10es JOURNÉES du GREPI

Y-a-t-il des marqueurs biologiques fiables de pneumopathie aigue communautaire ?

Dr Damien BASILLE – CHU AMIENS-PICARDIE

UNIVERSITÉ de Picardie Jules Verne

CHU AMIENS PICARDIE

AGIR Agents Infectieux, Résistance et chimiothérapie

SPLF Société de Pneumologie de Langue Française

GREPI

Liens d’intérêts

- **Aucun lien d’intérêt en rapport avec cette présentation**

Introduction – 3 Questions à l'assistance

Définition : une caractéristique qui est objectivement mesurée et évaluée comme indicateur d'un processus biologique normal, d'un processus pathologique, ou de la réponse pharmacologique à une intervention thérapeutique

- **Un biomarqueur de PAC ? Mais plus précisément ?**
- **C'est quoi un biomarqueur fiable ?**
- **Exemples de biomarqueurs ?**

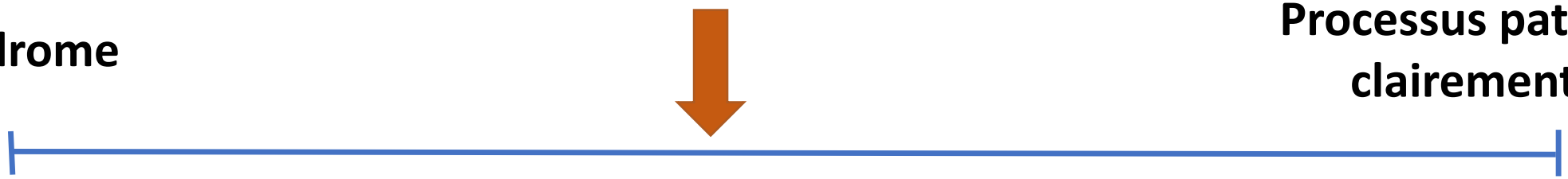
Les objectifs possibles de l'utilisation d'un biomarqueur

- **Diagnostic positif de PAC / éliminer les diagnostics différentiels**
- **Diagnostic étiologique de la PAC**
  - Bactérienne / Virale / …
- **Evaluation de la gravité / orientation du patient**
- **Décision thérapeutique**
  - Instauration / arrêt de l'antibiothérapie
- **Surveillance**

C’est quoi une PAC ?

Syndrome

Processus pathologique clairement défini



- Pathologie psychiatrique
- Pathologie qui donne un ictère
- …

- Leucémie myéloïde chronique
- Hépatite C
- …

Pneumopathie aigüe communautaire

“Pneumonia remains a 21st-century problem treated with 20th-century therapies and diagnosed using 19th-century tools”

Un biomarqueur idéal du diagnostic de PAC

- **Exprimé uniquement en cas d'infection bactérienne**
- **Simple à mettre en œuvre**
- **Rapidement disponible**
- **Bon marché**

- **Plus efficace que les autres méthodes**
  - Examen clinique, imagerie, score pronostic, examen microbiologique

Liste non exhaustive de biomarqueurs potentiels

- **C-Reactive Proteine**
- **Procalcitonine**
- **Leucoycte count**
- **sTREM-1 : soluble triggering receptor expressed on myeloid cells-1**
- **proADM : Pro-adrenomedullin**
- **Preseptin**
- **D-dimère**
- **Lactates**
- **NT-pro BNP**
- **Troponin**
- **Arterial blood lactate to serum albumin ratio**
- **neutrophil to lymphocyte ratio (NLR)**
- **Interleukines (Il-17 ; Il-27 ; Il-37; …)**
- **Serum resistin**
- **Serum suPAR**
- **Surface Proteome of Plasma Extracellular Vesicles**
- **Circulating sphingosine-1-phosphate**
- **fibroblast growth factor 21 (FGF21)**
- **Osteopontine**
- **Glycemic gap**
- **…….**

C-Reactive Proteine

- **Marqueur d'inflammation non spécifique**
- **Pic 36-50 h après le facteur déclenchant**
- **Demi-vie = 19 h**

Ito. *Ann Transl Med.* 2020;8:609

Diagnostic value of C reactive protein in infections of the lower respiratory tract: systematic review

Victor van der Meer, Arie Knuistingh Neven, Peterhans J va

Van der Meer. *BMJ.* 2005;331:26

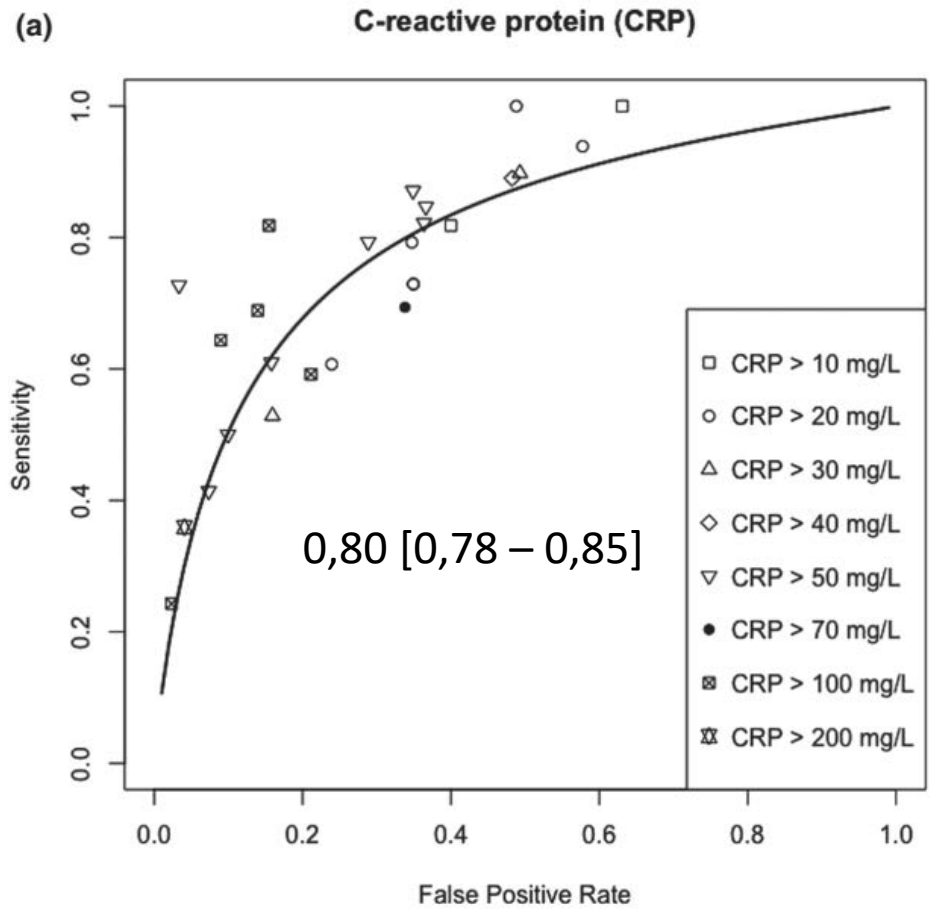
What this study adds

C reactive protein testing is neither sufficiently sensitive to rule out nor specific enough to rule in an infiltrate on chest radiograph and bacterial aetiology of infections of the lower respiratory tract

---

The use of tests for C reactive protein to guide antibiotic prescription in lower respiratory tract infection is not consistently supported by the present evidence

C-Reactive Proteine - diagnostic positif de PAC

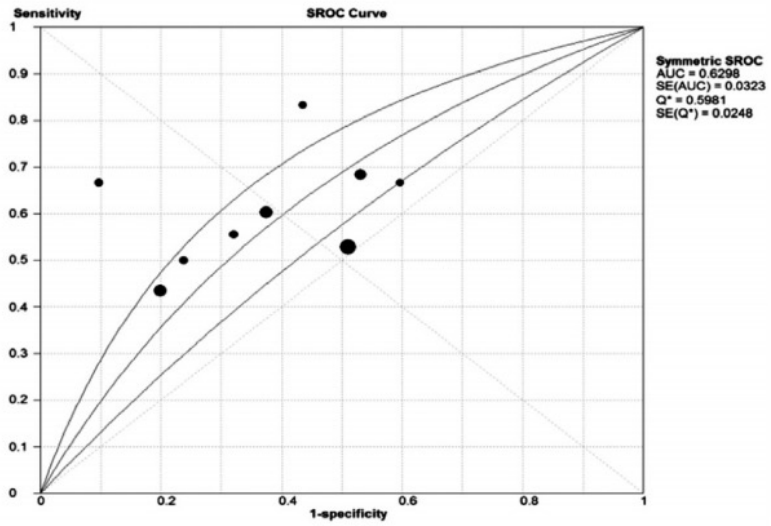


Ebell. A*EMJ.* 2020;27:195-205

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)

C-Reactive Proteine - marqueur pronostic

f. C-reactive protein



Prédiction du risque de Décès :

AUC = 0,63

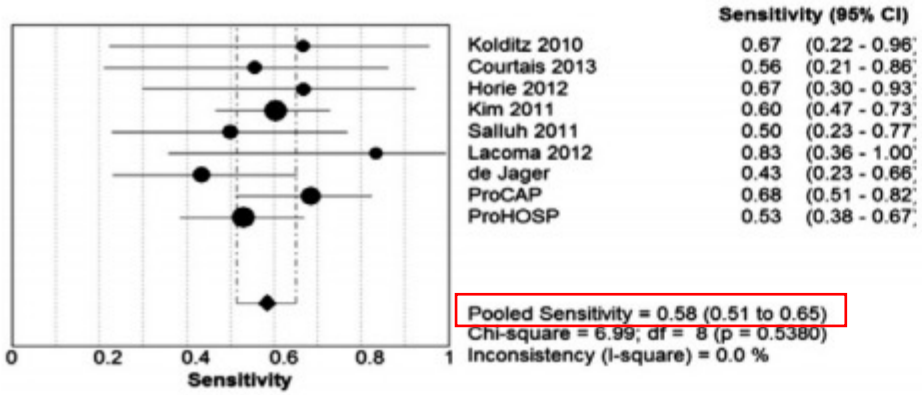
Sens = 0,58 [0,51 – 0,65]

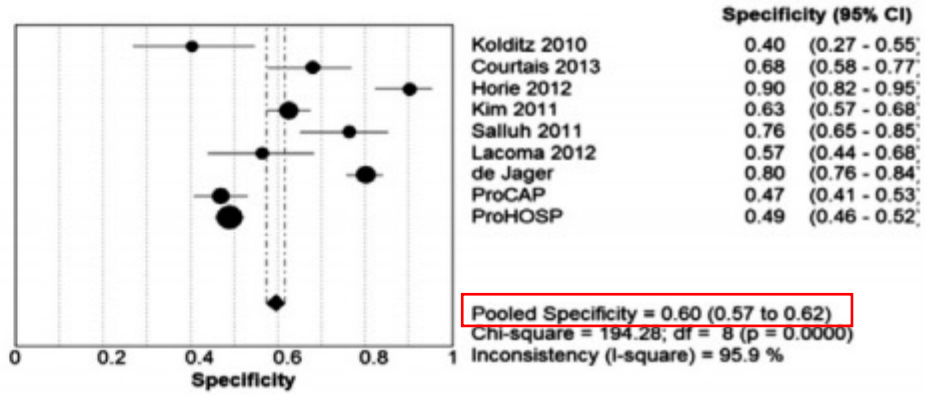
Spé = 0,60 [0,57 – 0,62]

Moins performant que PSI ou CURB-65

Viasus. *J of Inf.* 2016;72:273-82

f. C-reactive protein





sTREM-1 : soluble triggering receptor expressed on myeloid cells-1

- **Produit en cas d'infection bactérienne ou fongique** Ito. *Ann Transl Med.* 2020;8:609

- **sTREM-1 dans LBA**

Bactérien / fongique N = 29	Viral / atypique N = 14	Non infectieuse N = 37
521 ± 95 pg/ml	93 ± 20 pg/ml	93 ± 11 pg/ml

  - OR = 59.7 pour un seuil à 184 pg/ml Huh. *Crit Care.* 2008;12:R6

- **sTREM-1 sérique**
  - Pas de différence selon sévérité Müller. *Crit Care.* 2007;35:990
  - Peu discriminant entre bactérien et viral : AUC = 0,50 [0,45 – 0,56] Esposito. *Plos one.* 2016;11

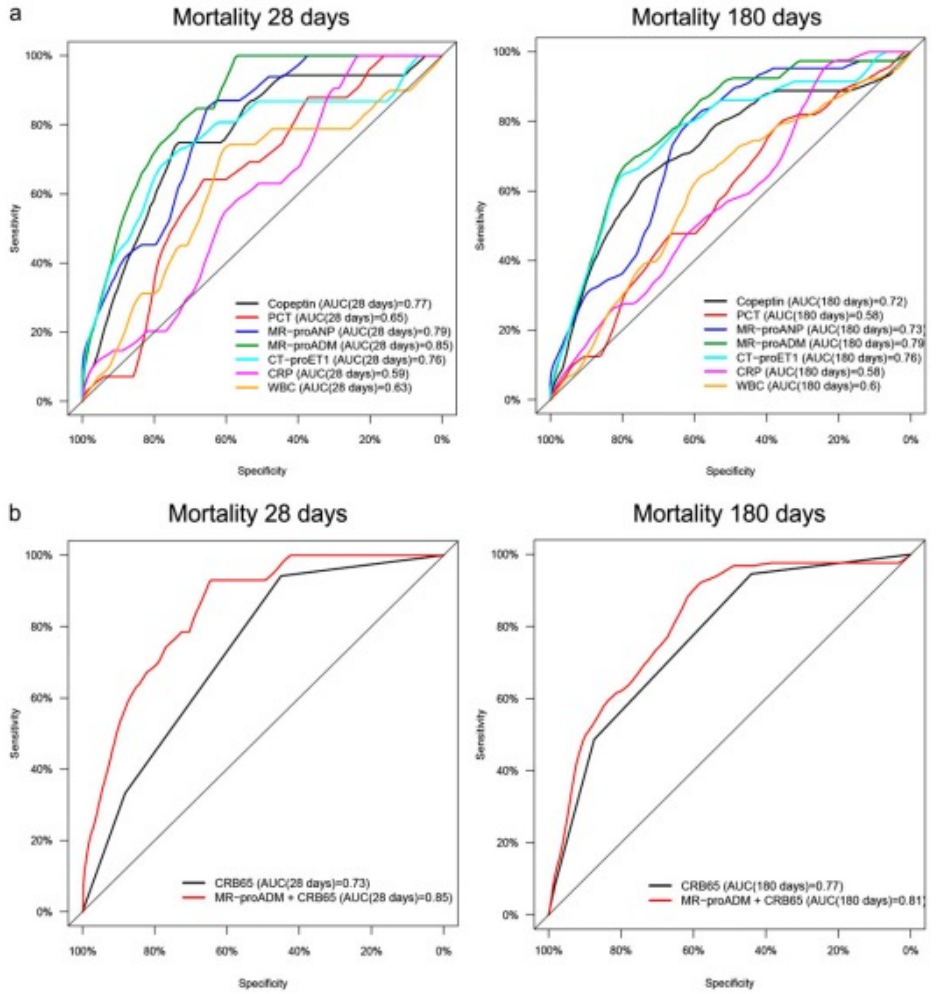
MR-Pro-adrenomedullin

- **Distinction étiologies bactériennes / virales**
  - Peu performant — Bello. *ERJ.* 2012;39:1144-55
- **Bon marqueur de sévérité**
  - Etude CAPNETZ
    - 728 CAP

Krüger. AJRCCM. 2010; 182:1426-34

  - Comparaison aux scores pronostics
    - MRproADM > CURB-65
    - MRproADM = PSI

Viasus. *J of Inf.* 2016;72:273-82

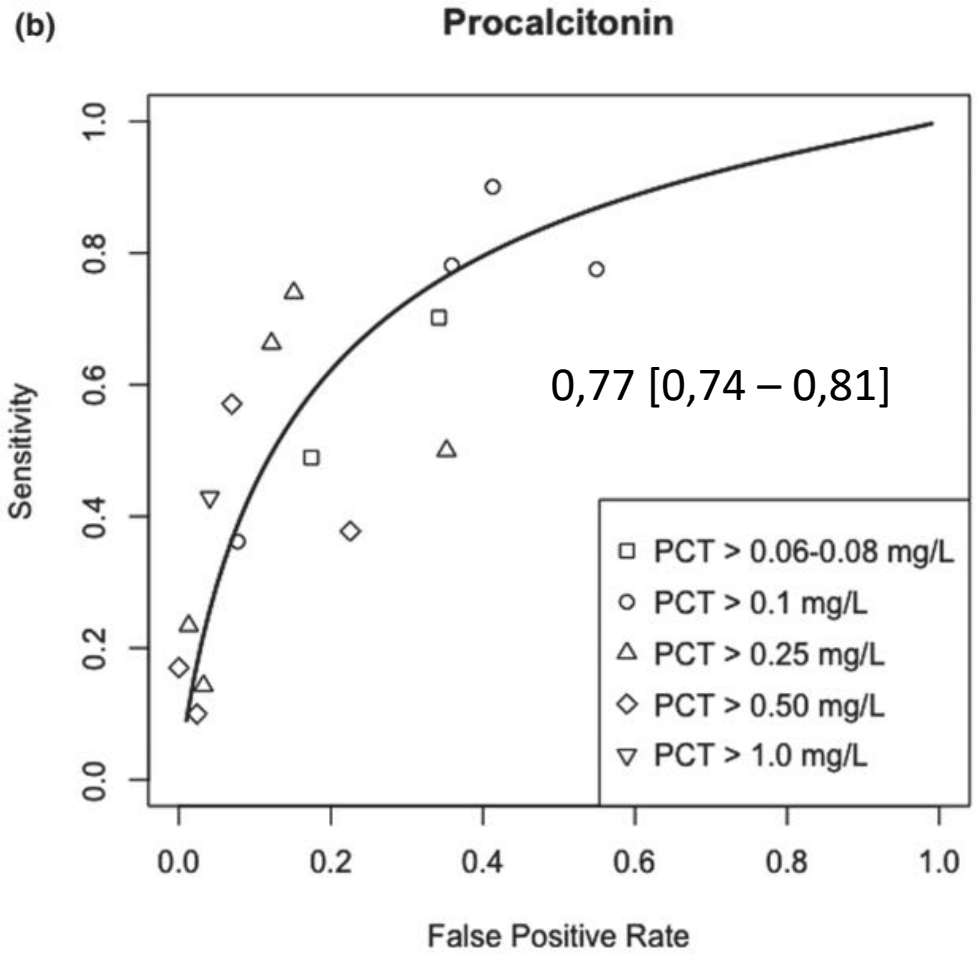


Procalcitonine

- **« spécifique de l'infection bactérienne »**
- **Pic à H6 ; ½ vie de 22-35 heures**
- **Niveau d'expression**
  - Bactéries typiques > atypiques > virus
- **Faux positifs :**
  - SDRA, défaillance multiviscérale, infection fongique systémique, traumatismes ou brûlures sévères, choc cardiogénique, insuffisance rénale, …

Ito. *Ann Transl Med.* 2020;8:609

Procalcitonine – diagnostic positif de PAC

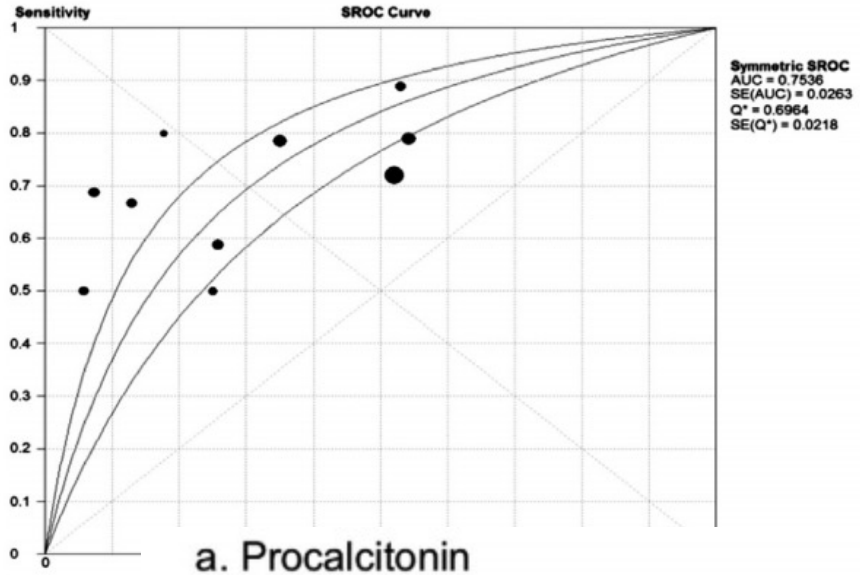


Ebell. A*EMJ.* 2020;27:195-205

Studies (#)	Test and cutoff	Sensitivity	Specificity	LR+	LR–	DOR
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)

Procalcitonine – marqueur pronostic

a. Procalcitonin



Prédiction du risque de Décès :

AUC = 0,75

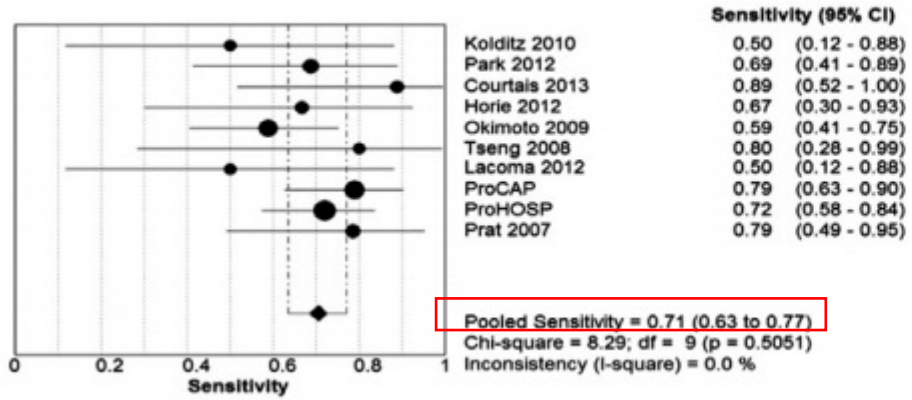
Sens = 0,71 [0,63 – 0,77]

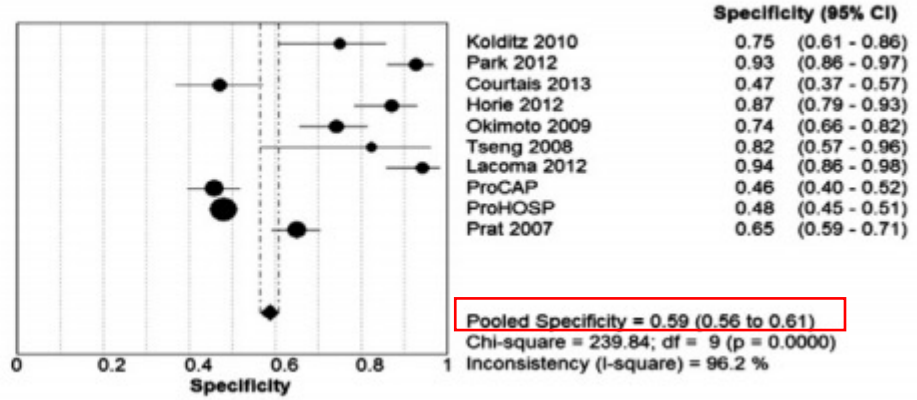
Spé = 0,59 [0,56 – 0,61]

Similaire à PSI et CURB-65

Viasus. *J of Inf.* 2016;72:273-82

a. Procalcitonin





Procalcitonine – Viral *vs.* Bactérien

- **Meta-analyse ➔ 12 études (2408 CAP documentées)**

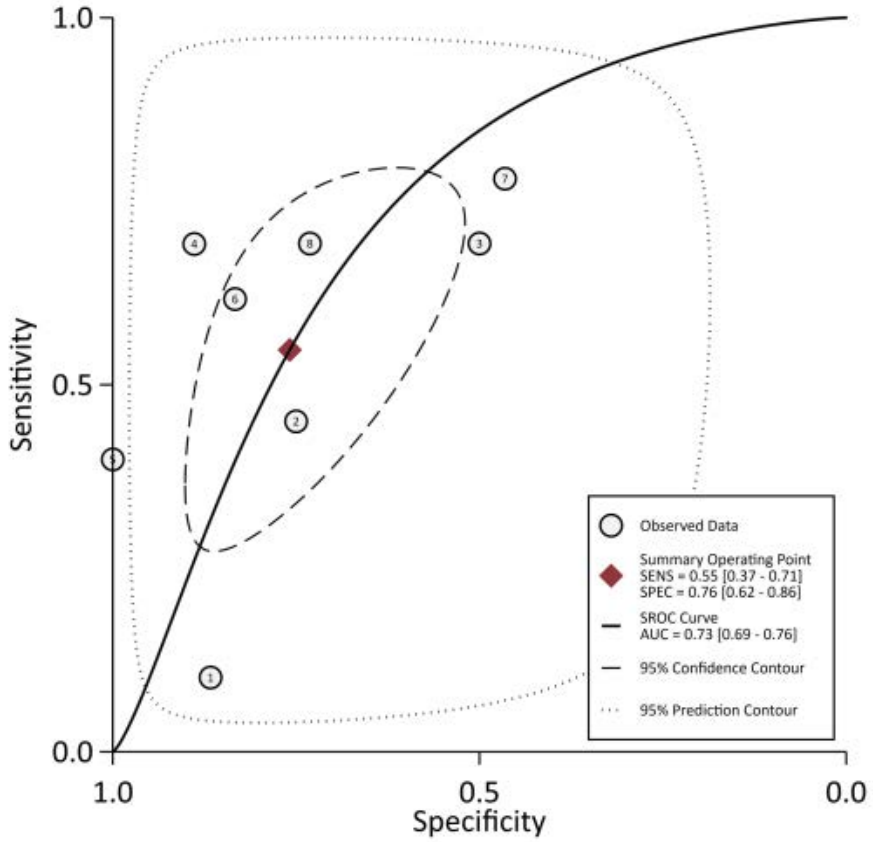
Table 1. Studies Included in the Present Meta-analysis

First Author, Year [Reference]	Study Type	Subjects, N	Procalcitonin Cutoff, µg/L	Sensitivity	Specificity
Masiá, 2005[a,b] [27]	Prospective cohort	104	0.5	0.101	0.867
Hirakata, 2008[a,b] [24]	Prospective cohort	88	0.5	0.450	0.750
Daubin, 2009[c] [23]	Prospective cohort	15	0.5	0.692	0.500
Ingram, 2009[c] [25]	Retrospective cohort	25	0.8	1.000	0.625
Cuquemelle, 2010[c] [22]	Retrospective cohort	52	1.5	0.895	0.667
Ahn, 2011[a] [21]	Retrospective cohort	60	0.8	0.563	0.841
Kasamatsu, 2011[a] [26]	Prospective cohort	116	0.5	0.398	1.000
Song, 2011[a] [31]	Retrospective case control	54	0.35	0.800	0.667
Menéndez, 2012[a] [28]	Prospective cohort	236	0.5	0.691	0.889
Musher, 2013[a] [5]	Prospective cohort	102	0.5	0.617	0.833
Rodríguez, 2015[c] [29]	Prospective cohort	972	0.5	0.781	0.465
Self, 2017[a] [30]	Prospective cohort	582	0.5	0.692	0.731

Kamat. *CID.* 2020;70:538-42

Procalcitonine – Viral *vs.* Bactérien

- **Meta-analyse ➔ 8 études avec seuil à 0,5 (2217 CAP documentées)**



<u>Prédiction Viral vs. bactérien:</u>
AUC = 0,73
Sens = 0,55 [0,37 – 0,71]
Spé = 0,76 [0,62 – 0,86]

Kamat. *CID.* 2020;70:538-42

Procalcitonine et décision thérapeutique

B. Moderate risk or acuity: pneumonic infections in the emergency department and inpatients				
Evaluation on admission				
PCT threshold	**<0.1µg/l**	**<0.25µg/l**	**≥0.25µg/l**	**>0.5µg/l**
Recommendation on antibiotics	Strongly discouraged	Discouraged	Encouraged	Strongly encouraged
Over-ruling the algorithm	Consider alternative diagnosis; consider antibiotics if patient are clinically unstable or at high risk for adverse outcome (e.g., PSI classes IV–V) or have strong evidence for bacterial pathogen			
Follow-up/other comments	Reassess patient and re-check PCT after 6–24h if no clinical improvement		Re-check PCT every 2–3 days to consider early stop of antibiotic therapy	
During antibiotic therapy follow-up evaluation every 1–2 days				
PCT threshold	**<0.1µg/l**	**<0.25µg/l**	**≥0.25µg/l**	**>0.5µg/l**
Recommendation on antibiotics	Stop strongly encouraged	Stop encouraged	Stop discouraged	Stop strongly encouraged
Over-ruling the algorithm	Consider continuing antibiotics if patient clinically not stable			
Follow-up/other comments	Clinical re-evaluation as appropriate		Consider treatment failure if PCT does not decrease adequately	
C. High risk or acuity: sepsis in need of intensive care unit admission				
Evaluation on admission				
PCT threshold	**<0.25µg/l**	**<0.5µg/l**	**≥0.5µg/l**	**>1.0µg/l**
Recommendation on antibiotics	Empirical antibiotics strongly recommended in all patients			
Follow-up/other comments	Consider alternative diagnosis; reassess patient ad re-check PCT every 2 days		Reassess patient and re-check PCT every 2 days to consider discharge and early stop of antibiotic therapy	
During antibiotic therapy follow-up evaluation every 1–2 days				
PCT threshold or change	**<0.25µg/l or >90% drop**	**<0.5µg/l or >80% drop**	**≥0.5µg/l**	**>1.0µg/l**
Recommendation on antibiotics	Stop strongly encouraged	Stop encouraged	Stop discouraged	Stop strongly discouraged
Over-ruling the algorithm	Consider continuation of antibiotics if patient clinically not stable			
Follow-up/other comments	Clinical re-evaluation as appropriate		Consider treatment failure if PCT does not decrease adequately	

Table 1. Baseline Characteristics Overall and by Randomization Group[a]

Characteristics	All (N = 1359)	PCT Group (n = 671)	Control Group (n = 688)
Final diagnosis, No. (%)			
CAP	925 (68.1)	460 (68.6)	465 (67.6)
Exacerbation of COPD	228 (16.8)	115 (17.1)	113 (16.4)
Acute bronchitis	151 (11.1)	69 (10.3)	82 (11.9)
Other final diagnosis	55 (4.0)	27 (4.0)	28 (4.0)
Risk assessment in patients with CAP	**(n = 925)**	**(n = 460)**	**(n = 465)**
PSI points overall, median (IQR)	91 (66-115)	91 (67-117)	91 (66-114)
PSI class, No. (%)			
I	90 (9.7)	76 (11.0)	63 (9.3)
II	173 (18.7)	138 (20.1)	124 (18.4)
III	189 (20.4)	147 (21.4)	152 (22.7)
IV	349 (37.7)	243 (35.3)	252 (37.6)
V	124 (13.4)	84 (12.2)	80 (11.9)
Hospitalized patients, No. (%)	1257 (92.5)	628 (93.7)	629 (91.4)
Initial prescription of antibiotics[b]	1060 (84.3)	492 (78.3)	568 (90.3)
Outpatients, No. (%)	102 (7.5)	43 (6.4)	59 (8.6)
Initial prescription of antibiotics[c]	49 (48.0)	14 (32.6)	35 (59.3)

Schuetz. *JAMA*. 2009;302:1059-66

Procalcitonine et décision thérapeutique

Table 2. Rates of Combined Adverse Outcomes and Mortality by Randomization Group

	No. (%) of Patients		
	PCT Group	Control Group	Risk Difference, % (95% CI)
All patients (intention-to-treat)[a]	**(n = 671)**	**(n = 688)**	
Overall adverse outcome	103 (15.4)	130 (18.9)	–3.5 (–7.6 to 0.4)
Death	34 (5.1)	33 (4.8)	0.3 (–2.1 to 2.5)
ICU admission	43 (6.4)	60 (8.7)	–2.3 (–5.2 to 0.4)
Recurrence/rehospitalization	25 (3.7)	45 (6.5)	–2.8 (–5.1 to –0.4)
Disease-specific complication	17 (2.5)	14 (2.0)	0.5 (–1.1 to 2.0)
Per-protocol population	**(n = 633)**	**(n = 650)**	
Overall adverse outcome	95 (15.0)	123 (18.9)	–3.9 (–8.2 to 0.03)
Death	29 (4.6)	31 (4.8)	–0.2 (–2.6 to 2.0)
Community-acquired pneumonia	**(n = 460)**	**(n = 465)**	
Overall adverse outcome	74 (16.1)	94 (20.2)	–4.1 (–9.1 to 0.9)
Death	24 (5.2)	26 (5.6)	–0.4 (–3.3 to 2.6)

Schuetz. *JAMA*. 2009;302:1059-66

Procalcitonine et décision thérapeutique

Table 3. Antibiotic Exposure, Adverse Effects, and Length of Hospital Stay

	PCT Group	Control Group	Relative Mean Change or Rate Difference % (95% CI)
All patients	**(n = 671)**	**(n = 688)**	
Antibiotic exposure, mean (median [IQR]), d	5.7 (5 [1-8])	8.7 (9 [6-11])	–34.8 (–40.3 to –28.7)
Antibiotic prescription rate, No. (%)	506 (75.4)	603 (87.7)	–12.2 (–16.3 to –8.1)
Adverse effect rate from antibiotics, No. (%)	133 (19.8)	193 (28.1)	–8.2 (–12.7 to –3.7)
Duration in patients with adverse effects, median (IQR), d	3 (1-7)	4 (2-10)	
Length of hospital stay, mean (median [IQR]), d	9.4 (8 [4-12])	9.2 (8 [4-12])	1.8 (–6.9 to 11.0)
Community-acquired pneumonia	**(n = 460)**	**(n = 465)**	
Antibiotic exposure, mean (median [IQR]), d	7.2 (7 [4-10])	10.7 (10 [8-12])	–32.4 (–37.6 to –26.9)
Antibiotic prescription rate, No. (%)	417 (90.7)	461 (99.1)	–8.5 (–11.3 to –5.6)
Adverse effect rate from antibiotics, No. (%)	108 (23.5)	154 (33.1)	–9.6 (–15.4 to –3.8)
Duration in patients with adverse effects, median (IQR), d	3 (2-7)	5 (2-10)	
Length of hospital stay, mean (median [IQR]), d	10.0 (8 [5-13])	9.5 (8 [4-12])	5.3 (–5.1 to 16.8)

Schuetz. *JAMA*. 2009;302:1059-66

Procalcitonine et décision thérapeutique

- **Méta-analyse**
  - 26 RCTs
  - 6708 patients avec IRB

	Control (n=3372)	Procalcitonin group (n=3336)	Adjusted OR (95% CI)*, p value	$p_{interaction}$
Overall				
30-day mortality	336 (10%)	286 (9%)	0·83 (0·7 to 0·99), p=0·037	..
Treatment failure	841 (25%)	768 (23%)	0·90 (0·80 to 1·01), p=0·068	..
Length of ICU stay, days	13·3 (16·0)	13·7 (17·2)	0·39 (–0·81 to 1·58), p=0·524	..
Length of hospital stay, days	13·7 (20·6)	13·4 (18·4)	–0·19 (–0·96 to 0·58), p=0·626	..
Antibiotic-related side-effects	336/1521 (22%)	247/1513 (16%)	0·68 (0·57 to 0·82), p<0·0001	..
Setting-specific outcomes				
Primary care	501	507	..	..
30-day mortality	1 (<1%)	0 (0)	..	..
Treatment failure	164 (33%)	159 (31%)	0·96 (0·73 to 1·25), p=0·751	0·715
Days with restricted activities	8·9 (4·2)	8·9 (4·1)	0·07 (–0·44 to 0·59), p=0·777	..
Antibiotic-related side-effects	128/498 (26%)	102/506 (20%)	0·65 (0·46 to 0·91), p=0·012	0·596
Emergency department	1638	1615	..	..
30-day mortality	62 (4%)	57 (4%)	0·91 (0·63 to 1·33), p=0·635	0·546
Treatment failure	292 (18%)	259 (16%)	0·87 (0·72 to 1·05), p=0·141	0·807
Length of hospital stay, days	8·2 (10·5)	8·1 (7·5)	–0·14 (–0·73 to 0·44), p=0·631	0·684
Antibiotic-related side-effects	208/1023 (20%)	145/1007 (14%)	0·66 (0·52 to 0·83), p=0·001	0·596
Intensive care unit	1233	1214	..	..
30-day mortality	273 (22%)	229 (19%)	0·84 (0·69 to 1·02), p=0·081	0·619
Length of ICU stay, days	14·8 (16·2)	15·3 (17·5)	0·56 (–0·82 to 1·93), p=0·427	0·849
Length of hospital stay, days	26·3 (26·9)	25·8 (23·9)	–0·33 (–2·28 to 1·62), p=0·739	0·641

Schuetz. *Lancet Inf Dis*. 2018;18:95-107

Procalcitonine et décision thérapeutique

- **Méta-analyse**
  - 26 RCTs
  - 6708 patients avec IRB

	Control (n=3372)	Procalcitonin group (n=3336)	Adjusted OR or difference (95% CI), p value*	$p_{interaction}$
Overall				
Initiation of antibiotics	2894 (86%)	2351 (70%)	0·27 (0·24 to 0·32), p<0·0001	..
Duration of antibiotics, days†	9·4 (6·2)	8·0 (6·5)	−1·83 (−2·15 to −1·5), p<0·0001	..
Total exposure of antibiotics, days‡	8·1 (6·6)	5·7 (6·6)	−2·43 (−2·71 to −2·15), p<0·0001	..
Setting-specific outcomes				
Primary care	501	507	..	..
Initiation of antibiotics	316 (63%)	116 (23%)	0·13 (0·09 to 0·18), p<0·0001	<0·0001
Duration of antibiotics, days†	7·3 (2·5)	7·0 (2·8)	−0·52 (−1·07 to 0·04), p=0·068	0·064
Total exposure of antibiotics, days‡	4·6 (4·1)	1·6 (3·2)	−3·02 (−3·45 to −2·58), p<0·0001	0·101
Emergency department	1638	1615	..	..
Initiation of antibiotics	1354 (83%)	1119 (69%)	0·49 (0·41 to 0·58), p<0·0001	<0·0001
Duration of antibiotics, days†	9·8 (5·4)	7·3 (5·1)	−2·45 (−2·86 to −2·05), p<0·0001	<0·0001
Total exposure of antibiotics, days‡	8·2 (6·2)	5·2 (5·4)	−3·02 (−3·41 to −2·62), p<0·0001	<0·0001
Intensive care unit	1233	1214	..	..
Initiation of antibiotics	1224 (99%)	1116 (92%)	0·02 (0·01 to 0·05), p<0·0001	<0·0001
Duration of antibiotics, days†	9·5 (7·4)	8·8 (7·8)	−1·23 (−1·82 to −0·65), p<0·0001	<0·0001
Total exposure of antibiotics, days‡	9·5 (7·4)	8·1 (7·9)	−1·44 (−1·99 to −0·88), p<0·0001	<0·0001

Schuetz. *Lancet Inf Dis*. 2018;18:95-107

Procalcitonine et décision thérapeutique

- **Méta-analyse**
  - 26 RCTs
  - Sous groupe PAC

	Control (n=3372)	Procalcitonin group (n=3336)	Adjusted OR (95% CI)*, p value	$p_{interaction}$
Disease-specific outcomes				
Community-acquired pneumonia	1468	1442	..	..
30-day mortality	206 (14%)	175 (12%)	0·82 (0·66 to 1·03), p=0·083	0·958
Treatment failure	385 (26%)	317 (22%)	0·78 (0·66 to 0·93), p=0·005	0·052
Length of ICU stay, days	10·5 (10·3)	11·9 (13·3)	1·45 (0·15 to 2·75), p=0·029	0·119
Length of hospital stay, days	13·3 (15·7)	13·9 (16·1)	0·74 (−0·25 to 1·73), p=0·143	0·094
Antibiotic-related side-effects	186/671 (28%)	127/666 (19%)	0·62 (0·48 to 0·8), p<0·0001	0·227
Community-acquired pneumonia	1468	1442	..	..
Initiation of antibiotics	1455 (99%)	1340 (93%)	0·08 (0·04 to 0·15), p<0·0001	<0·0001
Duration of antibiotics, days†	10·5 (6·2)	8·0 (5·7)	−2·45 (−2·87 to −2·02), p<0·0001	<0·0001
Total exposure of antibiotics, days‡	10·4 (6·2)	7·5 (5·9	−2·94 (−3·38 to −2·5), p<0·0001	0·004

Schuetz. *Lancet Inf Dis*. 2018;18:95-107

Procalcitonine et décision thérapeutique

- **RCT dans 14 hôpitaux avec haut niveau de qualité pour PEC des PAC**
- **Rappel des recommandations**
  - TTT des PAC
  - Interprétation PCT
- **1656 patients avec IRB**
  - 20 % de PAC
  - 38% d'asthme
  - 32% EA-BPCO
  - 25% de bronchite aiguë

Table 1. (Continued.)

Characteristic	Procalcitonin (N = 826)	Usual Care (N = 830)
Community-acquired pneumonia	167/822 (20.3)	161/823 (19.6)
PSI class I	48/167 (28.7)	34/161 (21.1)
PSI class II	52/167 (31.1)	52/161 (32.3)
PSI class III	30/167 (18.0)	33/161 (20.5)
PSI class IV	29/167 (17.4)	38/161 (23.6)
PSI class V	7/167 (4.2)	3/161 (1.9)
Other lower respiratory tract infection	42/822 (5.1)	42/823 (5.1)
Non–lower respiratory tract infection	20/822 (2.4)	21/823 (2.6)
Hospitalized — no. (%)‡‡	378 (45.8)	404 (48.7)

Huang. *NEJM*. 2018;379:236-49

Procalcitonine et décision thérapeutique

- **RCT dans 14 hôpitaux avec haut niveau de qualité pour PEC des PAC**
- **Rappel des recommandations**
  - TTT des PAC
  - Interprétation PCT
- **1656 patients avec IRB**

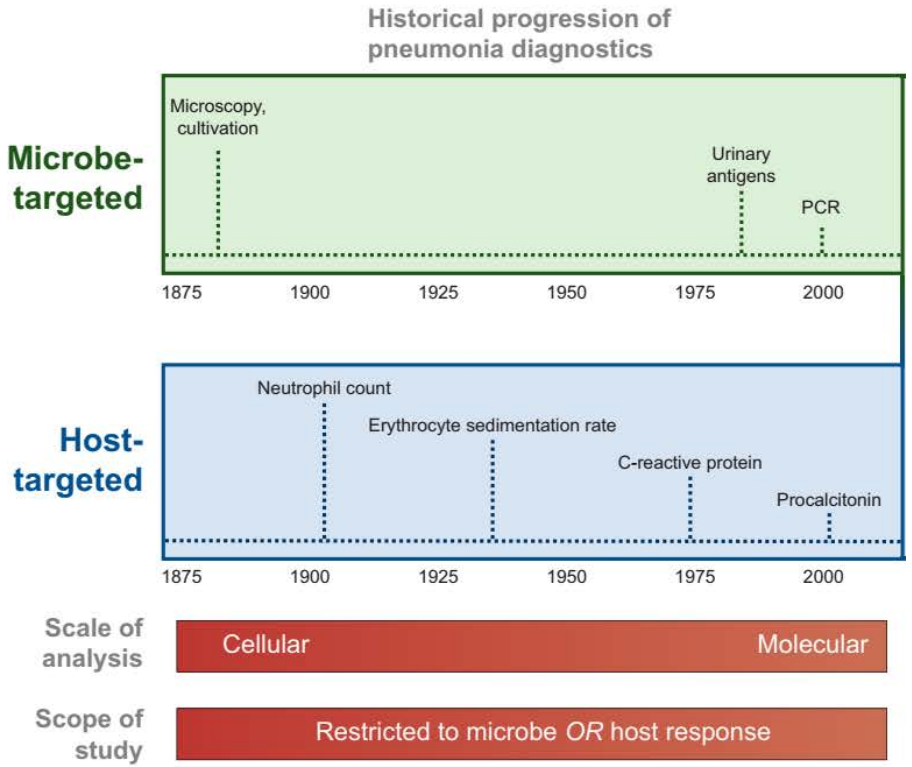
Table 2. Antibiotic Exposure.*

Outcome	Procalcitonin (N=826)	Usual Care (N=830)	Difference (95% or 99.86% CI)†
Intention-to-treat population‡			
Antibiotic-days by day 30§	4.2±5.8	4.3±5.6	−0.05 (−0.6 to 0.5)
Received any antibiotics by day 30 — estimated no. (%)¶	471 (57.0)	513 (61.8)	−4.8 (−12.7 to 3.0)
Antibiotic prescription in ED — estimated no. (%)¶‖	282 (34.1)	321 (38.7)	−4.6 (−12.2 to 3.0)
Antibiotic-days during hospital stay	2.6±3.3	2.7±3.0	−0.1 (−0.8 to 0.6)
Hospital length of stay — days	5.0±4.4	4.7±3.5	0.3 (−0.2 to 0.9)
Patients with final diagnosis of community-acquired pneumonia			
No. of patients	167	161	
Antibiotic-days by day 30	7.8±7.0	7.2±6.0	0.7 (−1.7 to 3.1)
Received any antibiotics by day 30 — estimated no./total no. (%)¶	148/167 (88.6)	154/161 (95.9)	−7.3 (−16.8 to 2.2)
Antibiotic prescription in ED — estimated no./total no. (%)¶‖	120/167 (71.9)	123/161 (76.3)	−4.4 (−19.9 to 11.0)
Antibiotic-days during hospital stay	3.9±3.0	4.1±3.1	−0.2 (−1.5 to 1.1)
Hospital length of stay — days	5.8±4.9	5.9±4.2	−0.1 (−1.2 to 1.1)

Huang. *NEJM*. 2018;379:236-49

Conclusion

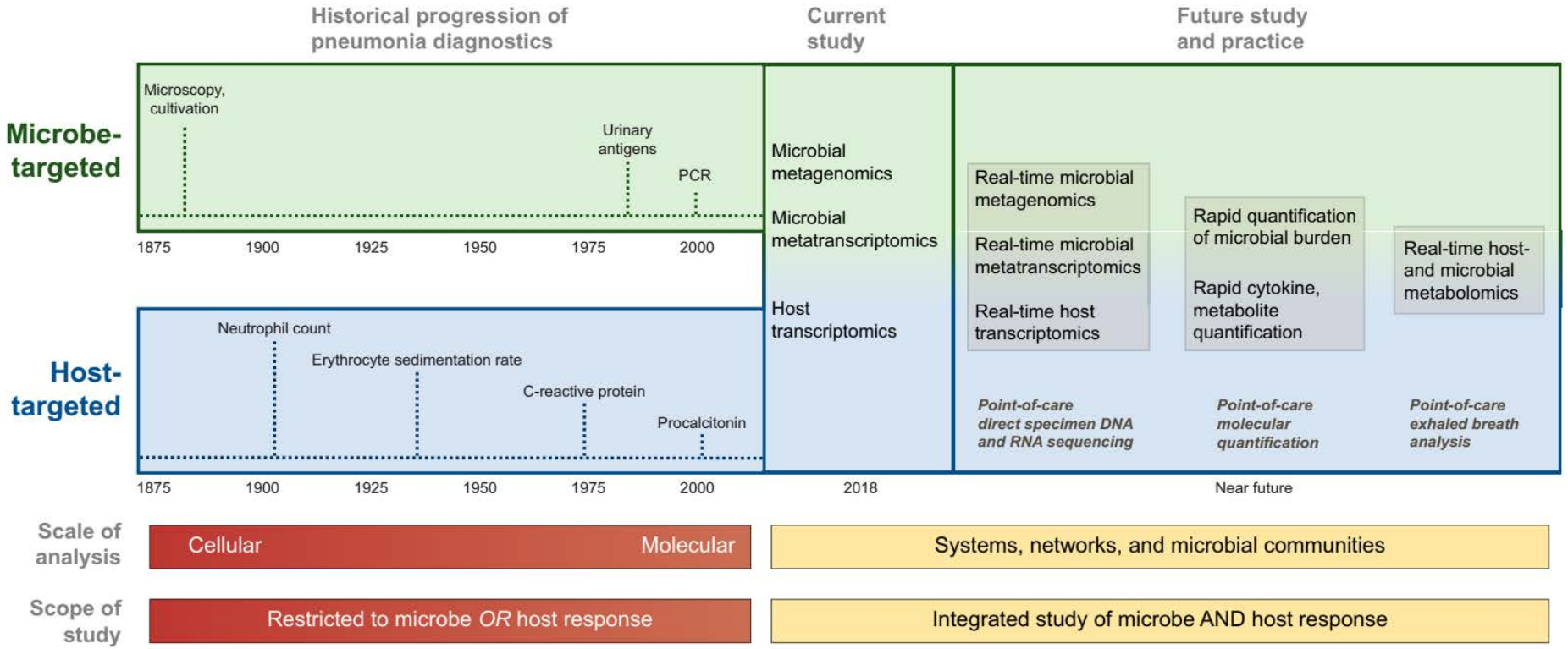
- **Biomarqueurs peu performants pour :**
  - Diagnostic positif de PAC / Diagnostic étiologique



Chanderraj. *PNAS*.2018;115:13148-13150

Conclusion

- **Biomarqueurs peu performant pour :**
  - Diagnostic positif de PAC / Diagnostic étiologique



Chanderraj. *PNAS*.2018;115:13148-13150

Conclusion

- **Evaluation de la gravité & aide à l'orientation :**
  - MR-Pro-adrenomedullin
  - PCT

  ➔Peu de bénéfice par rapport aux scores cliniques

- **Aide à la décision thérapeutique limitée**
  - Intérêt +++ du suivi des recommandations actuelles
    - Critères de stabilité clinique
  - Intérêt +++ d'études pour définir la durée d'antibiothérapie