

# TESTING FACTS: CYSTATIN C

## Description:

The enzyme cystatin C is an enzyme that is a member of the cysteine proteinase inhibitor family that is produced at a constant rate by all nucleated cells. It is freely filtered by the glomerulus, fully reabsorbed and broken down by the renal tubules.<sup>1</sup> Cystatin C is an endogenous marker of kidney function that is more sensitive for detecting mild changes in GFR than is creatinine.<sup>2</sup>

## CVD Risk Relevance:

Recent epidemiological studies report a 40% increase in chronic kidney disease (CKD) in recent years affecting about 15% of the U.S. population. Early CKD is present in half of Americans over age 55.<sup>3</sup>

Even minor degrees of renal dysfunction are associated with an increase in CVD risk. CKD among persons with established CHD predicts cardiovascular events as strongly as other established risk factors, such as diabetes mellitus and hypertension.<sup>1</sup> Increases in cystatin C levels are associated with increased risk of CAD even in the absence of renal diseases.<sup>2</sup> In a multivariate analysis, elderly patients

with heart failure symptoms who had elevations of both NTpro-BNP and cystatin C within the highest quartile had a 13-fold increased CV mortality risk.<sup>3</sup> Studies have shown the association between increased levels of cystatin C and risk of CVD events and all-cause mortality.<sup>2,4,5</sup>

## Measurement:

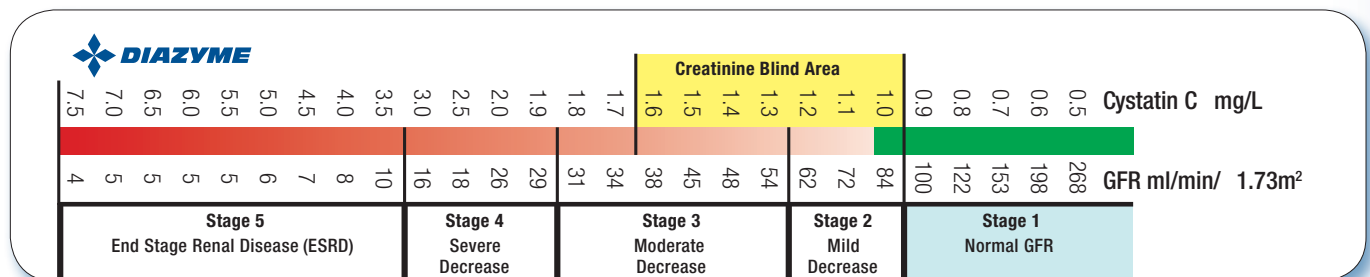
0.5 – 1.03 mg/L

## Interferences and Influences:

Medical problems and medications that may affect renal function will influence cystatin C levels. Unlike creatinine, cystatin C serum levels are unaffected by age (>1 year), muscle mass, gender and race.<sup>6,7</sup>

## Treatment Advantages:

Several recent publications have demonstrated that cystatin C is superior to serum creatinine for prediction of all-cause mortality, cardiovascular events and heart failure.<sup>1,2,4,8</sup>



<sup>1</sup> Jernberg T, Lindahl B, James S. et al. Cystatin C – A Novel Predictor of Outcome in Suspected or Confirmed Non-ST-Elevation Acute Coronary Syndrome. *Circulation*. 2004;110:2342-2348.  
<sup>2</sup> Ix JH, Shlipak MG, Chertow GM, Whooley MA. Association of cystatin C with mortality, cardiovascular events, and incident heart failure among persons with coronary heart disease: data from the Heart and Soul Study. *Circulation*. 2007;115:173-179.  
<sup>3</sup> Alehagen U, Dahlstrom U, Lindahl T. Cystatin C and NTproBNP, a powerful combination of biomarkers for predicting cardiovascular mortality in elderly patients with heart failure: results from a 10-year study in primary care. *Eur J Heart Fail*. 2009;11:354-360.  
<sup>4</sup> Taglieri, N, Koenig W, Kaski JC. Cystatin C and Cardiovascular Risk. *Clinical Chem*. 2009;55:1932-1943.  
<sup>5</sup> Ge C, Ren F, Lu S. et al. Clinical Prognostic Significance of Plasma Cystatin C Levels among Patients with Acute Coronary Syndrome. *Clin Cardiol*. 2009;32:644-648.  
<sup>6</sup> Kassirer JP. Clinical evaluation of kidney function-glomerular function. *N Engl J Med*. 1971;285:385-389.  
<sup>7</sup> Levey AS. Measurement of renal function in chronic renal disease. *Kidney Int*. 1990;38:167-184.  
<sup>8</sup> Shlipak MG, Katz R, Sarnak MJ. et al. Cystatin C and Prognosis for Cardiovascular and Kidney Outcomes in Elderly Persons without Kidney Disease. *Annals of Intern Med*. 2006;145:237-246.