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NDFS 356
Nutrition Support Calculations

1. Determine the following for Ensure at 68 ml/hour (Note: when working with volumes of formula for enteral formula, it is expressed in total volume/ml not as cans or ounces. For example: 1200 ml's, not 5 cans)

   a. Total volume: (68 ml/hr) x (24 hr) = 1632 ml/24 hr

   b. Total calories: (1632 ml) x (1.06 kcal/ml) = 1730 kcals

   c. Protein (grams): (1632 ml) x (9 g protein/237 ml) = 62 g protein

2. Determine the following for Jevity1.2 at 120 ml/hour:

   a. Total volume (ml): (120 ml/hr) x (24 hr) = 2880 ml/24 hr

   b. Total calories: (2880 ml) x (1.2 kcal/ml) = 3456 kcals

   c. Total protein (g): (2880 ml) x (13.2 g protein/237 ml) = 160 g protein

   d. Free water (ml): (2880 ml) x (191 cc/237 ml) = 2321 cc H2O

   e. Fiber (g): (2880 ml) x (4.3 g fiber/237 ml) = 52 g fiber

3. How much Perative would need to be delivered to provide about 2,500 calories and about 130 protein?

   Total volume in ml's: (2500 kcal)/(1.3 kcal/ml) = 1923 ml

   (1923 ml) x (15.8 g protein/237 ml) = 128 g protein is ~130 g protein

4. Calculate the following for Procalamine at 100 ml x 24 hours.

   a. Protein (grams): (2400 ml) x (29 g protein/1000 ml) = 70 g protein

   b. Total calories: (29 g) x (4 kcal/g) = 116 kcal/1000ml + (130 kcal NPC) = (246 kcal/1000 ml) x (2400 ml) = 590 total kcal

   c. Total non-protein calories (NPC): (130 kcal NPC/1000 ml) x (2400 ml) = 312 kcals NPC

5. Calculate how much Impact is necessary to provide 80 grams of protein. What are the total volume, calories and free fluid that it would provide? 250 ml 1.0 nutrient density

   a. Total volume (ml): (14 g/250 ml) = (80 g protein/x ml) → x =1429 ml

   b. Total calories: 1429 ml = 1429 kcals

   c. Free fluid (water) (ml): (85% H2O) x (1429 ml) = 1215 ml free fluids

6. How many cans of Nutren 2.0 are necessary to provide 1250 calories? How much protein does it provide? How much free fluid? (when supplements are consumed PO, they are usually expressed in cans/day)

   a. # of cans: (1250 kcal/x ml) = (500 kcal/250 ml) → x = 625 ml /(250 ml/can) = 2.5 cans

   b. Protein (g): (2.5 cans) x (20 g protein/can) = 50 g protein

   c. Free Fluid: (625 ml) x (70% H2O) = 438 ml free fluid

7. Determine the following for someone who consumed 3 and one-half cans of Boost.

   a. Calories: (240 kcal/can) x (3.5 cans) = 840 kcals

   b. Protein (g): (10 g protein/can) x (3.5 cans) = 35 g protein

8. How much of the following nutrients would be provided in 2 Glucerna meals bars?

   a. Kcals: (220 kcal/bar) x (2 bars) = 440 kcals

   b. Protein: (10 g protein/bar) x (2 bars) = 20 g protein

   c. Overall % of DV: (20% DV/bar) x (2 bars) = 40% DV

9. For the following Standard TPN solution, calculate the requested information:
   2800 ml of 50% CHO and 8.5% AA.

   1400 ml D50, 1400 ml 8.5% AA

   a. Protein (grams): (1400 ml) x (.085) = 119 g protein

   b. Total NPC: (1400 ml) x (.5) = 700 g CHO x (3.4 kcal/g dextrose) = 2380 kcals

   c. Total calories: 2380 NPC + (119 g pro x 4 kcal/g) = 2856 kcals

10. Calculate the nutritional provisions in a standard solution of 2,450 ml 50% CHO, 10% protein, and 10% lipids (500ml's) QOD.

    10% lipids 550 x (3.5 QOD) = 1925 kcal/week /(7 days/week) = 275 kcal/day lipids

    a. Protein (grams): (2450 ml) x (.05 protein) = 123 g protein

    b. Total NPC: (2450 ml) x (.25 CHO) = 613 g CHO x (3.4 kcal/g dextrose) = 2084 kcal CHO + 275 kcal lipids = 2359 kcals

    c. Total calories: (123 g protein x 4 kcal/g) + 2359 kcals = 2851 kcals

11. Calculate the following: 1,200 ml of 70% CHO; 1,000 ml of 8.5 % protein; and 20% lipids (in 500 ml bag) given QOD to a 74 kg person.

(1200 ml) x (.7 CHO) = 840 g CHO x (3.4 kcal/g dextrose) = 2856 kcal

(1000 ml) x (.085 protein) = 85 g protein x (4 kcal/g) = 340 kcal
(20% lipids 1000 kcal) x (3.5 QOD) = 3500 kcal /(7days/week) = 500 kcal /(9 kcal/g) = 56 g lipids

a. Protein (grams): 85 g

b. Total NPC (average/day): 2856 kcal CHO + 500 kcal lipids = 3356 kcals

c. Total calories: 3356 kcal NPC + 340 kcal protein = 3696 kcals

d. Fat load: 56 g lipids/74 kg = .76 < 1.0 acceptable fat load

e. CHO load: 840000 mg/74 kg = 1440 min/day = 7.9 high CHO load 5-7

f. What is the max amount of CHO for this person:

12. MC is starting on TPN (wt. 61 kg). You determined his needs to be 2,650 kcals/day and protein needs at 91 grams. He will get 10% lipids 3 times/week. Write a TPN order using 60% dextrose and 8.5% AA (include protein calories) to meet his needs:

a. Volume CHO (60%): 236 kcal lipids + 364 kcal = 600 kcal → 2650 kcal – 600 kcal = 2050 kcal CHO /(3.4 kcal/g dextrose) = 603 g CHO /(.6) = 1005 ml

b. Volume Pro (8.5%): (91 g protein)/(.085) = 1071 ml
91 g x 4 kcal/g = 364 kcal

c. Average daily lipid calories: (550 kcal) x (3 times/week) = 1650 kcal /(7 days/week) = 236 kcals/day

d. Fat load: (236 kcals)/(11 kcal/g) = 21.4 g /(61 kg) = .35

e. CHO load: (603000 mg CHO)/(61 kg)/(1440 min/day) = 6.9

13. Design a TPN formula to provide 1840 calories and 65 grams of protein for a 59 kg person. Remember the minimum lipid requirements. Make sure the person receives adequate fluid.

	%	Volume (ml)	
CHO	D50	606	
Protein	8.5	765	
Fat	10	Volume: 500	Frequency: qd
Fat load	.85		
CHO load	5.1		

25-30 ml fluid x 59 kg = 1475-1700 ml fluids

1. (65 g)/(.085 g/ml) = 765 ml protein
   65 g x 4 kcal/g = 260 kcal protein

2. 10% lipids 550 kcal, 50 g, 500 ml

260 kcal protein + 550 kcal lipids = 810 kcal → 1840 kcal – 810 kcal = 1030 kcal CHO

3. (1030 kcal)/(3.4 kcal/g) = 303 g CHO /(.5 g/ml) = 606 ml CHO

Fat load: 50 g lipids/59 kg = .85 < 1.0
CHO load: 303000 mg CHO/59 kg/1440 min/day = 3.6

14. JT is receiving both Procalamine and Jevity 1.0. He is tolerating Jevity at only 40 ml/hour, which doesn't meet his protein needs of 90 grams. How much Procalamine does he need and at what rate over 24 hours to meet his total protein needs?

Procalamine 29 g protein/1000 ml
Jevity 1.0 nutrient density 1.06, 10.4 g protein/237 ml
(40 ml/hr) x (24 hr) = 960 ml → (x/960 ml) = (10.4 g protein/237 ml) → x = 42 g protein

a. Procalamine (grams protein): 90 g – 42 g = needs 48 g protein from Procalamine

b. Procalamine (volume): (29 g pro/1000 ml) = (48 g pro/x) = 1655 ml

c. Rate of Procalamine: 1655 ml/24 hr = 69 ml/hr

d. Kcals provided by Jevity: (237 ml) x (1.06 kcal/ml) = (251 kcal)/(237 ml) = (x/960 ml) → x = 1016 kcal

15. Find a product that will provide 1,200 calories and >60 grams pro in less than 1,000 ml and osmolality less than 600 mOsm. How much must be delivered?

    Osmolite 1.5; per 1000 ml offers 62.7 g protein, 525 mOsm/kg H2O, 1500 cal

16. Calculate the following for Jevity1.5 half strength (diluted in equal water—i.e. ½ of the total volume is added water) at 83 ml/hour over 22 hours = 1826 ml/2 = 913 ml free fluids, 913 ml

    per can 237 ml, 15.1 g protein, 355 kcal, 180 ml H2O

a. Calories: (355 kcal/237 ml) = (x/913 ml) → x = 1367 kcals

b. Protein: (15.1 g protein/237 ml) = (x/913 ml) → x = 58 g protein

c. Total volume: 83 ml/hr x 22 hr = 1826 ml

d. Free fluid from Jevity 1.5: (180 ml/237 ml) = (x/913 ml) → x = 693 ml

e. Total free fluid provided (added water plus Jevity free fluid): 1606 ml

17. Design a tailor-made formula providing 112 grams protein, 2,875 total calories, and 3,100 ml's total fluid (± 100 ml's) for an 89 kg person. Complete the table below.

	Initial Stock concentration	Total grams	Total volume
Amino acids	7%	112	1600
Dextrose	D50	552	1104
Fat	10% qd	50	500
CHO load	4.3		
Fat load	.56		
Final AA concentration	3.5%		
Final dextrose concentration	17.23%		
Total final volume	3204 ml		

7% protein
(112 g)/(.07 g/ml) = 1600 ml
(112 g) x (4 kcal/g) = 448 kcal

10% qd lipids
550 kcal/day, 500 ml
Fat load: (50 g/day)/(89 kg) = .56

D50
550 kcal + 448 kcal = 998 kcal protein & fat → 2875 kcal – 998 kcal = 1877 kcal CHO
1877 kcal CHO/(3.4 kcal/g dextrose) = (552 g CHO)/(.5 g/ml) = 1104 ml
CHO load: 552000 mg/89 kg/1440 min/day = 4.3

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NDFS 356
Enteral Comparison Assignment

1. Compare the following formulas by looking up the requested information (per 240-250 ml's). Some columns might not be applicable to all products.

FORMULA	CHO (gm)	PRO (gm)	FAT (gm)	Caloric Density	Volume to meet RDA	Osm	FIBER (gm)	AA source	FAT source	CHO source
ENSURE	40	9	6	1.06	948	620	0	Milk Protein Concentrate, Soy Protein Concentrate	Soy Oil, Canola Oil	Sugar, Corn Maltodextrin
BOOST	41	10	4	1.0	1185 ml	625	0	Milk protein concentrate, soy protein isolate	Vegetable Oil (Canola, High Oleic Sunflower, Corn)	Corn Syrup, Sugar, Cellulose Gel and Gum
BOOST Plus	45	14	14	1.5	1185 ml	670	3	Milk protein concentrate, calcium and sodium caseinates, soy protein isolate	Vegetable Oil (Canola, High Oleic Sunflower, Corn)	Corn Syrup, Sugar, Gum Acacia
JEVITY 1.2 237 ml	40.2	13.2	9.3	1.2	1 L 1200 cal	450	4.3	Sodium & Calcium Caseinates, Soy Protein Isolate	Canola Oil, Corn Oil, Medium-Chain Triglycerides	Corn Maltodextrin, Corn Syrup Solids

DIABETISOURCE AC	25	15	14.7	1.2	1250 ml	450	3.8	Supplemental L-arginine, Soy Protein Isolate	Canola Oil, Refined Fish Oil	Corn Syrup, Green Pea and Green Bean Puree and less than 2% of Fructose, Peach Puree
BOOST PUDDING 5 oz	33	7	9	1.6			0	Milk protein concentrate, sodium and calcium caseinates	Canola Oil, High Oleic Sunflower Oil and less than 2% of Corn Oil	Sugar, Maltodextrin, Modified Cornstarch
TWOCAL HN	51.8	19.9	21.5	2.0	948	725	1.2	Sodium & Calcium Caseinates,	High Oleic Safflower Oil, Medium-Chain Triglycerides, Canola Oil, Soy Lecithin	Corn Syrup Solids, Corn Maltodextrin, Sugar (Sucrose)
ENLIVE/ Ensure Clear 296 ml	35	9	0				0	Whey Protein Isolate		Corn Syrup Solids, Sugar
PULMOCARE 237 ml								Sodium & Calcium Caseinates		

2. Name 2 different (i.e. do not use the same manufacturer) elemental, high protein formulas.

- Abbott - VITAL AF 1.2 CAL is Advanced Formula therapeutic elemental nutrition with ingredients to help manage inflammation and promote GI tolerance. Offers 17.8 g protein/237 ml fluids.
- Nestle - PEPTAMEN AF has balanced peptide profile and MCT oil to promote absorption and tolerance. Very high protein to support the demands of metabolic stress: 19 g protein/250 ml fluids.

3. Name 3 diseases/conditions for which elemental, high protein formulas are indicated.

- Several studies show trends toward reduced length of hospital and ICU stays compared to patients on intact protein diets and TPN.
- Pancreatitis
- GI dysfunction

4. Identify 2 different diabetic products? Name at least 2 characteristics that make them appropriate for diabetics?

Glucerna

- Carbohydrate steady – slowly digestible carbohydrates break down more slowly and increase blood sugar at a steady pace to help minimize blood sugar spikes.
- Contain chromium picolinate to help your body's own insulin work better.

Boost Glucose Control

- Contains a unique blend of protein, fat and slow-digesting carbohydrates designed to help manage blood glucose levels as part of a balanced diet.
- Only 1 Carbohydrate Choice per 8 fl oz serving.

5. Name a pre-dialysis renal failure product? What are some its characteristics?

Suplena

- Therapeutic nutrition that can help patients with chronic kidney disease (stage 3 and 4) to help maintain their nutritional status while adhering to their renal diets.
- Low in protein (10% of total calories).
- Low in phosphorus, potassium, calcium and sodium.

6. Name a renal failure product for someone receiving dialysis? How is it different than a pre-dialysis product?

Nepro is therapeutic nutrition specifically designed to help meet the nutritional needs of patients on dialysis (stage 5 chronic kidney disease). Nepro is clinically shown to improve the nutritional status of dialysis patients. Nepro is high in protein and low in potassium, phosphorus, and sodium.

Pre-dialysis products are low in protein to preserve renal function as long as possible, while adhering to renal diet and before disease state progresses requiring dialysis.

7. Name 1 liver failure product. What are some nutritional characteristics that make it appropriate for liver failure?

NUTRIHELP

- Formulated to help decrease metabolic end products in patients with hepatic disease.
- High ratio of branched-chain amino acids to aromatic amino acid.
- Calorically dense for fluid management.
- High MCT to LCT ratio to facilitate absorption.

8. Name an immune enhancing formula. What formulation characteristics does it have to make it unique?

IMPACT GLUTAMINE contains a unique, evidence-based blend of arginine, omega-3 fatty acids, and nucleotides. This blend of immunonutrients, present in other IMPACT formulas, has been shown to support the immune system and reduce rates of infection, LOS and ventilator days in surgical and critically ill patients when used as part of an early enteral nutrition regimen. This formula contains immune-modulating ingredients supported by the Critical Care Nutrition Guidelines. Glutamine helps to support GALT (gut-associated lymphoid tissue) and cells of the GI tract.