Thank you for joining the webinar!

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Nutrition Strategies for Pressure Injury Healing

Mary Ellen Posthauer RDN, CD, LD, FAND

will begin shortly.

Call-in toll-free number (US/Canada)
1-855-244-8681
Access code: 662 856 729

Nutrition Strategies for Pressure Injury Healing

Mary Ellen Posthauer, RDN,LD, CD, FAND

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Objectives

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1. Define the new National Pressure Ulcer Advisory Panel's pressure injury staging system(previously pressure ulcer staging system)
2. Detail the effects of key nutrients in pressure injury healing
3. Implement nutrition quality measures addressing the IMPACT ACT's skin integrity Quality Measure Domain

Participant Poll

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What is your profession?

- Registered Dietitian
- Registered Nurse
- Etc…

What type of facility do you work in?

- Hospital
- Nursing Home
- Rehabilitation Facility
- Home Health Agency
- Academia/Research
- Etc…

Why the Terminology Change?

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- April 2016 NPUAP consensus conference announced terminology change from pressure ulcer to pressure injury & validated new terminology, which more accurately describes pressure injury in intact and ulcerated skin. [1]
- Previous staging system described both Stage 1 & Deep Tissue Injury as injured intact skin and the other stages described open ulcers.
- There has been confusion because the definitions for each of the stages referred to the injuries as “pressure ulcers”.

Additional Pressure Injury Definitions

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- **Medical Device Related Pressure Injury: This describes an etiology.**
  Medical device related pressure injuries result from the use of devices designed and applied for diagnostic or therapeutic purposes. The resultant pressure injury generally conforms to the pattern or shape of the device. The injury should be staged using the staging system.
- Medical devices include cervical collars, leg brace, splints

Mucosal Membrane Pressure Injury

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- **Mucosal Membrane Pressure Injury:** Mucosal membrane pressure injury is found on mucous membranes with a history of a medical device in use at the location of the injury. Due to the anatomy of the tissue these injuries cannot be staged.
- The injured tissue bleeds & forms a clot within minutes. However, because of the moist environment and mucus, the clot does not resemble the hard, dry clots seen on the skin. They are too shallow to stage.
- Examples: oxygen tubing, urinary catheters, nasogastric tubing, etc.

Participant Poll

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How familiar are you with the new pressure injury definition?

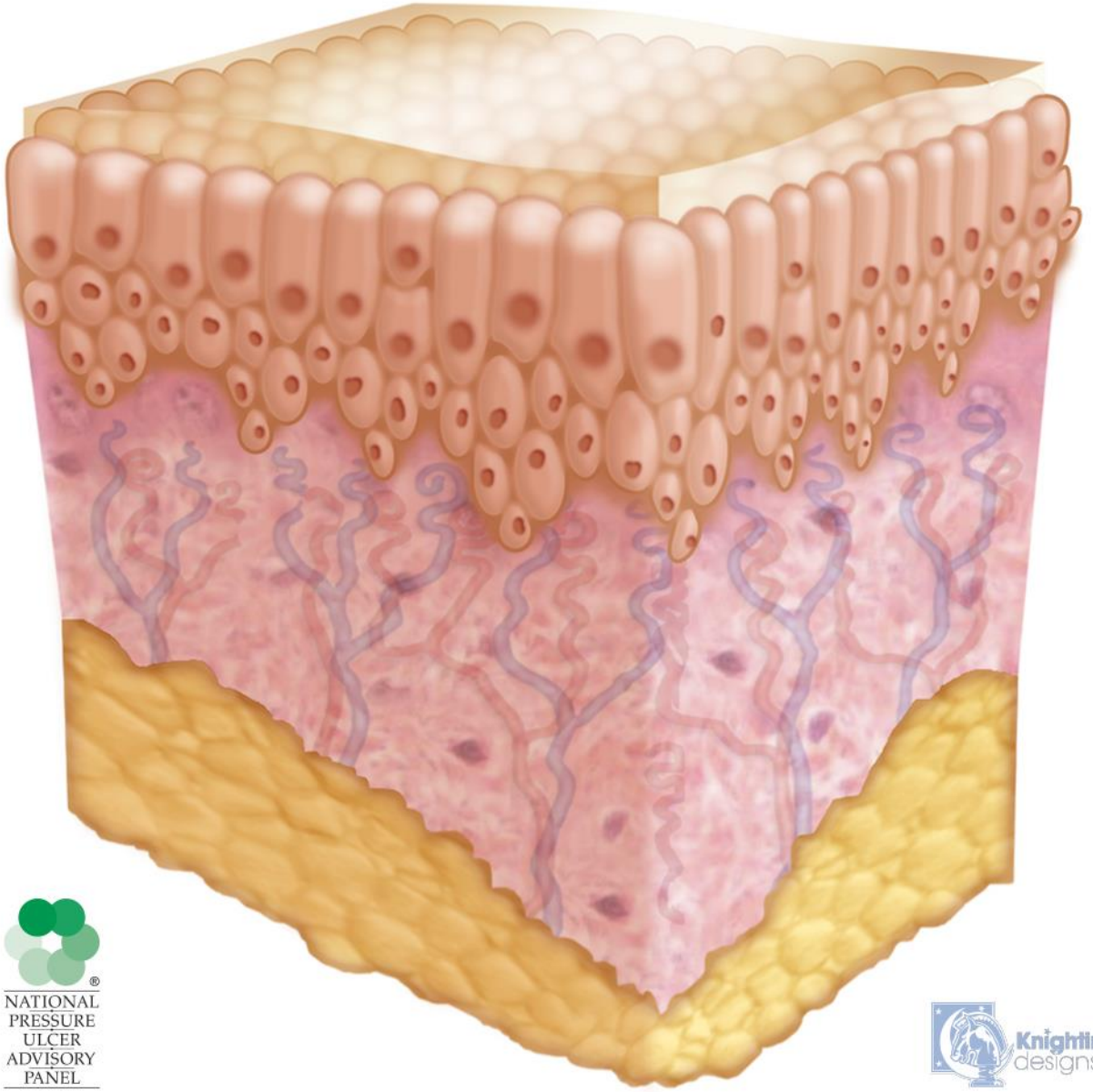
Not familiar at all

Slightly familiar

Moderately familiar

Very familiar

Mucous Membrane



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Future Direction

- The National Database of Nursing Quality Indicators is changing their reporting documents and training modules into the new system effective 2017.
- NPUAP is working with CMS and ICD-10 coding system to adapt wording.
- Clinicians are encouraged to begin documenting pressure ulcer injury

Revised Terminology

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Pressure Injury:

A pressure injury is localized damage to the skin and/or underlying soft tissue usually over a bony prominence or related to a medical or other device. The injury can present as intact skin or an open ulcer and may be painful. The injury occurs 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, co-morbidities and condition of the soft tissue.

www.npuap.org

Pressure Injury Stages

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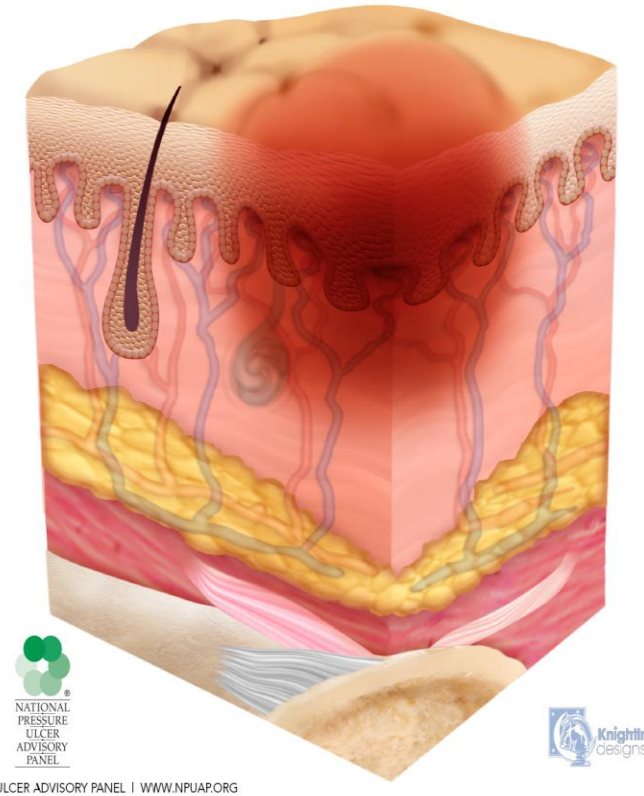
Stage 1 Pressure Injury - Lightly Pigmented



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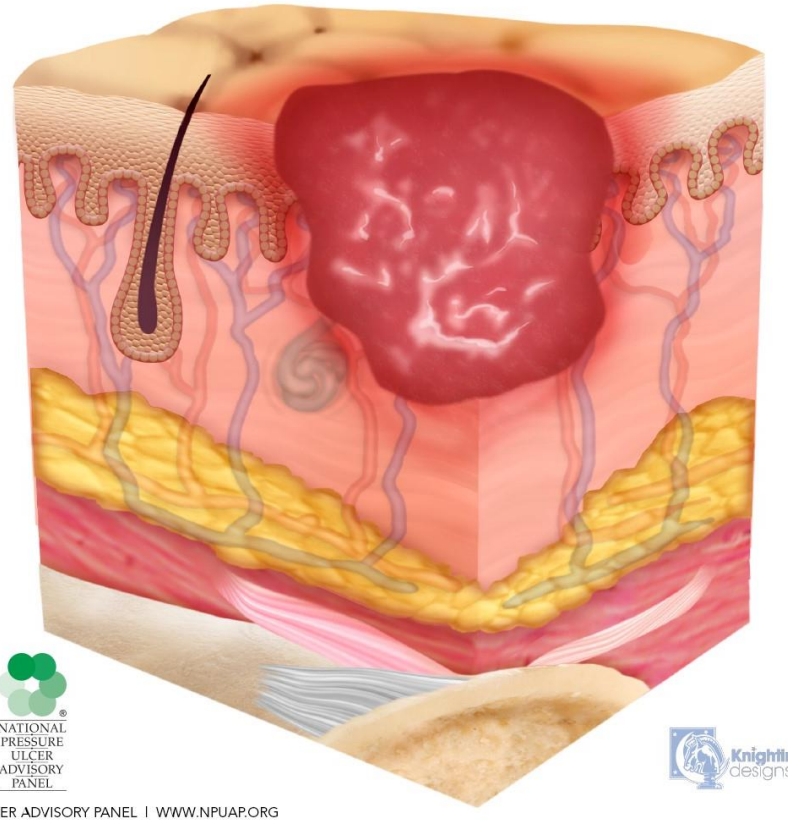
Stage 2 Pressure Injury



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Pressure Injury Stages

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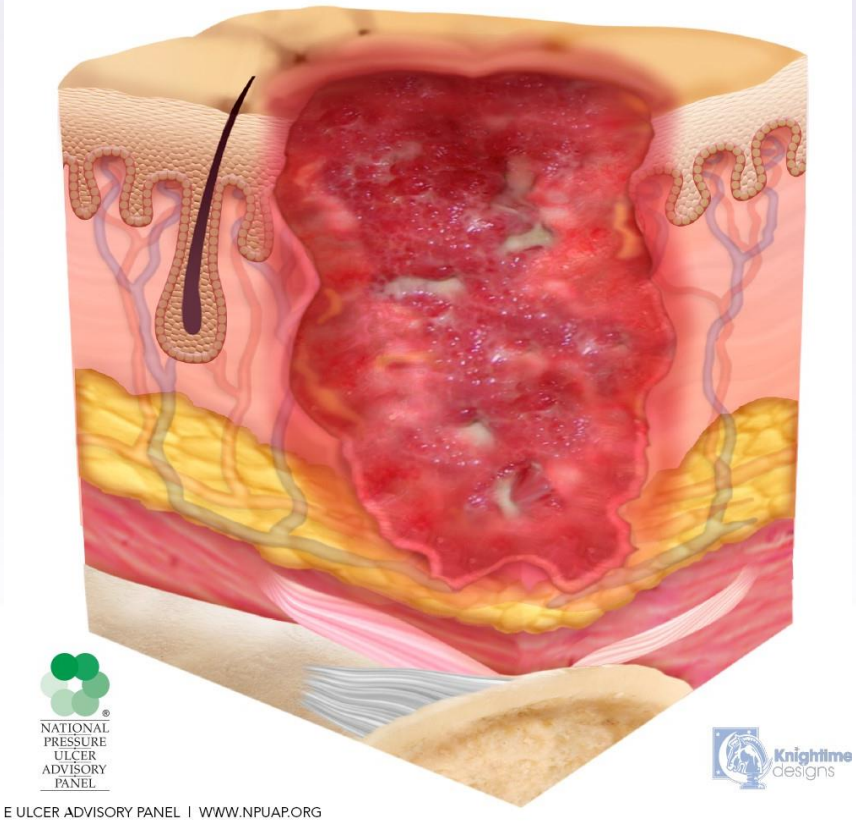
Stage 3 Pressure Injury



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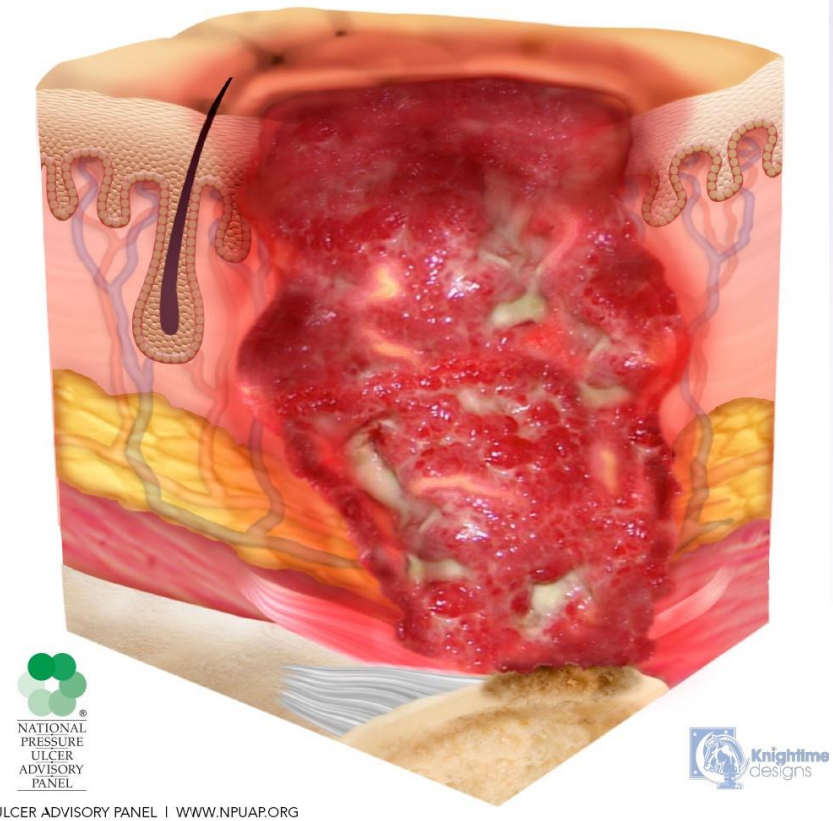
Stage 4 Pressure Injury



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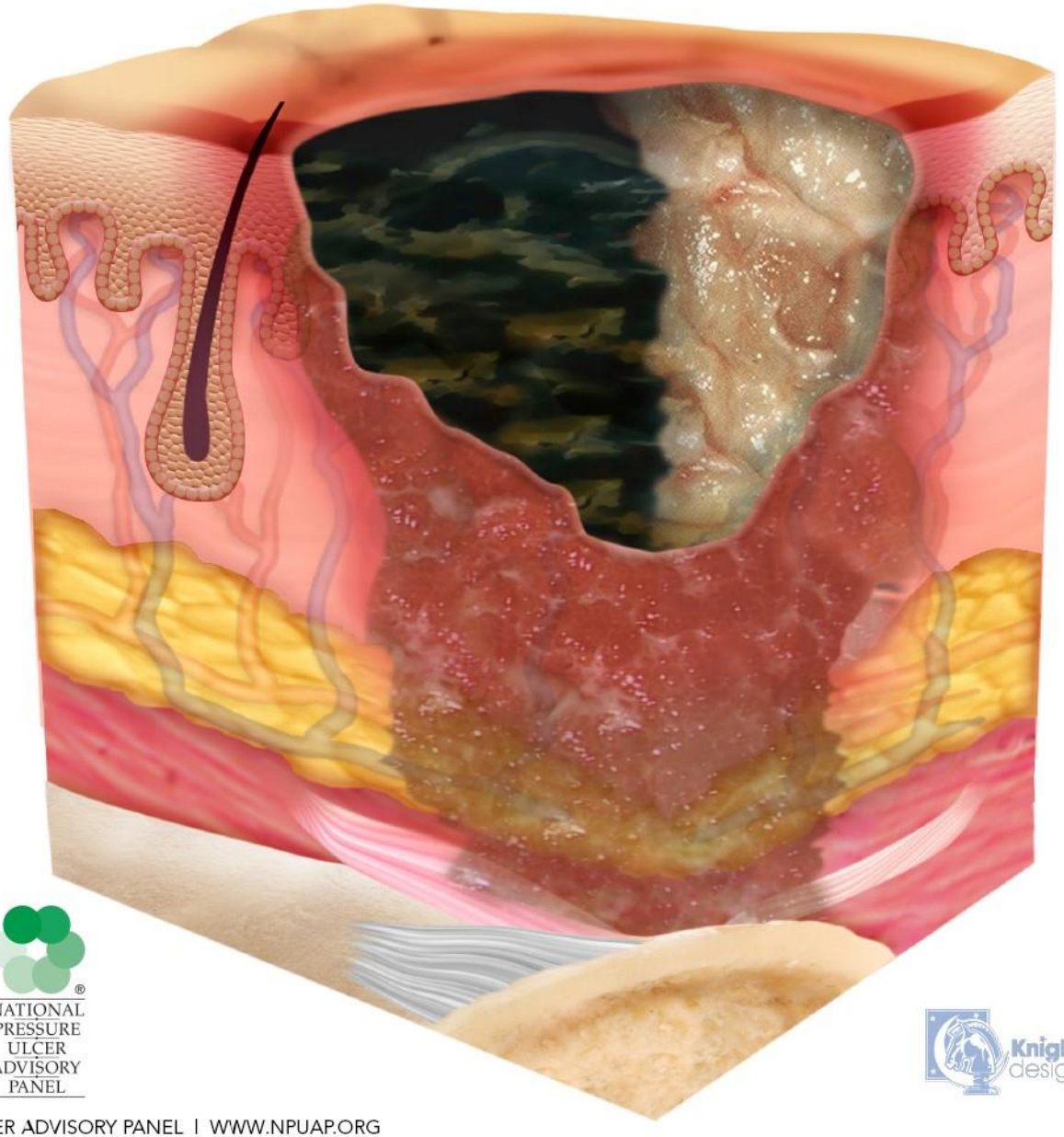
Unstageable Pressure Injury – Slough and Eschar



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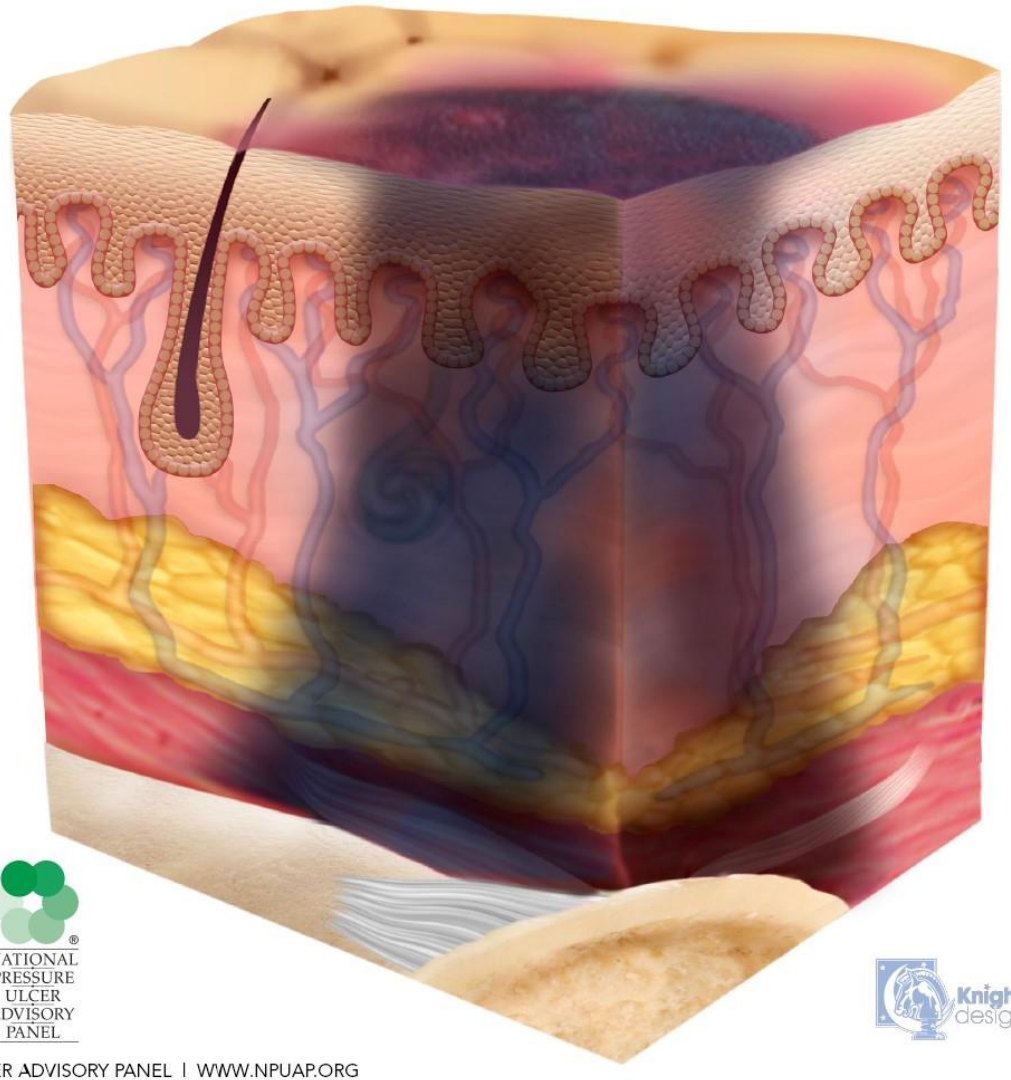
Deep Tissue Pressure Injury



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Improving Medicare Post-Acute Care Transformation Act of 2014 (IMPACT)

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- **Goal:** reform post acute care (PAC) payments & reimbursement while ensuring continued beneficiary access to the most appropriate setting of care [2]
- **Measure Domain**: skin integrity & changes in skin integrity
- **Outcome Measure:** Percent of residents or patients with pressure ulcers that are new or worsened.
- **Target Date** Oct. 2016: long term care hospitals (LTCHs), inpatient rehabilitation facilities (IRFs,) and skilled nursing facilities (SNFs) to report standardized assessment data for the skin integrity and changes in skin integrity Quality Measure Domain (QMD)
- **QMD reports:** percent of patients/ residents with Stage 2-4 pressure ulcers that are new or worsened since admission.

Participant Poll

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Does your facility report standardized assessment data for skin integrity and changes in skin integrity Quality Measure Domain?

Yes

No

Unsure

Quality Measure Description

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- SNF Data: data from MDS 3.0 & measure is restricted to short-stay residents defined as ≤ 100 days in SNF
- LTCH Data: LTCH Care Data Set is for all patients
- IRF Data: IRF-PAI for IRF patients & limited to Medicare part A and C patients
- Data affects payment determination beginning 2018
- Nutrition interventions should be part of prevention & healing strategy for QMD

Rationale for Pressure Ulcer (Injury) Quality Measure

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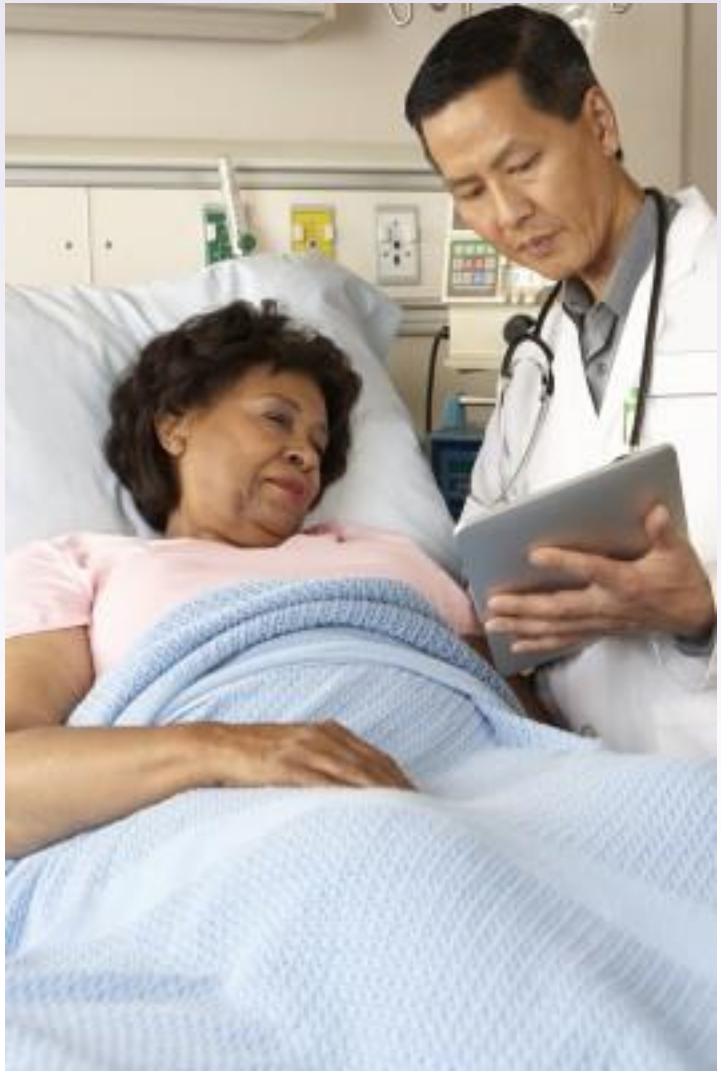
- Linked to malnutrition
- Increases mortality in elderly, 70% occur in adults > 70
- Longer hospital stays ⇧cost of care
- Cause discomfort & pain
- Can lead to septicemia & osteomyelitis
- Pressure injuries are high cost adverse condition across all settings
- Burden of litigation associated with pressure injuries

Age Related Skin Changes

- Flattening of the dermal epidermal junction
- Slower cell turnover, decreased elasticity
- Thinning of subcutaneous layers,
- Decrease in overall muscle mass,
- Decreased intradermal vascular perfusion and oxygenation.

Malnutrition



- Increases morbidity and mortality.
- Decreases function and quality of life.
- Increases frequency and length of hospital stay.
- Increases health care costs.
- Lack of calories, protein or other nutrients needed for tissue maintenance and repair [3,4]

Definitions: Adult Malnutrition

- "Malnutrition is most simply defined as any nutritional imbalance." (Dorland 2011)

- Undernutrition: lack of calories, protein or other nutrients needed for tissue maintenance and repair.

- Undernutrition and malnutrition used interchangeably.

Diagnosing Adult Malnutrition

Identification of ≥2 of the following characteristics: [4]

1. Insufficient energy intake
2. Weight loss
3. Loss of muscle mass
4. Loss of subcutaneous fat
5. Localized or generalized fluid accumulation that may sometimes mask weight loss
6. Diminished functional status as measured by hand grip strength (strong research; cost effective)

Inflammation & Malnutrition

- Inflammation (d/t infection, injury, surgery, etc.): an important underlying factor that increases risk for malnutrition.
- May contribute to suboptimal response to nutrition intervention and increased risk of mortality.[5]

Malnutrition & Pressure Ulcers

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Fry

- Pre-existing malnutrition/weight loss increased the odds of developing a PU 3.8 times. [6]

Banks

- Australia, odds ration of having a pressure ulcer are higher with malnutrition in acute and LTC. [7]

Iizaka

- Home care study in Japan: ≥ 65, rate of malnutrition 58.7% with pressure ulcers compared to 32.6% without them. [8]

Addressing the Skin Integrity QMD

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Nutrition Guidelines

2014 National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel, Pan Pacific Pressure Injury Alliance Pressure Ulcer Prevention and Treatment Guidelines [9]

Nutrition Care Process

Strength of Recommendations (SOR) Assists Health Professionals Prioritize Interventions

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Strong positive recommendation: definitely do it

Weak positive recommendation: probably do it

No specific recommendation

Weak negative recommendation: probably don't do it

Strong negative recommendation: definitely don't do it

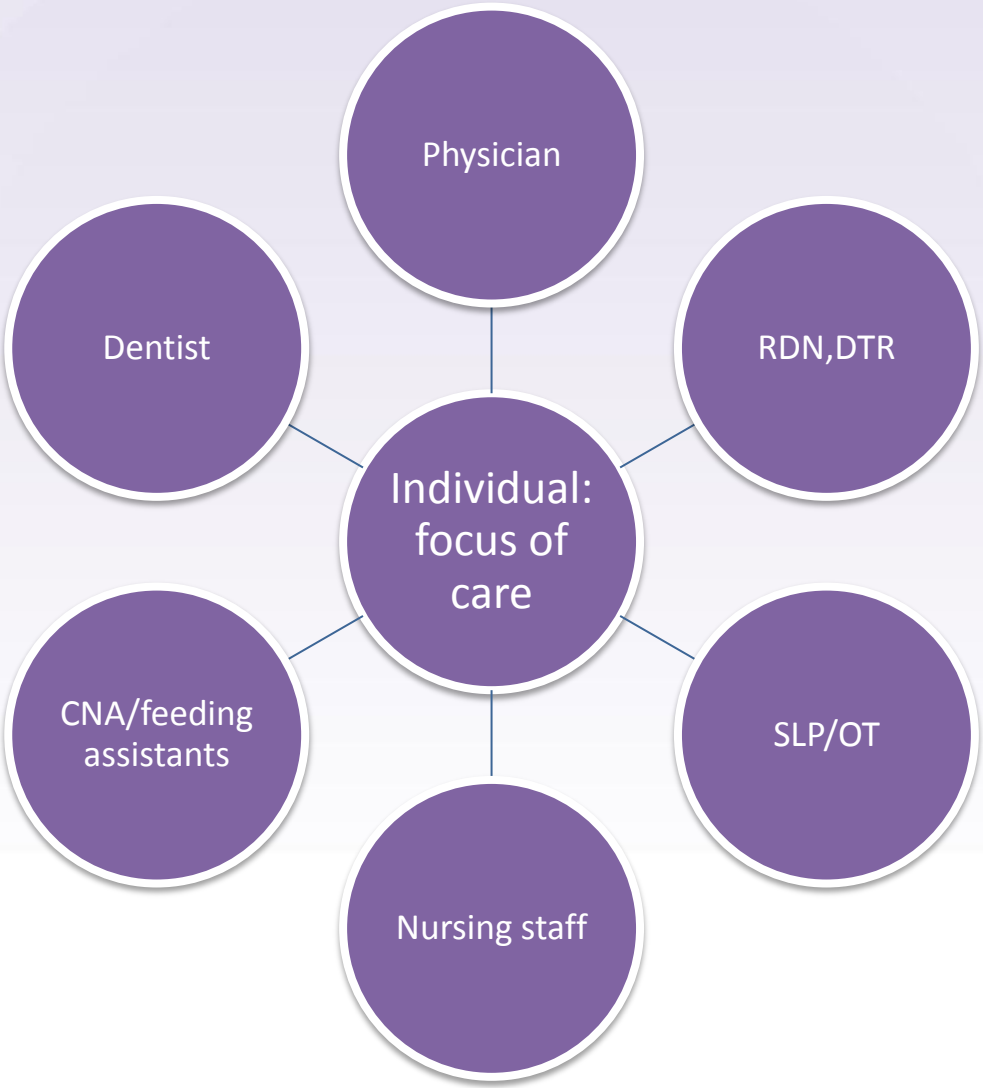
Nutrition Care Process

Academy's Nutrition Care Process

Nutrition:

1. Assessment
2. Nutrition Diagnosis
3. Intervention
4. Monitoring and Evaluation

Interprofessional Team



Individualized Nutrition Care

Nutrition Screening

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1. Screen nutritional status for each individual at risk of or with a pressure ulcer:
   - at admission to a health care setting;
   - with each significant change of clinical condition; and/or
   - when progress toward pressure ulcer closure is not observed. (Strength of Evidence = C, Strength of Recommendation = probably do it)

Nutrition Screening

2. Use a valid and reliable nutrition screening tool to determine nutritional risk. (Strength of Evidence = C, SOR= Probably do it)

3. Refer individuals screened to be at risk of malnutrition and individuals with an existing pressure ulcer to a registered dietitian or an interprofessional nutrition team for a comprehensive nutrition assessment. (Strength of Evidence = C; SOR=probably do it.)

Nutrition Screening Tool

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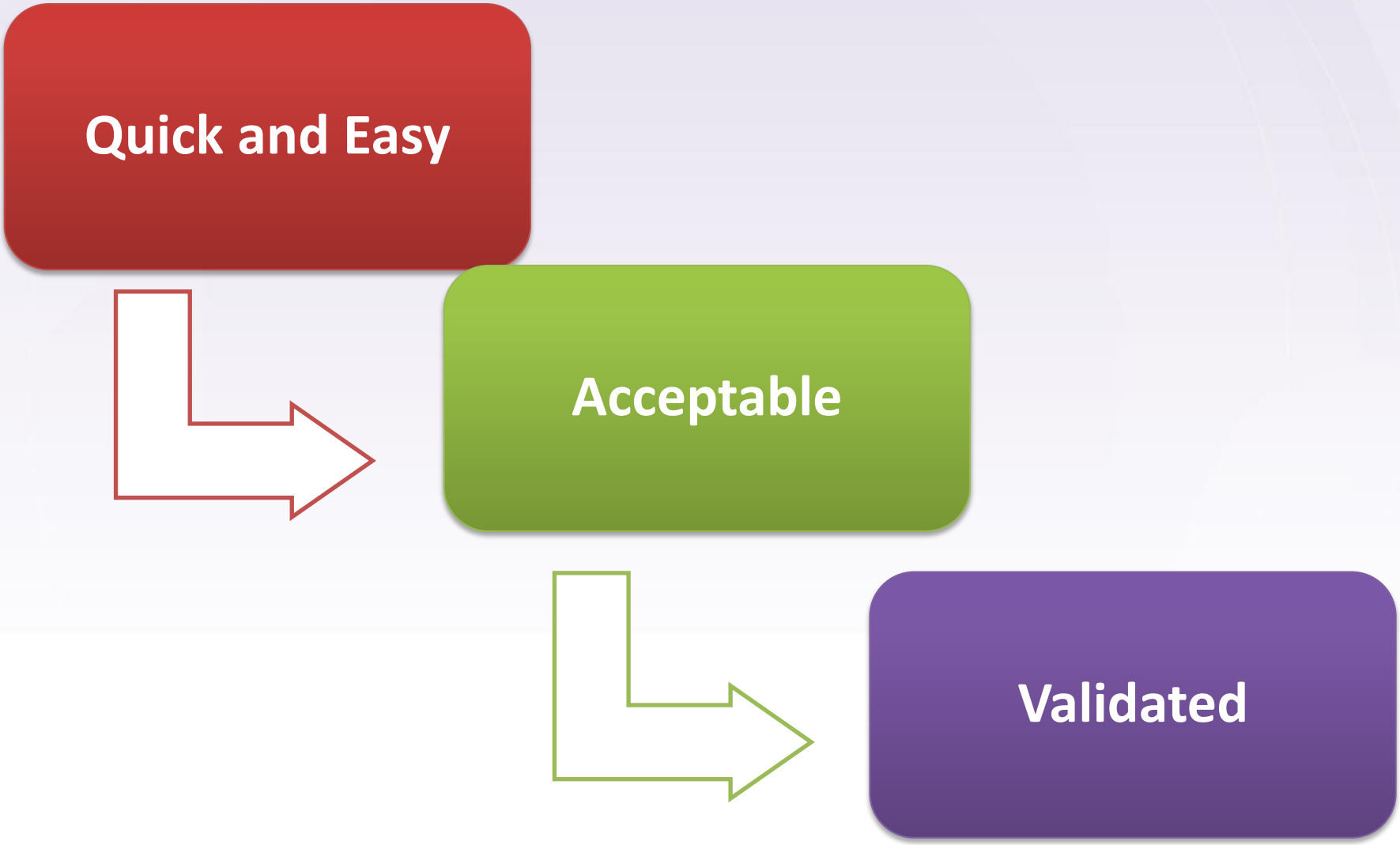

Validated Screening Tools

MST Malnutrition Valid and reliable for use in ***acute care and ambulatory care*** to identify malnutrition

MNA Mini-Nutritional Assessment

Validated in ***individuals with PUs***

Validated and easy to use in ***older adults***

MUST Malnutrition Universal Screening Tool

To identify risk of undernutrition Validated for use in ***older adults admitted to acute care***

SNAQ Short Nutrition Assessment Questionnaire

Acute care, residential care and community adults ≥65.

Nutrition Assessment

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Medical History	Diet History, Food Intake	Body Composition
Diagnosis/ recent changes in condition (depression) Medications Risk or S/S of malnutrition, dehydration	Adequacy of food/fluid/protein intake compared to needs Chewing, swallowing, self feeding issues	Height, weight, wt. history, UWL (≥5% in 30 days or ≥10% in 180 days), BMI ≤19 Insidious weight loss

Nutrition Assessment

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Current Interventions	Interviews	Nutrition Focused Physical Exam
Food & dining interventions Oral nutrition supplements Enteral nutrition support	Interviews with resident, family, caregivers Understanding and acceptance of nutrition interventions	Overall appearance, Fragile skin Mobility-able to move independently Oral examination

Dietary Intake

- Depression affects appetite of 30% of adult outpatients.
- Loss of appetite related to high risk of malnutrition.
- Increases risk of poor wound healing.
- Decreased ability to eat independently ↑ risk for pressure ulcers and delays healing.[10,11]

Nutrition Assessment

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1. Assess weight status for each individual to determine weight history and significant weight loss from usual body weight (≥5% change in 30 days or ≥10% in 180 days)**.**
SOE = C; SOR= Probably do it

2. Assess the individual's ability to eat independently.
SOE = C; SOR= Definitely do it

3. Assess the adequacy of total nutrient intake (food, fluid, oral supplements, enteral/parenteral feedings)**.**
SOE = C; SOR= Definitely do it

What about Biochemical Data?

No lab test can specifically determine an individual's nutritional status.

- Serum protein(albumin& prealbumin) levels may be affected by metabolic stress, inflammation, renal function, hydration and other factors.[12,13]

What about labs for diagnoses of malnutrition?

Not recommending any specific inflammatory markers for malnutrition diagnosis at this time.

Inflammatory biomarkers, C-reactive protein and other positive acute phase reactants were excluded – **no conclusive relationship to nutritional status** [4]

Care Planning

1. Develop an individualized nutrition care plan for individuals with or at risk of a pressure ulcer. (SOE = C, SOR= Probably do it)

1. Follow relevant and evidence-based guidelines on nutrition and hydration for individuals who exhibit nutritional risk and who are at risk of pressure ulcers or have an existing pressure ulcer. (SOE=C, SOR= Probably do it)

General Recommendation: Nutrition Intervention for Pressure Injuries (Ulcers)

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CALORIE

What Does the Evidence Suggest?

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Energy Intake

Responsive increase in metabolic rate which increases caloric needs

Energy is essential for pressure ulcer healing

Need to provide adequate calories to promote anabolism, nitrogen and collagen synthesis

Energy Intake

1. Provide individualized energy intake based on underlying medical condition and level of activity. (SOE = B, Probably do it)
2. Provide 30 to 35 kcalories/kg body weight for adults at risk of a pressure ulcer who are assessed as being at risk of malnutrition. (SOE = C, SOR= Probably do it)
3. Provide 30 to 35 kcalories/kg body weight for adults with a pressure ulcer who are assessed as being at risk of malnutrition. (SOE = C, SOR= **Definitely do it**)

Energy Intake

4. Adjust energy intake based on weight change or level of obesity. Adults who are underweight or who have had significant unintended weight loss may need additional energy intake. (SOE = C, SOR= **Definitely do it)**
5. Revise and modify/liberalize dietary restrictions when limitations result in decreased food and fluid intake. These adjustments should be made in consultation with a medical professional and managed by a registered dietitian whenever possible. (SOE = C, SOR= Probably do it)

Obese Individuals

- No evidence based guidelines available R/T the nutritional needs of the obese person with pressure injuries
- Adequate calories, protein, fluids and nutrients are needed for healing
  - General consensus- diets should be liberalized to promote healing
  - Consider Mifflin-St. Jeor formula to assess energy
  - Once the pressure injury is completely healed, diet restrictions may be gradually implemented as needed
- Monitor skin integrity and coordinate with RDN (ongoing)

Weigh Risk vs. Benefits of Treatment for Adults with Pressure Injuries

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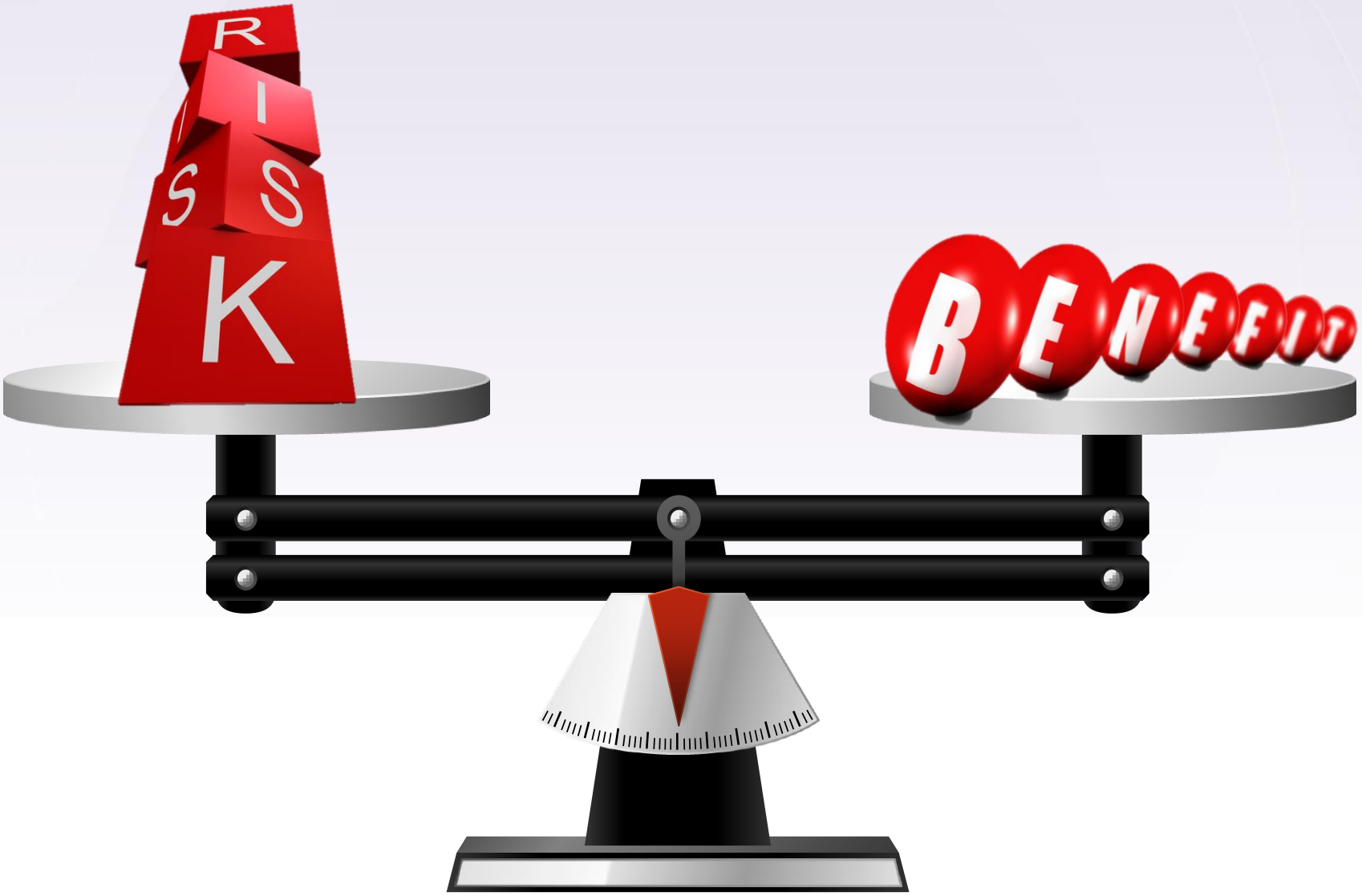


Energy Intake

6. Offer fortified foods and/or high calorie, high protein oral nutritional supplements between meals if nutritional requirements cannot be achieved by dietary intake. (SOE = B, SOR= **Definitely do it)**

Stratton results of 4- RCTs compared ONS with routine care & 1 RCT Tube feeding to routine care indicate reduction in pressure injury dev. [14]

ONS given between meal result in better absorption of nutrients [15]

Medical Food Supplement

- Foods that are specially formulated & processed for the resident who is seriously ill or who requires the product as a major treatment modality

- Criteria:
  - for oral or tube feeding
  - labeled for the dietary management of a specific medical disorder, disease, or condition for which there are distinctive nutritional requirements
  - intended to be used under medical supervision

http://www.cfsan.fda.gov/~dms/medfguid.html

Protein

What does the Evidence Suggest?

All stages require adequate protein

Increased protein levels have been linked to improved healing rates [16,17,18]

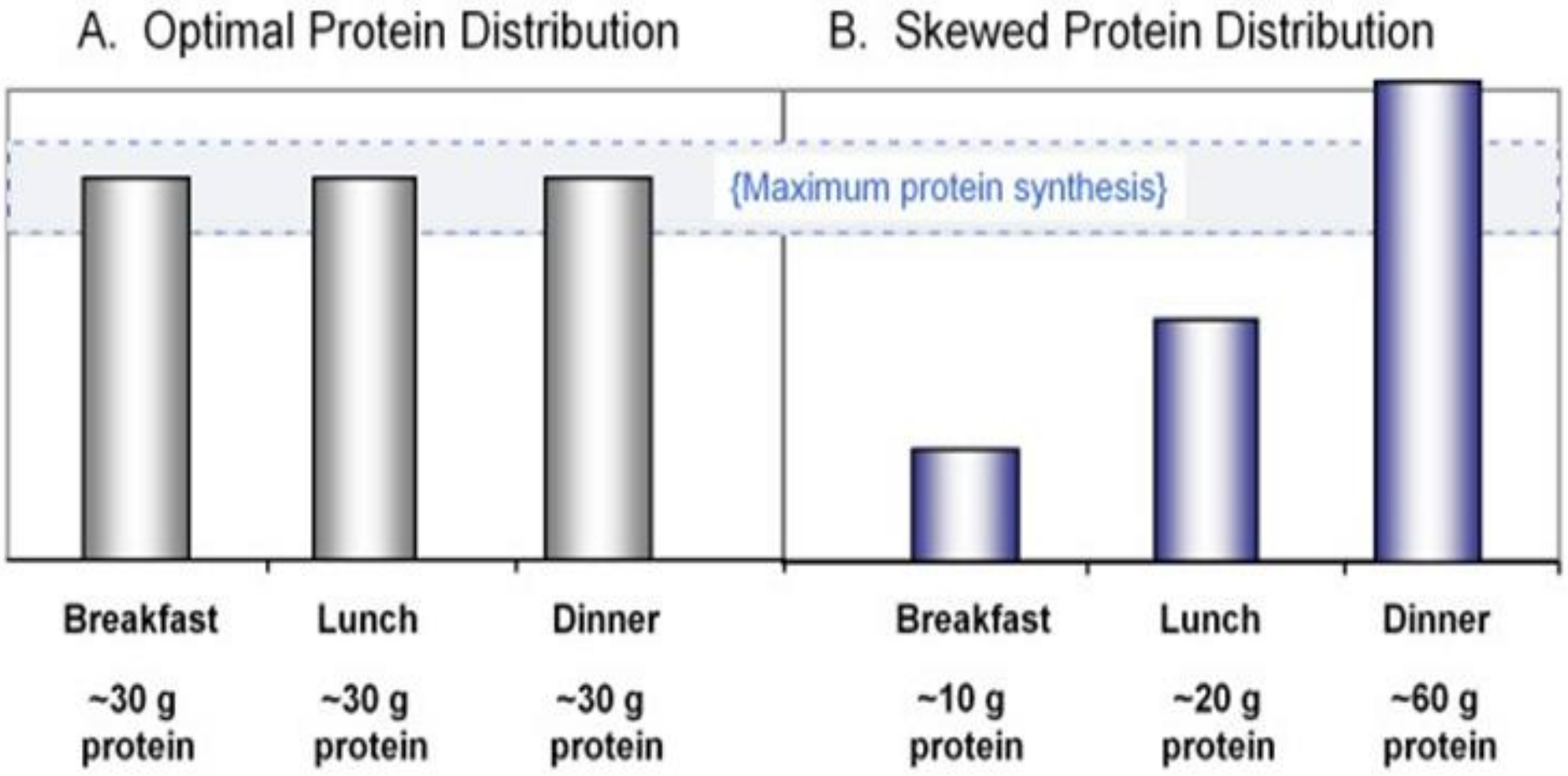
Inadequate Protein:

- prolongs inflammatory state
- inhibits antibody responses
- ↓collagen synthesis & deposition
- ↓ cell multiplication
- ↓wound contraction

What Does the Evidence Suggest for Optimal Protein Intake for Older Adults

- Based on metabolic changes & loss of muscle mass with aging protein ⇧ 1.2 – 1.5 g/kg/day is recommended [19]
- Positive association between protein ingestion and muscle mass [20]
- Protein spread equally between breakfast lunch and dinner [21]

Protein Distribution



Complications of Loss of Lean Body Mass [22]

Loss of LBM	Complications	Associated Mortality
10%	↓immunity, ↑ infections	10%
20%	↓ healing, weakness, infection	30%
30%	too weak to sit, pressure injuries, pneumonia, no healing	50%
40%	**DEATH,** usually from pneumonia	100%

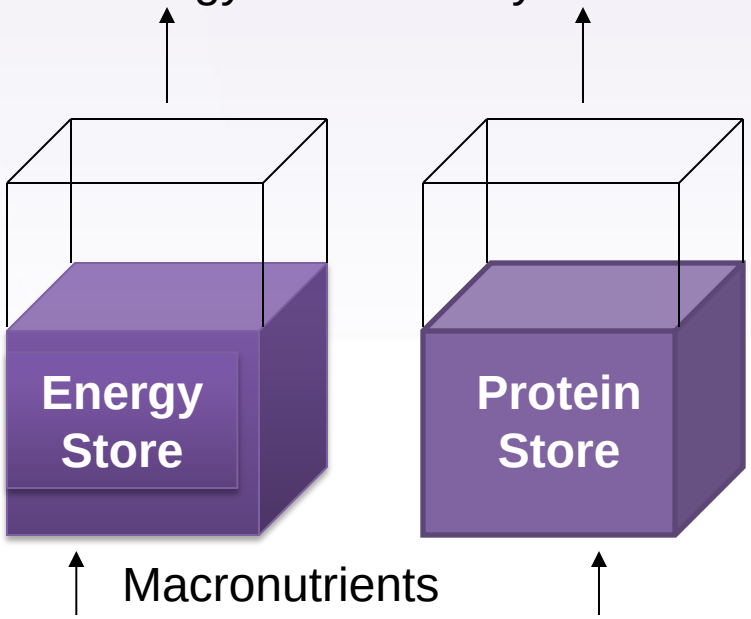
The Non-healing Chronic Wound

Failure to Heal by 12 Weeks [22]

The Non-healing Wound

↑ Catabolism ↓ Anabolism

Energy Protein Synthesis

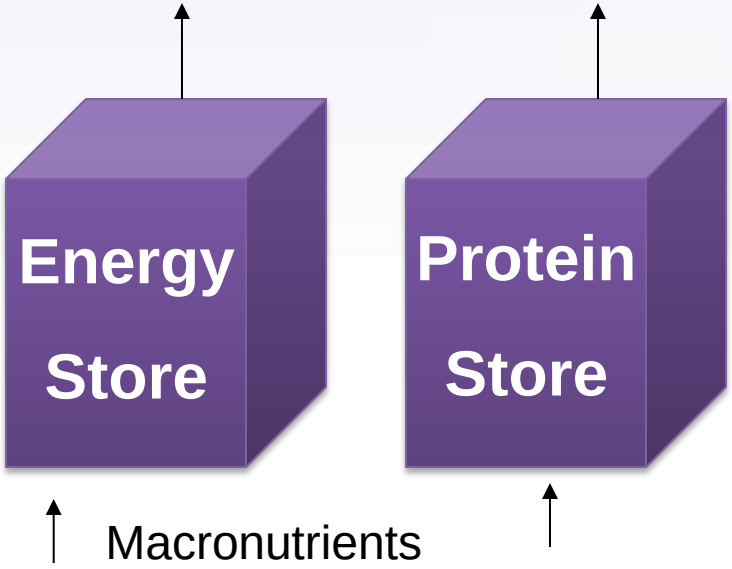


The Healing Wound

Wound contraction

↑ Anabolism ↓ Catabolism

Energy Protein synthesis



Protein Intake

1. Provide adequate protein for positive nitrogen balance for adults assessed to be at risk of a pressure ulcer. (SOE = C, SOR= Probably do it)
2. Offer 1.25 to 1.5 grams protein/kg body weight daily for an adult at risk of a pressure ulcer who is assessed to be at risk of malnutrition when compatible with goals of care, and reassess as condition changes. (Strength of Evidence = C), SOR =Probably do it
3. Provide adequate protein for positive nitrogen balance for an adult with a pressure ulcer. (Strength of Evidence = B, Probably do it)

Protein Intake

4. Offer 1.25 to 1.5 grams protein/kg body weight daily for adults with an existing pressure ulcer who is assessed to be at risk of malnutrition when compatible with goals of care, and reassess as condition changes. (SOE = C, SOR= Probably do it)
5. Offer high calorie, high protein nutritional supplements in addition to the usual diet to adults with nutritional risk and pressure ulcer risk, if nutritional requirements cannot be achieved by dietary intake. (SOE = A, SOR= Probably do it)

Participant Poll

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In your opinion,
do your patients with pressure injuries
eat enough protein?

Yes

No

Unsure

Protein Needs: 150#

Protein Values	Healthy: 0.8 gms/Kg (1.0 older adult)	Pressure Injury: 1.25-1.5 gms/Kg
	54.5 - 68 grams	**85 – 102 grams (+30-47 g)**
Food needed to achieve protein values	Breakfast: 1 egg, 8 oz milk (15) Lunch: 2oz meat, 4oz milk (18) Dinner: 3oz meat, 4oz milk (25) **Total** (+ starches, veg. 21= 79)	Breakfast: 2 eggs, 8 oz milk (+7) Lunch: 2oz meat, 8oz milk (+4) Dinner: 3 oz meat, 8 oz milk (+4) Snack: 8 oz shake (+8) **102 Total**

Can your patients eat all this food?

Protein Intake

6. Assess renal function to ensure that high levels of protein are appropriate for the individual. (SOE = C, SOR= **Definitely do it)**
   - Clinical judgment is required to determine the appropriate level of protein for each individual, based on the number of pressure ulcers present, overall nutritional status, co-morbidities, and tolerance to nutritional interventions.

Protein Intake

7. Supplement with high protein, arginine and micronutrients for individuals with a pressure ulcer Category/Stage III or IV or multiple pressure ulcers when nutritional requirements cannot be met with traditional high calorie and protein supplements. (SOE = B, SOR= Probably do it)

CUBE Trial

A multi-country, randomized, placebo-controlled trial to demonstrate the efficacy of a specific 'arg+ONS-spec.') on pressure ulcer healing in **non-malnourished patients with stage III-IV ulcers** [23]

Ready-to-drink, high-protein, arginine enriched nutritional supplement

Containing per 200-ml serving:
20 g protein
3 g L-arginine
250 kcal
Vitamins and micronutrients including:
250 mg vitamin C
38 mg vitamin E (α-TE)
9 mg zinc
1.5 mg carotenoids

Synergistic Effect of Nutrients

Nutrient	Function
Energy	Increased requirements based on assessed needs
Protein	Collagen synthesis; wound contraction; scar formation; immune response
Arginine	Collagen deposition; wound strength; serves as a precursor of nitric acid improves immune response protein retention
Citrulline	Boosts nitric-oxide production in the body; bypasses kidney & liver breakdown; converts to Arginine for more efficient nitric oxide production
Zinc	Protein synthesis; cellular growth; deficiency impairs healing
Vitamin A	Collagen synthesis; immune response; wound closure
Vitamin C	Collagen synthesis; wound strength
Vitamin E	Wound strength; antioxidant

Patient Inclusion

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Patients

- Between 18 yrs and 90 yrs
- Stage III or IV pressure ulcers
  (EPUAP & NPUAP grading)
- BMI ≥18.5 (18-70 yrs) or BMI ≥21 (>70 yrs)
- Nursing home or hospital based

Total group (ITT)	
Age*	74.9 ± 14.6 y
BMI*	24.4 ± 4.8 kg/m^2
Ulcer stage III/IV	31/12 (72/28%)
Pressure ulcer size* (ellipse)	10.5 ± 11.5 cm^2
PUSH tool score*	11.5 ± 3.1

No sign. differences between groups at baseline
* means ± SD

Set-up

43 patients in intention-to-treat analysis (ITT)

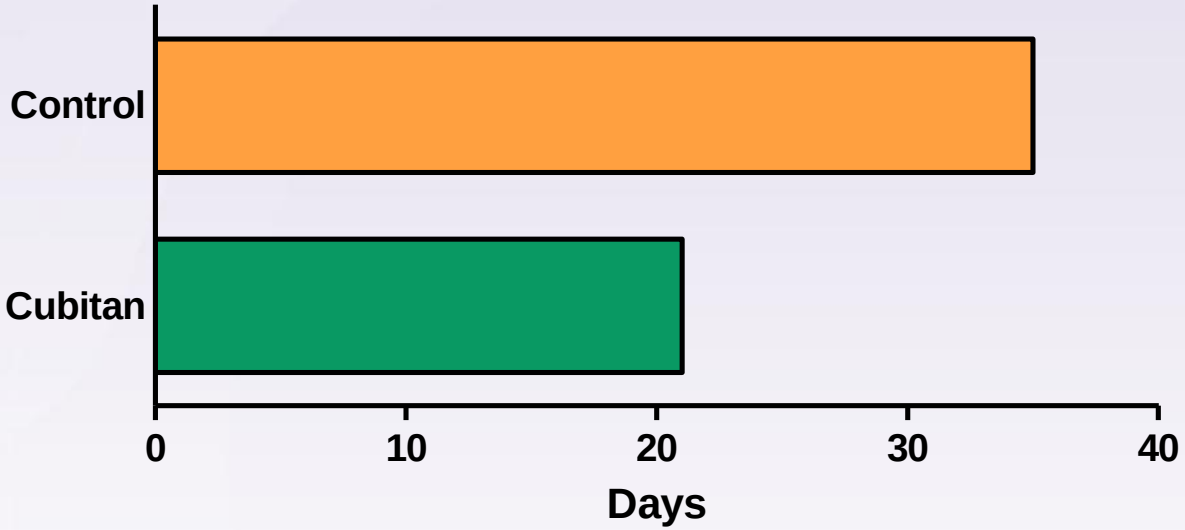
-Intervention ('arg+ONS-spec.') group: 22 patients

-Control (placebo) group: 21 patients

-Product use: 3x200 ml/day; max. 8 weeks

-Standard diets and pressure ulcer care were maintained

Earlier Reduction in Ulcer Size from Baseline



With specific oral nutritional support a significant reduction in ulcer size was reached 2 weeks earlier compared to the control group.

- First time-point with a significant reduction compared to baseline
- Arg+ONS-spec.= day 21, P=0.011
- Control group = day 35, P= 0.019
- Means ± SEM; data adjusted for center

Oligo Element Trial Study Group [24]

- Multicenter, RCT to evaluate supplementation with arginine, zinc & antioxidants in high-calorie, high-protein formula to improve pressure injury(ulcer) healing [26]
- 200 malnourished patients with stage II, III, and IV pressure injuries(ulcer)
- 8 week trial – LTC and home care in Italy
- Majority of pressure injurys on sacrum
- Mean age 81 in both groups

Malnourished criteria

- UWL – 5%(30 days) and 10% 3months
- BMI< 20 age <65 and < 21 > 65
- Food intake =<60% of estimated total daily energy requirements in the week before the study. RDN calculated energy needs.
- Both groups received a 400 mL high-calorie, high-protein formula (100 Ml ,4x /day)
- RDN & RN monitored compliance
- Standard wound care for all

Nutritional Supplement in 100mL

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Intervention ONS

- Protein 10 grams
- Arginine-L 1.5
- Zinc 4.5 mg
- Copper 675 mcg
- Vitamin C 125 mg
- Vitamin E 19.0 mg
- 125 kcalories

Standard: Control ONS

- Protein 10 grams
- Arginine-0
- Zinc 2.3 mg.
- Copper 338 mcg
- Vitamin C 19mg
- Vitamin E 2.3 mg
- 125 kcalories

Conclusion

- 69.9% in intervention formula group had 40% or greater reduction in pressure injury(ulcer) size compared to 54.1% in control
- The efficacy of these nutrients in wound healing is likely synergistic because there is no evidence supporting an independent effect when given alone
- This nutritional intervention may be beneficial when added to optimized local wound care for the treatment of pressure injuries(ulcers) in malnourished patients.

Fluids: What Does the Evidence Suggest?

Dehydration is a risk factor for pressure injury development

Hydration needs must be met to assure proper prevention and healing

Hydration

1. Provide and encourage adequate daily fluid intake for hydration for an individual assessed to be at risk of or with a pressure ulcer. This must be consistent with the individual's comorbid conditions and goals. (SOE = C, SOR= **Definitely do it)**

Hydration

2. Monitor individuals for S/S dehydration: changes in weight, skin turgor, urine output, elevated serum sodium and/or calculated serum osmolality. (SOE = C, SOR= Probably do it)
3. Provide additional fluid for individuals with dehydration, elevated temp, vomiting, profuse sweating, diarrhea or heavily draining wounds. (SOE = C, SOR= **Definitely do it)**

Methods of Calculating Fluid Needs

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1 mL/calorie consumed

In generally healthy individuals that are adequately hydrated, food accounts for >20% of total fluid intake.

Total fluid needs include water content of food.

Hydration Interventions

- Add variety: soft drinks, lemonade, coffee, tea, juice
- Glass of water with meals
- Hydration pass with choices
- Juice machines with resident access
- Hydration in rehab department

What does the Evidence Suggest?

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Micronutrients

Micronutrients

- Is the diet served consumed?
- Do mega doses result in adverse outcomes?
- Are deficiencies suspected or confirmed?

Micronutrients

Most nutrient needs can be met through a healthy diet

However, individuals with pressure injuries(ulcers) may not be consuming an adequate diet to meet established nutritional reference standards

Vitamins and Minerals

1. Provide/encourage individuals assessed to be at risk of pressure ulcers to consume a balanced diet that includes good sources of vitamins and minerals. (SOE = C, SOR = **Definitely do it)**

1. Provide/encourage an individual assessed to be at risk of a pressure ulcer to take vitamin and mineral supplements when dietary intake is poor or deficiencies are confirmed or suspected. (SOE = C, SOR= Probably do it

3. Provide/encourage an individual with a pressure ulcers to consume a balanced diet that includes good sources of vitamins and minerals. (SOE = B, SOR = **Definitely do it)**

4. Provide/encourage an individual with a pressure ulcer to take vitamin and mineral supplements when dietary intake is poor or deficiencies are confirmed or suspected. (SOE = B, SOR= Probably do it)

Vitamin C

Mega doses of vitamin C are not recommended

There is no evidence to support vitamin C above the RDI unless a deficiency is diagnosed or suspected.[24]

Zinc

Zinc requirements can be met by 2 servings/ day of animal protein.

A multivitamin/mineral supplement daily (15 mg zinc) may be adequate.
(DRI 2004)

Zinc

No research has demonstrated an effect of zinc supplementation on improved pressure injury healing.

When clinical signs of zinc deficiency are present, zinc should be supplemented at ≤40 mg elemental zinc/day (UTL). 220 mg. zinc sulfate=50 mg elemental zinc

- Doses >40 mg/day can adversely affect copper status and possibly result in anemia.
- High serum zinc levels may inhibit healing.

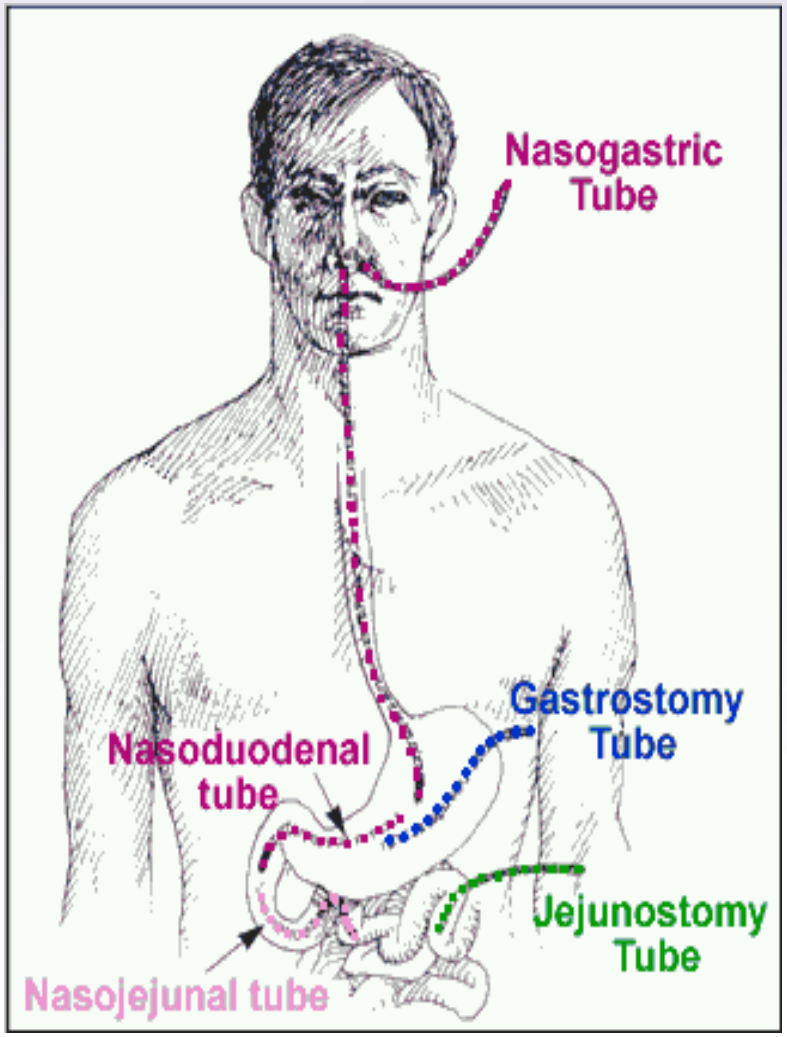
Nutrition Support

Consider nutritional support (enteral or parenteral nutrition) when oral intake is inadequate. This must be consistent with the individual's goals. (Strength of Evidence = C, SOR= Probably do it)

Nutrition Support

- NPO >3-5 days
- Hydration with IVs does not supply nutrients
- Places individual at risk of malnutrition and pressure injury (ulcer) development
- Individuals have the right to request or refuse nutrition & hydration as medical treatment.[26]

Enteral Feedings



Determine if patient ***actually*** receives TF as prescribed:

- Is TF given as ordered (product, mLs/hr)?
- Are flushes given as ordered (flushes, flushes with meds)?
- Is the strength correct?
- Is the individual tolerating the feeding?
- Round the clock or intermittent (turned off)?

Achieving Positive Outcomes

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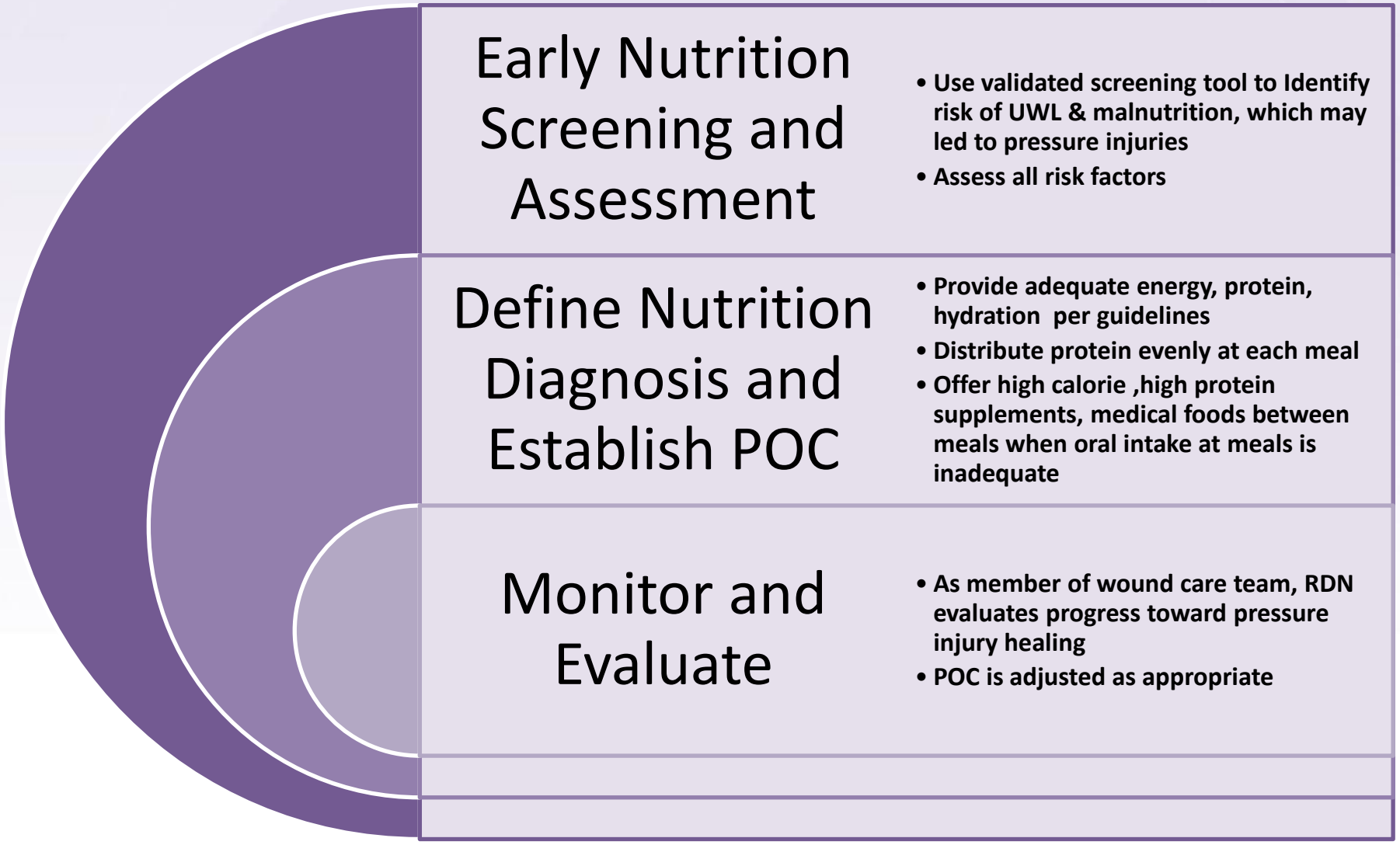

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Questions?

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