

Case Study 3
FDNS 4510 Fall 2021

Case Study Group Number	6
Group Members (list all)	Laney Jones, Brianna Cannova, Maggie Green, Ava Harris
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Group Manager	Laney Jones

*Please note, Case Study 3 should be submitted by **11:59 PM on November 27, 2021**

Please answer the following questions about David. Include in-text citations within your answers, as well as a reference list at the end of your document. References should be formatted in the style of the Journal of the American Medical Association (same format at your Self-Directed Posts), and you are permitted to reference your textbook, but other external resources are also required. Additional formatting requirements are presented in the 'Case_Study_Instruction' document on eLC.

David is 9 years old and lives with his Data, Tony, outside of Hawkinsville, Georgia. He has no siblings. David's parents divorced 3 years ago, and he rarely sees his mother. Tony works as a nursing assistant at Taylor Memorial Hospital. Because of his varied work hours, Tony's mom often takes care of David and helps him get ready for school. David is in the fourth grade at Pulaski County Elementary School.

David recently became interested in basketball, so he decided joined a basketball team. This is the first time he has participated in any organized sport. He was required by the county to have a physical exam prior to enrolling in the youth basketball league. The pediatrician who examined David at Pulaski County Health department indicated to the grandmother that David had gained a considerable amount of weight over the past two years. Measurements of David's height and weight were obtained beginning at four years of age and recorded until the current time (see below). The pediatrician also tested David's blood and found the following laboratory values.

Age	Wt (lbs)	Ht (in)	BMI
4	39	42	15.5
5	45	45	15.6
6	49	47	15.6
7	57	49	16.7
8	87	55	20.2
9	107	58	22.4

Laboratory values	
Total cholesterol	185 mg/dL
HDL	40 mg/dL
LDL	125 mg/dL
Triglycerides	85 mg/dL
Blood pressure	120/85 mmHg
Fasting blood glucose	110 mg/dL

Basketball is the only sport David participates in. Practices are held about 1-2 times per week, and he plays one game on the weekend. Most afternoons he goes home on the school bus and stays with his grandmother. Afterwards he usually does his homework, watches television and plays video games until his dad picks him up. David's grandmother lives on a non-productive cotton and peanut farm down a rural two-lane highway in Pulaski County. On the weekend if his mom is not working, they may take a walk together.

Lately, David's appetite has dramatically increased and his energy levels have not been very high. In addition, David frequently complains of having to go to the restroom to urinate more than usual.

Nutrition History:c

The following is a typical 24-hour intake for David:

Breakfast: 1 Frisco breakfast sandwich from the local Hardees and large orange juice (12 ounces) or 2 large bowls of corn flakes with 2% milk (16 ounces)

Lunch: Eats at school; 2 corn dogs, fruit cup (6 ounces), tater tots (1 cup, however, he usually eats his friends tater tots), 1 cookie, juice (6 ounces)

Snack: Cheetos (3 big handfuls), 2 cookies and sweet tea (12 ounces)

Supper: Fried fish (frozen; 2 large pieces), macaroni and cheese (1 cup), turnip greens (1 cup), 1 biscuit and sweet tea (12 ounces)

Snack: Chocolate ice cream (1 cup)

1. Plot the growth data on the age/weight, age/height and the age/BMI charts. What is David's height, weight, and BMI percentile at each age (**3 points**)? What is your interpretation of his growth pattern with respect to these body size measurements (**2 points**)? Please submit plotted growth charts along with your final submission (**3 points**).

a.

Age	Weight for age percentile	Height for age percentile	BMI for age percentile
4	74th	76th	49th
5	75th	89th	51st

6	74th	75th	52nd
7	75th	74th	75th
8	100th	96th	96th
9	105th	97th	105th

- b. David's growth pattern tracked around the 75th percentile for both weight and age for the first 7 years of his life. His BMI tracked around the 50th percentile during this time. He experienced a large growth spurt between ages 7 and 8 that increased his weight, height, and BMI to above the 95th percentile indicating he is overweight.
2. What factors (behavioral and social) in David's life may contribute to his overall health status? Please list at least four **(2 points)** and provide a brief description of how these factors contribute to his health status **(4 points)**.
- Low physical activity level
 - David participates in organized basketball 1-2 times per week, and he will occasionally walk with his grandmother. He is not getting the recommended amount of 60 minutes of exercise per day for a healthy 9-year-old.¹ This contributes to his high BMI and suboptimal health status.
 - Divorced parents
 - Because David's parents are divorced and he rarely sees his mother, he does not have a team of parents to help him make healthy food and exercise choices all the time. Splitting time between his Dad's house and his grandmother's house exacerbates this problem. David's dad works early and long hours at the hospital, so he is unable to prepare David's meals. Fast-food is a cost and time-efficient option for food for the family, even though it may have negative effects on David's Health.
 - No siblings
 - Having siblings in a family often leads to more organized activities and increased physical exercise. Because David is an only child, he spends the majority of his free time playing video games and watching TV instead which lowers his amount of physical activity.
 - Poor diet
 - According to David's 24-hour recall, he is consuming well above his recommended energy intake, added sugar, saturated fat, and likely sodium levels. This will heavily affect his overall health status.
3. **For each of the laboratory values listed above, please indicate what is considered 'normal' for an individual of David's age (3 points), and note whether David's measurements are considered 'normal' (3 points). Please comment on each of the measurements, indicating the meaning of each measure (what each of these measurements are indicative of; 3 points).**
- For an individual of David's age, his total cholesterol should be less than 170 mg/dL.² Since he has a total cholesterol of 185 mg/dL, it is considered elevated. Elevated cholesterol can be a sign of diabetes.² His HDL level is 40 mg/dL when it should be more

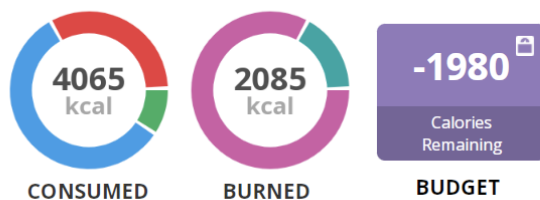
than 45 mg/dL.² According to the American Diabetes Association, a lower HDL level can be an indicator of diabetes.³ His LDL level is 125 mg/dL, which means it is higher than it should be at the normal range of 110 mg/dL.³ This elevated level can lead to blocked arteries.³ His triglyceride levels are at 85 mg/dL when the normal level is categorized as less than 150 mg/dL.⁴ This is considered normal.⁴ A normal blood pressure for David should be around 120/80 mmHg when the norm is 120/85 mmHg.⁵ His blood pressure does not indicate an extreme deviation from what is expected from a child his age.⁵ A normal fasting blood glucose would be 90 mg/dL or lower.⁶ Since David has an elevated fasting glucose level of 110 mg/dL, he is classified as having prediabetes.⁶

4. **Comment on the symptoms that David reported. Are these normal for young boys his age? Please provide an explanation for each symptom (5 points total).**
 - a. David's appetite has increased and he has reported frequent urination. The frequent urination aligns with symptoms of oncoming diabetes.⁷ His increase in appetite might also stem from his body's inability to convert glucose into energy, which is also a sign of diabetes.⁷ The increase in hunger could be a normal thing at his age due to a higher energy demand from puberty, but since they have increased dramatically and he has a low energy need, it is a bigger issue. The frequent urination is not normal for his age.
5. **Analyze his diet using a diet analysis program. How does his diet compare to recommendations for a boy his age with respect to energy intake, macronutrients, micronutrients, and specific food groups (8 points total)?**

Description	Amount	Unit	Energy (kcal)
🍏 Hardee's, Frisco Breakfast Sandwich	1	each	450.19
🍏 Orange Juice, Fortified with Vitamins C and E	12	fl oz	183.02
🍏 Corn Dog	2	each	390.38
🍏 Dole, mixed fruit, in juice, individual cup	1	Individual Cu	80
🍏 Potato Tots, Tater Tots, Baked	2	cup	887.04
🍏 Chips Ahoy, Chewy Chocolate Chip Cookies	1	each	68.72
🍏 Orange Juice, Fortified with Vitamins C and E	6	fl oz	91.51
🍏 Cheetos, Crunchy	1.5	cup, whole pieces	277.82
🍏 Chips Ahoy, Chewy Chocolate Chip Cookies	2	each	137.44
🍏 Iced Tea, Ready-to-drink, Decaf, Sweetened with Sugar	12	fl oz	152.5
🍏 Ian's, fish patty, breaded & fried, frozen	2	Each	380
🍏 Kraft, Macaroni & Cheese, Original	1	× 1/3 Box	260
🍏 Turnip Greens, Cooked from Frozen	1	cup, chopped	47.56
🍏 Biscuit, Homemade	1	large - 3" diameter	254.26
🍏 Tea, Brewed, Decaf, Sweetened with Sugar	12	fl oz	119.65
🍏 Breyers, Ice Cream, Chocolate	1	cup	284.97

Log a biometric to your diary

Energy Summary ⓘ



Macronutrient Targets ⓘ



a.

General			
Energy	4445.1	kcal	213%
Alcohol	0.0	g	No Target
Caffeine	18.2	mg	No Target
Water	1862.9	g	233%

Carbohydrates			
Carbs	639.2	g	246%
Fiber	31.4	g	125%
Starch	228.2	g	No Target
Sugars	226.1	g	No Target
Net Carbs	606.9	g	258%

Lipids			
Fat	163.7	g	234%
Monounsaturated	55.4	g	No Target
Polyunsaturated	33.8	g	No Target
Omega-3	3.0	g	599%
Omega-6	26.7	g	580%
Saturated	45.2	g	n/a
Trans-Fats	20.4	g	n/a
Cholesterol	371.7	mg	No Target

Protein			
Protein	125.1	g	96%
Cystine	1.1	g	70%
Histidine	1.8	g	77%
Isoleucine	3.0	g	99%
Leucine	5.6	g	85%
Lysine	4.2	g	67%
Methionine	1.5	g	97%
Phenylalanine	3.3	g	110%
Threonine	2.6	g	76%
Tryptophan	0.8	g	88%
Tyrosine	2.4	g	80%
Valine	3.7	g	89%

Vitamins			
B1 (Thiamine)	2.4	mg	814%
B2 (Riboflavin)	2.3	mg	574%
B3 (Niacin)	23.6	mg	590%
B5 (Pantothenic Acid)	5.7	mg	317%
B6 (Pyridoxine)	1.7	mg	558%
B12 (Cobalamin)	2.0	µg	408%
Folate	780.3	µg	975%
Vitamin A	19097.9	IU	1146%
Vitamin C	415.5	mg	831%
Vitamin D	120.8	IU	30%
Vitamin E	43.9	mg	879%
Vitamin K	899.6	µg	35983%

Minerals			
Calcium	1177.2	mg	453%
Copper	1.5	mg	702%
Iron	26.2	mg	238%
Magnesium	343.8	mg	458%
Manganese	4.3	mg	722%
Phosphorus	1427.3	mg	519%
Potassium	4365.4	mg	508%
Selenium	104.4	µg	522%
Sodium	7599.5	mg	2054%
Zinc	8.5	mg	285%



Learn more

b.

- i. Source: Cronometer⁸
- c. According to We Can⁹, David should be consuming 1600-2000 kcal/ day. Based on his usual intake, he is consuming around 4,000 kcal/ day which is 2-2.5 times the recommended amount. Based on David's age, he should be consuming 0.85 g/ kg body weight of protein per day or 41.3 grams per day and protein should account for 10-35% of his daily caloric intake. ⁹ He is currently consuming around 103 grams of protein daily, or 11% of his total calories, which is 2.5 times the amount recommended. David's carbohydrate intake should fall between 45-65% and his fat intake should be 25-35% his total calorie intake. ¹⁰ Based on his usual intake, his is meeting these percentages but vastly overconsuming each with his carbohydrate intake at 606 grams per day compared to the recommended 180-325 grams.¹⁰ His usual fat intake is high as well, with 163 g/ day compared to the recommended 44- 77 g/ day.¹⁰ Micronutrients that are of concern for the growth and development of children of David's age include vitamin A at 600 mcg, vitamin D at 600 IU, calcium at 1300 mg, and iron at 8 mg.¹⁰ David has an adequate intake of vitamin A, iron, and calcium but falls short on vitamin D. David is only consuming around 20% of his daily vitamin D needs.¹⁰ Based on his usual intake, he is meeting his 31 g of fiber per day requirement.¹⁰ David's current diet is high in simple sugars, low in whole grains, high in fat, and low in vegetable and fruit intake.

6. Answer the following questions regarding David's physical activity levels.

- a. **What are physical activity recommendations for children David's age (2 points)?**
 - i. According to the CDC ¹¹, children ages 6 to 17 should participate in 60 minutes of moderate to vigorous activity daily. Children should spend 3 days per week for at least 60 minutes on physical activity that encourages bone strength like jumping, running, or sports that incorporate rapid changes in direction.¹² Children should also spend at least 3 days a week for a minimum of 60 minutes on muscle building activities like bodyweight resistance activities or climbing on playground equipment.¹ The majority of a child's physical activity should be moderate to vigorous aerobic activities like walking or running that increases their heart rate and respiration rate.¹
- b. **Based on the information provided, do you think David is meeting these recommendations? Please discuss (3 points).**
 - i. No, David is not meeting these recommendations. Based on the information provided, David is participating in at most 3 hours of moderate-vigorous activity. He spends the majority of his time inside at school, playing video games, or working on homework. His activity includes basketball practice 1-2 times per week and one game per week. This activity most likely includes aerobic and some jumping but most likely very little muscle-building activity like push-ups, climbing, or bodyweight squats.
- c. **What suggestions could you make to David and his dad/grandmother regarding his activity level (2 points)?**
 - i. David should increase his activity to 60 minutes every day when possible. He should begin taking more walks outside with his mom, dad, or grandma and

spend less time inside playing on electronics. He should incorporate activities like jump rope, push-ups, jogging, and increased basketball. David's movement should focus on encouraging activity rather than specific movements and be enjoyable for him.

7. **What are the goals for weight loss in the pediatric population (3 points)? Under what circumstances might weight loss in overweight children not be appropriate (3 points)?**

When it comes to the pediatric population, the best weight loss method is to alter the diet and increase the amount of exercise.¹² In pediatrics, the initial goal is to maintain a baseline weight and then add those changes to diet and exercise previously stated.¹² Stanford Children's Health recommends increasing the consumption of fruits and veggies, consuming fewer high-fat foods, and fewer foods with high amounts of added sugars.¹²

In most cases, it is not recommended for children to lose weight as they are still growing and developing, but instead, we want to get David to a point where his weight is not rapidly climbing but can begin to level off as his height continues to increase.¹²

Furthermore, weight loss for adolescence is usually only recommended when the child has finished growing.¹² In terms of increasing his physical activity, David can decrease his screen time and go for more walks instead, practice basketball more often throughout the week, or even play outside while waiting on his Dad to come to pick him up.

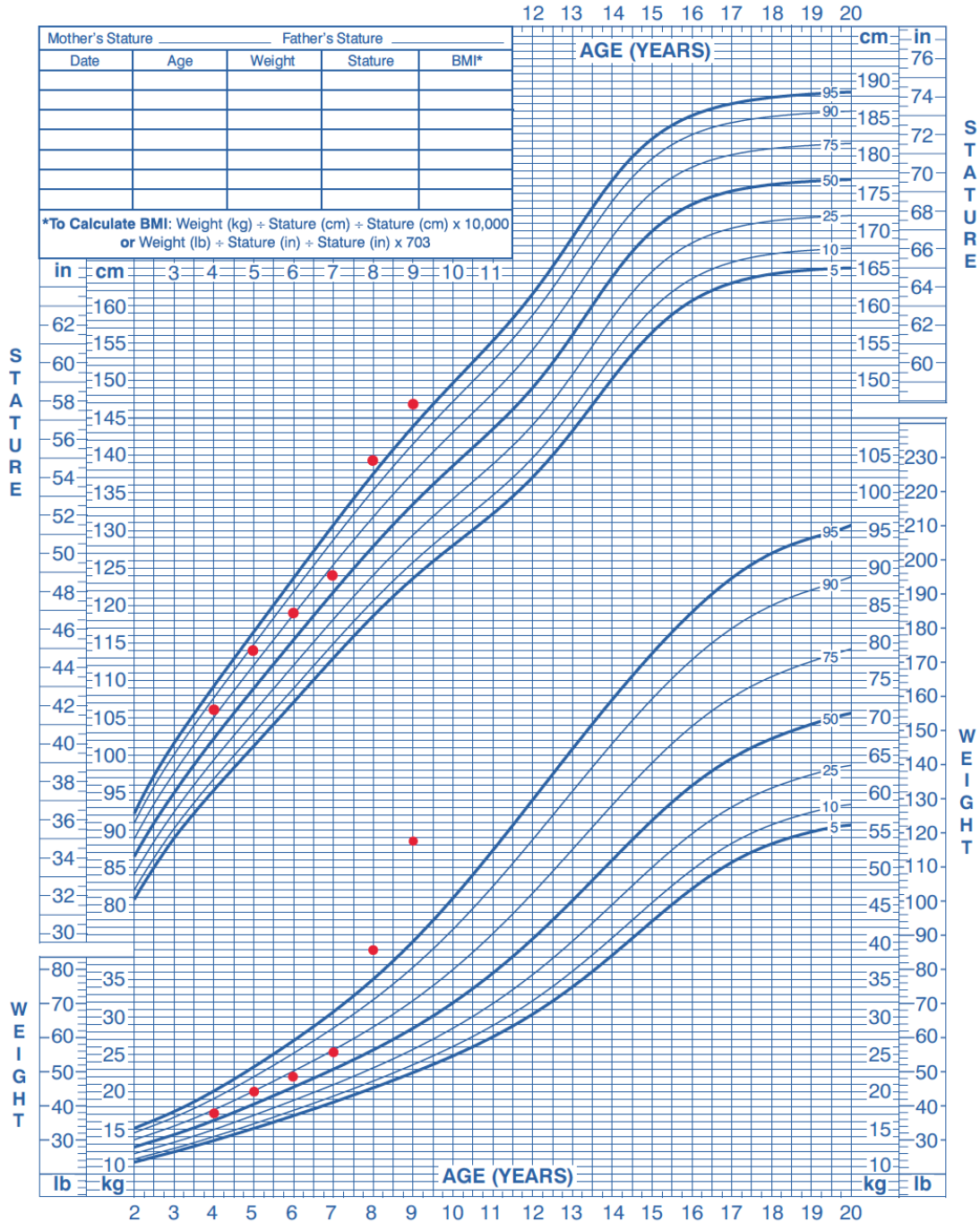
8. **What are some school and community resources that David's family may be able to take advantage of to help improve David's overall health status and risk for chronic disease later in life (4 points)?**

Based on personal experience and that of my peers as well, David's family can take advantage of afterschool Programs such as the YMCA. The YMCA is adaptable to parent's working schedule and David can be engaging in physical activity, games, and socializing while waiting on his Dad to get off work. Most private and public schools do offer health classes as well where David can personally learn about MyPlate and take an initiative in caring for himself and getting equipped with the tools for him to make healthier eating choices or ask his parents for healthier options. In addition, since Pulaski County is a rural county, there are most likely to be community gardens available for public use and children's learning where David can get outside and work with his hands while learning about different fruits or vegetables. Getting outside, being physical, and learning about the benefits of fruits and vegetables can all work to improve David's overall health status and decrease his risk of developing chronic diseases later in life.

2 to 20 years: Boys
Stature-for-age and Weight-for-age percentiles

NAME _____

RECORD # _____



Published May 30, 2000 (modified 11/21/00).

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
<http://www.cdc.gov/growthcharts>



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NAME _____
RECORD # _____

Published May 30, 2000 (modified 10/16/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with
the National Center for Chronic Disease Prevention and Health Promotion (2000).
<http://www.cdc.gov/growthcharts>


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[1] How much physical activity do children need? Centers for Disease Control and Prevention. <https://www.cdc.gov/physicalactivity/basics/children/index.htm#:~:text=Children%20and%20adolescents%20ages%206,doing%20push%20Dups>. Published May 8, 2021. Accessed November 21, 2021.

[2] Default - Stanford Children's health. Stanford Children's Health - Lucile Packard Children's Hospital Stanford. <https://www.stanfordchildrens.org/en/topic/default?id=children-and-cholesterol-1-1988>. Accessed November 19, 2021.

[3] Haase CL, Tybjaerg-Hansen A, Nordestgaard BG, Frikke-Schmidt R. HDL cholesterol and risk of type 2 diabetes: A mendelian randomization study. *Diabetes*. <https://diabetes.diabetesjournals.org/content/64/9/3328>. Published September 1, 2015. Accessed November 19, 2021.

[4] Triglyceride level. UCSF Benioff Children's Hospitals. <https://www.ucsfbenioffchildrens.org/medical-tests/triglyceride-level>. Published June 16, 2021. Accessed November 19, 2021.

[5] Hypertension symptoms & causes in children: Boston Children's Hospital. Boston Children's Hospital. <https://www.childrenshospital.org/conditions-and-treatments/conditions/h/hypertension/symptoms-and-causes>. Accessed November 19, 2021.

[6] Diabetes tests. Centers for Disease Control and Prevention. <https://www.cdc.gov/diabetes/basics/getting-tested.html>. Published August 10, 2021. Accessed November 19, 2021.

[7] Type 2 diabetes - symptoms. Type 2 Diabetes - Symptoms | ADA. <https://www.diabetes.org/diabetes/type-2/symptoms>. Accessed November 19, 2021.

[8] Cronometer

[9] Parent tips: Calories needed each day - NHLBI, NIH. <https://www.nlm.nih.gov/health/educational/we-can/downloads/calreqtips.pdf>. Published December 9, 2013. Accessed November 21, 2021.

[10] Libretexts. 13.2: Early adolescence and Nutrition. Medicine LibreTexts. [https://med.libretexts.org/Courses/Metropolitan_State_University_of_Denver/Introduction_to_Nutrition_\(Diker\)/13%3A_Lifecycle_Nutrition%3A_Childhood_to_Late_Adulthood/13.03%3A_Puberty_and_Nutrition](https://med.libretexts.org/Courses/Metropolitan_State_University_of_Denver/Introduction_to_Nutrition_(Diker)/13%3A_Lifecycle_Nutrition%3A_Childhood_to_Late_Adulthood/13.03%3A_Puberty_and_Nutrition). Published July 21, 2021. Accessed November 21, 2021.

[11] Aerobic, muscle- and Bone-strengthening: What counts for school-aged children and adolescents? Centers for Disease Control and Prevention. https://www.cdc.gov/physicalactivity/basics/children/what_counts.htm. Published November 18, 2020. Accessed November 21, 2021.

[12] Weight Management. Stanford Children's health.
<https://www.stanfordchildrens.org/en/topic/default?id=weight-management-and-adolescents-90-P01626>. Published 2021. Accessed November 15, 2021.