Nutrition Support Calculations

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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: **68ml x 24 hrs= 1632 ml**

   b. Total calories: **1632 ml/ 237ml= 6.8 cans x 250 kcal= 1,700 kcal**

   c. Protein (grams): **6.8 cans x 9g = 61.2 g**

2. Determine the following for Jevity1.2 at 120 ml/hour:
   a. Total volume (ml): **120 ml/hr x 24 hr= 2880 ml**

   b. Total calories: **2880 ml x 1.2 kcal= 3456 kcal**

   c. Total protein (g): **2880 ml/237 ml= 12.15 cans; 12.15 cans x 13.2g= 160.4 g**

   d. Free water (ml): **807g/1000 ml= X ml/ 2880 ml= 2324.2 ml**

   e. Fiber (g): **12.15 cans x 4.3 g= 52.3 g**

3. How much Perative would need to be delivered to provide about 2,500 calories and about 130 protein?
   Total volume in ml's: **1.3 kcal/ 1 ml= 2500 kcal/ X= 1,923 ml**

4. Calculate the following for Procalamine at 100 ml x 24 hours.
   a. Protein (grams): **29g/1000 ml= Xg/ 2400 ml= 69.6 g**

   b. Total calories: **312 NPC + (69.4 x 4) = 590.4 kcal**

c. Total non-protein calories (NPC): **130/1,000= X kcal/ 2400 ml= 312 NPC**

5. Calculate how much Impact is necessary to provide 80 grams of protein. What is the total volume, calories and free fluid that it would provide?
   a. Total volume (ml): **250 ml/ 14 g= X ml/ 80g= 1429 ml**

   b. Total calories: **250 ml/ 250 kcal= 1429 ml/ X kcal= 1429 kcal**

   c. Free fluid (water) (ml): **85% water= 85/100 ml= X ml/ 1429= 1215 ml**

6. How many cans of Nutrena 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: **500 kcal/ 1 can= 1,250 kcal/ X can= 2.5 cans**
   b. Protein (g): **20g/ 1 can= X g/ 2.5 can= 50g**
   c. Free Fluid: **170 ml H2O/ 250 ml= X ml H2O/ 625 ml= 438 ml**

7. Determine the following for someone who consumed 3 and one-half cans of Boost.
   a. Calories: **240 kcal/ 1 can= X kcal/ 3.5 cans= 840 kcal**

   b. Protein (g): **10 g/ 1 can= X g/ 3.5 can= 35 g**

8. How much of the following nutrients would be provided in 2 Glucerna meals bars?
   a. Kcals: **1 bar= 220 kcal x 2= 440 kcal**

   b. Protein: **10g/ 1 bar= X g/ 2 bar= 20g**

   c. Overall % of DV: **20-60%**

9. For the following Standard TPN solution, calculate the requested information:
   2800 ml of 50% CHO and 8.5% AA.
   a. Protein (grams): **1400 ml x .085= 119 g**

b. Total NPC: **1400 x .50= 700 g x 3.4 kcal= 2380 kcal**

c. Total calories: **2380 kcal + (119 x 4) = 2856 kcal**

10. Calculate the nutritional provisions in a standard solution of 2,450 ml 50% CHO, 10% protein, and 10% lipids (500ml's) QOD
    a. Protein (grams): **1225 ml x .10= 122.5 g**

    b. Total NPC: **(550 kcal x 3.5 QOD/ 7 days) + (1225 x .50= 612.5g x 3.4)= 2357 NPC**

    c. Total calories: **2357 NPC + (1225 x .10= 122.5g x4) = 2847 kcal**

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.

    a. Protein (grams): **1000 ml x .085= 85g**
    b. Total NPC (average/day): **2856 kcal + 450kcal= 3306 NPC**
    c. Total calories: **.7=Xg/1200 ml= 840g x 3.4= 2856 + (85g x 4)+ [(500 ml= Xg/.2)x 10kcal]= 3696 kcal**
    d. Fat load: **112g x 3.5= 392/ 7= 56g/ 74 kg= .75**
    e. CHO load: **840g x 1000= 840,000/74kg/1440 min= 7.8**
    f. What is the max amount of CHO for this person:**7= x/ 74/ 1440= 746g**

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%): **7 days x 61 kg x 1440 min= 614.88g /X ml= .6= 1025 ml**

    b. Volume Pro (8.5%): **91g/ X ml= 0.085= 1070.6 ml**

    c. Average daily lipid calories: **550 kcal x 3=1650/7=236 kcal**

    d. Fat load: **50g x 3= 150/7 days= 21/61 kg= .34**

e. CHO load: **615,000/61 kg/ 1440 min= 6.8**

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	**30**	**1097 ml**	
Protein	**10**	**650 ml**	
Fat	**25**	**Volume:** **380ml**	**Frequency:** **QOD**
Fat load	**.4**	**Fluid Needs: 59 kg (30-35ml)= 1770ml-2065ml**	
CHO load	**3.9**	**10%= 65g/ X= 650ml**	

1840 x .25= 460 kcal/ 1000 ml= 46%
460/9= 51 g fat
1840kcal- 260 kcal- 460 kcal= 1120 kcal CHO/ 3.4= 329g/.3= 1097 ml
23.5 g/59kg= .39 fat load
329,000/59 kg/ 1440 min= 3.9 carb load

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?
    a. Procalamine (grams protein): **10.4g/237ml=0.04 x 40 ml= 1.75 g x 24 hr= 42g jevity, 90-42g= 48g procalamine**
    b. Procalamine (volume): **29g/ 1000ml = 48g/ X ml= 1655 ml**
    c. Rate of Procalamine: **1655 ml/ 24 hr= 69 ml/ hr**
    c. Kcals provided by Jevity: **40 ml/hr x 24 hr= 960 ml/ 237 ml= 4.05 cansx 250kcal =1013 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 has 1.5 kcal/ml and 62.7g/L protein, with osmolality of 525 mOsm/kg H2O

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.

a. Calories: **42 ml x 1.5 kcal/ ml= 124 kcal/ hr x 22 hr= 1370 kcal**

b. Protein: **15.1 g/ 237 ml= g/ 913 ml= 58 g**

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

	Initial Stock concentration	**Total grams**	**Total volume**
Amino acids	**.10**	**112**	**1120**
Dextrose	**.30**	**502**	**1673**
Fat	**.25**	**80**	**360**
CHO load	**4**		
Fat load	**.9**		
Final AA concentration	**112/3153= 3.5**		
Final dextrose concentration	**502/ 3153= 15.9**		
Total final volume	**1120 + 1673 + 360 = 3153**		

d. Free fluid from Jevity 1.5: **1800ml / 237ml= Xml/ 913ml jevity= 693.4 ml H20**

e. Total free fluid provided (added water plus Jevity free fluid): **693.4 ml jevity + 913 added H20= 1606.4 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.

112 g / .10 = 1120
2875 kcal x .25= 719kcal/ 1000ml= 71.9 % x 112 g= 80g
71.9 % x 500 ml = 360 ml
2875kcal- 719 kcal- (112g x 4kcal) = 1708 kcal
1708 kcal x 3.4 kcal= 502 g/ .3= 1673 ml
71.9% x 112 g= 80g/ 89 kg= .9
502x 1000= 502,000/89 kg/ 1440 min= 4

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	1.5		640	1	Milk protein concentrate, soy isolate protein, pea protein	Soy oil, canola oil, corn oil	Sugar, corn maltodextrin
BOOST	41	10	4	1.0	1185	625	0	Milk protein concentrate, soy isolate protein	Vegetable oil	Corn syrup, sugar
BOOST Plus	45	14	14	1.5	1185	670	3	Milk protein concentrate, calcium and sodium caseinate, soy protein isolate	Vegetable oil	Corn syrup, sugar, fructooligosacharrides
JEVITY 1.2	40.2	13.2	9.3	1.2	1200	450	4.3	Sodium and calcium caseinate, soy protein isolate	Corn oil, canola oil, medium chain triglycerides	Corn maltodextrin, corn syrup solids, fructooligosacharri

										des, fiber, oats, soy
DIABETISOURCE AC	25	15	14.7	1.2	1250	450	3.8	Soy protein isolate, L-arginine	EPA + DHA, canola oil	corn syrup, pea puree, peach puree, tapioca dextrin, soy, fiber, maltodextrin, fructooligosacharrides
BOOST PUDDING	33	7	9	1.6			0	Milk protein concentrate, sodium and calcium caseinate	Canola oil, high oleic sunflower oil, corn oil	Sugar, maltodextrin, modified cornstarch
TWOCAL HN	51.8	19.9	21.5	2.0	948	725	1.2	Soy protein isolate, sodium and calcium caseinate	Safflower oil, medium chain triglycerides, canola oil	Corn syrup solids, corn maltodextrin, sugar, fructooligosacharrides
ENSURE CLEAR	43	7	0	1.0		700	0	Whey protein	none	Corn syrup solids, sugar
PULMOCARE	25	14.8	22.1	1.5	947	475	0	Calcium and sodium caseinate	Canola oil, safflower oil, corn oil, medium chain triglycerides	Sugar, maltodextrin

2. Name 2 different (i.e. do not use the same manufacturer) elemental, high protein formulas.
Abbott manufactures a product called Jevity 1.2 cal that is a high protein, high fiber formula. Nestle also has Boost High Protein, which is a complete nutrition formula with 15g of protein/ 240 ml.

3. Name 3 diseases/conditions for which elemental, high protein formulas are indicated.
People who have major burns, are undergoing cancer treatment, or have pressure ulcers would benefit from high protein formulas.

4. Identify 2 different diabetic products? Name at least 2 characteristics that make them appropriate for diabetics?
Diabeticsource AC is appropriate for diabetics because it contains vegetable and fruit puree that is meant to keep blood glucose levels steady. It also has a larger fat and protein ratio when compared to carbohydrate composition. Glucerna is another diabetes product that is appropriate because it focuses on glycemic control through the use of slowly digestible carbohydrates to keep blood glucose in check. It also has a lower carbohydrate concentration than other predicts typically do.

5. Name a pre-dialysis renal failure product? What are some its characteristics?
Suplena is a pre-dialysis renal failure product. This product is low protein, high calorie (1.8), low in minerals such as phosphorus, potassium, calcium and sodium. This product is also good for low-residue diets and has fiber that helps maintain steady glucose levels. This product is good for both oral and tube feeding.

6. Name a renal failure product for someone receiving dialysis? How is it different than a pre-dialysis product?
Nepro is a product for renal failure. This product is different than a pre-dialysis product because it contains high- quality protein to help with losses during dialysis. The vitamin and mineral content is specialized for those who are on dialysis and provides enough calories to maintain nutritional status.

7. Name 1 liver failure product. What are some nutritional characteristics that make it appropriate for liver failure?
One liver failure product is Nutrahep. This product has more branched chain amino acids than it does aromatic amino acids. This is significant because high levels of aromatic amino acids are common with liver failure, while branched chain amino acids seem to benefit patients. There are also more medium chain triglycerides and long chain because absorption can occur easier with shorter fatty acid chains. This product also provides enough calories to help meet nutritional needs.

8. Name an immune enhancing formula? What formulation characteristics does it have to make it unique?
One immune enhancing formula is Pivot 1.5 cal. This formula is high protein, hydrolyzed and peptide based. It also contains ingredients that support the immune system, such as arginine, glutamine, omega 3 fatty acids, and antioxidants. The formula is also specialized

to enhance the tolerance of this product when ingested.