



Procalcitonin (PCT) Reference Ranges

Diagnosis of Systemic Bacterial Infection/Sepsis*

PCT <0.05 µg/L

Healthy individuals

Determination of normal values with a high sensitive assay revealed normal values to be below 0.05 µg/L.

PCT <0.5 µg/L

Systemic infection (sepsis)
is not likely.

Local bacterial infection is possible.

Low risk for progression to severe systemic infection (severe sepsis).

Caution: PCT levels below 0.5 µg/L do not exclude an infection, because localized infections (without systemic signs) may be associated with such low levels. Also if the PCT measurement is done very early after a following bacterial challenge (usually < 6 hours), these values may still be low. In this case, PCT should be re-assessed 6-24 hours later.

PCT ≥0.5 – <2 µg/L

Systemic infection (sepsis)
is possible, but various conditions
are known to induce PCT as well.¹⁾

Moderate risk for progression to severe systemic infection (severe sepsis). The patient should be closely monitored both clinically and by re-assessing PCT within 6-24 hours.

PCT ≥2 – <10 µg/L

Systemic infection (sepsis) is likely,
unless other causes are known.¹⁾

High risk for progression to severe systemic infection (severe sepsis).

PCT ≥10 µg/L

Important systemic inflammatory
response, almost exclusively due to
severe bacterial sepsis or septic shock.

High likelihood of severe sepsis or septic shock.

Differential Diagnosis of Lower Respiratory Tract Infections*

PCT <0.1 µg/L

Indicates absence of bacterial infection.²⁾

Use of antibiotics strongly discouraged, also in the presence of impaired pulmonary reserve in AECOPD.

PCT ≥0.1 – <0.25 µg/L

Bacterial infection unlikely.²⁾

The use of antibiotics is discouraged.

PCT ≥0.25 – <0.5 µg/L

Bacterial infection is possible.

Advice to initiate antimicrobial therapy.

PCT ≥0.5 µg/L

Suggestive of the presence of bacterial infection.

Antibiotic treatment strongly recommended.

Note: The PCT reference ranges are provided for orientational purpose only. PCT serum concentrations are elevated in clinically relevant bacterial infections and continue to rise with the increasing severity of the disease. However, as an expression of individually different immune responses and different clinical situations, the same focus of infection may be associated with varying individual elevations in PCT concentrations. Therefore, clinicians should use the PCT results in conjunction with the patient's other laboratory findings and clinical signs, and interpret the concrete values in the context of the patient's clinical situation.

1) Increased PCT levels may not always be related to systemic bacterial infection.

There are a few situations described where PCT can be elevated by non-bacterial causes. These include, but are not limited to

- neonates < 48 hours of life (physiological elevation)
- the first days after a major trauma, major surgical intervention, severe burns, treatment with OKT3 antibodies and other drugs stimulating the release of pro-inflammatory cytokines
- patients with invasive fungal infections, acute attacks of plasmodium falciparum malaria
- patients with prolonged or severe cardiogenic shock, prolonged severe organ perfusion anomalies in severe liver cirrhosis and acute or chronic viral hepatitis
- patients with small cell lung cancer or medullary C-cell carcinoma of the thyroid.

2) Low PCT levels do not automatically exclude the presence of bacterial infection.

Such low levels may be obtained, e.g., during the early course of infections, in localized infections and in subacute endocarditis. Therefore, follow-up and re-evaluation of PCT in clinical suspicion of infection is pivotal. The PCT measuring technique should be chosen dependent on intended clinical use.

Please note: PCT values are given in µg/L (△ ng/mL).

* Source: Meisner M. Procalcitonin - Biochemistry and Clinical Diagnosis. Bremen 2010.

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Clinical Diagnostics

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