

# NUTRITIONAL NEEDS IN OLDER ADULTS 2.0

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# DISCLOSURES:

- I do not have a financial interest or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.



# PRE-TEST: QUESTION 1

- **All of the following signs are potential risks for malnutrition in adults 50 years and older; however, which of the following signs are the MOST WORRISOME indicators of nutritional risk for malnutrition?**
  - A. Change in appetite and unintentional weight loss
  - B. Low and fixed level of income
  - C. Changes in sense of taste and smell
  - D. Isolation and changes in mobility



## PRE-TEST: QUESTION 2

- **In adults 50 years and older, what is an appropriate amount of daily calcium and vitamin D intake?**
  - A. 800 mg Calcium + 400 IU's Vitamin D
  - B. 1000 mg Calcium + 400 IU's Vitamin D
  - C. 1000 mg Calcium + 800 IU's Vitamin D
  - D. 1200 mg Calcium + 1000 IU's Vitamin D



## PRE-TEST: QUESTION 3

- **In otherwise healthy adults 50 years and older with no major medical conditions, what is an appropriate amount of protein per day?**
  - A. 0.8 mg Protein/kg/day
  - B. 1.0-1.2 mg Protein/kg/day
  - C. 1.2-1.4 mg Protein/kg/day
  - D. 1.4-1.6 mg Protein/kg/day



# OBJECTIVES:

1. Perform a **nutritional needs assessment** for older adults
  1. Identify **nutritional risk factors** and recognize the clinical features of **four common undernutrition syndromes** in older adults.
  2. Assess **macronutrient needs** (water, calories, protein, carbohydrates, fats)
  3. Assess **micronutrient needs** (vitamins, minerals, and phytochemicals)
2. Calculate **nutritional needs** in older adults
3. Describe appropriate nutritional recommendations as well as **treatments for macronutrient and micronutrient deficiencies** in older adults.



# WHY IS THIS IMPORTANT TO PA'S?

- Malnutrition in older adults is common
- Malnutrition has increased morbidity, mortality, & healthcare costs
- Malnutrition syndromes are being encountered with increased frequency in PA clinical practice across a wide range of medical specialties.



# CASE STUDY: MEET DIANE

- **56 y/o post-menopausal female with history of diabetes (type 2), hypertension, obesity, and depression.**
  - **Family History:** Heart Disease, Diabetes, Osteoporosis, Cancer
  - **Social:**
    - Lives alone (divorced); both children live out of state.
    - Works at call center with fixed income.
    - No alcohol use; 15 pack year history of smoking (quit > 10 years ago)
  - **Medications:** Metformin 1g BID, Lisinopril 20mg QD, Prozac 20mg
  - **Vitals:** BMI 39.4, Wt: 230 lbs (104.5 kg) Ht: 5'4" (162.5 cm), BP: 128/82
  - **Exam:** Poor oral health with multiple dental caries; missing upper molars
  - **Labs:** A1C 6.8%, SCr: 1.3, LFT's WNL





# CASE STUDY: THINGS TO CONSIDER

- What are Diane's nutritional risk factors?
- Identify at least one malnutrition syndrome for Diane
- What are Diane's daily calorie needs?
- How many grams of protein does Diane need daily?
- How much calcium/vitamin D does Diane require daily?



# PREVALENCE AND IMPACT:

- What defines an older adult? There is not consensus on what age defines “the older adult”
  - NCOA defines “the older adult” as > 60 y/o
  - Most Census Data = 65+
- Kaiser Foundation: Estimates 29% of US population is aged 55+
- U.S. Census Data: 2017
  - ~101 million Americans 50 and older
  - ~31% of Americans are 50 years and older
  - ~16% of Americans are 65 years and older



# PREVALENCE AND IMPACT:

- **National Council on Aging:**

- People are living longer than ever before. In 2017, there were 6.4 million Americans over the age of 85.
- Hunger: More than 10 million older Americans lack financial means to consistently purchase sufficient food (~10% of individuals aged 50+)
- Chronic Disease: ~80% of older adults have at least 1 chronic medical condition and two-thirds have 2+ chronic conditions.
- Falls: Falls cost Medicare \$31 billion each year



# PREVALENCE AND IMPACT:

- **Malnutrition-Associated Outcomes:**

- Frailty, Increased risk for falls, Disability, Loss of Independence
- Decreased effectiveness of medical treatments, medical complications

- **Morbidity and Mortality:**

- Patients with malnutrition have higher morbidity and mortality rates

- **Hospitalizations:**

- Patients with malnutrition have longer hospitalizations
- Patients with malnutrition have higher readmissions rates

- **Costs of Malnutrition:**

- Patients with malnutrition have increased healthcare costs



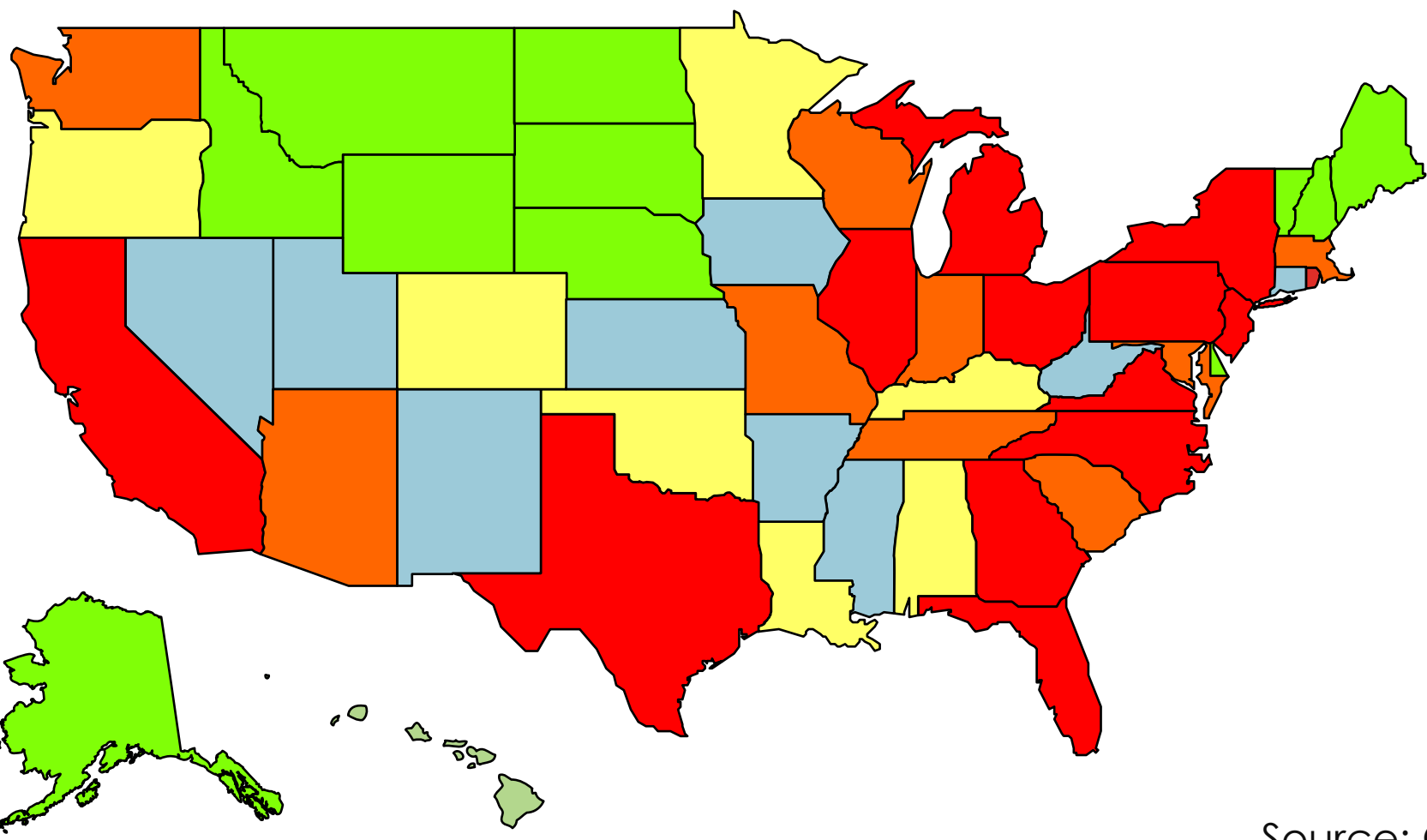
# MALNUTRITION IS A COMMON AND COSTLY HEALTH CARE PROBLEM: TOTAL ANNUAL BURDEN

**\$157 Billion**

disease-associated malnutrition  
cost to our society and healthcare  
systems

**\$51 Billion**

disease-associated malnutrition  
cost for the “older population”



- > \$100 Million
- \$75-100 Million
- \$50-74 Million
- \$25-49 Million
- < \$24 Million



# RISK FACTORS IMPACTING NUTRITIONAL NEEDS:

- **Chronic Medical Conditions:**
  - CAD, Stroke, Diabetes, Hypertension, Hyperlipidemia, Obesity, Cancer
  - Oral Health Concerns, Changes in Taste/Smell
  - Chronic Kidney Disease, electrolyte imbalances (Na<sup>+</sup>/K<sup>+</sup>)
  - Gastrointestinal Disorders, Constipation, Chronic Liver Disease
  - Wounds: Pressure Ulcers, Diabetic Ulcers
  - Osteoporosis/Osteopenia, Arthritis
  - Post Surgical Healing
  - Polypharmacy: Drug-Nutrient Interactions, EtOH consumption
- **Mental Health:**
  - Dementia, Alzheimer's etc.
  - Depression, Anxiety, Neglect etc.



# ELDERLY: DENTITION IMPACTS NUTRITION

- Tooth Loss: 20% of elderly have zero teeth!<sup>1</sup>
  - Missing teeth and dentures affect chewing
  - Softer, easy-to-chew foods work better
- Gum Disease: 68%<sup>1</sup>
- Untreated Tooth Decay: 96% have cavity history and 20% have untreated tooth decay<sup>1</sup>
- Dry mouth/reduced saliva flow: Rx and OTC play a role<sup>1</sup>
- Tooth loss in the elderly has been associated with both weight loss<sup>2</sup> and obesity<sup>3</sup>

1. [https://www.cdc.gov/oralhealth/basics/adult-oral-health/adult\\_older.htm](https://www.cdc.gov/oralhealth/basics/adult-oral-health/adult_older.htm).

2. Ritchie CS et al. *J Gerontol A Biol Sci Med Sci*. 2000;55(7): M366-M371.

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# RISK FACTORS IMPACTING NUTRITIONAL NEEDS:

- **Diverse Patient Settings:**
  - Inpatient
  - Outpatient
  - Skilled Nursing Facilities (SNF)
  - Rehab Facilities
  - Community Dwelling Facilities
  - Assisted Living Homes
  - Rural vs Urban
- **Socioeconomic Status:**
  - Retired (vs) Work-Force



# RISK FACTORS IMPACTING NUTRITIONAL NEEDS:

- **Most important risk factors for malnutrition:**
  1. Changes in appetite (decreased appetite)
  2. Unintentional weight-loss
- **Weight loss is considered to be clinically significant if:**
  - >2% decrease from baseline in 1 month
  - > 5% decrease ifrom baseline in 3 months
  - >10% decrease from baseline in 6 months.



# NUTRITION 101: WHAT ARE MACRONUTRIENTS AND MICRONUTRIENTS?

- **Macronutrients:**

- **Carbohydrates** = 4 kcal/gram
- **Proteins** = 4 kcal/gram
- **Fats** = 9 kcal/gram
- **Alcohol** = 7 kcal/gram
- **Water** = 0 kcal/gram

- **Micronutrients:**

- **Vitamins** (thiamine, cobalamin, folate etc)
- **Minerals** (calcium, iron, zinc etc)
- **Phytochemicals** (polyphenols, terpenoids, flavonoids etc)



# NUTRITION 101: WHAT IS MALNUTRITION?

- **Defining Malnutrition:** Malnutrition = “Nutritional imbalance”
  - **Undernutrition (vs) Overnutrition** = Malnutrition!
  - Malnutrition is a spectrum disorder!
- **Clinical Mindset - Overnutrition (vs) Undernutrition Syndromes:**
  - **Overnutrition:** Obesity, diabetes, hypertension, heart disease, GERD, gout
  - **Undernutrition:** Protein malnutrition, Iron deficiency, vitamin deficiencies, sarcopenia, osteoporosis, cancer, wounds
  - **Both ends of the spectrum:** Obesity, eating disorders, alcoholism, GERD (effects of chronic acid suppression), S/P bariatric surgery, polypharmacy, low SES (food access)



# NUTRITION 101: WHAT IS MALNUTRITION?

The Spectrum:



# NUTRITION 101: MACRONUTRIENT MALNUTRITION SYNDROMES:

- **Undernutrition Malnutrition:**
  - Inadequate Dietary Intake: Calories, Protein, or Both!
- **Protein Malnutrition:** (Kwashiorkor) – Enough calories, not enough protein
- **Calorie Malnutrition:** (Marasmus) – Not enough calories AND protein
- **Anorexia:** an abnormal loss of appetite for food. Anorexia can be caused by cancer, AIDS, a mental health disorder (anorexia nervosa, depression etc) or other diseases
- **Cachezia:** a condition marked by loss of appetite, subsequent weight loss, lean body mass/muscle loss, and general weakness
- **Sarcopenia:** an age dependent loss of muscle mass and function
- **Obesity:** BMI > 30.0
- **Sarcopenic Obesity:** the presence of both sarcopenia and obesity



# NUTRITION 101: MICRONUTRIENT DEFICIENCIES:

- NHANES data indicates adults older than 50 years are at risk for inadequate intake of the following:
  - Calcium & Vitamin D
  - Iron
  - Vitamin B12
  - Vitamin B6
  - Vitamin E
  - Magnesium



# INCORPORATING NUTRITIONAL SCREENING INTO ROUTINE PATIENT CARE

## General Approach:



### EMR

- Individual Patient Visits (vs) Population-based Metrics
- Pre-visit Planning – Screening Questionnaires
- During Visit – growth charts, weight/lab trends



### Screening Questionnaires

- The Challenge: So many tools to pick from and when/which to implement?
- MNA, SGA, NSAQ, NUTRIC
- Use of support staff (MA, RN to collect information and provider to review)



### Anthropometrics/Vitals

- BP, Weight, Height, BMI, Waist Circumference
- Trends: Reported Weight (vs) Documented Weight



### Physical Exam Findings



**Labs:** +/- depending on anthropometrics, history, questionnaires, and risk.





# NUTRITION CARE STARTS WITH IDENTIFYING THE PROBLEM:

Two important signs of malnutrition:

- Unintentional Weight Loss
- Loss of Appetite

Diagnosis of malnutrition is made when patients have 2 or more of the following:

- Weight loss over time
- Loss of muscle mass
- Insufficient food intake compared with nutrition requirements
- Fluid accumulation
- Loss of fat mass
- Measurably diminished grip strength



# ELDERLY: NUTRITIONAL NEEDS

- **The aging body has specific needs:**
  - Bone Health: Calcium and Vitamin D
  - Vitamin B12
  - Reduce risk of cardiovascular disease, diabetes, and promote “regularity”
    - Higher Fiber Diets
    - Increase Hydration
  - Electrolytes: K<sup>+</sup>, Na<sup>+</sup>
  - Good Fats:
    - PUFA’s (polyunsaturated fatty acids)
    - MUFA’s (monounsaturated fatty acids)



# ELDERLY: EYE HEALTH

- Goal: Prevent cataracts, macular degeneration, glaucoma
- Promote intake of lutein and zeaxanthin (related to vitamin A and beta-carotene)
  - Kale
  - Sweet potatoes
  - Strawberries
  - Fatty fish
  - Greet Tea



# SCREENING FOR NUTRITIONAL STATUS: **HISTORY**

- **History:**

- Dietary recalls, food journals, and direct patient questioning can be time intensive, but yield more information.
- Use of screening questionnaires can save time.
- Evaluate Appetite and dietary Intake:
  - Question patient regarding appetite, dietary intake, number of meals/snacks, portion sizes, satiety, and if they actually like what they eat.
  - Change in Hunger or Satiety (vs) Formal Dietary Recall
- Reported Weight-Loss (vs) Documented Weight-Loss
  - Weight trends can be more helpful than a single documented weight.



# SCREENING FOR NUTRITIONAL STATUS: **HISTORY**

- **Findings on Patient History:**

- **“Red Flags”**

- ❏ Changes in body weight (both weight loss and weight gain)
      - Trends helpful!
      - Intentional vs **unintentional weight change**
    - ❏ Increase or **decrease in appetite** (anorexia)
    - ❏ Financial limitations (food access)
      - Access to healthy nutritious foods (vs) access to high-calorie, low-quality foods (i.e. fast foods)
    - ❏ Chronic Conditions: Can be responsible for both weight gain and loss
    - ❏ Swallowing/Chewing Issues: Dysphagia
    - ❏ Medications: can be responsible for both weight gain and loss
    - ❏ Changes to ADL's & AIADL's



# SCREENING FOR NUTRITIONAL STATUS: QUESTIONNAIRES

- **Subjective Global Assessment (SGA)**
  - Inexpensive, quick nutritional assessment method conducted at the bedside, reliable tool for predicting outcomes in critically ill patients
- **Simplified Nutrition Assessment (SNAQ)**
  - Four-item screener, was tested in community-dwelling older adults and long-term care residents. In those populations, it had a sensitivity and specificity of 81.3 and 76.4, and 88.2 and 83.5 percent, respectively, for identification of older persons at risk for 5 and 10 percent weight loss respectively.
- **Mini Nutrition Assessment (MNA)**
  - Consist of a global assessment and subjective perception of health, as well as questions specific to diet, and series of body measurements. It has been widely validated and is predictive of poor outcomes.



# SCREENING FOR NUTRITIONAL STATUS: **EXAM**

- **Anthropometric findings on physical exam:**
  - BP: Salt intake
  - BMI
  - Waist Circumference (WC): Surrogate marker for visceral adipose tissue
    - Men > 102 cm
    - Women > 88 cm



# SCREENING FOR NUTRITIONAL STATUS: EXAM

- **Non-specific Findings** (i.e. not always nutrition-related)
  - Hair Loss: inadequate protein, B12, and folate
  - Temporal Atrophy: general muscle wasting
  - Angular Palpebritis: riboflavin deficiency
  - Oral Health: too many to list (macronutrient deficiencies, vitamin C, D, B12)
  - Glossitis/Angular Cheilosis: low vitamin B complex
  - Peripheral Edema: poor nutritional status, protein malnutrition
  - Decreased Hand Grip Strength: decreased muscle mass
  - Poor Wound Healing: lack of vitamin C/zinc/protein/calories





# SCREENING FOR NUTRITIONAL STATUS: LABS & OTHER DIAGNOSTIC STUDIES

- **Laboratory Data:** *Sometimes helpful, sometimes not*
  - CBC
  - CMP (Albumin)
  - TSH
  - Vitamin B12 and Folate
  - Vitamin D
  - Iron Studies
  - Prealbumin
  - A1C
- **DEXA** (Osteoporosis)
- **Gastrointestinal Studies:** EGD, Colonoscopy, Barium swallow etc (GERD management, motility issues)



# USING APPROPRIATE TESTS TO ANALYZE NUTRITIONAL DEFICIENCIES (INCLUDING OVERNUTRITION)

- **Basic Laboratory Data:**

- A1C (prediabetes, diabetes)
- Lipids\*
- CBC/ferritin/vitamin B12/folate – anemia
- CMP (electrolytes, protein stores, albumin)
- Uric acid (gout management)
- Vitamin D (controversial)
- Celiac panel

- **Nutrition Specific Labs:**

Not all high yield

- Zinc, selenium, copper, manganese
- Vitamins B1 (thiamine), B6 (pyridoxine), A, K, E
- Biotin

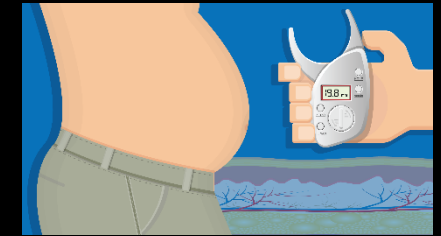
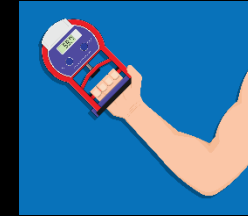
\*Vary depending on fasted/non-fasted state, whether on or off statins.  
CMP, comprehensive metabolic panel



# USING APPROPRIATE TESTS TO ANALYZE NUTRITIONAL DEFICIENCIES (INCLUDING OVERNUTRITION)

## Scanning/Procedures:

- Body Composition Studies:
  - Poor clinical application:  
Handgrip Dynamometry, Skin-fold thickness – pros/cons
  - Better clinical application:  
Bioelectrical Impedance Analysis (BIA) – pros/cons
- DEXA (osteoporosis guidelines)
- Gastrointestinal Studies: EGD, Colonoscopy, Barium swallow etc (GERD management, motility issues)



# CALCULATING NUTRITIONAL NEEDS:

- **Calculating CALORIE Needs:**
  - Harris Benedict Equation
  - Online Calculators: There are many
  - Considerations: Ideal Body Weight (IDW) VS. Actual Body Weight (ABW)
- The “Practical Method” – to be used with Actual Body Weight (ABW)
  - For Weight Gain: 25-30 kcal/kg/day
  - For Weight Maint: 20-25 kcal/kg/day
  - For Weight Loss: 15-20 kcal/kg/day
- Ideal Body Weight (IBW): Hamwi Method
  - Men: 106 lbs for the first 5 feet, then 6 lbs for every inch thereafter (+/-10%)
  - Women: 100 lbs for the first 5 feet, then 5 lbs for every inch thereafter (+/- 10%)



# CALCULATING NUTRITIONAL NEEDS:

- **Protein:** 1 g = 4kcal (10 g Protein = 40 calories)
  - Total Protein: 10-20% total daily calories
  - Example: 2,000 calorie diet = 200-400 calories from protein, which is 50g-100g protein per day.
- **Weight-Based Protein Needs:**
  - Sedentary Adults (18-49 y/o): 0.8 g/kg/day
  - Active Adults (18-49 y/o): 1.0 g/kg/day (1.2-1.8 g/kg/day if on daily exercise regimen)
  - Obesity: 1.5-2 g/kg IBW (not actual body weight)
  - **Older Adults (> 50 y/o): 1.0-1.2 g/kg/day (this is a great starting recommendation)**
- When to Refer to a Registered Dietitian (RD)?
  - Wounds: 1.5-2.0 g/kg/day
  - Renal Disease, Liver Disease, Cancer, Pulmonary Disease, Organ Transplant



# ELDERLY: LEAN BODY MASS

- Optimizing protein consumption
  - Estimated that 38% of men and 41% of women have dietary intakes <RDA
- Sarcopenia: Loss of muscle mass & strength
- Less responsive to anabolic stimulus
  - Improves with increased protein intake
- Experts recommend a protein intake between 1.2 and 2.0 g/kg/day or higher (RDA recommended intake is 0.8 g/kg/day)
  - Up to 30-35% of total caloric intake
  - Protein intake may need to be restricted in patients with advanced renal or liver disease



# CALCULATING NUTRITIONAL NEEDS:

- **Carbohydrates**: 4 kcal/g (10g Carbs = 40 calories)
  - Total Carbohydrates: ~45-65% total daily calories
  - Example: 2,000 calorie diet = 900-1,300 calories from carbohydrates, which is 225g-325g carbohydrates per day.
- **Fiber**:  $\geq 25$  g/day
- **Fats**: 9 kcal/g (10 g fat = 90 calories)
  - Total Fat: <30 % of total daily calories
  - Saturated Fat: < 7% of total daily calories
  - Example: 2,000 calorie diet = 600 calories from fats, which is 66g of fat and less than 5g saturated fat per day.



# CALCULATING FLUID NEEDS:

- **Holliday-Segar Method:**

- < 10 kg                      100 mL/kg
- 11-20 kg                      1000 mL/kg + 50 mL/kg for each kg > 10kg
- >20 kg                        1500 mL + 20 mL/kg for each kg > 20 kg

- **RDA Method:** the “practical method”

- 1 cc fluid per 1 kcal of estimate needs





# MICRONUTRIENT NEEDS: RDA'S (VS) TREATING DEFICIENCIES

- Calcium: RDA = 1,200mg daily
- Vitamin D: RDA = 800-1,000 IU's daily
  - Tx: 50,000 IU's once weekly x 12 weeks
- Cobalamin (Vitamin B12): RDA = 2.4 mcg/day
  - Tx: 1,000-2,000 mcg/day
- Pyridoxine (Vitamin B6): RDA = 1.5-1.7 mcg/day
  - Tx: 10-20 mcg/day x 3 weeks
- Iron: RDA = 8 mg/day
  - Tx: Ferrous Sulfate 325mg QD-BID (~65 mg of elemental iron)
- Magnesium: RDA = 320 (F) – 420 (M) mg/day
  - Tx: caution in renal disease
- Vitamin E: RDA = 15 mg/day
  - Tx: 100-400 mg/day
- What about a general multi-vitamin (MVI)?
  - If nutritionally compromised?  
Generally recommended, but evidence remains weak.



# TREATMENT OF MALNUTRITION SYNDROMES:

- **General Approach:**

- Identify the relevant risk factors and minimize the impact
- Identify and remove the barriers
- Provide a recommendation or “prescription” for dietary needs.
- Identify foods, supplements, and programs (i.e. meals on wheels etc) that are needed to meet dietary needs
- Monitor Progress (intakes, weight, labs, dexa, mobility, strength)



# TREATING MACRONUTRIENT DEFICIENCIES & MALNUTRITION SYNDROMES:

- **Undernutrition Malnutrition:**
  - **Calorie Malnutrition:** Replace calories (food +/- supplementation)
  - **Protein Malnutrition:** Replace protein (food +/- supplementation)
- **Anorexia:** Stimulate their Appetite
- **Cachexia:** Supplementation
- **Sarcopenia:** Focus on Protein
- **Obesity & Sarcopenic Obesity:** Calorie Restriction with Adequate Protein Intake
  - don't forget the exercise (strength training)



# MEDICATIONS:

- Studies are limited.
- May consider on a case by case situation.
- Consider the side effects (sedation and risk of falls)
- Appetite Stimulants:
  - Mirtazapine
  - Dronabinol
  - Megestrol Acetate
  - Cannabis?



# SUMMARY:

- Nutrition is important!
- PA's play an important role in nutrition advocacy!
- When in doubt, let the RD help out! (Refer)



# QUESTIONS?

- Thank you!
- Email: [darrin.cottle@aruplab.com](mailto:darrin.cottle@aruplab.com)



# POST-TEST: QUESTION 1

- **All of the following signs are potential risks for malnutrition in adults 50 years and older; however, which of the following signs are the MOST WORRISOME indicators of nutritional risk for malnutrition?**
  - A. Change in appetite and unintentional weight loss
  - B. Low and fixed level of income
  - C. Changes in sense of taste and smell
  - D. Isolation and changes in mobility



## POST-TEST: QUESTION 2

- **In adults 50 years and older, what is an appropriate amount of daily calcium and vitamin D intake?**
  - A. 800 mg Calcium + 400 IU's Vitamin D
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  - C. 1000 mg Calcium + 800 IU's Vitamin D
  - D. 1200 mg Calcium + 1000 IU's Vitamin D





## POST-TEST: QUESTION 3

- **In otherwise healthy adults 50 years and older with no major medical conditions, what is an appropriate amount of protein per day?**
  - A. 0.8 mg Protein/kg/day
  - B. 1.0-1.2 mg Protein/kg/day
  - C. 1.2-1.4 mg Protein/kg/day
  - D. 1.4-1.6 mg Protein/kg/day



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