

1. Current research indicates that the cause of childhood obesity is multifactorial. Briefly outline the role of genetic, environment, and nutritional intake in development of obesity in children.
 - A. Genetic and environmental factors play key roles in the development of childhood obesity. Placing an individual with a susceptible genome for obesity in an environment that does not promote physical activity and that has an abundance of energy-dense, high-fat foods readily available results in obesity. To date, eleven genes have been identified as indicators of obesity in severely obese individuals with onset at an early age. In individuals seven years or older, the fat mass and obesity-associated (FTO) gene was found to be a promising marker of obesity risk. In another study on children ages 4-10 years old, it was suggested that a variant in the FTO gene plays a role in control of food intake and possibly a preference for energy-dense foods. Large study research needs to be conducted to accurately identify the contribution of various gene polymorphisms and their contribution to obesity (Nelms, Sucher, Lacey, & Roth, 2011, p. 198-199). Major influential factors on the nutritional intake in children include, family environment, societal trends, the media, peer pressure, and illness or disease. School-aged children and adolescents who rarely eat dinner with their families eat less fruits and vegetables, drink more soda, and consume more fried foods than those who regularly eat dinner with their families. A negative environment can also lead to emotional stress, which can contribute to negative eating patterns. It is estimated that one in five American children live in families with incomes below the poverty line, resulting in less money for food expenses, making these families more vulnerable to marginal health and nutritional status. Television viewing has also been linked to excessive weight gain in school-age children and adolescents due to its multiple media cues to eat. The food choices friends make can also influence the food selections of a child. (Mahan & Escott-Stump, 2004, p. 269-272)

2. Describe health consequences of overweight and obesity for children.
 - A. Children who are overweight or obese can suffer both from both psychosocial and health consequences. The psychosocial difficulties an overweight or obese child may face include, discrimination from others, a negative self-image, depression, and decreased socialization. Children who are overweight or obese are at an increased risk for developing type-2 diabetes, which can lead to other chronic diseases and health care costs. Other consequences include, increased cardiovascular risk factors, such as hyperlipidemia, hypertension, or hyperinsulinemia. The longer the child has been overweight, the more likely the child is to be overweight during adolescence and adulthood. (Mahan & Escott-Stump, 2004, p. 276)

3. Jamey has been diagnosed with obstructive sleep apnea. Define *sleep apnea*.
 - A. Sleep apnea is a chronic condition in which a person has one or more pauses in breathing or shallow breaths while they sleep. Breathing pauses and shallow breaths can last from a few seconds to minutes, and can occur 30+ times an hour. When an individual's breathing becomes shallow or pauses, they will often move out of a deep sleep and into a light sleep (National Heart, Lung and Blood Institute, 2012). Obstructive sleep apnea leads to pauses in breathing or shallow breathing due to a lack of airflow (New York Cardiovascular Associates, 2013).
4. Explain the relationship between sleep apnea and obesity.
 - A. The greatest risk factor for sleep apnea is being overweight or obese. When in a sleeping position, the excess fat around the neck can block the upper airway, making it difficult for oxygen to pass through. (New York Cardiovascular Associates, 2013)
5. What are the goals for weight loss in the pediatric population?
 - A. The primary goal for weight loss in the pediatric population is to promote healthy eating and activity with minimal use of highly restrictive diets or medication to control weight. Pediatric weight loss programs should be family based and incorporate physical activity. A team approach helps to incorporate behavioral intervention, with the goal to decrease weight gain, maintain weight, or gradual weight loss (in severe cases). Aggressively treating the pediatric population should be avoided to prevent the child from developing an eating disorder or poor self-image, feeling deprived and isolated, and feeling like a failure. (Mahan & Escott-Stump, 2004, p. 276-277)
6. Under what circumstances might weight loss in overweight children not be appropriate?
 - A. For children who are overweight but are still growing and developing, weight loss is not recommended. Weight loss is also not appropriate for children with a pre-existing condition or injury. Particularly for children under the age of seven who are overweight or obese, the treatment goal should be to slow down the rate of weight gain and to maintain a baseline weight. When the child is done growing, slow changes can be made in their diet and exercise patterns to achieve slow weight loss if necessary. (Lucile Packard Children's Hospital at Stanford, 2013)
7. What would you recommend as the current focus for nutritional treatment of Jamey's obesity?
 - A. After reviewing Jamey's chart and analyzing her 24-hour recall, I would focus her nutritional treatment on creating a healthier lifestyle by educating Jamey on healthy food choices and the importance of physical activity. I would do this by reducing her fat intake and excess sugar intake, and increasing her level of physical activity. Jamey's 24-hour recall shows

that she consumes high-fat dairy products, a variety of fried and processed foods, and sugary beverages. Jamey's lab results show that her glucose levels were high (112 mg/dL), her HDL-C levels were low (34 mg/dL), and her LDL/HDL ratio was high (3.23). These lab results indicate that Jamey's health would benefit from a diet that would control her fat and sugar intake. It was also recorded in her charts that her physical activity level was low and that the activities she enjoys do not involve any physical activity (reading and playing video games). An effective nutrition treatment plan for Jamey would involve increasing her activity level. (Nelms & Roth, 2013, p. 4-6)

8. Evaluate Jamey's weight using the CDC growth charts provided (p. 8): What is Jamey's BMI percentile? How is her weight status classified? Use the growth chart to determine Jamey's optimal weight for height and age.
 - A. Using the CDC growth chart for Jamey's weight of 115 lbs and her age of 10 years, Jamey falls into the 97th percentile line for BMI-for-Age. Based on this, Jamey's nutritional status is obese. In order to fall onto the 50th percentile line for BMI-for-Age, Jamey's optimal weight would be around 70-75 lbs. (CDC, 2013)

9. Identify two methods for determining Jamey's energy requirements other than indirect calorimetry, and then use them to calculate Jamey's energy requirements.
 - A. EER for Females 9-18 years (Nelms, Sucher, Lacey, & Roth, 2011, p. 242)
 - i. $EER = 135.3 - 30.8 \times \text{age} + PA \times (10.0 \times \text{weight}(\text{kg}) + 934 \times \text{height}(\text{m})) + 25$
 - o Weight= 115 lbs./2.2 lbs.= 52.3 kg
 - o Height= 57" x 2.54 in.= 144.8 cm/100cm= 1.45 m
 - o PA= 1.16 for low active
 - o $EER = 135.3 - 30.8 \times 10 \text{ years} + 1.16 \times (10 \times 52.3 \text{ kg} + 934 \times 1.45 \text{ m}) + 25 = 2,030 \text{ kcal}$
 - a. **EER= 2,000-2,100 kcal**
 - B. TEE for Overweight Females Aged 3-18 years (Nelms, Sucher, Lacey, & Roth, 2011, p. 243)
 - i. $TEE = 389 - 41.2 \times \text{age} + PA \times 15.0 \times \text{weight} + 701.6 \times \text{height}$
 - o Weight= 115 lbs./2.2 lbs.= 52.3 kg
 - o Height= 57" x 2.54 in.= 144.8 cm/100cm= 1.45 m
 - o PA= 1.18 for low active
 - o $TEE = 389 - 41.2 \times 10 \text{ years} + 1.18 \times (15 \times 52.3 \text{ kg} + 701.6 \times 1.45\text{m}) = 2,103 \text{ kcal}$
 - a. **TEE= 2,100- 2,200**

10. Dietary factors associated with increased risk of overweight are increased dietary fat intake and increased calorie-dense beverages. Identify foods from Jamey's diet recall that fit these criteria.

A. Below is Jamey's 24-hour recall. The items in **bold** represent the food that meets the criteria for **increased fat intake**, while the items that are *italicized* represent the food that meet the criteria for *increased calorie-dense beverages*. (Nelms & Roth, 2013, p. 5)

AM	2 breakfast burritos , <i>8 oz whole milk</i> , 4 oz apple juice, 6 oz coffee with <i>¼ cup cream</i> and 2 tsp sugar
Lunch	2 bologna and cheese sandwiches with 1 tbsp mayonnaise each, 1 oz pkg. Fritos corn chips , 2 Twinkies , <i>8 oz. whole milk</i>
After school snack	Peanut butter and jelly sandwich (2 slices of enriched white bread with 2 tbsp crunch peanut butter and 2 tbsp grape jelly), <i>12 oz whole milk</i>
Dinner	Fried chicken (2 legs and 1 thigh), 1 c mashed potatoes (made with <i>whole milk and butter</i>), 1 c fried okra , <i>20 oz sweet tea</i>
Snack	3 c microwave popcorn, <i>12 oz Coca-Cola</i>

11. Calculate the percent of kcal from each macronutrient and the percent of kcal provided by fluids for Jamey's 24-hour recall.

A. Below is a breakdown of Jamey's 24-hour recall calculated from fitday.com. Jamey consumed 46% of her total kcal from fat, 38% from carbohydrates, and 16% from protein. Jamey consumed 19.9% of her total kcal from fluids (512 kcal from milk+ 58 kcal from apple juice + 113 kcal from coffee + 120 kcal from sweet tea + 137 kcal from Coca-Cola= 940 kcal/4,730 kcal= .199 x 100= 19.9%). (FitDay, 2013)

Dietary Analysis of Jamey's 24-Hour Recall

Food Name	Amount	Unit	Cals	Fat (g)	Carbs (g)	Pro (g)
Burrito with eggs and cheese	2	Medium burritos	613	37.1	36.0	32.4
Whole Milk	28	Fl. Oz.	512	27.8	38.6	27.5
Apple Juice	4	Fl. Oz.	58	.1	14.5	.1
Coffee	1	Coffee cup (6 fl. Oz.)	2	0	.1	.2
Cream	¼	Cup	78	6.9	2.6	1.8
Sugar	2	Tsp.	33	0	8.4	0
Bologna	2	Slices	172	13.8	3.1	8.5
American Cheese	2	Slices	172	13.6	2.4	10.0
Mayonnaise	2	Tbsp.	198	21.6	1.1	.3
Corn Chips	1	Oz.	139	6.1	18.3	2.5
Twinkie	2	Cakes	300	9.0	54.0	2.0
Peanut Butter	2	Tbsp.	188	16.1	6.3	8.0
Jelly	2	Tbsp.	101	0	26.6	.1
White Bread	6	Regular slices	415	5.1	79	11.9
Fried Chicken Leg	2	Small legs	712	42	22.7	57.1
Fried Chicken Thigh	1	Small thigh	140	8.5	0	14.9
Mashed Potatoes prepared with whole milk	1	Cup	174	1.2	36.8	4
Butter	1	Tbsp.	102	11.5	0	.1
Fried Okra	1	Cup	173	12.9	13.1	2.4
Sweet Tea	20	Fl. Oz.	120	0	31.3	0
Buttered Popcorn	3	Cups, popped	190	10.9	21	3.6
Coca-Cola	1	Can (12 fl. Oz.)	137	.1	35.3	.3
Totals			4,730 kcal	244.4 g Fat (46%)	451.0 g Carbs (38%)	187.7 g Pro (16%)

12. Increased fruit and vegetable intake is associated with decreased risk of overweight. What foods in Jamey’s diet fall into these categories?
- A. Based on Jamey’s 24-hour recall, Jamey consumed apple juice, okra, and mashed potatoes, which would fall under the categories of fruits or vegetables. However, Jamey’s 24-hour recall does not specify that the apple juice was 100% juice, the okra she consumed was fried, and the potato had added whole milk and butter. All of these factors would decrease the nutritional benefits of consuming these foods. (Nelms & Roth, 2013, p. 5)
13. Use the ChooseMyPlate online tool to generate a customized daily food plan. Using this eating pattern, plan a 1-day menu for Jamey.
- A. Based on the foods Jamey consumed in her 24-hour recall, I created a 1-day menu for her that allows her to eat the same foods she was before, but reduced her excessive fat and calorie-dense beverage intake. (Nelms & Roth, 2013, p. 5)

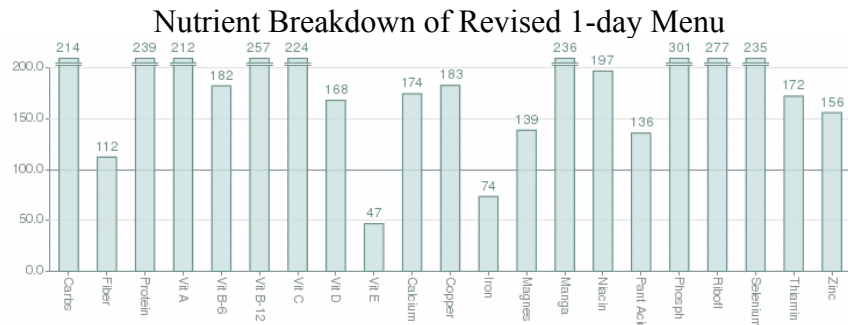
AM	1 scrambled egg, 2 slices of whole wheat toast with 1 tbsp margarine, 8 oz skim milk, 1 medium sliced apple
Lunch	Ham and cheese sandwich (4 thin slices of reduced-sodium deli meat, 1 oz slice of low-fat cheddar cheese, 2 slices of whole wheat bread, 1 tbsp light mayonnaise), 1 serving of raw baby carrots, 2 tbsp hummus, 8 oz skim milk
After school snack	Peanut butter banana wrap (1 medium banana, 1 whole wheat tortilla, 2 tbsp reduced-fat peanut butter), 8 oz. low-fat chocolate milk
Dinner	2 oz grilled chicken, ½ c mashed potatoes (with 1 tbsp butter), 1 cup string green beans, 8 oz 100% apple juice
Snack	1 cup of slice strawberries, 1 cup of low-fat vanilla yogurt

14. Now enter and assess the 1-day menu you planned for Jamey using the MyPlate SuperTracker online tool. Does your menu meet macro- and micronutrient recommendations for Jamey?
- A. Using fitday.com, I analyzed the 1-day menu I created for Jamey (displayed below). The new menu provides Jamey with a total of 2,150 kcal, 30% kcals coming from fat, 50% from carbohydrates, and 20% from protein. With this distribution, Jamey is right on target for meeting her macro- and micro-nutrient recommendations. Jamey is still consuming 19.7% of her total kcal from fluids. However, the fluids she is consuming are reduced fat milk and 100% fruit juice (166 kcal skim milk + 117 kcal

apple juice + 140 kcal chocolate milk= 423kcal/2150kcal= .197 x 100= 19.7%). (FitDay, 2013)

Dietary Analysis of Jamey's Revised 1-Day Menu

Food Name	Amount	Unit	Cals	Fat (g)	Carbs (g)	Pro (g)
Egg, whole, fried	1	Egg	87	6.8	.4	6.2
Whole Wheat Bread	4	Regular slices	276	3.8	49.1	11.5
Skim Milk	16	Fl oz	166	.4	24.3	16.5
Raw Apple	1	Cup, sliced	57	.2	15.2	.3
Low Salt Deli Ham	4	Thin slices	92	4.3	.3	12.3
Low-fat cheddar cheese	1	Slice (1 oz)	49	2.0	.5	6.9
Light Mayonnaise	1	Tbsp	36	3	2.5	0
Baby Carrots, raw	1	Serving	30	.1	7.0	.5
Hummus	2	Tbsp	53	2.6	6.0	1.5
Banana	1	Medium	105	.4	27	1.3
Whole Wheat Tortilla	1	Tortilla	92	.5	19.5	3.4
Reduced Fat Peanut Butter	2	Tbsp	187	12.2	12.8	9.3
Chicken Breast	2	Oz, boneless, cooked	111	4.4	0	16.8
Mashed Potato	½	Cup	105	3.7	16.5	1.9
Butter	2	Tbsp	204	23	0	.2
String Beans	1	Cup	82	4.3	10.7	2.5
Apple Juice	8	Fl oz	117	.3	29	.1
Low-fat Vanilla Yogurt	1	8 oz. container	107	.4	17	8.8
Strawberries	1	Cup, sliced	53	.5	12.7	1.1
Low-fat Milk	8	Fl oz	140	.7	27.2	8.5
Totals			2,150 kcal	73.5 g Fat (30%)	277.8 g Carbs (50%)	109.9 g Pro (20%)



15. Why did Dr. Lambert order a lipid profile and blood glucose tests? What lipid and glucose levels are considered altered (i.e., outside of normal limits) for the pediatric population? Evaluate Jamey’s lab results.

A. Dr. Lambert ordered a lipid profile test to assess the patient’s fat metabolism status and a glucose test to evaluate the level of sugar in the blood. A lipid profile analyzes a person’s cholesterol, which is composed of low-density lipoproteins (LDL), high-density lipoproteins (HDL), and triglycerides. In children with high cholesterol levels, their chance of having high cholesterol as an adult increases, which also increases their risk of developing heart disease in the future. Normal cholesterol levels for children are as follows: total cholesterol less than 170 mg/dL, LDL cholesterol less than 100 mg/dL, and HDL cholesterol above 60 mg/dL. Borderline cholesterol levels are: total cholesterol 170-200 mg/dL, LDL cholesterol 100-130 mg/dL, and HDL cholesterol 40-60 mg/dL. Total cholesterol above 200 mg/dL, LDL cholesterol over 130 mg/dL, and HDL cholesterol below 40 mg/dL, are considered to be abnormal (Schmitt & Brayde, 2010). A blood glucose test is used to test for diabetes mellitus. The normal fasting blood glucose range for the pediatric population is 70-99 mg/dL and a range of 100-125 mg/dL is labeled as impaired fasting glucose or pre-diabetes. A level of 126 mg/dL or higher is considered abnormal and can indicate diabetes (RelayHealth, 2011). Jamey’s glucose level of 112 mg/dL indicates she has an impaired fasting glucose and is pre-diabetic and her HDL-C level and LDL/HDL ratio levels are considered abnormal. (Nelms & Roth, 2013, p. 6)

Chemistry	Ref. Range	9/22
Glucose (mg/dL)	70-110	112
HDL-C (mg/dL)	>55 F	34
LDL/HDL ratio	<3.22 F	3.23

16. What behaviors associated with increased risk of overweight would you look for when assessing Jamey and her family’s diets? What aspects of Jamey’s lifestyle place her at increased risk for overweight?

A. One of the first aspects I would consider in assessing Jamey and her family’s diet is the intake of high fat and highly processed foods, as well as, calorie-dense beverages. High processed foods tend to be high in fat,

sugar, and/or sodium, increasing an individual's risk of becoming overweight, when consumed in large quantities. A contributing factor to a large consumption of such foods is a fast-pace lifestyle with little time for meal preparation. Jamey's 24-hour recall also indicates that she consumes large portions of food at each sitting, which plays a crucial role in her body composition. In addition to Jamey's abundant nutrient consumption, her low activity level has contributed to her obesity. Her elementary school no longer offers physical education and her favorite activities include playing video games and reading, severely limiting Jamey's physical activity level. (Nelms & Roth, 2013, p. 5)

17. You talk with Jamey and her parents, who are friendly and cooperative. Jamey's mother asks if it would help for them to not let Jamey snack between meals and to reward her with dessert when she exercises. What would you tell them?

A. Growing children cannot get all the necessary nutrients they need within three meals due to their small stomachs and high energy needs. Small snacks between meals are very important to keeping kids full and focused. I would recommend to Jamey's parents that they serve her small, healthy snacks between meals, such as fresh fruit and vegetables, in order to help Jamey meet her daily requirements of at least 2-4 cups of fruits/day and 2 ½ cups of vegetables per day. I would further state that it is okay for Jamey to consume an indulgent treat every once in awhile, however, it should not be used as a reward (Children's Hospital of Orange County, n.d.). Children who are rewarded with dessert may develop a belief that these foods are more valuable than healthier foods and may expect more dessert when they perform a good behavior (Koshare, n.d.).

18. Identify one specific physical activity recommendation for Jamey.

A. Since Jamey is not getting any physical activity in school or at home, I would recommend that Jamey and her family go for a 30-minute bike ride each day after school, or if possible, Jamey could even ride her bike to and from school.

19. Select two nutrition problems and complete PES statements for each.

A. (Academy of Nutrition and Dietetics, 2013, p. 149-151, 156-157, 276-277)

i. Excessive Energy Intake (NI-1.3)

o Excessive energy intake related to food-and-nutrition related knowledge deficit concerning energy intake as evidenced by patient's intake of energy in excess of her estimated needs of 2,000-2,100 kcal/day, estimated from patient's 24-hour recall and patient's BMI which is greater than the 95th percentile for children of her height and weight.

ii. Physical Inactivity (NB- 2.1)

o Physical inactivity related to limited access and lack of social support as evidenced by patient's BMI, which is

grater than the 95th percentile, and patient's report of large amounts sedentary activities (playing video games and reading) and discontinued physical education at patient's elementary school.

20. For each PES statement written, establish an ideal goal (based on signs and symptoms) and an appropriate intervention (based on etiology).
- A. Excessive Energy Intake (NI-1.3)
 - i. Goal: Twenty-four hour dietary recall indicates patient consumes approximately 4,730 kcal/day. Patient's target calorie intake level is 2,000-2,100 kcal/day. This will be accomplished by substituting the food containing excessive fat (whole milk, fried foods, processed foods) in the patient's diet with reduced fat options (reduced fat dairy products, baking instead of frying foods). Eliminating the consumption of calorie-dense beverages in the patient's diet will also help to manage calorie intake.
 - B. Physical Inactivity (NB- 2.1)
 - i. Goal: Patient record indicates current lifestyle to be of generally low activity level. The goal for the patient is to participate in 30 minutes of physical activity per day, at least 5 days per week. This will be accomplished by a family bike ride after school and playing more active video games, such as *Just Dance* or *Wii Sports*, on her game console.
21. Mr. and Mrs. Whitmer ask about using over-the-counter diet aids, specifically Alli (orlistat). What would you tell them?
- A. Orlistat is a gastrointestinal lipase inhibitor that can be effective in adolescents to improve adiposity in conjunction with a comprehensive weight management program. However, long-term studies with orlistat have not been conducted and its effectiveness has not been studied at all in children younger than 12 years. Therefore, I would not recommend orlistate to this patient. (Conclusion statement, 2006)
22. Mr. and Mrs. Whitmer ask about gastric bypass surgery for Jamey. Using EAL, what are the recommendations regarding gastric bypass surgery for the pediatric population?
- A. Weight-loss surgery is not typically considered appropriate for obese adolescents under the age of 13 years. Significant short-term and long-term weight-loss through surgery has been found to be effective in adolescents who meet recommended criteria. Potential candidates should be referred to centers with multidisciplinary weight management teams. To be considered for weight-loss surgery, an adolescent must have:
 - i. Failed at least six months of monitored weigh-loss attempts.
 - ii. A BMI of 40 or greater with serious obesity-related medical complications or a BMI of 50 or greater with less-severe co-morbidities.

- iii. Co-morbidities related to obesity that might be resolved with a significant weight loss.
- iv. Attained a majority of skeletal majority (13 years old for girls and 15 years of age for boys).
- v. A commitment to psychological and medical evaluations.
- vi. A decisional capacity.
- vii. A supportive family environment.
- viii. A multi-disciplinary team involved in the process.

(Pediatric weight management (PWM) adjunct therapies, n.d.)

23. What is the optimal length of weight management therapy for Jamey?

- A. The optimal length of weight management therapy for Jamey should be at least 3 months or until her initial weight-management goals are achieved. The longer Jamey participates in the weight management therapy, the more successful the maintenance of her weight will be. (Pediatric weight management (PWM) optimal length ..., n.d.)

24. Should her parents be included? Why or why not?

- A. Jamey's parents should be included in her weight management therapy. Research indicates that including parents in pediatric behavior change in the treatment of their child's obesity results in short-term and longer-term improvements in weight status. Counseling children in the absence of parental involvement has been found ineffective. (Pediatric weight management (PWM) family participation..., n.d.)

25. What would you assess during this follow-up counseling session?

- A. During a follow-up counseling session, I would want to reassess Jamey's lipid profile levels, as well as her blood glucose levels. This would help me to identify if Jamey's weight management plan is positively affecting her LDL, HDL, and glucose levels. I would also request another 24-hour recall from Jamey to reevaluate her dietary consumption. This would help me to see if she is meeting her goals and reducing her fat and simple carbohydrate intake. Talking to Jamey's parents would also be an important aspect I would include in the follow-up session. I would evaluate their involvement in Jamey's weight management process thus far and see if they were positively contributing to Jamey's weight management therapy.

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