

FASTING BLOOD GLUCOSE AND CHOLESTEROL

RATIONALE

Screening for elevated fasting blood glucose and cholesterol in overweight or obese children/adolescents will help to identify children/adolescents with pre-diabetes (also referred to as impaired glucose tolerance), type 2 diabetes, and those at highest risk for developing early cardiovascular disease. In addition, screening for elevated cholesterol in children and adolescents who may not be overweight will help to identify children/adolescents at highest risk for developing early cardiovascular disease.

The Centers for Disease Control and Prevention (CDC) State Nutrition, Physical Activity, and Obesity Profile for California (2012) states that California's children aged two years to less than five years, 16% are overweight (85th to <95th percentile BMI for Age); and 17.2 % were obese (95th percentile or greater BMI for Age). According to the [National Health and Nutrition Examination Surveys](#), the prevalence of overweight preschool children and adolescents has doubled between 1976-1980 and 1999-2002, and more than tripled for school age children aged 6-11 years. The Survey, from 2011-2012, using measured heights and weights, indicated that an estimated 16.9% of U.S. children and adolescents aged 2-19 years are obese, and another 14.9% are overweight. It is estimated that one in five children (17%) are overweight. Overweight or obese preschoolers are 5 times more likely than normal-weight children to be overweight or obese adults.¹ Nationally, overweight has increased among both sexes and among all racial, ethnic and socioeconomic groups. However, the prevalence of overweight among African-Americans, Mexican Americans, and Native Americans exceeds that of other ethnic groups thereby creating greater health disparities for these populations.

Childhood overweight and obesity have significant adverse effects on the present and future health of children. Among the most common medical conditions associated with primary childhood overweight are asthma, type 2 diabetes, gallstones, heart disease, high blood pressure, liver problems, menstrual problems, trouble sleeping, obstructive sleep apnea, certain kinds of cancers and metabolic syndrome.³ Many overweight children/adolescents have high cholesterol and/or blood pressure values which are risk factors for heart disease and stroke. In the [Bogalusa Heart Study](#), overweight school children were 2.4 to 7.1 times more likely to have elevated total cholesterol, LDL cholesterol, and triglycerides.⁴

In addition, children/adolescents who may not be overweight but instead have a family history of premature cardiovascular disease or have at least one parent with high blood cholesterol are at increased risk of having high blood cholesterol and accelerated atherosclerotic processes. Pathology studies have shown that atherosclerosis begins in childhood and that the extent of atherosclerotic change in children and young adults can be correlated with the presence of the same risk factors identified in adults.³

FASTING BLOOD GLUCOSE AND CHOLESTEROL

Also refer to sections within the Health Assessments Guidelines on Nutrition and Anthropometric Measurements.

SCREENING REQUIREMENTS

It is recommended that all children five years of age and older receiving CHDP health assessments be assessed for risks of complications of overweight/obesity or a family history of heart disease and the following tests ordered if the individual meets the identified risk factors.⁵

1. Screen for both elevated fasting glucose* and cholesterol blood levels if body mass index (BMI) \geq 85th percentile AND two of the following risk factors are present:
 - a. BMI also \geq 95th percentile
 - b. Family history of diabetes
 - c. Race/ethnicity: Black, Hispanic, American Indian, Asian, Pacific Islander, Native Alaskan
 - d. One of the following signs: acanthosis nigricans, a sign of insulin resistance (hyperpigmentation and thickening of the skin into velvety irregular folds in the neck and flexural areas), hypertension, dyslipidemia (e.g., elevated cholesterol, abnormal lipid profile, subcutaneous fat deposits), polycystic ovary disease (e.g., irregular or absent menses, striae, hirsutism, acne).
 - e. Less than 30 minutes activity per day and/or a consistently unbalanced diet.

**Both glucose and cholesterol tests should be obtained fasting if they are obtained at the same time. Fasting is defined as no consumption of food or beverage other than water for at least 8 hours before testing.*

2. Screen for cholesterol if one of the following risk factors is present:
 - a. One parent or grandparent had heart/vascular disease, heart attack, heart death, heart surgery or stroke at \leq 55 years.
 - b. One parent has a cholesterol level \geq 240 mg/dL.

Note: While at risk-children identified above who are 5 years and above need to be screened, if there is concern about a child under 5 years of age needing glucose and/or cholesterol screening, these tests can be ordered at any age and be reimbursed.

Note: Currently payment of these tests are limited to once per year. Changes to the payment system will be made in recognition that an elevated test result may need to be repeated to confirm an abnormality, or some children/adolescents may need testing more than annually. A future CHDP Provider Information Notice (PIN) will notify CHDP Providers of these changes.

Billing Instructions for Blood Glucose and Cholesterol

FASTING BLOOD GLUCOSE AND CHOLESTEROL

Please use the following instructions for billing for blood glucose and cholesterol. Refer to the [CHDP Provider Manual, Rates](#), pages 6 and 7 for additional information.

- In the “Other Tests” section of the CHDP PM 160 Confidential Screening/Billing Report, enter the appropriate code 25 and/or code 26.
- Enter the correct fee in the Fees Column (Note: fees do not apply on the “Information Only” PM 160).
- In the adjoining column, on the same line as the code, indicate that this is a glucose test (code 25) or a cholesterol test (code 26)

Referral and Care Management of Borderline Abnormal and Abnormal Screening Tests

- A. Children and teens identified to have type 1 or type 2 diabetes, and who meet financial need criteria may be eligible for the California Children Services (CCS) Program.
- B. If the cholesterol level is >170 and < 200 mg/dL, the child/adolescent and the family should be informed of the borderline high cholesterol and counseled about activity, diet, and adverse cardiovascular consequences if the level remains elevated or increases. Repeat testing should be done in one year.
- C. If the cholesterol level is ≥ 200 mg/dL, the result is abnormal, the child/adolescent should be considered for referral to the CCS Program, or a cardiologist for a diagnostic cardiac evaluation involving further testing for possible familial hyperlipidemia.
- D. When both glucose and cholesterol levels are done:
 - If the fasting glucose is ≤ 100 mg/dL (normal) or > 100 mg/dL and < 126 mg/dL (diagnostic of pre-diabetes), and:
 - If the cholesterol is ≤ 170 mg/dL, the child/adolescent should have laboratory testing repeated in one year. The child/adolescent should have counseling about increasing activity, improving diet, and losing weight.
 - If the cholesterol is >170 and < 200 mg/dL, the child/adolescent and the family should be informed of the borderline high cholesterol and counseled about activity, diet, and adverse cardiac/vascular consequences if the level remains elevated or increases. Repeat testing should be done in one year.
 - If the cholesterol is ≥ 200 mg/dL, the result is abnormal and the child/adolescent and family should be informed of the abnormally high cholesterol and counseled about activity, diet, and adverse cardiac/vascular consequences if the level remains elevated or increases. Repeat testing should be done in six months to one year.

Bright Futures*

FASTING BLOOD GLUCOSE AND CHOLESTEROL

[Performing Preventive Services: A Bright Futures Handbook](#), *Anticipatory Guidance, Cardiometabolic Risk of Obesity*, pages 167-174.

[Performing Preventive Services: A Bright Futures Handbook](#), *Anticipatory Guidance, Weight Maintenance and Weight Loss*, pages 185-190.

CONSIDERATIONS FOR REFERRAL TREATMENT AND/OR FOLLOW-UP

- Provide treatment and counseling
 - Include family members in the behavior changes needed for weight loss in the child.
- The USDA Dietary Guidelines 2015-2020 recommends a healthy eating pattern that includes limiting calories from added sugars and saturated fats, and to reduce sodium intake.⁶
- Encourage regular exercise, preferably 60-minutes of moderate to vigorous physical activity per day, as tolerated. Patients and families should consult with their pediatric providers so as to determine if there any medical conditions that might moderate or prevent this type of physical activity.
- Encourage decrease of screen time to less than 2 hours per day.⁷

Resources

- [Child & Adolescent Obesity Provider Toolkit, 2011-2012](#). California Medical Association Foundation, California Office of Multicultural Health, California Medical Association, 2011.
- Child Health and Disability Prevention [Childhood Obesity Trainings](#) on *Counseling the Overweight Child* and *Glucose and Cholesterol Screening for Pediatric Obesity*.
- [Healthychildren.org](#) from the American Academy of Pediatrics to raise awareness of health care, safety, and well-being of infants, children, adolescents, and young adults.
- Schuster MD, M, Elliott, M, Bogart, L, et al, [Changes in Obesity Between Fifth and Tenth Grades: A Longitudinal Study in Three Metropolitan Areas](#), *Pediatrics*. Published on line November 10, 2014.

References

- ¹ [Childhood Obesity Facts](#). Centers for Disease Control and Prevention. Retrieved November 20, 2014.
- ² [California State Nutrition, Physical Activity, and Obesity Profile](#). Centers for Disease Control and Prevention. Retrieved November 20, 2014.
- ³ [Health Risks of Overweight Children](#). UCSF Benioff Children's Hospital. Retrieved November 20, 2014.
- ⁴ [The Bogalusa Heart Study, 1972-2016](#). Tulane University Center for Cardiovascular Health. Retrieved November 20, 2014.

FASTING BLOOD GLUCOSE AND CHOLESTEROL

- ⁵ Daniels, Stephen R. MD, Greer, Frank, MD, and the American Academy of Pediatrics Committee on Nutrition. [Lipid Screening and Cardiovascular Health in Childhood](#), *Pediatrics* 2008; 122:198 DOI: 10.1542/peds.2008-1349.
- ⁶ [Dietary Guidelines 2015-2020](#) : U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015 – 2020 Dietary Guidelines for Americans. 8th Edition. December 2015. Available at <http://health.gov/dietaryguidelines/2015/guidelines/>.
- ⁷ [Children, Adolescents, Obesity, and the Media](#). American Academy of Pediatrics Policy Statement. *Pediatrics* Vol. 138 No. 1, July 1, 2011.

*American Academy of Pediatrics (AAP) materials linked to with permission for reference only. Use of these materials beyond the scope of these guidelines must be reviewed and approved by the AAP, who can be reached at marketing@aap.org.