

# What's in Your Food?

## HASPI Medical Anatomy & Physiology 15c

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Lab Activity

### Background

#### Nutrition Facts

Most of us have seen the nutrition facts on food labels, boxes, and now posted on fast food menus. As of 1994, the Food and Drug Administration requires that foods sold in the United States post the nutrition contents of packaged foods and more recently fast food menu items. The nutrition facts contain information on the amounts and percentage of nutrients found within the food product.

The most commonly included nutrient information is the amount of calories, fat, cholesterol, sodium, carbohydrates, and protein found in the food. Of particular importance are the serving size and approximate total size. Serving sizes can be tricky because some food producers want the item to appear to have fewer calories and nutrients than the package actually contains. For example, the Skittle bag nutrition facts to the right contains the information for a 1.5 oz serving size (about one handful), but the entire bag contains 9 servings! There are 1,530 calories in a bag, not 170 calories.

Nutrition Facts for Skittles		
Nutrition Facts		
Serving Size 1.5 oz (42g/about 1/4 cup)		
Serving per Container about 9		
Amount per Serving:		
Calories 170	Calories from Fat 15	
% Daily Value*		
<b>Total Fat</b>	2g	3%
Saturated Fat	2g	10%
Trans Fat	0g	
<b>Cholesterol</b>	0mg	0%
<b>Sodium</b>	5mg	0%
<b>Total Carbohydrate</b>	39g	13%
Dietary Fiber	0g	0%
Sugars	32g	
<b>Protein</b>	0g	

<http://www.sweetfactoryonline.com/images/Nutrition/31000-NutriFact.jpg>

Table 1 – FDA Daily Allowance

Food Nutrient	Daily Allowance
<b>Calories</b>	2,000
<b>Total Fat</b>	65 g
<b>Saturated fatty acids</b>	20 g
<b>Cholesterol</b>	300 mg
<b>Sodium</b>	2,400 mg
<b>Potassium</b>	3,500 mg
<b>Total Carbohydrates</b>	300 g
<b>Fiber</b>	25 g
<b>Sugars</b>	0 g
<b>Protein</b>	50 g
<b>Calcium</b>	1,000 g

The Food and Drug Administration (FDA) has established a daily allowance of the major food nutrients to provide consumers a better idea of how much of each nutrient they should be consuming. The daily allowance for these food nutrients is outlined in Table 1.

The daily caloric intake for a healthy adult with limited exercise is 2,000 to 2,500 calories. Very simply, if an individual is losing weight he or she is taking in less calories or being active enough to burn more calories. If an individual is gaining weight he or she is taking in more calories and/or burning less calories from daily activity. An increase in caloric intake and subsequently weight can lead to obesity and a host of obesity-related diseases.

In a recent study completed by the Center for

Disease Control, it was found that most youth in the United States do not consume enough whole grains, fruits, or vegetables and consume more than the daily recommended amount of sodium. In addition, it was found that calories from fat and sugar made up approximately 40% of the diet of youth under 18 years of age with the primary sources being whole milk, pizza, dairy desserts, grain desserts, fruit drinks, and soda.

#### Excess Sodium in the Diet (Boyers 2011)

Sodium is an important nutrient that plays vital roles in health and metabolism. Sodium is a necessary component of muscle contraction, nerve impulse, and homeostasis. Consuming an

adequate amount of sodium is necessary for the body to perform these functions. According to the Food and Nutrition Board, the daily recommended allowance for sodium is 2,400 mg (2.4 g) per day. Just as a lack of sodium can interfere with bodily function, so can an excess amount of sodium in the diet. When too much sodium is consumed, the body attempts to compensate with water retention. Retention leads to an increase in blood volume, which leads to an increase in the amount of effort the heart has to output as well as the amount of pressure exerted on the blood vessels. More pressure on the blood vessels means high blood pressure, which can lead to serious health problems over time such as stroke and heart disease.

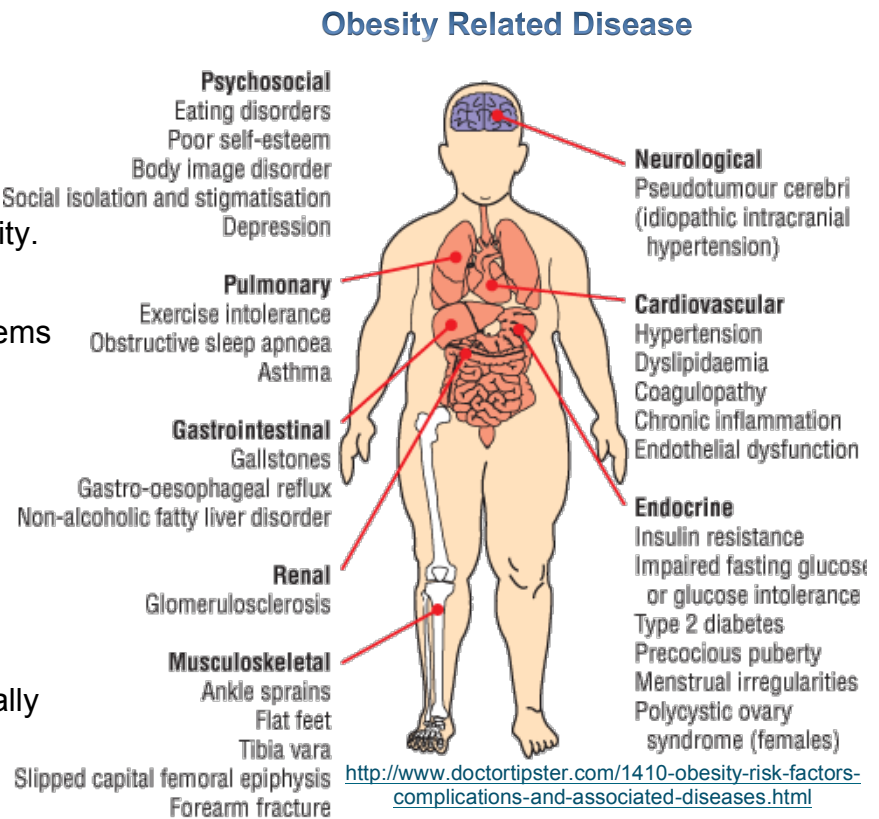
### Excess Sugar in the Diet (Doheny and Martin 2012)

Carbohydrates are the primary source of fuel for the body, and therefore are important to normal bodily function. The recommended daily allowance for carbohydrates is 300 g, but this includes all carbohydrate sources like bread, fruit, and sugar. According to the American Heart Association, sugar should be limited to 36 g per day for men and 24 g per day for women. On average, Americans consume approximately 85 g of sugar daily.

Many foods have natural sugars, and therefore added sugar is truly unnecessary to the diet. Excess sugar in the diet has been linked to a variety of health problems including diabetes, liver disease, increased triglycerides, high blood pressure, and obesity.

### Obesity & Disease

Obesity is the leading cause of health problems in the U.S. Obesity-related health problems include stroke, heart disease, diabetes, and even cancer. Poor diet has been linked to an increased risk of colorectal, stomach, esophageal, lung, and prostate cancers. According to the Centers for Disease Control, over 35% of the adult population in the United States is obese. In addition, the healthcare costs for individuals who are obese is approximately \$1,500 higher annually than those with normal weight.



### References

- Boyers, L. 2011. Excess Sodium in the Diet. [www.livestrong.com](http://www.livestrong.com).
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- Dietary Guidelines Advisory Committee. 2010. Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans to the Secretary of Agriculture and the Secretary of Health and Human Services. Washington, DC: U.S. Department of Agriculture.
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- FDA. 2012. Nutrition Facts Label Programs and Materials. U.S. Food and Drug Administration, [www.fda.gov](http://www.fda.gov).
- Hoyland A, Dye L, Lawton C. 2009. A systematic review of the effect of breakfast on the cognitive performance of children and adolescents. *Nutrition Research Reviews*, 22:220–243.

## Materials

Lard	Small plastic bags (4)	Spoons (4)
Salt	Large plastic bag	Scale
Sugar	Labels (5)	Weighing boats (4)
Beans		

Reading the nutrition labels and seeing that our favorite meal may have 120 grams of fat will not always stop us from eating it, but what if we were able to actually see that fat before we ate it? Would we make a different choice? Let's find out!

## Procedure

✓ when complete

<b>Step 1</b>	As a group, look up and/or bring in the nutrition facts for a fast food meal. This includes both the main food and any sides such as french fries, sauce or dressing, and drink that you normally consume with this meal.	
<b>Step 2</b>	Complete Data Table 2 by inputting the amount of total fat, sodium, sugars, and protein (in grams) for your meal.	
<b>Step 3</b>	Sodium may be listed on the nutrition facts in milligrams. Convert the amount to grams using the following conversion; 1 gram = 1000 mg.	
<b>Step 4</b>	<b>NOTE:</b> Make sure to look at the serving size and adjust the amounts accordingly! For example, if the nutrition fact lists 20 g of total fat, but there are two servings per package, that is a true total of 40 g of fat!	
<b>Step 5</b>	Add the amounts of total fat, sodium, sugars, and protein for the main food item, sides, and drink together and record the total amount in grams in the last column labeled "Total for Meal".	
<b>Step 6</b>	Collect four small Ziploc bags, one large Ziploc bag, and a set of labels.	
<b>Step 7</b>	Unpeel and stick the "Total Fat", "Sodium", "Sugars", and "Protein" labels, one for each of the small Ziploc bags.	
<b>Step 8</b>	Unpeel and stick the "Favorite Meal" label on the outside of the large Ziploc bag.	
<b>Step 9</b>	Record the total amount of fat for your meal on the "Total Fat" label.	
<b>Step 10</b>	Record the total amount of sodium for your meal on the "Sodium" label.	
<b>Step 11</b>	Record the total amount of sugars for your meal on the "Sugars" label.	
<b>Step 12</b>	Record the total amount of protein for your meal on the "Protein" label.	
<b>Step 13</b>	Write your name(s) and list all of the contents of your favorite meal (specific food items, sides, drink, etc.) on the "Favorite Meal" label.	

## Data Table 2 – Nutrition Facts

What is it? (Big Mac, burrito, fries, Sprite, etc.)	Main Food Item	Sides and Sauces	Drink	Total for Meal (g)
<b>Total Fat (g)</b>				
<b>Sodium (g)</b>				
<b>Sugars (g)</b>				
<b>Protein (g)</b>				

## Total Fat Weigh Station

✓ when complete

<b>Step 1</b>	Take your Ziploc bag labeled "Total Fat" to the weighing station with lard.	
<b>Step 2</b>	Place a weighing dish on the scale and tare.	
<b>Step 3</b>	Use a spoon to scoop lard into the weighing dish until the scale reaches the amount of "Total Fat" in grams recorded on your Ziploc bag.	
<b>Step 4</b>	Using the spoon, scoop the lard into your "Total Fat" Ziploc bag and seal the bag.	

## Sodium Weigh Station

✓ when complete

<b>Step 1</b>	Take your Ziploc bag labeled "Sodium" to the weighing station with salt.	
<b>Step 2</b>	Place the weighing dish on the scale and tare.	
<b>Step 3</b>	Use a spoon to scoop salt into the weighing dish until the scale reaches the amount of "Sodium" in grams recorded on your Ziploc bag.	
<b>Step 4</b>	Pour all of the salt into your "Sodium" Ziploc bag and seal the bag.	

## Sugar Weigh Station

✓ when complete

<b>Step 1</b>	Take your Ziploc bag labeled "Sugars" to the weighing station with sugar.	
<b>Step 2</b>	Place the weighing dish on the scale and tare.	
<b>Step 3</b>	Use a spoon to scoop sugar into the weighing dish until the scale reaches the amount of "Sugar" in grams recorded on your Ziploc bag.	
<b>Step 4</b>	Pour all of the sugar into your "Sugars" Ziploc bag and seal the bag.	

## Protein Weigh Station

✓ when complete

<b>Step 1</b>	Take your Ziploc bag labeled "Protein" to the weighing station with beans.	
<b>Step 2</b>	Place the weighing dish on the scale and tare.	
<b>Step 3</b>	Use a spoon to scoop beans into the weighing dish until the scale reaches the amount of "Protein" in grams recorded on your Ziploc bag.	
<b>Step 4</b>	Pour all of the beans into your "Protein" Ziploc bag and seal the bag.	

## Complete the "Favorite Meal" Bag

✓ when complete

<b>Step 1</b>	Once all four smaller bags are complete, place all of the completed bags into the larger bag labeled "Favorite Meal" and seal the bag.	
<b>Step 2</b>	Turn your completed bag in to your instructor.	
<b>Step 3</b>	All of the bags will be placed for the entire class to observe and complete the analysis.	

## Analysis Questions - on a separate sheet of paper complete the following

- Look at the other "favorite meal" bags created by your classmates.
  - Which meal had the most fat?
  - Which meal had the most sodium?
  - Which meal had the most sugars?
  - Which meal had the most protein?
- Did the fat, sodium, sugar, or protein content in any of the meals surprise you? Which ones and why or why not?
- Did the visual representation of your "favorite meal" change your perspective on whether you would consume the meal (imagine consuming each bag)? Why or why not?
- What percentage of the total fat, sodium, sugars, and protein "daily allowance" was your favorite meal? (Use Table 1 for daily allowance amounts)

*Analysis continues on next page...*

### Analysis Questions continued - on a separate sheet of paper complete the following

5. All nutrition facts for food can be found on the internet. Using a search engine, create a menu for a day that is within the daily allowance range for calories, total fat, sodium, carbohydrates, and protein provided in the following chart. You must have AT LEAST one item for breakfast, lunch, and dinner. This is harder than it looks and you should be considering it daily when planning your meals!

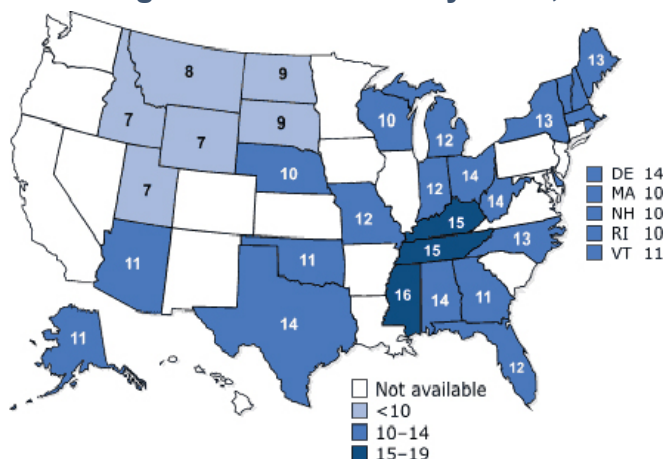
	Calories	Total Fat	Sodium	Carbohydrates	Protein
<b>Breakfast</b>					
<b>Lunch</b>					
<b>Dinner</b>					
<b>Snacks/Drinks</b>					
<b>Allowable Range</b>	1800-2200	60-70 g	2000 – 2400 mg	275-375 g	45-60 g
<b>Totals</b>					



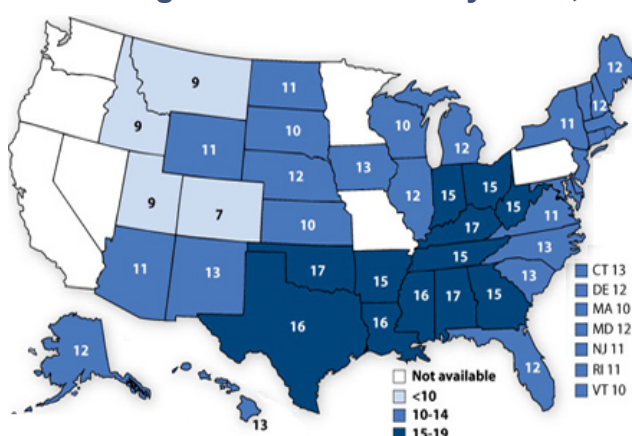
## Review Questions - on a separate sheet of paper complete the following

1. When did the FDA require that nutrition facts be posted on packaged foods?
2. Why can the serving size located on nutrition facts sometimes be deceiving?
3. What is the daily allowance for calories? Total fat? Sodium? Sugars?
4. In the CDC study, what two nutrients make up approximately 40% of the diet in youth under 18 years of age?
5. What is sodium used for in the human body?
6. Explain how an excess of sodium intake could eventually lead to stroke or heart disease.
7. List at least three health problems that can result from excess sugar in the diet.
8. List and give a short explanation of at least three obesity-related diseases.
9. What percentage of the adult population is obese? How does this impact healthcare cost?
10. Look at the maps below and answer the following:
  - a. Compare the rate of youth obesity from 2003 to 2011. How many states is 15% or more of the population obese in 2003? 2011?
  - b. Compare the Obese Youth, 2011 map to the Obese Adult, 2011 map. What similarities do you find? Hypothesize why this has occurred.
  - c. Where does obesity tend to center in the United States? Hypothesize why this has occurred.

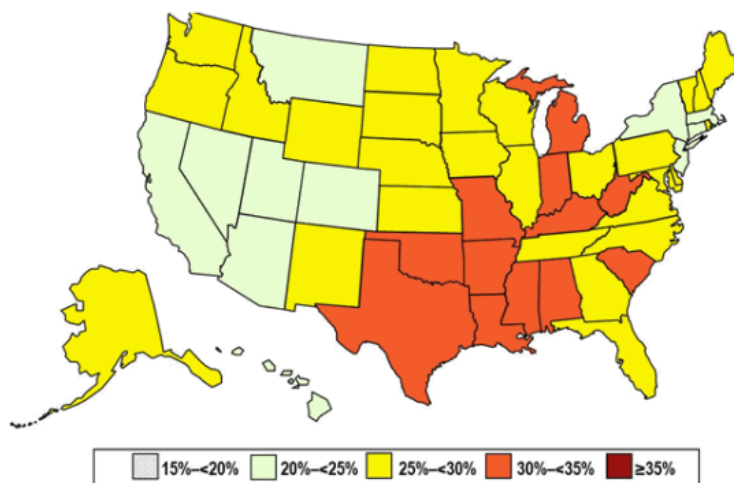
Percentage of Obese Youth by State, 2003



Percentage of Obese Youth by State, 2011



Percentage of Obese Adults by State, 2011



CDC. 2012. Obese Youth Over Time. Division of Adolescent and School Health, Centers for Disease Control and Prevention, [www.cdc.gov](http://www.cdc.gov).