# Procalcitonin

Last Literature Review: April 2025 Last Update: April 2025

Procalcitonin is an inflammatory marker that can be used as a biomarker for sepsis and lower respiratory tract infections (e.g., community acquired pneumonia [CAP]).[1,2] This test can be used to[3]:

- Aid in risk assessment of critically ill individuals for progression to severe sepsis or septic shock on the first day of intensive care unit (ICU) admission
- Aid in assessing the cumulative 28-day risk of all-cause mortality in individuals diagnosed with severe sepsis or septic shock when serial measurements are obtained in the ICU or in other settings before ICU admission
- Aid in decision-making on antibiotic discontinuation for individuals with confirmed or suspected sepsis
- Aid in decision-making on antibiotic therapy for inpatients or individuals in the emergency department with confirmed or suspected lower respiratory tract infections, specifically, acute bronchitis, acute exacerbation of chronic obstructive pulmonary disease (COPD), or CAP

For complete information about this test, refer to the Elecsys BRAHMS PCT package insert.[3]

## Featured ARUP Testing

Procalcitonin 0020763

**Method:** Quantitative Electrochemiluminescent Immunoassay (ECLIA)

## Test Interpretation

### Results Interpretation Based on Clinical Indication

#### ICU Admission Risk Assessment

When measured on the first day of ICU admission, procalcitonin may be used as an aid in the assessment of risk for progression to severe sepsis and/or septic shock in critically ill individuals.

| Procalcitonin Interpretation in Risk Assessment for Sepsis Progression | |
|---|---|
| **Procalcitonin Concentration on the First Day of ICU Admission** | **Interpretation** |
| >2.00 ng/mL | High risk for progression to severe sepsis and/or septic shock |
| 0.50-2.00 ng/mL | Evaluate carefully in the context of the individual's clinical history<br>Retesting within 6-24 hours recommended |
| <0.50 ng/mL | Low risk for progression to severe sepsis and/or septic shock<br>Does not exclude localized infection or initial stage systemic infections<br>Retesting within 6-24 hours recommended |

#### Cumulative 28-Day Risk Assessment

When measured on the day of diagnosis (day 0) or day after diagnosis (day 1) of severe sepsis or septic shock and again on the fourth day after diagnosis (day 4), the percentage change in procalcitonin may be used to as an aid in assessing the 28-day cumulative risk of all-cause mortality in individuals in the ICU or coming from the emergency department or other clinical settings. The highest procalcitonin concentration obtained on day 0 or 1 should be used, and the most recent value from day 4 should be used. The Change in Procalcitonin Calculator[4] can be used for convenience.

| Procalcitonin Interpretation for Cumulative 28-Day Risk Assessment | |
|---|---|
| **Percent Change in Procalcitonin Concentration From Day 0 or 1 to Day 4** | **Interpretation** |
| ≤80% decrease | Higher risk of all-cause mortality |
| >80% decrease | Lower risk of all-cause mortality |

### Antibiotic Discontinuation for Sepsis

Procalcitonin concentrations may be used as an aid in determining whether discontinuation of antibiotic therapy may be appropriate in individuals with confirmed or suspected sepsis. The current (most recent) procalcitonin concentration and peak (highest observed) concentrations should be used to determine the percent change. Samples should be tested every 1-2 days based on clinician discretion and the clinical situation.

| Procalcitonin Interpretation for Antibiotic Discontinuation Decision-Making in Sepsis | |
|---|---|
| **Procalcitonin Concentration** | **Interpretation** |
| ≤0.50 ng/mL current | Antibiotic therapy discontinuation may be considered if appropriate, based on other clinical findings |
| >80% decrease change from peak to current | Antibiotic therapy discontinuation may be considered if appropriate, based on other clinical findings |
| ≤80% decrease change from peak to current | Antibiotic therapy should not be discontinued<br>Consider reevaluation and potential treatment failure if concentrations remain high and the clinical situation does not improve |

### Antibiotic Initiation for Lower Respiratory Tract Infections

Procalcitonin testing may be used in the context of other findings as an aid in determining whether antibiotic therapy should be initiated in individuals with confirmed or suspected lower respiratory tract infections (acute bronchitis, acute exacerbation of COPD, or CAP).

| Procalcitonin Interpretation for Antibiotic Initiation Decision-Making in Lower Respiratory Tract Infections | |
|---|---|
| **Procalcitonin Concentration** | **Interpretation** |
| <0.10 ng/mL | Bacterial infection not present<br>Initiation of antibiotic therapy strongly discouraged unless the individual is at high risk of adverse outcomes, clinically unstable, or if there is strong evidence of bacterial infection or other findings that warrant antibiotics<br>Reassess according to symptoms and/or repeat procalcitonin testing within 6-24 hours if antibiotics are not administered |
| 0.10-0.25 ng/mL | Bacterial infection unlikely<br>Initiation of antibiotic therapy discouraged unless the individual is at high risk of adverse outcomes, clinically unstable, or if there is strong evidence of bacterial infection or other findings that warrant antibiotics<br>Reassess according to symptoms and/or repeat procalcitonin testing within 6-24 hours if antibiotics are not administered |
| 0.26-0.50 ng/mL | Bacterial infection possible<br>Initiation of antibiotic therapy is encouraged<br>Repeat procalcitonin every 1-2 days based on clinical discretion and the clinical situation |
| >0.50 ng/mL | Bacterial infection likely<br>Initiation of antibiotic therapy is strongly encouraged<br>Repeat procalcitonin every 1-2 days based on clinical discretion and the clinical situation |

### Antibiotic Discontinuation for Lower Respiratory Tract Infections:

When measurements are made every 1-2 days, procalcitonin testing may be used in the context of other findings as an aid in determining whether antibiotic therapy may be discontinued in individuals with confirmed or suspected lower respiratory tract infections (acute bronchitis, acute exacerbation of COPD, or CAP). The current (most recent) procalcitonin concentration and peak (highest observed) concentrations should be used to determine the percent change.

| Procalcitonin Interpretation for Antibiotic Discontinuation Decision-Making in Lower Respiratory Tract Infections | |
|---|---|
| **Procalcitonin Concentration** | **Interpretation** |
| ≤0.25 ng/mL current | Antibiotic therapy discontinuation may be considered if appropriate, based on other clinical findings |

| Procalcitonin Concentration | Interpretation |
| --- | --- |
| >80% change from peak to current | Antibiotic therapy discontinuation may be considered if appropriate, based on other clinical findings |
| ≤80% change from peak to current | Antibiotic therapy should not be discontinued<br>Consider reevaluation and potential treatment failure if concentrations remain high and the clinical situation does not improve |

## Limitations

- This test is not indicated for use as a standalone diagnostic assay.
- Changes in procalcitonin must be interpreted in the context of an individual's clinical status and other findings.
- Procalcitonin concentrations may be low within 6 hours of the start of systemic infection.
- Procalcitonin concentrations may be elevated for reasons other than sepsis, septic shock, or lower respiratory tract infections (e.g., major trauma, small cell lung carcinoma, prolonged or severe cardiogenic shock).
- Overall mortality risk is strongly dependent on many other factors in addition to procalcitonin concentrations.
- Procalcitonin concentrations should not be the sole basis for antibiotic therapy decision-making.
- The use of procalcitonin to guide antibiotic therapy has not been established in individuals younger than 17 years of age, individuals taking immunomodulatory agents, immunocompromised individuals, or pregnant individuals.

## References


1. Evans L, Rhodes A, Alhazzani W, et al. Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021. *Intensive Care Med*. 2021;47(11):1181-1247.

2. Schuetz P, Beishuizen A, Broyles M, et al. Procalcitonin (PCT)-guided antibiotic stewardship: an international experts consensus on optimized clinical use. *Clin Chem Lab Med.* 2019;57(9):1308-1318.

3. Roche Diagnostics GmbH. Elecsys BRAHMS PCT package insert, v3.0. Accessed Jan 2025.

4. B·R·A·H·M·S PCT Calculator. Change in procalcitonin calculator (mortality risk prognosis). Accessed Jan 2025.



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