LAB ASSESSMENT OF NUTRITIONAL STATUS:
Translating Lab Data into Practice

Mary D. Litchford PhD, RDN, LDN

Sl 2 Disclosures

- President, CASE Software & Books
- Author of cutting-edge reference books and advanced-level CE courses including:
  - ***Nutrition Focused Physical Assessment: Making Clinical Connections;***
  - ***Laboratory Assessment of Nutritional Status: Bridging Theory & Practice***
  - ***Nutrition & Pressure Injuries: Putting New Guidelines into Practice***
  - ***Common Denominators of Declining Nutritional Status***
- Consultant to Prosynthesis Labs and Medline Industries

There are no conflicts of interest for this webinar

SL4 Objectives

1. Interprets and integrates evidence-based research and literature relevant to inflammatory biomarkers as it relates to declining nutritional status.
2. Integrates relevant information on laboratory test results for hydration status, nutrition-related anemia, micronutrient deficiencies, and other nutrition related disorders with previous learning, experience, and current practice models.
3. Apply principles of Nutrition Care Process in the laboratory assessment of nutritional status.

SL5-8 What are the Burning Questions That RDNs & NDTRs Face in the Next 3 Years?

- How Do I Make My Clinical Practice Indispensable In My Healthcare Setting?
- How Can I Equate Nutrition Interventions with: Improved Health Outcomes & Reduced Healthcare Costs
- How Can I Use Lab Assessment Data as A Measure of Quality of Nutrition Services: Improved Health Outcomes & Reduced Healthcare Costs

SL9 Specimen Types:

- Blood
- Urine
- Breath Tests
- Saliva
- Biopsy samples
- Feces
- Hair & Nails
- Sweat

SL10 Blood Cell Types

- Reticulocytes
- Erythrocytes
- Platelets
- Leukocytes
  - Neutrophils
  - Lymphocytes
  - Monocytes
- Leukocytes
  - Eosinophil
  - Basophils

SL11 Whole blood

- Plasma
- Buffy Coat
- Erythrocytes

SL12 Serum- The fluid obtained from blood after the blood has been clotted and then centrifuged to remove the clot and blood cells

SL13 Plasma

Water	Proteins	Other solutes
92% by weight	7-9% by weight	1% by weight
	Albumin 58%	Electrolytes
	Globulin 37%	Nutrients
	Fibrogen 4%	Respiratory Gases
	Regulatory Proteins 1%	Waste Products

SL14 Specimen Types: Dried Blood Spots or Dried Plasma Spots

- 1960's screening test for PKU
- Early applications to identify presence or absence of component

SL15 Urinalysis

▪ Color	▪ Protein	Microscopic analysis for:
▪ Clarity	▪ Glucose	▪ RBC or WBC
▪ Odor	▪ Nitrates	▪ Casts
▪ Specific gravity	▪ Leukocytes	▪ Crystals
▪ pH	▪ Ketones	▪ Bacteria, yeast cells, parasites

SL16 Urinalysis

▪ Color- Factors that affect color:	▪ Clarity- Factors that affect clarity
▪ Hydration status	▪ Normally clear
▪ B vitamin supplements → bright yellow	▪ Clouded urine → Bacteria, blood, sperm, crystals, or mucus
▪ Blackberries, beets, rhubarb or blood → red-brown	
▪ Some medicines → red-brown, blue, green	

SL17 Urinalysis

▪ Odor- Factors that affect normal odor	▪ Specific gravity-wt of urine c/o distilled water
▪ E. coli → strong foul odor	▪ ↑ with dehydration
▪ Diabetes or starvation → fruity odor	▪ ↓ with overhydration
▪ UTI → strong foul odor	

SL18 Urinalysis

pH-affected by meds, diet, renal tubular function, acid-base balance	**Protein- Conditions that may cause protein in urine**	**Protein- Conditions that may cause protein in urine**
▪ **Nitrates**	▪ Fever	▪ Kidney disease
▪ UTI	▪ Strenuous exercise	▪ Poorly controlled diabetes
	▪ Pregnancy	

SL19 Urinalysis

Glucose- Conditions that may cause glucose in urine	**Leukocytes esterase**	**Ketones**
▪ Poorly controlled diabetes ▪ Kidney disease	▪ UTI	▪ DKA

SL20 Urinalysis

RBC or WBC- Conditions that may cause RBC and WBC in urine	**Casts**- indicate type of kidney disease
▪ Injury, inflammation	▪ **Crystals**- may suggest stones
▪ Disease of kidney, ureters, bladder or urethra	▪ **Bacteria, yeast cells, or parasites**- may suggest infection
▪ Strenuous exercise	

SL21 24 hour Urine Tests

- Nitrogen Balance
  - Research: use isotope labeled protein to track turnover
  - Healthcare setting :Does not reflect true protein turnover
    - Not using labeled protein
    - Std calculations inaccurate with inflammatory metabolism
- Urine Creatinine
  - Ordered if serum levels are elevated
  - Levels r/t muscle mass rather than total body weight
- Urine Sodium (40-220 mEq/d)
  - Used to evaluate hyponatremia, volume depletion, ARF, adrenal disturbances, acid-base imbalances

SL22 Specimen Types

▪ **Feces**	▪ **Hydrogen Breath Tests**
• Stool electrolytes	• Lactose intolerance
• Stool fat	• Other CHO
• Fecal occult blood (FOBT)	• Alcohol
• Fecal immunochemical test (FIT)	• Indicator Amino Acid Oxidation
• Stool DNA (sDNA)	

SL23 Specimen Types: Hair Analysis

What does the consumer read about hair analysis on the web?

- *identifies toxins*
- *determines nutrient depletions*
- *learn the REAL cause of your poor health*
- *use hair analysis to prove that their detox system is working*

SL24 Specimen Types Hair Analysis

What does science report about hair analysis?

- Identifies some poisons i.e. arsenic, lead, & some minerals
- Can't distinguish between internal and external exposure
- No universal testing standards
- No normal ranges for minerals in hair
- Can be used for DNA testing
- DNA may predict genetic predisposition to disease and effectiveness of MNT
- Limited science to support most claims
- Might be useful in the future

SL25 Specimen Types Saliva

- Substance Abuse screening
- DNA ancestry
- Risk assessment for selected diseases i.e. Parkinson's, late onset Alzheimer's, celiac , Alpha-1 antitrypsin deficiency, Dystonia, Blood clotting disorders, Gaucher disease Type 1, glucose-6-Phosphate Dehydrogenase deficiency, Hemochromatosis

SL26 Specimen Types Sweat Dx cystic fibrosis

Chloride Concentration	**Result**	**Chloride Concentration**	**Result**
< 40 mmol/L	Normal	> 60 mmol/L	Abnormal
40-60 mmol/L	Inconclusive		

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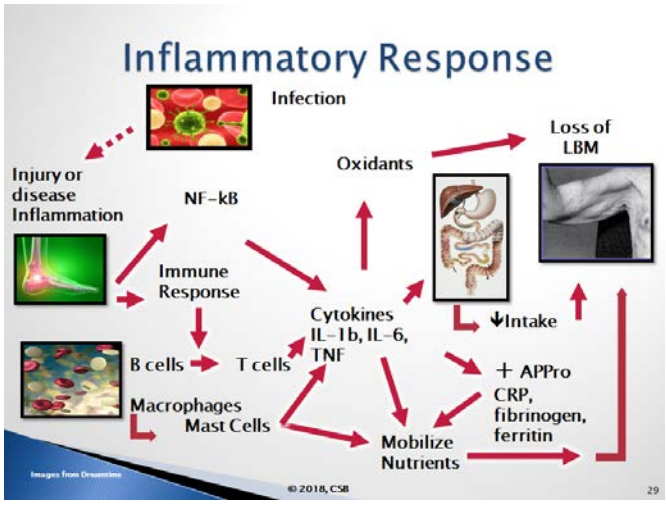
SL27 Factors that Influence Lab Test Results

▪ Hydration status	▪ Timing	▪ Handling of samples
▪ Inflammation	▪ Alcohol	▪ Equipment
▪ Age	▪ Meds	▪ Reference std

SL28



SL29 Markers of Inflammation

Commonly Used Markers	Emerging Markers
Albumin	IL-1b, IL-6, IL-8
Prealbumin	Tumor Necrosis Factor TNF
Transferrin	Plasminogen Activator Inhibitor 1 (PAI-1)
Ferritin	CD4/CD8 Ratio
C-Reactive Protein & hs-CRP	Serum Amyloid A
Erythrocyte Sedimentation Rate	Haptoglobins
D-dimer levels	Intercellular adhesion molecule-1
Fibrinogen	Vascular cell adhesion molecule-1
Lp-PLA2 : PLAC	Exhaled Nitric Oxide

SL30-31 Minnesota Starvation Study, 1944

Parameter	Baseline	6 mo semi-starvation diet
BMI	21.7	16.4
Body composition: LBM	33.9%	29.2%
Fat	9.8%	3.1%
Serum Albumin	4.3 g/dL	3.9 g/dL

SL32 Inflammatory Markers

Albumin	Prealbumin
Adults: 3.5-5.0 g/dL; 35-50 g/L	Adults: 15-36 mg/dL;150-360 mg/L
18-21 day half life	2-3 day half life
Negative acute phase reactant	Negative acute phase reactant
Affected by hydration status	Somewhat affected by hydration status
NOT a marker of protein status or repletion of LBM	NOT a marker of protein status or repletion of LBM
Albumin ➔extravascular space to plasma. 1.5 to 2 X more alb in extravascular space than in blood	Levels r/t thyroid & zinc status

SL33-35 Inflammatory Markers

Transferrin	**Ferritin**
Males 215-365 mg/dL Females 50-380 mg/dL	Males 12-300 ng/mL Females 10-150 ng/mL ACD < 20 ng/mL
9-11 day half life	30 hr half life
Negative acute phase reactant	Positive acute phase reactant
Affected by nutritional anemias	Affected by nutritional anemias
NOT a marker of protein status or repletion of LBM	NOT a marker of iron status if inflammatory processes are sustained
	↑ Several types of cancers
C-Reactive Protein & hs-C-Reactive Protein	
CRP Adults: <1.0 mg/dL or < 10 mg/L; hs-CRP 1.0-3.0 mg/dL High risk: > 3.0 mg/dL	
18-20 hr half life	
Positive acute phase protein	
Up to 30% variation in day to day results in non sick person	
Can increase 1000 X normal with inflammation	
As inflammation wanes, levels fall and negative acute phase proteins may rise, BUT this is NOT indicative of improved protein status	
Erythrocyte Sedimentation Rate	
M 0-15 mm/hr (50 yr+ 0-20 mm/hr) F 0-20 mm/hr (50+ 0-30 mm/hr)	
Rate at which RBC clump or stack in a column	
Inflammation ↑ wt RBC	
Nonspecific marker used to monitor course of disease	
↑ infections, inflammatory diseases, thyroid disorders, anemias, MI, renal diseases	

SL36 Case Study

JD, 74 yr old, retired salesman; lives with his son, accidently set the house on fire, found unconscious on floor

Health Hx: HTN, type 2 diabetes, emphysema, heart failure, smoker, pneumonia in last 12 months.

Admission dx: smoke inhalation, diabetes, ASCVD, HTN. Braden Score 18, Nutrition subscore 3. MNA Score 8

Meds: furosemide 40 mg 2X d, atorvastatin 40 mg 2Xd, metformin 1000 mg 2xd

72 inches, 134 lbs, BMI 18

Does he have any medical conditions that may increase his risk for undernutrition or malnutrition?

SL37 Nutrition Assessment Findings

Findings	**Suspected Etiology**
Admission Labs (non-fasting):	
▪ ALB 3.0 g/dL	
▪ PAB 12 mg/dl	
▪ Other abnormal labs	

SL38 Case Study

How would you address 'nutrition consult for low albumin and prealbumin' in your PES statement and assessment note?

SL39-40 Sample Nutrition Diagnosis Statements

1. Impaired nutrient utilization related to inflammatory conditions as evidenced by redistribution of acute phase protein levels.
2. Increased energy expenditure related to chronic respiratory illnesses as evidenced by BMI 18 and 12 % weight loss in 6 months.
3. Malnutrition related to chronic respiratory illnesses as evidenced by 12 % weight loss in 6 months and mild muscle wasting.

SL41 Questions

SL42 Vitamin & Mineral Deficiencies

SL43 Nutritional Anemias

1. Folic Acid deficiency
2. Vitamin B 12 deficiency
3. Iron Deficiency Anemia
4. Anemia of Chronic & Inflammatory Diseases (ACD)

SL44-46 Anemia Markers

Hemoglobin	**Hematocrit**
Adults: F 12-16 g/dL; 7.4-9.9 mmol/L M 14-18 g/dL; 8.7-11.2 mmol/L Critical values < 5 g/dL	Adults: F 37-47% M 42-52% Critical values < 15% & > 60%
Main component of RBC Transporter of O_2 and CO_2	Measure of % of RBC in total blood volume
↑ With dehydration status	↑ With dehydration status
Mean Corpuscular Volume	**Mean Corpuscular Hgb**
Adults: 80-95 fL	Adults: 27-31 pg/cell
Measure of ave size or volume of RBC	Measure of ave wt of Hgb in RBC
MCV = HCT X 10/ RBC	MCH= Hgb X 10/RBC
Serum Fe	**RDW**
F 60-160 mcg/dL;11-29 mmol/L M 80-180 mcg/dL; 14-32 mmol/L	Adults 11-14.5%
Measure of Fe bound to TNF	Measures variation in RBC size
Serum B12	**Methyl Malonic Acid**
Adults: 160-950 pg/mL	Adults: S: 17-76 ng/mL; U < 5 mg/d
Deficiency signs reported in values < 320 pg/mL	Intermediate metabolite that ↑ when vitamin B_{12} is deficient
	Urinary MMA/creatinine ratio is more accurate than serum MMA
Serum Folate	**RBC Folate**
Adults: 3-13 ng/mL	Adults: 140-628 ng/mL
Assessment for macrocytic anemia	FA in reticulocyte in bone marrow & not mature RBC (more accurate than serum)

SL47-49 Nutritional Anemias

Lab test	Normal ranges	Fe deficiency	ACD	B12 deficiency	Folate deficiency
Hct	M 42-52% F 37-47 %	↓	↓	↓	↓
Hgb	M 14-18 g/dL F 12-16 g/dL	↓	↓	↓	↓
MCV	80-100 fL	↓	↔	↑ or ↔	↑
MCH	27-31 pg/cell	↓	↓	↑	↑
Serum Fe	M 80-180 mcg/dL F 60-160 mcg/dL	↓	↓	↑	↑
Ferritin	M 12-300 ng/mL F 10-150 ng/mL	↓	↑ or ↔	↑	↑
RDW	11-14.5%	↑	↔	↑	↑
B12 (s)	160-950 pg/mL	↔	↔	↓ or ↔	↑
Folate/ RBC Folate	3-13 ng/mL 140-628 ng/mL	↔	↔or ↓	↑	↓
MMA (S)	17-76 ng/mL	↔	↔	↑	↔
MMA (U)	< 5 mg/d	↔	↔	↑	↔

SL50 Vitamin D

Organization	Deficiency (Rickets & Osteomalacia)	Sufficiency	Optimal
DRI provides sufficient levels to achieve these cutpoints (2011)	Adults < 30 nmol/L; <12 ng/mL Infant/Child <27 nmol/L; <11 ng/mL	>30 nmol/L; >12 ng/mL	
IOF (2010) & Endocrine Society (2011)	No cut point	>75 nmol/L; >30 ng/mL	
American Geriatric Society (2013)		>75 nmol/L; >30 ng/mL	> 100 nmol/L; > 40 mcg/mL

SL51-52 Vitamin A Deficiency vs. Toxicity

Normal Retinol 20-80 mcg/L Toxicity > 100 mcg/L

Primary deficiency	Deficiency Symptoms
▪ inadequate intake	Changes in hair; Alopecia of eyebrows
▪ fat malabsorption (gastric bypass surgery)	Dry, rough skin OR 'goose flesh' follicular hyperkeratosis
▪ liver disorders	Dry eyes, Bitot spots, Keratomalacia
Secondary deficiency	Cracked lips
▪ ↓ bioavailability of provitamin A carotenoids	Impaired night vision leading to night blindness
▪ interference with vitamin A absorption, storage or transport	**Toxicity Symptoms** Hypercarotenemia Severe headache (pseudotumor)

SL 53 Thiamine Deficiency

Normal Values Thiamine Diphosphate in Whole Blood: Adults: 80-150 nmol/L

Other Indicators of deficiency

- Thiamine Diphosphate in Whole Blood: Adults:< 80 nmol/L
- Pyruvate level of >1 mg/dL
- Erythrocyte transketolase activity of <0.017 U/dL

SL 54-55 Chronic Disease Markers: JNC 8 & ATP 4

Guidelines Atherosclerotic Cardiovascular Disease

1. Treatment blood cholesterol	2.Assessment of cardiovascular risk
3. Lifestyle management to reduce CV risk	4. Management of overweight & obesity in adults

SL 56 Treatment blood cholesterol

- Eliminated LDL & non-HDL cholesterol targets
- No recommendations for specific LDL-cholesterol or non-HDL targets for prevention of ACVD
- Statins for primary & secondary prevention

SL 57 Assessment of cardiovascular risk

- High Risk Individuals:
  - clinical atherosclerotic cardiovascular disease.
  - LDL-cholesterol levels $\geq$190 mg/dL, such as those with familial hypercholesterolemia.
  - Dx diabetes, 40 to 75 yrs w/ LDL-C between 70 -189 mg/dL & no evidence of ACVD
  - No evidence ACVD or diabetes but who have LDL-C levels between 70 -189 mg/dL & a 10-year risk of atherosclerotic cardiovascular disease $\geq$7.5%.

SL58 Determining 10 yr Atherosclerotic Cardiovascular Disease Risk Score :

Included Risk Markers	Excluded Risk Markers	Conditional Markers
Age	Family Hx premature CVD	Family hx
Sex	Triglycerides	Hs-CRP
Race	Waist circumference	Ankle-brachial index (ABI)
Total cholesterol	BMI	Coronary artery calcium score
HDL-cholesterol	Lifestyle habits	
BP & BP Tx status	Smoking Hx	
Diabetes		
Current smoking status		

SL59 Conditional Markers

Coronary Artery Calcium Screening	**Ankle Brachial Index**
CT scan(higher the number the greater the risk)	< 20 mm Hg difference in systolic BP in lower extremity compared to upper extremity
>0-99 100-399 >400	Test used to rule out occlusive disease of lower extremities

SL60-61 Diabetes & Metabolic Syndrome

Pre-Diabetes	**Diabetes**
A1C 5.7-6.4% *OR*	A1C ≥6.5% *OR*
Impaired fasting glucose tolerance (IFG): FPG 100 mg/dL-125 mg/dL dl (5.6-6.9 mmol/l) *OR*	Fasting plasma glucose (FPG) ≥126 mg/dl (7.0 mmol/l) *OR*
Impaired glucose tolerance (IGT) 2-hour PG in 75 g OGTT 140 -199 mg/dL (7.8-11.0 mmol/l)	Two-hour plasma glucose ≥200 mg/dl (11.1 mmol/l) during an OGTT (75g) *OR*
	A random plasma glucose ≥200 mg/dl (11.1 mmol/l)

SL62 Glycemic BP & Lipid Targets

Marker	**Target**
A1C	< 7%
BP	<140/80 mm Hg (Lower systolic may be desirable)
Lipids	LDL-C <100 mg/dL;< 2.6 mmol/L(<70 using high dose of statin may be desirable)

SL63 Not Everyone Agrees … Glycemic Targets

Marker	Target ADA/AACE	Target ACP
A1C	< 7%	7-8%; Most non-pregnant patients <8%

On March 6, 2018 the American College of Physicians (ACP) issued new guidance on HBA1c levels, *Annals of Internal Medicine.* The ACP recommends a target HBA1c of 7-8% for most non-pregnant adults with type 2 diabetes. Recommendations from the American Diabetes Association (ADA) and American Association of Clinical Endocrinologists (AACE) take issue with these higher glycemic control targets.
http://annals.org/aim/fullarticle/2674121/hemoglobin-1c-targets-glycemic-control-pharmacologic-therapy-nonpregnant-adults-typeSL65

SL64 Glucose Targets for Hospitalized Patients

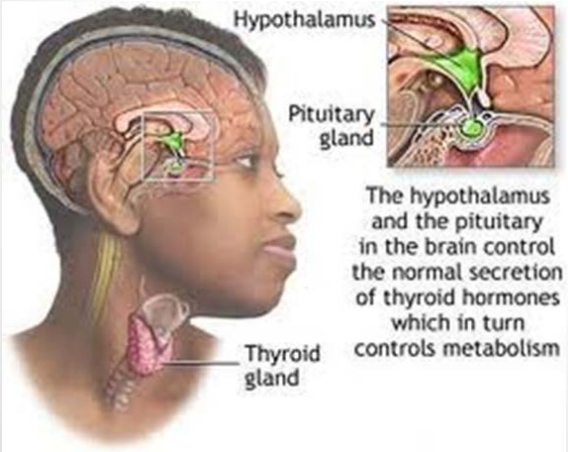
Type of Patient	Recommendations
Critically ill patients	Initiate insulin for tx of persistent hyperglycemia starting at ≤180 mg/dL (≤10.0 mmol/L); Once insulin is started, 140-180 mg/dL (7.8-10.0 mmol/L) is recommended glucose range

SL65 Diagnosis: Metabolic Syndrome: Dx when any of 3 of the following are present:

Risk Factor	**Cutpoint**
Abdominal obesity (waist circumference): Men Women	> 102 cm (> 40 in) > 88 cm (> 35 in)
Triglycerides	> Or = to 150 mg/dL
HDL: Men HDL: Women	< 1.0 mmol/L (< 40 mg/dL) < 1.3 mmol/L (< 50 mg/dL)
Blood Pressure	> Or = 130/85 mm Hg
Fasting glucose	> 100 mg/dL
DEXA Scan for % body fat	> 25% M and > 35% F

SL66-67

Thyroid Function Tests



The hypothalamus and the pituitary in the brain control the normal secretion of thyroid hormones which in turn controls metabolism

Thyroid Dysfunction

Lab test	Normal Ranges	Hyperthyroidism
Thyroxine (T4)	M 5–12 mcg/dL F 4–12 mcg/dL 60 yr: 5–11 mcg/dL	↑
Triiodothyronine (T3)	20–50 yrs: 70–205 ng/dL 50 yr: 40–180 ng/dL	↑
Thyroid Stimulating Hormone (TSH)	3–12 mU/L	↓

S & S Hyperthyroidism	
• atrial fibrillation	• hypertension
• heart failure	• osteoporosis
• arterial thromboembolism	

SL68-69

Signs & Symptoms of Thyroid Dysfunction

Hyperthyroidism	
• atrial fibrillation	• hypertension
• heart failure	• osteoporosis
• arterial thromboembolism	

Lab test	Normal Ranges	Hyperthyroidism
Thyroxine (T4)	M 5–12 mcg/dL F 4–12 mcg/dL 60 yr: 5–11 mcg/dL	↑
Triiodothyronine (T3)	20–50 yrs: 70–205 ng/dL 50 yr: 40–180 ng/dL	↑
Thyroid Stimulating Hormone (TSH)	3–12 mU/L	↓

Abnormal Thyroid Labs

Lab test	Normal Ranges	Hyperthyroidism	Hypothyroidism
Free T4 (f T4)	0.8–2.8 ng/dL	↑	↓
Free T3 (f T3)	260–480 pg/dL	↑	↓
Thyroxine–binding Globulin (TBG)	1.7–3.6 mg/dL	↑	↓

SL70

Euthyroid Sick Syndrome

Lab test	Values
Thyroxine (T4)	↓
Triiodothyronine (T3)	↓
Free T4 (f T4)	↓
Free T3 (f T3)	↓
Thyroid Stimulating Hormone (TSH)	↓

SL71-72 Renal Function Tests BUN & Osmolality
Normal Ranges: BUN 10-20 mg/dL; 3.6-7.1 mmol/L
Osmolality 285-295 mOm/kg H2O; 285-295 mmol/L
Creatinine M 0.6-1.2 mg/dL; F 0.5-1.1 mg/dL
Patterns of Renal Function Tests

- ↑ BUN & ↑ osmolality suggests dehydration
- ↑ BUN, but osmolality & creatinine are WNL, suggests GI bleeding, MI or high protein intake
- ↑ BUN & ↑ creatinine, but osmolality is WNL, suggests renal insufficiency or inability to concentrate urine
- ↑ creatinine suggests renal injury/disease, rapid muscle loss
- ↓ creatinine suggests muscular debilitation, very low protein intake

SL73 Glomerular Filtration Rate (GFR) Creatinine clearance (M <40y 107-139 mL/min: F < 40y 87-107 mL/min)

- Used to assess ability of the glomeruli to act as a filter
- Requires 24 hr urine collection & serum creatinine
- MDRD Study prediction equation using serum creatinine, age, race
- http://www.kidney.org/professionals/kdoqi/gfr_calculator.cfm

SL74-75 Liver Function Tests

- Aspartate aminotransferase (AST) (0-35 IU/L)
  - enzyme in the heart, liver, skeletal muscle cells
  - diagnostic tool hepatocellular disease
  - replaced by cardiac troponin for dx MI
- Alanine aminotransferase (ALT) (4 - 36 U/L)
  - enzyme primarily in liver & to a lesser degree in the kidneys, heart & skeletal muscle
  - injury to the liver results in ↑levels
  - ↓ malnutrition
- Ratio AST: ALT > 1 acholic cirrhosis, cancer; < 1 hepatitis

SL 76 Liver Function Tests

- Alkaline phosphatase (ALP) (30-120 U/L)
  - Enzyme in bone, liver & biliary tract
  - ↑ alkaline environment
  - Isoenzymes of ALP are used to distinguish between liver and bone diseases
  - ↓ vitamin B12 deficiency
  - ↓ zinc deficiency

SL 77 Gastrointestinal Dysfunction Tests

- Hydrogen Breath Tests: Evaluate for maldigestion of sugars, carbs, Small Intestinal Bacterial Overgrowth (SIBO)
- C-xylose Breath Tests: Evaluate for SIBO, celiac disease
- Urea BreathTests: Evaluates for Helicobacter pylori (H.pylori)
- Stool Culture
  - Distinguishes between normal gut flora & pathogens
  - pH for macronutrient malabsorption
    - carb fermentation changes stool pH to acid
    - protein fermentation changes stool pH to alkaline

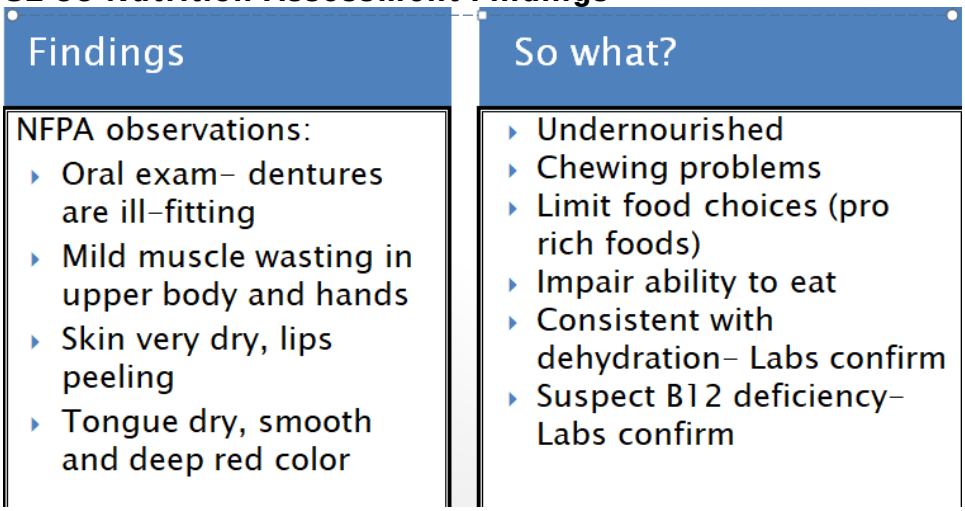
SL 78-82 Case Study

JD, 74 yr old, Health Hx: HTN, type 2 DM, emphysema, HF, smoker, pneumonia in last 12 months
Admission dx: smoke inhalation, diabetes, ASCVD, HTN. Meds: furosemide 40 mg 2X d, atorvastatin 40 mg 2Xd, metformin 1000 mg 2xd. Anthro: 72 inches, 134 lbs, BMI 18
Review JD's labs from admission and Day 3. Does he have any nutrition-related altered labs?

Lab test	Admission (Non-fasting)	Day 3 (Fasting)
Na	150 mEq	140 mEq
K	3.4 mEq/L	3.6 mEq/L
Cl	110 mEq/L	100 mEq/L
CO2	25 mEq/L	23 mEq/L
Glucose	187 mg/dL	117 mg/dL
BUN	35 mg/dL	25 mg/dL
Creat	2.1 mg/L	1.8 mg/L
Ca	9.4 mg/dL	9.1 mg/dL
Alb	3.0 g/dL	2.2 g/dL
AST	47 U/L	45 U/
ALT	38 U/L	36 U/L
PAB	12 mg/dL	8 mg/dL

Lab test	Admission (NF)	Day 3 (F)	Lab test	Day 3 (F)
WBC	6.2	7.4	Cholesterol	245 mg/dL
RBC	5.1	5.3	TG	160 mg/dL
HGB	10 g/dL	8 g/dL	HDL	30 mg/dL
HCT	33%	24%	LDL	183 mg/dL
MCV	107 mg^3	104 mg^3		
MCH	37 mg/dL	36 mg/dL	A1c	8.2%
MCHC	30 g/L	35 g/L	25(OH)D	15 ng/mL
RDW	14%	13.5%		

SL 83 Nutrition Assessment Findings



SL 84 Future???

1. Preventive services more likely to be approved
2. Savvy consumers will be willing to pay for testing whether its covered by insurance or not
3. Broad spectrum screening labs less likely to be ordered
4. Healthcare providers must justify each lab ordered w dx or clinical signs
5. New, more sensitive tests- be sure you know which assay has been ordered

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