

**Wake Forest Baptist Medical Center**  
**Center for Antimicrobial Utilization, Stewardship, and Epidemiology**

**Interpretation of Procalcitonin for the Evaluation of Sepsis**

Procalcitonin is a prohormone of calcitonin. The production of procalcitonin is stimulated by inflammatory cytokines. Unlike other acute phase reactants (e.g. ESR and CRP), production of procalcitonin is usually only stimulated by bacterial infection, making it a useful biomarker to differentiate bacterial infection from non-infection or viral infection. Procalcitonin has other potential uses not addressed in this guide: to assess efficacy of antibacterial therapy, to guide duration of antibacterial therapy, and to prognosticate (assess risk of mortality).<sup>1,2</sup>

In the evaluation of bacterial infection or sepsis, procalcitonin testing is best applied by ordering paired tests at first suspicion of sepsis (separated by 12 hours). This is done to limit error in interpretation of the first test, which could be falsely low if obtained very early in sepsis. Wake Forest Baptist Medical Center guidelines for interpreting paired tests are presented in the tables below.

<b>Interpretation of 1<sup>st</sup> test</b>	
<b>Response</b>	<b>Action</b>
<0.25 ng/mL	Antibiotics discouraged; continuing empiric antibiotics until the 2 <sup>nd</sup> test result is available may be warranted if signs and symptoms are consistent with bacterial infection
0.25-0.5 ng/mL	Consider antibiotics- especially if no alternate diagnosis present
>0.5 ng/mL	Antibiotics encouraged

<b>Interpretation of 2<sup>nd</sup> test (performed 12 hours after the 1<sup>st</sup>)</b>		
<b>Result of 1<sup>st</sup> test</b>	<b>Result of 2<sup>nd</sup> test</b>	<b>Action</b>
<0.25 ng/mL	<0.25 ng/mL	Antibiotics discouraged
	0.25-0.5 ng/mL	Consider antibiotics- especially if no alternate diagnosis present
	>0.5 ng/mL	Antibiotics encouraged
0.25-0.5 ng/mL	<0.25 ng/mL	Antibiotics discouraged
	0.25-0.5 ng/mL	Consider antibiotics- especially if no alternate diagnosis present
	>0.5 ng/mL	Antibiotics encouraged
>0.5 ng/mL	<0.25 ng/mL	Repeat test in 12 hours; if <0.25: consider stopping antibiotics
	0.25-0.5 ng/mL	Continue antibiotics as appropriate for clinical scenario
	>0.5 ng/mL	Continue antibiotics as appropriate for clinical scenario

Interpretation of procalcitonin results should always be performed in conjunction with evaluation of signs and symptoms that may suggest the presence of bacterial infection as well as diseases and conditions that may account for a patient's apparent systemic inflammatory response. Conditions associated with a falsely elevated procalcitonin include recent trauma/burns, recent major surgery, pancreatitis, cardiogenic shock, certain malignancies, or treatment with drugs that stimulate release of pro-inflammatory cytokines. Infectious Diseases consultation should be considered in cases when such confounders cloud the interpretation of procalcitonin results.

1. Procalcitonin algorithms for antibiotic therapy decisions: a systematic review of randomized controlled trials and recommendations for clinical algorithms. Arch Intern Med 2011;171:1322-1331.
2. Diagnostic and prognostic biomarkers of sepsis in critical care. J Antimicrob Chemother 2011;66 Supp 2:ii33-ii40.