

Cost-Saving Impact of PCT-Guided Antibiotic Stewardship in ICU



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Garnfeldt VM, Vincent JL, Gruson D, Garay OU, Vansielegheem S, Iniguez L, Lefevre A. [The budget impact of procalcitonin-guided antibiotic stewardship compared to standard of care for patients with suspected sepsis admitted to the intensive care unit in Belgium.](#) *PLoS One* 2023;18(10):e0293544 doi:10.1371/journal.pone.0293544

The inappropriate use of antibiotics is causing an increase in antimicrobial resistance (AMR), reducing their effectiveness, and posing a global health issue. In Belgium alone, AMR causes 530 deaths annually, contributing to a total of 33,000 deaths in Europe each year. The economic burden of AMR in Belgium is estimated to be €24 million per year and is expected to increase to €787 million per year by 2050. Procalcitonin (PCT) is a biomarker that can help improve antimicrobial stewardship (ASP) and reduce the duration of antibiotic therapy, leading to cost savings. The current study aims to assess the budget impact of PCT-guided antibiotic stewardship in patients with suspected sepsis, particularly those admitted to the intensive care unit (ICU).

Methods

- The study estimated the impact of PCT-guided antibiotic stewardship vs. standard of care (SOC) in patients with sepsis in the ICU
- A decision tree modeled outcomes of PCT-guided antibiotic stewardship programs for ICU patients
- A literature review using a PICO (population, intervention, comparison, outcome) search, which included English-written articles from 2017-2022, was conducted
- Scenario analysis assessed the budget impact of reducing ICU stay and mechanical ventilation duration with base-case parameters
- **Outcomes:** Total budget impact per patient, reduction in antibiotic resistance cases, and cost per antibiotic day avoided

Results

- In Belgium, using PCT as a tool for antibiotic stewardship can:
 - Reduce antibiotic exposure by 66,868 days/year, saving €1.98M annually. An average of 3 PCT tests per patient can prevent 256 AMR infections.
 - Reduce AMR cases by 7.7% compared with SOC
- Implementing PCT-guided antibiotic stewardship for suspected sepsis patients requires a national budget investment of €68,220 (€1.90 per patient)
- PCT testing can reduce:
 - Costs by €1,405 per patient
 - The LOS in the ICU by 1.46 days (13.9%), leading to a €45.80M saving per year
 - Mechanical ventilation (22.7%), resulting in a €4.20M saving
- Implementing PCT as a tool for antibiotic stewardship could save the Belgian healthcare system €49.90M per year
- Main drivers of savings: reduction in the ICU LOS, sepsis cases per year, LOS in the ICU with the standard of care, and cost per ICU stay

Conclusion

This Belgian study found that the small investment per patient (€1.90) required to implement PCT testing may lead to considerable cost savings (€1,405/patient). Also, PCT-guided antibiotic stewardship was associated with clinical benefits positively impacting antimicrobial resistance.



“In conclusion, the implementation of PCT tests may add clinical benefit to patients with sepsis, and generate considerable savings in the Belgian healthcare system.”