food Safety Authority³⁶
- European Society for Clinical Nutrition and Metabolism [ESPEN]^{25,41,72}
- American Society for Parenteral and Enteral Nutrition [ASPEN]^{32,38,43,75,76,81}
- Australian National Health and Medical Research Council [NHMRC]³⁹
- New Zealand Ministry of Health⁴⁴
- PROT-AGE Study Group⁷⁹
- Paralyzed Veterans of America (PVA)⁷⁸

Implementation considerations

- Recognize challenges in implementation, particularly in clinical and geographic contexts where access to a nutrient-dense foods is limited.
- Provide mealtime assistance to facilitate optimal nutrition and fluid intake.^{8,34} Implement standard nutrition care strategies to promote optimal intake (e.g., facilitate access to nutrient-dense foods; suggest smaller, frequent meals for individuals who cannot tolerate larger meals; create a positive mealtime environment; facilitate optimal posture for eating; address functional or cognitive deficits that impact dietary intake; etc.).
- Modify/liberalize dietary restrictions when limitations result in decreased food and/or water/fluid intake.²⁷ Adjust dietary restrictions in consultation with a medical professional. Wherever possible dietary restrictions should be managed by a registered dietitian/ nutritionist.
- Manage signs and symptoms (e.g., pain, nausea, gastrointestinal signs and symptoms, etc.) and clinical conditions (e.g. dysphagia) that may impact nutrition intake.
- Calculate and adjust fluid requirements appropriately.⁸² In healthy individuals, water/fluid intake should be approximately 30 mL/kg body weight/day or 1 mL/kilocalories/day.^{83,84} Fluid intake is often restricted for individuals with heart or renal failure. Individuals with elevated temperature, vomiting, profuse sweating, diarrhea, and/or heavily exuding wounds often require additional fluid intake to replace losses.⁸⁴ Individuals consuming high levels of protein may require additional fluid intake. Use of an air fluidized or low air loss full body support surface can also cause fluid loss that may require replacement.

Nutritional Supplementation for Individuals at Risk of Pressure Injuries

When oral dietary intake is inadequate, or nutritional deficiencies are suspected or confirmed, nutritional supplementation may be offered. Supplementation may include food fortifiers, enhanced foods, or nutritional supplements (i.e., products that supply protein and/or amino acids, carbohydrate-based energy, fat, vitamins and minerals). These options are used when individuals are unable to meet their estimated nutritional requirements to achieve their clinical goals (one of which may be preventing PIs) through their normal food intake.

Most evidence on the role of dietary interventions in preventing PIs explores nutritional interventions that combine multiple different macronutrients and micronutrients. This means it is difficult to establish the relative benefit in preventing PIs that might be attained from any individual dietary component. The Guideline Governance Group considered the overall role of nutritional supplementation and explored the most common dietary interventions used to prevent PIs: protein supplementation and carbohydrate-based supplementation in addition to micronutrient supplementation.

Clinical question: Should any nutritional supplementation versus no nutritional supplementation be used to prevent PI occurrence in individuals at risk?

N4: We suggest that nutritional supplementation be implemented for individuals at risk of pressure injuries who have been identified as malnourished or at risk of malnutrition when nutritional needs are not met by usual dietary intake.

(Conditional recommendation, very low certainty of evidence)

Evidence summary

The meta-analysis included 13 RCTs^{11,85-96} that compared any nutritional supplementation to no supplementation for individuals at both PI risk and nutrition risk. The meta-analysis showed that taking a nutritional supplement was associated with a statistically significant lower rate of PI occurrence (odds

ratio [OR] 0.75, 95% confidence interval [CI] 0.61–0.91, relative effect 24 fewer PIs per 1,000 individuals treated [from 38 fewer to 9 fewer]). There is very little confidence that this effect estimate represents a true effect. The evidence was downgraded due to risk of bias and indirectness of the evidence. Most of the regimens reported in the studies were based on about 50% energy from carbohydrate, some were high protein supplements, and some were described as disease-specific formulae. Some of the regimens included vitamins and minerals, and one regimen included only protein.[#] Control interventions were generally described as a standard hospital diet. A meta-analysis⁹⁷ of 11 studies^{85,89,92,93,98-103} showed no difference in relative effect of nutritional supplementation on undesirable effects (mortality). Based on the available evidence and the opinion of the Expert and Consumer Panel Groups, the required resources, cost effectiveness, feasibility and acceptability of providing nutritional supplementation is considered variable depending on the individual and the geographic and clinical context of the healthcare system. There is likely to be individuals at risk of PIs who cannot access nutritional supplements and the systems required to support use (e.g., screening for nutritional deficits and review by a registered dietitian/nutritionist or an interprofessional nutrition team).

Implementation considerations

- Consult a registered dietitian/nutritionist regarding appropriate supplementation based on the individual's needs.
- Consider options in the following priority when providing nutrition supplementation: increased and optimized oral intake, fortified foods, oral supplements, enteral tube feeding, parenteral supplementation.²⁵
- Recognize challenges in implementation, including resource availability, the individual's acceptance of nutritional supplements, and potential financial or logistical barriers in certain care settings.
- Select nutritional interventions based on the individual's overall nutritional needs rather than considering any single dietary component in isolation. Supplements should be tailored to the individual's needs, considering their clinical condition and tolerance. This approach minimizes the risk of over-supplementation or adverse effects while optimizing benefits.
- Provide nutrition supplements between meals or 'ad libitum' (when desired).^{104,105}
- Serve supplement dose with an energy density of 1.5–2.4 kilocalories/ml. Higher energy density in a smaller volume can increase concordance with oral nutritional supplementation.¹⁰⁵
- Consider preferences for flavor, texture, temperature, thickness and variety to increase palatability.^{13,17,105}
- Continue supplementation for at least four weeks before re-evaluating the nutrition care plan.

Additional considerations for children and neonates

- Consider the following for critically ill children and neonates: sufficient carbohydrate, high levels of protein and adequate levels of vitamin C, zinc, vitamin A, iron, and minerals.⁸²
- Base the calculation of nutrition requirements on the requirements for normal growth and development, the child's nutrition status guided by anthropometric measurements obtained at admission and disease state.^{48,82} Adjust micro-nutrient supplementation based on laboratory measurements.^{48,82}
- Re-evaluate nutrition requirements, including the mode of delivery, of critically ill children and neonates regularly.
- Be diligent in preventing device related PIs if delivering nutritional supplementation and hydration via enteral or parenteral routes or intravenously. Recommendations are available in the guideline section on *Preventing Device Related Pressure Injuries*.

[#] Regimens are summarized in the data extraction tables. Product names may have changed.

Clinical question: Should protein supplementation versus no protein supplementation be used to prevent PI occurrence in individuals at risk?

N5: We suggest implementing protein supplementation for individuals at risk of pressure injuries who have been identified as malnourished or at risk of malnutrition.

(Conditional recommendation, very low certainty of evidence)

Evidence summary

A meta-analysis¹⁰⁶ of four RCTs^{85,87,90,91} that compared protein supplementation to no protein supplementation for individuals at both PI risk and nutrition risk showed that taking protein supplementation was associated with a non-significant lower rate of PI occurrence (relative risk [RR] 0.75, 95% CI 0.49–1.14. This translated to a difference of seven fewer PIs per 1,000 individuals treated (from 14 fewer to 4 more). There is very little confidence that this effect estimate represents a true effect. The evidence was downgraded due to risk of bias, and due to the imprecision and indirectness of the evidence. Most of the protein supplementation regimens were individualized.* Control interventions were generally described as a standard hospital diet. A meta-analysis¹⁰⁶ of two studies^{85,87} showed a lower rate of undesirable effects (minor gastrointestinal symptoms) for protein supplementation versus no supplementation with (RR 0.70, 95% CI 0.06–7.96) but this body of evidence had very low certainty. Based on the available evidence and the opinion of the Expert and Consumer Panel Groups and Guideline Governance Group, the required resources, cost effectiveness, feasibility and acceptability of providing protein supplementation are variable depending on the individual and the healthcare system (including the geographic and clinical context). There is likely to be individuals at risk of PIs who cannot access protein supplementation, the systems required to support its use (e.g., access to appropriate products) and review by a registered dietitian/nutritionist or an interprofessional nutrition team).

Implementation considerations

- Consult a registered dietitian/nutritionist regarding appropriate supplementation based on the individual's needs.
- Recognize challenges in implementation, including resource availability, the individual's acceptance of protein supplements, and potential financial or logistical barriers in certain care settings.
- Calculate macronutrient requirements based on recommendations outlined in dietary/nutrition guidelines relevant to the individual's clinical, nutritional and demographic profile. The nutritional requirements of individuals will vary based on their underlying demographics and clinical condition. Providing guidance on calculating specific nutritional requirements is beyond the scope of this guideline, which focuses on considerations specific to the context of preventing PIs. Available dietary/nutrition guidelines are provided in the resources.
- Consider the adequacy of the individual's caloric intake when considering the need for protein supplementation.
- Provide adequate protein for positive nitrogen balance for adults at risk of a PI.³¹
- Assess renal function to ensure that high levels of protein are appropriate for the individual, and reassess when the individual's clinical condition changes.¹⁰⁷

Additional considerations for older adults

- Review and follow dietary/nutrition guidelines for older adults. Dietary/nutrition guidelines suggest supplementing protein at a rate of 1.2–1.5 g/kg body weight/day.^{25,38,41,79,84}

Additional considerations for individuals in critical care

- Review and follow dietary/nutrition guidelines for critically ill individuals. Dietary/nutrition guidelines suggest supplementing protein at a rate of 1.2–2.0 g/kg actual body weight/day.^{25,79,81} For critically ill

* Regimens/products are summarized in the data extraction tables. Product names may have changed.

individuals who have obesity, increasing protein supplementation to 2.0 g/kg ideal body weight/day (BMI >30 to 40) or 2.5 g/kg ideal body weight/day (BMI > 40) is sometimes suggested.³⁸

Additional considerations for individuals with spinal cord injury

- Review and follow dietary/nutrition guidelines for individuals with spinal cord injury. Be aware that this population has injury-induced changes to body composition and metabolism that will influence dietary requirements and may change throughout the stages of disease.¹⁰⁸

Clinical question: Should carbohydrate-based energy, protein and micronutrient supplementation versus no carbohydrate-based energy, protein and micronutrient supplementation be used to prevent PI occurrence in individuals at risk?

N6: We suggest that carbohydrate-based energy and micronutrient supplementation should be reserved for individuals with known malnutrition or micronutrient deficiencies, in addition to supplementation that meets their protein needs.

(Conditional recommendation, very low certainty of evidence)

Evidence summary

A meta-analysis¹⁰⁶ of three RCTs^{11,86,88} that compared carbohydrate-based energy, protein and micronutrients (zinc and vitamin C) supplementation to no supplementation for individuals at both risk of malnutrition and at risk of PIs showed that carbohydrate-based energy, protein and micronutrient supplementation was associated with a non-significant lower rate of PI occurrence (RR 0.92, 95% CI 0.71–1.19). However, there is limited confidence in the effect estimate.¹⁰⁶ The body of evidence was downgraded for risk of bias. The studies used a range of nutritional formulas* that provided 400–700kcal/day, with 50–55% energy from carbohydrates, 20–36% energy from fat and 14–30% of energy from protein. Micronutrients were not individually targeted at identified nutritional deficiencies. The comparative intervention was a standard hospital diet in all studies. Participants were primarily hospitalized older adults who were at risk of becoming malnourished (a minority had malnutrition) but specific vitamin/mineral deficiencies had not been assessed. Carbohydrate-based energy, protein and micronutrients (zinc and vitamin C) supplementation was delivered for more than 14 days in only one study.¹¹ Information on undesirable effects was limited and only reported in one study⁸⁸ that indicated no significant difference in serious adverse events. Based on the available evidence, the Guideline Governance Group considered that the cost effectiveness, feasibility and acceptability of providing carbohydrate-based energy, protein and micronutrient supplementation are variable depending on the individual and the healthcare system, including the geographic and clinical context. There is likely to be individuals at risk of PIs who cannot access supplementation, and the systems required to support its use (e.g., screening for nutritional deficits, access to appropriate products and review by a registered dietitian/nutritionist or an interprofessional nutrition team).

The above conclusions were based on populations who generally did not have specific nutritional deficits or malnutrition. For individuals who are malnourished, underweight, have significant unintended weight loss, inadequate caloric intake, critical medical conditions, or known vitamin/mineral deficiencies, clinical benefits might be achieved from energy-based supplementation. However, the impact on preventing PIs is uncertain.

* Regimens are described in the data extraction tables. Product names may have changed.

Implementation considerations

- Calculate energy intake and macronutrient requirements based on recommendations outlined in dietary/nutrition guidelines relevant to the individual's clinical and demographic profile. In general, use indirect calorimetry to estimate resting energy expenditure.^{38,79} If indirect calorimetry is unavailable, use an appropriate predictive equation^{25,79} or use a simplistic weight-based equation (e.g., 25–30 kcal/kg/day^{38,81}), noting that these methods are less accurate than indirect calorimetry in estimating needs.²⁵
- Individualize energy intake. The nutritional requirements of individuals will vary based on their underlying demographics and clinical condition. Providing detailed guidance on calculating specific nutritional requirements is beyond the scope of this guideline, which focuses on considerations specific to the context of preventing PIs. Dietary/nutrition guidelines are provided in the resources.

Clinical question: Should tube feeding versus no oral feeding be used to prevent PI occurrence in individuals at risk?

N7: We recommend against tube feeding for the specific purpose of preventing pressure injuries in individuals with or at risk of malnutrition and at pressure injury risk.

(Strong recommendation, very low certainty of evidence)

Clarifiers:

- This recommendation is not intended for individuals who are receiving tube feeding as a part of their usual clinical care, critically ill individuals, or for pediatric and neonatal populations for whom tube feeding is a requirement.

N8: It is good practice to make every reasonable effort to maintain and promote oral nutrition. When oral intake is inadequate, providers should not presume that there is an imperative to implement tube feeding; any decision should be preceded by a comprehensive, multidisciplinary assessment of goals of care, benefits, risks and preferences related to the individual.

(Good practice statement)

Evidence summary

A meta-analysis¹⁰⁶ of one RCT⁹¹ and three non-randomized studies¹⁰⁹⁻¹¹¹ comparing any form of tube feeding to oral diet for individuals at both PI risk and nutrition risk showed that tube feeding was associated with a statistically significant higher PI occurrence (RR 1.50, 95% CI 1.02–2.20, relative effect 103 more PIs per 1,000 individuals treated [from 4 more to 246 more]). There is very little confidence that this effect estimate represents a true effect. The evidence was downgraded due to risk of bias, imprecision and inconsistency. The results may reflect the populations in the studies, which were primarily individuals with severe dementia. Additionally, a meta-analysis¹¹² of eight studies^{109,113-119} showed that serious adverse events, including mortality and pneumonia, occur more often with tube feeding compared to oral diet. Based on the available evidence, the Guideline Governance Group, considered that the required resources, feasibility and acceptability of initiating tube feeding with the primary purpose of preventing PIs is variable depending on the individual, their formal and informal carers, the underpinning ethical philosophy of the healthcare setting, the geographic and clinical context, among many other considerations. The Guideline Governance Group made a strong recommendation despite the low certainty of evidence because of the likelihood of harm from adverse events associated with initiating tube feeding solely to prevent a PI. This recommendation is not intended

to suggest tube feeding is not appropriate for meeting other care goals or in some populations (e.g., achieving nutritional support for children and neonates), or based on individualized care needs, but tube feeding specifically for the purpose of preventing PIs should be considered very judiciously.

Implementation considerations

- Discuss the benefits and harms of implementing enteral (e.g., naso-enteric tube or PEG tube) or parenteral feeding with individuals at risk of PIs and their informal carers. Balance patient autonomy, beneficence, nonmaleficence, and justice. Enteral feeding might be implemented for individuals who cannot meet their nutritional requirements through oral intake despite nutritional interventions when it meets their care goals and priorities.
- If used, enteral feeding should be administered by qualified professionals using a monitoring protocol³⁸ that includes routine assessment that tube-feeding is delivered as prescribed. The regimen should be guided by clinical guidance from nutrition/dietary guidelines appropriate to the individual's clinical, nutritional and demographic profile. Suggested nutritional guidelines are provided in the resources.
- Evaluate tolerance of enteral feeding daily through physical examinations, stool and flatus regularity, and gastrointestinal signs and symptoms.^{38,105}
- Be aware of the risk of device related pressure injuries and mucosal membrane injuries when tube feeding is being administered. The guideline section *Device Related Pressure Injuries* discusses assessment and prevention strategies.

Additional considerations for individuals in end-of-life and palliative care settings

- Prioritize comfort and symptom control. If providing supplemental nutrition augments the individual's comfort and is mutually agreed upon by the individual, informal carers, and the healthcare team, then supplemental nutrition (in any form) is appropriate. If the individual's condition is such that to provide supplemental nutrition increases discomfort and the prognosis is expected to be poor, then providing supplemental nutrition should not be a priority and is not appropriate.²⁷
- Strive to maintain adequate nutrition and hydration compatible with the individual's condition and preferences. Adequate nutritional support is often not attainable when the individual is unable or refuses to eat, based on certain disease states.³⁵
- Ensure the delivery of good oral care including lip balm to prevent lip cracking.

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