

PREVINE Campaign: Care that protects, rights that PREVENT - Pressure Injury Prevention Campaign Plan 2025

Campanha PREVINE: Cuidados que protegem, direitos que PREVINEM - Plano de Campanha para Prevenção de Lesões por Pressão 2025

DOI: 10.37111/braspenj.previne-en

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Keywords:

Pressure ulcer. Injury severity score. Wound healing. Nutritional status.

Unitermos:

Lesão por pressão. Escala de gravidade do ferimento. Cicatrização. Estado nutricional.

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Submission:

September 1st, 2025

Accepted for publication:

September 30th, 2025

Date of publication:

November 13th, 2025

ABSTRACT

This document is part of the CUIDADOS campaign and consolidates the discussions and strategies for the “Campaign for the Prevention and Treatment of Pressure Injuries: Care that protects, rights that PREVENT”, in 2025, promoted by the Brazilian Society of Parenteral and Enteral Nutrition (SBNPE/BRASPEN). The focus is to provide a comprehensive plan that highlights the steps, strategies, and approaches grounded in the seven “PREVINE” (PREVENT in Portuguese) principles to ensure campaign success.

RESUMO

Este documento é parte da campanha CUIDADOS e consolida as discussões e estratégias para a “Campanha de Prevenção e Tratamento de Lesões por Pressão: Cuidados que protegem, direitos que PREVINEM”, em 2025, promovida pela Sociedade Brasileira de Nutrição Parenteral e Enteral (SBNPE/BRASPEN). O foco é fornecer plano abrangente que destaque as etapas, estratégias e abordagens fundamentadas nos sete princípios “PREVINE” para garantir o sucesso da campanha.

INTRODUCTION

Pressure injury (PI) is considered the most frequent adverse event found in hospitalized patients and represents a serious public health problem in Brazil and worldwide. The damage affects not only the injured person, with considerable worsening of complications and quality of life, but also represents an important cost increase for the health sector^{1,2}.

PIs are damaged areas of the skin or underlying soft tissues, usually over a bony prominence, through long-term pressure or pressure in combination with shear. It is estimated that one in 10 patients admitted to the hospital have PI¹.

The skin, as the first protective barrier of the human body, is exposed to constant aggressions from external agents. When healthy and intact, this protects the body against pathogens, prevents fluid loss and regulates body temperature³.

The Brazilian National Health Surveillance Agency (Anvisa) published the 29th edition of the Patient Safety and Quality in Health Services Bulletin, presenting all incidents related to care that occurred and were reported in Brazilian territory between 2014 and 2022, with a total of 1,100,352 incidents notified. This leads us to an average of 335 notifications every 24 hours. Analyzing this bulletin, there is exponential growth over these years, reaching a maximum of 30 thousand notifications in one month during the year 2022. It is noted in this bulletin that, from 2014 to 2019, PI was the third most reported incident. From June 2019 to December 2022, the PI occupied second place with more than 150 thousand notifications throughout Brazil. Also, 26,735 “never events” (events that, due to the impact and risk to the patient’s life, should never occur in health services) were reported, consisting mostly of PIs, with a total of 25,076 (93.8%) notifications, 72.2% of which were stage 3 and 21.6% stage 4⁴.

The PREVINE campaign aims not only to treat PL, but warn about preventive care, since PL remains at high incidence in hospital units. Because PI is painful it requires specific care procedures, with eventual difficulty in curing it in a short time. In addition, they have a negative impact on the clinical and nutritional evolution and quality of life of the individual, with an increase in the number of days of hospitalization and mortality⁵⁻⁷.

To facilitate the assimilation of the concepts, a mnemonic method was developed with the word “PREVINE”, in which each letter proposes steps that help in the identification of risk, evaluation, treatment and follow-up of pressure ulcers, as shown in Board 1.

The SEVEN steps to combat PIs will be detailed in the topics below:

1. Prioritize risk assessment for Pressure Injuries at patient admission, for early diagnosis and care

It is known that the development of PI is of multifactorial origin and includes intrinsic factors (that is, inherent to the patients), such as nutritional status, mobility, incontinence and extrinsic factors (related to the environment and exposures that the patient presents throughout his hospitalization), such as the use of medications and invasive devices. Identifying the risk factors for the occurrence of PIs at admission is of fundamental importance for the implementation of preventive actions as early as possible in susceptible patients, aiming to avoid the development of injuries⁸. Currently, there are different methods of risk assessment of PI, based on literature review, expert opinion, or adaptation of existing tools. The Braden Scale (1987) is one of the best known and

Quadro 1 – Mnemonic method with 7 steps to prevent pressure injury (PI).

- P** Prioritize risk assessment for PIs at patient admission, for early diagnosis and care.
- R** Reevaluate and assess risk areas for immediate care action and classify injuries for individualized treatment.
- E** Exclude excessive tension and promote pressure relief with personalized care.
- V** Vouch for permanent attention to the skin, with adjustment of preventive care measures and appropriate treatment.
- I** Individualize the care and nutritional strategy for each patient and user of the health networks, following and keeping protocols up to date.
- N** Notify skin changes and communicate clearly to the team. This action is part of integrated care.
- E** Enfold all key healthcare stakeholders, caregivers, family members, and patients in the integrated approach to preventive care and individualized treatment of PI.

Source: prepared by the authors.

most used in Brazilian health services, and has been validated in Brazil. The Norton Scale (1962) and the Waterlow Score (1985) are also used. The Intensive Care Pressure Injury Risk Assessment Scale (EVARUCI) is specifically for the assessment of patients admitted to the Intensive Care Unit (ICU), the Risk Assessment Scale for the Development of Injuries Resulting from Surgical Positioning (ELPO), the Munro Scale for patients in the Operating Room, and the Braden Q Scale for pediatric patients⁹⁻¹².

These tools do not necessarily include the evaluation of all the factors that may contribute to the occurrence of PI⁸, which among the most prevalent are:

- Reduction in mobility and physical activity – they favor increased pressure on bone prominences, especially in bedridden patients with spinal cord injury^{8,13};
- Presence of edema or conditions that alter tissue perfusion and oxygenation, such as diabetes mellitus, vascular disease, and smoking¹³⁻¹⁵;
- Malnutrition, obesity, and sarcopenia^{8,16};
- Increased skin moisture, commonly observed in patients with urinary and fecal incontinence¹⁵;
- High body temperature¹⁶;
- Deficit in the sensory perception of the skin¹⁶;
- Laboratory abnormalities, such as a drop in hemoglobin with a consequent reduction in tissue oxygenation, an increase in the inflammatory marker C-Reactive Protein (CRP), leukopenia, and hypoalbuminemia, causing edema and changes in tissue perfusion¹⁷;
- Presence of previous diseases, chronic wounds, use of medications, infection, and altered level of consciousness¹⁸⁻²¹;
- High surgical time and immobility in the perioperative period⁸;
- Disease severity - critically ill patients, with long ICU stays, mechanical ventilation, use of vasopressors^{10,18,19,22,23};

- Patients in palliative care⁸;
- Patients in prolonged transport, for example, in ambulances⁸;
- Neonates and children, due to skin immaturity with repercussions on tissue perfusion⁸;
- Use of medical devices, most commonly devices for ventilatory support⁸.

Patients considered to be at high risk for PI include those who present multiple factors that affect mechanical conditions such as points of increased pressure on the skin, friction or shear, and factors related to the morphological and physiological characteristics of the tissues, as is the case of the elderly. Thus, care for the elderly requires a different look. These have higher risks due to reduced skin thickness and elasticity, changes in blood circulation and tissue oxygenation, reduced mobility, and the presence of comorbidities that can interfere with patients' perception of lesions, and even advanced age^{8,14,16,23,24}.

Recent research has used artificial intelligence (AI) to assess risk for PI, through the development of predictive models created from databases and machine learning. AI techniques show promise in automatically and dynamically identifying patients at risk of developing PI²⁵⁻²⁷.

Practical approach:

- Perform interprofessional evaluation of the patient at admission, listing all risk factors for the development of PI;
- It is suggested the use of a risk assessment instrument for PI validated for the population of interest;
- Reassess the presence of risk factors on a daily basis, considering changes in the clinical picture and worsening of the underlying disease.

Board 2 – Risk factors for the development of pressure injuries (PIs).

Risk factor	Exposure to mechanical damage	Individual susceptibility and tolerance
Activity and mobility limitation	X	
Current skin condition		X
Perfusion, circulation and tissue oxygenation		X
Nutritional indicators		X
Skin moisture	X	X
Body temperature		X
Advanced age	X	X
Sensory perception limitation	X	
Blood markers		X
General condition and mental health	X	X
Risk factors for specific populations		
Surgical patients	X	X
Critical patients	X	X
Neonates and children	X	X

Fonte: European Pressure Ulcer Advisory Panel: international guideline⁸.

Board 2 presents the categorization of the risk factors that favor the appearance of PI.

Prevention of PI is a goal of patient safety and the responsibility of all interprofessional teams at all levels of health care, and the occurrence is an adverse event, most of the time, avoidable. The use of risk assessment instruments, combined with knowledge and physical examination of the skin performed by health professionals, are essential for directing preventive measures. The importance of directing investments in material and human resources to consolidate a culture of harm prevention and patient safety should be emphasized²⁸.

2. Reevaluate assiduously assess risk areas for immediate care action and classify injuries for individualized treatment

Assiduously assessing skin integrity and risk areas for the development of PI is an essential action in the prevention, classification, diagnosis, and treatment of this lesion. The condition of the skin can serve as an indicator of early signs of damage, offering opportunities to identify and intervene early when skin changes are identified, especially PIs⁸.

The physical examination performed by the nurse should include a careful evaluation of the skin and the risk

classification for PI in order to prescribe appropriate preventive care. The nursing diagnoses “Risk of pressure injury in adults” and “Risk of pressure injury in children”, present in the North American Nursing Diagnosis Association (NANDA) taxonomy, corroborate the importance of this assessment in the context of nursing care²⁹.

This continuous inspection of skin integrity, which is the responsibility of the nursing team, enables the identification of alterations or the presence of lesions, a careful evaluation for the realization of a care plan for prevention, as well as a therapeutic plan during PI.

Skin assessment and risk areas

In a cross-sectional, descriptive, and analytical study conducted in two hospital institutions by Mendonça et al.³⁰, which included 104 participants, it was evident that skin inspection was prescribed by only 18.3% of the nurses, which was statistically associated with the absence of PI ($p < 0.001$)³⁰.

Intact skin also deserves care, such as hydration and skin water balance, fundamental factors to ensure the integrity and function of the tissue. Among the main functions of hydration, we can highlight skin barrier repair, appearance

maintenance and the maintenance of the lipid barrier's ability to attract, maintain and redistribute water. There are several inputs available that can be used to combat skin dehydration, such as those based on alpha-hydroxy acids, glycerin, urea, propylene glycol and lipids⁸.

Findings such as dryness, excess moisture, decreased stratum corneum, or inflammation can weaken the skin's barrier function and increase susceptibility to PI⁸.

Practical approach:

A complete evaluation of the skin, by means of a physical examination, should be performed upon admission to the health service and periodically, especially if there is a change in the patient's clinical condition. It is important to identify any change that impacts a decline in the risk score, following the steps below, as recommended by ANVISA²⁸:

- Daily and complete evaluation of the skin in the regions of bony prominences (sacral region, calcaneus, trochanters, occipital, knees and elbows) by means of physical examination. At least twice a day, regions subjected to pressure by health devices, such as catheters, tubes, drains, and immobilization devices should be evaluated;
- Attention to devices, which must have a well-defined indication for use, adequate sizes and quality raw material, preferably equipped with specific manufacturing measures to prevent PI;
- Careful and specific evaluation for black skin, taking into account the plurality of skin colors associated with melanin levels, since the initial erythema (stage 1 PI) may not be so easily identified. In these cases, trigger additional measures such as evaluating changes in sensitivity, temperature or consistency (tightening) of the skin.

Other points of attention to skin inspection:

- Attention to the presence of edema, especially in patients in the ICU, with impaired mobility, infusion of large volumes of fluids, and organic dysfunctions. Mendonça et al.³⁰ shows that edema and the occurrence of PI had a significant association ($p=0.012$);
- Evaluation of tissue perfusion is necessary, as deficient perfusion can be an aggravating factor affecting PI healing⁸;
- Ensure that comprehensive skin assessment is an integral part of the PI risk screening policy and should be implemented in all health institutions^{31,32};
- Perform a complete skin assessment in patients at risk of developing PI within a maximum period of eight hours after admission and as an integral part of all risk assessments⁸;

- Increase the frequency of skin assessments in response to any deterioration in general condition³;
- Inspect the skin under and around medical devices at least twice a day in order to identify signs of PI in the surrounding tissue⁸;
- Perform more frequent skin evaluations (more than twice a day) in devices that interface directly with the skin, especially in those individuals susceptible to fluid changes or in individuals with signs of localized/generalized edema⁸;
- Reassess continuously, based on the clinical context and the individual's risk potential. Thus, those patients at moderate to high risk for PI should be reassessed every 24 hours. Patients at low risk for PI can be reassessed every 72 hours, or reassessed immediately if there is a change in clinical condition³³;
- Perform an evaluation before the patient is transferred from one unit or sector, and before being discharged⁸.

Board 3 presents a tool for assessing the general conditions of the skin in detail, and with guidelines for professionals related to the questions that should be asked. They include guidelines for the thorough inspection of the skin, in addition to a reference of the expected ideal, with a focus on the prevention of PI.

Pressure injury classification

As well as the assessment of the skin and the risk of developing pressure ulcers, the classification of PI is essential for establishing the appropriate therapeutic approach. PI can be classified according to etiology, tissue involvement, healing time, level of microbiological burden, tissue characteristics, among other factors⁸.

The concepts, nomenclature, and classification of the stages of PIs were changed by the National Pressure Ulcer Advisory Panel in 2016 and maintained in the publication of the same entity in 2019. The modification of the proposed nomenclature was validated for the Portuguese language with the recognition of the Brazilian Association of Stomatherapy (SOBEST) and the Brazilian Society of Dermatology Nursing (SOBENDE) in 2016. This same nomenclature is maintained in the publication of "Patient Safety Practices in Health Services: prevention of pressure injuries" of Anvisa^{8,28,35,36}.

Practical approach:

Due to the extreme relevance of the classification of PL for clinical practice for the appropriate selection of the

Board 3 – Assessment of general skin conditions related to the risk of developing pressure injury (PI).

	C	E	T	U	B	C
	Coloring	Edema	Temperature	Moisture	Barrier	Consistency
Questions	Is this skin color normal for this patient?	Is the edema the result of an inflammatory process?	Are there areas of localized heat on the skin on palpation?	Is skin moisture excessive?	Are there areas of skin barrier breakage?	Is the skin too thin?
	Are there areas of redness that, when compressed, do not turn white?	Is the edema related to the circulatory system?	Are there cold areas, compatible with areas of low vascularization?	Is there contact with dirt, exudations, secretions, urine or feces?	Are there modifiable factors such as friction or shear?	Is there noticeable edema?
	How are the perfusion and oxygenation?	Is the edema causing interstitial pressure?		Is the skin getting macerated?		Is the skin macerated over?
Guidelines	There is evidence to suggest that the presence of areas of redness that do not turn white when compressed is a predictor of the development of stage 2 PIs. Evaluation by inspection and local pressure for 3 seconds proved to be an effective evaluation instrument in this case. Special attention should be paid to dark skin that has impaired evaluation.	Cell death causes an inflammatory response that causes increased vascular permeability, such as gaps developing between endothelial cells. This results in inflammatory edema, that further increases mechanical loads on cells and tissues through increased interstitial pressure.	Trained professionals can identify up to 1.0-3.0°C difference in temperature on palpation. More recent studies show that the use of infrared thermometers can help the manual evaluation.	Humidity increases the effects of pressure under the skin, predisposing it to necrosis and maceration and making it more vulnerable to injury. In addition, it causes the adhesion of bed linen and clothing to the skin, enhancing the action of shear and friction. The presence of urine or feces changes the pH of the skin, in addition to leaving it exposed to substances, such as ammonia. This contributes to the breakdown of the skin barrier, favoring colonization by the microbiota (mainly bacteria) and predisposing to infections.	Friction occurs when two surfaces are rubbed against each other, resulting in abrasion. Shear is the result of the interaction between friction and the force of gravity, and can lead to deformation and rupture of tissues and blood vessels. Both favor the development of PI and should be avoided with the correct positioning and mobilization of patients in bed. It requires care with the patient's movement, protection of sensitive areas, among others. Early care should be instituted for any noticeable injury.	Tissue tolerance is related to the tissue capacity to withstand pressure, resisting deformation and the formation of PI. This can be altered by extrinsic factors such as moisture, friction, and shear. Other factors such as low arteriolar pressure, in addition to the risk factors. The presence of edema or macerations requires additional care, regarding the risk of developing PI.
Expected ideal	Homogeneous color	Absence of edema	Temperature homogeneous along the body	Dry and clean skin	Intact skin	Firm skin

Source: elaborated by the authors, based on NUPAP⁶; Holloway & Jones³⁴.

therapy to be instituted (both in treatment and prevention), it is suggested to use the classification proposed in Board 4.

Finally, it is worth noting that the following stages of injury are considered “never events” related to PIs and subject to

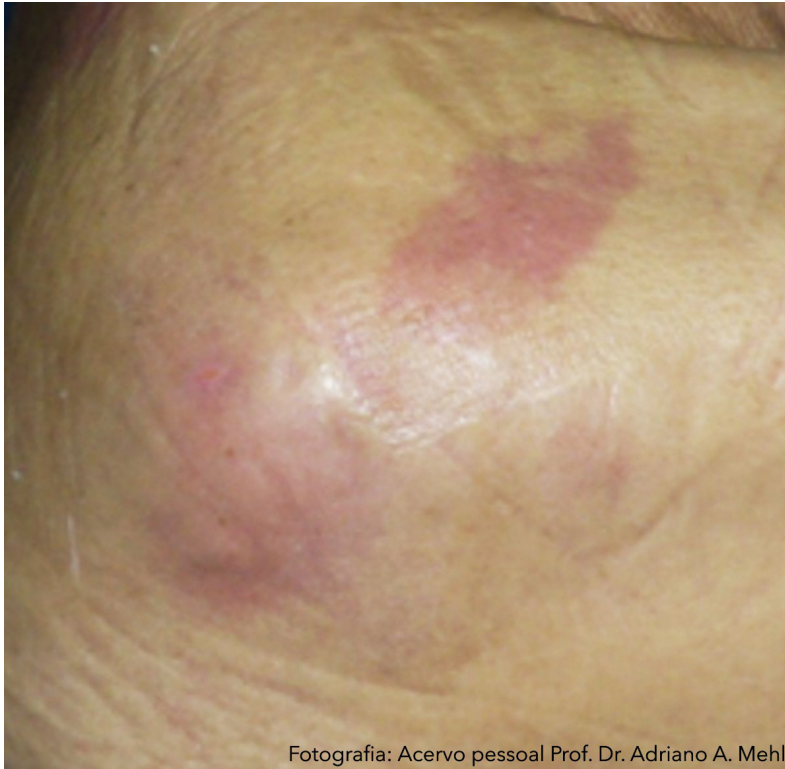
notification to the National Health Surveillance System by the Patient Safety Centers of health services²⁸:

- Stage 3 PI;
- Stage 4 PI;
- Unclassifiable PI.

Board 4 – Classification of pressure injuries (PIs).

Injury Classification	Definition
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Stage 1 PI Intact skin with a localized area of erythema that does not whiten and may look different in dark-colored skin. Presence of erythema that whitens or changes in sensitivity, temperature, or consistency (hardening) may precede visual changes. Changes in color do not include purple or brown discoloration, as these may indicate deep tissue damage²⁸.



Fotografia: Acervo pessoal Prof. Dr. Adriano A. Mehl

Stage 2 PI Partial thickness skin loss with exposure of the dermis. The wound bed is viable, pink or red in color, moist, and may also present as an intact (filled with serous exudate) or ruptured blister. Adipose tissue and deep tissues are not visible. Granulation tissue, slough and eschar are not present. These lesions usually result from inadequate microclimate and skin shear in the pelvis region and calcaneus. This stage should not be used to describe moisture-associated skin lesions, including incontinence-associated dermatitis (IAD), intertriginous dermatitis, skin lesions associated with medical adhesives, or traumatic wounds (friction injuries, burns, abrasions)²⁸.



Fotografia: Acervo pessoal Prof. Dr. Adriano A. Mehl

Continuation Board 4 – Classification of pressure injuries (PIs).

Injury Classification	Definition
Stage 3 PI	Full-thickness skin loss, in which fat is visible, and often granulation tissue and epibole (lesion with curled edges) are present. Slough or eschar may be visible. The depth of tissue damage varies according to the anatomical location. Areas with significant adiposity may develop deep lesions. Detachment and tunneling may occur. There is no fascia, muscle, tendon, ligament, cartilage, or bone exposure. When slough or eschar impairs the identification of the extent of tissue loss, it should be classified as unclassifiable PI ²⁸ .



Fotografia: Acervo pessoal Prof. Dr. Adriano A. Mehl

Stage 4 PI	Full-thickness skin loss and tissue loss with direct exposure or palpation of fascia, muscle, tendon, ligament, cartilage, or bone. Slough or eschar may be visible. Epibole (lesion with curled edges), detachment, or tunnels often occur. The depth varies according to the anatomical location. When slough or eschar impairs the identification of the extent of tissue loss, it should be classified as unclassifiable PI ²⁸ .
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Fotografia: Acervo pessoal Prof. Dr. Adriano A. Mehl

Continuation Board 4 – Classification of pressure injuries (PIs).

Injury Classification	Definition
Unclassifiable PI	Full-thickness skin loss and tissue loss in which the extent of the damage cannot be confirmed because it is obscured by sloughing or bedsores. When the slough or eschar is removed, stage 3 or stage 4 PI will be apparent ²⁸ .



Fotografia: Acervo pessoal Prof. Dr. Adriano A. Mehl

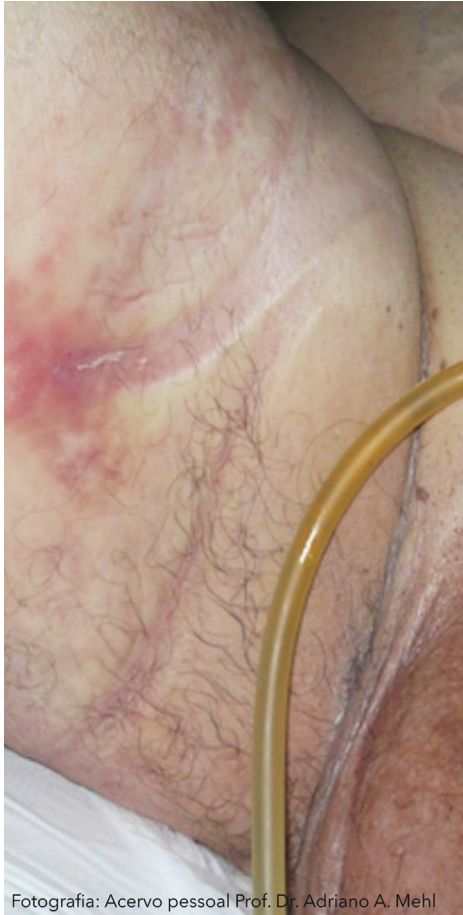
Deep tissue PI	Intact or unbroken skin with a localized, persistent area of dark red, brown, or purple discoloration that does not whiten or epidermal separation that shows a lesion with a darkened bed or a blister with bloody exudate. Pain and change in temperature often precede changes in skin color. Discoloration may present differently in people with darker skin. This injury results from intense or prolonged pressure and shear at the bone-muscle interface. The wound may evolve rapidly and reveal the current extent of tissue injury or resolve without tissue loss. When necrotic tissue, subcutaneous tissue, granulation tissue, fascia, muscle, or other underlying structures are visible, this indicates PI with total tissue loss (unclassifiable PI, stage 3 or stage 4). The category deep tissue PI should not be used to describe vascular, traumatic, neuropathic, or dermatological conditions ²⁸ .
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Fotografia: Acervo pessoal Prof. Dr. Adriano A. Mehl

Continuation Board 4 – Classification of pressure injuries (PIs).

Injury Classification	Definition
Medical device-related PI	This terminology describes the etiology of the injury and results from the use of devices created and applied for diagnostic and therapeutic purposes. The resulting PI usually presents the pattern or shape of the device. This injury should be categorized using the PI classification system ²⁸ .



Fotografia: Acervo pessoal Prof. Dr. Adriano A. Mehl

PI in mucous membranes

Found when there is a history of medical device use at the site of the damage. Due to the anatomy of the tissue, these lesions cannot be categorized²⁸.



Fotografia: Acervo pessoal Prof. Dr. Adriano A. Mehl

3. Exclude excessive tension and promote pressure relief with personalized care

The need to promote patient mobilization for prevention and aid in the treatment of PI is very well established in clinical practice. Data from the literature have demonstrated the importance of implementing protocols, such as personalized and systematic repositioning in bed every two hours, pressure relief maneuvers when the patient is seated, adequate hydration and hygiene of the skin, protection of susceptible points that are usually those with greater bone protrusion or places where injuries have already occurred in the past³⁷. These points may be located in the lower limbs (trochanter, malleolus, and calcaneus), in the pelvis, and, although less frequent, in the upper limbs (elbows, shoulders, and shoulder blades), so that all of them require continuous monitoring.

It is known that mobilization and repositioning aim to redistribute pressure on the skin, especially on bone prominences, maintaining adequate blood circulation and reducing the magnitude of the force, in addition to being considered a maneuver for tissue vitality³⁸.

Some medical devices may increase the risk of the patient developing PI, as they may remain in contact with the skin for prolonged periods or even due to the tissue fragility already existing in the region, increasing the need for frequent evaluations³⁶. Non-invasive ventilation and oxygen therapy devices, such as the bilevel positive airway pressure (BIPAP), continuous positive airway pressure (CPAP) and high flow nasal catheter are devices that can be used daily, increasing the pressure on the patient's skin. The use of this equipment may be indicated for the treatment of sleep apnea, or for long periods in cases of hospitalization for various causes. Thus, it is necessary to periodically evaluate the pressure points that masks and catheters can generate on the patients' faces³⁹.

Practical approach:

The main recommendations regarding bed repositioning are^{37,40-43}:

- Initially evaluate the skin in order to direct the frequency of repositioning in bed, considering: activity level, mobility, clinical condition, skin condition, comfort and pain;
- Regularly inspect the skin and bony prominences during repositioning, with a record in the medical record at least once a day;
- Encourage self-care for those who manage to reposition themselves. Including caregivers and family members in this process is important in clinical practice and seems to result in better adherence to care;

- Record the frequency of repositioning in bed, as well as the position and angulation;
- Prioritize decubitus at 30° in the semi-fowler position and maximum rotation of 30° to the sides (alternating right, left and dorsal sides);
- Restrict the time in a sitting position without pressure relief, as the weight of the body increases the pressure of the ischial tuberosities. In clinical practice, actions are adopted to mitigate pressure points when in an armchair/ chair, such as remaining for 1 hour with the lower limbs elevated and 1 hour with the lower limbs resting on the floor, not exceeding the maximum time of 2 hours;
- Check, after positioning, the pressure points on devices such as probes and drains. The use of preventive dressings for pressure relief is recommended in cases that are difficult to control;
- Intersperse BIPAP/CPAP masks and use preventive dressings to ease the pressure load imposed on the skin;
- Regularly assess discomfort and pain. When these happen, reconsider the frequency and method of repositioning;
- Assess the need for pre-mobilization analgesia at least 20 to 30 minutes in advance, in cases of severe pain;
- Mobilize patients with hemodynamic instability, as long as they recover their parameters 10 to 20 minutes after repositioning in bed (adjustment of orthostatic pressure and baseline). In selected cases, mobilize the patient gradually to 15° in the first minute and if tolerance reaches 30°;
- Use pillows and cushions to support the arms and legs. This procedure has good results in critically ill patients, minimizing shear;
- Use mechanical lifts and transfer sheets to reduce the risk of shear;
- Apply preventive dressings to areas of greater pressure points such as bony prominences, frequently evaluating the facial region, when the patient is prone;
- Prioritize comfort in patients in end-of-life care;
- Contraindicate ring- or ring-shaped assistive devices (cushions or circular seats), as they create areas of high pressure with a risk of tissue damage. This also applies to synthetic sheepskin pads, intravenous fluid sacs, or water-filled gloves to elevate the calcaneus.

4 – Vouch for permanent attention to the skin, with adjustment of preventive care measures and appropriate treatment

Interdisciplinary collaborative practices contribute to the reduction of adverse events. Therefore, with regard to the prevention and treatment of PI, there is a certain

autonomy in the actions performed by the nursing team. However, there are times when complementarity with the other professionals of the health team is necessary and, in this context, the nursing professional becomes the interlocutor between the members of the multiprofessional team and the patients⁴⁴.

The assessment of the risk for the development of PI is the first step for prevention and should be performed at admission to the health service, through the application of validated scales, as previously mentioned. When identifying people at risk, nurses need human and material resources (HR and MR) to implement care that requires continuity, such as hygiene, daily skin inspection, hydration, or constant diaper changes⁴⁵.

The Brazilian Institute for Patient Safety has emphasized that risk assessment, skin assessment, early treatment, mechanical overload, use of support surfaces, and education for professionals, families, and patients are the guidelines for the prevention of these injuries⁴⁶.

The most effective strategy in the prevention of PI is the implementation of care packages that involve all professionals in the care team⁴⁷.

A bundle is considered a structured and conceptualized strategy among care aimed at prevention. It is a practical and effective instrument, consisting of proven and safe conducts. The measures proposed for structuring this instrument act directly on the most harmful factors of health problems. In addition, the bundle can be a powerful stimulus for teamwork, bringing standardization to the service and offering the best care for the patient⁴⁸.

Monitoring to prevent and effectively treat PI should include routine activities, with bedside inspection and structuring of protocols that favor the recognition of the population most susceptible to PI⁸.

The continuing education of health professionals favors the effectiveness of care. A recent systematic review and meta-analysis showed that education and training programs in PL can improve the knowledge and clinical judgment of nurses in the prevention and treatment of these injuries, and should be encouraged in health institutions⁴⁹.

Practical approach:

Permanent attention focused on risk stratification for the development of PI, preventive measures, and treatment of lesions are essential for the elaboration of the care plan in an individualized way.

Predictive scales are not complete in terms of the inclusion of all risk factors. For this reason, continuous, and individualized search should be considered in monitoring activities⁵⁰.

As a suggestion, a flowchart protocol (Figure 1) is presented for monitoring patients at risk of developing PL or who already have some lesion:

In 2020, SBNPE/BRASPEN proposed 4 measures to monitor Nutritional Risk Factors to prevent PI⁵⁰:

- a) Nutritional risk tracking;
- b) Dysphagia follow-up and oral acceptance (estimation of the composition of the diets and with the approximate recording using food recall);
- c) Monitoring of caloric-protein intake, control of infused and prescribed volume, in patients with enteral or parenteral nutrition;
- d) Use and preventive replacement of micronutrients according to clinical need.

Considering risk stratification, it is proposed to develop care plans with prevention strategies with planned conducts according to the recommendations with level of evidence⁸, as exemplified in Figure 2.

If patients develop PI, some other type of skin lesion, or are already hospitalized with a wound, topical management should take into account not only the PI stage but also the other etiologies and type of tissue present in the bed.

The selection of the most appropriate dressing for the prevention of PIs should be made based on clinical evaluation. The cost-benefit of coverage should be taken into account, including direct and indirect costs for the health system and for the patient (Figure 3).

5- Individualize the care and nutritional strategy for each patient and user of the health networks, following and keeping the protocols up to date.

Nutritional screening and assessment

Processes that allow prevention of the appearance of PI should be part of the institutional protocols of the various health sectors. In this sense, carrying out a nutritional screening, followed by nutritional assessment, is essential.

Malnutrition, the presence of involuntary weight loss, and inadequate food intake are three of the many independent nutritional vulnerabilities that increase the risk of developing PI or interfere with the wound healing process⁵¹.

It has already been well proven by the literature, both in multicenter studies and in meta-analysis, that people at risk for malnutrition or already malnourished are more likely to present PI. These results are worse when the population is elderly. The tool generally used in studies is the Nutritional Risk Screening 2002 (NRS 2002) for adults and the Malnutrition Universal Screening Tool (MUST) and Mini Nutrition

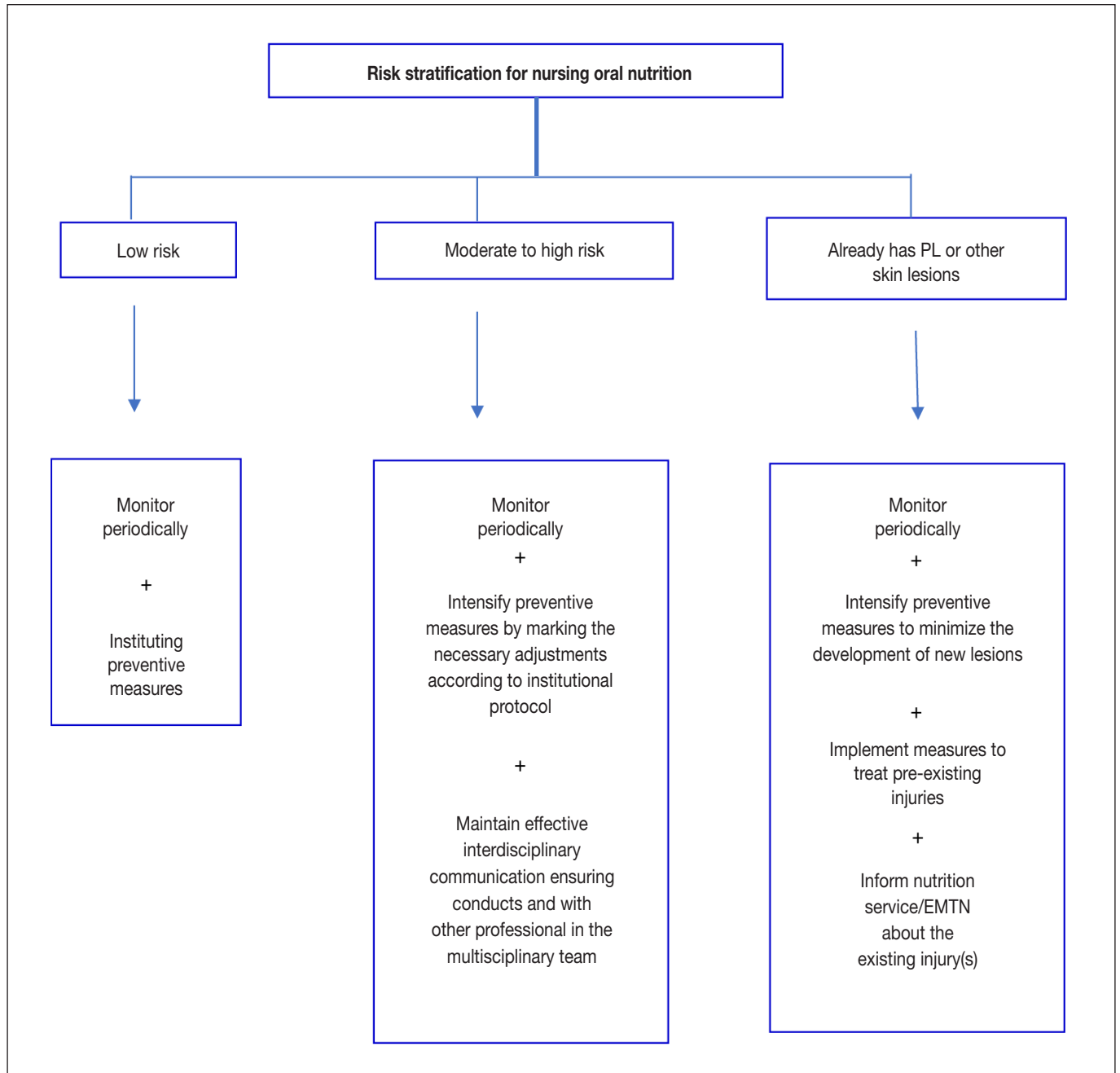


Figure 1 - Flowchart for monitoring risk for pressure injury (PI).
Source: elaborated by the authors.

Assessment (MAN) for the elderly, with the presence of nutritional risk ranging from 36 to 76% of patients with PI detected^{8,52-56}.

Early nutritional screening reduces PI incidence rates by up to 50%, allows early planning by the multidisciplinary health team, greater success in PI healing, reduced hospital stay, and reducing costs⁵⁷.

Screening should be performed with a simple, valid, and reliable tool within 24 to 48 hours of hospital admission, repeated 7 to 10 days whenever risk is not found. In

case of nutritional risk, nutritional assessment should be performed⁵⁸⁻⁶⁰. Some validated tools, such as MAN, demonstrate integrity of the skin in their preparation, as well as include risk factors for PI^{58,61}. The same occurs with the Braden scale, used to assess the risk of PI, which considers the presence of nutritional risk in its score¹⁰. It is worth mentioning that in other environments of the health sector, this dynamic must be maintained.

Nutritional assessment should include dietary history, basic anthropometric measurements (weight, height, body

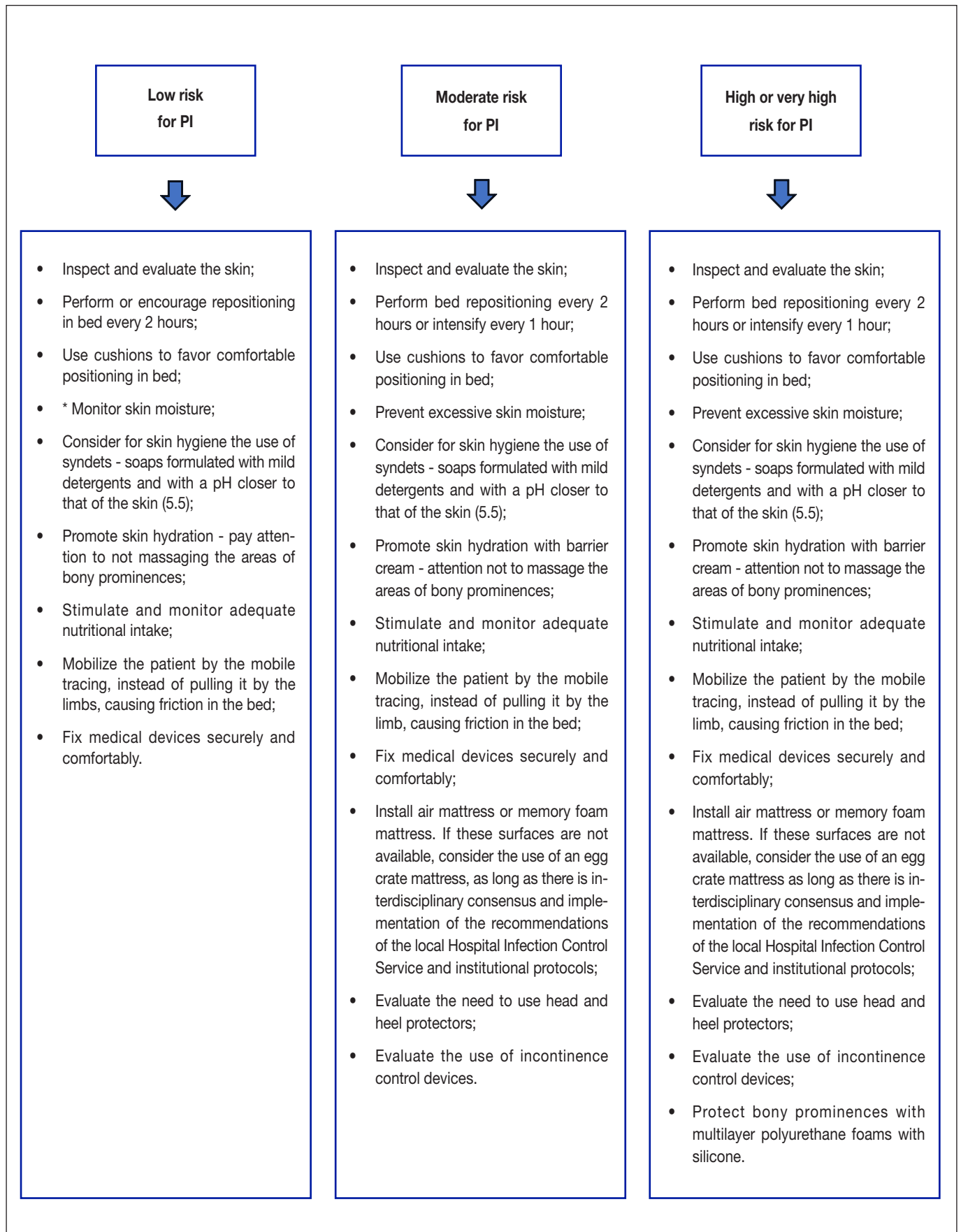


Figure 2 - Care plan according to risk for pressure injury (PI).
Source: elaborated by authors.

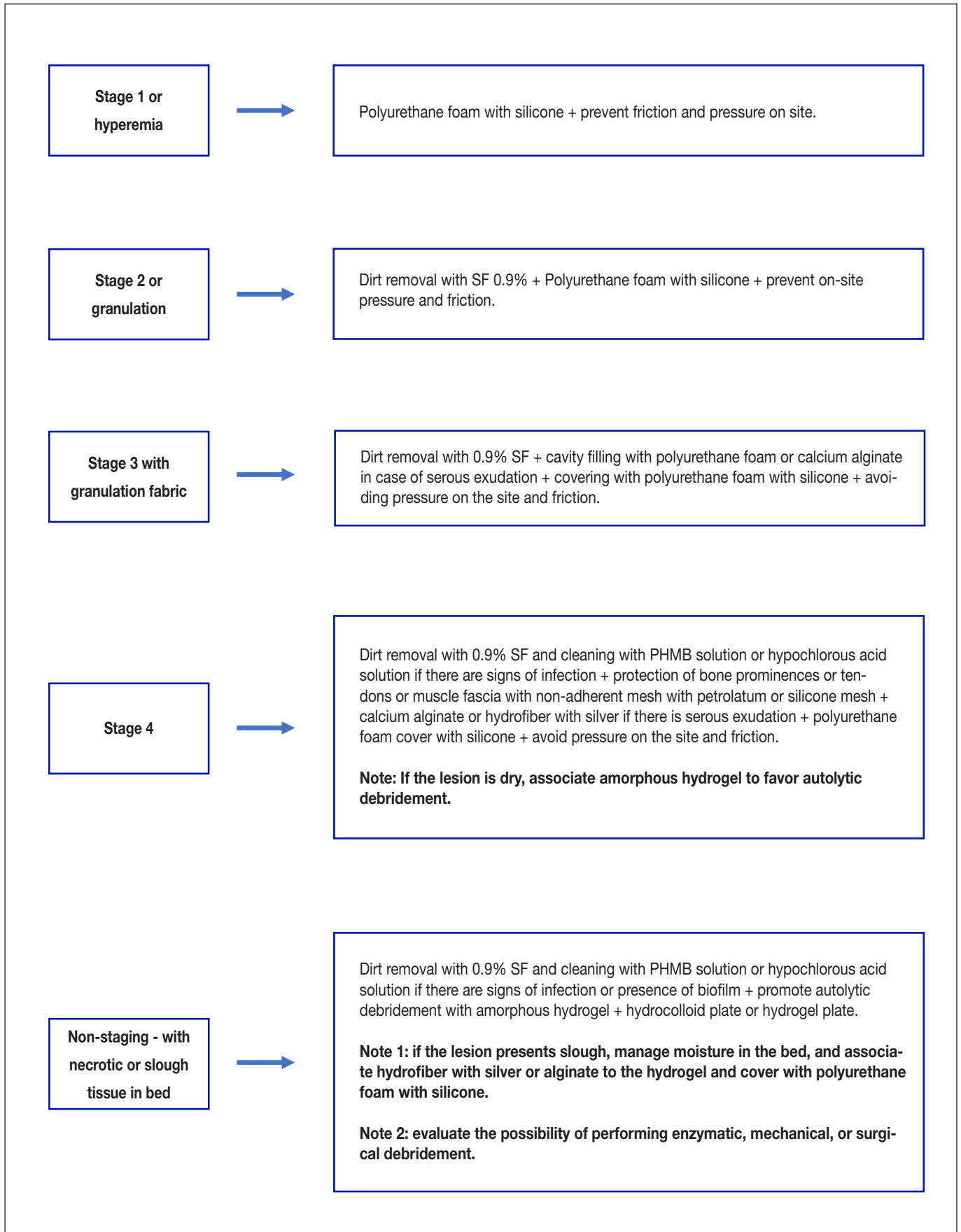


Figure 3 - Care choice for pression injury (PI), according to lesion stage.
Source: elaborated by the authors.

mass index), weight loss history, assessment of muscle mass loss, edema, signs of micronutrient deficiency, ability to eat independently, and, when possible, muscle strength tests by dynamometry (handgrip)⁶². The assessment of muscle strength can predict the risk of developing PL during hospitalization and within 30 days after hospital discharge⁶³.

Practical approach:

Perform nutritional screening for all hospitalized patients. For the elderly, MAN tool is suggested. For adults, use NRS 2002 or MUST.

Include in the nutritional assessment: food history, basic anthropometric measurements (weight, height, and body mass index), history of weight loss, evaluation of muscle mass loss, evaluation of peripheral edema, strength assessment using dynamometry (if possible), assessment of micronutrient deficiencies whenever indicated, and assessment of the ability to eat independently.

Set nutritional and hydration goals

Nutritional therapy in patients with PL aims at tissue regeneration, favoring the healing process. Maintaining adequate nutritional status also plays an important role in the prevention of PI, since malnutrition can alter the inflammatory response, collagen synthesis, and wound tensile strength. Thus, it is necessary to identify and correct nutritional imbalances⁷. Nutritional inadequacy is a risk factor for PI, which can impact the development, severity, and prolongation of the healing process. An intervention that includes an individualized nutritional plan is necessary to ensure the adequacy of nutrients and hydration^{8,64,65}.

Adequate calorie supply is essential for phagocytic activity, cell proliferation, and fibroblast function. All macronutrients play an important role in the healing process^{33,66}. Carbohydrate deficiency impairs the synthesis of adenosine triphosphate (ATP), which compromises protein synthesis and angiogenesis⁶⁶. As for proteins, they participate in neovascularization, fibroblast proliferation, collagen synthesis, and leukocyte production and migration in patients with PI^{65,67,68}. International guidelines show the need to increase protein intake in malnourished individuals at risk or presence of PI, with the objective of both prevention and treatment of PI⁶⁹⁻⁷¹. Fatty acids play an important role in cellular functions, such as the formation of cell membranes⁶⁶.

Calorie intake should be adjusted based on weight change, degree of obesity, or according to the patient's diagnosis and clinical condition. Indirect calorimetry (IC) is the gold standard recommendation for setting the goal of patients' energy requirements. However, due to the difficulties

of implementing it in clinical practice, validated pocket formulas can be used⁸.

Water supply and maintenance of serum proteins at adequate levels are necessary to promote satisfactory healing and may also play a protective role in the development of PI, usually not found in frail elderly, critically ill patients, and end-of-life care⁷²⁻⁷⁴. These factors play an important role in fluid and electrolyte balance, skin turgor, tissue perfusion, and body temperature, in addition to serving as a solvent for vitamins, minerals, glucose, and other nutrients. Dehydration impairs vital circulation functions, decreasing tissue oxygenation. Lower tissue perfusion and oxygenation reduce the rate of tissue metabolism and energy, predisposing to hypoxemia and organ dysfunction that contribute to PI formation^{73,75}. Conditions of hyperthermia, emesis, diarrhea, high sweating or wounds with high exudation, and patients with high protein intake require additional water intake, which must be evaluated individually⁸.

Practical approach:

Board 5 suggests pocket rules for calculating energy and protein requirements based on the latest national and international guidelines, as well as the routes of administration of nutritional therapy.

Patients who do not have an intact gastrointestinal tract should receive parenteral nutrition according to established nutritional goals. It is important to remember that malnourished patients or those at nutritional risk, with specific clinical conditions, such as malabsorptive syndromes, burns, or intestinal fistulas, need evaluation to prescribe replacement of vitamins and trace elements in order to favor healing. The need for intravenous or enteral multivitamin replacement should be evaluated (when possible), in addition to specific replacements as needed^{66,79}.

Implement nutritional therapy protocols

Clinical protocols are the best methods to integrate and systematize good patient care practices.

In the context of hospital nutritional therapy, the standardization of routines, the development of protocols, and continuing education are actions that should be promoted by the multidisciplinary team in nutritional therapy (MTNT)⁸⁰.

To build protocols, we must take into account the target population and the profile of the institution involved, aiming to create a standardized model that helps and standardizes the conducts within the institution. Algorithms, medical, dietetic, and nursing prescriptions can be incorporated into

Board 5 – Nutritional requirements and routes of administration of nutritional therapy in the risk of pressure injury (PI) and in the installed PI.

	Risk of PI	PI installed
Calories (patient stable)	Malnourished or nutritional risk: 30–35 kcal/kg/day ^{8,76}	Malnourished or nutritional risk: 30–35 kcal/kg/day ^{8,76}
Calories not critically ill*	15 to 20 kcal/kg/day from the 1st to the 3rd day; 25 to 30 kcal/kg/day after the 4th day of patients in recovery ⁷⁷	15 to 20 kcal/kg/day from the 1st to the 3rd day; 25 to 30 kcal/kg/day after the 4th day of patients in recovery ⁷⁷
Calories in the obese patient*	11-14 kcal/kg/day of actual body weight for patients with a BMI between 30-50 kg/m ² 22-25 kcal/kg/day of ideal weight, for patients with BMI >50 kg/m ^{3 77}	11-14 kcal/kg/day of actual body weight for patients with a BMI between 30-50 kg/m ² 22-25 kcal/kg/day of ideal weight, for patients with BMI >50 kg/m ^{3 77}
Proteins	1.25-1.5 g protein/kg/day ⁸ Assess clinical condition of renal patients	1.5g-2.0 g protein/kg/day ^{1,77} Assess clinical condition of renal patients
Liquids	1ml of fluids/kcal/day, or, 30 ml/kg ⁸	1ml of fluids/kcal/day, or 30 ml/kg ⁸
Oral nutritional supplement (ONS)	If low feed acceptance (less than 60% of nutritional requirements), assess the need for the introduction of hyperprotein ONS in the context of the diet offered ^{8,78}	Introduce specific oral nutritional supplements for healing (containing specific nutrients: zinc, arginine, carotenoids, vitamins A, C and E) from stage 2,3,4 PI, non-classifiable PI, DTPI** or mucous membrane supplements ⁸
Enteral nutrition	If food acceptance with ONS is less than 60% of nutritional requirements, enteral nutritional therapy is indicated ^{8,78}	If food acceptance with ONS is less than 60% of nutritional requirements, enteral nutritional therapy is indicated ^{8,76,77}
Parenteral nutrition	If it is impossible to use the gastrointestinal tract, parenteral nutritional therapy is indicated ^{8,76}	If it is impossible to use the gastrointestinal tract, parenteral nutritional therapy is indicated ^{8,76}

*; = preferably use indirect calorimetry; ** = DTPI: deep tissue pressure injury. Source: prepared by the authors.

the protocols and allow the expectation of well-defined results. Generally, clinical protocols for local use should consider the relevant medical literature and the guidelines established by national or international professional societies⁸¹.

Health quality indicators are part of the strategic map of institutions. It is worth considering the great challenge due to the variables that contemplate hospital nutritional therapy, highlighting the patient experience, moving on to care, nutritional assessment and conduct, protocols, sanitary aspects, standardizations, and regulations that directly impact the results⁸⁰.

In the context of nutritional therapy, the implementation of protocols seems to significantly improve the quality of the nutritional therapy performed, as well as standardize the conducts of the assistant team with regard to the nutritional therapy adopted. In order to adhere to the protocols, it is necessary that their implementation contemplates the interaction of several factors associated with the type of protocol, implementation process, characteristics of the institution and team profile.

The success of the implementation and execution of a nutritional conduct protocol lies in its simplicity and personalization. For greater effectiveness, they must contemplate the scientific basis of the recommendations offered by guidelines, adaptation to the reality of each service, taking into account clarity, conciseness, format and easy handling⁸¹.

The implementation of protocols for conduct in nutritional therapy can be a relevant alternative for better clinical results. In the scope of nutritional therapy, the concepts of management and quality assurance can be translated by the need for protocols, procedure manuals, indicators and audits in compliance with routines⁸². According to a study⁸ that investigated the use of a nutritional protocol for patients with stage 2 or 3 PI, nutritional assessment was associated with improved healing of PIs.

Practical approach:

A suggestion for protocols in flowchart format is presented, as can be seen in Figure 4 below:

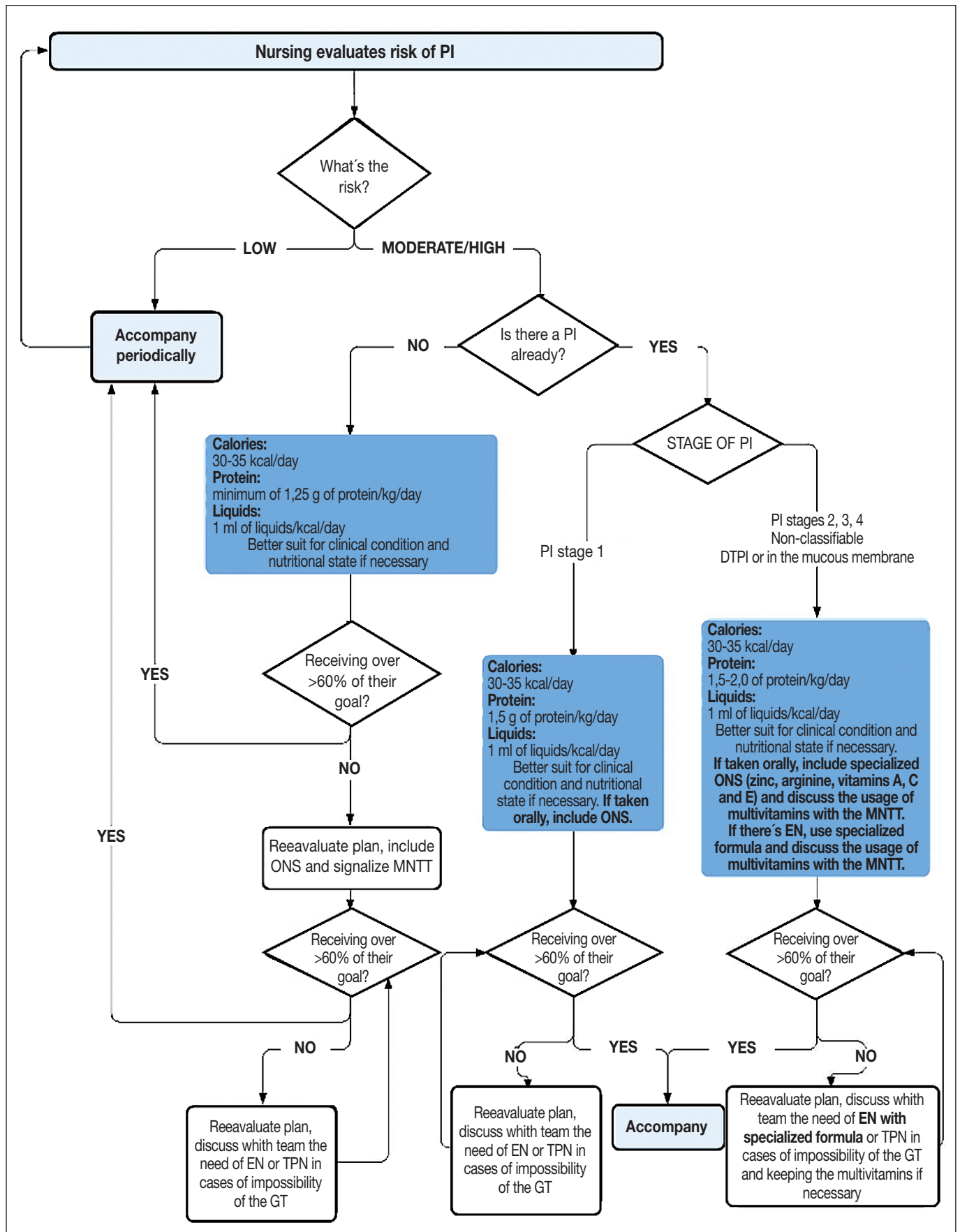


Figure 4 - Protocol for the evaluation and treatment of pressure injury for stable patients.

Source: adapted from MTNT in Practice HIAE⁷⁶; EPUAP/NPIAP/PAN PACIFIC⁸; BRASPEN aging guideline⁸³.

6- Notify skin changes and communicate clearly to the team. This action is part of integrated care

Complete documentation of PI is essential and nurses play a central role in this process. However, documentation by other health professionals is also important. Studies have shown that incomplete and incorrect records can threaten the validity of treatment and the quality-of-care provided⁸⁴.

In view of the need to improve clinical and care practice by providing professionals with security for the process of evaluating PIs, several authors have proposed instruments to measure wounds⁸⁵. The initial evaluation of the patient with PI should be comprehensive and include a complete health history, physical examination focused on nutritional status, pain, risk assessment of developing new lesions, quality of life, functional capacity, available resources and support, and ability to adhere to the proposed prevention and treatment plan. Laboratory tests and radiological images may also be necessary during the evaluation of a lesion⁸⁶.

Currently, the use of an electronic system can be considered an important aid in documentation by the interprofessional team, with the objective of keeping all information in an easily accessible place, allowing strategies such as a reminder system, decision support tools in clinical conduct, evaluation and more accurate documentation of PIs⁸⁷.

Practical approach:

- The evaluation and registration of the PI must include⁸⁷:
- The anatomical site;
- The staging of the lesion;
- The size and surface area;
- The types of fabrics present and coloring;
- The condition of the perilesional skin;
- The edge and margin;
- Presence of epibole and tunneling;
- Type and amount of exudate;
- Presence of odor.

Wound pain assessment should be included in all PI assessments. In black-skinned patients, priority should be given to the presence of heat in the skin, increased sensitivity, and changes in perilesional tissue thickness⁸⁸. If PI does not show signs of healing within two weeks, comprehensively reassess the patient⁸⁹. This reassessment of the lesion consists of:

1. Evaluate at the beginning and at least once a week to monitor healing;
2. Consider the need for wound bed biopsy when healing does not progress;

3. Use a uniform and consistent method to measure PI size;
4. Calculate the wound area (should reduce surface area by 40% to 50% within four weeks of starting treatment) and scarring predictive factor.

For a hypothetical practical example of how this evaluation should be described, it could be written down as: *patient presents in the region of the right calcaneus PI stage 4, measuring 4.5 x 4.0 cm. In its extension, it has 40% necrotic tissue and 60% granulation. Perilesional region with a hyperemic halo of approximately 2.0 cm from the edge of the lesion. Irregular borders and detachment of approximately 1.0 cm in the cephalo-podalic position between 3 pm and 6 pm. Absence of tunneling. Exudate in moderate quantity of pious, bloody and odorless appearance.*

7- Enfold all key healthcare stakeholders, caregivers, family members, and patients in the integrated approach to preventive care and individualized treatment of PI.

One of the fundamental actions to reduce the incidence of PI is to raise the awareness of patients and family members in the care process, as active subjects, main responsible and holders of knowledge about the body. Therefore, they can serve as a source of control, autonomy, values, and decision-making, which can make the safe practices established by the institution to combat injuries more effective⁹⁰.

The care process requires decision-making based on scientific knowledge centered on the patient's individuality, requiring continuing education, both in hospitals and in long-term care institutions^{1,91}. This continued education should base its objectives on the training of the health team with an evidence-based practice⁹².

For this, the multidisciplinary team, the patient, family members and caregivers must be aligned on preventive conducts. Each agent in the process must jointly set goals that ensure that patients at risk of PI are positively benefited^{90,93}.

Multimodal continuing education shows an increase in PI knowledge scores, an improvement in team competence, an increase in the use of risk assessment instruments, and a reduction in the prevalence of injuries⁹⁴⁻⁹⁶. It is ideal that these programs include theoretical and practical parts with the association of various methods within the educational process. They should be innovative, with active strategies such as: didactic presentations, workshops, practical simulations, case studies, use of specific applications, bedside discussion of cases, and reading materials⁹⁷⁻¹⁰⁰.

In this sense, in addition to the various methods used, it is important to adapt the training to the target audience, paying attention to verbal expression, level of education, primary

language, and sensory deficiencies to involve individuals and engage them in the learning process¹⁰¹.

A very important professional in this gear is the nurse. However, it is known that not all professionals have access to continuing education programs on PI. In this context, recent meta-analyses have shown that continuing education significantly improves nurses' knowledge and competencies on preventive measures and care with PI^{49,102,103}.

On the other hand, considering the arduous routine in the hospital setting, many barriers hinder the care and prevention of PI, some of which¹⁰⁴ are: 1) little knowledge and beliefs about the consequences of PI (nature, source, timing, and taboo); 2) lack of clarification of the role to be played by each member (who does what, conflicting councils and divergences); 3) lack of motivation and priorities (competing needs for self-care and the caregiver's physical capacity); 4) poor memory (forgetting to reposition in bed); 5) low emotion (caregiver exhaustion and isolation, conflict in the caregiver's role, and patient feelings) and 6) inadequate work environment (scarcity of human resources and equipment).

In this way, several education and awareness programs have been created and evaluated on their effectiveness. One of them is the Shanley Pressure Ulcer Prevention Program (SPUPP)¹⁰⁵, which observed positive impacts on the participants' knowledge scores regarding the prevention of PI. There was an improvement in the patient's level of knowledge, which allowed them to take proactive action in the prevention of PI.

Undoubtedly, every hospital unit must ensure that the team, patients, family members and caregivers are aware of the negative impacts of PI. This results in improved patient quality of life, reduced hospitalizations, morbidity and mortality, and hospital costs. To this end, protocols on prevention and care must be developed and routinely updated¹⁰⁶.

Every team must be aware of the activity and actions that each professional must perform to achieve the preventive objective. It is important to understand, systematically, importance of medical care, nursing care, and nutritionists¹⁰⁷. This care should be part of the daily conduct of patients at risk of PI during the hospitalization time and after discharge home, being part of a well-structured discharge planning.

The objective of adequate and efficient discharge planning is to improve the patient's quality of life, ensuring continuity of care and reducing the rate of readmissions and/or unplanned complications, which can reduce the financial burden on the health system¹⁰⁸. It is part of assessing the individual's self-care capacity, as well as the ability and knowledge of their caregiver⁸.

Establishing a structured hospital discharge plan with understandable tools for patient education will improve the

multidisciplinary team's ability to ensure the effectiveness of the individual's educational process¹⁰⁹. Kim et al.¹¹⁰ developed an education program focused on PI prevention with a focus on self-care for eight weeks. As a result, a greater willingness to adopt preventive and self-care behaviors, as well as an increase in knowledge, was observed in the group that was part of the program. In addition, one patient in the control group presented with a new PI during the study¹¹⁴.

In another study, the use of telenursing through family education interventions via messaging apps for 30 days after hospital discharge was shown to be effective, with a lower Pressure Ulcer Scale for Healing (PUSH) score 30 days after discharge in the group that received telenursing¹¹¹.

Another important strategy is the involvement of health managers and administrators in institutional policies related to the prevention, treatment, and management of PI. These include:

- Complying with current legislation regarding actions for patient safety, establishing the Patient Safety Center (PSC) and supporting its actions in the institution;
- Strengthening the institutional patient safety policy, providing technical, financial, administrative, and human resources for the appropriate surveillance, monitoring, prevention and mitigation of the incidence of PI;
- Support the actions established and directed to the prevention and minimization of PI risks;
- Support the promotion of a safety culture in the institution, encouraging the notification of incidents related to PI, as well as encouraging learning about failures and instituting measures to prevent these events in health services;
- Ensure continuing education activities for professionals to improve the quality of care provided.

Practical approach:

An example of five key steps to implement an effective continuing education program to prevent PI include^{8,95,97,98,103,114-112}:

1. Assess the need for continuing education

Before developing an education program, it is essential to assess the educational needs of the team. This can be done through questionnaires, interviews, and analysis of current practices. Understanding the gaps in knowledge and skills will allow you to create a targeted and effective program.

2. Develop educational content

Based on the needs assessment, develop educational content that addresses the key aspects of PI prevention. This should include:

- Skin conditions: hydration, fragility, presence of wounds
- Risk factors for PI: age, malnutrition, related diseases
- Techniques for assessment and skin care: structured and validated scales
- Preventive interventions, such as changes in position, use of support surfaces, and skin care
- Care protocols with evidence-based practices
- Personal hygiene;
- Strategies for redistributing pressure when sitting and lying down;
- Use of suitable mattresses and pillows;
- Use of appropriate clothing and footwear;
- Inspection and skin care;
- Wound care;
- Exercise plan according to the individual's functionality.

3. Create varied teaching methods

Using a variety of teaching methods can help engage different learning styles. Consider including:

- Face-to-face sessions and hands-on workshops
- Interactive e-learning modules
- Hands-on demonstrations and simulations
- Case studies and group discussions
- Reading materials and instructional videos

4. Develop ongoing training with updates

- Continuing education should be an ongoing process. Plan regular training sessions to review and refresh staff knowledge. This may include:
- Quarterly or bi-annual updates on new practices
- Refresher sessions to reinforce fundamental knowledge
- Ongoing hands-on training to ensure competence in specific skills

5. Monitor and evaluate the continuing education program

To ensure the effectiveness of the continuing education program, it is crucial to continuously monitor and evaluate its impact. This can be done through:

- Staff performance evaluations before and after training
- Monitoring of PI rates at the institution
- Regular feedback from participants on the content and effectiveness of the trainings
- Program adjustments based on assessment results and feedback received

Considering a multidisciplinary home care plan for an individual in the presence of a PI, it should contain the following topics:

- Etiology of PI including skin anatomy and risk factors for development;
- Dietary advice;
- Recommendations for healthy habits;
- Approach to smoking and alcohol consumption;

In the patient's educational process, it is suggested^{76,78,115-117}:

- Recognition of possible barriers to learning and communication: visual, auditory, speech, and others (cultural, religious, psychomotor, emotional);
- Identification of the person involved in the educational process for engagement and empowerment (patient, relative, caregiver or home care team);
- Start the orientation process during the hospitalization period and as early as possible;
- Define the best teaching method according to the level of understanding of the patient and those involved: demonstration, audiovisual, verbal, or brochure;
- Assess the understanding of the guided individual through verbalization, refusal, demonstrative ability, or non-understanding;
- Identify the need for strengthening the guidelines;
- Detect whether the objective was achieved or not, performing the teach back (confirmation if there was an understanding, asking the involved person to explain what was oriented) to assess the understanding of the discharge instructions and the ability to perform self-care;

It is extremely important that the multidisciplinary team maintains the continuity of treatment through teleconsultation, outpatient clinic, or home visit.

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Study location: Brazilian Society of Parenteral and Enteral Nutrition (SBNPE/BRASPEN), São Paulo, SP, Brazil.

Conflict of interest: The authors declare there are none.