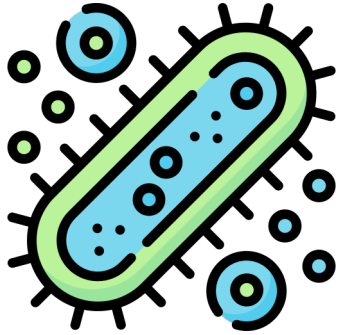
Biomarqueurs sériques : PCT ou CRP ? Quel impact sur l'antibiothérapie ?

Séminaire BUA aux urgences

12/11/2025

Nicolas Lauwerier



Problématiques des infections bactériennes aux urgences

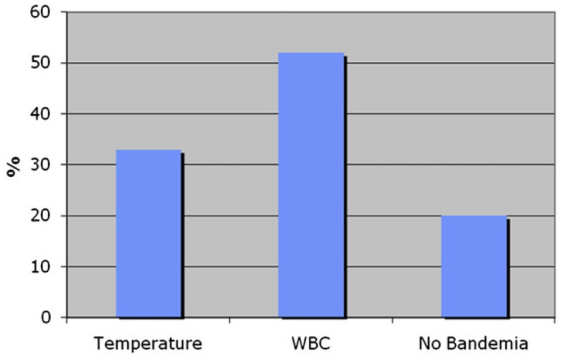
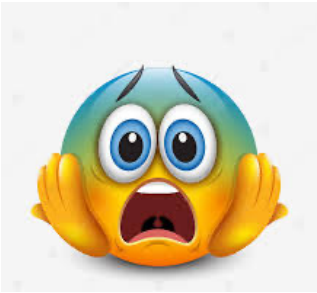


Figure 1. Percent of bacteremic patients with normal values for temperature, total white blood cell (WBC) count, or band count. Normal temperature was defined as 36.1–38°C (97–100.4°F). Normal WBC count was defined as 4–12 K/μL. A normal band count was defined as < 5% bands on the differential.

Seigel, The Journal of Emergency Medicine, 2010

Gravité des infections bactériennes
Faible sensibilité et spécificité des signes cliniques
Bactériologie souvent non disponible
Bon usage antibiotique



Le biomarqueur idéal:

- Sensible
- Spécifique
- Cinétique rapide
- Evaluation de la gravité
- Evaluation de l'efficacité
- Faisabilité

CRP/PCT: Bases physiologiques

- CRP: Sécrétion hépatique en réponse à IL6
- PCT: Sécrétion en réponse à des endotoxines ou cytokines (IL6, TNF, IL1). Down-regulation en réponse à l'INF ɣ (infections virales)

Table 2 Main host-response biomarkers used in routine practice in critically ill patients

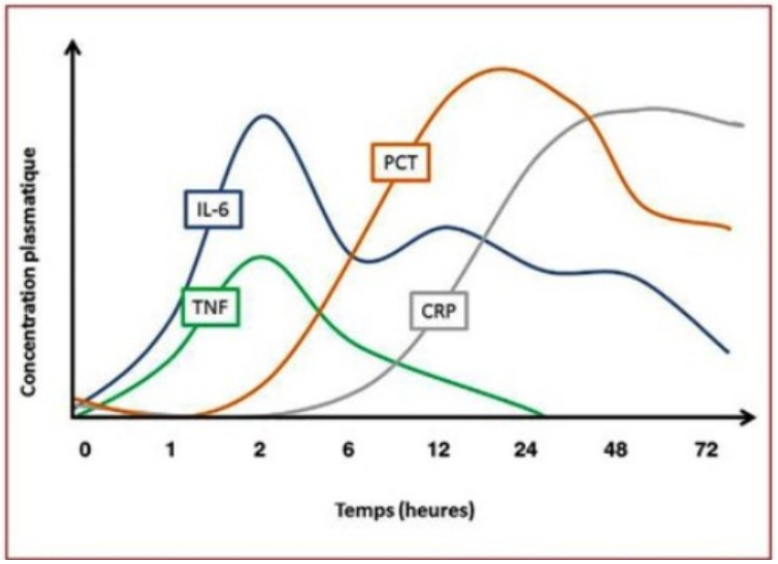
	C-reactive protein	Procalcitonin
Properties	Acute phase protein (pentraxin)	Hormokine
Normal values	0.08 mg/dL (median)	< 1 ng/mL
Maximum peak	> 50 mg/dL (> 1000 × reference value)	> 100 ng/mL (> 10.000 × reference value)
Source	Liver	Virtually all cells and macrophages
Time to increase after insult	4–6 h	3–4 h
Time to peak concentration	36–50 h	Around 24 h
Half-life	19 h	22–35 h
Possible confounders		
Steroids	No effect	frequent false negatives
Immunosuppression	No effect	frequent false negatives
Neutropenia	No effect	frequent false negatives
Renal failure	No effect	⬆⬆
Renal replacement therapy	No effect	⬇⬇
Chronic liver failure	⬇ (70% of the normal)	No effect
Acute liver failure	No CRP increase	No effect
Secondary infection (2nd hit)	⬇ (70% of 1st episode)	⬇⬇⬇ (10% of 1st episode)
Bacterial vs viral infections	Poor	Poor

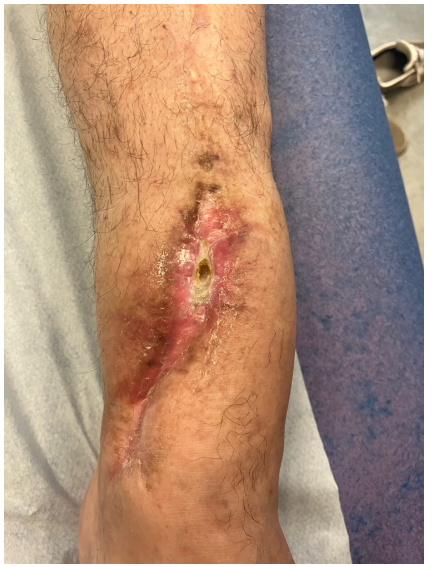
CRP C-reactive protein, *PCT* Procalcitonin

Povoa, Intensive Care Med, 2023

CRP: Une bonne (et non parfaite) sensibilité

- Sensibilité variable (71-100%) selon le type d'infection et le timing
- Piège de la cinétique
- Infections localisées
- Infections subaiguës-chroniques





CRP: Prise en compte de la cinétique

- Etude rétrospective
- Infections bactériennes: bactériémie
- Infections virales: preuve biologique (PCR ou sérologie)
- Sous groupe CRP initiale inférieure à 60 mg/l

Coster, Infection, 2020

Table 1 Demographic characteristics of the bacterial and viral groups in the low-CRP1 cohort

	Viral $N=369$	Bacterial $N=265$	AUC	MW p value	Chi^2 p value
Age, years	63.3 ± 22.7	75 ± 16.5	0.67	< 0.0001	–
Gender (% female)	174 (47.2)	132 (49.8)	0.51	–	0.62
Δt, h	14.7 ± 6	13.5 ± 6.3	0.57	0.024	–
CRP1, mg/L	26.88 ± 16.97	23.03 ± 16.9	0.56	0.003	–
CRP2, mg/L	35.66 ± 35.73	75.76 ± 46.24	0.77	< 0.0001	–
AbsTrend, mg/L/h	1.04 ± 1.7	4.34 ± 10.88	0.83	< 0.0001	–
7 days mortality, *n* (%)	4 (3.5)	24 (9.1)	–	–	< 0.0001
30 days mortality, *n* (%)	16 (4.3)	45 (17)	–	–	< 0.0001
30 days readmission, *n* (%)	36 (9.8)	48/212 (22.6)	–	–	< 0.0001

Values are mean ± SD, % for women

MW p value of the Mann–Whitney test, *Chi² p* value for the Pearson's Chi-squared test, *CRP1, CRP2* the first and second CRP measurement upon admission. In the AUC computation, the positive class was bacterial infection

Table 2 Selected sensitivity and specificity values of on the low-CRP1 group (CRP1 < 60 mg/L, $n=634$) a positive predictive value (PPV), negative predictive value (NPV) and Youden's index

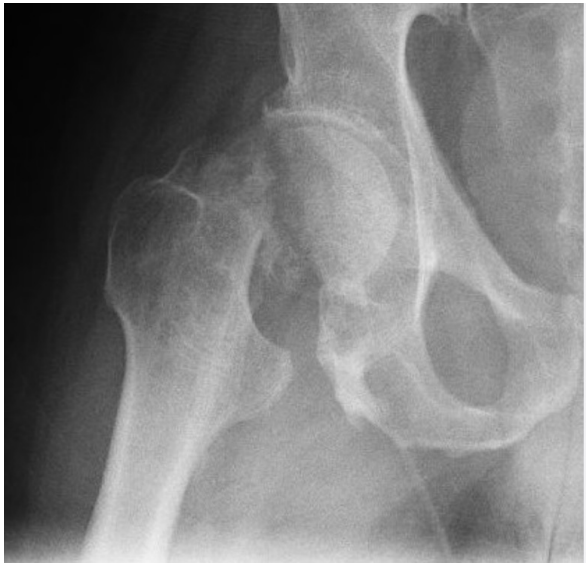
AbsTrend (mg/L/h)	Sensitivity (TPR %)	Specificity (1-FPR %)	PPV	NPV	Youden's index
7.27	9.8	98.6	83.8	60.4	0.08
5.96	21.1	97.0	83.1	62.9	0.18
5.08	29.1	95.9	83.7	65.3	0.25
4.36	38.9	94.9	84.3	68.2	0.34
3.47	50.2	93.8	85.2	72.2	0.44
2.86	60.4	91.3	83.3	76.2	0.52
2.05	70.9	84.3	76.3	79.9	0.55
1.56	72.8	78.6	71.0	80.1	0.51

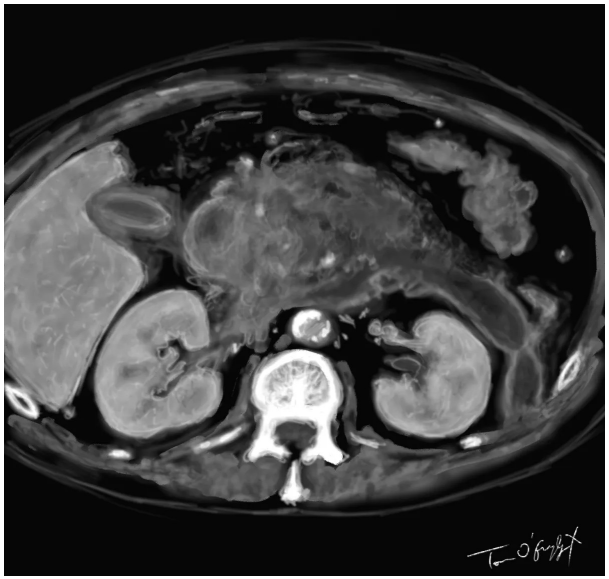
- Augmente spécificité mais mauvaise sensibilité
- Egalement montré sur une valeur de CRP
- Cinétique par rapport au début des symptômes du patient

Largman-Chalamish, Plos one, 2022

CRP: Un problème de spécificité

Non spécifique (66-85%) des infections et encore moins bactériennes





CRP group, mg/L	Bacterial N	Bacterial %	Viral N	Viral %
>300	9	100	0	0
275-300	4	100	0	0
250-275	6	85.7	1	14.3
225-250	9	100	0	0
200-225	13	86.7	2	13.3
175-200	14	100	0	0
150-175	16	94.1	1	5.9
125-150	25	89.3	3	10.7
100-125	10	76.9	3	23.1
75-100	9	64.3	5	35.7
50-75	20	74.1	7	25.9
25-50	27	61.4	17	38.6
0-25	19	30.2	44	69.8

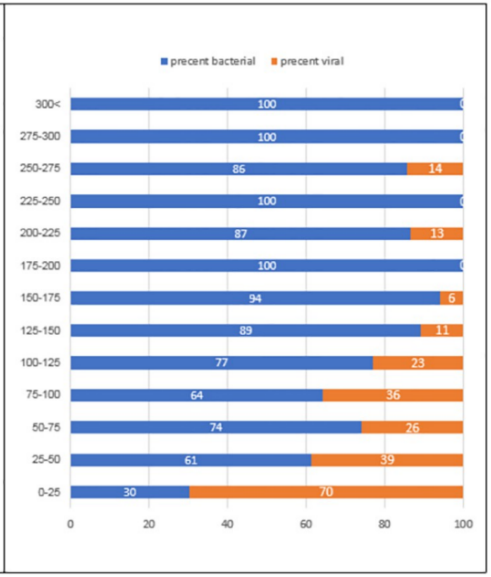


Fig 3. The ratio between bacterial (blue) and viral (orange color) infections in each range of CRP values.

Largman-Chalamish, Plos one, 2022

CRP: Une utilisation parfois excessive

Contents lists available at ScienceDirect

Clinical Microbiology and Infection

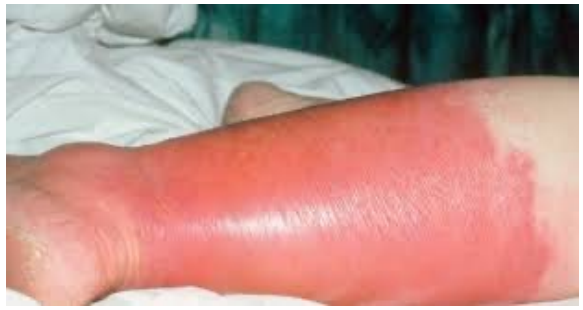
journal homepage: www.clinicalmicrobiologyandinfection.com

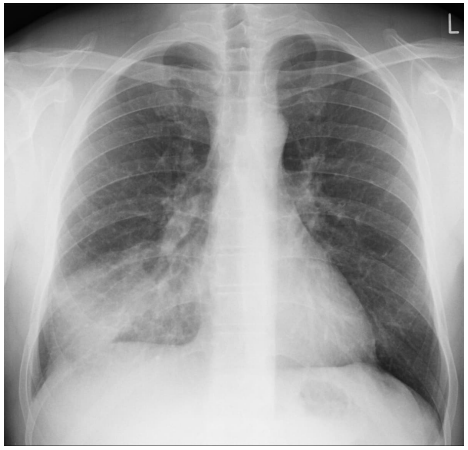
Commentary

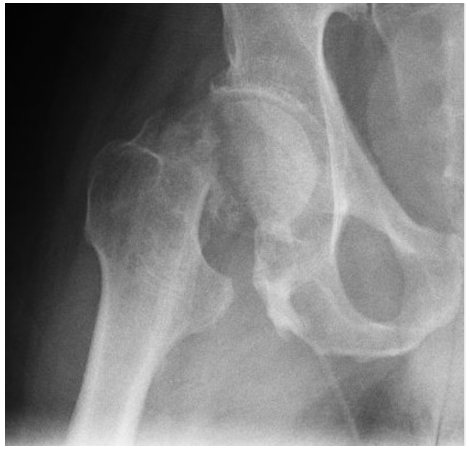
Revisiting diagnostics: erythrocyte sedimentation rate and C-reactive protein: it is time to stop the zombie tests

Brad Spellberg [1,*], Travis B. Nielsen [2,3], Matthew C. Phillips [4,5], Bassam Ghanem [6], Tom Boyles [7], Boris Jegorović [8,9], Brent Footer [10], Jordan K. Mah [11], Anthony Lieu [12], Jake Scott [13], Noah Wald-Dickler [1], Todd C. Lee [14], Emily G. McDonald [15,16]

- Situations évidentes d'étiologie bactérienne
- Situation non infectieuse inflammatoire
- Risque d'antibiothérapie inadaptée ?







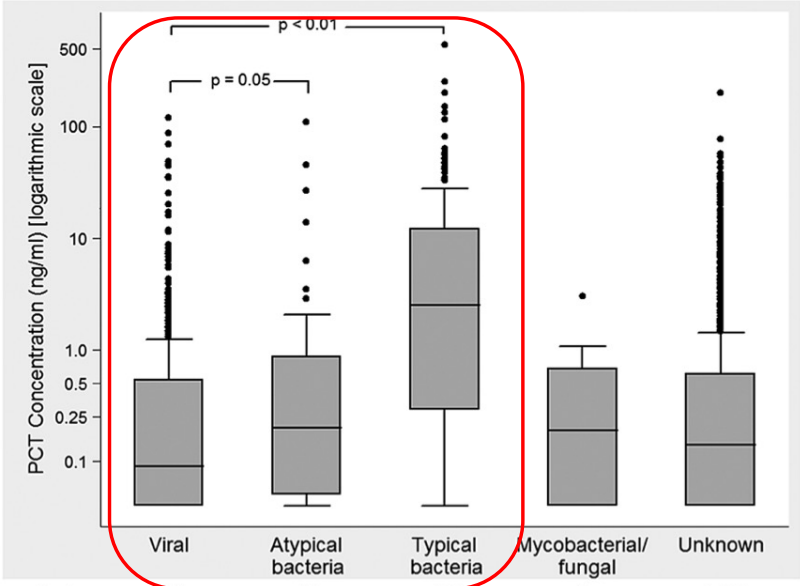
PCT : marqueur imparfait d'infection bactérienne

Table 2. Principal causes of hyperprocalcitonemia

	False negative
A. Neuroendocrine tumors Medullary thyroid cancer Small cell lung cancer Carcinoid syndrome	Very early course of community-acquired pneumonia
B. Noninfectious systemic inflammation Inhalational injury Pulmonary aspiration Pancreatitis Heat stroke Mesenteric infarction	Atypical pneumonia Tuberculosis Brucellosis Lyme disease
C. Severe infection Bacterial Viral Parasitic	Localized infection (ex: soft tissue abscess)
D. Sepsis	
E. Trauma Mechanical injury Burns Surgery	

Becker, Crit Care Med 2008

Hausfater, Médecine et maladies infectieuses, 2014



	Viral	Atypical bacteria	Typical bacteria	Mycobacterial/ fungal	Unknown
n patients	409	67	169	15	1,075
PCT median (ng/ml)	0.09	0.20	2.5	0.19	0.14
PCT IQR (ng/ml)	<0.05, 0.54	<0.05, 0.87	0.29, 12.2	<0.05, 0.68	<0.05, 0.61

Self, CID, 2017

Objectif du test diagnostique ?

Sensibilité :

- Infection grave
- Triage aux urgences

Spécificité :

- Bon usage antibiotique
- Incertitude de prise en charge aux urgences dans les zones grises

Performances si « fièvre aux urgences »

Figure 2

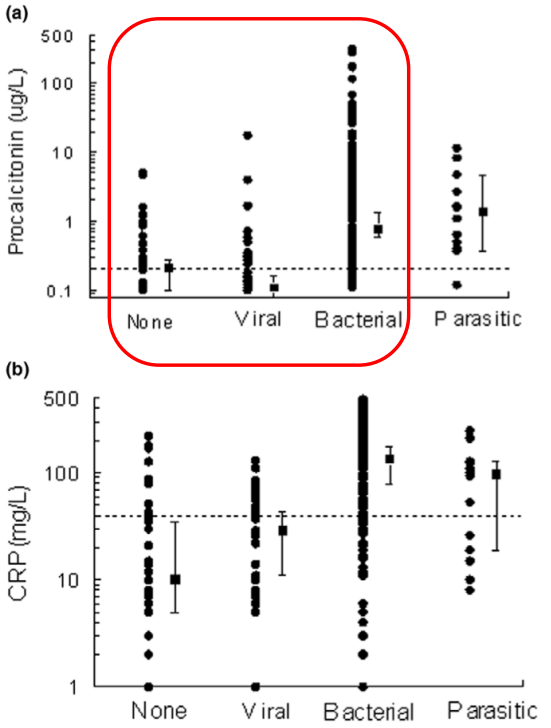


Table 2

PCT and CRP versus emergency physician judgement in diagnosing bacterial/parasitic infection

Test and cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)	Accuracy (95% CI)
CRP					
≥ 5 mg/l	0.96 (0.91–0.98)	0.16 (0.09–0.26)	0.71 (0.65–0.77)	0.63 (0.41–0.81)	0.71 (0.64–0.76)
≥40 mg/l	0.76 (0.69–0.82)*	0.62 (0.51–0.72)	0.81 (0.74–0.87)	0.54 (0.44–0.64)*	0.71 (0.65–0.77)
≥100 mg/l	0.54 (0.46–0.62)	0.90 (0.82–0.95)	0.93 (0.85–0.96)	0.47 (0.39–0.56)	0.65 (0.59–0.71)
PCT					
≥0.1 µg/l	0.90 (0.85–0.94)	0.32 (0.22–0.43)	0.74 (0.68–0.80)	0.60 (0.47–0.74)	0.72 (0.66–0.77)
≥0.2 µg/l	0.77 (0.70–0.82)*	0.59 (0.48–0.70)	0.80 (0.74–0.86)	0.54 (0.43–0.64)*	0.71 (0.65–0.77)
≥0.5 µg/l	0.63 (0.55–0.70)	0.79 (0.68–0.87)	0.87 (0.80–0.92)	0.49 (0.40–0.58)	0.68 (0.62–0.73)
≥2 µg/l	0.36 (0.30–0.44)	0.93 (0.85–0.97)	0.92 (0.83–0.97)	0.40 (0.33–0.47)	0.54 (0.48–0.60)
≥5 µg/l	0.23 (0.17–0.30)	0.99 (0.93–1.00)	0.97 (0.87–0.99)	0.37 (0.30–0.44)	0.46 (0.40–0.53)
Emergency physician	0.85 (0.79–0.90)	0.57 (0.45–0.67)	0.81 (0.75–0.86)	0.63 (0.51–0.74)	0.76 (0.70–0.81)

Clinique

Hausfater, Critical Care 2007

PCT et impact sur la prescription antibiotique (fièvre)

- Etude contrôlée randomisée
- Fièvre aux urgences
- Seuil diagnostic à 0,5 µg/L pour initier l'antibiothérapie

Van der Does, CMI, 2018

Contents lists available at ScienceDirect

Clinical Microbiology and Infection

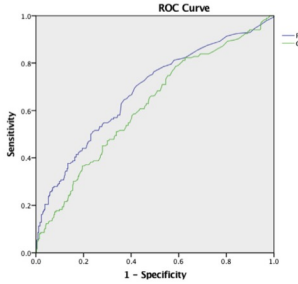
journal homepage: www.clinicalmicrobiologyandinfection.com

Original article

Procalcitonin-guided antibiotic therapy in patients with fever in a general emergency department population: a multicentre non-inferiority randomized clinical trial (HiTEMP study)

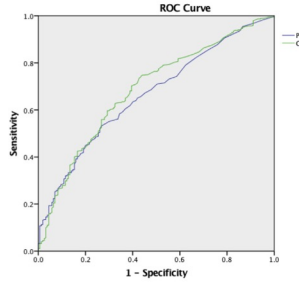
Efficacy outcomes		All (n = 551)	Control group (n= 276)	PCT-guided group (n = 275)	p-value
Antibiotics prescribed	n (%)	411 (75)	212 (77)	200 (73)	0.28[b]
Antibiotics started because of SIRS criteria	n (%)	283 (51)	148 (54)	135 (49)	0.31[b]
Second ED visit within 14 days	n (%)	43 (8)	26 (10%)	17 (7)	0.20[b]
Hospital admission	n (%)	408 (78)	213 (81)	195 (74)	0.10[b]
Length of hospital stay (days)	median (IQR)	4.0 (1.0–7.3)	4.0 (1.0–8.0)	4.0 (0.0–7.0)	0.25[c]
ICU admission within 30 days after ED visit	n (%)	20 (4)	10 (4)	10 (4)	1.00[b]
Length of intensive care stay (days)	median (IQR)	4.5 (5)	5.0 (2.0–9.3)	3.5 (1.0–5.5)	0.32[d]
Mortality within 30 days	n (%)	15 (3)	11 (4)	4 (2)	0.11[b]

ROC curve of PCT and CRP for confirmed bacterial infection (n = 529)



PCT AUC 0.681 (95%CI 0.633 – 0.730)
CRP AUC 0.619 (95%CI 0.569 – 0.669)

ROC curve of PCT and CRP for confirmed and suspected bacterial infection (n = 529)



PCT AUC 0.683 (95%CI 0.635 – 0.731)
CRP AUC 0.695 (95%CI 0.646 – 0.744)

AUC: Area under curve, CRP: C- reactive protein, PCT: Procalcitonin, ROC curve: Receiver operator characteristic curve

Performances pour les pneumonies

Table 3
Summary Estimates of the Accuracy of Biomarkers at Different Cutoffs for the Diagnosis of Community-acquired Pneumonia

Studies (#)	Test and cutoff	Sensitivity	Specificity	LR+	LR–	DOR
3	CRP > 10 mg/L	0.90 (0.52–0.99)	0.48 (0.27–0.70)	1.71	0.27	11.40 (1.64–41.40
6	CRP > 20 mg/L	0.80 (0.68–0.89)	0.62 (0.51–0.71)	2.08 (1.77–2.40)	0.32 (0.21–0.45)	6.63 (4.52–9.34)
2	CRP > 30 mg/L	0.76 (0.29–0.96)	0.70 (0.32–0.92)	2.56 (1.38–3.91)	0.38 (0.12–0.78)	7.55 (4.22–12.50)
1	CRP > 40 mg/L	0.89 (0.85–0.92)	0.52 (0.44–0.59)	1.84 (1.59–2.17)	0.21 (0.15–0.29)	8.68 (5.59–13.48)
9	CRP > 50 mg/L	0.71 (0.56–0.82)	0.80 (0.70–0.88)	3.68 (2.70–4.92)	0.36 (0.25–0.50)	10.20 (8.16–12.70)
1	CRP > 70 mg/L	0.69 (0.59–0.78)	0.66 (0.54–0.77)	2.05 (1.44–2.92)	0.46 (0.33–0.65)	4.44 (2.32–8.50)
6	CRP > 100 mg/L	0.58 (0.39–0.74)	0.90 (0.80–0.95)	5.79 (3.49–9.07)	0.48 (0.31–0.65)	12.20 (7.98–18.00)
1	CRP > 200 mg/L	0.36 (0.31–0.41)	0.96 (0.92–0.98)	8.83 (4.22–18.47)	0.67 (0.62–0.73)	13.22 (6.13–28.46)
2	PCT > 0.06–0.08 µg/L	0.60 (0.36–0.80)	0.75 (0.55–0.88)	2.46 (1.67–3.64)	0.55 (0.35–0.75)	4.64 (2.80–7.07)
3	PCT > 0.1 µg/L	0.74 (0.48–0.90)	0.69 (0.42–0.87)	2.50 (1.50–4.31)	0.39 (0.20–0.63)	6.85 (3.58–12.00)
4	PCT > 0.25 µg/L	0.44 (0.21–0.70)	0.91 (0.76–0.97)	5.43 (2.29–10.80)	0.62 (0.38–0.83)	9.14 (3.37–19.60)
4	PCT > 0.50 µg/L	0.28 (0.11–0.53)	0.96 (0.80–0.99)	8.25 (1.85–28.20)	0.76 (0.54–0.91)	11.20 (2.32–35.50)
1	PCT > 1.0 µg/L	0.43 (0.38–0.48)	0.96 (0.92–0.98)	10.54 (5.05–21.98)	0.60 (0.54–0.65)	17.71 (8.23–38.07)
5	WBCs > 9.5×10^9–10.5×10^9 cells/L	0.55 (0.45–0.66)	0.82 (0.78–0.86)	3.15 (2.46–3.97)	0.54 (0.42–0.66)	5.92 (3.90–8.77)
1	CRP > 49.5 mg/L + PCT > 0.1 µg/L	0.69 (0.59–0.78)	0.69 (0.57–0.80)	2.24 (1.54–3.25)	0.44 (0.32–0.62)	5.05 (2.61–9.75)
1	CRP > 49.5 mg/L + PCT > 0.13 µg/L	0.63 (0.53–0.73)	0.70 (0.58–0.81)	2.14 (1.45–3.16)	0.52 (0.39–0.70)	4.10 (2.14–7.86)
1	CRP > 49.5 mg/L + PCT > 0.25 µg/L	0.48 (0.38–0.58)	0.70 (0.58–0.81)	1.62 (1.07–2.45)	0.74 (0.58–0.94)	2.19 (1.15–4.17)
1	CRP > 49.5 mg/L + PCT > 0.50 µg/L	0.37 (0.27–0.47)	0.79 (0.68–0.88)	1.74 (1.03–2.92)	0.80 (0.66–0.97)	2.17 (1.08–4.34)

CRP = C-reactive protein; DOR = diagnostic odds ratio; LR+ = positive likelihood ratio; LR– = negative likelihood ratio; NC = not calculable; PCT = procalcitonin; WBCs = white blood cells.
*Note: where necessary, a continuity correction was used to avoid division by zero.

Ebell, ACADEMIC EMERGENCY MEDICINE, 2020

Gold standard (scanner, bactériologie)
CRP plus sensible
PCT plus spécifique
Cutoff variables

Objectif du test

CRP et impact sur la prescription antibiotique (pneumonies)

Infection respiratoire:
- Clinique difficile
- Radiologie difficile d'accès et d'interprétation
- Peu de microbiologie
- Infection bactérienne grave

Antibiothérapie inadaptée

Point-of-care biomarker for infection compared with standard of care for guiding antibiotic therapy in acute respiratory infections

Patient or population: people with acute respiratory infections

Settings: primary care

Intervention: point-of-care biomarker (C-reactive protein) test

Comparison: standard care

Outcomes	Illustrative comparative risks* (95% CI)		Effect (95% CI)	No. of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Standard care	C-reactive protein				
Number of participants given an antibiotic prescription at index consultation	**516 per 1000**	**397 per 1000** (356 to 444)	**RR 0.77** (0.69 to 0.86)	10218 (12 RCTs)	⊖⊖⊖⊙ **Moderate**[a]	
Number of participants given an antibiotic prescription within 28 days follow-up	**664 per 1000**	**538 per 1000** (505 to 571)	**RR 0.81** (0.76 to 0.86)	5091 (7 RCTs)	⊖⊖⊖⊖ **High**	
Clinical recovery within 7 days follow-up	**567 per 1000**	**584 per 1000** (545 to 636)	**RR 1.03** (0.96 to 1.12)	3104 (4 RCTs)	⊖⊖⊖⊙ **Moderate**[b]	Defined as number of participants at least substantially improved at 7 days follow-up
Mortality within 28 days follow-up	**1 per 1000**	**0 per 1000** (0 to 2)	**RR 0.53** (0.10 to 2.92)	7737 (9 RCTs)	⊖⊖⊙⊙ **Low**[c]	3 studies reported 5 events. 6 studies had no events. 3 studies did not report on death.

Smedemark, Cochrane Database of Systematic Reviews, 2022

CRP et impact sur la prescription antibiotique (BPCO)

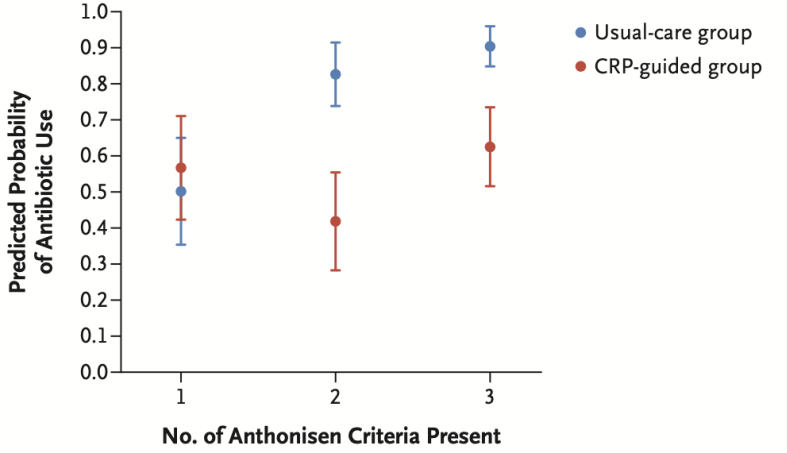


Figure 2. Differential Effect of the Interventions on the Use of Antibiotics during the First 4 Weeks.

Shown is the predicted probability of antibiotic use for acute exacerbations of COPD during the first 4 weeks according to the number of Anthonisen criteria present. The Anthonisen criteria include increased dyspnea, increased sputum volume, and increased sputum purulence. I bars denote 95% confidence intervals.[29]

Butler, NEJM, 2019

PCT et impact sur la prescription antibiotique (pneumonies)

Summary of findings 2. Point-of-care biomarkers (procalcitonin) for infection compared with standard of care for guiding antibiotic therapy in acute respiratory infections

Point-of-care biomarker for infection compared with standard of care for guiding antibiotic therapy in acute respiratory infections						
Patient or population: people with acute respiratory infections **Settings:** primary care **Intervention:** point-of-care biomarker (procalcitonin) test **Comparison:** standard care						
Outcomes	**Illustrative comparative risks* (95% CI)**		**Effect (95% CI)**	**No. of participants (studies)**	**Certainty of the evidence (GRADE)**	**Comments**
	Assumed risk	**Corresponding risk**				
	Standard care	**Procalcitonin**				
Number of participants given an antibiotic prescription at index consultation	**566 per 1000**	**181 per 1000** (130 to 249)	**RR 0.32** (0.23 to 0.44)	317 (1 RCT)	⊕⊝⊝⊝ **Very low**[a]	
Number of participants given an antibiotic prescription within 28 days follow-up	**70 per 1000**	**74 per 1000** (31 to 174)	**RR 1.05** (0.44 to 2.48)	277 (1 RCT)	⊕⊝⊝⊝ **Very low**[a]	
Clinical recovery within 7 days follow-up	**395 per 1000**	**486 per 1000** (367 to 639)	**RR 1.23** (0.93 to 1.62)	277 (1 RCT)	⊕⊝⊝⊝ **Very low**[a]	

Smedemark, Cochrane Database of Systematic Reviews, 2022

Performances diagnostiques (méningites)

Table 7. A summary of the sensitivity and specificity of the blood biomarkers with information about potentially diagnosed etiology and age group. The biomarkers with the highest values are additionally highlighted (sensitivity > 90%, blue; specificity > 90%, orange; both values > 90%, green).

Biomarker	Study	Study Design	Sensitivity	Specificity	Cut-Off	Meningitis Type	Age
PCT	[16]	prospective	87%	100%	>0.88 ng/mL	bacterial vs. non-bacterial	adults
PCT	[17]	prospective	94%	92%	>0.28 ng/mL	bacterial vs. viral	adults
PCT	[19]	cross-sectional	83.3%	86.5%	>0.6 ng/mL	bacterial vs. non-bacterial	adults
PCT	[22]	prospective	94.6%	72.4%	≥1.1 ng/mL	bacterial vs. viral	adults
CRP			67.5%	86.3%	≥90 mg/L		
PCT	[30]	cross-sectional	95.45%	84.6%	>0.5 ng/mL	bacterial vs. non-bacterial	neonates
PCT	[32]	prospective	92.9%	76%	≥1.38 ng/mL	meningitis vs. non-meningitis	children
CRP	[33]	prospective	94%	65%	>50 mg/mL	bacterial vs. viral	children
PCT	[35]	retrospective (secondary analysis)	99%	83%	>0.5 ng/mL	bacterial vs. aseptic	children
PCT	[36]	prospective	100%	63%	>2 ng/mL	bacterial vs. aseptic	children
PCT			86%	82%	>10 ng/mL		
CRP			89%	60%	>10 mg/dL		
CRP			74%	78%	>20 mg/dL		
PCT	[37]	prospective	95%	94%	>0.16 ng/mL	bacterial vs. non-bacterial	children
CRP			80%	90%	>10 mg/dL		
leukocytes			70%	66%	<4 or >15 × 10^9/L		
PCT + CRP	[38]	prospective	100%	96%	PCT > 0.16 ng/mL CRP > 31.2 mg/L	bacterial vs. enteroviral	children
CRP	[39]	retrospective	98.46%	100%	>84 mg/dL	bacterial vs. aseptic	children

Baran, Int. J. Mol. Sci. 2025

Performances diagnostiques (Pyélonéphrites)

- Etude prospective aux urgences
- Relecture des dossiers 7 jours après passage aux urgences
- Severity: Pyélonéphrite ou sepsis

Hertz, J. Clin. Med. 2024

Table 2. AUROCs, cut-offs, diagnostic values, cross-tabulations, and prevalence for each index test stratified by reference test.

Index Test	Reference Test	n	Model AUROC	EEO AUROC	Non-Inf AUROC	Cut-Off	Sens	Spec	PPV	NPV	DA	TP	FP	FN	TN
PCT	UTI	196	0.717	0.648	0.612	0.43 µg/L	57.5%	78.3%	83.0%	50.0%	64.8%	73	15	54	54
	Severity	127	0.712	0.712	-	0.08 µg/L	95.1%	25.0%	84.5%	54.5%	81.9%	98	18	5	6
	Bacteremia	173	0.809	0.858	0.777	0.15 µg/L	94.9%	38.8%	31.1%	96.3%	51.4%	37	82	2	52
suPAR	UTI	195	0.583	0.581	0.480	6.5 µg/L	66.1%	54.4%	73.0%	46.3%	62.1%	84	31	43	37
	Severity	127	0.576	0.638	-	3.74 µg/L	95.1%	0.0%	80.3%	0.0%	77.2%	98	24	5	0
	Bacteremia	172	0.637	0.679	0.605	4.62 µg/L	94.9%	19.5%	25.7%	92.9%	36.6%	37	107	2	26
CRP	UTI	229	0.723	0.771	0.599	71 mg/L	77.9%	58.8%	77.9%	58.8%	71.2%	116	33	33	47
	Severity	149	0.676	0.778	-	19 mg/L	95.0%	20.7%	83.2%	50.0%	80.5%	114	23	6	6
	Bacteremia	201	0.689	0.782	0.646	14 mg/L	95.7%	13.6%	25.3%	91.3%	32.8%	45	133	2	21

AUROC—area under receiver operating characteristics curve; CRP—C-reactive protein; DA—diagnostic accuracy; FN—false negative, FP—false positive; EEO—excluding extreme outliers; Non-inf—excluding the non-infected patients (only UTI and bacteremia); NPV—negative predictive value; PPV—positive predictive value; PCT—procalcitonin; Sens—sensitivity; Spec—specificity; suPAR—soluble urokinase-type plasminogen activator receptor; TN—true negative; TP—true positive; UTI—urinary tract infection.

Performances comparables
Bonne sensibilité pour l'origine haute
Spécificité très mauvaise
La CRP élevée n'est pas un critère fiable de pyélonéphrite

Prédiction de la gravité d'une infection

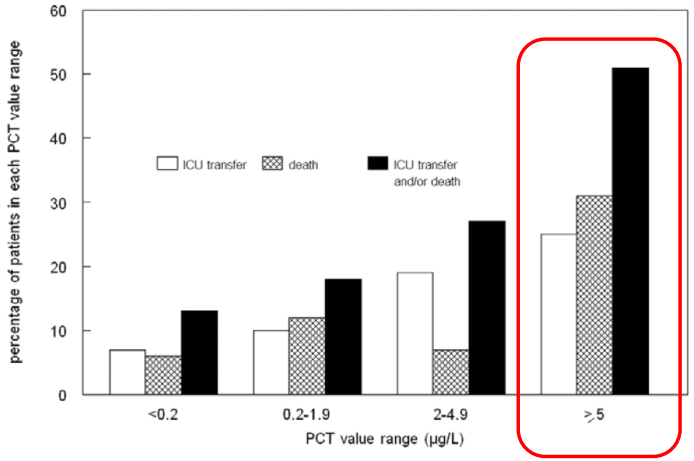
Table IV. Plasma C-reactive protein, procalcitonin and interleukin-6 at admission according to study group ($N = 539$). Differences between the 5 study groups were tested with the Kruskal–Wallis test.

Parameter	All patients ($N = 539$)	No SIRS, no bacterial infection ($n = 59$)	Bacterial infection, no SIRS ($n = 68$)	SIRS, no bacterial infection ($n = 54$)	Sepsis ($n = 309$)	Severe sepsis ($n = 49$)	p-Value
CRP (mg/l) median (range)	111.0 (0.2–580.0)	25.5 (0.2–261.6)	119.3 (0.2–330.3)	27.8 (0.7–365.4)	135.0 (1.0–455.8)	134.5 (3.8–580.0)	<0.0001
PCT (ng/ml) median (range)	0.18 (0.02–165.16)	0.05 (0.02–5.95)	0.13 (0.02–9.75)	0.07 (0.02–3.34)	0.23 (0.02–165.16)	1.05 (0.03–88.96)	<0.0001
IL-6 (pg/ml) median (range)	74.3 (1.5–50 000)	15.3 (1.5–653)	41.3 (1.5–2 637)	32.7 (1.5–3 552)	93.5 (1.5–43 790)	233.4 (9.0–50 000)	<0.0001

SIRS, systemic inflammatory response syndrome; CRP, C-reactive protein; PCT, procalcitonin; IL-6, interleukin-6.

Uusitalo-Seppala, Scand J Infect Dis, 2011

Figure 3



Relation between critical illness (death or ICU transfer) and PCT value range. A total of 55 patients had critical illness, 31 of which were intensive care unit (ICU) transfers and 30 died (including six patients admitted to the ICU). PCT, procalcitonin.

Hausfater, Critical Care 2007

Une PCT ≥ 5 µg/l est un critère de gravité
Performance diagnostique modeste pour la prédiction du sepsis sévère
Infériorité par rapport à la clinique (SOFA)

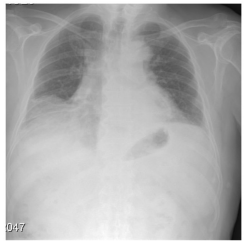
Vignettes cliniques

Vignette 1
Homme 25 ans
Céphalées depuis 12h avec syndrome méningé fébrile à 39°
CRP : 12 mg/l
PCT : 0,16 µg/l

Méningite bactérienne méningocoque

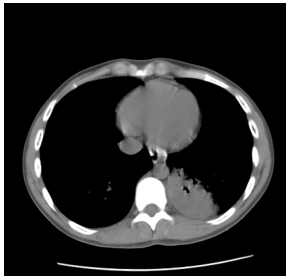
H24: CRP : 150 mg/l
PCT: 2 µg/l
Piège de la cinétique

Vignette 2
Homme 55 ans BPCO
Dyspnée avec expectoration majorée depuis 4 jours
T: 38°
CRP : 17 mg/l



Exacerbation virale

Vignette 3
Homme 70 ans
Fièvre depuis 48h
CRP : 80 mg/l
PCT: 3 µg/l
Pas de franc point d'appel
Examen complémentaire ?



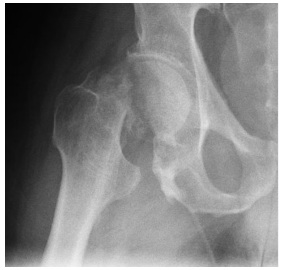
Pneumopathie bactérienne

Vignettes cliniques

Vignette 4
Femme de 26 ans
Signes fonctionnel urinaire depuis 72h
Pas de fièvre, pas de douleur lombaire
BU franchement positive
CRP: 35 mg/l

Cystite simple

Vignette 5
Femme 80 ans
Chute mécanique au domicile
Apyrétique



ECBU : leucocyturie, bactériurie
E coli 10^5
CRP : 150 mg/l

Colonisation urinaire

Synthèse : performances diagnostiques et antibiothérapie

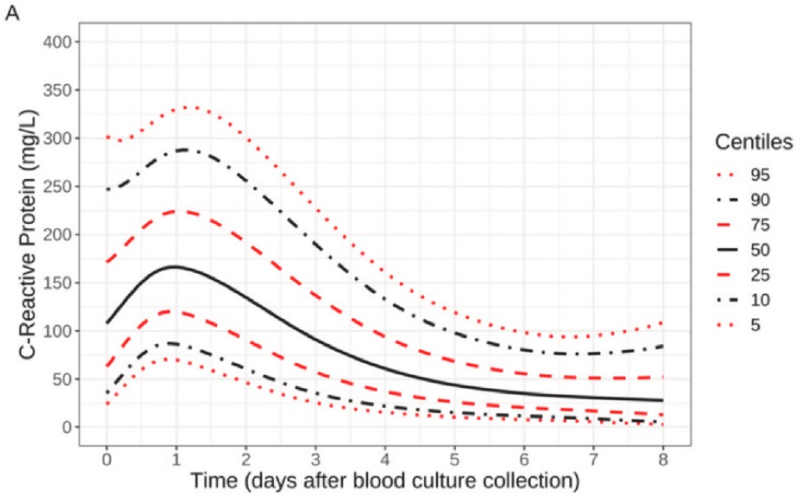
Caractéristiques différentes (sécrétion, cinétique, immunosuppresseurs, foie, rein)

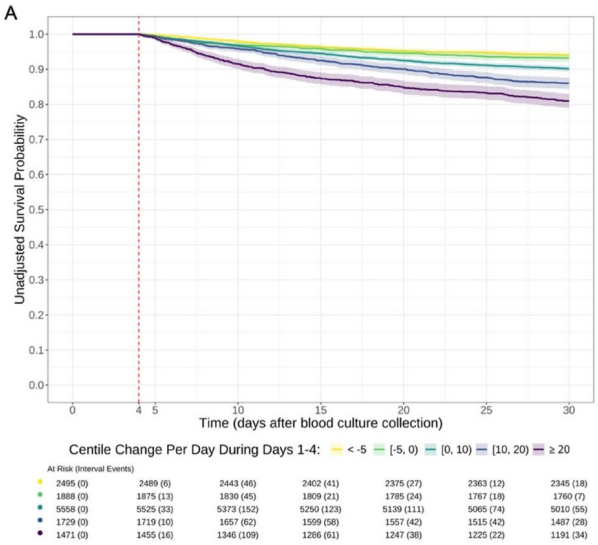
CRP:
- Bonne sensibilité (hors symptômes < 24-48h, et infections localisées/chroniques)
- Aide à la prescription antibiotique dans les infections respiratoires

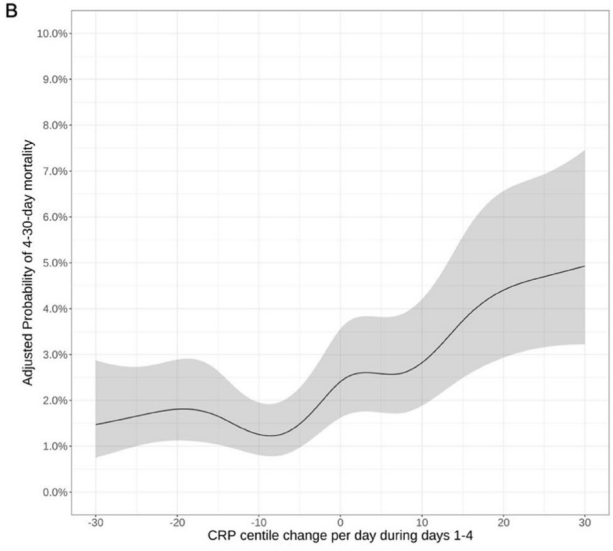
PCT:
- Spécificité plus importante mais imparfaite
- Prédiction de la gravité si élevée mais pas d'intérêt clinique (non inclus dans SOFA)
- Non validée pour aide à l'initiation d'antibiotique aux urgences (fièvre, pneumonie)
- Indication à exploration complémentaire si élevée (seuil ? imageries ?)

Aucun biomarqueur recommandé dans le diagnostic des pneumopathies aigues communautaires

CRP et suivi des infections aigues (bactériémies)







Gu, BMC, 2025

Baisse de la CRP à J4 associée à une réponse clinique, bactériologique et une meilleur survie
Performance diagnostique médiocre car chevauchement

PCT et suivi des infections aigues

Table 3 72-hour PCT kinetics and mortality

PCT kinetics over 72 ± 12 hours	Derivation cohort (number = 154)
ICU mortality	
PCT increase	47.8% (number = 11/23)
PCT decrease 0% to 40%	52.9% (number = 9/17)
PCT decrease 40% to 60%	30.4% (number = 7/23)
PCT decrease 60% to 80%	28.6% (number = 14/49)
PCT decrease >80%	9.5% (number = 4/42)

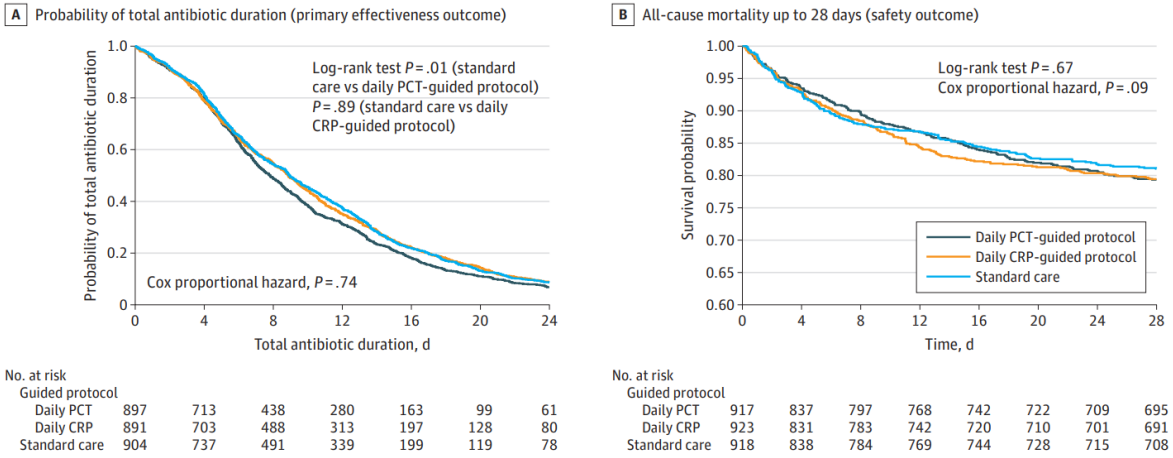
Schuetz, Critical Care, 2013

Suivi de biomarqueurs et arrêt de l'antibiothérapie

PCT protocol	CRP protocol	Advice for PCT and CRP protocols	Advice for control group
Standard care + daily serum PCT measurement until antibiotic discontinuation	Standard care + daily serum CRP measurement until antibiotic discontinuation	Written advice delivered daily by local research team to treating clinician until antibiotic discontinuation	Written advice delivered daily by local research team to treating clinician until antibiotic discontinuation
PCT < 0.25µg/l	CRP < 25mg/l	*"Protocol **STRONGLY** supports stopping antibiotics"*	*"Protocol supports usual care"*
PCT fall by ≥80% from baseline or PCT ≥ 0.25 & ≤ 0.50 µg/l	CRP fall by 50% from baseline	*"Protocol **suggests** stopping antibiotics"*	*"Protocol supports usual care"*

Dans le groupe CRP:
- Pas de diminution de la durée de l'antibiothérapie
- Non infériorité non démontrée sur mortalité

Figure 3. Kaplan-Meier Curves for Probability of Antibiotic Duration and Mortality to 28 Days



No. at risk

Guided protocol							
Daily PCT	897	713	438	280	163	99	61
Daily CRP	891	703	488	313	197	128	80
Standard care	904	737	491	339	199	119	78

No. at risk

Guided protocol								
Daily PCT	917	837	797	768	742	722	709	695
Daily CRP	923	831	783	742	720	710	701	691
Standard care	918	838	784	769	744	728	715	708

The medians of the total antibiotic treatment duration up to 28 days for each of the 3 groups are 7.8 (IQR, 4.5-13.6) days for the daily procalcitonin (PCT)-guided protocol, 8.9 (IQR, 4.5-14.9) days for the daily C-reactive protein (CRP)-guided protocol, and 9.0 (IQR, 4.7-14.6) days for standard care.

Dark, JAMA, 2025

Dans le groupe PCT:
- Diminution modeste de la durée de l'antibiothérapie (6 VS 7 jours)
- Non infériorité démontrée sur mortalité

Merci pour votre attention