An All-Inclusive Guide to the
Dietetic Technician, Registered Exam!

Domain I. FOOD AND NUTRITION SCIENCES (10%)

PROPERTIES OF FOOD

1. Fruits
   a. Low intake in U.S.
   b. Similar vitamin C content: oranges, cantaloupe

2. Vegetables
   a. Low intake in U.S.
   b. Contain 78% water
   c. Mostly carbohydrate but also some fat and protein
   d. Grading voluntary
   e. Lose nutrients once cut
   f. Fermented soy products
      1. Tempeh—fermented cooked whole soybeans, higher protein and fiber than tofu

3. Milk and Dairy
   a. Contain manganese, calcium, phosphorus, potassium, selenium, vitamin A, D, and B’s
   b. 1 cup has 30% RDA for calcium
   c. Ice Cream: >10% milk fats, >20% milk solids

4. Meat, Poultry, Fish
   a. Grading and Inspection
      1. Grading is voluntary
         i. USDA grades meat, based on maturity, marbling (fat between muscle), color, texture (regular grades based on quality, firmness, color, maturity, freedom from defects, uniform size)
         ii. Beef: prime (best) → choice → select → standard → commercial → utility → cutter → canner
      2. Inspection
         i. Poultry and shellfish—mandatory inspection (A, B, or C)
         ii. Fish—inspection not mandatory
   b. Primal Cuts—the main cuts (fabricated cuts are individual portions)
      1. Chuck—tough, front by neck, use in soup or stock
         i. Short ribs, ground, cubes
      2. Brisket and Shank—tough, upper front legs
      3. Rib—upper middle
      4. Short Plate—lower middle (below ribs)
      5. Loin—back area
      6. Flank—bottom back (like belly button if cows have belly buttons)
      7. Round—butt
   c. Doneness
      1. Rare: 145 degrees F
      2. Medium: 160 degrees F
      3. Well-done: 170 degrees F
   d. Some fish stuff
      1. High in omega-3 fatty acids, lower in cholesterol than red meat
      2. Fresh fish has sea smell, no bruises, bright red gills
      3. Fatty fish: salmon, mackerel
      4. Lean fish: cod, haddock, shellfish
      5. Crustaceans: have an exoskeleton
      6. Shellfish can be kept alive for 1 week, must be in their natural water
   e. Contain chromium, cobalt, iodine, phosphorus, potassium, sodium, sulfur, zinc, thiamin (pork)
   f. A better protein source than plants
5. Eggs
   a. Anatomy
      1. Chalaza—anchors the yolk
      2. Vilelinne—membrane that surrounds yolk
      3. Shell membrane—an inner and an outer, surround albumin and form air pocket
   b. Grades—graded using a candler to see silhouette
      1. AA—yolk clearly defined
      2. A—yolk is pretty firm, white stands well around yolk, there is large portion of thick to thin white
      3. B—less clearly defined
   c. 80 calories, 6g fat, 6g protein, vitamin A, D, riboflavin
   d. Coagulates at room temp (62 to 70 degrees F)
   e. Syneresis—separation of liquid from gel, makes tough and watery, caused by too high of temperature
   f. Yolks deteriorate when frozen (so angel food cake does well in freezer)

6. Flour
   a. All-purpose: muffins, quick breads
   b. Bread: high gluten, protein, more elastic
   c. Cake: low protein, low gluten
   d. Pastry: low protein, low gluten

7. Fats and Oils
   a. Types
      1. Saturated: coconut, butter, cream, cheese, beef, solid at room temperature
      2. Monounsaturated: peanut oil, black olives, nuts (cashews), avocados, canola, olive
      3. Polyunsaturated: fish, sunflower oil, omega 3 and 6, soybeans, grains, peanut butter
   b. Emulsification—mixing of two substances that do not usually mix (oil + water)
      1. Lecithin—a phospholipid, common emulsifier found in egg yolk

8. Various Food Classifications
   a. Engineered Foods
      1. GMOs have had their DNA changed
      2. Designer foods have added phytochemicals
      3. Agencies that regulate
         i. FDA—tests new GMO (GM) foods
         ii. USDA—obtain permit for field testing
         iii. EPA—regulate pesticides
   b. Functional Foods—food that contain healthy compounds beyond basic nutrition, can be naturally occurring or fortified
      1. Categorized by Grade: A (naturally occurring beneficial compounds, chocolate, garlic)
      2. Functional fibers:
         i. Chitin, B-glucans—reduce cholesterol
         ii. Fructans (includes inulin)—prebiotic
   c. Natural Foods—original ingredients have no additives
   d. Organic Foods—food is grown or raised without chemical fertilizers or pesticides (may use natural fertilizers and pesticides)

   FOOD PREP

1. Functions of ingredients
   a. Baking
      1. Tougheners—flour, milk, water, egg white,
      2. Tenderizers—fat, yolk, sugar, leaveners, acids
         i. Fats in baking—adds color, flavor, moisture, shortener (shortens gluten)
   b. Doughs
      1. Crumb—butter holds together, 1 butter : 2 sugar : 4 crumb
      2. Sweet—sturdier, like cookies
      3. Flaky—a lot of cold butter, little sugar
      4. Mealy—cornmeal consistency, for custards
   c. Rennen—coagulates casein in milk to make cheese (whey is removed)
d. Roux—a mix of flour and fat used to thicken and flavor, cooked on low to brown then cooled to room temperature, used in gravies, soups, stews

e. Starches—gelatinization agent, when heated to 155 to 212 degrees F they absorb water and swell, then form a gel when they cool back down (sauces, dressings, dessert fillings)
   1. Retrogradation—when a gel cools and solidifies, expelling water

2. Methods of Preparation
   a. Al dente—cook pasta “to the tooth”
   b. Bard—wrap meat in fat before cooking
   c. Blackened—Cajun style, food is seasoned then charred
   d. Clarify—skim to remove fat or impurities
   e. Cream—beat butter or fat until fluffy
   f. Cut-In—mix fat with dry ingredients
   g. Deglaze—add a bit of liquid to pan that was sued to cook meat, scrape to get up remaining pieces of food, makes tasty sauce
   h. Dredge—coat with flour, bread crumbs
   i. Fold—gentle mixing to prevent over-beating

j. Heat
   1. Types of heat
      i. Convection—transfer heat through liquid, vapor, air
      ii. Conduction—from source (gas, electricity), through a medium (pan), and to food (grilling, frying)
      iii. Radiation—heat energy by waves (microwave, infrared)
   2. Moist heat—good for tough cuts of meat
      i. Braise—cook in a bit of water, covered
      ii. Simmer—just below boiling
      iii. Baste—add moisture while cooking
      iv. Poach
   3. Dry heat
      i. Bake—dry heat in
      ii. Broil—direct, dry heat (oven or frill)
      iii. Roast—dry heat method, no water, internal temperature will rise after removing from heat so let stand 30 minutes
      iv. Grill
      v. Frying—should have a high smoke point oil (>400 degrees F)
   k. Julienne—matchstick cuts
   l. Macerate—soak fruits or veggies in liquid
   m. Marinate—soak meat in liquid
   n. Pare—remove skin or fruit or veggie
   o. Radura—a symbol that says a food has been irradiated
   p. Render—remove fat from meat by cooking, heating, or straining
   q. Score—lightly cut surface of food to tenderize
   r. Sear—quick cook on all sides to brown before cooking thoroughly, traps juices
   s. Sous vide—raw foods vacuum sealed in plastic bag and cooked in boiling water
   t. Tenderize—make meat more tender
      1. Mechanical—pierce, pound, or grind
      2. Enzymatic—breaks down collagen in meat (bromelain, papain)
      3. Hydration (marinating)—use salt or acid to tenderize
   u. Yeast bread
      1. Measure ingredients → mix and knead → ferment and let rise → punch down and let rise again → portion → shape portions → final rise → bake

3. Factors affecting food quality
   a. Altitude
      1. Higher altitude → lower pressure
      i. Foods take longer to cook / bake
      ii. Water evaporates faster
iii. Gases expand faster → dough rises faster → less leavening agent
iv. Water boils at lower temperature → increase temperature or cook time

b. Ethylene Gas (CH₂)—cause of ripening and decaying, can be sprayed on prior to selling to have ripe fruit in store
1. Fruits giving off most ethylene gas: banana, tomato, apple, pear, melon
2. Fruits giving off little: cherries, blueberries

c. Pastries are finicky
1. Cake with cracked, steep middle: too hot oven, too much flour, over mixing, not enough sugar/fat/liquid, account for altitude
2. Muffins that are flat: under mixed, not enough leavening agent
   i. Use 1 tsp leavening agent (baking soda, baking powder) per 1 cup flour
3. Muffins with tunnels: over mixed, steam wants out but gluten won’t let it so it makes a tunnel
4. Bread is dry: oven too low (think French bread, just four and water, no butter so it can’t be because of fat), probably cooked too long
5. Biscuits/shortcakes/scones are hard: over kneading over developed the gluten
d. pH (0-acidic to 14-alkaline)
e. Refrigerating potatoes increases sugar content → more browning when frying
f. Turgor—crispness in produce, distension of the plant cell wall caused by water, age causes wilting

4. Factors affecting nutrient retention
a. Chlorophyll + alkali (baking soda) → chlorophytin
1. Baking soda on green beans/cabbage/vegetables enhances color but makes mushy and destroys water-soluble vitamins (like vitamin C)
b. Chlorophyll + acid (lemon juice) → pheophytin
1. Turns green veggies olive green
c. Vitamin C lost when cold water brought to boil

5. Food Additives—improve safety and freshness
a. Regulated by the FDA, evaluated on:
   1. Composition and property of the substance
   2. Amount to be consumed
   3. Short and long term effects
b. GRAS (Generally Regarded as Safe) List developed by government
   1. MSG (monosodium glutamate) is on list, but causes reactions in some people so should be avoided in foodservice

   BASIC HUMAN NUTRITION

1. Macronutrients
a. Energy (calories) (not a macronutrient, I know)
   1. 1 kcal = 1000 calories = amount needed to raise 1 kg water 1 degree C
   2. 1 kJ = 4.2 kcal
b. Carbohydrates (CHO): 45-65% kcal/day
   1. Monosaccharides
      i. Glucose—main source of energy after a meal
      ii. Fructose
      iii. Galactose—found only as part of disaccharide in nature
   2. Disaccharides
      i. Lactose = Galactose + Glucose
         • Requires lactase to break down, lack → lactose intolerance
            a. Can tolerate fermented milk products (yogurt, cottage cheese)
            b. Not common in Caucasians
      ii. Sucrose = Fructose + Glucose
      iii. Maltose = Glucose + Glucose
   3. Fiber
      i. Soluble—helps lower cholesterol (pectin and gums, gluten foods like barley, rye, bran carrots, oats), slows it down
      ii. Insoluble—adds bulk and softness and speeds it up (bran, whole grains)
iii. Recommended: 25-25g, Average intake in America: 10-15g

4. Polysaccharides (>10 monosaccharides)
   i. Starch—plant form of polysaccharide storage
      • Amylose—straight chain with alpha 1-4 bonds, more resistant to digestion (resistant starch)
      • Amylopectin—branched chain, more soluble

5. Glycemic Index
   i. High >70 (fast rise and fall)
   ii. Low 55 (moderate rise and fall)

6. Glycemic Load: High >20, Low 10

7. Replacements: Xylitol, Sucralose, Stevia, Saccharin, Acesulfame K, Aspartame

c. Proteins (PRO): 10-35% kcal/day
   1. Amino acids
      i. Made of C, H, O, and N
      ii. 9 essential
         • BCAA ( Branched Chain Amino Acids)—essential, make up energy for skeletal muscle, heart, and brain when absence of glucose
            a. Leucine, isoleucine, valine

2. Digestions
   i. Deamination—removal of N intake group (NH₂) from a compound → ammonia + carbon
      • Ammonia converted to urea in liver, kidneys filter it out in urine
      • Carbon gives energy

3. \[ 6.25 \text{ g PRO} = 1 \text{ g N} \]

d. Fats (FAT): 20-35% kcal/day
   1. Simple Lipids
      i. Fatty Acids
         • Saturated—no double bonds in fatty acid chains
            a. Increase serum cholesterol
            b. 10% from saturated (unless heart disease then 7%)
         • Monounsaturated—1 double bond, 2 less hydrogen atoms
            a. Decreases serum cholesterol
         • Polyunsaturated—>1 double bond, at least 4 less hydrogen atoms
            a. Decreases serum cholesterol
            b. Omega 3 (a-linolenic acid (ALA))—anti-inflammatory, chia, flax, walnuts
               i. EPA & DHA: human milk, fatty cold water fish, shellfish
            c. Omega 6 (linoleic acid (LA))—pro-inflammatory, poultry, eggs, avocado, various oils
      ii. Monoglycerides, diglycerides—modified to create, less calories (5 kcal/g) but similar sensation
      iii. Triglycerides (a.k.a. triacylglycerol, TAG)
         • Structure
            a. Glycerol—backbone, 1 per triglyceride
            b. Fatty Acid—chains, 3 per triglyceride
         • MCT (Medium-Chain Triglycerides)—6 to 12 C, occur naturally, also man made for clinical use, can water-soluble so no need for bile

2. Compound Lipids
   i. Lipoproteins
      • Chylomicrons—large, mostly triglycerides
      • VLDL—slightly smaller, triglycerides and cholesterol
      • LDL—“bad”, can be made in body, deposits fat around body, mostly cholesterol
      • HDL—“good”, carries fat to liver, small and dense, carries proteins, cholesterol, phospholipids
   ii. Phospholipids (like lecithin, big in VLDL and membranes), glycerolphospholipids, glycosphingolipids, glycolipids

3. Miscellaneous Lipids
   i. Sterols (cholesterol, vitamin D, bile salts)
   ii. Fat-soluble vitamins
4. Replacements: N-Lite, Simplese, Oatrim, Avicel, Polydextrose, Salatrim, Benefat, Olestra

e. Fluids (not a macro but needed to fit it in somewhere)
1. 30 mL / kg of body weight
2. RDA method (for healthy person) = 1 mL / kcal
3. Dehydration—loss of 2-3% of body mass
   i. Mild <5% BW, Severe >5% BW
4. Drink before, during, after exercise. 16-24 oz for each 1 lb lost in exercise.
5. Potable water = safe to drink

2. Micronutrients

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Function</th>
<th>Source</th>
<th>Factors influencing absorption</th>
<th>Deficiency</th>
<th>Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biotin (B7)</td>
<td>Coenzyme in macro metabolism, glycogen synth</td>
<td>Widespread, bacterial synth in GI</td>
<td>Inhibit: alcohol, smoking</td>
<td>Tingling/numb, depression, rash, dry scaly skin, brittle nails</td>
<td>None</td>
</tr>
<tr>
<td>Folate (B9)</td>
<td>Coenzyme in DNA synth, cell synthesis</td>
<td>Leafy greens, enriched foods</td>
<td>Inhibit: legumes, cabbage, alcohol</td>
<td>Alcoholics, pregnant women. Megaloblastic anemia, glossitis, neural tube defects</td>
<td>Masks symptoms of B12 deficiency</td>
</tr>
<tr>
<td>Niacin (B3)</td>
<td>Coenzyme in energy metabolism</td>
<td>Milk, grain, protein containing food, can be made from tryptophan</td>
<td>Inhibit: alcohol</td>
<td>Pellagra (diarrhea, dermatitis, dementia, death)</td>
<td>Niacin flush rash, nausea, liver damage, impaired glucose tolerance</td>
</tr>
<tr>
<td>Riboflavin (B2)</td>
<td>Coenzyme in FAD/ FMN, neurotransmitter</td>
<td>Milk, grain</td>
<td>Inhibit: certain drugs</td>
<td>Cheilosis (cracked mouth), glossitis, rash</td>
<td>None</td>
</tr>
<tr>
<td>Thiamin (B1)</td>
<td>Nerve function, DNA/RNA synthesis</td>
<td>Pork, grain, everything</td>
<td>Inhibit: alcohol,</td>
<td>Beriberi (lose appetite, enlarged heart, weak, from polished rice)</td>
<td>Rapid pulse, weakness</td>
</tr>
<tr>
<td>Vit B6 (Pyridoxine)</td>
<td>Makes hemoglobin Conversion of tryptophan → niacin and serotonin</td>
<td>Meat, legumes, fruit, starchy veggies</td>
<td>Inhibit: alcohol, high protein diet, drugs (antibiotics, TB)</td>
<td>Unlikely. Microryctic hypochromic anemia, depression, scaly dermatitis</td>
<td>Nerve damage causing numbness, weakness, discoordination</td>
</tr>
<tr>
<td>Vit B12 (Cobalamin)</td>
<td>Cells &amp; RBC synthesis</td>
<td>Animal products</td>
<td>Enhance: HCl unbinds B12 from protein so intrinsic factor (IF) can bind (in stomach)</td>
<td>Cystic fibrosis, parasites, vegans, lack IF. Megaloblastic anemia, nerve degeneration, tingling/numb</td>
<td>None</td>
</tr>
<tr>
<td>Vit C (Ascorbic Acid)</td>
<td>Antioxidant, collagen synth, restores Vit E</td>
<td>Citrus fruit, dark green veggies</td>
<td>Inhibit: smoking, cooking (especially in water)</td>
<td>Scurvy, joint pain, infection, rough skin</td>
<td>Nausea, abdominal cramps</td>
</tr>
</tbody>
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3. Fat-Soluble Vitamins

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Vit A</td>
<td>Bone &amp; tooth growth, immune, reproduction, vision</td>
<td>B-carotene (precursor): yellow/orange produce Vit A: fortified milk, egg</td>
<td>Inhibit: low protein diet</td>
<td>Steatorrhea pts, kids, Night blind, xerophthalmia (no tears), stunted bone growth, keratin lumps</td>
<td>B-carotene: harmless tinting of skin Vitamin A: reduced bone density, birth defect/ spontaneous abortion</td>
</tr>
<tr>
<td>Vit D</td>
<td>Mineralize bones (increase Ca &amp; P absorption in GI)</td>
<td>Fatty fish, fortified milk, synthetic via sunlight (7-dehydrocholesterol → pre-vitamin D3 by sun → cholecalciferol)</td>
<td>Enhance: dietary VD2 absorbed with micelles</td>
<td>Dark skin, kids, Rickets (children, bowed legs is indicator) Osteomalacia (soft bones) or osteoporosis (adults)</td>
<td>High Ca → calcification of soft tissue &amp; joints</td>
</tr>
<tr>
<td>Vit E</td>
<td>Protect PUFA and Vit A, stabilize membrane</td>
<td>PUFA plant oils, leafy greens, egg yolk</td>
<td>Enhance: bile salt</td>
<td>Fat malabsorption (like cystic fibrosis). RBCs break, liver spots (PUFA oxidation)</td>
<td>Enhances anti-clotting meds and B-carotene</td>
</tr>
<tr>
<td>Vit K</td>
<td>Synth proteins for bone mineralization &amp; clots</td>
<td>Leafy greens, cabbage-type veggies, bacteria synth in GI</td>
<td>Interfere: antibiotics, high vit A &amp; E</td>
<td>People with GI disorders, on antibiotics, infants. Low bone mineralize, hemorrhage</td>
<td>Interferes with anti-clot meds</td>
</tr>
</tbody>
</table>

4. Minerals

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Ca2+</td>
<td>Contraction/relax, bone</td>
<td>Milk, small fish (w/ bones), leafy greens</td>
<td>Inhibit: steatorrhea, alcohol, caffeine, oxalate (beet, spinach, peanut, rhubarb, tea), fiber, PTH</td>
<td>Stunted growth (children) or bone loss (adults)</td>
<td>Constipation, kidney stones, interferes with absorption of others, calcification of soft tissue</td>
</tr>
<tr>
<td>Cu1+</td>
<td>Fe and Mn metabolism/absorption</td>
<td>Seafood, nuts, legumes</td>
<td>Inhibit: antacids (high pH)</td>
<td>Wilson’s Disease. Liver damage</td>
<td></td>
</tr>
<tr>
<td><strong>F</strong></td>
<td>Incorporated into bone, teeth via apatite</td>
<td>Fluorinated water, seafood, tea</td>
<td>Note: no way homeostasis/way to prevent toxicity</td>
<td>Tooth decay, funky teeth</td>
<td>Fluorosis (discolored teeth with pits)</td>
</tr>
<tr>
<td><strong>I</strong></td>
<td>Part of thyroid hormones</td>
<td>Iodized salt, seafood, plants from soil near sea</td>
<td>Inhibit: goitrogens (suppress thyroid), cabbage, turnips, nuts</td>
<td>Goiter (lack I to make T3 or T4 → over produce TSH → enlarge), cretinism (retardation in infants)</td>
<td>Thyroid problems, cancer</td>
</tr>
<tr>
<td>Fe²⁺ (ferrous) or Fe³⁺ (ferric)</td>
<td>Carries oxygen as part of hemoglobin</td>
<td>Heme: animal flesh Non-heme: legumes, egg, dried fruit</td>
<td>Inhibit: polyphenols (coffee, tea), Zn, Mn, P</td>
<td>Enhance: acid (ascorbate), meat</td>
<td>Rapid growth, pregnant, blood loss. Anemia, pale, pica, unregulated temp (can’t make thyroid hormone), impaired cognitive, brittle/curved nails</td>
</tr>
<tr>
<td><strong>Mg</strong>²⁺</td>
<td>Bone mineralize, enzyme actions</td>
<td>Nuts, legumes, dark green veggies, chocolate, cocoa</td>
<td>Weakness, confusion, convulsions</td>
<td>Difficult to overdo, diarrhea, dehydration</td>
<td></td>
</tr>
<tr>
<td><strong>Mn</strong>²⁺</td>
<td>Pancreatic function, reproduction, antiox</td>
<td>Whole grain, dried fruit</td>
<td>Inhibit: Fe, Zn</td>
<td>Difficult. Decreased hair/nail growth, impaired glucose tolerance</td>
<td>Miners/steelworkers/women at risk, nervous system problems, delusion</td>
</tr>
<tr>
<td><strong>P</strong></td>
<td>Energy metabolism, part of phospholipids</td>
<td>Animal sources</td>
<td>Very unlikely, muscle weakness, bone pain</td>
<td>Calcification of soft tissue (kidneys)</td>
<td></td>
</tr>
<tr>
<td><strong>K</strong></td>
<td>Maintain electrolyte balance, nerve impulse</td>
<td>All whole foods (milk, grain, fruit, veggies)</td>
<td>Irregular heartbeat, weakness</td>
<td>Weakness, vomiting</td>
<td></td>
</tr>
<tr>
<td><strong>Na</strong></td>
<td>Maintain blood pressure, muscle contraction, nerve impulse</td>
<td>Baked products, meat, processed foods 1 tsp = 2300 mg</td>
<td>Unlikely</td>
<td>2400 mg recommended</td>
<td></td>
</tr>
<tr>
<td><strong>Zn</strong>²⁺</td>
<td>Activates enzymes, associated with insulin, taste perception, wound healing, make sperm, fetal develop.</td>
<td>Protein containing food (meat, grains, fortified cereal)</td>
<td>Inhibit: oxalates, tea, fiber, Fe, Ca, Cu</td>
<td>Enhance: protein ingestion</td>
<td>Rough, dry skin, poor immune, delay sexual develop, hair loss or dull hair</td>
</tr>
</tbody>
</table>

**Flavonoids**—water-soluble antioxidants that turn brighter in acid (oregano, in fruits, tea, wine, veggies)

- Anthocyanin: Leaves, flowers, fruits, stems, roots
- Anthoxanthin
- Quercetin

**Phytochemicals**

- Isoflavones: Block estrogen activity in cells, reduce risk breast and ovarian cancer

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3. **Basic Human Physiology**
   a. **Ingestion**
      1. **Mouth**
         i. **Anatomy**
            a. Tongue
               - Tip = sweet
               - Front sides = salty
               - Middle rear = sour
               - Back = bitter
         ii. **Hormones**
            - Salivary amylase—breaks starches
            iii. Dysgeusia—reduced sense of taste
            iv. **Dysphagia**—difficulty swallowing, puree diet best
            v. Xerostomia—dry mouth, common in elderly
      2. **Esophagus**
         i. Lower esophageal sphincter—prevents heartburn
   b. **Digestion**—peristalsis moves food from esophagus to anus
      1. **Stomach**—very acidic
         i. **Anatomy**: cardia, fundus, body, atrium, pylorus
            - Pyloric sphincter—allows contents of stomach to enter small intestines
Hiatal hernia—portion of stomach protrudes up through diaphragm, lower esophageal sphincter no longer supported by diaphragm

Hormones/Enzymes/Secretions
- Gastrin—stimulated by protein, causes release of HCl by parietal cells
- Gastric Inhibitory Peptide—reduces flow of stomach juices
- HCl—denatures proteins, kills some bacteria
- Pepsin—hydrolyze peptide bonds

Alcohol, drugs, I, Cu, F absorbed

2. Small Intestines—major site of absorption
   i. Anatomy: duodenum (Fe, Ca, Mg, Zn, monosaccharide absorption), jejunum (vitamin C, B vitamins), ileum (amino acids, fat-soluble vitamins, bile, B12, cholesterol)
      • Villi covered by microvilli (brush border)
      • Sites of absorption
         a. GLUT-5 fructose → enterocyte interior
         b. SGLT-1 glucose, galactose → enterocyte interior
         c. GLUT-2 all → portal circulation
   ii. Hormones/Enzymes
      • CCK (Cholecystokinin)—release in response to fat, causes gallbladder to contract
      • Secretin—stimulates secretion of bicarbonate to reduce acidity as food enters SI
      • Proenzyme trypsinogen from pancreas → small intestines and is activated to trypsin, breaks down peptide bonds of some amino acids

3. Large Intestines—some H2O, vitamin K, Na, K absorption
   i. Anatomy: ileocecal valve, cecum, ascending colon, transverse colon, descending colon, sigmoid colon, rectum, anal canal, external sphincter

4. Peripheral Organs
   i. Pancreas
      • Hormones
         a. Insulin—from B-cells in response to glucose, promotes glucose uptake
         b. Glucagon—from A-cells in response to low glucose, promotes glycogen breakdown
      • Makes trypsinogen
   ii. Liver
      • Produces bile
      • Ammonia → urea
   iii. Gallbladder—store bile (secreted into duodenum when fat present)
      • Anatomy
         a. Sphincter of Oddi—relaxes in response to CCK, allows bile out
         b. Gallstones—stones slip into common bile duct, causes cramps, pain, possibly infection

C. Absorption
   1. Passive—doesn’t require carriers or energy
      i. Ex: diffusion, substances easily pass through (like small lipids)
   2. Facilitated—uses a carrier to move the nutrient from the lumen into the cell, no energy needed
      i. Ex: fructose because larger molecule
   3. Active—uses carrier and energy to pump
      i. Ex: amino acids
   4. Phagocytosis—absorbing cell surrounds and engulfs the nutrient

d. Metabolism
   1. Energy transfer
      i. Anabolic—uses energy, build glycogen, fats, proteins, often N+ balance
         • Glycogenesis—formation of glycogen
            a. Glycogen—energy store in liver and muscles
         • Gluconeogenesis—generates glucose from non-carbohydrate sources (pyruvate, lactate, glycerol, amino acids)
ii. Catabolic—yields energy, breaks down stores for ATP (the major energy carrier in most cells), often N- balance
  • Glycolysis—breaks down glucose for energy
    a. 1 6-carbon glucose → 2 3-carbon pyruvates
    b. 1 glucose molecule → 2 net ATP
    c. If no oxygen → lactic acid
  • Glycogenolysis—breakdown of glycogen

2. Energy production
i. Electron transport chain (mitochondria)

e. Excretion

f. Energy Utilization
1. Feasting
i. Insulin—stimulates glucose uptake, lipogenesis, anabolic reactions

2. Fasting
i. Glucagon—stimulates liver glycogen breakdown
ii. Leptin—fat cells make leptin, less fat = less leptin → brain sends hungrier signals (can also send fullness cues though)
iii. Ghrelin (hunger hormone)—secreted when stomach empty (tummy is growling)
iv. Ketone Bodies—in periods of starvation, brain uses for energy. They are the product of fatty acid oxidation

3. Exercise
i. Length
  • Short with ample oxygen—glycogen main source
  • Long with ample oxygen—fatty acids main source
ii. Intensity
  • High—glucose, a little bit of protein
  • Low—fatty acids

4. Somogyi Effect—hypoglycemia followed by rebound hyperglycemia

g. Other important systems
1. Bone
i. Remodeling
  • Osteoblasts—build bone, also require Zn, Na, Cu, decrease with age
  • Osteoclasts—break down bone
ii. Regulation
  • PTH (Parathyroid Hormone)—release Ca from bones (wants to maintain serum Ca)
  • 1,25-dihydroxy vitamin D₃—enhance reabsorption of Ca from kidneys, increase bone formation

2. Cardiovascular
i. Superior and inferior vena cava → Right atrium
ii. Right atrium → Right ventricle (via tricuspid valve)
iii. Right ventricle → Lungs (via pulmonary semilunar valve)
iv. Lungs → Left atrium
v. Left atrium → Left ventricle (via bicuspid valve, mitral)
vi. Left ventricle → Aorta (via aortic semilunar valve)

4. Nutrition Through the Lifecycle
a. Pregnancy and Lactation
1. Weight gain
i. Underweight: 28-40 lbs // With twins: 40-50 lbs
ii. Normal weight: 25-35 lbs // With twins: 35-45 lbs
  • 1st trimester: + 0 extra kcal
  • 2nd trimester: 1 lb/week, +340 kcal
  • 3rd trimester: 1 lb/week, +450 kcal
ii. Overweight: 15-25 lbs // With twins: 25-35 lbs
2. Fetus uses glucose as energy
3. Micronutrients of importance
   i. Calcium—dairy, leafy greens, almonds, salmon, tofu, beans
   ii. Vitamin D—calcium metabolism increases (10 micrograms/day from 5)
   iii. Folate—needed for cell division, prevents spina bifida (600 micrograms/day from 180, 400 for all fertile females), cereals, grains, legumes, leafy greens
   iv. Iron—RBC formation increases (30 mg/day from 15), may develop pica (craving for non-foods) as result of low iron
4. Lactation
   i. Prolactin stimulates milk production
   ii. Oxytocin moves milk down ducts, “let down reflex”
      • Also stimulates contractions in labor
   iii. Breastfeed more to make more milk (meets demands of baby)
   iv. 20 kcal/oz, higher in fat than formula
b. Infancy (0 to 12 months)
   1. Timeline
      i. 0-4 months: milk
         • Breast milk has more carbohydrates and fat, less protein than cow milk
         • Formula has more protein and iron, no antibodies
         • Cannot digest complex starches
      ii. 4-6 months: solid foods introduced
         • Start with Fe-fortified cereals, mashed vegetables → fruits and meats
         • Introduce in sequence to determine food allergies and acceptance
         • .25mg fluoride/day if water is lacking
      iii. 7-12 months: 676 to 743 kcals/day
      iv. 1 year
         • Cow’s milk may be introduced
         • Triple weight in first year, increase length by 50%
2. Requires a lot of calories
   i. 100kcal/kg (compare to 30kcal/kg for athletes)
   ii. 10% protein, 40% carbohydrates, 50% fat
3. Most important nutrients: vitamin D, iron (storage will run out by 4 months), fluoride, calcium
4. Prevent baby bottle tooth rot by not putting baby to bed with bottle, water okay
5. Colic—abdominal pain caused by gas or intestinal obstruction, common in infants
6. No eat list
   i. No honey or corn syrup, may have bacterial spores that cause botulism
   ii. No canned vegetables, high sodium
   iii. No sweets or desserts, no nutrition to support growth
   iv. Choking risks: popcorn, nuts, hot dogs, whole grapes, hard candies
c. Childhood (1 to 11 years)
   1. Timeline
      i. 1-2 years: 992 to 1046 kcals/day, 5-20% protein (1.1g/kg)
      ii. 3-8 years: 1642 to 1742 kcals/day
      iii. 4-18 years: 95g/kg protein
2. Percentiles: >95 obese, >85 overweight, 10-84 normal
   i. Look at trends in chart rather than focusing on percentile
3. Risks
   i. Fe toxicity via multivitamins
d. Adolescence (12 to 18 years)
   1. Highest Fe need. Anemia in adolescence most commonly due to low Fe
e. Adulthood
f. Elderly (senescence)
   1. Nutrient needs
2. BMR decreases so focus on nutrient density per calorie
   i. Macronutrients: Protein 0.8g/kg, Carbohydrates 45-65% (constipation is a concern in elderly), Fat 20-35%
   ii. Micronutrients—may be impaired because lower HCl production (→ lower absorption)
      • Calcium 1200mg
      • Vit B₁₂ 2.4
      • Vit D 1000 IU, Folate 400
      • Potassium 4700mg
      • Sodium 1500mg
      • Zinc 11mg (men) 8mg (women)
      • Also Fe
3. May get metallic taste from meds
Domain II. THE NUTRITION CARE PROCESS (for individuals and groups) (34%)

A standardized process (but not standardized care...it’s individualized care) that is an ongoing process for providing safe, effective, high quality nutrition care (ADIME)

ASSESSMENT
(Screen → Assessment Biochemical Clinical Dietary Economical)—ongoing process that analyzes clients’ needs, the main job of the DTR. Diagnosis and most intervention goes to the RD. Words like “interview, assess, investigate” = DTR. “Determine, prescribe” = RD.

1. Nutrition screening
   a. Purpose: obtain data to determine nutrition status and if at risk, early ID of nutrition-related complications/high risk patients lowers morbidity and mortality, screen for malnutrition
   b. Selection and use of risk factors
      1. Support System—referred by someone else (nurse, primary care provider, or even self-referral)
   c. Values and limitations
   d. Methodology—within 24 hours, include height, weight, appetite, food allergies, chewing, swallowing
   e. Documentation
      1. POMR (Problem Oriented Medical Record)—establish at time care is initiated, foundation for diagnosis and care plan
         i. SOAP/ADIME/DAR—standardized format for narrative progress notes
            • Problem List—act as table of contents (diagnosis, findings, symptoms, behavior)
            • Initial Care Plan—care plan for each problem (goals, Rx of diet, assessment, education, referrals)
            • Progress Notes—status of care (narrative, flow sheets, discharge summary)
         ii. Minimum Data Set—similar, a patient history/overview

2. Nutrition assessment of individuals (Anthropometric Biochemical Clinical Dietary Economic)—continually analyze patient needs
   a. A - Anthropometric: height, weight, body frame, standard weight for height, weight/height ratio (BMI), skinfolds, circumference, growth charts
      1. Weight
         i. BMI = kg / m²
            • 18.5-24.9 normal
            • 25-29.9 overweight
            • 30-34.9 obese I
            • 35-39.9 obese II
            • >40 obese III
         ii. For amputees
            • Leg (AKA): 16%
              a. Foot: 1.5%
              b. Below knee to foot: 4.5%
              c. BKA (Below Knee Amputation): 6%
            • Arm (AEA): 5%
              a. Hand: .7%
              b. Forearm: 1.6%
              c. BEA (Below Elbow Amputation): 2.3%
         iii. IBW (Ideal Body Weight)
            • Calculate with Hamwi equation
              a. Females 100 + 5 x (each inch over 5 ft)
              b. Males 106 + 6 x (each inch over 5 ft)
              c. +/- 10% for small or large frame
            • Ranges
              a. >120% obese
              b. 110-120% overweight
              c. 90-110% normal
• % IBW = current weight / IBW
• Adjusted Body Weight = [(weight – IBW) x 0.25] + IBW
  a. Use in BEE (Harris-Benedict) if 125% of IBW

2. Frame Size—use height and wrist circumference
   i. Height (cm) / Wrist (cm)
      • Men: >10.4 small, <9.6 large
      • Women: >11 small, <10.1 large

3. Body Composition
   i. Bioelectrical Impedance—measures body fat
   ii. MAMC (Mid-arm Muscle Circumference)= MAC – (3.14 x TSF)
   iii. TSF (Triceps Skinfold)—use caliper to measure body fat
   iv. Waist circumference: men >40 bad, women > 35 bad
      • Waist to Hip Ratio—men >1 or women >0.8 high risk for CVD or DM
   v. Frame size—use height and wrist circumference

b. B - Biochemical
   1. Anemia—blood with insufficient concentration of hemoglobin
      i. General test with:
         • MCV (Mean Corpuscular Volume)—volume of a RBC
         • MCHC (Mean Corpuscular Hemoglobin Concentration)—amount of hemoglobin per volume of fluid in the cell
         • HCT (Hematocrit) or HGB (Hemoglobin)
            a. 10-12g/dL normal
      ii. Microcytic—small RBCs
         • Fe deficiency
            a. Ferritin—storage protein for Fe, more Fe → more ferritin
            b. Serum Fe—amount of Fe bound to transferrin
            c. TIBC (Total Iron Binding Capacity)—measure of proteins available to bind iron (more = less Fe in body)
         • B6 deficiency (may be hypochromic too)
         • A & B thalassemia, lead poisoning
      iii. Macrocytic—large RBCs
         • Megaloblastic—inhibition of DNA synthesis during RBC production (can’t divide, just keep growing)
            a. B12 deficiency (pernicious)
            b. Folate deficiency
      iv. Normocytic—normal MC, low HCT and HGB
         • Hemolytic—RBCs destroyed faster than produced
            a. Sickle cell anemia
            b. Vitamin E deficiency
            c. G6PD deficiency

2. APR (Acute Phase Response)—related to inflammation
3. Albumin—plasma protein to check if weight loss present, maintains osmotic pressure
   i. Low: liver disease, malnutrition, malabsorption, over-hydration, skin breakdown in elderly, low body protein stores (when levels decrease, fluid moves to interstitial compartments → edema)
   ii. High: liver disease, inflammatory disease, dehydration (think highly concentrated)
4. BUN (Blood Urea Nitrogen)—renal health,
   i. Low: liver failure, positive N balance (like pregnant)
   ii. High: dehydration, renal disease, protein catabolism
5. CBC (Complete Blood Count)—count of cells in blood and looks at RBCs
6. Creatine (serum)—a waste product, high levels indicate poor renal function or PEM
7. CRP (C-reactive protein)—biomarker of inflammation, rises after acute stress
8. Diabetes
   i. FBG (Fasting Blood Glucose)
1. Normal = 70-99 mg/dL  
2. Pre-Diabetes / Insulin Resistance = 100-125 mg/dL  
3. Diabetes = >125 mg/dL

ii. hG1C (Glycated Hemoglobin)—to determine blood sugar control over a longer time period  
• Aim for  
  a. For non-diabetics = 5%  
  b. For diabetics = <7%  
• Diagnosis  
  a. Healthy = 4 to 5.6%  
  b. Diabetes diagnosis = >6.5%

iii. OGT (Oral Glucose Tolerance Test)—not needed for diagnosis  
• Pre-Diabetes = <140 mg/dL  
• Diabetes = >200 mg/dL

9. Hepatic proteins—screen for nutrition risk, relies on APR

10. Lipids  
i. Total cholesterol  
  • Normal = <200  
  • Borderline high = 200-239  
  • High = >240  
  • Dietary intake of cholesterol = <300mg/day  
ii. LDL (Low Density Lipoprotein)  
  • Optimal = <100  
  • Normal = 100-129  
  • Very high = >190  
  • Nicotinic acid can lower LDL  
iii. TG (Triglycerides)  
  • Normal = <100  
  • Borderline high = 150-199  
  • High = 200-499  
  • Very high = >500

11. Nitrogen Balance  
i. N balance = N input - N output  
ii. To measure:  
  • 24 hr urine collection  
  • Total UUN  
  • Estimate pro/day  
  • Calculate N/day

12. Pre-albumin (tranthyretin)—visceral (extra) protein in body  
i. Test for Fe deficiency anemia  
ii. Better indicator of immediate changes to nutrition status than albumin

13. RBP (Retinal-binding protein)

14. Renal Solute Load—most affected by proteins, sodium, potassium  
i. A high PRO diet needs high water to make up for high renal solute load

15. Transferrin—transports Fe to bone marrow for production of hemoglobin  
i. Low: protein deficiency, indicates Fe and protein energy malnutrition (PEM)

c. C - Clinical  
1. Physical assessments  
i. Renal  
  • Oliguria—no urine output  
    a. Pre-renal—before kidneys (dehydration)  
    b. Renal—kidney damage  
    c. Post-renal—obstructed flow (enlarged prostate, tumor)  
  • Polyuria—high urine output
1. Common in DM as result of polydipsia (excessive thirst)
2. Medical history—to determine nutrition deficiencies, medical, social
3. Drug/medication/nutrient interaction implications for potential nutritional problems
   i. Alprazolam (Zanax)—anti-anxiety
   ii. Amphetamines—lower appetite
   iii. Antibiotics—Ca\(^{2+}\) binds tetracycline, weakens the antibiotics
   iv. Antidepressants
      • Can cause dry mouth
      • Weight gain
      • Tricyclic antidepressants increase appetite (especially for sweets/CHOs)
      • MAO (Monoamine-Oxidase) Inhibitors
         a. + foods with tyramine (amino acid) $\rightarrow$ spike in blood pressure
         b. + St. John’s Wort $\rightarrow$ I dunno but bad, don’t
   v. Blood pressure meds
      • Grapefruit juice
      • Natural licorice—may increase cortisol $\rightarrow$ sodium retention
   vi. Corticosteroids—increase appetite
   vii. Digitalis—nausea, vomiting
   viii. Diuretics—loss of K
      • Lasix—a diuretic that prevents your body from absorbing too much salt, but may also cause loss of K, which would need supplementation
   ix. Docusate, Colace, Senna—Laxative
   x. Paxal, Ativan—Psychoactive
   xi. Prednisone—causes water retention, so reduce Na to prevent swelling blood pressure spikes
   xii. Warfarin (Coumadin)—prevents clots, Vitamin K makes clots (so vitamin K decreases effects)
4. D - Dietary intake (DTR can log this into medical record)
   1. Assessment method
      i. 24-hour recall—uses the 5 pass method
         • Quick List—uninterrupted list of all foods and drinks
         • Forgotten Foods—ask a series of questions to probe for forgotten sweets, alcohol etc.
         • Time and Occasion
         • Detail Cycle—answer standardized questions about foods reported
         • Final Probe
      ii. Food frequency questionnaire—looks at consumption over last 6 months, mainly food groups, good for large populations and research studies
      iii. Analysis of dietary information
         • Is there a gap (like not drinking milk)? Ask them if they’re allergic
   2. Oral dietary supplements
      i. Bioactive substance charting—chart miscellaneous substances (like vitamins, supplements)
      ii. Naturopathy—light, air, heat water, phytomedicines
      iii. Herbs
         • Echinacea—upper respiratory infection
         • Garlic—reduce blood clots
         • Ginger—nausea
         • Gingko—dementia
         • Ginseng—reduction of blood glucose levels
         • St. John’s Wort—depression (don’t mix with MAO antidepressants)
         • Saw Palmetto—enlarged prostate
         • Valerian—sedative, aids insomnia
3. Weight loss history fits here
4. E - Economic/Social
   1. Socioeconomic—personal, financial, environmental factors
   2. Age Specific
i. Infants
   • Normal birth weight = 3 to 4kg (6.5 to 8.5lbs)
   • LBW (Low Birth Weight) = <2.5kg
   • Measure standing up at 24 months

ii. Children
   • Growth rate best indicator of nutritional status for ages 0 to 18 years. Anything between 10-90% good as long as they aren’t falling off of their growth path
   • Chart types
     a. Birth to 36 months—measures length
     b. 2 to 18 years—measures height
   • Height for Age—detects stunted growth
     a. Height / Ideal Height for Age: >95% normal, <80% severe
   • Weight for Height—detects wasting
     a. Weight / IBW: <90% mild, <70% severe

iii. Elderly
   • Use weight change as indicator of nutritional status (instead of 24-hour recall, TSF etc.)
   • Many qualify for food stamps, few use
   • NSI (Nutritional Screening Initiative)—IDs elderly at risk due to financial, social, or functional status
   • Assure well-fitting of dentures, find alternative foods and tolerances
   • Post-menopausal women have decreased estrogen, increased risk heart disease

3. Cultural & religious food patterns
   i. Cultural
      • Chinese—low protein and iron, no milk
      • Hispanic—low leafy greens, milk, fish
      • Japanese—high salt
      • Korean—high fat
   ii. Religious
      • Buddhist—mostly lacto-ovo vegetarian
      • Hindu—pretty strict lacto-ovo, definitely no beef
      • Jewish—kosher
        a. No (or avoid): shellfish, catfish, eggs, pork, rabbit, camel, leavened bread
           i. Remove scales from fish
        b. No mixing meat + milk
        c. Symbols
           i. +M—is Kosher and contains meat, may also see “meat” or “glatt”
           ii. +D—is Kosher and contains dairy
           iii. +P—Kosher for Passover
           iv. +Pareve—neither meat nor dairy
      • Mormon—no coffee/tea
      • Muslim—no pork, alcohol, coffee/tea
      • Roman Catholic—no meat on Ash Wednesday or Fridays during Lent
      • Seventh-Day Adventist—no animal products, coffee/tea, alcohol

4. Psychological and behavioral
5. Lifestyles and preferences
6. Food fads
7. Level of education
8. Nutrition knowledge/interest

3. Nutrition assessment for populations
   a. Nutritional screening surveillance systems
      1. National surveys
         i. NHANES (National Health And Nutrition Examination Survey)
            • CSFII (Continuing Survey of Food Intake of Individuals) become part of NHANES
• What We Eat in America
  ii. NNMRR (National Nutrition Monitoring and Related Research) Act—organizes and makes
      surveying methods consistent

2. Reference data
   i. National Nutrient Databank—maintained by USDA

  **DIAGNOSIS**
  Identifies the problem, relates it to risk factors, and evaluates signs and symptoms

1. Medical diagnosis (like dehydration) vs. Nutrition diagnosis (like poor fluid intake)

2. Data sources for nutrition diagnosis
   a. Organize assessment data—POMR
   b. Use standardized language
      i. IDNT (International Dietetics and Nutrition Terminology)—defines diagnostic terminology

3. PES Statements—a diagnostic label and statement to describe how patient deviates from optimal health state.
   Ex: “Excessive fat intake related to (r/t) frequent consumption of high fat meals as evidenced by (aeb) 55% of total calories of from the day”
   a. Problem—nutritional problem/diagnosis, not the medical problem/diagnosis
      i. “Excess fat intake” “Inadequate fluid intake” instead of “Atherosclerosis” “Dehydration”
   b. Etiologies—underlying causes and contributing factors
      i. “Daily intake of 100 cheeseburgers”
   c. Signs and symptoms—link signs and symptoms to etiologies using subjective (symptoms, what the person reports) and/or objective (signs, hard evidence) data
      i. “Blood pressure of 300/180”

4. Scope of DTR practice—can never prescribe, increase consistency of food, change fluid consistency
   a. May decrease consistency if patient is having trouble chewing

  **INTERVENTION AND PLANNING**
  Set realistic goals and provide a plan to accomplish these goals

1. Intervention for individuals
   a. Nutrition care for health promotion and disease prevention
      i. Identifying desired outcomes/actions
         i. PES statement to determine intervention goals
         • Ex: “Client will reduce cheeseburger to consumption to 1 per day”
   2. Determining energy and nutrient needs
      i. Mifflin St Jeor or Harris Benedict
      ii. TEE (Total Energy Expenditure) = BMR + physical activity + TEF
         • BEE (Basal Energy Expenditure) or BMR (Basal Metabolic Rate)—minimum energy needed to sustain life when at rest
            a. Increases 7% for each 1 degree F rise in temperature over 98.6
            b. REE = energy used at rest, almost interchangeable with BEE and BMR, usually about 10% higher, so used more
            c. TEF (Thermic Effect of Food)—accounts for about 10%
      iii. Energy output (rough) = weight (in kg) x 24 x BMR factor
         • BMR factor: men -1, women -0.9
   3. Menu planning for health promotion
      i. Have to think about: nutritional adequacy, client acceptance, diet patterns, schedules, socio-cultural and ethnic factors, substitutions and food preferences
      ii. Food labeling
         • Nutrient Claims
            a. Calories
               i. Light = ⅓ fewer calories
               ii. Calorie free = <5 kcal
            b. Fat
               i. Reduced-fat = <25% of original
               ii. Low fat = <3g
               iii. Fat free = <.5g
iv. “Cholesterol Free” = <2mg

c. Source
i. “Good Source” = 10-19%
ii. “Excellent Source” = 20%
d. Low sodium = <140mg. Sodium-free <5mg
e. “Lean” on meat = <10% fat
f. “Ice Cream” has at least 10% milk fat, <50% overrun (growth when agitated to make ice cream)
g. Can say the nutrient “may help” reduce risk for something if scientifically backed. Can never say it will do something

- Regulations
  a. FDA—primary jurisdiction, must include: name of item, name and address manufacturer, packer, distributor, net contents by weight and count, ingredients (from most amount → least amount of ingredient in product), nutrition content
  b. Nutrition Labeling and Education Act of 1990—USDA and FDA come together to regulate, make more useful, provides nutrition information on packaged food, mandatory, regulate fortification and nutrition claims
  c. Pure Food and Drug Act—ban food that causes injury
  d. Food and Drug Cosmetic Act—ban food that causes injury and has specific labeling

b. Medical nutrition therapy
1. Plan
  i. Treatment of major-related disorders or conditions

<table>
<thead>
<tr>
<th>Disorder</th>
<th>What is it?</th>
<th>Specific Feeding/Diet Needs/Goals</th>
<th>Relevant Macros/Energy</th>
<th>Relevant Micros</th>
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<tbody>
<tr>
<td>Cardiovascular</td>
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<tr>
<td>Heart Disease</td>
<td>Cluster of heart-related problems</td>
<td>Lifestyle change first method prevention</td>
<td>Cut trans-fat, reduce sugar, only calories required</td>
<td>&lt; 300mg cholesterol/day &lt;2300mg Na/day (assess 1kcal = 2mg)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Good: &lt;120 / &lt;80 I: &gt;140 / &gt;90 mmHg II: &gt;160 / &gt;100</td>
<td>DASH (Dietary Approaches to Stop Hypertension) Diet: high produce, low fat</td>
<td>Reduce kcal, lose weight</td>
<td>low sodium also with portal hypertension, cause of ascites</td>
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<td>Critical Care</td>
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<tr>
<td>Trauma / Surgery</td>
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<td>Head Injuries: BMR 30-50%, minor surgery or infection: BMR 0-20%</td>
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<tr>
<td>Trauma: Fistula</td>
<td>Abnormal opening b/w organs</td>
<td>Treat fluid loss, aggressive nutrition support</td>
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<tr>
<td>Burn</td>
<td>First 48 hours dedicated to replenishing electrolytes and fluid</td>
<td>Severe burns: BMR 30-110%</td>
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<td>Supplement vit C, Mg, Zn</td>
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<td>Hyperemesis</td>
<td>Serious/rare pregnancy complication causing nausea, vomiting, dehydration</td>
<td>Correct/prevent electrolyte imbalances and dehydration</td>
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<tr>
<td>Metabolic Disorders</td>
<td></td>
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<td>CHO: 55-60%, 15g per choice</td>
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<tr>
<td>Diabetes</td>
<td>Type 1: inability to make insulin (beta cell destruction), can result in diabetic ketoacidosis (MNT aims to time meals)</td>
<td>[CHO] 15 [PRO] 3 [FAT] 1-80</td>
<td>[CHO] 15 [PRO] 3 [FAT] 1-80</td>
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<td>Type 2: insulin insensitivity (MNT aims to lose weight)</td>
<td>Very Lean: 7 0-1 35</td>
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<td>Symptoms: thirst, frequent urination, hunger, disorientation</td>
<td>Lean: 7 3 55</td>
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<td>Insulin is not MNT, it is drug therapy</td>
<td>Medium-Fat: 7 5 75</td>
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<td>High-Fat: 7 8 100</td>
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<td>Vegetable: 5 2 .75</td>
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<td>Fat: .5 45</td>
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<tr>
<td>Metabolic Acidosis/Alkolasos</td>
<td>Temporary conditions</td>
<td>Do the opposite of what they were doing to cause it...</td>
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<tr>
<td>Medical Condition</td>
<td>Description</td>
<td>Dietary/Therapeutic Recommendations</td>
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<td>CHO diet, diabetic ketosis</td>
<td>Reduced PCO₂ or and/or pH</td>
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<tr>
<td>Aiko: diuretic use, vomiting</td>
<td>High pH</td>
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<td>PKU (phenylketonuria)</td>
<td>Inability to convert phenylalanine to tyrosine, light skin and hair, musty smell</td>
<td>Very low phenylalanine diet, tyrosine supplementation</td>
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<tr>
<td>Metabolic Syndrome</td>
<td>3 or more of: hyperglycemia, abdominal obesity, high cholesterol, low HDL, HTN</td>
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<tr>
<td>Gastrointestinal</td>
<td>Reflux (GERD), Esophagitis (inflammation)</td>
<td>Lower esophageal sphincter allows food/acid from stomach back into esophagus, causes inflammation</td>
<td>Avoid: large, high fat, acidic meals, caffeine, chocolate, smoking, tight fitting clothes</td>
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<tr>
<td>Hepatic: Cirrhosis</td>
<td>Scarred liver tissue blocks blood flow → aldosterone degradation fails, remains high → retain Na → retain fluid, ascites</td>
<td>Low fat, high fiber, no caffeine, lactose-free. May benefit from bowel rest if no other known cause (no food or liquid for 24 to 48 hours, use IV to maintain electrolytes), slowly reintroduce food starting with clear liquids</td>
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<tr>
<td>Diarrhea</td>
<td>Autoimmune to gliadin in gluten (wheat, barley, rye, sometimes oats). Flattens villi, similar to Tropical Sprue</td>
<td>Low fat</td>
<td>Replenish electrolytes</td>
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<tr>
<td>Celiac Disease</td>
<td>No gluten (wheat, rye, oats, barley)</td>
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<tr>
<td>Diverticular Disease</td>
<td>Pouching of large intestines Many diverticula → diverticulosis Diverticulitis = collects fecal matter, hernia breaks, need low fiber</td>
<td>High fiber to decrease pressure</td>
<td>Avoid seeds, small nuts, residue (sort of a controversial recommendation)</td>
<td></td>
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<tr>
<td>Peptic Ulcer Disease</td>
<td>Pyloric infection, treat with NSAIDS, antibiotics. Can occur in stomach (gastric) or SI (duodenal)</td>
<td>Avoid: alcohol, spices, coffee, caffeine Increase: n6 and n3 FA</td>
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<tr>
<td>Steatorrhea</td>
<td>Fat in stool (&gt;7g/24 hrs.), foamy, smelly</td>
<td>May treat with digestive enzymes</td>
<td>Treat with medium chain FA b/c bile not needed</td>
<td></td>
</tr>
<tr>
<td>IBD (a disease, UC and Crohn’s) IBS (a syndrome)</td>
<td>Crohn’s: any part of GI, can skip areas Ulcerative Colitis: only colon, continuous</td>
<td>Restore nutritional status</td>
<td>High CHO and PRO</td>
<td></td>
</tr>
<tr>
<td>Short Bowel Syndrome</td>
<td>Part missing/removed</td>
<td>Parental → enteral gradually</td>
<td>Glutamine needed for gut</td>
<td></td>
</tr>
<tr>
<td>Ileostomy</td>
<td>Surgery to reroute ileum as site for waste removal with colon doesn’t work, waste goes through stoma (a hole) into a bag</td>
<td>Low fiber at first, bland</td>
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<tr>
<td>Blind Loop Syndrome</td>
<td>Bacterial growth from obstruction in SI</td>
<td>Treat for malabsorption and w/antibiotics</td>
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<tr>
<td>Pancreatitis</td>
<td>Inflammation of the pancreas, causes inability to digest fat</td>
<td>May need to take pancreatic enzymes to aid digestions</td>
<td>Very low fat diet</td>
<td></td>
</tr>
<tr>
<td>Constipation</td>
<td>3 main factors cause: Low fluid or fiber Pain medications Inactivity</td>
<td>No alcohol</td>
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<tr>
<td>Gastrectomy</td>
<td>Removal of all/part of stomach</td>
<td>Try to avoid symptoms of dumping syndrome (when food moves fast into jejunum, becomes hypertonic)</td>
<td>Moderate fat, few simple carbohydrate, high protein</td>
<td></td>
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<tr>
<td>Condition</td>
<td>Description</td>
<td>Dietary Recommendations</td>
<td>Specific Feeding Needs</td>
<td></td>
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<td>---------------------------------</td>
<td>------------------------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td><strong>Ileostomy</strong></td>
<td>Removal of colon, rectum, and anus, stoma formed from ilium</td>
<td>Low fiber, bland to prevent clogs and upsets, introduce new foods slowly</td>
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<tr>
<td><strong>Malnutrition</strong></td>
<td></td>
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<tr>
<td><strong>Protein</strong></td>
<td>Kwashiorkor: acute protein energy malnutrition → edema, fatty liver</td>
<td>Protein Protein Protein and calories and protein</td>
<td></td>
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<td></td>
<td>Marasmus: protein, energy, vitamin, mineral deficiency → emaciated, wasting</td>
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<tr>
<td><strong>Cancer</strong></td>
<td>Ileostomy: diarrhea, weakness, sweating, pain</td>
<td>Increase calories, prevent weight loss, focus on protein</td>
<td>Prevent/correct deficiencies</td>
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<tr>
<td><strong>Oncological</strong></td>
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<tr>
<td><strong>Cancer</strong></td>
<td>Cancer cachexia: wt loss, atrophy, fatigue, lose appetite</td>
<td>Avoid raw, unpasteurized, meat aversions are common</td>
<td></td>
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<tr>
<td><strong>Kidney Disease</strong></td>
<td>Permeability of glomerulus increase, more proteins pass through</td>
<td>Dialysis: clean blood by putting through a machine</td>
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<td></td>
<td>Stage 1: protein in urine, GFR 90-130 mL/min</td>
<td>Hemodialysis: clean blood by putting through a machine</td>
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<td></td>
<td>Stage 2: GFR 60-89</td>
<td>Peritoneal: uses gravity to clean, can be done at home, less restrictive</td>
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<td>Stage 3: GFR 30-59</td>
<td>Example of good meal for hemodialysis: chicken, rice, carrots</td>
<td></td>
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<td>Stage 4: GFR 15-29</td>
<td>Foods to avoid:</td>
<td></td>
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<tr>
<td></td>
<td>Stage 5: GFR &lt;15, end stage, need dialysis or transplant</td>
<td>Fruits: orange, cantaloupe, banana, prunes</td>
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<td></td>
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<td>Veggies: baked beans, yams, spinach, potato</td>
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<td>Meats: bacon</td>
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<td></td>
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<td>Dairy: buttermilk, milk</td>
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<tr>
<td><strong>Gout</strong></td>
<td>Abnormal excretion of purines → excess uric acid in blood</td>
<td>Low purine diet, weight loss, increase water, stop smoking</td>
<td>Low fat</td>
<td></td>
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<tr>
<td><strong>Respiratory Disorders</strong></td>
<td></td>
<td></td>
<td>Moderate protein from low purine sources (dairy, bread)</td>
<td></td>
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<tr>
<td><strong>COPD (Chronic Obstructive Pulmonary Disease)</strong></td>
<td>Airway obstruction due to chronic bronchitis or emphysema</td>
<td>Pancreatic insufficiencies → decrease bile and digestive enzymes</td>
<td>Try to meet increased energy requirements</td>
<td></td>
</tr>
<tr>
<td><strong>Cystic Fibrosis</strong></td>
<td>Production of thick mucus in airways, pancreatic ducts, and ducts in other organs → coughing, short of breath</td>
<td>Maintain weight, manage edema, manage drug interactions and side effects</td>
<td>Vitamin and mineral supplementation</td>
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<tr>
<td><strong>Other</strong></td>
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<tr>
<td><strong>Pressure ulcers</strong></td>
<td>Sores on the skin, typically in elderly, bed-bound, or terminally ill</td>
<td>High protein</td>
<td>B-carotene (skin)</td>
<td></td>
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<tr>
<td><strong>Sickle Cell Anemia</strong></td>
<td>RBCs concave, common in African American (malaria-proof, gene passed down)</td>
<td>Low albumin may contribute Need high protein, up to 2 g/kg</td>
<td>Thiamin, Zn → Ex: milk, beef, fish, poultry</td>
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<tr>
<td><strong>HIV/AIDS</strong></td>
<td></td>
<td>Maintenance Phase: 1-1.4 g/kg body weight PRO</td>
<td>Zinc increases oxygen affinity, supplement</td>
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</tbody>
</table>

ii. Specific feeding needs
- Composition and texture of foods
a. Modified Diets (food consistency prescribed by Speech Language Pathologist, RDs and DTRs may only downgrade a diet)
   i. Regular—no restrictions
   ii. Soft—common for gastrointestinal surgery, bland and soft, no raw fruits or veggies
   iii. Mechanically soft—ground meat, overcooked vegetables
   iv. Pureed—very smooth texture
   v. Full liquid
   vi. Clear liquid

• Food supplements—you may get someone to consume nutritional supplement just by putting it in a glass

• Enteral Nutrition—feeding tube, must have GI function
  a. Considerations—applicable, site placement, formula selection, nutrient/medication requirements, rate and method of delivery
     i. Advantages—easy, accurate, costs less, supplies readily avail, preserve gut
     ii. Disadvantages—costs more than oral, labor intensive
     iii. Complications—tube obstruction, aspiration, over-hydration, diarrhea
  b. Common tube-feeds
     i. NG-Tube (nasogastric)—enters at nose, for short-term nutrition (just out of surgery and on anesthesia, up top 3 to 4 weeks)
     ii. NDT (nasoduodenal) or NJT (nasojejunal)—through pylorus into small intestines
     iii. G-Tube or PEG (percutaneous endoscopic gastronomy)—feed directly into stomach via abdominal wall
     iv. J-Tube—feeds into jejunum from abdominal wall, may need hydrolyzed protein/free amino acid formula
  c. Calculations
     i. “Full strength” isn’t diluted with water
     ii. Delivery rate in mL/hr assumes a 24 hour feed (Ex: 75 mL/hr would have a final volume of 1800 mL)
     iii. Common measurement equivalent: 1 g = 1 mL
     iv. Calories: (amount dextrose weight in g) / 100 mL = amount dextrose in g
        x 3.4 kcal/g (standard dextrose solution has 3.4 kcal/g because has water)
     v. Protein: g x 4 kcal/g
  d. Equipment specifications
     i. Typical can is 240mL or 250-400mL
     ii. French Units are tube sizes
  e. Procedure specifications
     i. Gastric Residual (extra) measured before feeding (every 4-6hrs) and shouldn’t be more than 100mL
     ii. Lift head of bed while feeding + 30 minutes to prevent backflow and aspiration (could lead to aspiration pneumonia)
     iii. Cannot begin without patient/family consent
     iv. Never mix medication with enteral feeding

• Parenteral—intravenous, bypasses gut
  a. Types
     i. CPN (Central Parenteral Nutrition)—catheter in large blood flow area, like superior vena cava, for higher calorie/osmolality
     ii. PPN (Peripheral Parenteral Nutrition)—catheter in smaller vessel (arm)
  b. Reasons for parenteral nutrition
     i. TPN (Total Parenteral Nutrition) if no GI function, NPO (Nothing per Orem) > 5 days
     ii. GI fistula, pancreatitis, malnutrition with weight loss
  c. Calculations—must determine osmolality
     i. IV solution = .9% NaCl
     ii. Grams dextrose time 5 = mOsm/L
     iii. Grams PRO times 10 = mOsm/L
iv. Fat is isotonic, does not contribute
v. Electrolytes add to osmolality
vi. mEq = mg / atomic weight (Na = 23, K = 29)—solute per liter of solute

- Conditions requiring nutrition support: HIV/AIDS, respiratory failure, cystic fibrosis, traumatic brain injury, coma, Crohn’s, cancer
- Prevent refeeding syndrome (lethal electrolyte fluctuations) but slowly introducing higher levels of feeding (transitional feeding)

2. Implementing care plans
   i. Counseling
      - Four stage process: involve, explore, resolve, conclude
      - Factors affecting client/professional relationship: education level, past experiences, readiness to change
   ii. Discharge planning for continuity of care
      - Home health services beneficial for those with difficulty self-feeding
   iii. Documenting implementation
      - Document in chart: feeding type, method, rate, intake, tolerance, patient education

2. Interventions for populations
   a. Dietary Guides
      1. DRI (Dietary Reference Intake)—encompasses the 4 references, mostly for healthy, average people, created by Food and Nutrition Board
         i. RDA (Recommended Daily Allowance)—sufficient for 97% of population for each gender, age group
         ii. AI (Adequate Intake)—observed or experimentally determined when RDA can’t be
         iii. UL (Tolerable Upper Intake Level)—max of vitamin/mineral without seeing toxic effects
         iv. EAR (Estimated Average Requirement)—satisfy needs of 50% of population, use in life stage or gender group
   2. Federal dietary guidelines
      i. Dietary guidelines for Americans (for ages 2+)
         - MyPlate (USDA, 2011)
           a. Grains, Make half your grains whole (30% of plate): 1/2 c brown rice, 1 c white rice, 1 slice bread. ½ c oatmeal (6 oz total, 3 oz whole grain)
           b. Veggies, Vary your veggies (30% of plate): ½ c broccoli, 1 c spinach, 1 c carrots (2.5-3 cups)
           c. Fruits, Focus on fruits (20% of plate): 1 c fruit, ½ c dry (2 cups)
           d. Protein, Go lean with protein (20% of plate): 1 oz meat, ½ c beans, 1 Tbsp peanut butter (5.5 oz)
           e. Dairy, Get your calcium rich foods: 1 c milk/yogurt, 1.5 oz cheese (3 cups)
              i. Ages 4 to 8 years: 2.5 cups
           f. Physical Activity: 150 minutes of moderate or 75 minutes vigorous per week
           g. Oils: 2 Tbsp per day
         - Old Food Pyramid
           a. Failed to show serving sizes
           b. Meats and Beans → Proteins
           c. Milk → Dairy
           d. Had a Fats and Sweets category
      ii. From surgeon General’s report on nutrition and health
   b. Community nutrition programs, services, and implementation
      1. Federal resources and food assistance programs
         i. Low Income Programs
            - Supplemental Nutrition Assistance Program (SNAP) (formerly called Food Stamps)
              a. Funded by USDA Thrifty Food Program
            - Special Supplemental Nutrition Program for WIC
              a. Population: single mother, pregnant, post-partum, breast feeding women, <12 month infants, 1-5 year old children (but not any older)
b. Benefits include: food supplements, nutrition education, access to healthcare
c. Routinely check for anemia via hematocrit and hemoglobin, caused by folate, iron, B₁₂ deficiencies
   • Expanded Food and Nutrition Education Program (EFNEP)—funded by USDA to help families with limited resources in acquiring knowledge, skills, behaviors for nutritionally sound diets
   • Medicaid—medical benefits for low income who have no health care
   • Food Pantries—require proof of low income (soup kitchens require no proof)
ii. Child programs
   • National School Breakfast/Lunch Programs (by the USDA School Meals Initiative for Healthy Children)
     a. Breakfast: Must provide ¼ RDA
     b. Lunch: Must provide 1/3 RDA for certain nutrients for each age/grade group
        i. <30% fat, <10% saturated fat
     c. Food sold in competition with lunch must provide 5% RDA for protein, vitamin A, C, niacin, riboflavin, thiamin, Ca, and Fe
d. Low-cost or free to families under 130% poverty
iii. Elderly Programs
   • Older Americans Act Nutrition Programs—Title 111c Nutrition Programs, funded by U.S. Department of Health and Human Services (USDHHS)
     a. Meals on Wheels (Type III Home Delivered)—state and private-funded program for older Americans who cannot drive
     • Congregate Meal Program—nutritious meals in group setting, also have nutrition education and physical activity (also a Title III)
     • Medicare—covers >65 year olds eligible for social security, disabilities, workers with end stage renal disease, and merchant seamen
iv. CACFP (Children and Adult Care Food Program)—improves quality and affordability of day care (for both children and adults) for low income families by providing nutritious meals and snacks

3. Planning—what you will do with the patient next (diagnostic studies, referrals, recommendations for nutritional care)
   a. Ex: “Will follow-up on acceptance of dietary recommendations”

MONITOR AND EVALUATE
Determine degree to which goals have been met

1. Monitoring progress and updating previous care
   a. Monitor responses to nutrition care
   b. Compare outcomes to nutrition interventions
2. Measuring outcome indicators using ADA evidence based guides for practice
3. Evaluating outcomes compared to baseline
   a. Direct nutrition outcomes
   b. Clinical and health status outcomes
      1. Repeat labs, evaluate dietary intake forms
   c. Patient-centered outcomes
4. Communicating with healthcare staff
   a. Have a problem with a staff member of another department? Cannot discipline them, should talk to the department head
   b. Physicians are only ones who can change a medical record. Talk to them if there appears to be a mistake
5. Documentation
   a. Electronic medical records
      1. Not easily accessible outside of the network
   b. HIPAA (Health Insurance Portability Accountability Act) has 4 main objectives
      1. Regulate computer-to-computer sharing of info
      2. Provide universal IDs for healthcare providers and healthcare plans
      3. Information security regulations
i. Information can be shared with healthcare professionals directly involved in care and to anyone specified by the patient
4. Establish a privacy rule
c. Progress notes
   1. Make a mistake? Cross out and put initials next to it
   2. Discontinuation of an order—highlight it and write date discontinued
Domain III. PRINCIPLES OF EDUCATION AND TRAINING (7%)

ASSESSMENT AND PLANNING

1. Components of the educational plan
   a. Types
      1. Patient counseling—one-on-one or in a group
      2. OJT (On the Job Training)—see and practice under safe condition
         i. Training where student practices it themselves → 90% retention of material
   b. Goals and objectives
      1. Goals—broad-based statements you hope to achieve, words like “understand”
      2. Objectives—a measurable/quantifiable result you hope to achieve, words like “demonstrate”
   c. Needs assessment
      1. Survey population—aim for least biased source of information
         i. Ex: for a rural population, use census data rather than information from the church or volunteer organization
         ii. Food Frequency Questionnaire good for large populations
      2. Learning needs assessment—what needs to be learned?
         i. Ex: new employee, test them on a piece of equipment to see how much you need to teach them
      3. Adjust plan to suit needs
   d. Content—dictated by findings of needs assessment
      1. Psychomotor learning—relates cognitive function to physical movement
         i. Cognitive → associative → autonomic
      2. Evaluation criteria—determined before delivering content, measurable objectives
      3. Develop budget
      4. Promotion program

2. Educational readiness assessment
   a. Motivation level
      1. Behavior change theories
         i. Transtheoretical Theory (Stages of Change)—pre-contemplation → contemplation → Preparation → action → maintenance
         ii. Social Cognitive Theory—personal, environmental, and behavior all related
         iii. Health Belief Model—looks at an individual’s perceived barriers, benefits, beliefs etc.
         iv. Cognitive Behavioral Theory—thoughts, feelings, and behaviors all related, more focus on how to make change
      2. Motivational Interviewing
         i. Express empathy
         ii. Develop discrepancy
         iii. Roll with resistance
         iv. Support self-efficacy
   b. Education level
      1. Bloom’s Taxonomy—lower levels must be mastered before higher level learning
         i. Knowledge
         ii. Comprehension
         iii. Application
         iv. Analysis
         v. Synthesis
         vi. Evaluation
      2. SMOG Readability Index (McLaughlin)—reading level of a text
         i. Number of words with 3 or more syllables → square root of that → +3 → compare to a chart
         ii. General population reads at 8th grade level
   c. Situational
      1. Hierarchy of Needs (Maslow, 1943)—people motivated by a desire to fulfill specific needs, in order:
         i. Physiological—survival needs, pay, benefits, work conditions, water, sleep, food
         ii. Safety/Security—protection from danger, employment, shelter, health insurance
iii. Social—need to belong, employee relationships
iv. Esteem—self-worth, self-respect, title and responsibility for job
v. Self-Actualization—desire to fulfill potential, growth in an organization

2. Clayton Alderfer’s ERG Theory—hierarchy of needs, lower ones have priority but all can be pursued simultaneously
   i. Existence
   ii. Relatedness
   iii. Growth

IMPLEMENTATION AND EVALUATION

1. Implementation
   a. Communication—6 steps are send, encode, message, receive, decide, feedback
      1. Interpersonal
         i. Always create a trusting, nonjudgmental environment first, and assess client’s comfort level
         ii. Be a good listener. Ask questions to clarify.
         iii. Paraphrase—choose highlights and repeat them back
         iv. Reflective Listening—like paraphrasing but with empathy
         v. Physical Interference—phone call, loud people, loud fan
   2. Group process
      i. Aim to include everyone by providing supportive, motivating session
      ii. Avoid pointing out errors and discouraging sharing
      iii. Take charge of a group that tends to get off topic

b. Methods of instruction
   1. Young children—hands on (taste-testing as way to teach about foods)
   2. Adults—learn better by talking (groups)
   3. Foreign language—use pictures where possible, if not try to find a translator
   4. Never put someone else down (like “the guy down the street who gave nutrition advise”), just demystify information

2. Evaluation of educational outcomes
   a. Measurement of learning
      1. Formative—have they learned what was intended? Helps ID material needing clarification throughout process of learning, provides immediate feedback
      2. Summative—have they met objectives at end of educational session?
   b. Evaluation of effectiveness of educational plan
      1. Techniques: tests, questionnaires, interviews Likert scales (strongly agree → strongly disagree)

3. Documentation—do it
Domain IV. FOODSERVICE SYSTEMS (22%)

MENU PLANNING
Menu drives the foodservice operation

1. Types of menus
   a. Cycle—repeats menu on predetermined basis
   b. Static—same menu always
   c. Nonselective—no choice, set menu
   d. Selective—provides at least 2 options for each category of food offered

2. Menu development
   a. Clients—knowing the audience is most important aspect
      1. Survey population to predict acceptance of new food
      2. Elderly—liberalizing food choices in long term care (LTC) increases food consumption
   b. Operational influences
   c. External influences, contingencies (contingency = emergency)
   d. Client satisfaction measuring and documentation
      1. Hedonic Scale—measures food preference

3. Menu modifications
   a. “Big 8” most common food allergies: eggs, fish, shellfish, wheat, soy, peanuts, tree nuts, milk
      1. Food Allergen Labeling Act requires a label on any processed food with one of the “Big 8” allergens
         i. Does not regulate USDA meat, poultry, egg products
         ii. “Tree nut”, “fish”, “shellfish” must be defined, what kind?
         iii. Soy = soya = soybean
      2. Skin Prick Test—measures IgE (immunoglobulin E) to determine allergies
      3. RAST (Ratio Allergo Sorbent Test)—looks for antibodies in blood

FLOW OF FOOD
(Work Flow Pattern): purchase and receive → pre-production/production → assembly → distribution → service

1. Purchasing and Receiving
   a. Develop specifications for purchase of food and supplies
      1. Purchasing specifications
         i. Name of product (trade brand)
         ii. Federal grade brand (or other quality designation)
         iii. Capacity of container (weight, can size, etc.)
         iv. Count per container
         v. Unit on which price will be based
      2. Vendor selection (bids, contracts)
   b. Purchasing systems, methods, decisions
      1. Buy according to what you need
      2. Reorder Point—lowest amount of stock that can safely be maintained to prevent ordering more in the event of an emergency
         i. Normal usage x time frame until next delivery + safety factor
   c. Receiving
      1. First step is comparing purchase order to invoice (slip that comes with comparing what is being delivered)
      2. Inspect items then accept or reject
      3. Complete receiving record
      4. Put into storage
         i. Don’t put odor absorbers (rice, eggs, milk) with odor givers (potatoes, onions, cabbage)
         ii. Dry goods—50 to 70 degrees F, 6 inches from floor
   d. Inventory management
      1. Inventory Sheet—tracks ordering of food and supplies
      2. Cost of Goods Formulas
         i. Total value of food you have (inventory at end of month) = inventory at beginning of month + purchases of the month
ii. Ending inventory of one month = beginning inventory of next

3. FIFO uses older items first vs. LIFO uses newer items first (for when you want to give freshest ingredients to customers, typically for a higher profit and made in smaller batches)

4. Accounting for inventory
   i. Physical Inventory—going and counting everything you have
   ii. ABC—classifying inventory as either high value (A), moderate (B), or low (C)

e. Ordering food and supplies
   1. Can sizes
   
<table>
<thead>
<tr>
<th>Size Number</th>
<th>Weight (oz)</th>
<th>Cups</th>
<th>Servings</th>
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</thead>
<tbody>
<tr>
<td>¼</td>
<td>4</td>
<td>½</td>
<td>1</td>
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<tr>
<td>3/8</td>
<td>6</td>
<td>⅜</td>
<td>1</td>
</tr>
<tr>
<td>½</td>
<td>8</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1 picnic</td>
<td>10 ½ 1¼</td>
<td>2 to 3</td>
<td></td>
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<tr>
<td>211</td>
<td>12</td>
<td>1 ⅛</td>
<td>3 to 4</td>
</tr>
<tr>
<td>300</td>
<td>13 ⅓</td>
<td>2</td>
<td>3 to 4</td>
</tr>
<tr>
<td>303</td>
<td>15 ⅛</td>
<td>2</td>
<td>4</td>
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<tr>
<td>2</td>
<td>20</td>
<td>2 ½</td>
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<tr>
<td>2 ½</td>
<td>28 ⅛</td>
<td>3 ¼</td>
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<tr>
<td>3</td>
<td>33 ¼</td>
<td>4 ¼</td>
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<tr>
<td>3 cylinder</td>
<td>46</td>
<td>5 ½</td>
<td>10 to 12</td>
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<tr>
<td>5</td>
<td>56</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>10</td>
<td>6 lbs</td>
<td>12-13</td>
<td>25</td>
</tr>
</tbody>
</table>

   i. #10 is most common in food service, 6 cans per case

2. Pre-Production and Production
   a. Forecasting food demands
      1. EP (Edible Portion) = Amount Purchased (AP) x % yield
      2. EP cost per lb (cost to the customer) = (AP cost per lb x AP weight) / percent yield
      3. Moving Average Method—smooth the randomness of data by using the previous X months to determine average for next month
   b. Procedures—use a production schedule to layout menu item, quantity, employee assignments, time schedule, yield
      1. Recipes
         i. Standardized Recipes—anyone can follow, specific to a foodservice establishment and a forecasted volume
      2. Ingredient control
         i. 3 tsp in 1 Tbsp // 16 Tbsp in 1 cup (8oz) // 16 cup in 1 gallon ← KNOW!
         ii. Central ingredient room best
      3. Portion control
         i. Yield analysis
            • Multiplying (or conversion) factor = new yield / original yield
         ii. Costing
            • Cost control primary reason for portion control
            • Food Cost—dollar cost of recipe or menu item, add cost of all ingredients and divide by yield
            • Food Cost % (a.k.a. Food Cost Factor or Target) = actual food cost / selling price
               a. Has nothing to do with labor cost, possible trick answer
               b. Cost per meal = total food costs / meals served (make sure to include any money removed from inventory)
            ii. Pricing
               • Selling/Menu Price—based on many factors (cost, popularity, promos)
               a. Selling Price = food cost / % food cost objective
               b. Selling Price = raw food cost x markup factor
   c. Production systems
1. Conventional—scratch, high labor demand, all production and service in same place
   i. Advantages: adaptable, low distribution cost, less freezers
   ii. Disadvantage: higher labor cost
2. Commissary—central production kitchen, various service locations centralized delivery (schools, flights)
   i. Advantages: uniform quality, economic, no duplicate equipment
   ii. Disadvantages: delivery and safety issues, 9 CCPs
3. Ready prepared—cook to inventory not meal (cook → chill or cook → freeze), made on site
   i. Types
      • Cook-chill—partially cooked, rapidly chilled and refrigerated, and reheated for service
      • Cook-freeze—same but like…with freezing
   ii. Advantages: can manage time by separating time between preparation and service
   iii. Disadvantages: requires blast chiller or freezer, adequate storage
4. Assembly/serve—fully prepared when bought, “kitchen-less kitchen”
   i. Advantages: less equipment and space, low labor cost
   ii. Disadvantages: limit menu items, high food cost, lower perceived quality of food

3. Distribution and Service
   a. Form of food delivery
      1. Self-Service—cafeteria
      2. Straight Line—difficult, limited number items
      3. Scramble/Hollow square—most common, less customers waiting
   b. Type of service
      1. Centralized—better portion control, easy to supervise, one set of equipment, large number of meals in shorter time
      2. Decentralized—bulk quantities sent to patient floors, not good portion control, more waste, hard to supervise, faster service

SAFETY, SANITATION, EQUIPMENT, AND FACILITIES

1. Safety
   a. Employee safety
      1. OSHA (Occupational Safety Health Administration)—establish standards for a safe and healthy work environment
         i. Requires employers to comply with Hazard Communication Standard
         ii. Requires to train employees in healthy practices
         iii. Requires MSDS be available on all hazardous substances
      2. Most employee injuries from falls (more costly than workman’s comp from burns or cuts)
      3. Child labor laws restrict <18 from operating heavy machinery
   b. Safety programs and practices
      1. Fires
         i. Extinguishers
            • Class A Paper and Wood: extinguisher has triangle symbol
            • Class B Oil: use baking soda, put lid over, NO water, extinguisher has square
            • Class C Electrical: use CO₂ and dry chemical, extinguisher has circle
            • Class D Other: extinguisher has star
         ii. RACE
            • Rescue anyone in danger
            • Activate nearest fire alarm
            • Confine fire by closing doors (not locking)
            • Evacuate via stairs
   2. Sanitation and Food Safety
      a. Principles
         1. Contamination
            i. Biological
               • Bacteria, Viruses, Parasites
                  a. Campylobacter jejuni—grows at fridge temp
b. **Campylobacter perfringes**—fecal contaminated water

c. **Clostridium botulinum**—anaerobic, can form spores, causes bulging in canned foods, onset 4 hours to 8 days \(\rightarrow\) vomiting, constipation, diarrhea, fatigue

d. **Clostridium perfringens**—associated with meats and casseroles stored at 120 to 130 degrees F, anaerobic from dead bacteria, onset 8-24 hours \(\rightarrow\) toxic infection in stomach, pain and diarrhea

e. **E. coli**—found in human GI tract, undercooked meat, unpasteurized milk, onset 2-5 days \(\rightarrow\) abdominal cramps, bloody diarrhea, kidney failure

f. **Giardiasis**—contaminated water, onset 5-25 days \(\rightarrow\) diarrhea, vomiting, nausea

g. **Salmonella**—cross contamination from egg shell, raw chicken/meat is source, onset 6-48 hours \(\rightarrow\) nausea, vomiting, fever

h. **Shigellosis**—high protein salad and poor hygiene

i. **Listeria monocytogenes**—deli meats, unpasteurized cheese, raw milk, VERY bad for pregnant women, causes still birth, grows at fridge temp

j. **Yersinia Entercolitica**—portion in lower right abdominal area, grows at fridge temp

k. **Trichinella Spiralis**—roundworm parasite from pigs \(\rightarrow\) chills, sweats, bleeding, fatigue

• **Pests**
  a. **Insects**—pepper-like substance with oily odor (roaches), use sprays, UV lights, zappers, powders
  b. **Rodents**—leave gnawing marks, droplets, holes

ii. **Chemical**—pesticides, cleaning agents

iii. **Physical**—hair, glass, foreign objects

2. Factors affecting bacterial growth

i. **FAT-TOM**
  • **Food**—present
  • **Acidity**—between 4.6 to 7.5
  • **Temperature**—40 to 140 degrees F (or 135 for ServSafe)
  • **Time**—foods in Danger Zone >4 hours susceptible
  • **Oxygen present?**
    a. **Facultative**—bacteria grow with or without oxygen
    b. **Aerobic**—needs oxygen
    c. **Anaerobic**—doesn’t need oxygen
  • **Moisture**—present

ii. **Phases of Growth**
  • **Lag**—bacteria adjust to new environment
  • **Log**—exponential growth

3. **Foodborne Illness**

i. **Outbreak of foodborne illness**—when 2 or more people get sick from same thing

ii. **Incubation period**—how long after consuming do symptoms occur?

b. **Sanitation practices and infection control**

1. **Personal hygiene**

i. Hand washing stations must include: hot and cold running water, soap, means for drying, trash can, sign instructing to wash hands

ii. **Temperature control**

2. **Food and equipment temperature control and sanitation**

i. **Storage**

   • **Refrigeration storage levels**
     a. **Top**: non-meats
     b. **Any cooked meats**
     c. **Ground meats, stored in pan**
     d. **Poultry**

ii. **Temperature control**
Use small batch cooking/cooling/reheating to prevent bacterial growth
• If you suspect contamination (temperature in Danger Zone for too long, customer complaints that it tastes rancid), remove from service immediately, investigate, and possibly discard
• Thaw food in fridge or under cold tap water
• Okay to reheat within 2 hours, but no reheating on hot-holding equipment

iii. Sanitation
• Three-compartment sink for manual dishwashing: wash → rinse → sanitize (180 deg F)
  a. Five stations: rinse/scrape/soak → wash → rinse → sanitize → dry
• Cleaners
  a. Abrasive—crusted on gunk
  b. Acid—rust, stains, tarnish
  c. Sanitizers—used on food surfaces after being cleaned with soap
  d. Solvents—remove grease

iv. Service
• Don’t place food out on steam table more than 30 minutes before service
• Salad bar sneeze guard 14 to 48 inches above food

v. Temperatures (degrees F) for food storage, cooking, service
• <0—freezer
• 32-40—storage of meat, dairy, eggs
• <40—fridge, raw cut veggies, receive meat, poultry, fish, dairy
• <45—receive shellfish
• 50-70—dry food storage
• 41-135—Danger Zone, don’t thaw food at room temperature
• 135—maintain cooked food (ServSafe)
• 140—maintain cooked food (USDA)
• 145—steaks, chops, meat, fish (15 sec), roasts (4 min)
• 155—ground meat, patties (15 sec)
• 165—ground poultry (15 sec), reheat cooked food (15 sec)
• 300-325—cooking temperature for roasting beef, veal, lamb, cured pork

vi. Documentation and record keeping
• Measure temperature of all foods on tray line prior to serving

vii. Food handling techniques
• Slacking—gradually thawing frozen food (room temp or in low temp oven), usually in preparation for deep-frying. Food must not go above 40 degrees F.

3. HACCP (Hazard Analysis Critical Control Plan)—IDs and controls possible hazards in flow of food
i. First step to ID potential food hazards and locate where potentially adverse condition present (receive → store → prepare → cook → serve)
ii. CCP (Critical Control Point)—(cooking, cooling, holding) last point to prevent/eliminate growth of microorganisms before service
iii. CP (Control Points)—any step in flow where hazard can be controlled (like prep)
iv. Critical Limit—minimum and maximum limits that the Critical Control Point must meet
  • Monitoring—to determine if Critical Limit is being met
  • Ex: cooking chicken to 165 degrees F for 15 seconds
v. Corrective Action—taking a step where a critical limit is missed

4. MSDS (Material Safety Data Sheet)—lists chemical, common names, health hazards, how to use and handle safely (comes from manufacturer)

3. Regulations
1. Governmental
i. State Department of Health
  • Oversees sanitation, nutrition
ii. Standards of quality apply mainly to canned fruits and vegies
iii. USDA (U.S. Department of Agriculture)
• Inspects and grades meat and poultry products
• Provide information on fruits and vegetables

iv. FDA (Food and Drug Administration)
• All foods except meat and poultry
• Use Standards of Identity to determine what products contain what ingredients
• Regulate additives

v. U.S. Department of Commerce
• Voluntary fish inspection (National Marine and Fisheries Service?)

vi. CDC (Center for Disease Control)
• Investigate outbreaks of foodborne illness
• Conducts Vessel Sanitation Program

2. Agencies
i. EPA (Environmental Protection Agency)—only federal agency with food safety responsibilities
• Sets standards for air and water quality
• Regulates use of pesticides, handling of waste

3. Facility and equipment planning
a. Layout design and planning considerations
   1. Flow of food from receiving → storage → preparation → serving should have as few points of intersection as possible
   2. Dining room aisles must be 6 feet to accommodate wheel chairs
   3. NSF (National Sanitation Foundation)—marking on equipment means it is easy to clean and disassemble
   4. Need 2 to 3 watts lighting per square foot in dry storage
b. Roles of planning team members
   1. Teamwork = synergy

c. Equipment specification
   1. Technical specifications indicate quality by objective tests
      i. Metals (aluminum, stainless steel) measured by gauges. Standard gauge of stainless steel 20
   2. Scoop Sizes—specify the number of scoops in 1 quart, all go into 4, higher # smaller scoop
      i. #4 = 1C
      ii. #5 = 4/5C
      iii. #6 = 2/3C
      iv. #8 = 1/2C
      v. #10 = 2/5C
      vi. #12 = 1/3C
      vii. #16 = 1/4C
      viii. #24 = 1/6C
      ix. #40 = 1/10C
      x. #60 = 1/15C
      xi. Easy way to remember: 4 / scoop # = serving size in cups

d. Equipment selections
   1. Most important considerations: intended use, initial cost
   2. Dishwasher
      i. Flight type—better for high volume operation, must reach 180 degrees F
      ii. Stationary rack or door type—must reach 165 degrees F

SUSTAINABILITY

1. Non-food
   a. Equipment
      1. Return on Investment = (initial price – selling price) / initial price
      2. Efficiency
         i. Combination oven not efficient (can steam or bake)

2. Waste management
   a. Reduction
      1. Leftovers
i. Use within 3 to 4 days (fridge) or 3 to 4 months (freezer)
   ii. Must be refrigerated within 2 hours

b. Disposal
   1. Cardboard most recycled material in food service (everything comes in cardboard)
   2. Disposal devices
      i. Pulper—grinds waste (food and paper) and mixes it with water, water is removed and waste is more compact
Domain V. MANAGEMENT OF FOOD AND NUTRITION SERVICES (27%)

HUMAN RESOURCES
Function is hiring, determining qualifications, leading (directing employees)

1. Organizational relationships
   a. Organizational chart—first tool of management, a graphic representation of chain of command
      1. Got a problem? Always go up the chain, rarely go sideways
      2. Shows relationships, not names or duties
   b. Unity of Command—each employee is accountable to only one superior

2. Staff management
   a. Procedures for regulation and compliance
      1. Labor laws
         i. ADEA (Age Discrimination in Employment Act) of 1967—protects those age >40 from being discriminated against
         ii. ADA (Americans with Disabilities Act) of 1990, Title I and V—protects qualified individuals with disabilities
         iii. Civil Rights Act of 1964, Title VII—prohibits employee discrimination based on race, religion, sex, nationality
         iv. Fair Labor Standards Act—federal wage and hour law to stop poverty
            • Equal Pay Act of 1963—equal pay for equal work, regardless of gender
            • $7.25 as of 2009
            • Regulates where children can work (never dangerous places, never during school)
   b. Recruitment, selection, and orientation
      1. Hiring process—recruit, test, check background, interview, physical exam, orientation
      2. Job descriptions, specifications, and classifications
         i. Job description—minimum standards, skills and responsibilities, always says “but not limited to”
         ii. Job specifications—describes requirements that are expected (title, education, experience, knowledge, skills, mental/physical requirements)
   c. Scheduling
      1. Staggered scheduling more efficient but harder to manage
   d. Productivity
      1. Percent Productivity = hours labored / hours at work
      2. Hawthorne Effect—employees are more productive when they know they are being watched/held accountable/involved in the process. Emphasizes the importance of human relations in management
      3. Job Enlargement—increasing number of duties given to an employee, may help with burnout or boredom while accomplishing more
4. Job Enrichment—add motivating factors (hygiene/motivators theory)
e. Performance standards and appraisal
   1. Standards are quantifiable and specific (serve 90 people in 1 hour)
   2. Appraisal needed to assess training needs for an individual. Measures skills and knowledge needed for job, then assesses where the employee is and what trainings they require. For current employees, use to evaluate work.
f. Personnel actions and theories
   1. Problems
      i. Problem with an employee? Talk to them directly, in private, before anything
      ii. Effective discipline is consistent and progressive
      iii. Always best to involve everyone and to be involved yourself if trying to accomplish a large task
   2. MacGregor’s Theories
      i. Theory X—person has poor views of organization, doesn’t like work
      ii. Theory Y—person is committed to objectives of the organization
g. Retention
   1. Maintain good relations with employees by building their self-esteem and increasing job satisfaction
   2. Frederick Herzberg’s Motivational Theory
      i. Hygiene—cannot make more satisfied, only less satisfied if removed (how employees feel about wages, work environment, co-workers, general necessities)
      ii. Motivators—can make more satisfied with the job if added (job satisfaction, recognition in company, achievement)
   3. Turnover rate = total separations / total on payroll
h. Diversity—have it

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1. Finance Terms 101
   a. BEP = Break Even Point—where revenues equal total costs
   b. FC = Fixed Costs—don’t change (rent, insurance, property tax)
   c. VC = Variable Costs—the more you produce the more your need (food, paper)
   d. CM = Contribution Margin—the amount that a particular item contributes to profit
   e. CR = Contribution Rate (a.k.a. Contribution Margin Ratio)—proportion of profit generated from a particular item
   f. SP = Selling Price per Unit (a.k.a. Revenue per unit)
   g. VR = Variable Rate
   h. Revenue = all costs + profits (total money brought in)

2. Budget development
   a. Financial objectives
      1. Break-even analysis—the budget plan that operates your business, determines at what point your revenues and your losses are going to be equal
         i. BEP
         • For finding dollar equivalent: BEP = FC / CR
         • For finding unit equivalent: BEP = FC / CM
         • CR = CM / SP or CR = 1 – VR
         • CM = SP – VC
         • VR = VC / SP
         • BEP increase → increased costs, decreased profit
   b. Types
      1. Operational Budget—used to forecast future needs and costs
      2. Capital Budget—also called investment appraisal, more for long term investments (property, machinery)
   c. Components
      1. Revenue
         i. Average check = net revenue / people served
      2. Costs
         i. Direct costs—directly involved in production (food, chef)
ii. Indirect costs—not directly involved (administration, maintenance)

3. Profit and Loss
   i. Income Statement—reflects profits and losses by comparing revenue and expenses
   ii. Profit
      • Pareto Analysis—80% sales come from 20% customers
      • Profit Margin = net profit / sales

3. Financial analysis
   a. Labor
      1. FTE (Full-Time Equivalent) = 40 hours in a week
         i. Hours per month: FTE x 40 x 52 = hours per year, divide by 12 (every month a little different)
         ii. How many employees do you need? FTE + relief staff (assuming a 7 day operation) so use a factor of 1.55
            • Ex: Need 10 employees? Multiply by 1.55 for actual number
      2. Productivity
         i. Meals/labor hour = total meals served/day divided by labor hours/day
         ii. Minutes/meal = labor min/day divided by total meals/day
      3. Pay
         i. Payroll cost/day = sum of hourly rate of each employee x hours worked by all
         ii. Payroll cost/meal = total daily payroll divided by meals/day
         iii. Labor cost/meal = total labor cost (both productive and non-productive) / meals
         iv. Total labor cost/day = total payroll + total of all other direct (fringe benefits etc.)/day
         v. Sales = cost of labor / labor cost %
   b. Food—easiest to control, fluctuates the most
   c. Capital
      1. Current Assets—things that can be converted to cash
      2. Capital ownership—interests and earnings retained, when revenue is high than expenses put money back into business
   d. Some other stuff
      1. Fixed Assets—cannot be converted to cash easily (land, building, inventory)
      2. Liabilities—what we owe (rent, credit cards)

4. Balance Sheet—snapshot of the financial condition of business. Has 3 parts:
   a. Assets
   b. Liabilities
   c. Owner’s Equity (capital)

MARKETING

1. Marketing strategies
   a. Marketing Mix
      1. Product
      2. Place
      3. Promotion
      4. Price
   b. 5 Marketing Concepts
      1. Production Concept—clients want lots and cheap, extra features don’t matter
      2. Product Concept—quality and performance matter
      3. Selling Concept—must persuade and sell if you want the product to be bought, sell what they make, not make what the market wants, focus on needs of seller
      4. Marketing Concept—must be better than competitors at engaging, communicating with, and delivering to customers, focus on needs of buyer
         i. Ex: Offering a special dinner to new patients in hospital
      5. Societal Marketing Concept—like marketing concept but also focuses on needs of society (world hunger, poverty, environment, long-run interests of society)

PRINCIPLES OF MANAGEMENT

1. Management principles
   a. Approaches
1. Behavioral—focuses more on needs of employee
   i. Hawthorne did some studies on this, those treated better were more productive
2. Human Relations—employees are a person who can be trusted
   i. Theory Z (Ouchi’s Theory)—person trusted to do job as long as managers are trusted to support
3. Classical
   i. Skinner studied reinforcement (reinforcement theory)
      • Negative reinforcement—take away a thing increases behavior
      • Positive reinforcement—give something to increase a behavior
      • Negative punishment—remove something good to decrease a behavior
      • Position punishment—give something bad to decrease a behavior
   ii. Classic approaches think employees are a problem who don’t like to learn
4. Systems Contingency—no best way to manage
5. Transformational—work towards organizational goals
b. Traits
   1. Interpersonal communication
   2. Use of authority/influence/power
   3. Blake’s Managerial Grid
      i. X-axis: concern for work (1 → 9)
      ii. Y-axis: concern for employees (1 → 9)
c. Skills
   1. Technical (hard skill)—can be taught, important at low levels
   2. Human (soft skill)—must be developed in personal lives
   3. Conceptual—important at higher level management
d. Roles
   1. Information giver
   2. Conflict resolver—unbiased yet personal, taking all parties into account
      i. Best to meet with everyone at once when there’s a problem
   3. Problem solver
   4. Decision maker
e. 5 Basic Management Functions
   1. Planning—most important! Decision making for what has to be done. Includes goals and objectives
      i. Operational/Short Range—focus on goals and objectives
      ii. Strategic/Long Range—focus visions and priorities
         • SWOT Analysis
            a. Strengths
            b. Weaknesses
            c. Opportunities
            d. Threats
      iii. Disaster preparedness—be ready
      iv. Charrette—collaborative planning by all interested parties to create a master plan
         • Brainstorming—everyone inputs ideas
         • Rice-storming—after brainstorm, give an idea on a piece of paper
   2. Organizing—determine what tasks and skills are needed then allocate resources
      i. Structure/design of department/unit
      ii. Establishing priorities
      iii. Tasks/activities and action plans
         • Policy (guide to an organization, activate goals and objectives) → Procedure (chronological sequence of events) → Methods (relate to one step in procedure) → Rules (specify action)
      iv. Resource allocation
   3. Coordinating and Directing—explain what needs to be done, help if needed
   4. Controlling—evaluate how well something works, change if necessary
   5. Leading

QUALITY PROCESS
1. Purpose—to determine how well a particular service meets needs of customers

2. Regulatory guidelines
   a. Federal
   b. Accrediting agencies
      1. JCAHO (Joint Commission Accrediting Healthcare Certification) or TJC (The Joint Commission)—nonprofit that accredits medical care, evaluated facilities for safety and efficient patient care, basis for Medicaid reimbursement
         i. Mandates quality improvement of hospital dietetics
         ii. Requires nutrition documentation in medical records of long term patients quarterly
         iii. May post “unannounced surveys” of facility on their website morning of, occur every 18 to 39 months (unless it’s their first, then they get 7 days notice)
         iv. Submit action plan 45 days after a Requirement for Improvement (RFI) is issued

3. Process and implementation
   a. Plans and standards (indicators)
      1. Quality Assurance—ensures maintenance of standards of product or service
         i. First step is ID aspects of care/service that need monitoring or potential problem areas
         ii. Key is maintenance and monitoring
      2. TQM (Total Quality Management)—attempt to improve customer satisfaction and initiated positive change
         i. Client focused, looks for faults in system, continuing education and training (not profit focused)
      3. Six Sigma—continuous quality improvement
   b. Data collection
      1. Benchmarking—compare your organization against others in the industry
      2. Hypothesize
         i. Types
            • Directional (one-tailed)—will go one way
            • Non-directional (two-tailed)—could go both ways
            • Null—nothing will happen
         ii. Errors
            • Type 1 error—said there was a difference, there wasn’t (liar), more serious
            • Type 2 error—there was a difference, you didn’t report it (stupid)
   c. Implement corrective actions
   d. Evaluate effectiveness
      1. Measure client outcomes and degree to which goals were met

4. Research
   a. Identifying problems—major step
      1. Work Improvement Program Analysis
         i. Select job to be improved
         ii. Break down job in detail
         iii. Challenge every detail
         iv. Develop better method
         v. Put new method to action
      2. Feasibility Study—is potential business feasible from a financial standpoint?
   b. Data collection
      1. Answer is never “watch the employees complete X task” because Hawthorne effect
         i. Ex: don’t watch employees to ensure proper portion control, do a test tray study)