

Nutrition Matters: Micronutrients and Pressure Injury Healing

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September 18, 2018



Disclosures

- Honorarium provided by Nutricia
- Executive Board of Director, National Pressure Ulcer Advisory Panel
- Assistant Chief, NFS, Southern Nevada Healthcare System, Las Vegas
- Author:
 - Nutrition Assessment: Clinical and Research Applications. 1e Jones and Bartlett Publishers, Burlington, MA
 - Bernstein MA and Munoz N eds. Nutrition for the Older Adult. Jones and Bartlett Publishers, Burlington, MA. Second Edition. October 2014.
- ***None pose a conflict of interest for this presentation***

The opinions reflected in this presentation are those of the speaker and independent of Nutricia North America

Learning Objectives



Understand the role of micronutrients in the management of pressure injuries.

Recognize the key micronutrients essential in promoting pressure injury healing.

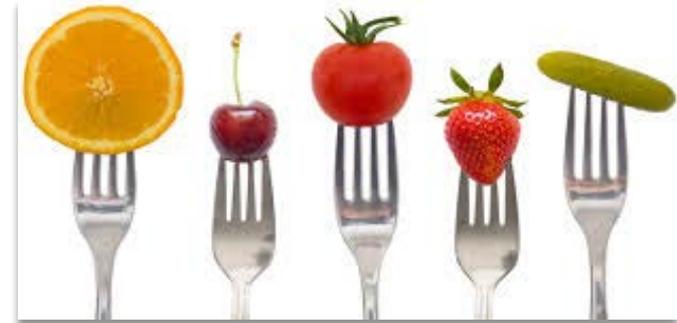
Implement patient-centered nutrition interventions for the management of pressure injuries.



Nutrition and Health

- Nutrition

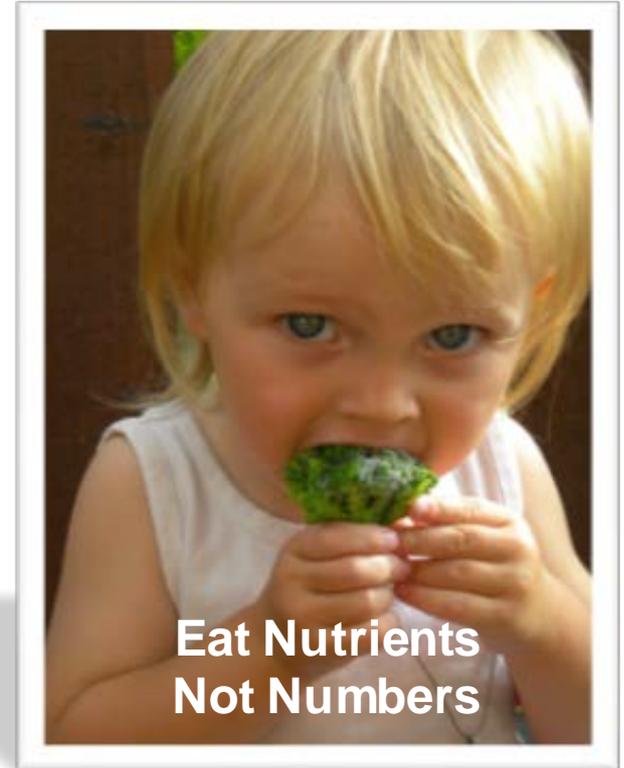
- Determinant of health
- Promotes physiological wellbeing
 - Also contributes to social, cultural, and psychological quality of life
- Promotes functionality
- Effective disease management approach
 - Can lessen chronic disease risk, slow disease progression, and reduce disease symptoms
 - Risk for developing pressure injuries
 - Management of pressure injuries



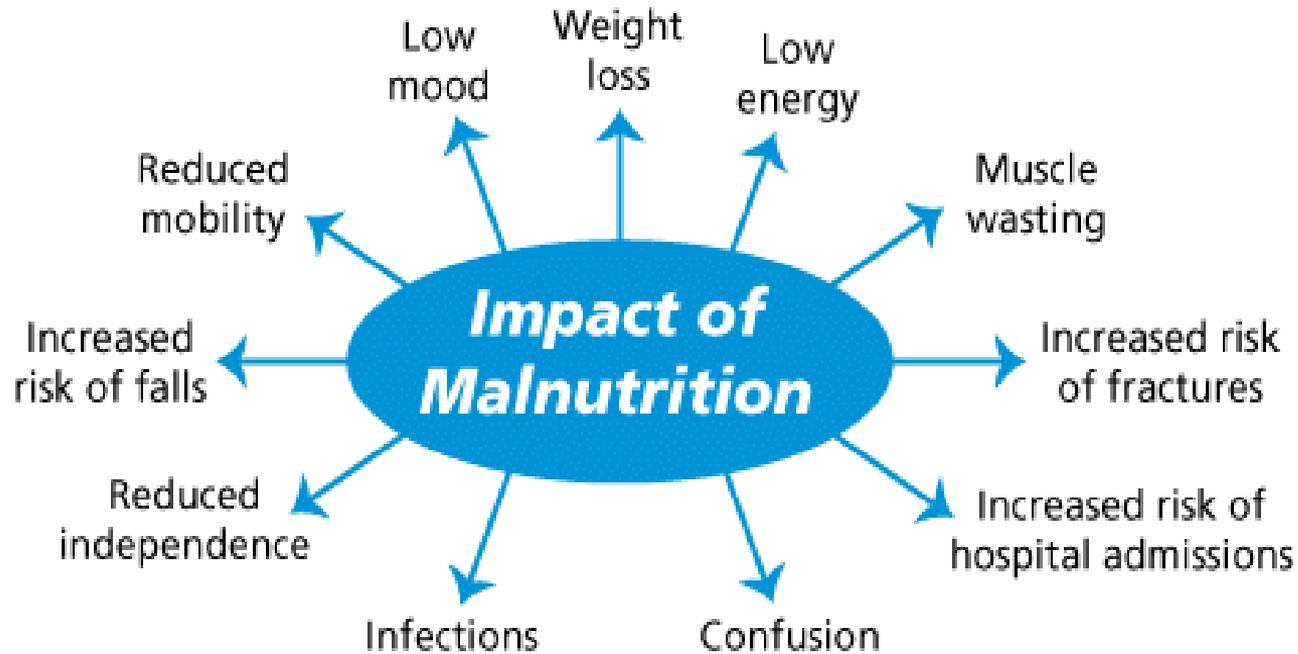
Nutrition and Health

To promote health

- Meet macronutrient needs:
 - Protein
 - Carbohydrates
 - Fat
- Ensure micronutrients are provided in sufficient amount to sustain body functions:
 - Vitamins
 - Minerals



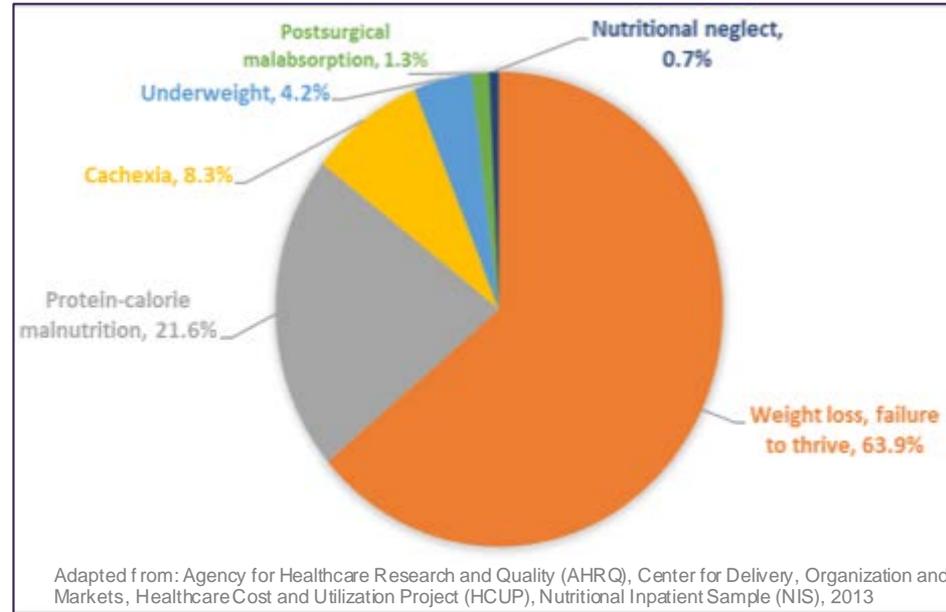
Malnutrition



What is the Nutritional Status of our Patients?

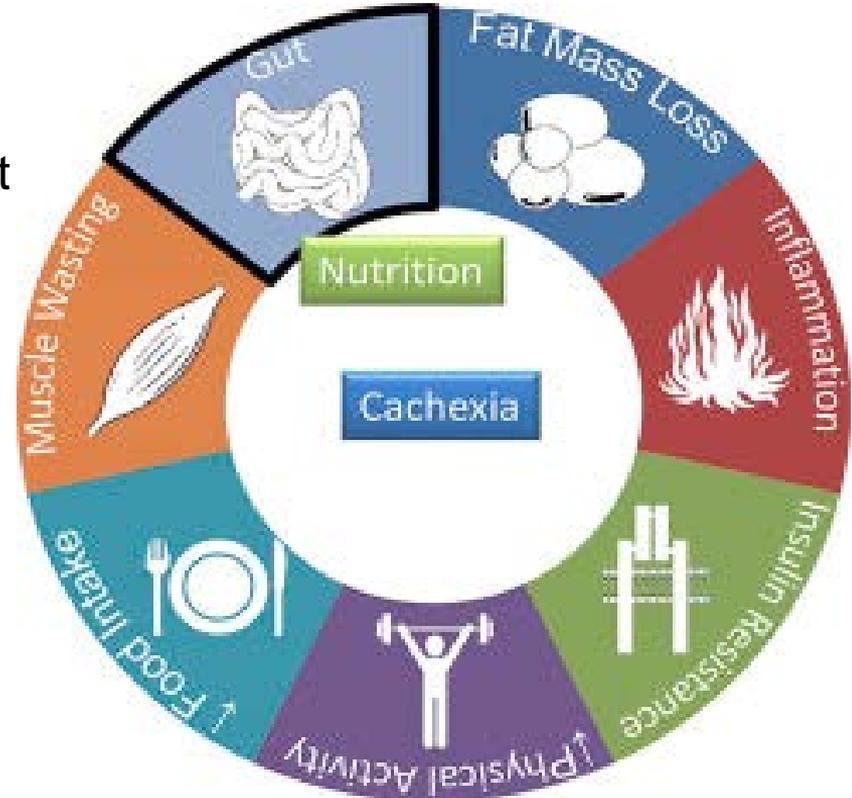
- Hospital inpatients
 - Protein-calorie malnutrition: The most common type of malnutrition
 - In 2013, there were 1.95 million hospital stays that involved malnutrition
 - 1.25 million malnutrition-related stays (63.9%) were categorized as protein-calorie malnutrition
 - 21.6% malnourished due to weight loss or failure to thrive

Types of malnutrition among hospital stays with malnutrition, 2013



What is the Nutritional Status of our Patients?

- Long-Term Care Setting
 - 20% of nursing home residents present with some form of malnutrition
 - Prevalence ranges from 1.5-66.5%
 - Due to variable malnutrition definitions

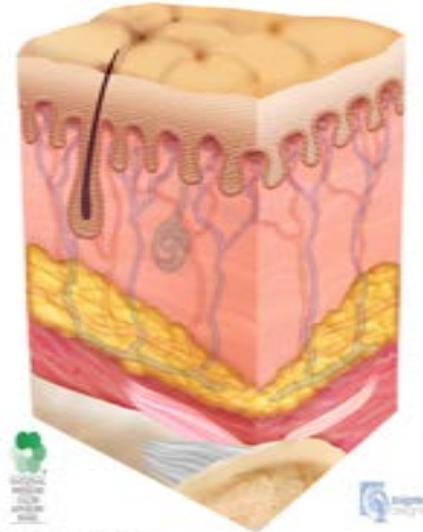


Pressure Injuries

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.

Healthy Skin – Lightly Pigmented



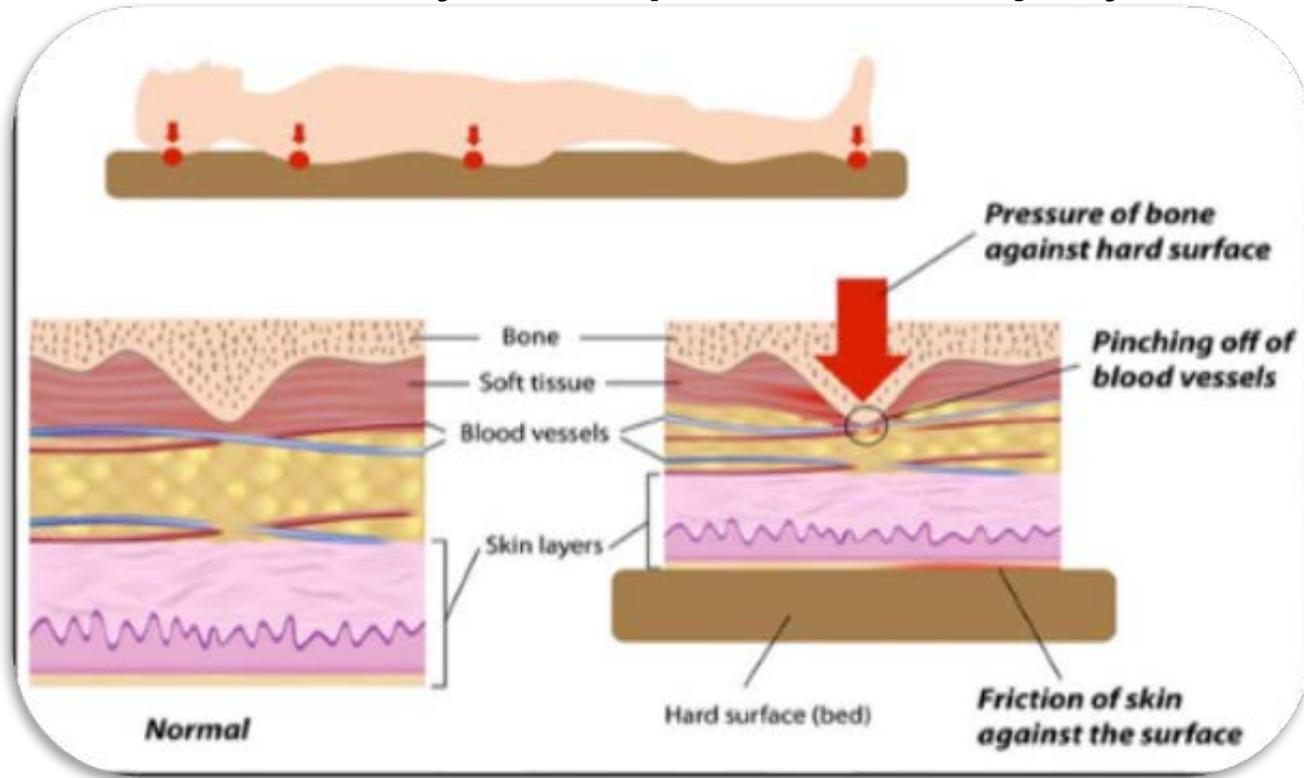
Nutrition Risk for Developing Pressure Injuries

- Unintended weight loss
- Undernutrition
- Increased nutrient needs
- Malnutrition
- Dehydration
- Low BMI
- Inadequate food and fluid intake
- Inability to feed self



Why the Interest in Pressure Injuries?

Anatomy of a pressure injury



Just the Facts

60,000 people die every year from hospital-acquired pressure injuries

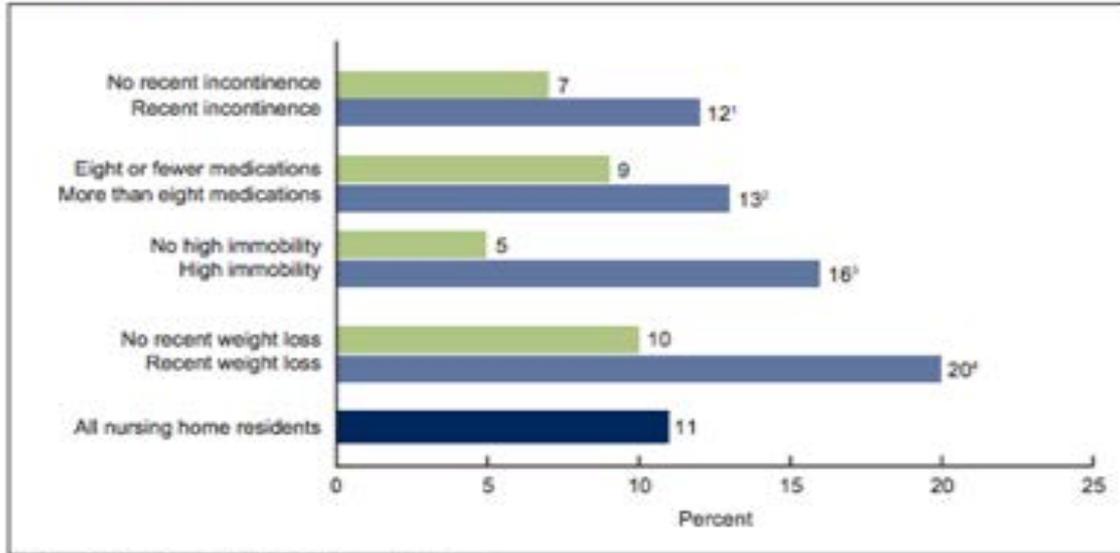


Just the Facts

Long-Term Care

Recent weight loss - 20% more likely to develop a pressure injury

Figure 3. Percentage of nursing home residents with pressure ulcers, by selected resident clinical characteristics: United States, 2004



¹ Significantly different from residents who had no recent incontinence.

² Significantly different from residents who took eight or fewer medications.

³ Significantly different from residents who had no high immobility.

⁴ Significantly different from residents who had no recent weight loss.

SOURCE: CDC/NCHS, National Nursing Home Survey.

In 2004:

- 11% of NH residents had pressure injuries
- Stage 2 pressure injuries - most common

Physiology of Pressure Injury Healing

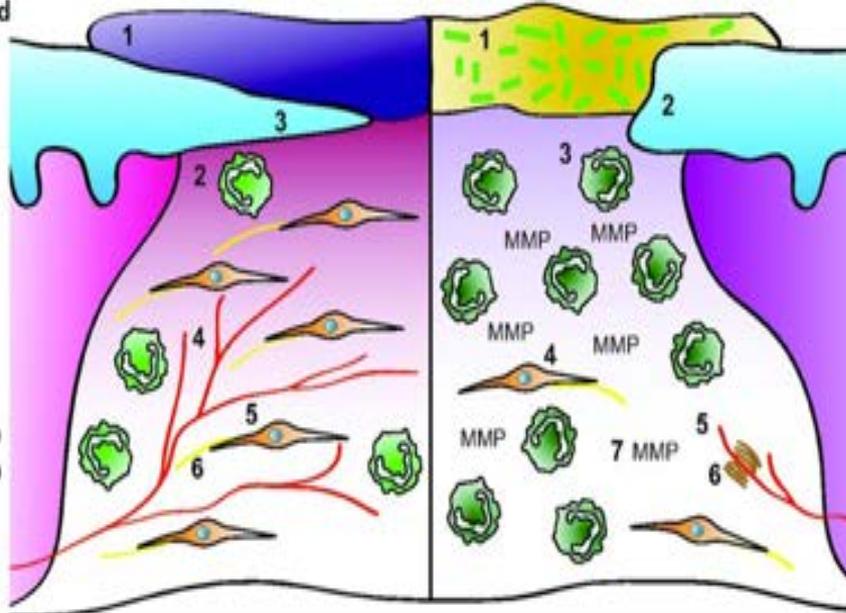
Acute (healing) wound

Initial phase:

1. Scab formation
2. Immune cell infiltration

Healing phase:

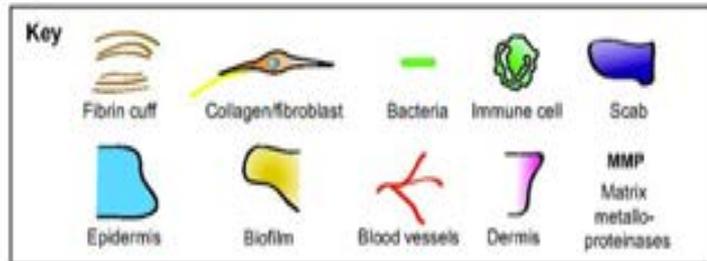
3. Re-epithelialisation
4. Angiogenesis
5. Fibroblast migration
6. Collagen deposition



Chronic (non-healing) wound

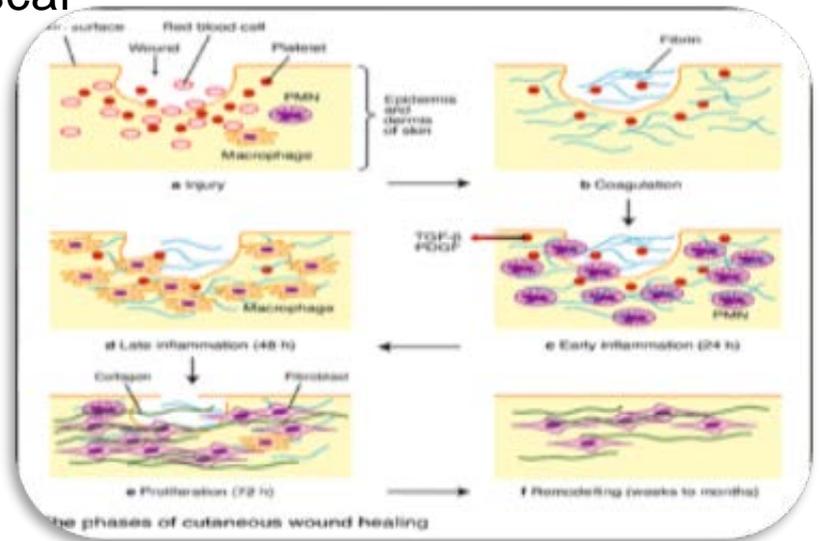
Chronic wound abnormalities:

1. Infection/biofilm
2. Hyperproliferative epidermis/ stalled re-epithelialisation
3. Persistent inflammation
4. Fibroblast senescence
5. Impaired angiogenesis
6. Fibrin cuffs (barrier to oxygen)
7. Elevated MMPs



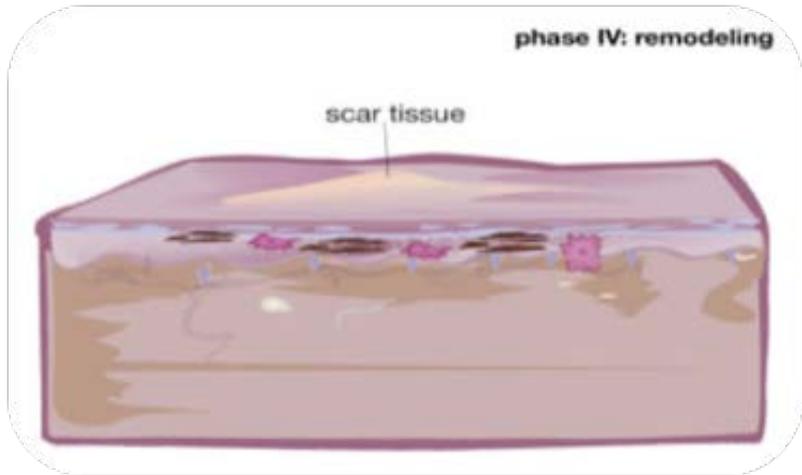
Cascade of Healing

- Coagulation/Hemostasis = Wounding
- Inflammation = Cleaning
- Proliferation/Repair = Growing new tissue
- Maturation/Remodeling = Strengthening scar



Wounds healed:

- The continuity of the skin is reestablished
- Tissue strength is sufficient for normal activities



Baranoski S, Ayello E. Wound Care Essentials: Practice principles. 4th ed. Wolster Klower. Philadelphia, PA.

Nutrients and Wound Healing

Macronutrients vs. Micronutrients



Nutrients and Wound Healing

- Nutrients: Essential to support health, skin integrity, and pressure injury healing
 - Calories need to support:
 - The inflammatory process
 - Angiogenesis (new blood vessel formation)
 - Collagen deposition
 - Prevent protein breakdown as an energy source
 - Carbohydrates:
 - Provide glucose to support normal cellular activities
 - Protein synthesis
 - Secretion of hormones and growth factors

➤ Protein:

- Immune system
 - Initiate healthy inflammatory response process for wound healing
 - Activate macrophages (clean the wound), release cytokines to trigger reactions essential for wound healing

➤ Protein-Calorie Malnutrition:

- Can contribute to increased susceptibility to infection, decreased collagen and granulation tissue development during proliferative stage of wound healing

Nutrients and Wound Healing

➤ Fats

- Dense source of calories
 - **Essential component of cell membranes**
- Essential fatty acid deficit:
 - Interferes with the body's ability to have a normal immune response

➤ Fluids

- Monitor for signs and symptoms of dehydration:
 - Dry oral mucosa
 - Dry furrowed tongue
 - Weight change
 - Skin tenting turgor
 - Decreased urine output
 - Hypernatremia
 - Calculated serum osmolality >295 mOsm/kg
 - Blood urea nitrogen (BUN):creatinine ratio above 25:1

Micronutrients

- Required in trace amounts for the normal growth and development of living organisms
- World Health Organization (WHO):
 - “Magic wands” that enable the body to produce enzymes, hormones and other substances
 - Essential for proper growth and development



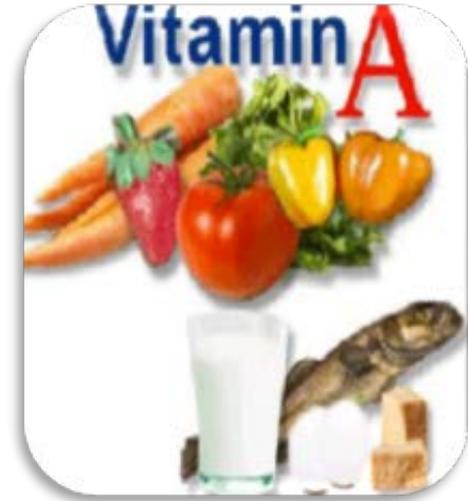
Micronutrients

- Vitamins and Minerals:
 - **Vitamin C**
 - Immune response
 - Provides tensile strength to newly developed collagen
 - Monocyte movement into wound tissue --→ Macrophages during inflammatory phase
 - Promotes iron absorption
- **Deficiency:** Produces capillary fragility and decreased wound strength



Micronutrients

- Vitamins and Minerals:
 - **Vitamin A**
 - Important for cell mediated immune function, collagen synthesis, and cross linking
 - Counteracts delay in wound healing seen in presence of steroid use, diabetes, and radiation damage
 - **Deficiency** can contribute to:
 - Increased susceptibility to infection
 - Decreased collagen and granulation tissue development during proliferative stage of wound healing



Micronutrients

- Vitamins and Minerals:
 - **B vitamins**
 - Essential co-factors in enzyme activity
 - **Thiamine, riboflavin, vitamin B₁₂, and pyridoxine**
 - Important in collagen matrix synthesis
 - **Deficiency:**
 - Impaired antibody formation and white blood cell function
 - Increases susceptibility to infections



Micronutrients

Vitamins and Minerals: **Vitamin E** and **K**

- **Vitamin E**

- Stabilizes cellular membrane
- **Can interfere with the role of Vitamin A**
- Scavenges oxygen
- Prolongs the inflammatory phase

- **Vitamin K** deficiency can contribute to decreased coagulation, thus impairing the inflammatory phase of healing

TOP 10 VITAMIN K FOODS	
 1	KALE 688 mcg (100% DV) 1/2 CUP
 2	SCALLIONS 303 mcg (100% DV) 1/2 CUP
 3	CABBAGE 82 mcg (100% DV) 1/2 CUP
 4	BRUSSELS SPROUTS 78 mcg (98% DV) 1/2 CUP
 5	PRUNES 52 mcg (65% DV) 1/2 CUP
 6	SALAD GREENS 50 mcg (62% DV) 1/2 CUP
 7	CUCUMBERS 49 mcg (61% DV) 1 MEDIUM
 8	BROCCOLI 46 mcg (58% DV) 1/2 CUP
 9	DRIED BASIL 36 mcg (45% DV) 1 TSP
 10	ASPARAGUS 26 mcg (33% DV) 1/2 CUP

TOP 10 VITAMIN E FOODS	
 1	ALMONDS 7.3 mg (14% DV) 1 OZ
 2	SPINACH 6.8 mg (14% DV) 1 BUNCH
 3	CHARD 3 mg (11% DV) 1 CUP
 4	SWEET POTATO 4.2 mg (15% DV) 1 CUP
 5	SUNFLOWER SEEDS 4.2 mg (14% DV) 1 Tbsp
 6	PALM OIL 2.2 mg (11% DV) 1 Tbsp
 7	AVOCADO 2.7 mg (10% DV) 1 WHOLE
 8	BUTTERNUT SQUASH 2 mg (7% DV) 1 CUP
 9	TROUT 2 mg (7% DV) 1 OZ
 10	OLIVE OIL 2 mg (7% DV) 1 Tbsp

Baranowski S, Ayello E. Wound Care Essentials: Practice principles. 4th ed. 2015. Wolster Klower. Philadelphia, PA.

Micronutrients

- Vitamins and Minerals:
 - **Iron is essential for:**
 - Improving tissue perfusion
 - Transporting oxygen to the tissues
 - Necessary for collagen synthesis
 - **Iron deficiency** can contribute to:
 - Increased tissue ischemia
 - Impaired collagen cross-linking
 - Decreased wound strength



Micronutrients

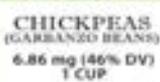
- Vitamins and Minerals:

- **Zinc**

- Stimulates the activity of more than 100 enzymes
 - Necessary for membrane stability
 - Maturation of collagen in the proliferative and remodeling phases of wound healing

- **Deficiency can decrease:**

- Rates of fibroplasia and collagen synthesis
 - Wound strength
 - Impair immune response
 - Increasing susceptibility to recurrent infections

TOP 10 ZINC FOODS	
	1 GRASS-FED BEEF 4.9 mg (33% DV) 4 OZ
	2 KEFIR or YOGURT 2.2 mg (15% DV) 1 CUP
	3 LAMB 4.6 mg (30% DV) 4 OZ
	4 CHICKPEAS (GARBANZO BEANS) 6.86 mg (46% DV) 1 CUP
	5 PUMPKIN SEEDS 2.5 mg (17% DV) 1/4 CUP
	6 CASHEWS 1.6 mg (10% DV) 1 OZ
	7 COCOA POWDER 0.3 mg (2% DV) 1 TESP
	8 CHICKEN 2.25 mg (15% DV) 3 OZ
	9 MUSHROOMS 1.4 mg (9% DV) 4 OZ
	10 SPINACH 1.4 mg (9% DV) 1 CUP

Prevention and Treatment of Pressure Ulcers (Injuries): Clinical Practice Guideline 2014

National Pressure Ulcer Advisory Panel (NPUAP)
European Pressure Ulcer Advisory Panel (EPUAP)
Pan Pacific Pressure Injury Alliance (PPPIA)



2014 Guidelines - Nutrition

At Risk for or Actual Malnutrition: **Calories**

- Provide individualized energy intake
 - Based on **underlying medical condition** and level of activity
- Provide 30 to 35 kcalories/kg body weight for adults at risk of a pressure ulcer and malnutrition
- Adjust energy intake based on weight change or level of obesity



2014 Guidelines - Nutrition

Energy Intake:

- Revise and modify/liberalize dietary restrictions
when limitations result in decreased food and fluid intake



2014 Guidelines - Nutrition

- Offer fortified foods and/or
- High calorie/ high protein oral nutritional supplements between meals if nutritional requirements cannot be achieved by dietary intake
- Consider enteral or parenteral nutritional support when oral intake is inadequate

2014 Guidelines - Nutrition

- Enteral Feeding
 - Not recommended for older adults with advanced dementia
 - Increased complications and development of new pressure injuries
- End of life decisions regarding interventions for pressure injury treatment
 - Implemented in accordance with the patient's wishes
 - Overall health status/prognosis

2014 Guidelines - Nutrition

- Calories:
 - Healthy Obese Individuals
 - Mifflin St. Jeor equation may be more accurate and have a smaller margin of error when used to determine resting metabolic rate.
 - There are currently no specific guidelines for obesity
 - Body mass index (BMI) ≥ 30 gm/m²

2014 Guidelines - Nutrition

At Risk for or Actual Malnutrition: **Protein**

- Provide adequate protein for positive nitrogen balance
- Offer 1.25 to 1.5 gm protein/kg body weight daily
 - When compatible with goals of care
 - Reassess as condition changes



2014 Guidelines - Nutrition

- Supplement with:
 - High protein
 - Arginine
 - Micronutrients
- For adults with a pressure injury category/stage 3 or 4 or multiple pressure injuries
- When nutritional requirements cannot be met with traditional high calorie and protein supplements

GROUP 3 High Arginine (lys/arg < 1)		
Vegetables Most beans and pulses, yams mushrooms onions, carrots, broccoli, cabbage. 	Fruits Most red fruits, berries citrus fruits 	
Bread Wheat oats and other grains 	Shellfish Crab prawns, shrimps clams 	Nuts & Chocolate Most types of Nuts 

2014 National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers: clinical practice guideline. Haesler E, ed. Cambridge Media: Osborne Park, Western Australia.

2014 Guidelines - Nutrition

Fluids

- Provide and encourage adequate daily fluid intake for hydration for an individual assessed to be at risk of or with a pressure injury
 - This must be consistent with the individual's comorbid conditions and goals
- Monitor individuals for signs and symptoms of dehydration
 - Change in weight, skin turgor, urine output, ↑ serum Na, and/or calculated serum osmolality
- Provide additional fluid for individuals with dehydration, elevated temperature, vomiting, profuse sweating, diarrhea, or heavily exuding wounds



2014 National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers: clinical practice guideline. Haesler E, ed. Cambridge Media: Osborne Park, Western Australia.

2014 Guidelines - Nutrition

At Risk for or Actual Malnutrition: **Micronutrients**

- Consider recommending a daily vitamin/mineral supplement that supplies 100% of Daily Reference Intake (DRI)
 - If the individual is unable or unwilling to consume a balanced diet that includes good sources of vitamins and minerals
 - Has poor dietary intake
 - A drug-nutrient depletion has been identified or suspected



2014 Guidelines - Nutrition

- Dietary supplementation in the absence of deficiency has not been shown to enhance wound healing
- Micronutrients thought to be related to pressure injury healing:
 - Zinc
 - Copper
 - Vitamin C
- Assays of zinc can be unreliable
 - Negative acute phase reactant
 - Appears low in the presence of inflammation



2014 National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers: clinical practice guideline. Haesler E, ed. Cambridge Media: Osborne Park, Western Australia.

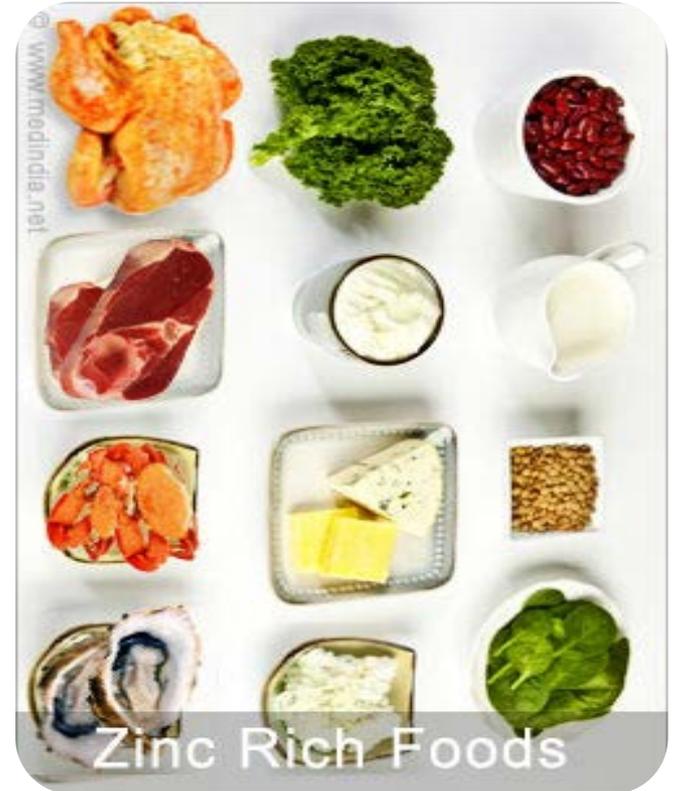
Zinc

- **RDA**

- Men 14+ years: 11 mg/day
- Women 19+ years: 8 mg/day
- Plasma zinc levels of $< 60 \mu\text{g}/\text{dl}$ are generally considered indicative of deficiency

- **Upper Limit (UL)**

- 40 mg elemental zinc/day = maximum level likely to pose no risk of adverse events



Copper

- **RDA**

- 18 years: 890 mcg/day
- 19+ years: 900 mcg/day

- **Upper Limit**

- 18 years: 8,000 mcg/day
- 19+ years: 10,000 mcg/day
- **Maximum level likely to pose no risk of adverse events.**

TOP 10 COPPER FOODS		
1	Beef Liver	14 mg (100% DV) 3 OZ
2	Dark Chocolate	0.9 mg (45% DV) 1 SQUARE
3	Dried Apricots	0.69 mg (34% DV) 1 CUP
4	Sunflower Seeds	0.63 mg (31% DV) 1/4 CUP
5	Lentils	0.5 mg (25% DV) 1 CUP
6	Mushrooms	0.43 mg (20% DV) 1 CUP
7	Almonds	0.4 mg (20% DV) 1/4 CUP
8	Turnip Greens (cooked)	0.36 mg (18% DV) 1 CUP
9	Blackstrap Molasses	0.28 mg (14% DV) 2 TSP
10	Asparagus	0.25 mg (12% DV) 1 CUP

Vitamin C

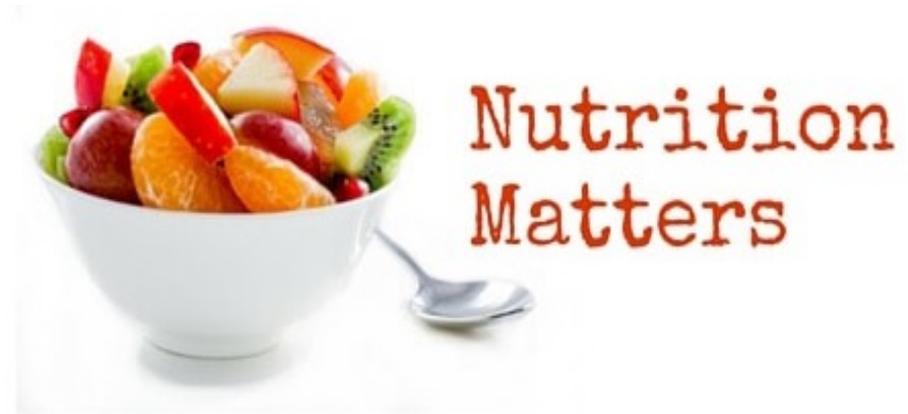
- **RDA**
 - Men:
 - 14-18 years: 75 mg/day
 - 19+ years: 90 mg/day
 - Women:
 - 14-18 years: 65 mg/day
 - 19+ years: 75 mg
- Inadequate intake and/or deficiency
 - Supplementation at physiological doses
 - individualized to remove deficiency state
- **Upper Limit**
 - 2000 mg /day = **maximum level likely to pose no risk of adverse events**
 - Doses at 10x the RDA or higher may lead to:
 - Nausea
 - Diarrhea
 - Abdominal cramps



2014 National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention and treatment of pressure ulcers: clinical practice guideline. Haesler E, ed. Cambridge Media: Osborne Park, Western Australia.

Nutrition recommendations:

- Nutrition screening
- Nutrition assessment
- Care planning





Practical Application: Case Study



Let's Practice - Case Study

Mary is a 78 YO female just admitted to your skilled nursing facility. She was just d/c'ed from the hospital due to episode of **heart failure**.

- Medical history includes:
 - **DM, Heart failure, Hypertension**, Hypercholesterolemia, GERD, Depression, **Arthritis, Chronic Kidney Disease** (decreased kidney function)
- Medications:
 - Aspirin, Warfarin, Diuretic, Acetaminophen, Simvastatin (for increased cholesterol), Lisinopril (Heart Failure), Calcium channel blocker (HTN), Omeprazole (GERD), SSRI (antidepressant), Metformin (DM)



Diet Rx: **2 gram Na diet**

- Intake @ **50% for the last week**
 - Consuming ~ **1200 calories/40 grams of protein**

Let's Practice - Case Study

Assessment Parameters

Parameter	On admission	2 month ago	3 months ago	6 months ago
Height	5'2"	5'2"	5'2"	5'2"
Weight	160	170	185	185
Laboratory Results				
Na (135-145)	148	150	140	138
Cl (96-106)	107	108	100	102
BUN (7-20)	23	22	20	18
Creatinine (0.6-1.2)	1.3	1.4	1.3	1.0
Blood Glucose (70-99-fasting)	160	150	135	140
A1C (<5.7)	7.2	7.0	6.2	6.5
Albumin (3.4-5.4)	2.5	2.8	3.2	3.5
Prealbumin (15-36)	10	12	15	15

Let's Practice - Case Study

What do you see?



Let's Practice - Case Study

Follow-up visit:

Change in Condition

- 10 lb. weight loss in the past month (6.2% TBW)
- Stage 2 pressure injury
- Intake < 50% for all meals



Let's Practice - Case Study

- Determine realistic wound goal
 - Heal the wound
 - Prevent deterioration
 - Expect the wound to worsen
- Risk factors - Interfere with wound healing
 - Tissue oxygen perfusion
 - Central circulatory dysfunction (CHF)
 - Presence of inflammatory or autoimmune disorders



IMPACT Act Update



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

- Bipartisan bill passed on September 18, 2014 and signed into law by President Obama on October 6, 2014
- Requires Standardized Patient Assessment Data that will enable
 - Data Element uniformity
 - Quality care and improved outcomes
 - Comparison of quality and data across post-acute care (PAC) settings
 - Improved discharge planning
 - Exchangeability of data
 - Coordinated care

Impact Act Update

Oct 2016
(FY 2016)

- Standardized resource use measure & some quality reporting begins

Oct 2017
(FY 2017)

- Confidential feedback provided on previous year's reports

Oct 2018
(FY 2019)

- Standardized assessment data required
- Public quality data available
- Penalties take effect for those not reporting

Oct 2021
(FY 2022)

- CMS & MedPAC reports on PAC prospective payment
- Study on hospital assessment data

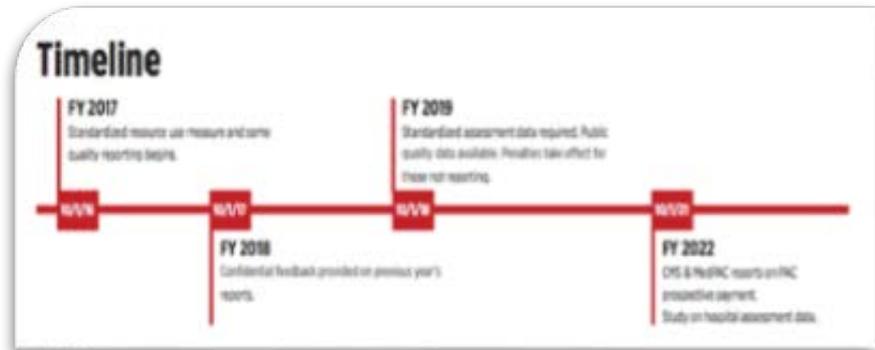
IMPACT Act and Nutrition Care Services

Nutrition Related Quality Domains:

- Functional Status
 - Assistance with ADLS and mobility
 - Eating: Use of utensils, chewing, and swallowing
- Falls with major injuries
 - Experiences one or more falls with major injury
 - Sarcopenia, malnutrition
- Hospital Readmission
 - Dehydration
 - Malnutrition
- Skin Integrity
 - Impacted by inflammation
 - Malnutrition
 - Dehydration

IMPACT Act Measures

- Domain
 - Skin Integrity and Changes in Skin Integrity
- Measure
 - Percent of Residents or Patients with Pressure Ulcers that are New or Worsened (Short Stay)
 - **REPLACED** with Changes in Skin Integrity Post-Acute Care: Pressure Ulcer/Injury
- Post-acute care setting adopted
 - Inpatient Rehabilitation Facility
 - Long-Term Care Hospital
 - Skilled Nursing Facility
 - Home Health Agency



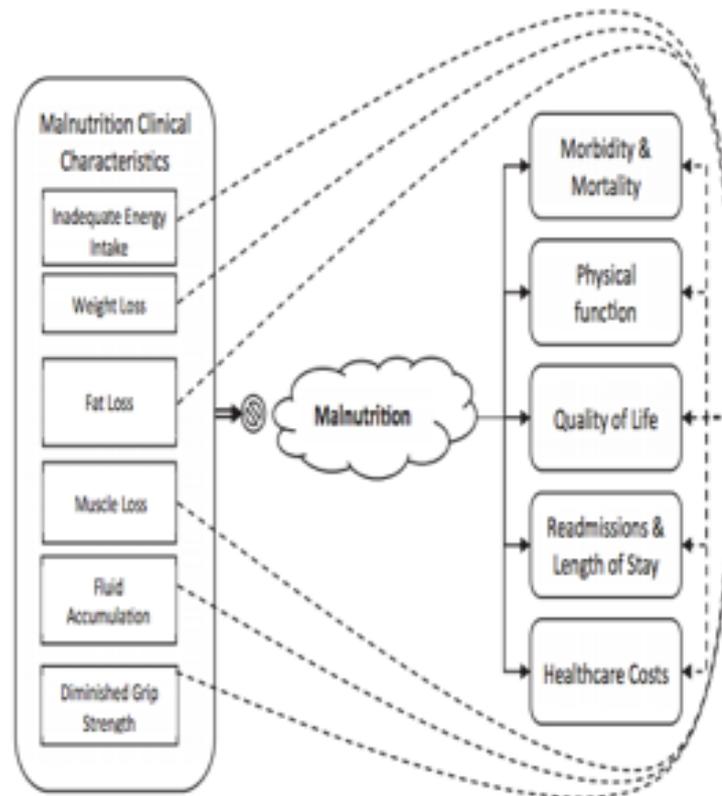
Take Home Messages

What will you do different tomorrow?



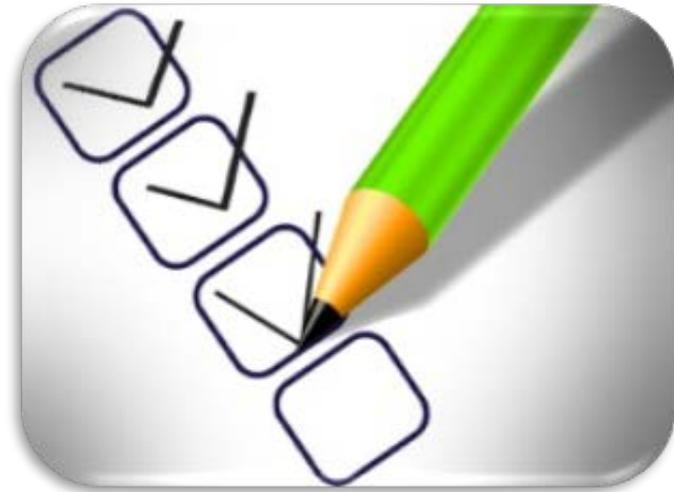
Take Home Message

- Clinical characteristics of malnutrition
 - Academy of Nutrition and Dietetics
 - ASPEN
 - Malnutrition:
 - Any type of nutrition imbalance
 - Undernutrition
 - Lack adequate calories, protein, or other nutrients needed for tissue maintenance and repair
 - Overnutrition



Take Home Message

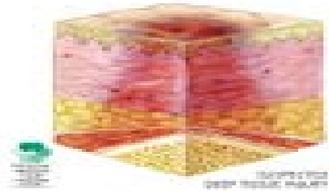
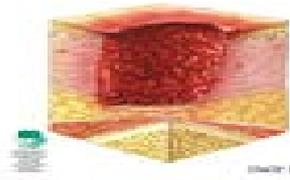
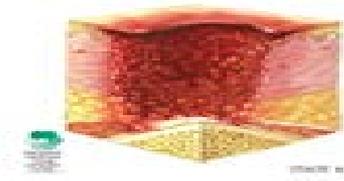
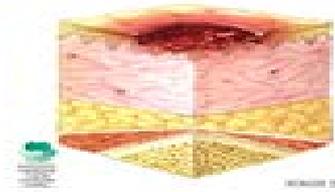
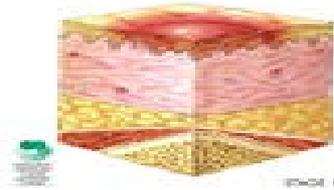
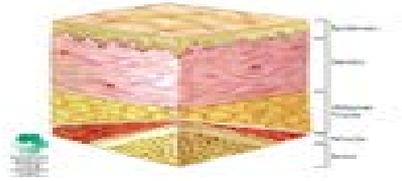
- If wound is healing, weight is stable, and there are no signs or symptoms of dehydration
 - Protein, energy, & fluid needs are most likely being met
- In consultation with a medical professional
 - Revise and modify/liberalize dietary restrictions
 - Can contribute to decreased food and fluid intake



Take Home Message

- Consider hospitalized individuals as at risk for undernutrition and malnutrition from their illness or as NPO for diagnostic testing
- Use a valid and reliable screening tool to determine risk of malnutrition, such as the Mini Nutritional Assessment
- Refer all individuals at risk for pressure injury from malnutrition to a registered dietitian/nutritionist
- Assist the individual at mealtimes to increase oral intake

Resources



NPUAP Resources

Resource

- Pressure Injury Prevention Points
 - <http://www.npuap.org/wp-content/uploads/2016/04/Pressure-Injury-Prevention-Points-2016.pdf>
- *Clinical Practice Guideline*: A comprehensive version of the guideline, including detailed analysis and discussion of available research, critical evaluations, and methodology used to develop the guideline.
- *Quick Reference Guide*: A summary of the recommendations and excerpts of the supporting evidence for pressure ulcer prevention and treatment. www.npuap.org to obtain a copy



NPUAP Resources

- NPUAP Pressure Injury Stages
 - Updated 2016
 - <http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-injury-stages/>
- Pressure Injury Prevention Points
 - <http://www.npuap.org/wp-content/uploads/2016/04/Pressure-Injury-Prevention-Points-2016.pdf>
- Pressure Injury Staging Illustrations
 - <http://www.npuap.org/resources/educational-and-clinical-resources/pressure-injury-staging-illustrations/>



NPUAP Position Statement on Staging – 2017 Clarifications
January 24, 2017

Introduction and Background

Recognizing that new research findings called for an updating of our 2007 staging definitions, NPUAP appointed a multi-disciplinary Staging Task Force to review the scientific literature and prepare refined definitions.

- We launched an inclusive, multi-year process designed to produce the best outcome.
- Definitions were initially revised based on new research and common clinician queries submitted to NPUAP after release of the 2007 NPUAP Staging System.
- An open invitation was issued for stakeholder comments. All stakeholder comments were reviewed and incorporated into a second draft as appropriate.
- A professionally mediated consensus conference was held in April 2016 and was attended by over 400 multidisciplinary professionals from around the world. Changes supported by research were not considered as part of the consensus process. Participants deliberated and then voted on the changes not addressed by research, yet critical to clinical practice.
- The new staging definitions were adopted and then promulgated.¹

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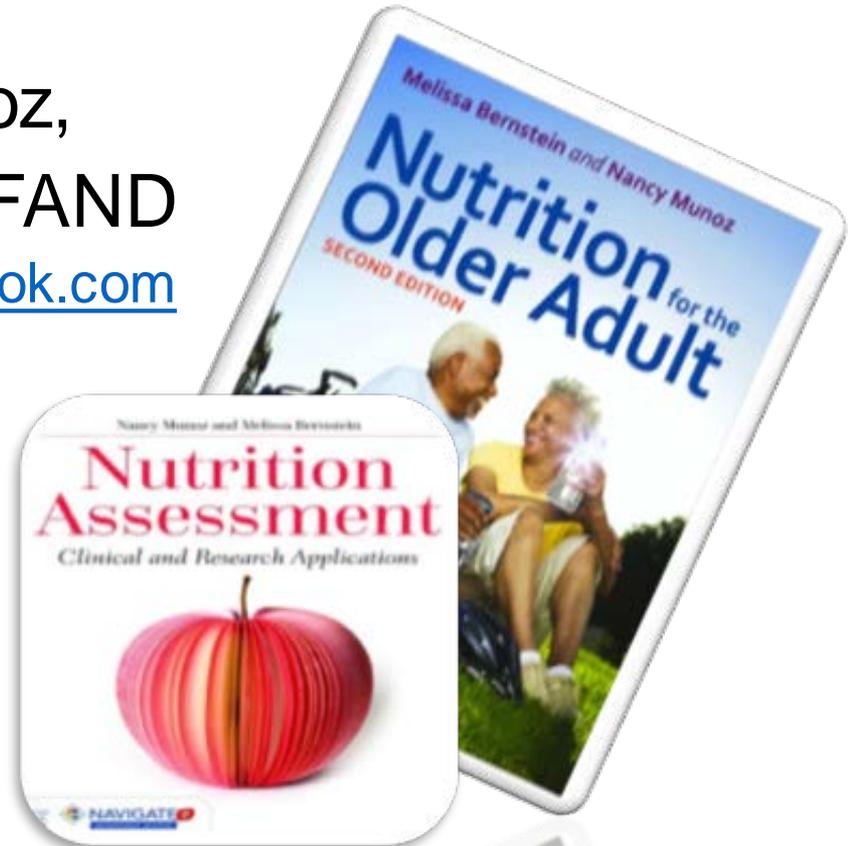
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