Optimizing Nutrition Interventions for Effective Prevention and Treatment of Pressure Injuries:

Fostering a Collaborative Healthcare Team Approach

Supported by an educational grant from Abbott Nutrition

Faculty

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Faculty Disclosures

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- **Anna de Jesus, MBA, RDN**
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  Research: Medtrition, Inc.; Speakers Bureau: Abbott Nutrition

Disclosures

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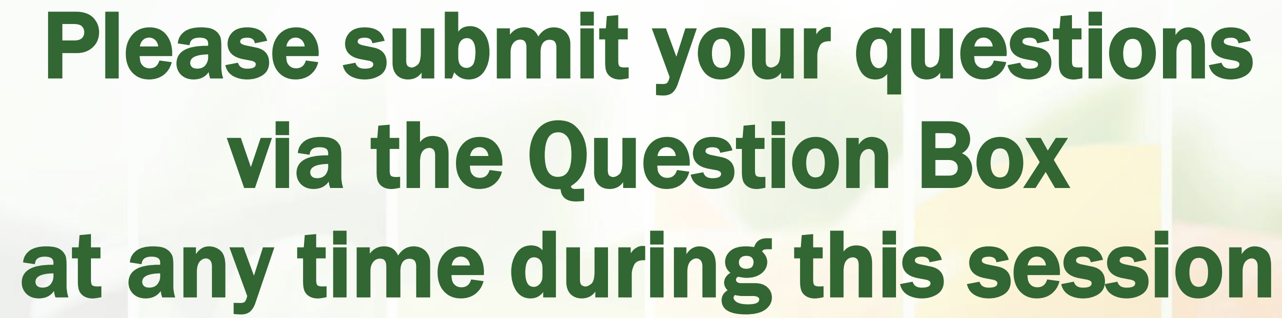

Please submit your questions
via the Question Box
at any time during this session

Learning Objectives

- Apply evidence-based guidelines to integrate nutrition interventions effectively in the prevention and treatment of pressure injuries (PIs)
- Compare the costs of oral nutritional supplementation (ONS) in PI treatment to demonstrate the economic benefits of early nutritional intervention
- Evaluate the impact of nutrition screening, assessment, and intervention as essential strategies within the healthcare team for preventing and treating PIs
- Implement a collaborative healthcare team approach that optimizes nutritional management to prevent PIs and enhance healing of existing wounds

PI = pressure injury; ORS = oral nutrition supplementation.

Nutrition Interventions in PI Prevention and Treatment: The Evidence is Here

Anna de Jesus, MBA, RDN

President, Food and Nutritional Solutions, LLC

Treasurer, National Pressure Injury Advisory Panel (NPIAP)

Tempe, AZ

The Evidence Is Here

Supporting Evidence:

- **Recommendations** are based on analysis of evidence from Tiers 1 (systematic review with meta-analysis), 2 (systematic review without meta-analysis) and 3A (randomized controlled trials).
- **Good Practice Statements** are designed to fill gaps in areas of practice not addressed by Tiers 1, 2, and 3A research. They are often supported by evidence from other study designs (3B and 3C) and the clinical expertise of Panel Group members and stakeholders. **When supported by Tier 3 evidence, Good Practice Statements are comparable to the evidence-based recommendations in the 2019 Guideline that were rated with B1, B2 or C Strength of Evidence.**

Recommendations and Good Practice Statements (GPS): Together, Recommendations and Good Practice Statements provide a comprehensive approach to "what to do" for individuals at risk for pressure injuries.

Implementation Considerations (in the full CPG and on the interactive guideline website) provide additional guidance on "how, when and under what conditions to" implement/or not implement a recommendation or GPS. Implementation Considerations also include practical guidance to address

Living Guideline: As new evidence becomes available and is analyzed, updates will be posted.

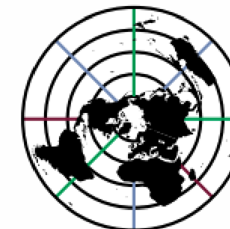
Prevention and Treatment of Pressure Ulcers/Injuries:

Quick Reference Guide Prevention Recommendations

The International Guideline

Fourth edition

Abridged early version



25 February 2025

National Pressure Injury Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. *Prevention and Treatment of Pressure Ulcers/Injuries: Quick Reference Guide. The International Guideline: Fourth Edition*. Emily Haesler (Ed.). 2025. [cited: May 26, 2025]. Available from: https://internationalguideline.com

Nutrition in PI Prevention: 2025 International Guidelines

Screening is associated with reduction of PI rates and decreased length of stay (LOS) due to faster nutritional interventions when patients who are at nutritional risk are identified.

Good Practice Statement

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

Good Practice Statement

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

LOS = length of stay.
https://internationalguideline.com/nutrition

Resource:
Nutrition Screening Tools for Adults

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

- Canadian Nutrition Screening Tool
  albertahealthservices.ca
- Malnutrition Screening Tool
  health.qld.gov.au
- Mini Nutritional Assessment® Full Version
  mna-elderly.com
- Malnutrition Universal Screening Tool
  hdft.nhs.uk
- Nutrition Risk Screening (2002)
  health.qld.gov.au
- Rapid Screen
- Short Nutrition Assessment Questionnaire
  grespen.org
- Seniors in the Community: Risk Evaluation for Eating and Nutrition
  olderadultnutritionscreening.com/faq/
- Subjective Global Assessment Tool
  health.qld.gov.au

Last name: First name:
Sex: Age: Weight, kg: Height, cm: Date:

Complete the screen by filling in the boxes with the appropriate numbers.
Add the numbers for the screen. If score is 11 or less, continue with the assessment to gain a Malnutrition Indicator Score.

Screening

A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?
0 = severe decrease in food intake
1 = moderate decrease in food intake
2 = no decrease in food intake

B Weight loss during the last 3 months
0 = weight loss greater than 3kg (6.6lbs)
1 = does not know
2 = weight loss between 1 and 3kg (2.2 and 6.6 lbs)
3 = no weight loss

C Mobility
0 = bed or chair bound
1 = able to get out of bed / chair but does not go out
2 = goes out

D Has suffered psychological stress or acute disease in the past 3 months?
0 = yes 2 = no

E Neuropsychological problems
0 = severe dementia or depression
1 = mild dementia
2 = no psychological problems

F Body Mass Index (BMI) = weight in kg / (height in m)^2
0 = BMI less than 19
1 = BMI 19 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater

Screening score (subtotal max. 14 points)
12-14 points: Normal nutritional status
8-11 points: At risk of malnutrition
0-7 points: Malnourished
For a more in-depth assessment, continue with questions G-R

Assessment

G Lives independently (not in nursing home or hospital)
1 = yes 0 = no

H Takes more than 3 prescription drugs per day
0 = yes 1 = no

I Pressure sores or skin ulcers
0 = yes 1 = no

J How many full meals does the patient eat daily?
0 = 1 meal
1 = 2 meals
2 = 3 meals

K Selected consumption markers for protein intake
- At least one serving of dairy products (milk, cheese, yoghurt) per day yes no
- Two or more servings of legumes or eggs per week yes no
- Meat, fish or poultry every day yes no

0.0 = if 0 or 1 yes
0.5 = if 2 yes
1.0 = if 3 yes

L Consumes two or more servings of fruit or vegetables per day?
0 = no 1 = yes

M How much fluid (water, juice, coffee, tea, milk...) is consumed per day?
0.0 = less than 3 cups
0.5 = 3 to 5 cups
1.0 = more than 5 cups

N Mode of feeding
0 = unable to eat without assistance
1 = self-fed with some difficulty
2 = self-fed without any problem

O Self view of nutritional status
0 = views self as being malnourished
1 = is uncertain of nutritional state
2 = views self as having no nutritional problem

P In comparison with other people of the same age, how does the patient consider his / her health status?
0.0 = not as good
0.5 = does not know
1.0 = as good
2.0 = better

Q Mid-arm circumference (MAC) in cm
0.0 = MAC less than 21
0.5 = MAC 21 to 22
1.0 = MAC greater than 22

R Calf circumference (CC) in cm
0 = CC less than 31
1 = CC 31 or greater

Assessment (max. 16 points)
Screening score
Total Assessment (max. 30 points)

Malnutrition Indicator Score

24 to 30 points	Normal nutritional status
17 to 23.5 points	At risk of malnutrition
Less than 17 points	Malnourished

References
1. Vellas B, Villars H, Abellan G, *et al.* Overview of the MNA® - Its History and Challenges. *J Nutr Health Aging.* 2006; **10**:456-465.
2. Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF). *J. Geront.* 2001; **56A**: M366-377
3. Guigoz Y. The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us? *J Nutr Health Aging.* 2006; **10**:466-487.

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For more information: www.mna-elderly.com

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NPIAP. Published Feb. 25, 2025. Accessed May 31, 2025. internationalguideline.com/nutrition#s1_resources.
Queensland Health. Accessed May 31, 2025. health.qld.gov.au/__data/assets/pdf_file/0029/148826/hphe-mst-pstr.pdf

Polling Question:

What nutritional screening tool do you use?

1. MST
2. MNA
3. OTHER
4. We use our own tool
5. We don’t use one

Balanced, Nutrient Dense Diet, and Hydration

- Food first
  - Balanced, nutrient dense, adequate hydration
- Mealtime assistance and strategies to increase oral intake – keep it personalized
- Modify/liberalize dietary restrictions when intake of food/fluids is inadequate
  - Healthy adult ≈30mL/kg BW or 1mL/kcal/day
  - Less fluids for heart failure, renal failure
  - Additional fluids for elevated temperature, vomiting, profuse sweating, diarrhea, and/or heavily exudating wounds, high-protein intakes, air fluidized or low air loss full body support surface
  - Comprehensive assessment for individuals with darker skin tones

Good Practice Statement

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

BW = body weight.

Recommendation

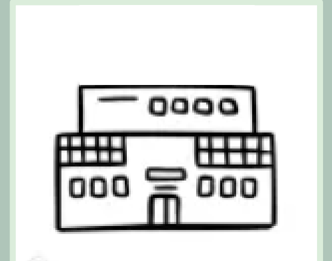
N4: We suggest that nutritional supplementatio
pressure injuries who have been identified as m
nutritional needs are not met by usual dietary ir

Conditional recommendation; very low certainty

Malnutrition Prevalence Across Care Settings

Acute Care
20%-50%

Post-Acute Care
14%-51%



Community Care
6%-30%

- Consult RDN
- How to start supplementation:
  - Increased, optimized oral intake
  - Fortified foods
  - ONS
  - Enteral/tube feeding
  - Parenteral supplementation
- Provide supplements between meals or when desired by the patient
- Use 1.5-2.4 kcal/ml x4 wks, then re-evaluate care plan
- Personalized nutrition: flavor, texture, temperature, thickness, variety

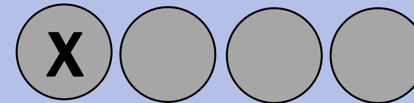
Riddle E, et al. *J Acad Nutr Diet.* 2024;124(7):896-916.e24. Malnutrition Quality Improvement Initiative. Updated Sept. 3, 2024. Accessed May 31, 2025. https://malnutritionquality.org/malnutrition-matters/

MORE THAN 40% OF PATIENTS AGE 50+
aren't getting the right amount of protein each day

Recommendation

N5: We suggest implementing protein suppleme[...]
who have been identified as malnourished or at risk of malnutrition.

Conditional recommendation; very low certainty of evidence



- Consult RDN
- Consider patient's caloric intake
- Provide adequate protein
- Assess renal function

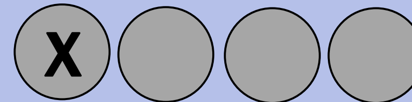
- Additional considerations for older adults
  - Older adult: 1.2-1.5g/kg ABW/d
  - Critically ill with obesity
    - BMI >30-40: 2.0g/kg IBW/d
    - BMI >40: 2.5g/kg IBW/d

ABW = actual body weight; IBW = ideal body weight.
McClave SA, et al. *JPEN J Parenter Enteral Nutr*. 2016;40(2):159-211. Erratum in: *JPEN J Parenter Enteral Nutr*. 2016;40(8):1200.

Recommendation

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

Conditional recommendation; very low certainty of evidence



- Carbohydrate-based energy, protein, and micronutrients (vitamin C and zinc)
- Indirect calorimetry to estimate resting energy expenditure is the gold standard
- Calculate energy intake and macronutrient needs
- Always personalize energy intake based on demographic and clinical condition

Delsoglio M, et al. *J Clin Med*. 2019;8(9):1387.

Polling Question:

How soon is an ONS ordered?

1. Within 1-2 days. An ONS is automatically ordered based on the Nutrition Screening score.
2. Within 1-2 days. An order is needed from the MD, NP, or RDN.
3. Within 3-5 days. An order is needed from the MD, NP, or RDN.
4. After 5 days. We don’t receive the orders timely.
5. We don’t use ONS.

ONS: Benefits vs Costs

Benefits

- Reduced hospital stay
- Improved nutritional status
- Labor savings
- Consistency
- Convenience
- Variety
- Supplements a meal

Costs

- Cost of ONS
- Side effects
- So many choices
- Administration of ONS
- Joy of eating diminished

In LTC, ONS increased BW, BMI, calorie and protein intake when given 1-3x/day in addition to regular meals

Riddle E, et al. *J Acad Nutr Diet*. 2024;124(7):896-916.e24. Schuetz P, et al. *BMJ Open*. 2021;11(7):e046402.

When Food and Hydration Are Not Enough

ONS Considerations

- When: Nutrition/hydration oral intake not met by diet
- How: Automatic orders, order writing privileges
- Timing: Between meals or when desired
- Kcal: 1.5-2.4kcal/mL
- Protein: 8-30gm/serving
- Time frame: At least 4 wks, then re-evaluate
- Delivery: Nursing or nutrition services
- Record: % intake consumed
- Follow up: Always

Nutrient	PI Prevention	Stage 1	Stage 2	Stage 3	Stage 4
Calories	ONS: 1.5-2.4kcal/mL x4 wks when not met by diet	30-35kcal/kg BW	same	same	same
Protein	Older Adult: 1.2-1.5g/kg ABW/d Critically ill: 1.2-2.0g/kg ABW/d WITH obesity: - BMI >30-40: 2.0g/kg IBW/d - BMI >40: 2.5g/kg IBW/d	1.25-1.5g/kg BW	same	same	same
Water/Fluids	30ml/kg BW or 1mL/kcal	same	same	same	same
Zinc	Only with known malnutrition or deficiency		yes	yes	yes
Arginine	Only with known malnutrition or deficiency		yes	yes	yes
Antioxidants	Only with known malnutrition or deficiency		yes	yes	yes

Personalize based on signs, symptoms, clinical conditions, and individual goals

Based on 2025 International Guideline for PI Prevention and 2019 Clinical Practice Guideline for PI Treatment for individuals with, or at risk of, malnutrition

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SPIPP 2.0 for Critical Care

Nutrition
Screen for malnutrition using a validated tool on admission
Consult dietitian for persons with or at risk of malnutrition, decreased nutrient intake, NPO > 48 hours or presence of stage 2 or greater PI (Braden Nutrition Score 1-2)
Provide additional calories, protein, fluids, and additional nutrients (i.e. multi-vitamin, arginine, glutamine, HMB) per nutrition plan of care or as appropriate
Continue to regularly assess goals and consult dietitian as needed

Unit ____ **Standardized Pressure Injury Prevention Protocol Checklist (SPIPP- Adult) 2.0** Date________

ITEM	Completed Yes/No	COMMENT
Assess risk factors for pressure injury to guide risk-based prevention		
Significant current or anticipated mobility problems		
Use a structured risk assessment approach (e.g., Braden or other validated risk tool) on admission		
Reassess risk q shift and with significant change in condition		
Patient/family informed of PI risk and prevention plan		
Additional risk factors considered: Previous PI__, Localized pain__, Diabetes__, Poor perfusion__, Vasopressors__, Oxygenation deficits__, Increased Temp__, Advanced Age__, Spinal cord injury__, Neuropathy__, Surgery/procedure duration > 2 hrs.__, Critical illness__, Organ Failure__, Sepsis__, Mechanical vent__, Medical devices__, Sedation __		
Assess Skin/Tissue for signs of skin damage and pressure injury		
Assess skin (comprehensive, visual, palpation) upon admission and q shift for erythema, discoloration, edema, and temperature		Location(s):
Assess skin under medical devices q shift		Device(s):
Inspect heels q shift		
In people of color: Ensure adequate lighting and moisten/moisturize skin to augment visual		
Consider enhanced skin assessment methods- thermography, SEM, skin color chart		
Preventative Skin Care- Manage moisture/Incontinence		
Cleanse and apply appropriate moisture barriers promptly after each incontinent episode		
Avoid use of alkaline soaps/cleansers		
Consider urinary/fecal management systems for high-risk persons		
Single layer, breathable, high absorbency pads for incontinence		
Consider using low friction textiles		
Apply wicking material to skin folds when appropriate		
Redistribute Pressure		
Turn/reposition q 2-3 hours persons who do not have independent bed mobility and as required by individual needs and risk, unless contraindicated (Braden Activity/Mobility score 1 or 2)		
Use high specification reactive foam or reactive air mattress/overlay for immobile persons (Braden Activity/Mobility score 1 or 2)		
Use positioning aids that minimize friction/shear (pillows, wedges). Use turn/lift equipment if available		
Keep head of bed as flat as possible		
Place silicone multilayer foam dressings on areas of high-risk (i.e., sacrum, lower buttocks, or heels) (Braden Activity/Mobility scores 1-2)		
Elevate heels off bed with pillows, heel devices or boots (Braden Sensory Perception score 1-3)		
Provide adequate repositioning (30 degree) when side lying		
Use slow, gradual, frequent, small, body shifts when unstable		
Use pressure redistributing seat cushion for persons who cannot adequately reposition		
Reposition seated persons q 1 hour		
Consult Physical Therapy for mobilization program when appropriate (Braden Activity/Mobility		
Consider reminder systems, pressure mapping, motion sensors		
Implement early mobilization program		
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NPIAP. Standardized Pressure Injury Prevention Protocol (S-PIPP). Accessed June 1, 2025. https://npiap.com/page/SPIPP

Clinical Pearls

Screen immediately

Personalize nutrition and hydration

Always balanced food first

ONS when food and fluids are not enough

Consult the RDN – a vital member of the wound team

Evaluate the Impact of Nutrition Screening, Assessment, and Intervention as Essential Strategies within the Healthcare Team for Preventing and Treating PIs

Frank Aviles, PT, CWS, FACCWS, CLT-LANA, ALM, AWCC

My Life Rehab & Wellness, Director of Clinical Education & Research

Wound Care Coordinator, NRMC Wound Center

Polling Question:

In your current setting, how often do you screen for malnutrition for PI prevention?

1. Always
2. Often
3. Sometimes
4. Rarely
5. Never

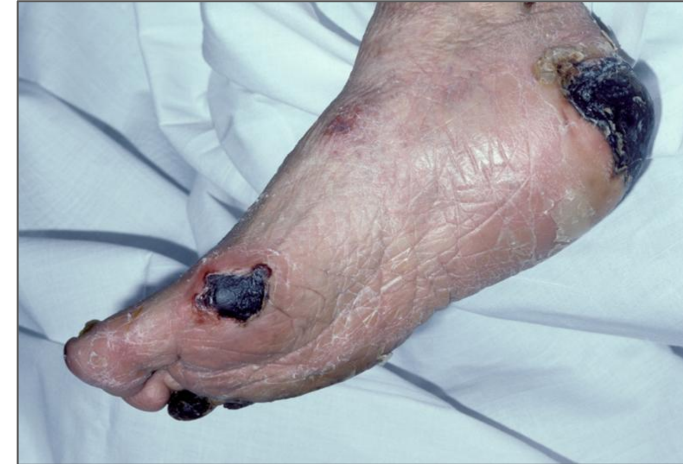
Economic Impact of Malnutrition

- Longer hospital stays
- Increased infection rates
- Longer hospital stays (malnutrition, infection)
- Increased cost of care
- Increased number of pressure injuries
- Increased risk (double) of 30-day readmissions
- More likely to fall during hospitalization
- Delayed wound healing in PI
- Delayed wound healing in surgical patients

Sørensen J, et al. *Clin Nutr.* 2008;27(3):340-349. Lim SL, et al. *Clin Nutr.* 2012;31(3):345-350. Allard JP, et al. *JPEN J Parenter Enteral Nutr*. 2016;40(4):487-497. Stratton RJ, et al. *Clin Nutr.* 2013;32(5):888-901. Neyens J, et al. *Arch Gerontol Geriatr.* 2013;56(1):265-269.

Pressure Injury Assessment

- Visual assessment
- Braden Scale
  - Sensory perception
  - Moisture
  - Activity
  - Mobility
  - Nutrition
  - Friction and shear



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NPIAP. Standardized Pressure Injury Prevention Protocol (S-PIPP). Accessed June 13, 2025. https://npiap.com/page/SPIPP

Background

Hospital Acquired Pressure Injuries (HAPI) continue to be a major challenge for institutions. There are numerous extrinsic and intrinsic factors that predispose patients to pressure injuries such as immobility, inadequate sensation, poor nutrition, excessive moisture, and poor perfusion.

In addition, an increased number of comorbidities expose hospitalized patients to a higher risk of harm, worse outcomes, escalating health care costs, and complex medical management. Approximately 80% of Medicare dollars are spent on patients with 4 or more chronic conditions. Healthcare dollars increase exponentially based on age, patient acuity, and the number of comorbidities.

A validated risk assessment, a multidisciplinary comprehensive prevention program, and evidence-based interventions are imperative in the fight against pressure injuries.

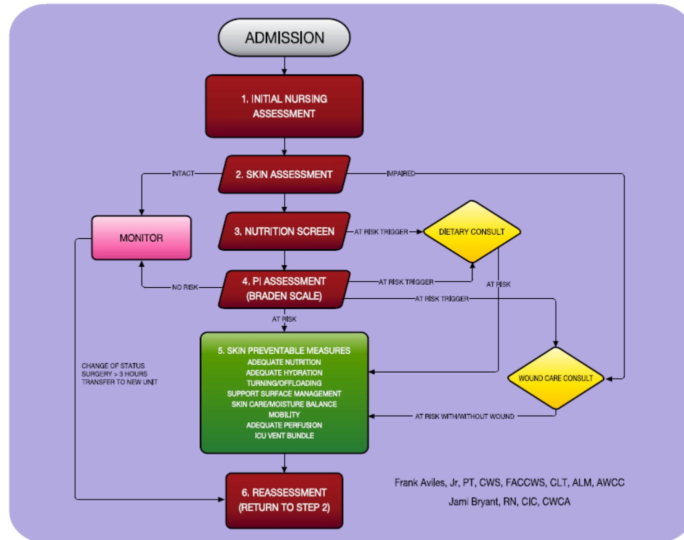


Figure 1. Pressure Injury Flowchart

Purpose

Natchitoches Regional Medical Center (NRMC) is a 96 bed hospital located in north central Louisiana, serving several rural communities. NRMC's mission is to "Inspire Excellence Everyday".

Our organization adopted a "Zero Patient Harm" culture and reducing hospital acquired conditions was made a priority. Our multidisciplinary team's goal was to develop a comprehensive plan (figure 1) based on current guidelines to reduce hospital acquired pressure injuries. In 2016, we began our improvement PDCA process with the initial goal of reducing pressure injury rates to 1.3 injuries or fewer per 1000 patient care days. The dietitians were key members to our program due to the risks associated with malnutrition. Statistics show that 30-50% of admitted patients are malnourished, up to 69% of admitted patients will undergo a nutritional decline[1], 44% of patients do not have a nutritional screen, and 72% are labeled malnourished with no interventions. Malnutrition is associated with adverse clinical outcomes[2]. It increases the length of stay, leads to muscle wasting, infections, falls, and pressure injuries.

Rolling Against Pressure - Journey to 252 Days Injury Free

Frank Aviles, Jr, PT. CWS, FACCWS, CLT, ALM, AWCC & Jami Bryant, RN, CIC, CWCA

Natchitoches Regional Medical Center

Methods

Our team collected data and formulated a comprehensive plan emphasizing early recognition of patients at risk for developing pressure injuries. Utilizing a quality improvement process (figure 2) we identified opportunities. We developed a system to trigger clinician consultations based on a nutritional screen and a validated risk assessment for pressure injuries. Our goal was to decrease hospital acquired pressure injuries while developing a consistent and meaningful process for team members across the institution (figure 1).

- Clear outcomes achieved
- Discrepancies surfaced with documentation & policy clarity
- Nutrition recognized as factor that lacked performance

- Identify risks through rapid RCA's
- Organize/planned HAI committee
- Identified goals
- Leadership presence

- Data collection
- Reporting # of days injury free at leadership safety huddle
- Display data to all staff

- Patient & Staff education
- Polices per EBP guidelines
- Ensured tools & equipment were available
- Accountability

Figure 2. Pressure Injury PDCA

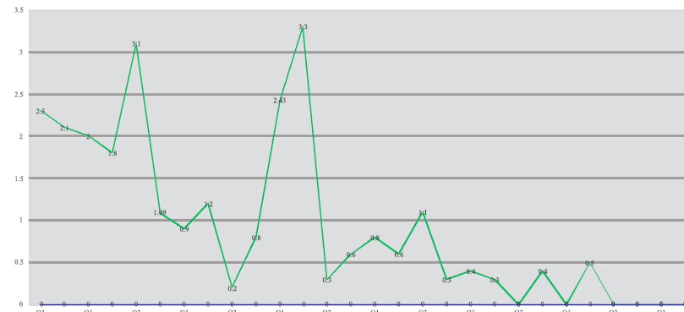


Figure 3. Hospital Acquired Pressure Injuries Per 1000 Patient Care Days

Results

Our hospital acquired pressure injury rate decreased from 1.87 to 0 injuries per 1000 patient care days (figure 3). As a motivator and an accountability model, success was measured by consecutive days without a pressure injury (figure 5). Instituting a trigger mechanism to deploy prompt notifications of patient's at risk made a significant impact to our program. Pre and post data demonstrated the number of wound care consults increased 175%, dietary consults increased 376% (figure 4), while the number of pressure injuries decreased 675% (figure 4).

Natchitoches Regional Medical Center

Inspiring Excellence Everyday

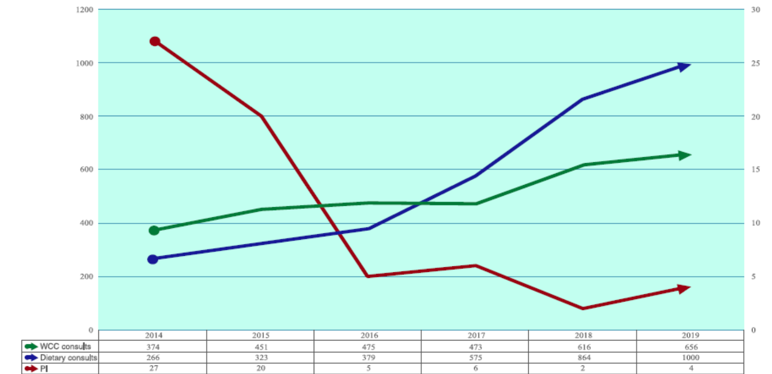


Figure 4. Wound Care Consults, Dietary Consults, and Pressure Injuries.

Conclusion

NRMC's multidisciplinary pressure injury prevention program achieved and surpassed the initial reduction goal of ≤ 1.3 injuries per 1000 patient care days. As the number of consultations increased, the number of pressure injuries began a downward trend (figure 4). The number of pressure injury free consecutive days was reported daily during the leadership huddle and to unit staff members as a mean of increasing awareness and accountability (figure 5).

After analyzing the data, it was obvious that increasing awareness, early recognition of patients at risk, prompt deployment of interventions, and promoting personal accountability contributed to our success. The increasing number of dietary and wound care consults (figure 4), was inversely related to the decrease in pressure injuries

We achieved multiple pressure injury free day streaks with our record being 252 consecutive days. Currently we have 186 pressure injury free days and counting.

PATIENT SAFETY

THIS UNIT HAS WORKED

DAYS

WITHOUT A PRESSURE INJURY

OUR PRIOR RECORD WAS 252 DAYS

Prevent Skin Injuries:

- Inspect entire skin frequently
- Maintain good hydration & nutrition
- Turn & reposition often - remove pressure
- Keep skin clean & dry

Figure 5. Unit Display

Acknowledgements

We would like to thank Sarah LaCour, administration, and the entire NRMC staff for their support and dedication.

References

1. Amaral TF, Matos LC, Tavares MM, et al. (2007). The economic impact of disease-related malnutrition at hospital admission, Clin Nutr, 26, 778-84.
2. De Van Der Schueren M, Elia M, Gramlich L, et al. (2014) Clinical and economic outcomes of nutrition interventions across the continuum of care. Ann NY Acad Sci, 20-40.

Aviles F, Bryant J. Rolling Against Pressure – Journey to 252 Days Injury Free. NPIAP Conference 2020.

Nutrition Prevalence and Risk

- Up to 50% of hospitalized patients are malnourished
- After admission, 69% of inpatients will experience a nutritional decline
- Malnutrition increases risk of PI 2-3 times in hospitalized patients
- In long-term care settings, up to 85% of residents with PIs are malnourished
- 44% of patients do not receive a nutritional screening
- 72% of patients are labeled “malnourished” with no interventions

Corkins MR, et al. *JPEN J Parenter Enteral Nutr*. 2014;38(2):186-195. Amaral TF, et al. *Clin Nutr.* 2007;26:778-784. De Van Der Schueren M, et al. *Ann NY Acad Sci.* 2014;20-40.

Definition? Diagnosis?

Malnutrition

American Society of Parenteral and Enteral Nutrition (ASPEN)

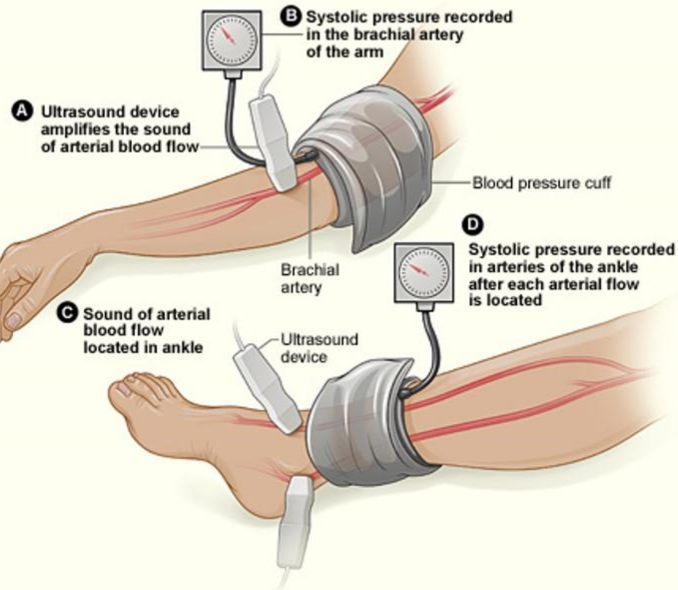
"An acute, chronic, or social/environmental condition resulting in altered body composition and impaired physical and/or mental function due to inadequate intake of assimilation of nutrients."

ASPEN 2012 Consensus ($\geq$2 of 6)

- Insufficient energy intake
- Weight loss
- Loss of muscle mass
- Loss of subcutaneous fat
- Localized or generalized fluid accumulation
- Diminished functional status (eg, handgrip strength)

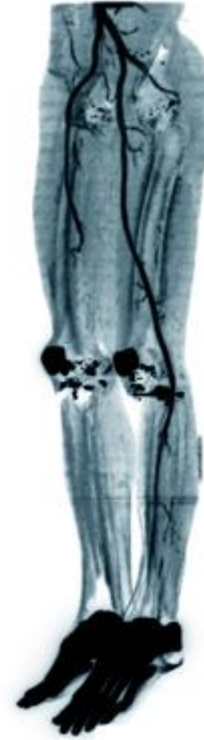
Consensus Statement of the Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition: Characteristics Recommended for the Identification and Documentation of Adult Malnutrition (Undernutrition) White JV, et al. *J Acad Nutr Dietetics*. 2012;112)5):730-738.

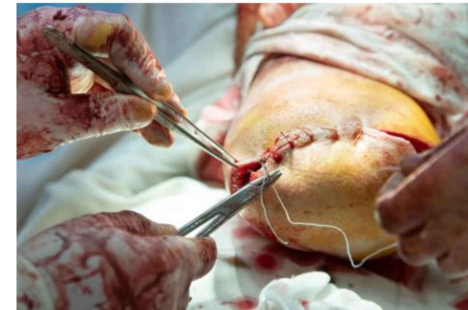
Screening



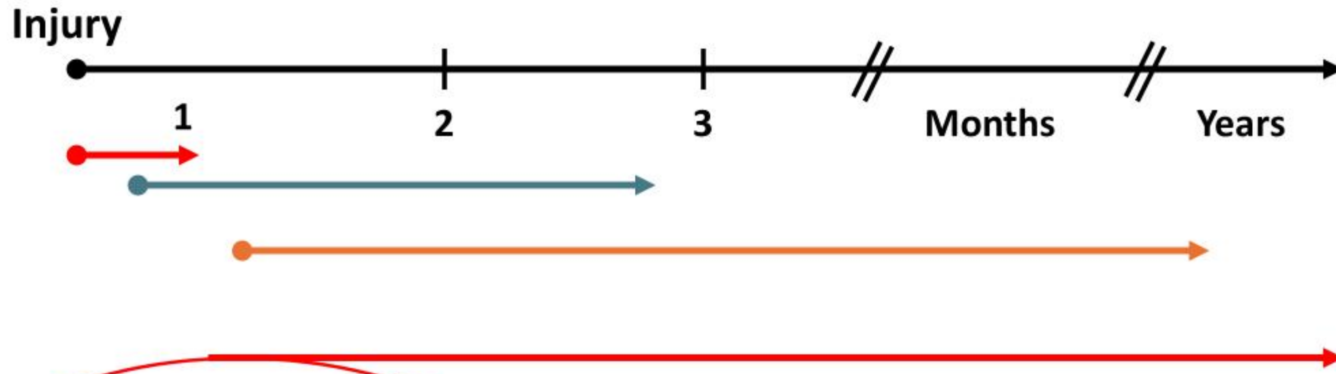
Assessment

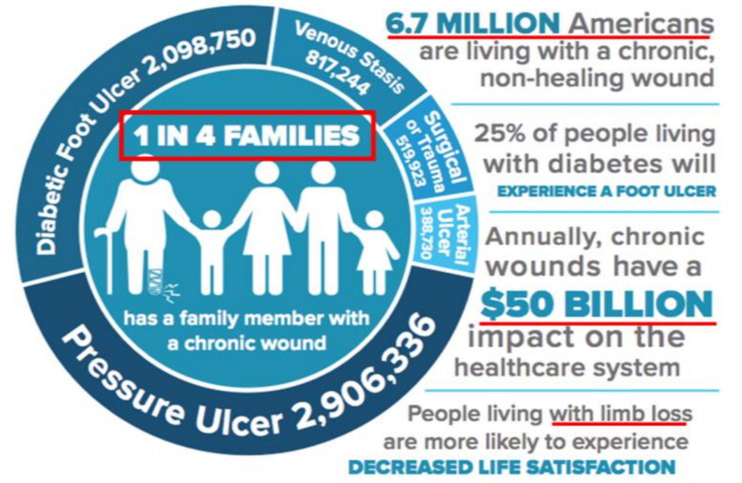
Interventions





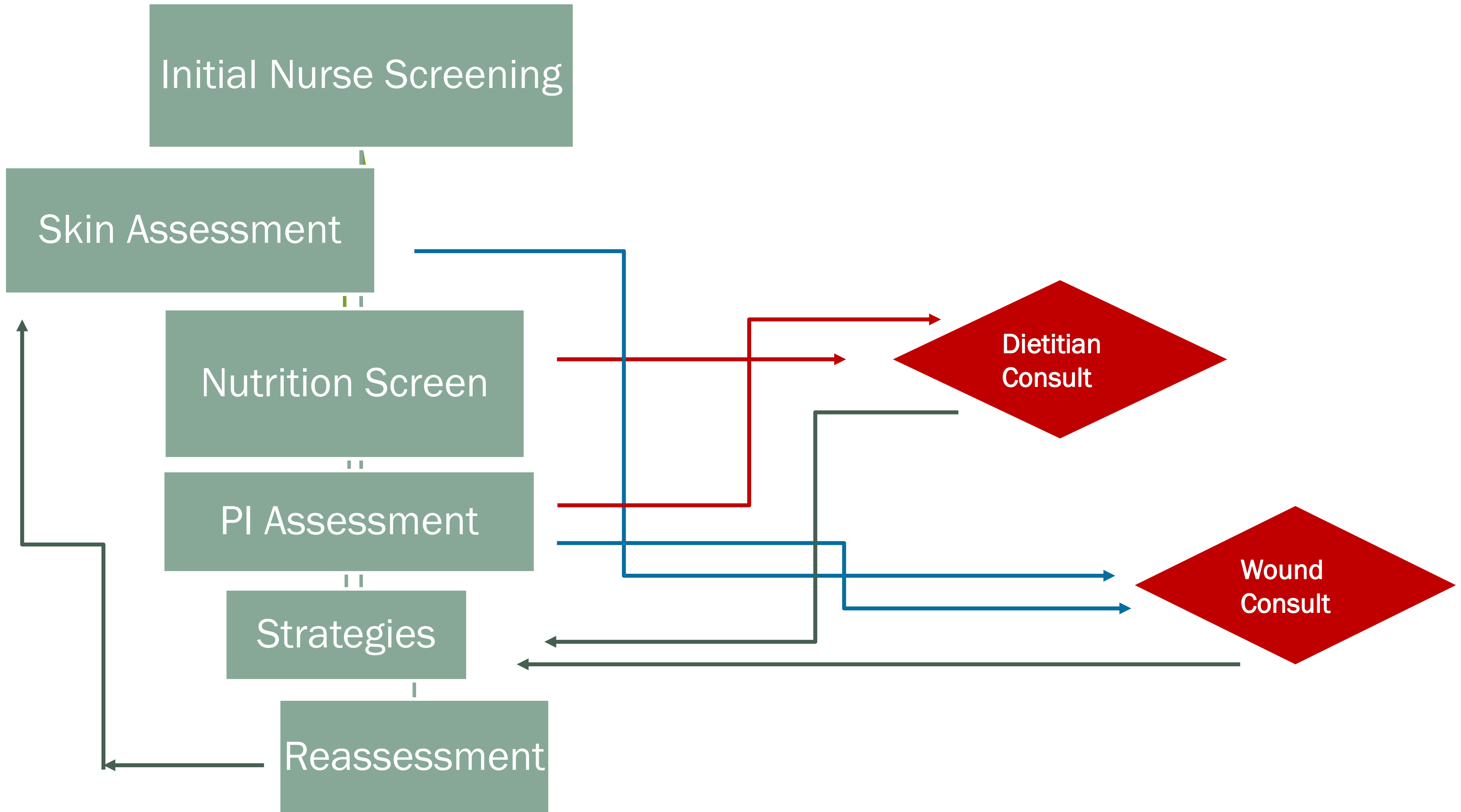
Normal Wound Healing Cascade of Events





Source: Woundcareawareness.com 2016

Inflammatory | Proliferative | Maturation



Aviles Frank, Bryant Jamie Rolling Against Pressure – Journey to 252 Days Injury Free, NPIAP Conference 2020.

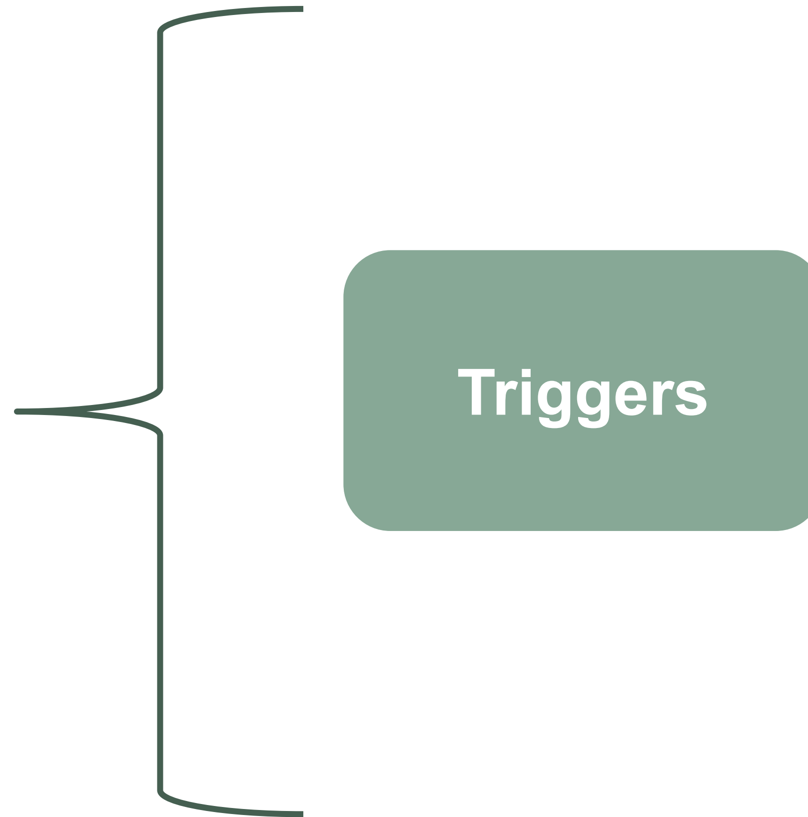
Screening

Nursing

- Malnutrition
  Validated tools:
  - MST

- Skin Impairment

- Braden Scale



Screening

Assessment

Dietitian Consult

Nursing

- Malnutrition Validated tools
  - MST

- Skin Impairment

Wound Care Consult

- Braden Scale

Assessment

Dietitian Consult

- Calorie/protein intake
- Anthropometrics
- Physical exam
- Lab review
- Functional status

Develops individual
POC & working Dx

Wound Care Consult

Screening

Nursing

- Malnutrition Validated tools:
  - MST
- Skin Impairment
- Braden Scale

Assessment

Dietitian Consult

- Calorie/protein intake
- Anthropometrics
- Physical exam
- Lab review
- Functional status

Develops individual POC & working Dx

Wound Care Consult

Interventions

Hydration

ONS Arginine, Glutamine, HMB

Calories/protein boosters

Micronutrient repletion

Protein Optimization

Address underlying cause

Promote early mobilization

Ongoing monitoring

Economic Benefits of ONS

- Reduced hospital LOS
- Lower hospital readmission rates
- Lower episode of care costs
- Improved wound healing
- PI prevention
- Reduced infection and complication rates
- ROI: Low-cost product with a high impact

Thomson KH, et al. *The Lancet.* 2022;3(10):E654-E666. Murphy J. *The Lancet*. 2022;3(10):E637-E638.

ONS

Standard Formulas, Wound Healing, and High-Protein Formulas

- Ensure Plus® (Abbott Nutrition)
- BOOST Plus® (Nestlé)
- RESOURCE® 2.0 (Nestlé)
- Ensure® Enlive® (Abbott Nutrition)
- BOOST® High Protein (Nestlé)
- Compleat® (Nestlé)
- Juven® (Abbott Nutrition)
- Arginaid® (Nestlé)
- Expedite (Medtrition)
- Pro-Stat® and Pro-Stat® AWC (Nutricia)
- BOOST Glucose Control® (Nestlé)
- Nepro® (Abbott Nutrition)
- Suplena® (Abbott Nutrition)
- Beneprotein® (Nestlé)
- LiquaCel® (Global Health Products)
- Push 20+ (Global Health Products)

Consider ONS with arginine, zinc, and antioxidants

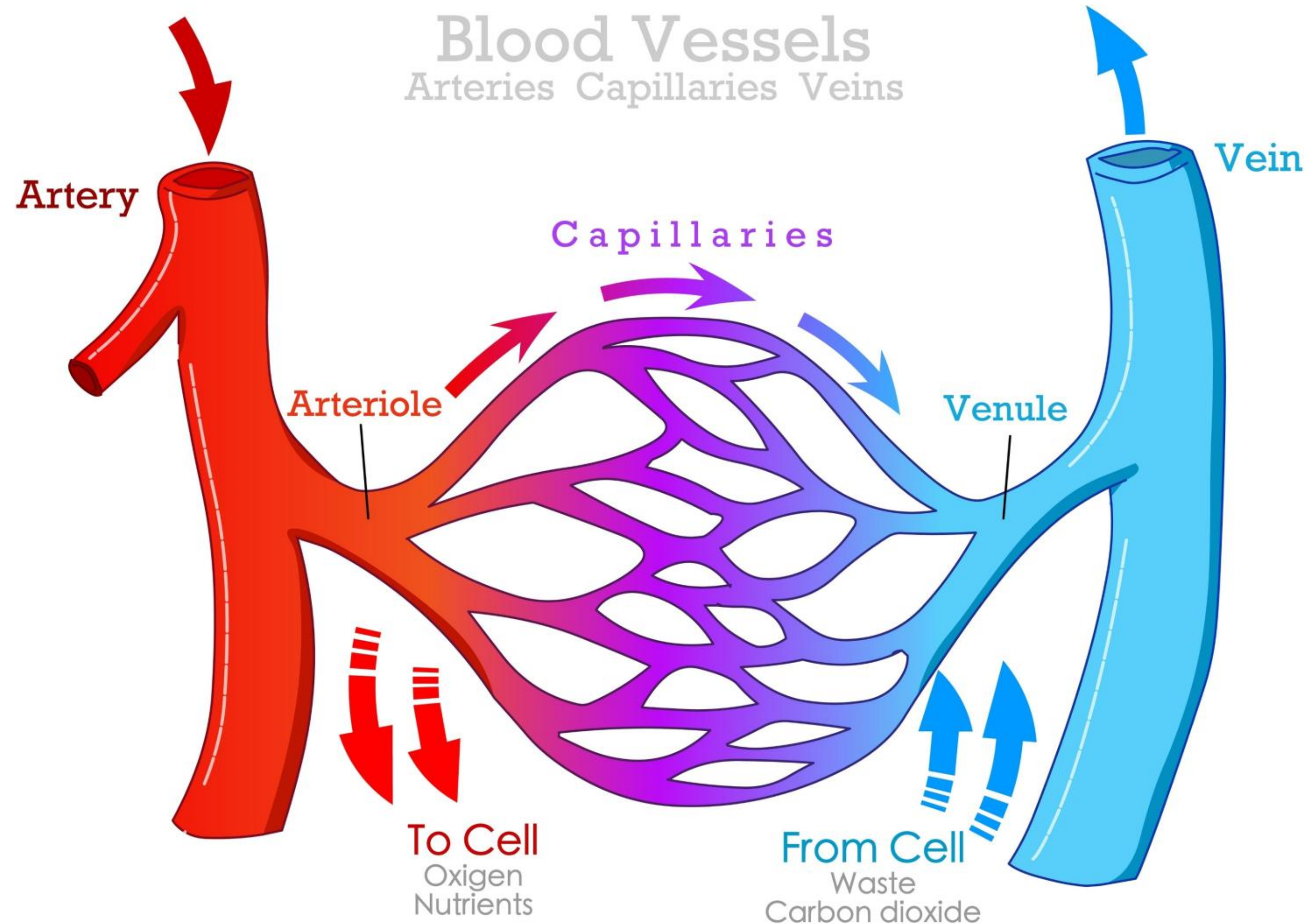
2019 International Pressure Injury Guidelines

Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline. The International Guideline 2019. Accessed June 13, 2025. https://internationalguideline.com/2019.

Why Hydration?

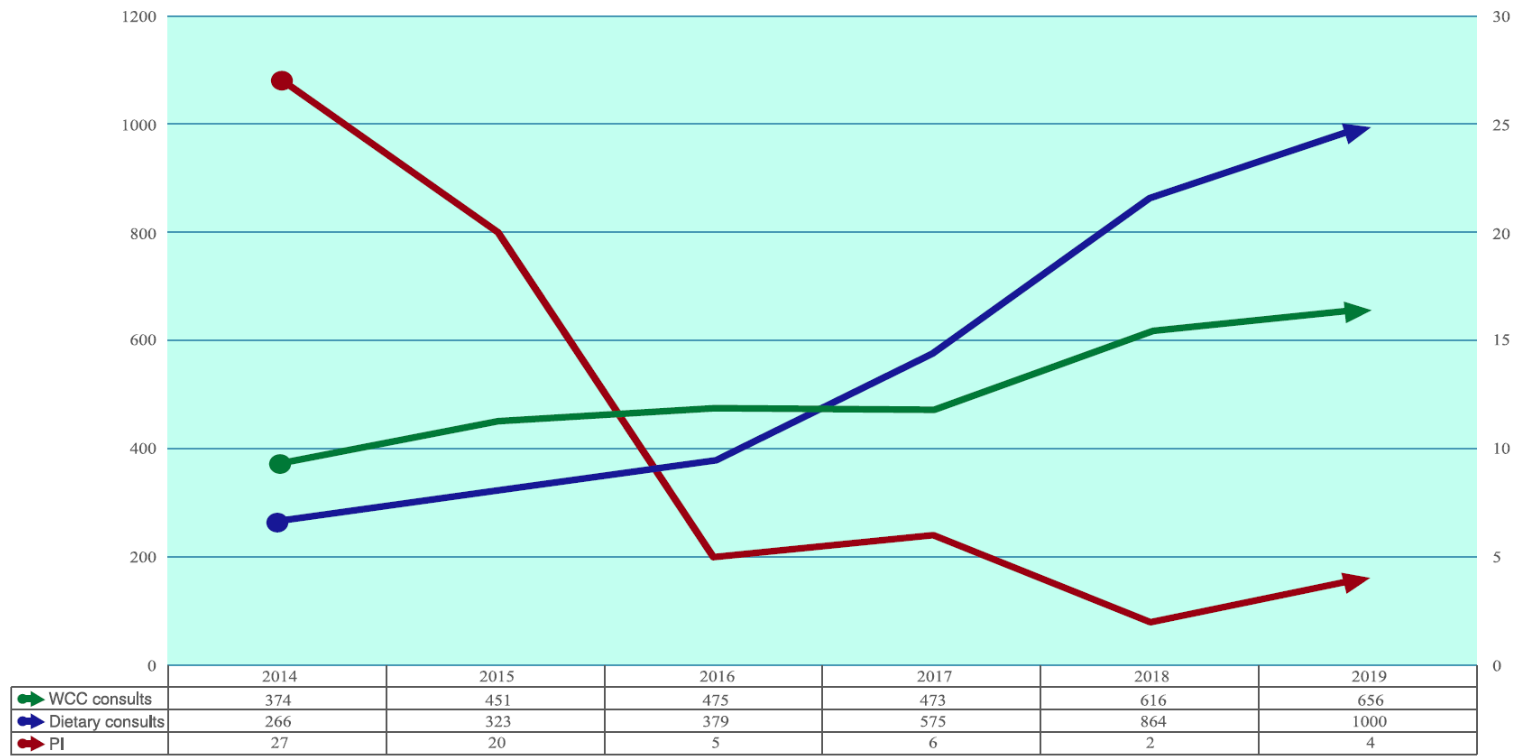
Perfusion

Diffusion



Inflammation

Results:



	2014	2015	2016	2017	2018	2019
WCC consults	374	451	475	473	616	656
Dietary consults	266	323	379	575	864	1000
PI	27	20	5	6	2	4

Figure 4. Wound Care Consults, Dietary Consults, and Pressure Injuries.

Aviles F, Bryant J. Rolling Against Pressure – Journey to 252 Days Injury Free. NPIAP Conference 2020.

Results:

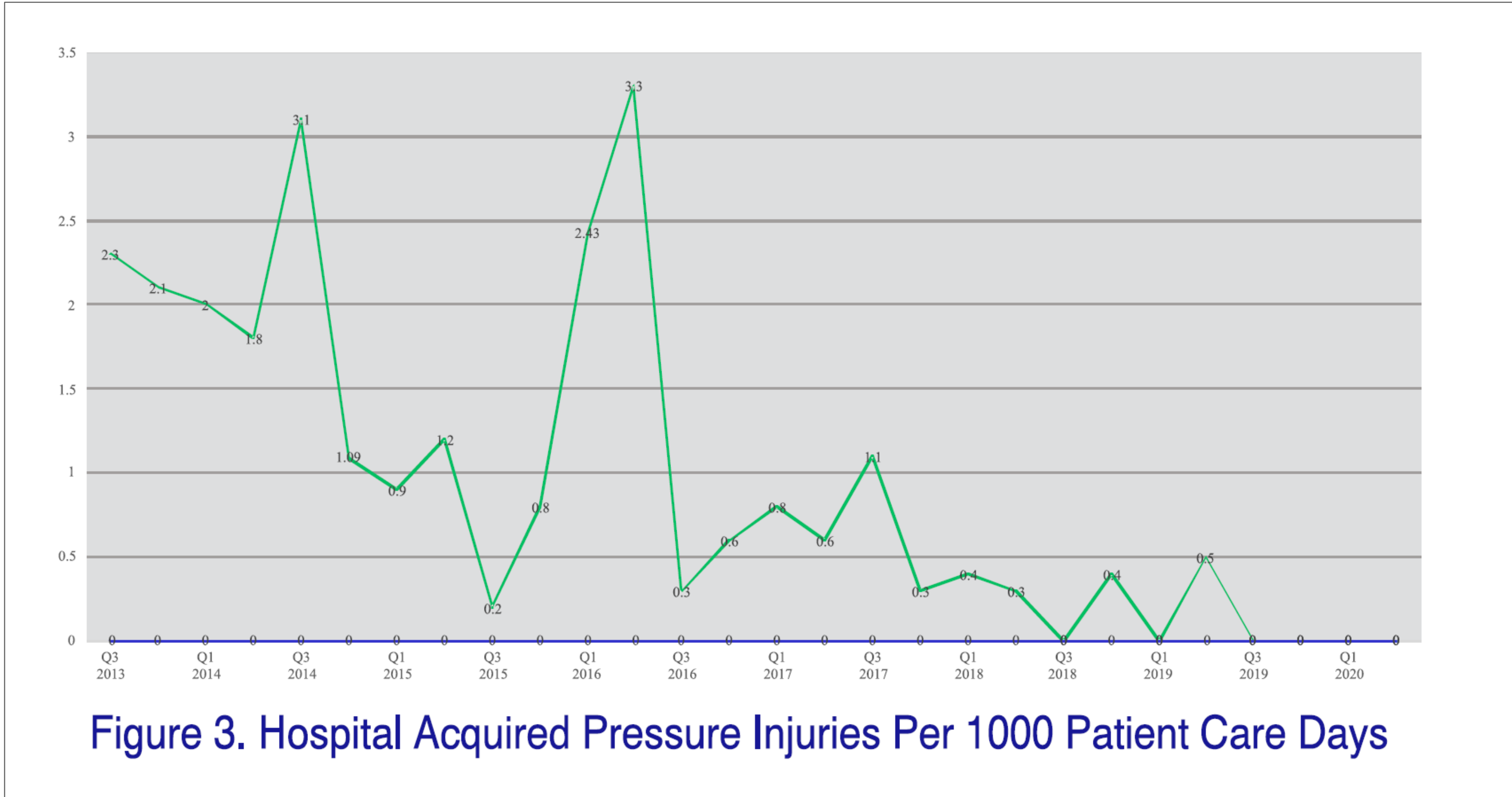


Figure 3. Hospital Acquired Pressure Injuries Per 1000 Patient Care Days

Aviles Frank, Bryant Jamie. Rolling Against Pressure – Journey to 252 Days Injury Free. NPIAP Conference 2020.

Clinical Pearls

- Early, aggressive, individualized, and interdisciplinary nutritional screening, assessment, and intervention can make an impact on patient outcomes

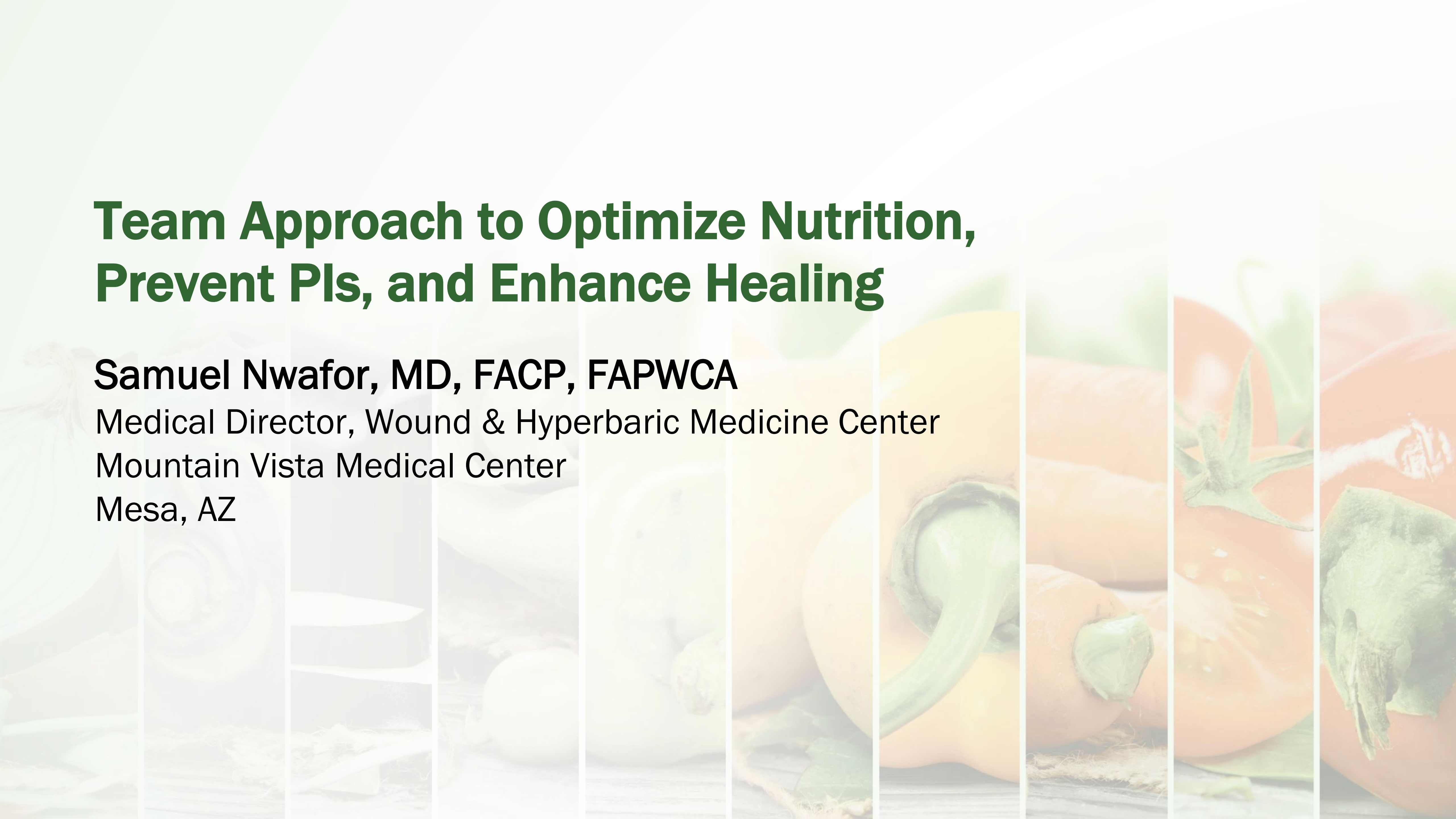
- Reversing nutrient deficits can prevent complications
- Team collaboration is essential

- Early intervention is linked to reduced LOS and fewer complications

Polling Question:

Which part of the screening-assessment-intervention process do you find most challenging to consistently implement in patients with, or at risk for, PIs?

1. Identifying at-risk patients early (screening)
2. Performing a thorough nutritional and skin assessment
3. Initiating timely and appropriate interventions
4. Interdisciplinary communication and follow-through
5. We consistently implement all three



Team Approach to Optimize Nutrition, Prevent PIs, and Enhance Healing

Samuel Nwafor, MD, FACP, FAPWCA

Medical Director, Wound & Hyperbaric Medicine Center

Mountain Vista Medical Center

Mesa, AZ

Definition of Pressure Injury (PI)

- A PI is localized damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device
- PIs can present as intact skin or an open ulcer and may be painful
- PIs occur as a result of intense and/or prolonged pressure or pressure in combination with shear
- The tolerance of soft tissue for pressure and shear may also be affected by microclimate, nutrition, perfusion, comorbidities, and condition of the soft tissue

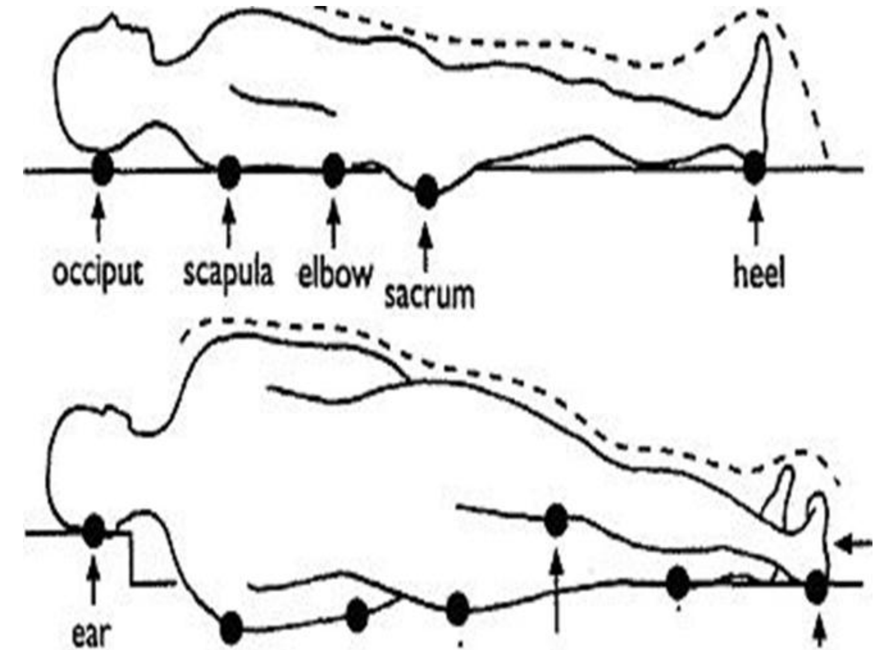


Photo: Weebly

Edsberg LE, et al. *J Wound Ostomy Continence Nurs*. 2016;43(6):585-597.

Impact of Pressure Injuries

- Hospital-acquired PIs (HAPIs) cost $26.8 billion in the U.S. annually based on 2.5 million reported cases. Stage 3 and 4 HAPIs accounted for 58% of all HAPI costs
  - Padula WV, Delarmente BA. *Int Wound J*. 2019;16(3):634-640.
- PIs are the #1 cause of patient harm in a care facility
  - Healthcare Finance. Published Oct. 10, 2019. Accessed May 31, 2025. https://www.healthcarefinancenews.com/news/pressure-ulcers-cost-health-system-268-billion-year
- A hospitalized patient with a PI has a mortality rate 2.8 times higher than a patient without a PI
  - Bauer K, et al. *Ostomy Wound Manage*. 2016;62(11):30-38.
- Up to 60% of elderly patients with PIs die within 1 yr of hospital discharge
  - Lyder CH, Ayello EA. Pressure Ulcers: A Patient Safety Issue. In: Hughes RG, editor. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Rockville MD: Agency for Healthcare Research and Quality (US); 2008 Apr. Chapter 12. https://www.ncbi.nlm.nih.gov/books/NBK2650/
- Over 17,000 lawsuits related to PIs are filed yearly. It is the 2nd most common claim after wrongful death.
  - Agency for Healthcare Research and Quality. Last updated Oct. 2014. Accessed May 31, 2025. https://www.ahrq.gov/patient-safety/settings/hospital/resource/pressureulcer/tool/pu1.html)

HAPI = hospital-acquired pressure injuries.

Pressure Injury Staging

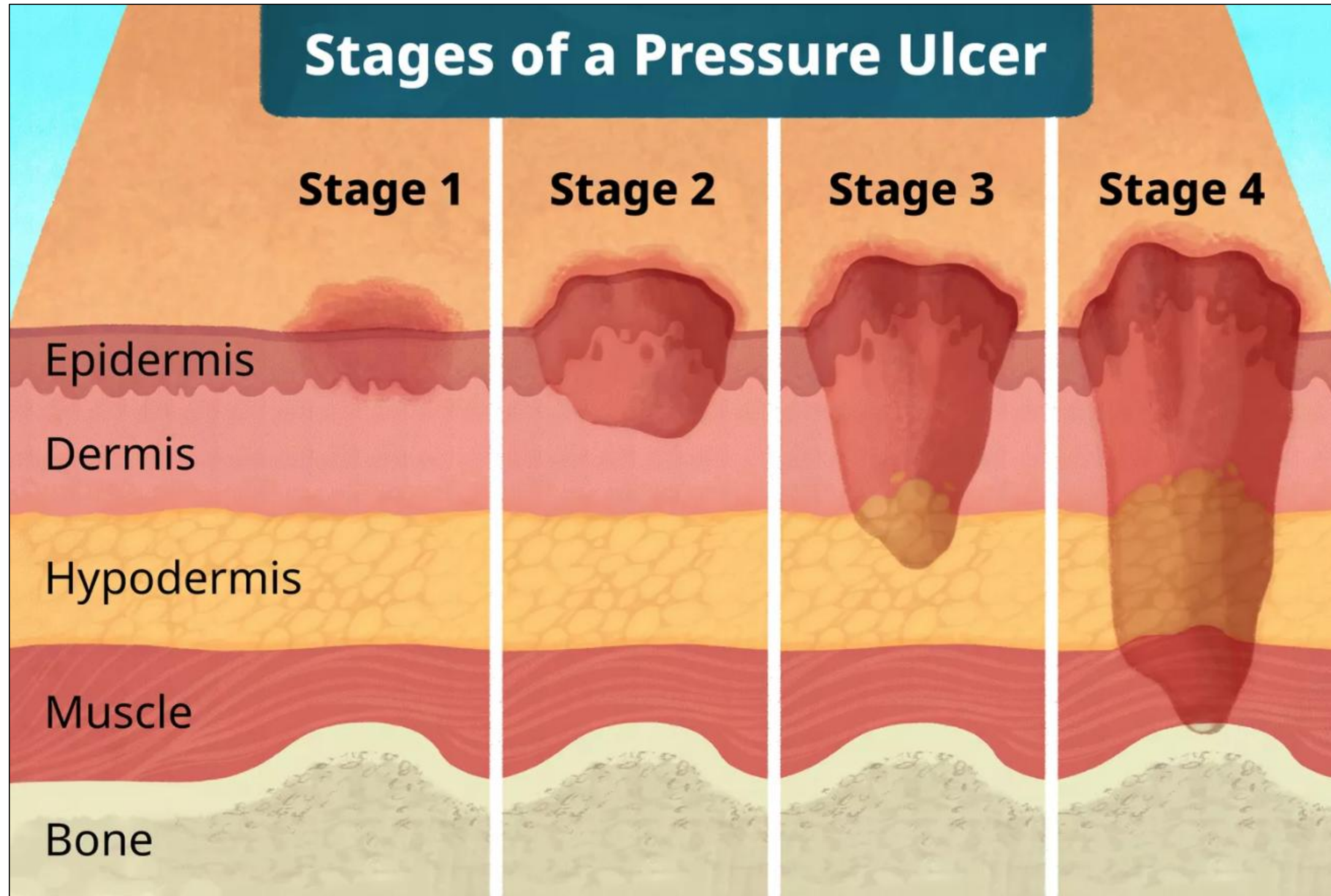
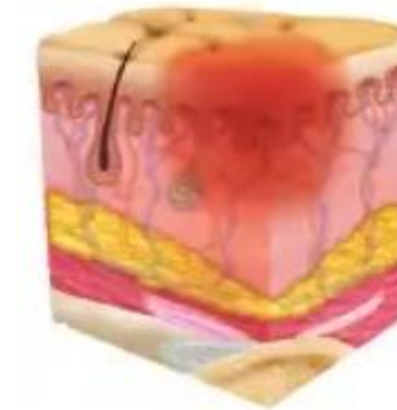
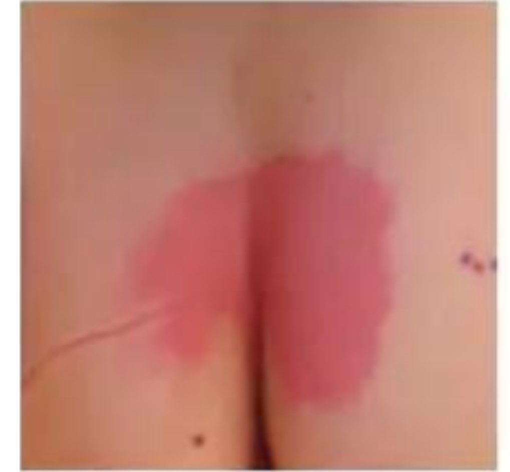


Illustration by Mira Norian for Verywell Health

Stage 1 Pressure Injury

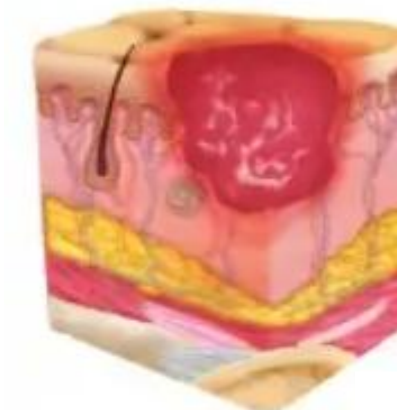
- Non-blanchable erythema of intact skin
  - May appear differently in darkly pigmented skin
  - Presence of blanchable erythema or changes in sensation, temperature, or firmness may precede visual changes





Stage 2 Pressure Injury

- Partial-thickness skin loss with exposed dermis
  - The wound bed is viable, pink or red, moist
  - May present as intact or ruptured serum-filled blister



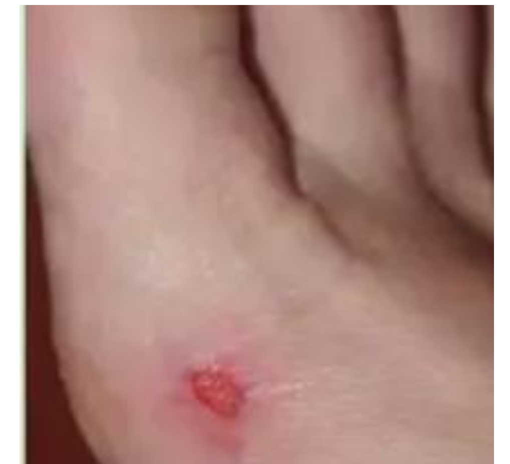
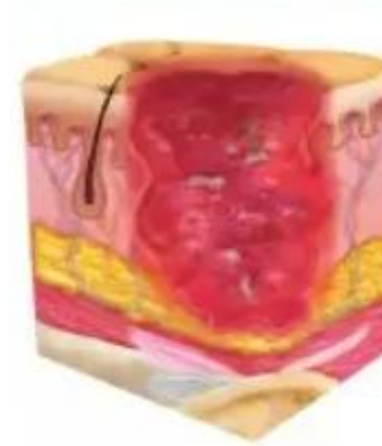
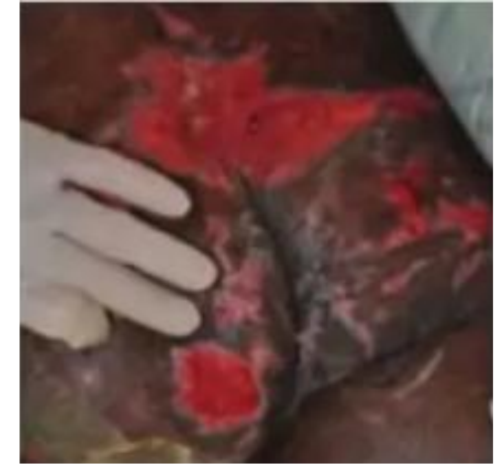


Image credit:
NPIAP https://npiap.com/store

Edsberg LE, et al. *J Wound Ostomy Continence Nurs*. 2016;43(6):585-597.

Stage 3 Pressure Injury

- Full-thickness skin loss with exposed dermis
  - Full-thickness skin loss in which adipose is visible
  - Granulation tissue and epibole (rolled wound edges) are often present
  - Slough and/or eschar may be visible

Stage 4 Pressure Injury

- Full-thickness loss of skin and tissue
  - Exposed or directly palpable fascia, muscle, tendon, ligament, cartilage, or bone in the ulcer
  - Slough and/or eschar may be visible

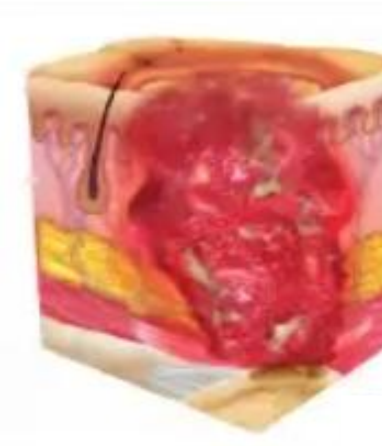
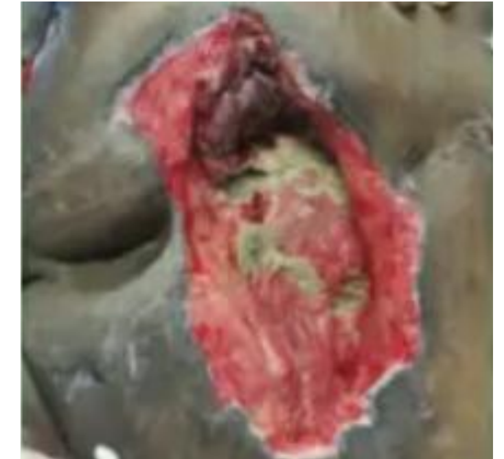



Image credit:
NPIAP https://npiap.com/store

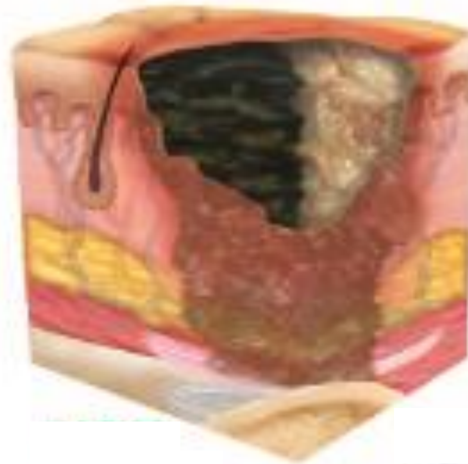
Edsberg LE, et al. *J Wound Ostomy Continence Nurs*. 2016;43(6):585-597.

Unstageable Pressure Injury

- Obscured full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar
  - Can be restaged to 3 or 4 after debridement

Unstageable
Darkly Pigmented

Unstageable PI
Slough and Eschar



Unstageable PI
Dark Eschar

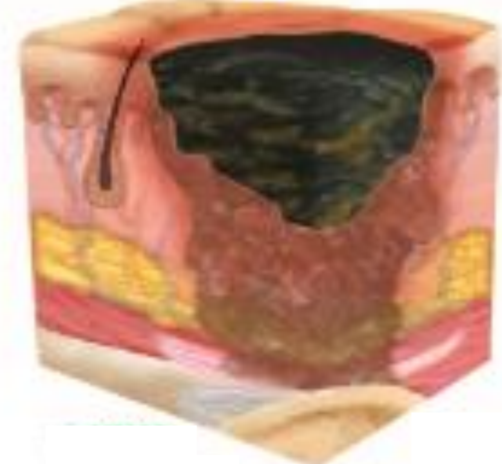


Image credit:
NPIAP https://npiap.com/store

Edsberg LE, et al. *J Wound Ostomy Continence Nurs*. 2016;43(6):585-597.

Nutrition and Pressure Injuries

Relationship Between Weight Loss and Wound Healing

- Demling RH. Nutrition, anabolism, and the wound healing process: an overview. ePlasty. 2009;9:65-94. http://www.medscape.com/viewarticle/711879_8. Accessed February 21, 2017.

Polling Question

Team collaboration for nutritional optimization in patients with PIs may include which of the following professionals?

1. Hospital case managers
2. Speech pathologists
3. Occupational therapists
4. Language experts
5. All of the above

Nutritional Interprofessional Collaboration in Hospitalized Patients

A study by Ellison, et al looked at interdisciplinary communication between Wound Care Nurse Specialists (WCNS) and Registered Dieticians (RDs)

- **Project Goal:** To improve Braden Nutritional Subscale accuracy through interprofessional collaboration to reduce Hospital Acquired Pressure Injury (HAPI) occurrence by early pressure injury prevention bundle implementation

Results

- 30% increase in early pressure injury prevention bundle implementation
- 75% reduction in HAPI occurrence compared to 0.25% in another unit

Ellison D, et al. *J Am Acad Nutr Diet.* 2024;124(10):Suppl A78.

Nutritional Optimization Team Collaboration in Hospitalized Patient with Pressure Injuries

Case Report

- 68y Male with cerebrovascular accident (CVA), sacral stage 4 and heel unstageable PIs, and severe protein calorie malnutrition

Key Clinical Challenges

- Immobility, neurologic deficits
- Protein loss from wound exudate
- Oral food intake barriers
- Diarrhea, dehydration

Hospital-Based Team Collaboration Strategies

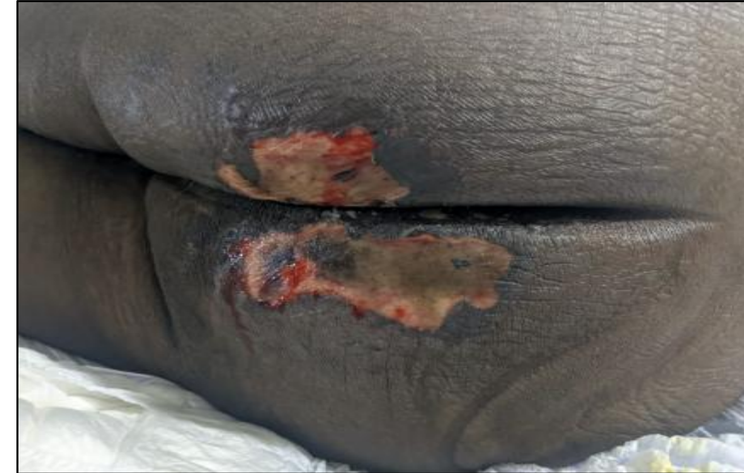
- Daily multidisciplinary team care conferences
- Interfaced communication platform embedded in hospital EMR system
- Physical multidisciplinary clinical rounds

Photo: ChatGPT

Team Collaboration in the Post Acute and Outpatient Setting

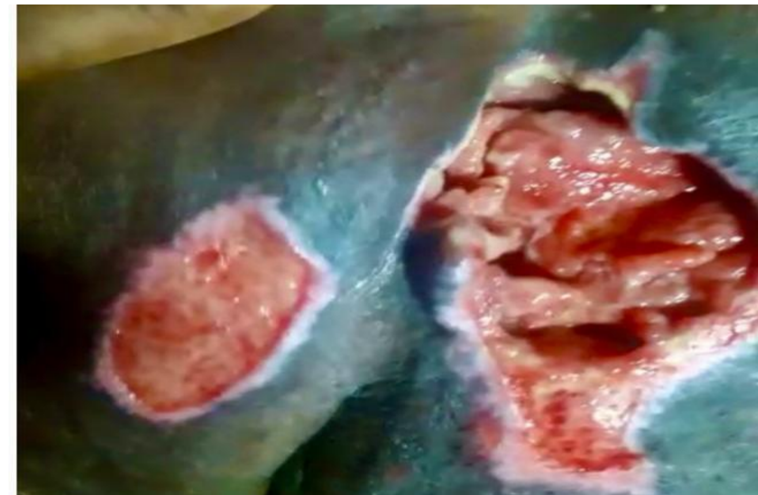
Case Report

- 56y African Male with history of CVA and buttocks stage 4 PIs



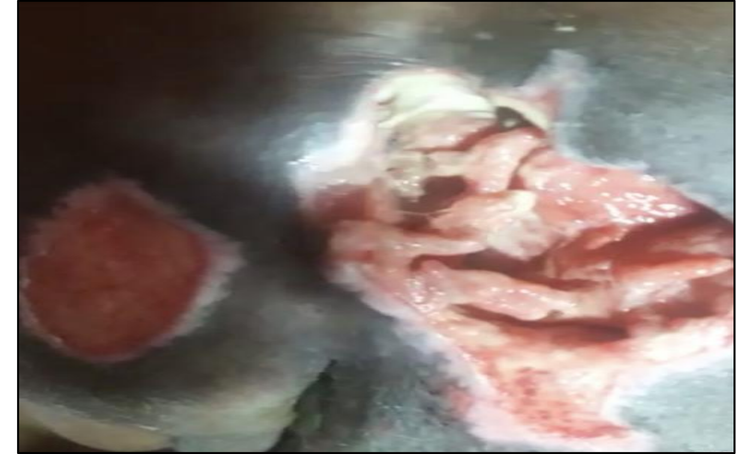
Key Clinical Challenges

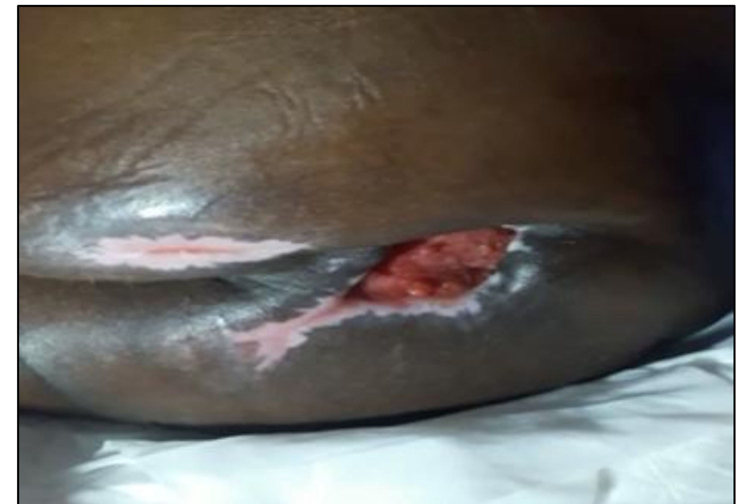
- Delayed wound healing due to malnutrition
- Poor po intake due to swallowing issues
- Vomiting
- Language barrier
- Cultural food preferences
- Limited resources



Impact of Nutritional Intervention Using a Collaborative Team Approach

- Significant wound improvement in 4 wks with enhanced nutritional optimization using a culturally sensitive team approach
- Speech pathologist
- Dietician
- Social worker
- Wound nurse
- Wound physician
- Language/cultural liaison
- Patients and their caregivers





The Role of Communication in Team Collaboration

- Electronic medical record (EMR)
- Medical practice apps
- AI-enhanced devices
- Phone calls
- HIPAA-compliant texts
- Faxes
- Video conferencing platforms
  - Zoom, Teams

Photo: Shutterstock

"Don't assume everybody knows what you are doing"

Polling Question

56y Female admitted to Telemetry unit of hospital with multilobar pneumonia. She had recent thromboembolic CVA and mild dysphagia. Initial nutritional screening revealed unintended weight loss of ≈20% of her body weight over the past 3 months. In addition to risk-based offloading and repositioning, which of the following interventions will decrease her risk of acquiring PIs during hospitalization?

1. Daily serum albumin monitoring
2. Weekly serum transferrin monitoring
3. Place her on multidisciplinary rounding list for comprehensive nutrition optimization plan
4. All of the above

Thank You.