

IMPACT Case Study

Multi-factorial case study with a hospital and long-term care facility

Measure Domains	Skin integrity and Changes in Skin integrity NQF Number: 0678
Case Study	<p>Patient Presentation</p> <p>GB is an 88-year-old female recently admitted to an acute care unit for extensive rehabilitation following surgery for her fractured hip. GB fell in her kitchen and was unable to call for help or move for 8 hrs. The extended time on the floor led to ischemia resulting from prolonged pressure leading to hypoxia or lack of oxygen to the tissue resulting in pressure injuries (PI). Her daughter found her, and she was transported to the hospital. GB has lived alone with assistance from her daughter. GB and her daughter related that her appetite has gradually declined over the past year, and she rarely eats three meals a day.</p> <p>GB's medical history includes congestive heart failure (CHF), hypertension, and GERD. She has stage 4 PI on coccyx measuring 3.2 cm X 1.7 cm and a stage 3 PI on her hip measuring 2.5 cm X 3.0 cm. Her medications include baby aspirin, blood thinner, diuretic, blood pressure medication, calcium supplement, and pain medication.</p> <p>Current anthropometric measurements: height: 60 inches; weight: 115 pounds. When talking with her family members, it was noted that GB had gradually lost weight over the past year. Her usual body weight is 135 pounds. The physician ordered a 2-grm sodium diet. She has upper and lower dentures that no longer fit. GB is very weak, walks with a walker and assistance. She eats 50% of her meals and states "this food is bland and tasteless". GB appears thin with mild muscle wasting in her extremities, moderate loss of subcutaneous fat stores, and reduced hand grip strength.</p> <p>Nutrition Screen</p> <p>The clinical staff screened GB's nutritional status using the Malnutrition Screening Tool (MST) and the score of 4 indicated a comprehensive nutrition assessment and intervention should be completed within 24-72 hours.¹ Consulted with the physician who added malnutrition to her current diagnosis.</p>

Sample Comprehensive Nutrition Assessment

Initial Comprehensive Nutrition Assessment using the Nutrition Care Process^{2,3}
Food / Nutrition-Related History
<p>Food and Nutrient Related History</p> <ul style="list-style-type: none"> • Medical History - hypertension, CHF, GERD, fix hip stage 3 and stage 4 PI, pain, and malnutrition • Suboptimal food and fluid intake over the past year • Current diet: 2 gm. sodium • Food preferences: dislikes meat but enjoys sweet foods and complains about the current diet being tasteless. • Feeds herself without assistance • Current Medications - Baby aspirin, Lasix (diuretic), Eliquis (blood thinner), Lisinopril (blood pressure), Calcium 500 mg/day and pain medication
Anthropometric Measurements
<ul style="list-style-type: none"> • Height: 60 inches (152.4 cm) • Weight: 115 pounds (52.2 kg) • Weight history: weight loss of 20 pounds or 14.8% in 180 days and 5 pounds or 4.1% in 30 days. Usual body weight 135 pounds • Body Mass Index: 22.5 kg/m²
Biomedical Data, Medical Tests & Procedures
<p>Altered nutrition related lab values:</p> <ul style="list-style-type: none"> • Depleted Values <ul style="list-style-type: none"> ○ Hemoglobin: 10.8g/dL (12-16 g/dL) ○ Hematocrit: 33.5% (37-42%) - Depleted level due to recent surgery • Albumin: 2.5 g/dL (3.1-5.0 g/dL) - Low related to (r/t) inflammation, acute injury ⁴⁻⁷ • C-reactive protein 18 mg/L (<1 mg/dL) - Elevated level due to inflammation r/t recent surgery ⁴⁻⁷
Nutrition-Focused Physical Findings
<p>Non-normal Nutrition Related Physical Findings:</p> <ul style="list-style-type: none"> • Overall appearance – mild muscle wasting and lean body mass losses in extremities, reduced grip strength • Oral cavity – Upper and lower dentures that do not fit. • Skin – No edema, stage 4 PI on coccyx measuring 3.2 cm X 1.7 cm and a stage 3 PI on her hip measuring 2.5 cm X 3.0 cm
Client History
<ul style="list-style-type: none"> • Age - 88 years old • Race / Ethnicity – Caucasian • Gender - Female • Medical History –hypertension, CHF, GERD • Social History – widowed, adult daughter (involved in care), prepared her own meals at home and avoided foods high in sodium, ate two meals a day at home

Nutrition Diagnosis
<p>P: malnutrition in context of acute illness ^{6,7}</p> <p>E: r/t intake less than calculated energy and protein needs</p> <p>S: as evidenced by (AEB) weight loss of 14.8% in 180 days, intake less than 50% of meals, and reduced grip strength for age and gender</p>
Nutrition Prescription
<p>Individualized regular diet, offer four ounces of a high calorie, high protein and arginine, zinc and antioxidant oral nutritional supplement four times a day between meals</p> <p>Estimated Energy Needs (Based on EPUAP, NPIAP, PPIIA International Clinical Guidelines) ⁸</p> <ul style="list-style-type: none"> • 1566-1829 kcal (30-35kcal/kg) • 65-78 gm protein (1.25-1.5gm/kg) • 1560-1829 fluid (1 mL/kcal)

Nutrition Interventions: Individualized Plan of Care
Food and/or Nutrient Delivery
<ol style="list-style-type: none"> 1. Individualize meals by collaborating with the physician and suggest individualizing diet to regular⁹ 2. Food and beverage preferences obtained from GB by dining service supervisor and/or nutrition and dietetics technician, registered (NDTR) 3. Offer GB four ounces of high calorie, high protein and arginine, zinc and antioxidant oral nutritional supplement 4 x day between meals. 4. Offer beverage/water for hydration during therapy sessions
Nutrition Education
<ol style="list-style-type: none"> 1. RDN educates GB and daughter on the benefit of consuming supplement and meals to heal PIs and improve nutritional status.
Coordination of Nutrition Care
<ol style="list-style-type: none"> 1. Review patient status with interprofessional (or interdisciplinary) team for coordination of care. 2. Collaborate with other caregivers - specifically the nurses and CNAs to provide assistance with meals, offer supplements, monitor intake and provide encouragement to GB. Include social worker, physical and/or occupational therapist, food and nutrition staff, and physician(s) as indicated. 3. Collaboration with patient and family members to discuss food and beverage preferences, interventions, recommendations and possible referrals 4. Allow flexibility and creativity in accommodating patient's food and fluid preferences 5. Ensure adequate fluid intake to keep the patient well hydrated, prevent dehydration, and maximize wound healing 6. Request dental consult to evaluate dental status due to ill-fitting dentures

Goals
Adequate intake of meals and supplements to meet nutritional needs, as evidenced by: <ol style="list-style-type: none"> 1. Improvement in PIs healing via monitoring weekly measurements. 2. Maintain current weight with no further weight loss; gradual weight gain of ½-1 pound per month.

Nutrition Monitoring and Evaluation			
Indicator	Criteria	Goals	Outcomes
Food/Nutrient Related History Outcomes			
<ul style="list-style-type: none"> • Energy intake • Fluid/beverage intake • Total Protein Intake • Supplement intake 	Meal intake records, meal composition, meal rounds, utilization of oral nutritional supplements as ordered	Adequate intake to meet needs ⁸ <ul style="list-style-type: none"> • 1566-1829kcal (30-35kcal/kg) • 65-78gm protein (1.25-1.5gm/kg) • 1566—1829 (1 mL/kcal) 	75% food and fluid intake 75-100% of nutritional supplement
Anthropometric Measurements Outcomes			
<ul style="list-style-type: none"> • Weight Change 	Patient weighed weekly until stable	Maintenance of current weight of 115 lbs. with no further weight loss; gradual ½ - 1 pound weight gain per month	½ - 1 pound weight gain monthly
Biochemical Data, Medical Tests and Procedures Outcomes			
<ul style="list-style-type: none"> • Hemoglobin • Hematocrit • Serum albumin • C-reactive protein 	Standard lab reference values	Biochemical values within normal limits / at baseline for medical condition	Lab values within normal limits
Nutrition-focused Physical Findings Outcomes			
<ul style="list-style-type: none"> • Overall appearance, specifically reduction in temporal wasting and lean body mass wasting in extremities 	Nutrition focused physical assessment/ examination as able	Improvement in overall physical appearance of mild malnutrition	To be determined

Summary	This case study addresses The Improving Medicare Post-Acute Care Transformation (IMPACT) Act outcome measure NQF #0678, Percent of Residents or Patients with Pressure Ulcers/Injuries That are New or Worsened. The case study reflects the latest research and standard of practice for treating pressure injuries utilizing the Nutrition Care Process.
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In this Case Study, the CDR has chosen to use the term RDN to refer to both registered dietitians (RD) and registered dietitian nutritionists (RDN) and to use the term NDTR to refer to both dietetic technician, registered (DTR) and nutrition and dietetics technician, registered (NDTR).

References

1. Skipper A, Coltman A, Tor Mesko J, et al. Adult malnutrition (undernutrition) screening: an evidence analysis center systematic review. *J Acad Nutr Diet.* 2020; 120(4): 669-708.
2. Academy of Nutrition and Dietetics online eNCPT Nutrition Terminology Reference Manual (Can be purchased at <http://ncpt.webauthor.com/>). Accessed July 18, 2023.
3. Academy of Nutrition and Dietetics Nutrition Care Manual. Available for purchase at: <https://www.nutritioncaremanual.org/adult-nutrition-care>.
4. Ferguson RP, O'Connor P, Crabtree B, Batchelor A, Mitchell J, Coppola D. Serum albumin and prealbumin as predictors of clinical outcomes of hospitalized elderly nursing home residents. *J Am Geriatr Soc.* 1993; 41(5):42(5)545-549.
5. Covinsky KE, Covinsky MH, Palmer RM, Sehgal AR. Serum albumin concentration and clinical assessments of nutritional status in hospitalized older people: different sides of different coins? *Journal of the American Geriatrics Society.* 2002;50(4):631-7.
6. White J. Consensus Statement: Academy and ASPEN: characteristics recommended for the identification and documentation of adult malnutrition (undernutrition). *Journal of the Academy of Nutrition and Dietetics.* 2012; 112(5):730- 738.
7. Sobotka L, Schneider SM, et al. ESPEN Guidelines on Parenteral Nutrition: Geriatrics. *Clin Nutr.* 2009;28(4):461-466. doi:10.1016/j.clnu.2009.04.004
8. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers/Injuries: Quick Reference Guide. Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA: 2019.
9. Dorner B, Friedrich EK. Position of the Academy of Nutrition and Dietetics: Individualized nutrition approaches for older adults: long-term care, post-acute care, and other settings. *J Acad Nutr Diet.* 2018; 118(4): 724-735. [https://doi.org: 10.1016/j.jand.2018.01.022](https://doi.org/10.1016/j.jand.2018.01.022).

<p>Authors/Reviewers</p>	<p>Mary Ellen Posthauer, RDN, LD, FAND Mary Ellen is Past-President of the National Pressure Injury Advisory Panel (NPIAP) and was a member of the nutrition small work group for the 2009, 2014 and 2019 EPUAP, NPIAP, PPIA Prevention and Treatment of Pressure Ulcers/Injuries Clinical Practice Guideline: The International Guideline. 2019</p> <p>Gretchen Robinson MS, RDN, LD, LDN, FADA, FAND Gretchen is a skilled expert in geriatric nutrition and post-acute care and served as the Chair of Scope/Standards of Practice Workgroup of the Quality Management Committee, Academy of Nutrition and Dietetics charged with developing the 2017 revision of the Scope of Practice and Standards of Practice in Nutrition Care and Standards of Professional Performance for the Registered Dietitian Nutritionist and for the Nutrition and Dietetics Technician Registered.</p>
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This case study was reviewed for clinical updates by members of the Dietetics in Health Care Communities Dietetic Practice Group of the Academy of Nutrition and Dietetics in 2022.

IMPACT Measure Domain
Skin integrity and Changes in Skin integrity

Measure Domain	<p> Skin integrity and Changes in Skin integrity NQF Number 0678 </p> <p> Outcome Measure: The <i>Changes in Skin Integrity Post- Acute Care: Pressure Injury</i> quality measure reports the percent of quality episodes in-which the patient has one or more stage 2-4 pressure injuries/ulcers, or an unstageable injury/ulcer, present at discharge that is/are new or worsened since the beginning of the quality episode.¹ This measure is calculated using data from the Home Health Agencies (HHAs) Outcome and Assessment Information Set (OASIS) assessment form. For home health patients, this measure reports the percent of quality episodes with reports of stage 2-4 pressure ulcers, or unstageable pressure injuries/ulcers due to slough/eschar, non-removeable dressing/device, or deep tissue injury, that were not present or were a lesser stage on start of care/resumption of care.¹ </p> <p> Purpose/Rationale for Quality Measure ¹ This quality measure replaces the pressure injury/ulcer measure, “Percent of Residents or Patients Pressure Injury/Ulcer That are New or Worsened (Short Stay) (NQF #0678),” in the HHA Quality Reporting Program (QRP) measure set with “Changes in Skin Integrity Post-Acute Care: Pressure Injury/ulcer” beginning with the Calendar Year (CY) 2020 HHA QRP. The change in the measure name is to reduce confusion about the new modified measure. The modified version differs from the previous version of the measure by: </p> <ul style="list-style-type: none"> • Including new or worsened unstageable pressure injuries/ulcers, including deep tissue injuries (DTIs), in the measure numerator. • Containing updated specifications intended to eliminate redundancies in the assessment items needed for its calculation and to reduce the potential for underestimating the frequency of pressure injuries/ulcers. • Satisfying the IMPACT Act domain of “Skin integrity and changes in skin integrity.” <p> The previous measure was modified in two ways in order to respond to recommendations provided by a crossing-setting pressure injury/ulcer Technical Expert Panel (TEP) and supported by the National Pressure Ulcer Advisory Panel (NPUAP): </p> <ol style="list-style-type: none"> 1. The measure has been modified to incorporate the addition of unstageable pressure injuries/ulcers due to slough or eschar, unstageable pressure injury/ulcer due to non-removable dressing or device, and unstageable pressure injuries/ulcers presenting as deep tissue injuries in the numerator. This measure is utilized across the Post-Acute Care settings, including HHA, Inpatient Rehabilitation Facilities (IRF), skilled nursing facility (SNF), and long-term care hospitals (LTCH) settings.
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	<p>2. The measure calculation has been amended to include M1311 items instead of the now retired M1313 Items for the HHA QRP. This item calculation modification is intended to reduce redundancies in assessment items.</p> <p>To reflect these two changes, the measure was finalized in CY 2018 federal rulemaking as: Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury.¹</p>
<p>Background</p>	<p>The IMPACT Act of 2014 was signed into law on Oct. 6, 2014. The Act directs the Secretary of Health and Human Services (HHS) to “specify quality measures on which Post-Acute Care (PAC) providers are required under the applicable reporting provisions to submit standardized patient assessment data” in several domains, including skin integrity, incidence of major falls and function. ² The IMPACT Act mandates the submission of standardized data by Home Health Agencies (HHAs), Skilled Nursing Facilities (SNFs), Long-Term Care Hospitals (LTCHs), and Inpatient Rehabilitation Facilities (IRFs). Standardized data are to be collected by the commonly used assessment instruments: The Long-Term Hospital Care Data Set (LCDS) for LTCHs, the Minimum Data Set (MDS) for SNFs, the Outcome and Assessment Information Set (OASIS) for HHAs and the Inpatient Rehabilitation Facility Patient Assessment Instrument (IRF PAI) for IRFs.³</p> <p>Meaningful MEASURES</p> <p>The IMPACT Act requires the reporting of standardized patient data regarding quality measures and standardized patient assessment data elements (SPADEs).⁴ The Act also requires the submission of data for measure domains pertaining to resource use, and other domains. In addition, the IMPACT Act requires assessment data to be standardized and interoperable to allow for exchange of the data among post-acute providers and other providers.⁴ The Act intends for standardized post-acute data to improve Medicare beneficiaries’ outcomes through shared decision making, care coordination, and enhanced discharge planning.⁴</p> <p>Work to address the intent of the IMPAC Act supports the Centers for Medicare & Medicaid Services (CMS) initiative “Meaningful Measures”.⁵ This initiative identifies the high priorities, for quality measurement and improvement, with the goal of improving health outcomes for patients, their families, and measured entities (e.g., clinicians, hospitals, health plans).⁵ Its purpose is to deliver value by empowering people to make informed decisions while also reducing burden on measured entities (e.g., clinicians, hospitals, health plans).⁵</p> <p>The Meaningful Measures Initiative helps move payment for healthcare services toward value by focusing everyone’s efforts on the same quality areas. The initiative helps identify measures that: ⁵</p> <ul style="list-style-type: none"> • Address high impact measure areas that safeguard public health • Are patient-centered and meaningful to patients • Are outcome based where possible • Fulfill requirements in program statutes • Minimize level of burden for providers

- Provide significant opportunity for improvement
- Address measure needs for population-based payment
- Align across programs with other payers (Medicaid, commercial payers)

2022 Cascade of Measures Tool

CMS continues to implement the Meaningful Measures Initiative and ensure alignment across programs. In 2022, the Cascade of Measures is a tool that breaks down the Meaningful Measures health care priorities into goals, objectives, measure families, and examples of individual measures. The cascade helps identify opportunities for measure alignment and priorities for future measure development by mapping existing measures to the Meaningful Measures Framework.⁵

The IMPACT Act Charge²

The IMPACT Act requires the HHS secretary to implement specified clinical assessment domains and categories using standardized data required for submission by LTCH, IRF, SNF and HHA. Standardized quality measures are developed and implemented from five quality measure domains. The Act also requires the development and reporting of crosscutting measures pertaining to resource use, hospitalization and discharge to the community. Additionally, CMS is to develop, implement, and maintain SPADEs for clinical categories.⁴

Quality Measure Domains²

These domains and categories include:³

- Skin Integrity and Changes in Skin Integrity
- Functional Status, Cognitive Function, and Changes in Function and Cognitive Function
- Medication Reconciliation
- Incidence of Major Falls
- Transfer of Health Information and Care Preferences when an Individual Transitions

In addition, the IMPACT Act requires that assessment data be standardized and interoperable to allow for exchange of the data among post-acute providers and other providers.⁴

Assessment Categories

The standardized patient assessment categories include the following:

- Functional Status
- Cognitive Functional and Mental Status
- Special Services, Treatments, and Interventions
- Medical Conditions and Co-morbidities
- Impairments
- Other categories required by the secretary

The Data Element Library (DEL) ⁶

The DEL is a CMS resource that moves toward enabling the availability of electronic health information when and where it’s needed.⁶ The DEL is a public resource for use by providers, vendors, researchers, and the general public, and helps to facilitate health information exchange and interoperability.⁶ The mission of the DEL is to serve as a comprehensive, electronic, distributable, and centralized resource of CMS patient assessment instrument content for the public.⁶ The DEL furthers goals of data standardization and interoperability, which is also a goal of the Improving Medicare Post-Acute Transformation (IMPACT) Act of 2014.^{5, 6}

The DEL contains data elements from the patient assessment instruments for the following Post-Acute Care settings. ⁶

PAC Setting	CMS Assessment Instrument
Long-Term Care Hospitals (LTCHs)	LTCH Continuity Assessment Record & Evaluation (CARE) Data Set (LCDS)
Skilled Nursing Home (SNFs)	Resident Assessment Instrument (RAI) Minimum Data Set (MDS)
Home Health Agency (HHAs)	Outcome and Assessment Information Set (OASIS)
Hospice Care	Hospice Item Set (HIS)
Home and Community-Based Services (HCBS)	Functional Assessment Standardized Items (FASI)

Why are PIs a concern?

Pressure injuries (PIs) are a frequently occurring health problem in PAC settings and recognized as a serious medical condition. They are painful, costly and another preventable complication for which many individuals are at risk. No other preventable event occurs as frequently as PIs.^{7, 8}

Pressure Injuries (PIs) can diminish global life quality, contribute to rapid morbidity and mortality in aging populations and pose significant cost to health care organizations. Over 60,000 people die annually as a direct result of PIs.^{9,10,11}

PIs are a devastating life safety issue impacting individuals living in post-acute care (PAC) settings when their health may be very vulnerable. PIs typically result from prolonged periods of uninterrupted pressure on the skin, soft tissue, muscle, and bone.¹²

PIs interfere with activities of daily living and functional gains made during rehabilitation and are strongly associated with longer hospital and in-patient rehabilitation facility stays.^{13, 14}

	<p>Elderly Individuals living in PAC settings have a wide range of impairments or medical conditions that increase their risk of developing PIs, including but not limited to, impaired mobility or sensation, malnutrition or undernutrition, obesity, stroke, diabetes, dementia, cognitive impairments, circulatory and renal diseases, sepsis, spinal cord injuries and dehydration.^{15,16,17}</p> <p>PI Incidence and Prevalence</p> <p>Pressure Injuries associated with extreme discomfort (pain) often lead to serious life-threatening infections which substantially increases the total cost of care. Data statistics indicate 2.5 million individuals in the US develop pressure injuries each year.⁸</p> <p>PIs are high-cost events across the spectrum of health care settings, from acute hospitals to home health. PI incidence rates vary considerably by clinical setting: 9.7% in acute care; 11.6% in SNFs and NHs; 25.2% in LTCHs; and 12% in IRFs. PIs cost \$9.1-\$11.6 billion per year in the US. Cost of individual patient care ranges from \$20,900-151,700 per PI. Medicare estimates that each pressure injury added \$20,900-151,700 in costs to a hospital stay¹⁸ costing the health system \$26.8 billion a year.^{19, 20}</p> <p>Legal Costs Associated with Pressure Injuries</p> <p>PI litigation adds to the burden of healthcare costs. This is especially true in long-term care, where nearly 87% of PI verdicts and PI settlements against facilities are awarded to the plaintiffs. It is estimated that more than 17,000 lawsuits are related to pressure injuries annually.¹⁷ PIs are second most common after wrongful death. In litigation cases related to PIs, jury awards are highest for multiple causation factors. When awards were related to single causes, the highest awards were for that where inadequate nutrition was alleged.¹⁹⁻²² Most recently, states have passed legislation limiting malpractice awards which may help to control the financial burden.</p> <p>Length of individual stay and lack of therapy progress increases when PIs are present. Legal costs are high in cases with PIs and particularly so when inadequate nutrition is in question. In many cases, the causes of undernutrition are treatable. PI care requires prevention and treatment that includes a focused interprofessional health care team and holistic approach that will improve quality of care/quality of life and monitor for efficacy.</p>
<p>Key Definitions²³</p>	<p>Stage 1 Non-blanchable erythema</p> <p>Intact skin with a localized area of non-blanchable erythema, which may appear differently in darkly pigmented skin. Presence of blanchable erythema or changes in sensation, temperature, or firmness may precede visual changes. Color changes do not include purple or maroon discoloration; these may indicate deep tissue pressure injury.</p> <p>Stage 2 Partial thickness skin loss with exposed dermis</p> <p>Partial-thickness loss of skin with exposed dermis. The wound bed is viable, pink or red, moist, and may also present as an intact or ruptured serum-filled blister. Adipose (fat) is not visible and deeper tissues are not visible. Granulation tissue, slough and</p>

eschar are not present. These injuries commonly result from adverse microclimate and shear in the skin over the pelvis and shear in the heel. This stage should not be used to describe moisture associated skin damage (MASD) including incontinence associated dermatitis (IAD), intertriginous dermatitis (ITD), medical adhesive-related skin injury (MARS), or traumatic wounds (skin tears, burns, abrasions).

Stage 3 Full thickness skin loss

Full-thickness loss of skin, in which adipose (fat) is visible in the injury and granulation tissue and epibole (rolled wound edges) are often present. Slough and/or eschar may be visible. The depth of tissue damage varies by anatomical location; areas of significant adiposity can develop deep wounds. Undermining and tunneling may occur. Fascia, muscle, tendon, ligament, cartilage and/or bone are not exposed. If slough or eschar obscures the extent of tissue loss, this is an unstageable PI.

Stage 4: Full thickness tissue loss

Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage or bone in the injury. Slough and/or eschar may be visible. Epibole (rolled edges), undermining and/or tunneling often occur. Depth varies by anatomical location. If slough or eschar obscures the extent of tissue loss, this is an unstageable PI.

Unstageable Pressure Injury: Obscured full-thickness skin and tissue loss

Full-thickness skin and tissue loss in which the extent of tissue damage within the injury cannot be confirmed because it is obscured by slough or eschar. If slough or eschar is removed, a stage 3 or stage 4 PI will be revealed. Stable eschar (i.e., dry, adherent, intact without erythema or fluctuance) on the heel or ischemic limb should not be softened or removed.

Deep Tissue Pressure Injury: Persistent non-blanchable deep red, maroon or purple discoloration

Intact or non-intact skin with localized area of persistent non-blanchable deep red, maroon, purple discoloration or epidermal separation revealing a dark wound bed or blood-filled blister. Pain and temperature change often precede skin color changes. Discoloration may appear differently in darkly pigmented skin. This injury results from intense and/or prolonged pressure and shear forces at the bone-muscle interface. The wound may evolve rapidly to reveal the actual extent of tissue injury or may resolve without tissue loss. If necrotic tissue, subcutaneous tissue, granulation tissue, fascia, muscle or other underlying structures are visible, this indicates a full thickness PI (unstageable, stage 3 or stage 4). Do not use DTPI to describe vascular, traumatic, neuropathic, or dermatologic conditions.²³

<p>Nutritional Implications</p>	<p>Nutrition is defined as the “science of food, the nutrients and other substances therein, their action, interaction and balance in relation to health and disease, and the process by which the organism ingests, absorbs, transports, utilizes and excretes food substances”²⁴</p> <p>Malnutrition and Pressure Injuries</p> <p>Malnutrition is characterized by inadequate protein and energy intake that can result in loss of fat and muscle stores. Malnutrition can result in decreased quality of life, and increased morbidity and mortality. (https://www.andeal.org/topic.cfm?menu=6064) Malnutrition affects tissue tolerance²⁴ and protein calorie malnutrition (PCM) can reduce the body’s ability to maintain tissue integrity, prevent PI breakdown and restoring tissue.^{25,26} Suboptimal nutrition status interferes with the immune system, collagen synthesis and tensile strength impacting wound healing.</p> <p>Unintended weight loss (UWL) contributes to undernutrition and PCM. It can be caused by many factors including:</p> <ul style="list-style-type: none"> • depression; • chronic disease such as frailty and sarcopenia;²⁶ • poor dentition; • the inability to obtain food or to self-feed; and • treatments and medications that alter desire for food, anorexia, etc. <p>Individuals who are older and/or chronically ill may be at greater risk for a dangerous stress response, which results in hypermetabolism. Unintended weight loss is considered one of the major causes of malnutrition and PCM development.²⁶ Poor nutritional intake, and low body weight are associated with compromised wound healing.²⁷</p> <p>Injury, infection and inflammation leads to increased catabolism and loss of lean body tissue, which may trigger the body’s response to stress. This in turns leads to PCM and weight loss, which contribute to immune impairment, weakness, and increased risk of PI development. To reverse the body’s catabolic state and promote tissue synthesis, optimal nutrition is necessary.</p> <p>Obesity can be synonymous with an absence of nutrition support for wound healing, particularly for the critically ill and older adults. Sarcopenic obesity is a multifactorial disease resulting from sedentary lifestyle, aging and unhealthy diets. It is concurrent with inflammation, insulin resistance, and oxidative stress, which results in loss of lean muscle mass and increased fat mass and impacts PI healing.^{28, 29}</p> <p>The Global Leadership on Malnutrition (GLIM) criteria for identifying malnutrition in adults in healthcare settings consist of three phenotype characteristics (low BMI, weight loss and decreased muscle mass) and two etiologic characteristics (decreased food intake or assimilation and disease burden/inflammation). The presence of one phenotype and one etiologic characteristic is required to determine malnutrition.²⁴</p>
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The European Pressure Ulcer Advisory Panel (EPUAP), National Pressure Injury Advisory Panel (NPIAP), and Pan Pacific Pressure Injury Alliance (PPPIA) 2019 Prevention and Treatment of Pressure Injury Clinical Practice Guideline (CPG)¹² refers to malnutrition and undernutrition interchangeably and cites the Academy of Nutrition and Dietetics (Academy) and the American Society of Parenteral and Enteral Nutrition (ASPEN) recommendations for identifying malnutrition.³⁰

To identify clients/patients who exhibit characteristics of malnutrition in 2012, the Academy and ASPEN recommended that a standardized set of diagnostic characteristics be used to identify and document adult malnutrition in routine clinical practice. The consensus statement by the Academy and ASPEN identifies nutrition-related malnutrition as the presence of two or more or the following characteristics:

- insufficient energy intake;
- unintended weight loss;
- loss of muscle mass;
- loss of subcutaneous fat;
- localized or generalized fluid accumulation that may sometimes mask weight loss; and/or
- decreased functional status as measured by hand grip strength.

The inclusion of laboratory values, such as albumin and pre-albumin, to diagnosis malnutrition are not recommended. Serum proteins correlate with mortality and morbidity, are useful indicators of illness severity and help identify individuals at risk of developing malnutrition. Hepatic protein levels do not accurately measure nutritional repletion. Serum albumin and prealbumin are acute phase reactants and decreased levels are affected by hydration status, infection, inflammation that affects the liver.³⁰⁻³³

Nutrition Screening

CDR defines: “Nutrition Screening is the process of identifying and referring those individuals and populations who are at risk for nutrition-related problems, are appropriate for nutrition care services, and would benefit from the NCP (Nutrition Care Process)”.³⁴ The initial screen should be completed in acute care facility within 24 hours of admission using a validated screening tool specific for the setting and the population screened. Any trained healthcare professional may complete a nutrition screen.

Nutrition screening may also be performed when an individual has had a significant change in condition and when progress toward PI healing is not observed. The screening tool used should be quick and easy, acceptable and validated. The health care community should have a nutrition screening policy to identify the risk for malnutrition and make appropriate referrals to the registered dietitian nutritionist (RDN) for a comprehensive nutrition assessment. Referrals may also be made to other interprofessional team members, such as the physician, dentist, speech or

occupational therapist who may need to evaluate factors contributing to poor nutrition.

Validated Nutrition Screening tools include: Malnutrition Screening Tool (MST), Mini Nutrition Assessment – Short form (MNA), Malnutrition Universal Screening Tool (MUST), Short Nutrition Assessment Questionnaire (SNAQ), Nutrition Risk Screening Tool 2002, and the Canadian Nutrition Risk Screening Tool. The Academy’s Evidence Analysis study concluded that the MST was the only tool shown to be both valid and reliable for identifying undernutrition in adults in acute care, hospital-based and ambulatory care settings.³⁵

The MNA and the MUST are valid and reliable screening tools that are sensitive indication for PI risk.³⁶⁻³⁸ The Braden Scale for Predicting Pressure Sore Risk includes a nutrition component.

Nutrition Assessment

All individuals at risk for malnutrition based on the results of a validated nutrition screening process should be referred to an RDN to complete a comprehensive nutrition assessment in collaboration with the interprofessional team. Examples of the RDN collaborating with the interprofessional team include speech therapy consultation for chewing and/or swallowing problems, or occupational therapy to address self-feeding concerns.

The nutrition assessment is the starting point in preparation to treat or manage a client/patient with PI(s). Assessment is the first step of a four-step methodology by which the RDN/nutrition and dietetics technician, registered (NDTR) team collaborate to collect individual data, think critically, and evaluate the body’s response to a lifetime of eating and make decisions on appropriate interventions. The Academy’s Nutrition Care Process (NCP) includes: nutrition assessment, nutrition diagnosis, nutrition intervention, and nutrition monitoring and evaluation.^{34,39}

The RDN should interview the individual/family to determine food preferences, goals and acceptance of nutrition interventions. A comprehensive nutrition assessment tool for the prevention or treatment of PIs should include a review of the five domains within Nutrition Assessment:

- **Food and Nutrition-Related History:** Adequacy of food/fluid intake compared to needs (both in recent history and current), barriers to achieving optimal nutrition, including chewing/swallowing, GI issues, food preferences. Review of current, oral nutrition supplements or nutrition support.
- **Anthropometric Measurements:** Height, weight, history, unintended weight loss (UWL) (>5% in 30 days or >10% in 180 days), insidious weight loss, usual weight, weight changes (lost or gained), Body Mass Index (BMI), body composition
- **Biochemical Data, Medical Tests, and Procedures:** Review all current laboratory values, such as electrolytes and glucose levels, and medical tests such as dysphagia evaluations

- **Nutrition-Focused Physical Findings:** Determine nutrient deficiencies, malnutrition and dehydration. Review findings, such as oral cavity for signs of poor oral health or malnutrition, upper and lower torso for muscle loss and diminished function and hand grip strength
- **Client History:** review of validated nutrition screening tool, medical and social history, adequacy of food intake, and social implications, cognitive function, including ability to eat independently

Nutrition Diagnosis

The RDN writes the nutrition diagnosis using the PES statement. The problem (P) describing the alteration in the individual’s nutrition; the etiology (E) linked to the diagnosis; and “as evidenced by” signs and symptoms (S).

Nutrition Interventions (Care Planning)

The RDN in consultation with the interprofessional team (including, but not limited to a physician, nurse, speech pathologist, occupational therapist, physical therapist, and dentist and nursing staff) should develop and document an individualized nutrition intervention plan based on the individual’s nutritional needs, preferences, and goals for care as determined by the nutrition assessment and individual/family discussions. The plan includes the use of clinical judgment based on a thorough medical and nutritional assessment to make the appropriate individualized recommendations.

Suggested Food/Nutrient Delivery Considerations:

- Provide preferred food/fluid (i.e., cultural, ethnic, religious)
- Individualize diet to least restrictive
- Incorporate nutrient dense foods at mealtime
- Provide high calorie, high protein oral nutritional supplements (ONS) between meals
- Consider offering high calorie, high protein ONS fortified with arginine, zinc and antioxidants to individual with stage 2 or greater Pls ¹²
- Consider modular protein supplements (whey, hydrolyzed collagen or soy)
- Vary type of food supplements offered to prevent taste fatigue
- Monitor hydration status and offer fluids based on individual’s clinical condition
- Offer choices of what to eat, when to eat and where to eat
- Provide positive dining experience
- Provide assistance at mealtime, if needed
- Weigh weekly or per policy
- Provide opportunity to eat with compatible companions

Monitoring and Evaluation

The nutrition care plan should be adjusted and updated with each change in the client/patient clinical condition. Monitor all interventions including:

- Improving and/or maintaining overall nutritional status
- Acceptance of interventions

- Clinical outcomes including PI status toward healing
- Consider alternate method of feeding if oral intake is inadequate; intervention must be consistent with individual's wishes and goals of care
- Provide parenteral nutrition for non-functioning GI tract, must be based on individual's goals and preferences

Energy Needs

Energy needs for individuals with PIs must be adequate to promote healing and improve or stabilize nutritional status. The clinical practice guideline (CPG) recommends 30-35 kcal/kg body weight for adults with pressure injuries who are malnourished or at risk of malnutrition.¹² The Trans-Tasman Dietetic Wound Care guidelines for adults with PIs recommends 30-35 kcal/kg body weight for individuals with moderate to high risk of delayed healing due to nutritional concerns.⁴⁰ Guideline by the European Society for Clinical Nutrition and Metabolism also recommended 30-35 kcal/kg body weight for nutritional support for most chronic conditions in individuals at risk of malnutrition.⁴¹

Receiving and consuming adequate calories is critical to support collagen and nitrogen synthesis promoting anabolism thus sparing protein from use as an energy source. Fat is the most concentrated source of energy and is stored in the adipose tissue and cushions bony prominences, and transports fat soluble vitamins A, D, E, and K. PI healing is compromised if the body is forced to degrade carbohydrate and fat to glucose for energy. Lean body mass is also depleted by this process.⁴²

Provision of sufficient caloric requirements should be based on achieving individualized nutritional goals, including adjusted energy needs for the critically ill and obese individual. Energy needs are currently assessed using several predictive formulas. The Academy's Evidence Analysis Work Group evidence analysis project concluded the Mifflin-St. Jeor Equation was the most reliable, predicting resting energy expenditure (REE) within 10% of measured in non-obese and obese individuals than any other equation. If available, indirect calorimetry is a more accurate measure of energy expenditure, but the cost may be prohibitive in many settings.⁴³

Protein Intake

Protein is essential for promoting positive nitrogen balance. Increased protein levels have been linked to improved healing rates. Clinical judgment is required to determine the appropriate level of protein for each individual based on the number of and severity of PIs, overall nutritional status, co-morbidities and tolerance to nutrition interventions. The CPG recommends 1.25 to 1.5 g/kg/day based on actual for adults with a PI who are malnourished or at risk for malnutrition. When oral intake is not sufficient to meet the caloric and/or protein requirements, fortified foods and/or ONS should be considered.¹²

Protein provided should be of high biological value. When increasing protein intake, it is important to ensure that adequate fluids are consumed due to the additional renal nitrogen load. Renal functional should be assessed to ensure tolerance to higher protein levels.

Individualized Nutrition Approaches

Caloric needs are ideally met by a healthy diet; however, some individuals are unable or unwilling to consume an adequate diet. Overly restricted therapeutic diets may make food unpalatable and unappealing, reducing intake. The Academy's position statement indicates that quality of life and nutritional status of older adults in long-term care, post-acute and other settings can be enhanced by individualized nutrition approaches.⁴⁴

The Academy advocates the RDN, as part of the interprofessional team, assess and recommend individualized nutrition interventions based on the individual's medical condition, preferences, and their right to make health care choices.⁴⁴ For example, an individual with a stage 2 PI may not find their diabetic/low cholesterol/low sodium diet appealing. As a result, their intake drops to an inadequate amount leading to undernutrition and slowed healing process. Based on the RDN's assessment and the individual's choice, the diet can be individualized to a regular diet. Monitoring individual food and fluid intake is key to ensuring the individual is ingesting estimated calorie and nutrient needs.

Oral Nutritional Supplements

Based on research, ONS and/or fortified foods are successful interventions for older adults to reverse unwanted weight loss and increase poor caloric intake. However, there is inconclusive evidence on the provision of ONS to prevent PIs. When an individual is at risk for PIs and the diet is not meeting energy needs, it is good clinical practice to provide ONS. Based on the significant evidence on the positive effect of offering ONS to individuals with PIs, the CPG recommends offering high calorie, high protein ONS to adults with PI who are malnourished or at risk of malnutrition whose nutrition requirements cannot be achieved by normal oral intake.¹²

Amino acids are the building blocks of protein. Specific amino acids such as arginine become provisional essential amino acids during periods of severe stress such as trauma, sepsis and/or PIs. There is sufficient research to support the inclusion of high calorie, high protein and arginine, zinc and antioxidants ONS or enteral formula for adults with stage 2 or greater PIs who are malnourished at risk of malnutrition.^{12,45, 46, 47} There is no research supporting supplementation of arginine alone but rather it is effective when combined with macro and micronutrients.

Enteral/parenteral support when intake is inadequate

Food and the enjoyment of eating play important social, religious, biological and symbolic roles in most cultures. If oral intake is inadequate, there is adequate research to support recommending nutrition support for individuals with PIs. The CPG recommends discussing the risk and benefits of nutrition support with the individual

and caregivers to support PI healing and goals of care if nutrition support is consistent with patient preferences.¹² Enteral nutrition is the preferred route if the gastrointestinal tract is functional.

Pneumonia, febrile episodes, and eating problems are frequent complications in individuals with advanced dementia. When considering the use of tube feeding in older adults with advanced dementia, the preponderance of evidence does not support its use. In observational studies, tube feeding has not been shown to prevent aspiration, heal pressure wounds, improve nutritional status, or decrease mortality in persons with advanced dementia.⁴⁸ Both researchers and expert opinion support hand feeding as the recommended standard practice for older adults with advanced dementia.⁴⁹

Hydration

Hydration needs must be met to assure proper prevention and healing of PIs. Dehydration is a risk factor for PI development (due to its effect on blood volume, circulation and skin turgor). Wounds heal more quickly if the individual is well hydrated. Fluid serves as a solvent for vitamins, minerals, glucose and other nutrients and transports nutrients and waste products through the body.

Total fluid intake includes the water content of food which accounts for up to 20% of total fluid intake. Oral nutritional supplements and enteral feedings are generally 75% water.

For prevention and healing of PIs, the recommendation is to provide adequate fluid. Clinicians should monitor the individuals' hydration status, checking for signs and symptoms of dehydration, such as changes in weight, skin turgor, urine output, elevated serum sodium or calculated serum osmolality.

For treatment of PIs, the CPG recommends calculating fluids as 1 ml fluid intake per calorie/day. The CPG states to provide and encourage adequate water intake for hydration for adults at risk or with a PI when consistent with goals of care and clinical condition.¹² In healthy individuals, hydration needs should be 30 ml/kg/body weight.

Individuals consuming high levels of protein require additional fluid. Elevated temperatures, vomiting, profuse sweating, diarrhea, heavily draining wounds and/or use of an air fluidized bed that elevates the body temperature increase fluid needs. Fluid needs decrease for CHF, and renal failure. The RDN calculates individual fluid requirements and determines necessary interventions.

Vitamins and Minerals

The National Academy of Sciences, Institute of Medicine, and Food and Nutrition Board Dietary Intakes indicate the level of each micronutrient needed at each stage of life.⁵⁰ Most nutrient needs can be met through a healthy diet. However, individuals with PI may not be consuming an adequate diet to meet established nutritional reference standards and should be provided a multivitamin with minerals.¹²

Ascorbic acid/Vitamin C, a water-soluble vitamin, is a cofactor with iron during the hydroxylation of proline and lysine in the production of collagen. A deficiency can be associated with impaired fibroblastic function and decreased collagen synthesis which can result in delayed healing of a PI. Ascorbic acid deficiency is associated with impaired immune function, which decreases the ability to fight infection.⁵¹ Based on the lack of evidence to support mega doses of vitamin C, or any other vitamin or mineral, to improve PI healing, the 2019 CPG nutrition work group did not address micronutrients.¹²

Vitamin A is a fat-soluble vitamin responsible for epithelium maintenance. During the inflammatory phase, it increases the number of macrophages and monocytes in the wound and stimulates cellular differentiation in fibroblasts and collagen formation.⁵²

Coenzymes (B vitamins) are necessary for production of energy from glucose, amino acids, and fat. Pyridoxine (vitamin B₆) is significant for maintaining cellular immunity and forming red blood cells.

Zinc is a mineral that functions as an antioxidant and is associated with collagen formation, synthesis of protein, DNA and RNA, and cell proliferation. Zinc is transported by albumin. When albumin declines, zinc absorption declines. Zinc deficiency may cause loss of appetite, abnormal taste, and impaired immune function and wound healing. No research has demonstrated that zinc supplementation >40 mg improves PI healing. High dosages of zinc supplementation are not recommended. High serum zinc levels may inhibit healing and interfere with copper stores because they both compete for binding sites on the albumin molecule.

Copper is essential for preserving the strength of the skin, blood vessels, and epithelial and connective tissue throughout the body.

Iron is needed for hemoglobin, collagen formation, and oxygen transport.⁴⁶

Individuals who consume a diet low in nutrient rich foods, or individuals with poor nutrient absorption or metabolism may not be consuming an adequate diet to meet established nutritional reference standards. Clinicians should review any vitamin/mineral supplements, enteral formulas, ONS or fortified food, which usually contain additional micronutrients.

Ethical and Clinical Implications for Practice

The debate over the use of artificial nutrition and hydration (ANH) remains controversial although scientific and medical facts are unequivocal.⁵³ ANH is a medical treatment based on evidence, a therapeutic goal, and the will (consent) of the patient, family member or surrogate decision maker.⁵³ The Code of Ethics for the Nutrition and Dietetics Profession states the RDN can participate in ethical decisions for feeding, including providing, withholding or withdrawing ANH.^{54,55} The nutrition and dietetics technician, registered (NDTR) works under the clinical supervision of the RDN. The

	<p>RDN, supported by evidence-based practices, works collaboratively as part of an interprofessional health care team and utilizes a patient-/resident-/family-centered care approach.⁵⁶ RDNs and NDTRs support and promote high standards of professional practice.⁵⁶</p> <p>Malnutrition and dehydration, caused by the lack of proper nutrition and fluids, can lead to infections, confusion, and muscle weakness. These symptoms can result in immobility, pressure injuries, and a weak immune system.³² Early nutrition interventions can help to prevent and/or delay undernutrition/malnutrition and the impact on PI risk and delayed healing. For individuals at the end of life (receiving hospice or palliative care), nutrition interventions must be weighed against the burdens of care and individual preferences. Individuals have the right to request or refuse nutrition and hydration as medical treatment.⁵⁵⁻⁵⁶</p> <p>It is the Academy’s position⁴⁴ to recognize:</p> <ul style="list-style-type: none"> • Each person approaches end of life with diverse cultural religious, philosophical and personal values. • The individual’s desire is the primary guide for treatment and generally takes precedence over the beliefs or wishes of health care providers. <p>The individual’s unique values and personal decisions affirms the individual’s right to self-determination as the overriding principle.</p>
<p>Outcomes/ Measures</p>	<p>The Changes in Skin Integrity PAC: Pressure Injury Measure reports the percent of quality episodes with reports of stage 2-4 pressure injuries/ulcers, or unstageable pressure injuries/ulcers due to slough/eschar, non-removable dressing/device, or deep tissue injury, that were not present or were at a lesser stage on start of care/resumption of care. The measure is intended to encourage HHAs, IRFs, SNFs, and LTCHs:</p> <ul style="list-style-type: none"> • To prevent pressure injury development or worsening. • To closely monitor and appropriately treat existing pressure injuries. <p>The Facility Quality Improvement Organization (QIO) may include outcomes/measures:</p> <ul style="list-style-type: none"> • To prevent changes in skin integrity (Pressure Injury) development through early identification of individuals at risk, using evidence-based prevention methods and systems to ensure adequate nutrition, i.e., develop facility pressure injury protocol and guidelines. • To prevent PI worsening through a facility developed monitoring/evaluation system. • To develop a staff training program on prevention and treatment of pressure injuries.
<p>Recommendations</p>	<p>Utilize the EPUAP, NPIAP, PPIA 2019 Clinical Practice Guidelines which summarizes the supporting evidence for PI prevention and treatment.¹²</p>

	<p>Each undernourished individual should be screened and assessed for nutritional risk at admission using reliable validated tools with a referral made to a RDN with the assistance of a NDTR per policy/protocol.</p> <p>Develop an individualized care plan for individuals with or at risk of pressure injury.</p> <p>Adequate calories, proteins, fluids, vitamins, and minerals are required by the body for maintaining tissue integrity and preventing tissue breakdown.</p> <p>Overly restricted diets may make food unpalatable, unappealing, and reduce intake. For individuals not taking in their assessed needs, diet liberalization, oral nutritional supplements (ONS), fortified food and/or nutrient dense food may be considered.</p> <p>If oral intake is inadequate, consider enteral or parenteral nutrition, if consistent with the individual and family wishes. If the gastrointestinal tract is functioning, enteral nutrition (tube feeding) is the preferred route.</p> <p>Other suggestions include offering ONS between meals for better assimilation and assessing renal function due to higher levels of protein.</p> <p>Daily administration of a therapeutic vitamin and mineral supplement may be considered if poor oral intake or deficiencies are suspected.</p> <p>The goal for end-of-life wound care is comfort for the individual and quality of life without the obvious intent of healing.</p> <p>PI treatment and prevention requires an interprofessional health team approach to care.</p> <p>In critically ill individuals, laboratory values such as albumin, prealbumin may not reflect the current nutritional state.</p> <p>Individual/caregiver education is an important piece of pressure injury prevention and treatment.</p>
<p>Additional Links</p>	<ul style="list-style-type: none"> • Agency for Healthcare Research and Quality: https://www.ahrq.gov/patient-safety/settings/hospital/resource/pressureinjury/tool/index.html • Centers for Medicare and Medicaid Services: http://www.cms.hhs.gov/ • NPAUP, EPUAP, PPIIA website: http://www.internationalguideline.com/ • The Society for Post-Acute and Long-Term Care Medicine: https://paltc.org • CMS Quality Improvement Organizations: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-instruments/qualityimprovementorgs

In this Measure Domain, the CDR has chosen to use the term RDN to refer to both registered dietitians (RD) and registered dietitian nutritionists (RDN) and to use the term NDTR to refer to both dietetic technician, registered (DTR) and nutrition and dietetics technician, registered (NDTR).

References

1. Centers for Medicare & Medicaid Services. Specifications for HHA QRP Quality Measures: Function, Falls, and Changes in Skin Integrity. Submitted by ABT Associates: July 25, 2019. Accessed July 18, 2023. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HomeHealthQualityInits/Downloads/Home-Health-QRP_Measure-Specifications_Function_Falls_Skin-Integrity.pdf. Accessed June 23, 2022.
2. CMS. Skilled Nursing Facility Quality Reporting Program-Specifications for Percent of Residents or Patients with Pressure Ulcers that are New or Worsened (NQF #0678). August 2016. Accessed July 18, 2023. https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/Downloads/SNF-QRP-Measure-Specifications_October-2016.pdf#:~:text=The%20Improving%20Medicare%20Post-Acute%20Care%20TransformationAct%20%28IMPACT%20Act%29%2C,Care%20Hospitals%20%28LTCHs%29%2C%20and%20Inpatient%20Rehabilitation%20Facilities%20%28IRFs%29.
3. CMS. Impact Act of 2014 Data Standardization & Cross Setting Measures. Accessed July 18, 2023. <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/IMPACT-Act-of-2014/IMPACT-Act-of-2014-Data-Standardization-and-Cross-Setting-Measures>
4. CMS. Impact Act Standardized Patient Assessment Data Elements. Accessed July 18, 2023. <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Post-Acute-Care-Quality-Initiatives/IMPACT-Act-of-2014/-IMPACT-Act-Standardized-Patient-Assessment-Data-Elements>.
5. CMS. Meaningful Measurers Initiative. Accessed July 18, 2023. <https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/QualityInitiativesGenInfo/CMS-Quality-Strategy>.
6. CMS. CMS Data Element Library Fact Sheet. Accessed July 18, 2023. <https://www.cms.gov/newsroom/fact-sheets/cms-data-element-library-fact-sheet>.
7. Casey G. Pressure ulcers reflect quality of nursing care. *Nurse N Z* 2013 Nov. 19(10):20-2 https://www.researchgate.net/publication/259764559_Pressure_ulcers_reflect_quality_of_nursing_care
8. Saghaleini S, Dehghan K, Ostadi Z. Pressure ulcer and Nutrition. *Indian J Crit Care Med* 2018;22(4): 283-289. DOI: 10.4103/ijccm.IJCCM_277_17
9. Thomas JM, Cooney LM Jr, Fried TR. Systematic review: health-related characteristics of elderly hospitalized adults and nursing home. residents associated with short-term mortality. *J Am Geriatric Soc.* 2013;61(6): 902-911.
10. Gorecki C, Nixon J, Madill A, Firth J, Brown JM. What influences the impact of pressure ulcers on health-related quality of life? A qualitative patient-focused exploration of contributory factors. *Journal of Tissue Viability.* 2021;21(1): 3-12.
11. Gorzoni ML, Pires SL. Deaths in nursing homes. *Rev Assoc Med Bras.* 2011;57(3):325-331.

12. European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and Treatment of Pressure Ulcers/Injuries: Quick Reference Guide. Emily Haesler (Ed.). EPUAP/NPIAP/PPPIA: 2019. <https://internationalguideline.com/2019>
13. Michel JM, et al. As of 2012, what are the key predictive risk factors for pressure ulcers? Developing French guidelines for clinical practice. *Ann Phys Rehabil Med.* 2012; 55(7): 454-465.
<https://doi.org/10.1016/j.rehab.2012.08.003>
14. Wang H, Niewczyk P, Divita M, Camicia M, Appelman J, Mix J, Sandel ME. Impact of Pressure ulcers on outcomes in inpatient rehabilitation facilities. *Am J Phys Med Rehabil.* 2014; 93(3):207-216.
15. Jaul E, Barron J, et al. An overview of co-morbidities and the development of pressure ulcers among older adults. *BMC Geriatrics.* 2018;18:305.
16. Cai S, et al. Obesity and pressure ulcers among nursing home residents. *Med Care.* 2013; 51(6): 478-486.
17. Dejong G, et al. Factors associated with pressure ulcer risk in spinal cord injury rehabilitation. *Am J Phys Med Rehabil.* 2014; 93(11):971-986.
18. National Pressure Injury Advisory Panel. Pressure Injury Fact Sheet. Accessed July 18, 2023. <https://npiap.com/store/viewproduct.aspx?id=14427618&hhSearchTerms=%22fact+and+sheet%22>
19. Morse SJ. Pressure ulcers cost the health system \$26.8 billion a year. *Healthcare Finance*; October 10, 2019. Accessed July 18, 2023. <https://www.healthcarefinancenews.com/news/pressure-ulcers-cost-health-system-268-billion-year#:~:text=Nationally%2C%20the%20U.S.%20spends%20about%20%2426.8%20billion%20a,patient%20harm%20in%20a%20care%20facility%2C%20Burns%20said.>
20. Law AL, Krebs B, Karnik B, Griffin L. Comparison of healthcare costs associated with patients receiving traditional negative pressure wound therapies in the post-acute setting. *Cureus.* 2020; 12(11): e11790.
21. Legal implication of pressure injuries/ulcers: what clinicians need to know.2018:(October 18). WoundSource Practice Accelerator Program on Pressure Injury/Ulcer Prevention. Accessed July 18, 2023. [https://www.woundsource.com/blog/legal-implications-pressure-injuriesulcers-what-clinicians-need-know.](https://www.woundsource.com/blog/legal-implications-pressure-injuriesulcers-what-clinicians-need-know)
22. Fife CE. Pressure Injuries: The legal implications of pressure injuries. *Today's Wound Clinic*; 2020;14(10). Accessed July 18, 2023. <https://carolinefifemd.com/2020/10/07/the-legal-implications-of-pressure-injuries/>
23. National Pressure Injury Advisory Panel: Pressure Injury Stages. Accessed July 18, 2023. <https://npiap.com/general/custom.asp?page=PressureInjuryStages>
24. Jensen GL, Cederholm T, et al. GLIM criteria for the diagnosis of malnutrition: a consensus report from the global clinical nutrition community. *JPEN J Parenter Enteral Nutr.* 2019;43(1):32-40. DOI: 10.1002/jpen.1440
25. Malone A, Hamilton C, The Academy of Nutrition and Dietetics/The American Society for Parenteral and Enteral Nutrition consensus malnutrition characteristics: application in practice. *Nutr Clin Pract.* 2013;28(6):630-650.
26. Cubbin B, Barazzoni B, Austin P, et al. ESPEN guidelines on definition and terminology of clinical nutrition. *Clin Nutr.* 2017;36:49-64.
27. Fry DE, Pine M, Jones BL Meimban RJ. Patient characteristics and the occurrence of never events. *Archives of Surgery.* 2010; 145(2): 148-151. [10.1001/archsurg.2009.277](https://doi.org/10.1001/archsurg.2009.277)

28. Polyzos SA, Margioris S, Sarcopenic obesity. *Hormones (Athens)*. 2018;17(3):321-331.
<https://doi.org/10.1007/s42000-018-0049-x>
29. Munoz N, Litchford M, Cox J, et al. Malnutrition and pressure injury risk in vulnerable populations: application of the 2019 International Clinical Practice Guideline. *Adv Skin Wound Care*. 2022;35(3):156-165.
30. White JV, Guenter P, Jensen G, et al. Consensus statement of the Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition: characteristics recommended for the identification and documentation of adult malnutrition (undernutrition). *J Acad Nutr Diet*. 2012;112(5):730-738.
31. Ferguson RP, O'Connor P, Crabtree B, Batchelor A, Mitchell J, Coppola D. Serum albumin and prealbumin as predictors of clinical outcomes of hospitalized elderly nursing home residents. *J Am Geriatr Soc*. 1993;41(5):545-549.
32. Shenkin A. Serum prealbumin: Is it a marker of nutritional status or of risk of malnutrition? *Clin Chem*. 2006; 52(12):2177-2179.
33. Fuhrman MP, Charney P, Mueller CM. Hepatic proteins and nutrition assessment. *J Am Diet Assoc*. 2004; 104(8):1258-1264.
34. Commission on Dietetic Registration. Definition of Terms List. Accessed July 18, 2023.
<https://www.cdrnet.org/definitions>
35. Skipper A, Coltman A, Tomesko J, et al. Adult malnutrition (undernutrition) screening: an evidence analysis center systematic review. *J Acad Nutr Diet*. 2020;120(4):669-708.
36. Langkamp-Henken B, Hudgens J, Stechmiller JK, et al. Mini nutritional assessment and screening scores are associated with nutritional indicators in elderly people with pressure ulcers. *J Am Diet Assoc*. 2005;105(10):1590-1596.
37. Grattagliano J, Marasciulo L, Paci C, et al. The assessment of the nutritional status predicts the long term risk of major events risk in older individuals. *Eur Geriatr Med*. 2017;8(3):273-274.
<https://doi.org/10.1016/j.eurger.2017.03.002>
38. Tsaousi G, Stavrou G, Ioannidis A, et al. Pressure ulcer and malnutrition: results from a snapshot sampling in a university hospital. *Med Princ Pract*. 2015;24(1):11-16.
39. Swan WI, Vivanti A, Hakel-Smith NA, et al. Nutrition care process and model update: Toward realizing people-centered care and outcomes management. *J Acad Nutr Diet*. 2017;117(12):2003-2014.
40. Trans Tasman Dietetic Wound Care Group. Evidence based practice guidelines for the dietetic management of adults with pressure injuries. 2011. Accessed July 18, 2023.
<https://scirp.org/reference/referencespapers.aspx?referenceid=714724>
41. Bozzetti F, Forbes A. The ESPEN clinical practice guidelines on parenteral nutrition: present status and perspectives for future research. *Clin Nutr*. 2009; 28(4):359-364.
42. Munoz N, Posthauer ME. Nutrition strategies for pressure injury management: implementing the 2019 international clinical practice guideline. *Nutr Clin Pract*. 2022;37(3):567-582.
<https://doi.org/10.1002/ncp.10762>
43. Frankenfield D, Roth-Yousey L, Compher C. Comparison of predictive equations for resting metabolic rate in healthy non obese and obese adults: a systematic review. *J Am Diet Assoc*. 2005; 105(5):775-789.

44. Dorner B, Friedrich EK. Position of the Academy of Nutrition and Dietetics: Individualized Nutrition Approaches for Older Adults: Long-Term Care, Post-Acute Care and Other Settings. *J Acad Nutr Diet.* 2018;118(4):724-735. <https://doi.org/10.1016/j.jand.2018.01.022>
45. van Anholt RD, Sobotka L, Meijer EP, et al. Specific nutritional support accelerates pressure ulcer healing and reduces wound care intensity in non-malnourished patients. *Nutrition.* 2010;26(9):867-872.
46. Cereda E, Klersy C, Seriola M, et al. A nutritional formula enriched with arginine, zinc, and antioxidants for the healing of pressure ulcers: a randomized trial. *Ann Intern Med.* 2015;162(3):167-174.
47. Cereda E, Klersy C, Andreola M, et al. Cost-effectiveness of a disease-specific oral nutritional support for pressure ulcer healing. *Clin Nutr.* 2017; 36(1): 246-252.
48. Sampson EL, Candy B, Jones L. Enteral tube feeding for older people with advanced dementia. *Cochrane Database Systematic Reviews.* 2009; Issue 2:CD007209. DOI: 10.1002/14651858.CD007209.pub2.
49. American Geriatrics Society feeding tubes in advanced dementia position statement. *J Am Geriatr Soc.* 2014;62(8):1590-1593.
50. Office of Dietary Supplements, National Institutes of Health. Nutrient Recommendations and Databases. Accessed July 18, 2023. <https://ods.od.nih.gov/HealthInformation/nutrientrecommendations.aspx>
51. Moores J. Vitamin C: a wound healing perspective. *Br J Community Nurs.* 2013;18 (Suppl 12): S6,S8-S11. <https://doi.org/10.12968/bjcn.2013.18.Sup12.S6>
52. Wild T, Rahbamia A, Killner M, Sobotka L, Eberlein T. Basics in nutrition and wound healing. *Nutrition.* 2010;26(9): 862-866.
53. Druml C, Ballmer PE, Druml W, et al. ESPEN guideline on ethical aspects of artificial nutrition and hydration. *Clin Nutr.* 2016; 35(3): 545-556.
54. 2018 Code of Ethics for the Nutrition and Dietetics Profession. Academy of Nutrition and Dietetics (Academy)/Commission on Dietetic Registration (CDR). Accessed July 18, 2023. <https://www.cdrnet.org/codeofethics>
55. Schwartz DB, Posthauer ME, O'Sullivan Maillet J. Advancing nutrition and dietetics practice: dealing with ethical issues of nutrition and hydration. *J Acad Nutr Diet.* 2021;121(5)823-830.
56. Schwartz DB. Ethical decisions for with-holding/withdrawing medically assisted nutrition and hydration. *J Acad Nutr Diet.* 2015;115(3):440-443. [10.1016/j.jand.2015.01.002](https://doi.org/10.1016/j.jand.2015.01.002)

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This measure domain was reviewed for clinical updates by members of the Dietitians in Health Care Communities Dietetic Practice Group of the Academy of Nutrition and Dietetics in 2022.