

Pressure Ulcers



Karen Green, Senior Specialist Dietitian (Neurosciences), The National Hospital for Neurology & Neurology, London, UK

This article will provide an overview on pressure ulcers (PUs), available nutrition guidance and NHS initiatives to highlight PUs and provide support to healthcare professionals (HCPs) and carers across health and social care settings.

What is a pressure ulcer?

A pressure ulcer (PU) is a localised injury to the skin and/or underlying tissue, usually over a bony prominence, caused by pressure alone, or pressure in combination with shear.¹ PUs range from blanching (redness) to deep penetrating wounds, to expose muscle, tendon and bone. Details of how pressure ulcers are classified can be found in **Table One**.¹

PUs are thought to develop secondary to sustained high pressure on a particular area of the body, frequently over bony prominences. Pressure compresses the capillaries, reducing blood flow and leading to tissue ischaemia, capillary thrombosis and occlusion of the lymphatic vessels. Increased capillary permeability means that fluid can escape into the extravascular space, causing interstitial oedema and eventually cell and tissue death.²

The most common sites for PUs to occur are over a bony prominence, such as the buttock (sacrum), heels, hips elbows, ankles, back, shoulders, back of the head and ears.³

A systematic review found that there is no single factor which can explain PU risk but described that a complex interplay of factors increases the probability of PU development.⁴ **Table Two** lists the intrinsic and extrinsic risk factors which may lead to the development of PUs.

Prevalence

The NHS Safety Thermometer⁶ estimates that the prevalence of NHS patients in England with a PU is approximately 4.3%, while new PUs are estimated to occur in 4-10% of patients admitted to hospitals in the UK.⁷ Older patients are five times as likely to die with a PU, and mortality in hospital in this group is 25-33%.²

Table One: Pressure Ulcer Classification¹

Category/Grade	Description
1	Intact skin with non-blanchable redness over a bony prominence
2	Partial thickness loss of dermis presenting as a shallow open ulcer, with a pink wound bed
3	Full thickness tissue loss. Subcutaneous fat may be visible, but bone, muscle or tendon are not exposed
4	Full thickness tissue loss with exposed bone, tendon or muscle
Unstageable	Full thickness tissue loss in which the base of the ulcer is covered in slough and/or eschar in the wound bed
Suspected deep tissue injury	Purple or maroon coloured area of discoloured intact skin (likened to a bruise) or blood-filled blister due to damage of the underlying soft tissue

Consequences of developing a pressure ulcer

Pressure ulcers can result in longer lengths of stay in hospitals. An observational study found that adult patients who develop PUs had an extended stay of 4.31 days.⁸ This increases to approximately 10 days in patients over 75 years of age, who develop a PU in hospital.⁹

The cost of treating a PU varies from £1,214 to £14,108 depending on grade of PU.¹⁰ Costs increase with ulcer grade because the time to heal is longer and because the incidence of complications is higher in more severe cases. The total cost in the UK is £1.4–£2.1 billion annually (4% of total NHS expenditure).¹¹

Screening tools

The SSKIN bundle¹² is widely used in nursing practice and is designed to facilitate consistency in care. SSKIN is a five-step model for PU prevention:

- **Surface:** make sure your patients have the right support
- **Skin inspection:** early inspection means early detection. Show patients & carers what to look for
- **Keep your patients moving**
- **Incontinence/moisture:** your patients need to be clean and dry
- **Nutrition/hydration:** help patients have the right diet and plenty of fluids.

On admission to a healthcare setting, the patient should undergo a complete nutrition screening. Several validated screening tools can be used in various settings, including 'MUST'.¹³

Nutritional guidelines to prevent and manage pressure ulcers

The 2014 National Pressure Ulcer Advisory Panel/European Pressure Ulcer Advisory Panel/Pan Pacific Pressure Injury Alliance¹⁴ Nutrition guidelines along with the National Institute for Health and Care Excellence (NICE) guidelines¹⁰ have been adopted in the UK and incorporated into nutritional care plans across many healthcare settings.

It is well documented that malnutrition is one of the risk factors for the development of PUs.^{7, 14, 15, 16} Malnutrition contributes to altered immune function, impaired collagen synthesis, and decreased tensile strength. In many cases, malnutrition also contributes to chronic wounds and increases the risk for delayed and impaired wound healing.

In patients with PUs, a chronic inflammatory state can induce catabolic metabolism, malnutrition, and dehydration.

Wound healing occurs in three distinct but overlapping stages: inflammatory, proliferative, and remodelling. Each stage is time limited and marked by distinct physiologic events, with specific key nutrients playing a crucial role during that phase.

Energy, protein and fluids

Energy, protein, and fluids play an important role in preserving the health of the skin and in supporting the healing process in the event of skin damage.¹⁶ Patients with PUs have increased requirements for energy and protein intake to support anabolism, nitrogen retention, collagen formation, and angiogenesis, all contributing to wound healing.

Energy

Recommendations¹⁴ advise a minimum of 30-35 calories/kg/day for adults who have or are at risk of PUs and malnutrition. Adjustments to energy intake should be based on weight change, underweight, and obesity.

Protein

Protein is needed for cell growth and structure, collagen production, fibroblast proliferation, and synthesis of enzymes involved in wound healing. Pressure ulcer healing requires adequate protein; increased protein intake is associated with improved wound healing rate. Recommendations¹⁴ advise 1.25-1.5 g/kg/day of protein for adults who have, or are at risk of, PUs and malnutrition. Patients with stage III/IV PUs or multiple wounds may need 1.5-2 g/kg/day. Those with a protein intake as high as 2 g/kg/day must be monitored for changes in renal function and hydration status.

Fluid

To prevent or treat PUs, patients require adequate hydration. Sufficient fluid intake maintains skin turgor and delivery of oxygen and nutrients to both healthy and healing tissues. Current fluid intake recommendations¹⁴ are 30 mL/kg/day or 1-1.5 mL per calories consumed.

Micronutrient requirements

Micronutrients are vitamins, minerals, and trace elements that the body requires for cell metabolism in small but critical amounts. Standard multivitamin supplements with minerals are

recommended for patients with pressure ulcers and inadequate oral or enteral intake. In particular, vitamins C and A and zinc play important roles in wound healing.

The new PENG Pocket Guide to Clinical Nutrition,¹⁷ which is being published this year, has also incorporated these guidelines into a standalone PU section. This section will further highlight the importance of good nutritional care and role of the dietitian in the prevention and management of PU across all healthcare settings.

NHS initiatives and campaigns

NHS Improvement (NHSI)¹⁸ is responsible for overseeing foundation trusts and NHS trusts, as well as independent providers that provide NHS-funded care. They offer support to these providers to give patients consistently safe, high quality, compassionate care within local health systems that are financially sustainable. Pressure ulcers are one area the NHSI supports and they launched the national 'Stop the Pressure' programme¹⁹ in November 2016.

The aim of this programme is to create a significant culture shift and eliminate avoidable PUs in acute, community and mental health provider settings. NHSI are working with frontline staff, NHS England and the Academic Health Science Network to deliver this programme.

Table Two: Risk Factors⁵

Intrinsic factors

- Nutritional status/hydration
- Reduced mobility/immobility
- Extremes of age
- Sensory impairment
- Incontinence
- Pain
- Chronic/acute/terminal illness
- Vascular disease
- Mental health status
- Level of consciousness
- Previous history of pressure damage

Extrinsic factors

- Pressure
- Shearing
- Friction
- Moisture
- Poor moving and handling
- Medication

To support their improvement work, 172 trusts submitted improvement plans in 2016, which highlighted examples of great work being done at trust level across the regions and good evidence of partnership-working across health and social care settings. The following areas that were identified from this work that were being improved by the trusts involved:

- Leadership
- Quality improvement
- Data measurement
- Documentation
- Clinical focus
- Education.

For a full breakdown please go to the Stop the Pressure website:

nhs.stopthepressure.co.uk²⁰

But some areas were less visible in their plans:

- The link between nutrition and development of PUs
- Incontinence management and the development of PUs
- Patient feedback about their experience
- Interventions in relation to bariatric patients.

National programme work and priorities

The NHSI national programme has been focusing on and providing leadership on a range of work related to the trusts' activity in the last 18 months, including:

- Launching a new framework '*Pressure ulcers: revised definition and measurement*' in June 2018.²¹ This document has been designed to support a more consistent approach to the definition and measurement of PUs at both local and national levels across all trusts for implementation from April 2019
- Developing a curriculum expanding SSKIN to support student and newly

qualified staff in practice in June 2018.²²

It includes a module on nutrition to ensure all students, nursing and all other healthcare professionals, understand the importance of adequate nutrition and the role nutrition plays in maintaining tissue viability. This will act as a great resource for current and future dietetic students and perhaps, where possible, will be incorporated into the dietetic curriculum

- Improvement capacity: The national Stop the Pressure collaborative was launched in October 2017 with 25 trusts and a total 90 trusts having applied to join it over the following months
- One area of the collaborative (24 trusts) is focusing on nutrition and PUs, led by Caroline Lecko. A small working party, mainly dietitians, have been working on the link between nutrition/hydration and PUs and have developed resources (case studies, tips for patients and carers, and key messages), which were launched in early 2018.²³ This collaborative hope to publish articles, present at local and national conferences to highlight PUs and how HCPs across all settings can contribute to and adopt the work of the NHSI over the next six months.

Summary

Prevention and effective, timely management is essential in reducing patient harm and unnecessary costs attributed to pressure ulcers. Key guidelines and documents are available to guide HCPs across healthcare settings and sharing changes in practice, like those from the NHSI collaborative work, is essential to achieve consistency locally and nationally.

“The most common sites for PUs to occur are over a bony prominence, such as the buttock (sacrum), heels, hips elbows, ankles, back, shoulders, back of the head and ears.”³”

References: **1.** National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance (2014). Prevention and Treatment of Pressure Ulcers: Quick Reference Guide. Cambridge Media: Osborne Park, Australia. Accessed online: www.epuap.org/wp-content/uploads/2016/10/quick-reference-guide-digital-npuap-epuap-pppia-jan2016.pdf (July 2018). **2.** Grey JE, Harding KG, Enoch S (2006). ABC of wound healing: pressure ulcers. *Br Med J*; 332(7539): 472-475 **3.** NHS Choices (2017). Pressure Sores. Accessed online: www.nhs.uk/conditions/pressure-sores/ (July 2018). **4.** Dealey C, Posnett J, Walker A (2012). The cost of pressure ulcers in the United Kingdom. *J Wound Care*; 21(6): 261-266. **5.** Bennett G, Dealey C, Posnett J (2004). The cost of pressure ulcers in the UK. *Age and Ageing*; 33(3): 230-235. *Age Ageing*; 33(3): 230-5. **6.** Whitlock J (2013). SSKIN Bundle: preventing pressure damage across the healthcare community. *Br J Community Nurs*; Suppl: S34-9. **7.** Coleman S, et al. (2013). Patient risk factors for pressure ulcer development: Systematic review. *Int J Nurs Stud*; 50(7): 974-1003. **8.** NICE (2005). Pressure ulcers: the management of pressure ulcers in primary and secondary care. Clinical guideline [CG29]. Accessed online: www.nice.org.uk/guidance/cg29 (July 2018). **9.** Health & Social Care Information Centre (2014). NHS safety thermometer; annual publication, patients harm and harm free England. Official statistics. **HSIC. 10.** NICE (2014). Pressure Ulcers Scope 2. Accessed online: www.nice.org.uk/guidance/cg179/documents/pressure-ulcers-scope2 (July 2018). **11.** Graves N, Birrell F, Whitby M (2005). Effect of pressure ulcers on length of hospital stay. *Infect Control Hosp Epidemiol*; 26(3): 293-297. **12.** Theisen S, Drabik A, Stock S (2012). Pressure ulcers in older hospitalised patients and its impact on length of stay: a retrospective observational study. *J Clin Nurs*; 21(3-4): 380-387. **13.** BAPEN (2016). Introducing 'MUST'. Accessed online: www.bapen.org.uk/screening-and-must/must/introducing-must (July 2018). **14.** National Pressure Ulcer Advisory Panel (2014). Prevention and Treatment of Pressure Ulcers Clinical Practice Guideline. Accessed online: www.npuap.org/resources/educational-and-clinical-resources/prevention-and-treatment-of-pressure-ulcers-clinical-practice-guideline/ (July 2018). **15.** Kottner J, Gefen A, Lahmann N (2011). Weight and pressure ulcer occurrence: A secondary data analysis. *Int J Nurs Stud*; 48(11): 1339-1348 **16.** Posthauer ME, et al. (2015). The role of nutrition for pressure ulcer management: national pressure ulcer advisory panel, European pressure ulcer advisory panel, and pan pacific pressure injury alliance white paper. *Adv Skin Wound Care*; 28(4): 175-188. **17.** PENG (2018). A Pocket Guide To Clinical Nutrition. Accessed online: www.peng.org.uk/publications-resources/pocket-guide.php (July 2018). **18.** NHSI (2018). Better healthcare, transformed care delivery and sustainable finances. Accessed online: <https://improvement.nhs.uk/> (July 2018). **19.** NHSI (2018). Stop the Pressure. Accessed online: <http://nhs.stopthepressure.co.uk/> (July 2018). **20.** NHSI (2017) National Stop the Pressure programme: One year on - our focus for improvement. Accessed online: https://improvement.nhs.uk/documents/1937/Stop_the_Pressure_one_year_on.pdf (July 2018). **21.** NHSI (2018). Pressure ulcers: revised definition and measurement. Summary and recommendations. Accessed online: https://improvement.nhs.uk/documents/2932/NSTPP_summary_recommendations_20June2018.pdf (July 2018). **22.** NHSI (2018). Pressure ulcer core curriculum. Accessed online: https://improvement.nhs.uk/documents/2921/Pressure_ulcer_core_curriculum.pdf (July 2018). **23.** NHSI (2018). Nutrition and hydration. Accessed online: <https://improvement.nhs.uk/resources/nutrition-and-hydration/> (July 2018).