

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: $(68 \text{ mL}) \times (24 \text{ hours}) = \mathbf{1632 \text{ mL/day}}$
 - b. Total calories: $(1632 \text{ mL/day}) \times (1.06) = \mathbf{1730 \text{ kcals}}$
 - c. Protein (grams): $(9 \text{ gm of protein}/237\text{mL}) \times (1632 \text{ mL}) = \mathbf{62 \text{ grams of protein}}$

2. Determine the following for Jevity1.2 at 120 ml/hour:
 - a. Total volume (ml): $(120 \text{ mL}) \times (24 \text{ hours}) = \mathbf{2880 \text{ mL/day}}$
 - b. Total calories: $(2880 \text{ mL/day}) \times (1.2) = \mathbf{3456 \text{ kcals}}$
 - c. Total protein (g): $(13.2 \text{ grams of protein}/237\text{mL}) \times (2880 \text{ mL}) = \mathbf{160 \text{ grams of protein}}$
 - d. Free water (ml): $191\text{mL}/237\text{mL}=80\%$ is free water; $(2880 \text{ mL/day}) \times .80 = \mathbf{2321 \text{ mL of free water}}$
 - e. Fiber (g): $(4.3 \text{ grams of fiber}/237\text{mL}) \times (2880\text{mL}/\text{day}) = \mathbf{52 \text{ grams of fiber}}$

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

Total volume in ml's: $(2,500 \text{ kcals}/1.3) = \mathbf{1,923 \text{ mL}}$
Perative has 15.8 grams of protein/237 mL

4. Calculate the following for Procalamine at 100 ml x 24 hours.
 - a. Protein (grams): $29 \text{ grams of protein}/1000\text{mL} \times 2,400\text{mL} = \mathbf{70 \text{ grams of protein}}$
 - b. Total calories: $(100 \text{ mL} \times 24 \text{ hours}) = (2400\text{mL}/\text{day}) \times (.246) = \mathbf{590 \text{ calories}}$
 - c. Total non-protein calories (NPC): $(3 \text{ grams}/100\text{mL}) \times (2,400 \text{ mL}) = 72 \text{ g} \times 4.3 = \mathbf{310 \text{ NPC}}$

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): $(14 \text{ grams of protein}/250\text{mL}); (80 \text{ grams of protein}/14) \times 250\text{mL} = \mathbf{1429 \text{ mL}}$
 - b. Total calories: $(1428.5\text{mL}) \times (1.0) = \mathbf{1429 \text{ kcals}}$

- c. Free fluid (water) (ml): $1428.5 \times .8 = 1215 \text{ mL of free fluid}$
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)
- # of cans: $1250 \text{ kcals} / 500 \text{ kcals per can} = 2.5 \text{ cans}$
 - Protein (g): $2.5 \text{ cans} \times 20 \text{ grams of protein} = 50 \text{ grams of protein}$
 - Free Fluid: $2.5 \text{ cans} \times 625 \text{ mL} \times .70 = 438 \text{ mL of free fluid (about } 1 \frac{3}{4} \text{ can)}$
7. Determine the following for someone who consumed 3 and one-half cans of Boost.
- Calories: $(240 \text{ kcals/can}) \times 3.5 = 840 \text{ kcals}$
 - Protein (g): $(10 \text{ grams of protein/can}) \times 3.5 = 35 \text{ grams of protein}$
8. How much of the following nutrients would be provided in 2 Glucerna meals bars?
- Kcals: $(220 \text{ kcals/bar}) \times 2 = 440 \text{ kcals}$
 - Protein: $(10 \text{ grams of protein/bar}) \times 2 = 20 \text{ grams of protein}$
 - Overall % of DV: **40%**
9. For the following Standard TPN solution, calculate the requested information:
2800 ml of 50% CHO and 8.5% AA.
- Protein (grams): $(1400 \times .085) = 119 \text{ grams}$
 - Total NPC: $(1400 \times .5) \times 3.4 = 2380 \text{ NPC}$
 - Total calories: $(119 \times 4) + (700 \times 3.4) = 2856 \text{ calories}$
10. Calculate the nutritional provisions in a standard solution of 2,450 ml 50% CHO, 10% protein, and 10% lipids (500ml's) QOD
- Protein (grams): $(1225 \times .10) = 123 \text{ grams}$
 - Total NPC: $2082.5 \text{ calories of CHO} + 275 \text{ calories from lipids} = 2358 \text{ NPC}$
 - Total calories: **2848 calories**
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.
- Protein (grams): $(1000 \times .085) = 85 \text{ grams}$
 - Total NPC (average/day): $2856 \text{ kcals of CHO} + 500 \text{ kcals from fat} = 3356 \text{ kcals}$
 - Total calories: $3356 \text{ NPC} + 340 \text{ kcals protein} = 3696 \text{ calories}$
 - Fat load: $(56/74) = 0.75 \text{ g/kg}$

- e. CHO load: $840,000/74/1440 = 7.8$
- f. What is the max amount of CHO for this person: $7=(x/74/1440)$; $x = 745,920 \text{ mg} =$
746 grams

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%): **1005 mL**
- b. Volume Pro (8.5%): **1070 mL**
- c. Average daily lipid calories: **235.7 kcals**
- d. Fat load: $21\text{g}/61\text{kg} = 0.34$
- e. CHO load: $603,000\text{mg}/61\text{kg}/1440 = 6.8$

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 | 40% | 955 mL | |
| Protein | 8.5% | 765 mL | |
| Fat | 10% solution | Volume: 250 mL | Frequency: QOD |
| Fat load | 0.43 | | |
| CHO load | 4.5 | | |

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): $(10.4 \text{ grams}/237\text{mL}) * 960 = 42$; $90 - 42 = 48 \text{ grams}$
- b. Procalamine (volume): $48 \text{ grams of protein} = 29\text{g}/1000\text{mL} * X = 1655 \text{ mL}$
- c. Rate of Procalamine: $(1655\text{mL}/24\text{hr}) = 69 \text{ mL/hour}$
- c. Kcals provided by Jevity: **1018 kcals**

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?

1,000 mL of Vital 1.2

CD: 1.2
 Protein: 75 grams
 1,000 mL
 Osmolality: 425

16. Calculate the following for Jevity 1.5 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: $(913\text{mL} * 1.5) = \mathbf{1370 \text{ calories}}$
- b. Protein: $(15.1\text{grams}/237\text{mL}) * 913\text{mL} = \mathbf{58 \text{ grams of protein}}$
- c. Total volume: **1826 mL/day** (Jevity 1.5 and water)
- d. Free fluid from Jevity 1.5: $(180/237) * 913\text{mL} = \mathbf{694 \text{ mL}}$
- 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 ($\pm 100 \text{ ml's}$) for an 89 kg person. Complete the table below.

| | Initial Stock concentration | Total grams | Total volume |
|------------------------------|------------------------------------|--------------------|---------------------|
| Amino acids | 8.5 % | 112 grams | 1320 mL |
| Dextrose | D41.5 | 632 grams | 1530 mL |
| Fat | 10 % | 25 grams | 250 mL |
| CHO load | 5 | | |
| Fat load | 0.28 | | |
| Final AA concentration | 3.6 % | | |
| Final dextrose concentration | 20.4 % | | |
| Total final volume | 3,100 mL | | |