Background
C-reactive protein (CRP) is the most sensitive of the acute phase reactants, and its concentration increases rapidly during inflammatory processes. It is synthesized by the liver and consists of five identical polypeptide chains that form a five-membered ring having a molecular weight of 105 kD. The main function of CRP is to bind and detoxify endogenous toxic substances produced as a result of tissue damage. CRP also helps the body to remove dead, dying or foreign cells (such as microbes) through binding to phosphocholine on cell surface, activating the complement system, and initiating opsonization and phagocytosis.

Measurements of CRP in blood are used to detect systemic inflammatory processes (apart from certain types of inflammation such as systematic lupus erythematosus [SLE] and ulcerative colitis); to assess treatment of bacterial infections with antibiotics; to differentiate between active and inactive forms of disease with concurrent infections, e.g. in patients suffering from systemic lupus erythematosis (SLE) or ulcerative colitis; to therapeutically monitor rheumatic disease and assess anti-inflammatory therapy; to determine the presence of post-operative complications at an early stage, such as infected wounds, thrombosis and pneumonia; and to distinguish between infection and bone marrow transplant rejection.

There are two different tests for CRP. The standard test measures a much wider range of CRP levels but is less sensitive in the lower ranges. The hs-CRP test is more sensitive and can accurately detect lower concentrations of CRP. The hs-CRP measurements have been used for early detection of infection in pediatric patients and risk assessment of coronary heart disease. Several studies indicated that the highly sensitive measurement of CRP could be used to predict the risk of coronary heart disease in apparently otherwise healthy persons and to aid in the prognosis of recurrent events. However, increases in CRP values are non-specific and should be interpreted only with a complete clinical history.

Clinical Indications
The American Heart Association (AHA) and the Centers for Disease Control and Prevention (CDC) have made several recommendations concerning the use of hs-CRP in cardiovascular risk assessment. hs-CRP is an independent marker of CVD risk, and may be useful as a prognostic indicator for recurrent events in patients with acute coronary syndrome. Testing for any risk assessment should not be performed while there is any indication of infection, systemic inflammation or trauma. Patients with persistently unexplained hs-CRP levels above 10 mg/L (95.2 nmol/L) should be evaluated for non-cardiovascular etiologies, such as an infection, illness or a serious flare-up of arthritis. When using hs-CRP to assess the risk of coronary heart disease, measurements should be made on metabolically stable patients and compared to previous values. Optimally, the average of hs-CRP results repeated two weeks apart should be used for risk assessment. Screening the entire adult population for hs-CRP is currently not recommended, and hs-CRP is not a substitute for traditional cardiovascular risk factors. Acute coronary syndrome management should not depend solely on hs-CRP measurements. Similarly, applications of secondary prevention measures should be based on global risk assessment and not solely on hs-CRP measurements. Serial measurements of hs-CRP should not be used to monitor treatment.

The AHA and CDC have defined risk groups as follows:
- **Low risk**: < 1.0 mg/L
- **Average risk**: 1.0 to 3.0 mg/L
- **High risk**: > 3.0 mg/L

Methodology
Various assay methods are available for hs-CRP determination, such as nephelometry and turbidimetry. The Roche hs-CRP assay used at Cleveland Clinic Laboratories is based on the principle of particle-enhanced immunological agglutination.
**Test Name:** High Sensitive CRP  
**Methodology:** Particle-enhanced immunoturbidimetric assay  
**Specimen Requirements:** Volume/Size: 1 mL; Type: Plasma; Tube/Container: Lithium heparin PST (Lt. Green)  
**Minimum Specimen Requirements:** Volume/Size: 1 mL; Type: Plasma; Tube/Container: Lithium heparin PST (Lt. Green)  
**Alternate Specimen Requirements:** Volume/Size: 1 mL; Type: Plasma; Tube/Container: EDTA (Lavender); – OR – Volume/Size: 1 mL; Type: Serum; Tube/Container: SST (Gold)  
**Clinical Information:** Assessment of cardiovascular event risk  
**Special Information:** Should not be used for assessment of acute inflammation. Should be ordered when evaluating apparently healthy individuals who have not had recent infection or other serious illness.  
**Reference Range:** CRP, High Sensitive: **Low Relative Risk** for CVD: <1.0 mg/L; **Average Relative Risk** for CVD: 1.0 – 3.0 mg/L; **High Relative Risk** for CVD: >3.0 mg/L  
**Billing Code:** 81384  
**CPT Codes:** 86141

**Technical Information Contact:**  
Anne Bordner Blank, MBA, MT(ASCP)  
216.444.2173  
bordnea@ccf.org

**Scientific Information Contact:**  
Edmunds Z. Reineks, MD, PhD  
216.444.9143  
reineke@ccf.org

**References**


---

**Cleveland Clinic Laboratories**  
9500 Euclid Avenue, L15, Cleveland, Ohio 44195  
800.628.6816 | clevelandcliniclabs.com