

Optimal Therapy in sCAP

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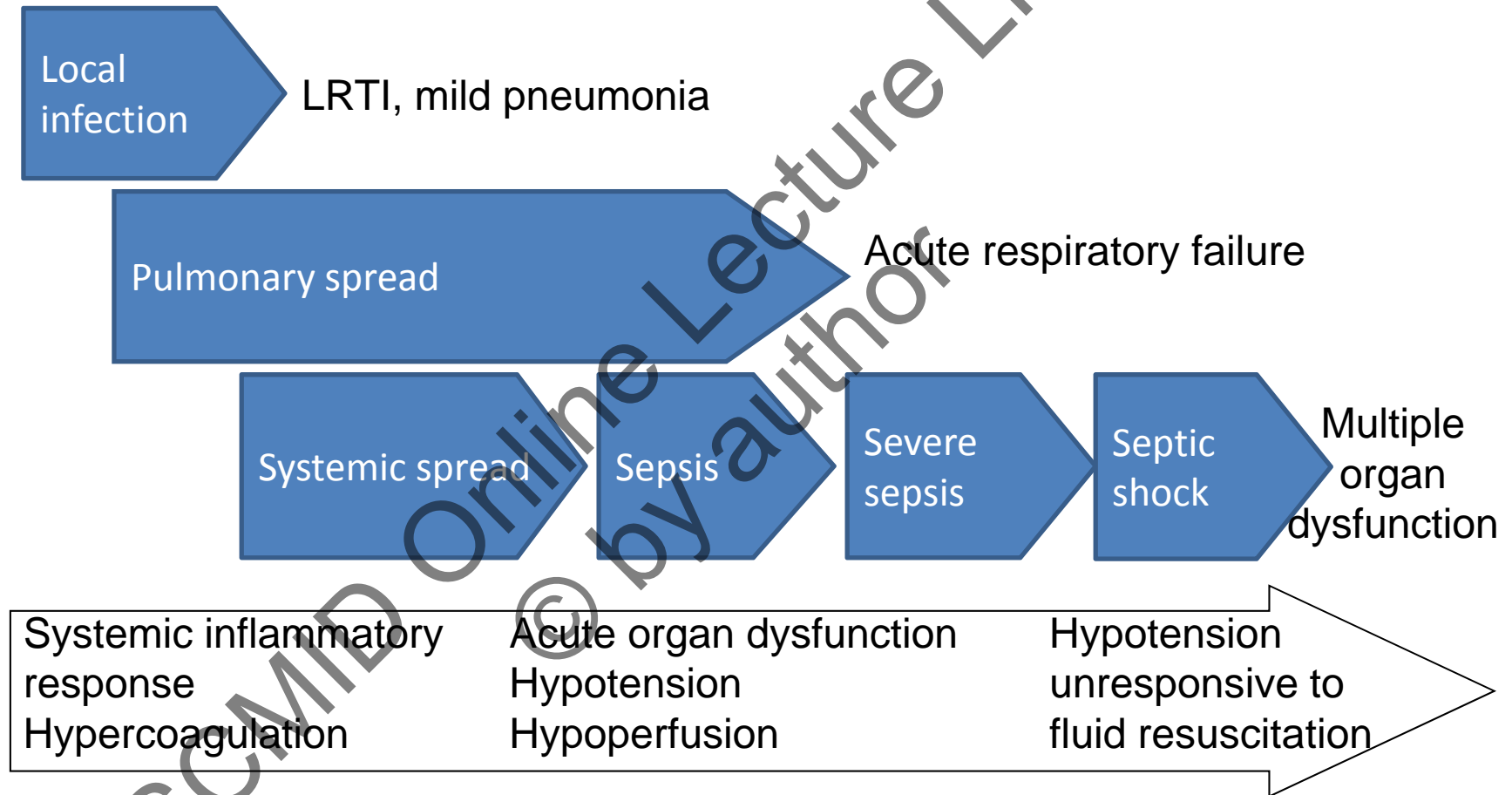
Overview

- Is sCAP a progressive or systemic disease?
- Despite advances in antimicrobial therapy, mortality due to pneumonia has not decreased significantly and ICU admissions are increasing. Why?
- PSI, CURB-65 and IDSA/ATS criteria aid site-of-care decision?
- Use of IDSA/ATS criteria, improves outcomes and optimises use of resources?
- What treatment is beneficial in improving outcomes?

Definition of severe community acquired pneumonia (sCAP)

- CAP is defined as...
 - ...an acute illness with clinical features of lower respiratory tract infection characterized by new radiological shadowing and no other explanation for the illness
- sCAP is defined as...
 - ...CAP that necessitates ICU admission

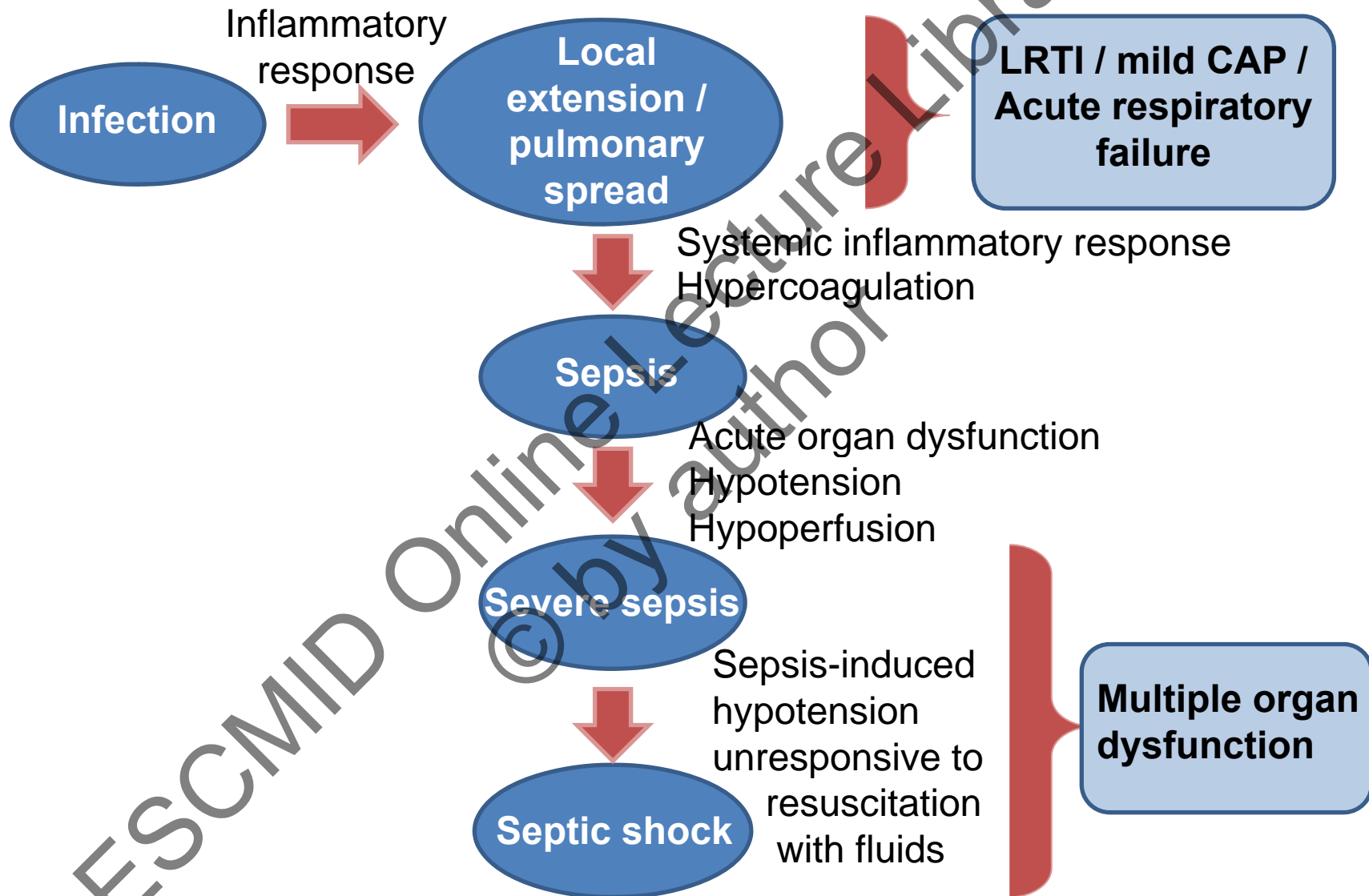
sCAP: A progressive disease



Neuhaus and Ewig, *Med Clin North Am* 2001; 85 (6): 1413-25
 Bone et al, *Chest* 1997; 112: 235-43
 Nystrom, *J Antimicrobial Chemotherapy* 1998; 41 (SA): 1-7
 Dremsizov et al, *Chest* 2006; 129: 968-78

Mandell, *Infect Dis Clin N Am* 2004; 18: 761-776
 Ewig et al, *Eu Respir J* 2006; 27: 6-8
 Restrepo and Anzueto, *Curr Opin Infect Dis* 2006; 19: 557- 564
 Beal and Cerra, *JAMA* 1994; 271 (3): 226-233

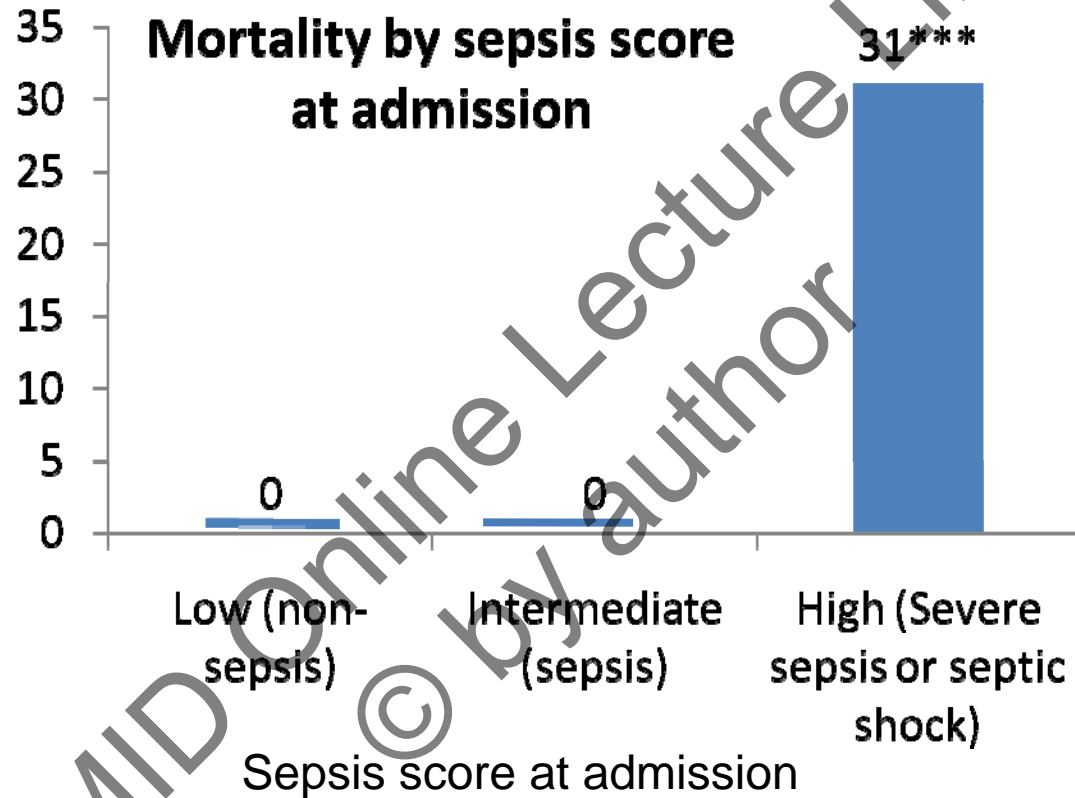
sCAP as a systemic disease



Beal and Cerra, JAMA 1994; 271 (3): 226-233

Nystrom, J Antimicrobial Chemotherapy 1998; 41 (SA): 1-7

Mortality due to sepsis in sCAP

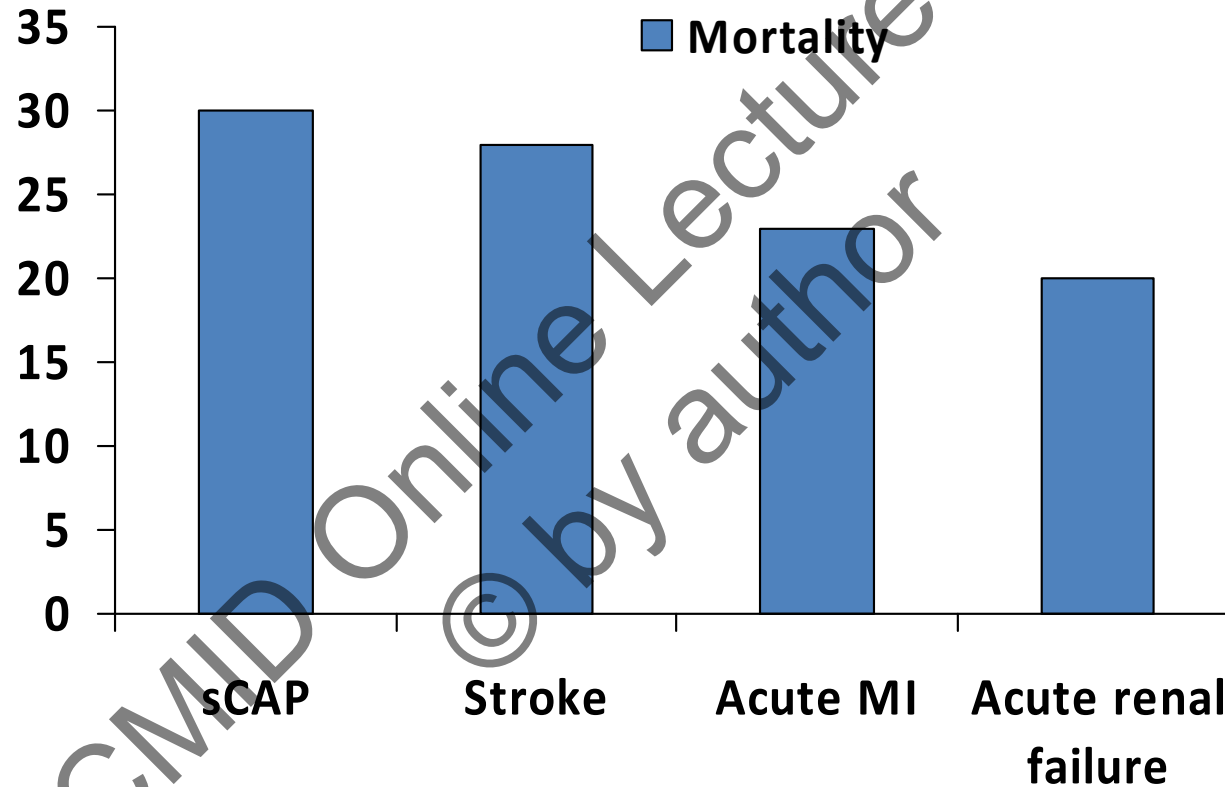


- Sepsis severity at admission significantly impacts outcome
- Pre-hospitalisation treatment is associated with less severe disease

*** $p < 0.0001$

Schaaf et al, Eur Respir J 2007; 30: 517- 524

sCAP mortality is high compared to other ICU conditions



Woodhead et al. *Crit Care* 2006;10(suppl 2): S1-S9

Lesage et al. *Crit Care Med* 2004; 32: 100-105

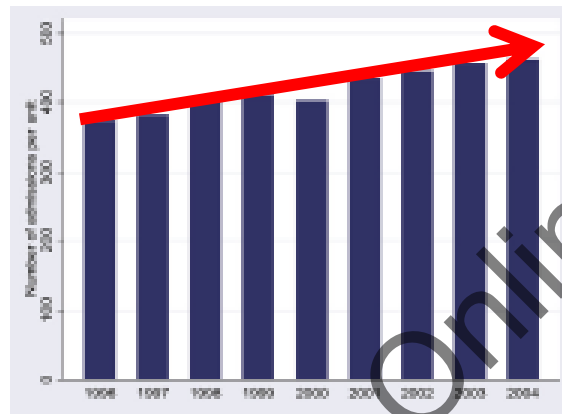
Clermont et al. *Kidney Int* 2002; 63: 986-996

Marik, *Internet J Emerg Intensive Care Med* 1997; 1(2): 1-10

sCAP admissions to ICU are rising

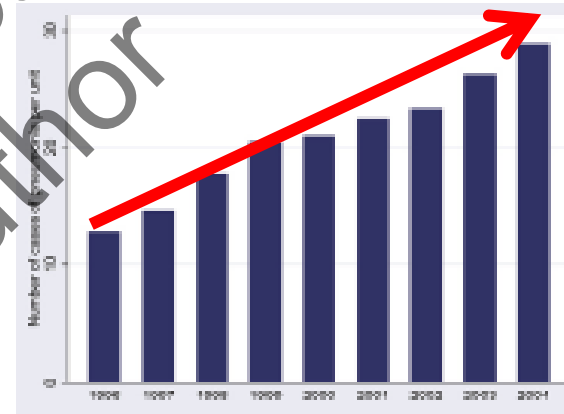
172 adult ICUs across England, Wales and Northern Ireland studied from 1996 to 2004
(n=301,871 admissions including n=17,869 CAP admissions)

Admissions to ICU / year



24%
increase

Admissions with sCAP to ICU / year



128%
increase

- ICU admissions for sCAP increased by 128% compared to 24% rise in total ICU admissions ($p < 0.001$)
- US census estimates
 - 750,000 admissions in 2010
 - 1 million admissions in 2020

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Severe Sepsis & CAP

- 39 yr woman. 6-months pregnant
- Admitted with multilobar pneumonia
- D0 - Husband took her to the ER
- Clinical examination:
 - 39.5 °C. BP 85/55 mmHg. RR 31x' Pulse 120x'
 - Lip cyanosis. Bilateral Rales
 - Chest-X Rays

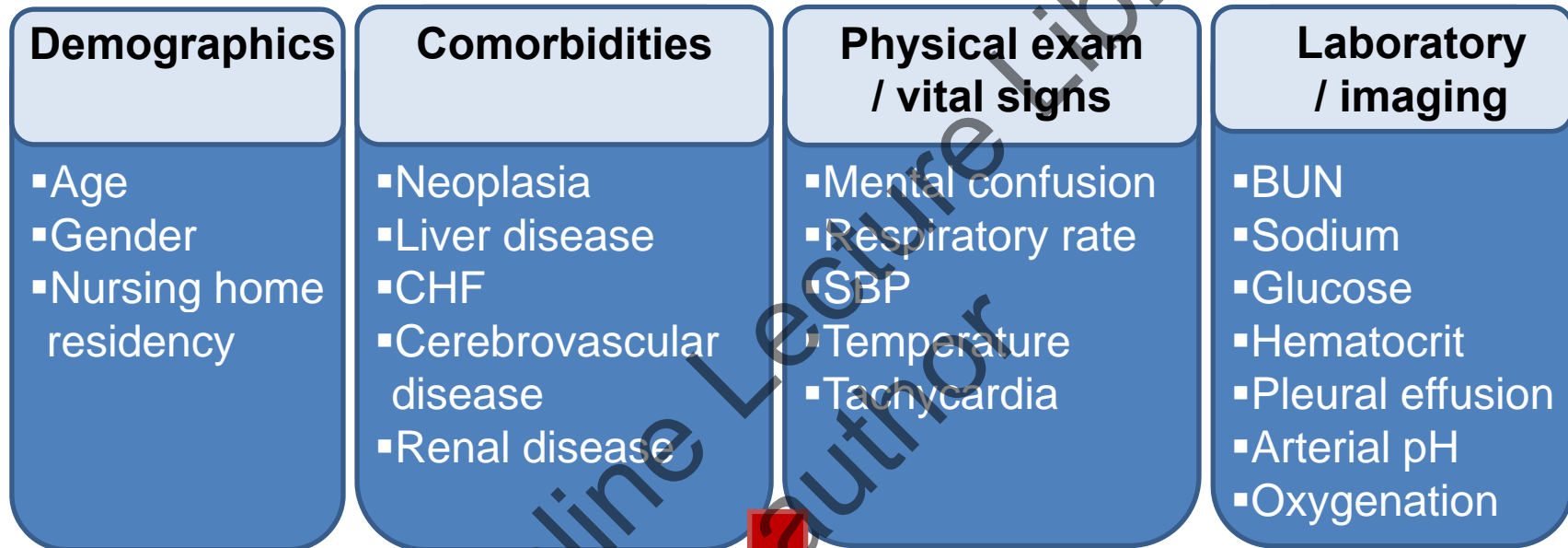
Exams

- WBC count 4,000 Hb: 13 g/l
- Platelets 89,0. PTT Normal. Quick: 1.3
- P/F ratio 157
- Creatinine: 0.8 mg/L Urea 4 mmol/l
- Na 136 K 4.5 Glucose 130
- Lactate 7 mmol/L

Crossroads

- **Diagnosis?**
- **Hospitalisation?**
 - PSI (Fine) 69 points – class II
 - 0.6% Predicted mortality
- **ICU admission?**
 - ATS criteria: tachypnea, bilateral pneumonia
 - BTS: RR > 30x', diastolic BP < 60
 - APACHE II : 14 (17% mortality)

PSI for hospitalisation decision



Risk class	Mortality (%)	Recommended site of care
I	0.1	Outpatient
II	0.6	Outpatient
III	2.8	Outpatient or brief inpatient
IV	8.2	Inpatient
V	29.2	Inpatient

Woodhead et al, *Eu Respir J* 2005; 26: 1138-1180
 Restrepo and Anzueto, *Curr Opin Infect Dis* 2006; 19: 557- 564
 Fine et al, *NEJM* 1997; 336: 243-50

CURB-65 for hospitalisation decision

- Evaluates
- **C**onfusion
 - **U**rea (>7 mmol/l)
 - **R**espiratory rate (≥ 30 /min)
 - **B**P (SBP <90 mmHg or DBP ≤ 60 mmHg)
 - Age (≥ 65 years)

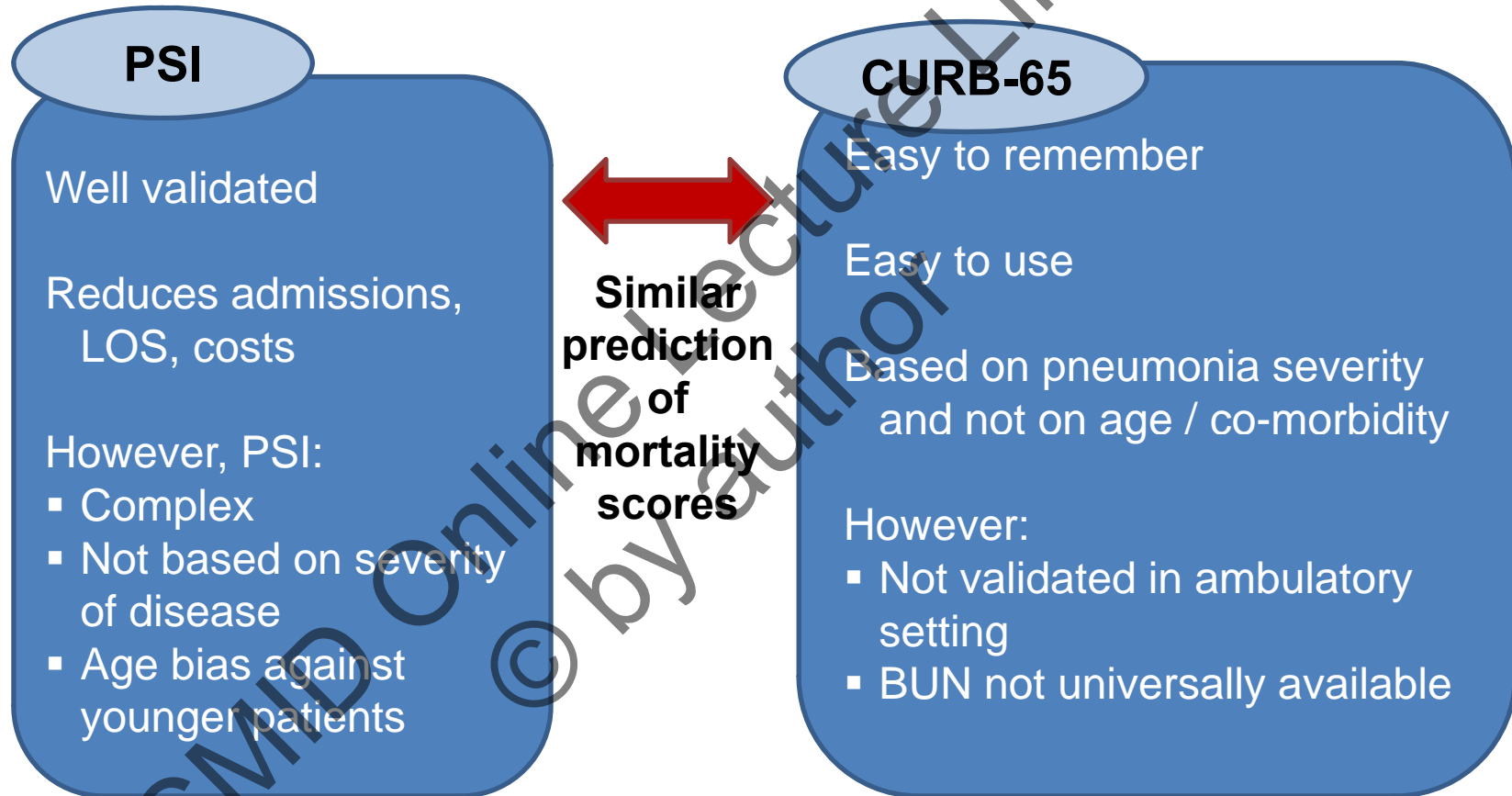


Risk class	Mortality (%)	Recommended site of care
0	0.7	Outpatient
1	2.1	Outpatient
2	9.2	Short hospital stay/ supervised outpatient
3	14.5	Hospital, assess for ICU
4	40	Hospital, assess for ICU
5	57	Hospital, assess for ICU

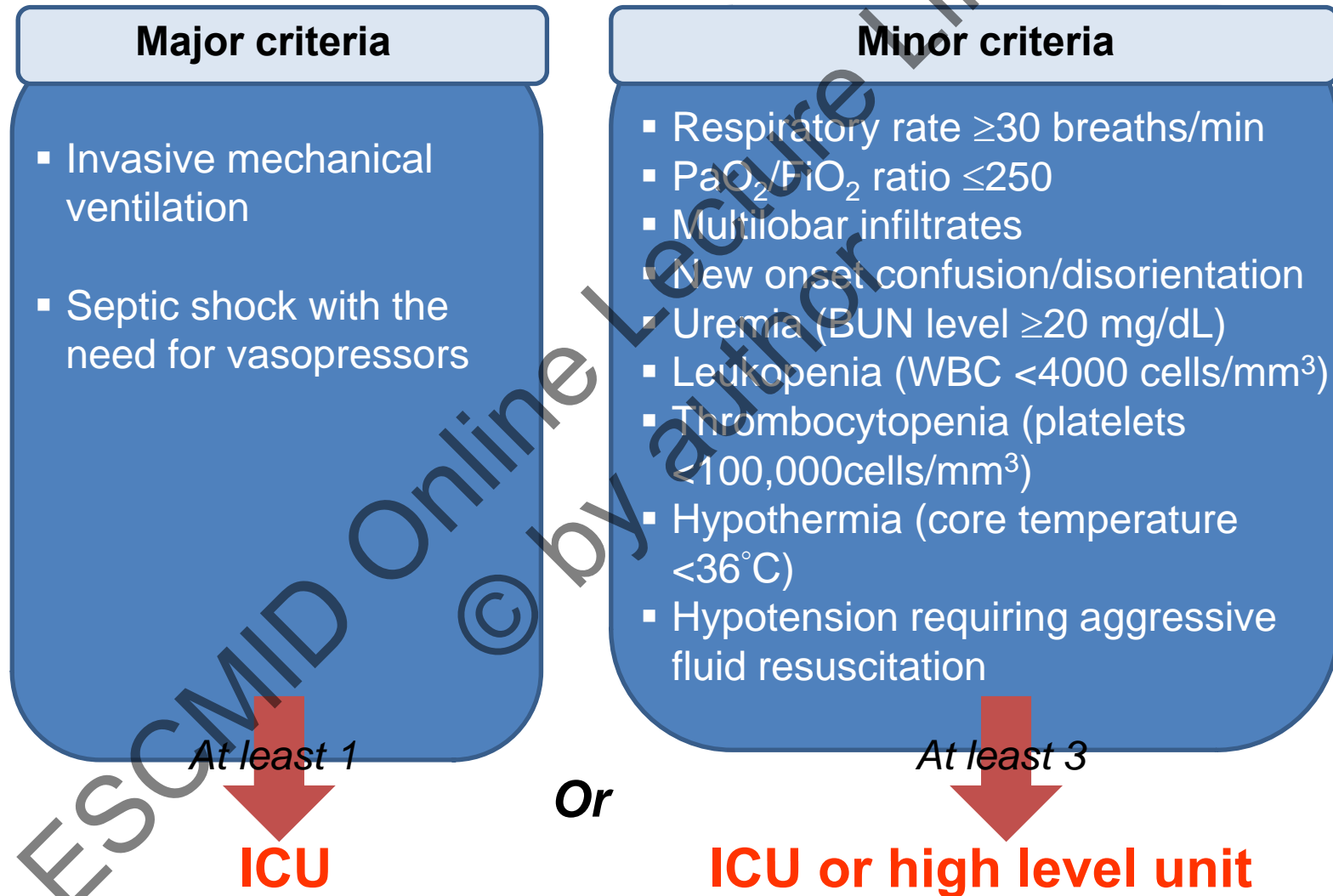
†developed by BTS

McFarlane et al, Thorax 2001; 56 (S IV): 1-96
Mandell et al, Clin Infec Dis 2007; 44 (S2): S27-S72

PSI vs CURB-65: Clinical utility



IDSA / ATS for ICU admission decision



Concerns

- P/F ratio = 157
- Lactate 7
- Platelets 89,000
- SBP
- Young mother
- WBC

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PIRO score as prognostic indicator in sCAP

- Analagous to TNM classification for cancer
 - Predisposition
 - Infection
 - Response
 - Organ dysfunction

Angus et al, Critical Care 2003; 7: 248-251
Vincent et al, Critical Care 2003; 7: 252-255
Gerlach et al, Critical Care 2003; 7: 256-258
Vincent et al, Critical Care 2003; 7: 260-264

The PIRO approach to SCAP

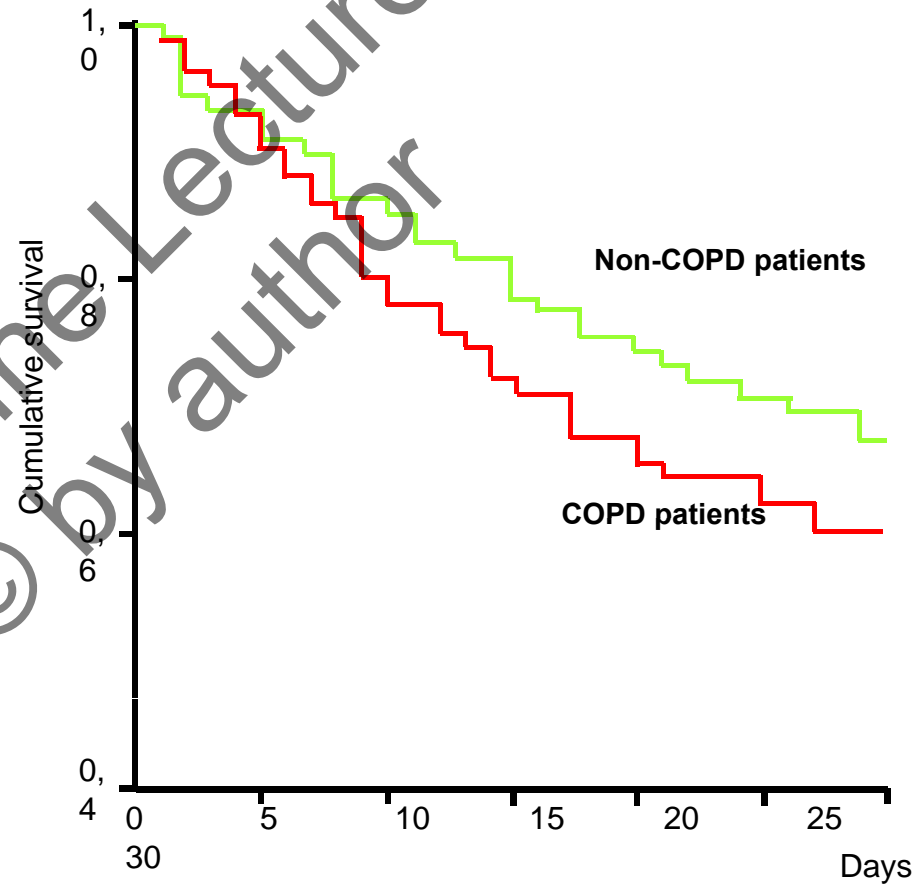
Variables included in PIRO score for CAP

Score	Variables	Point
Predisposition	Comorbidities (COPD or IC)	1
	> 70 yrs.	1
Insult	Bacteremia	1
	Multilobar opacities in chest X-ray	1
Response	Shock	1
	•Severe hypoxemia	1
Organ Dysfunction	Acute Renal Failure	1
	•ARDS	1
	Score range	0-8

(COPD: Chronic Obstructive Pulmonary Disease; IC: Immunocompromise)

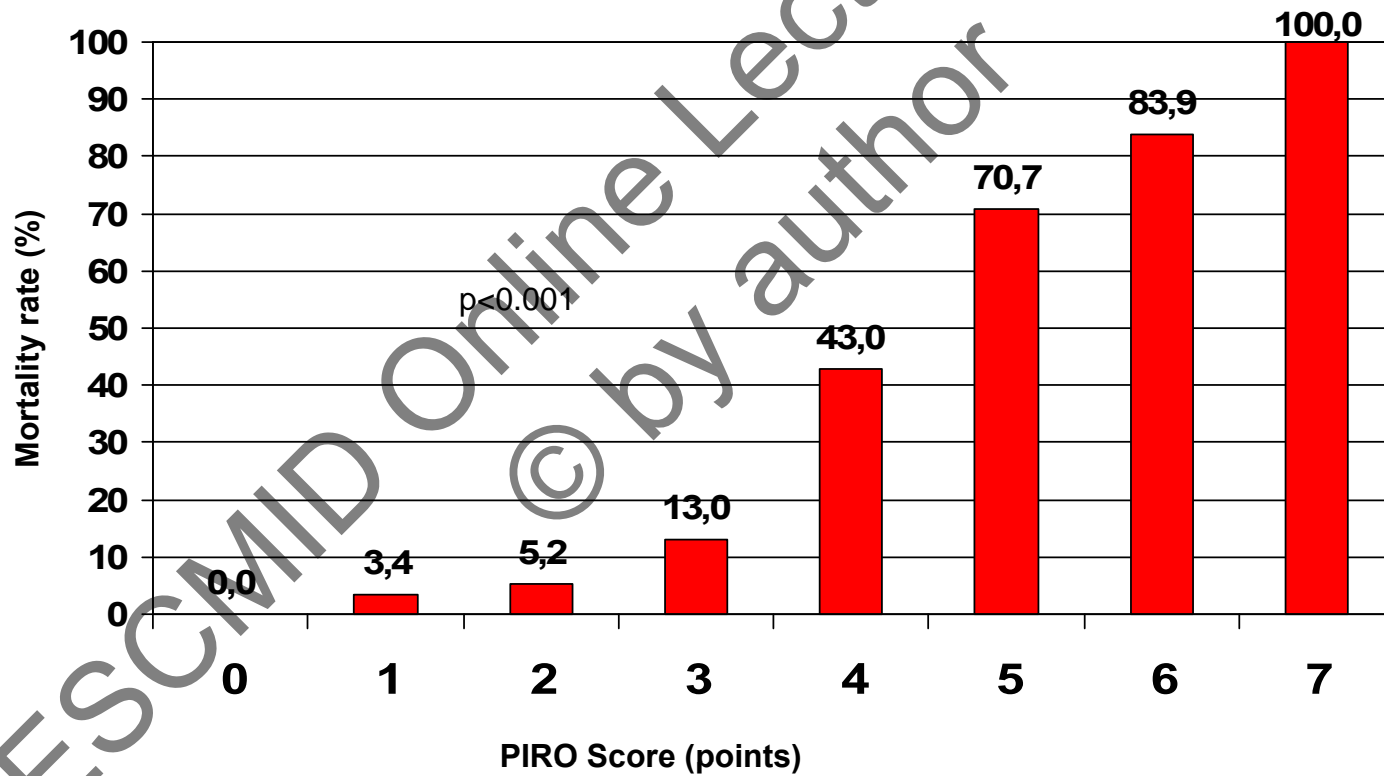
The PIRO approach to SCAP Predisposition

- Genetics
- Age
- Alcohol
- Comorbidities



The PIRO approach to SCAP

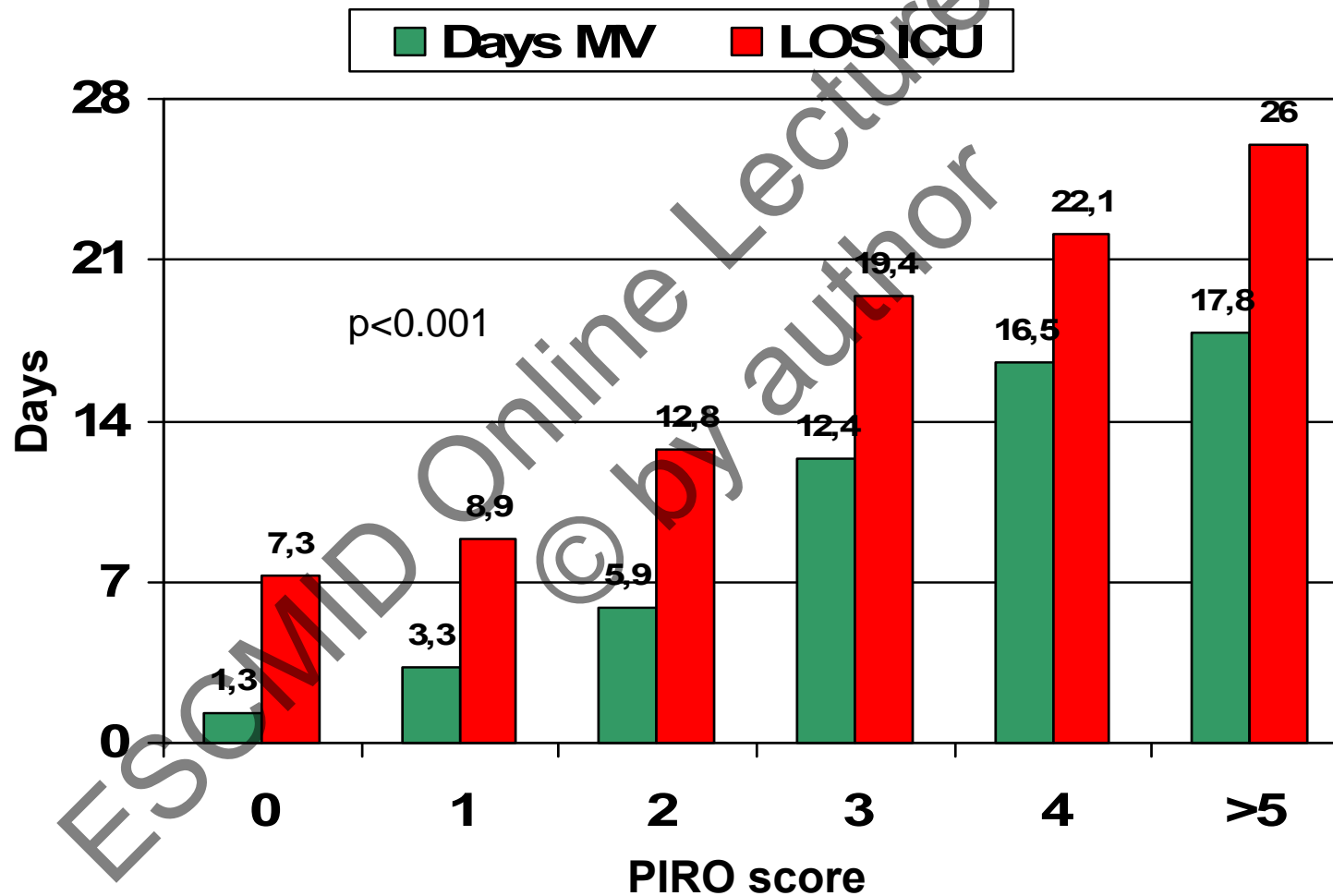
Mortality according to PIRO Score



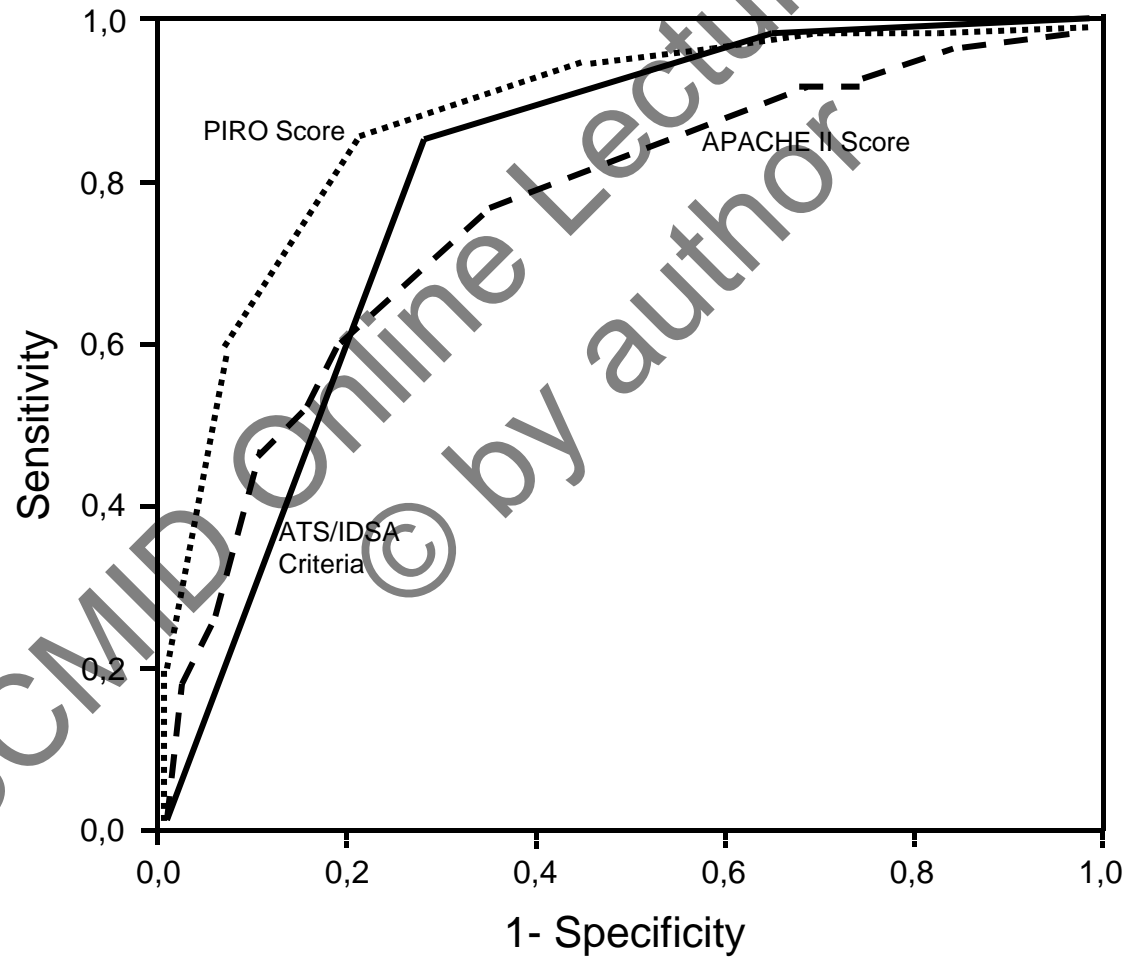
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The PIRO approach to SCAP

Health-care resources utilization



The PIRO approach to SCAP ROC Curve



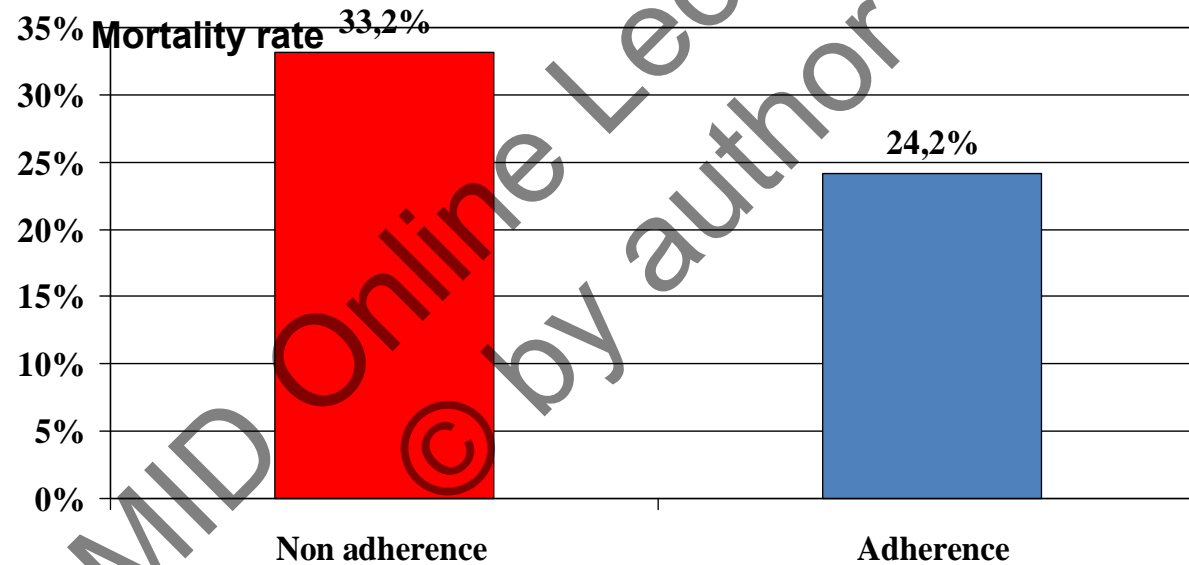
Antibiotic therapy

- **Which antibiotic?**
- **Pneumococcal resistance?**
 - Mono vs Combo?
 - Ceph 3rd + Macrolide ?
 - Quinolone ?
- **How quickly should be administered?**

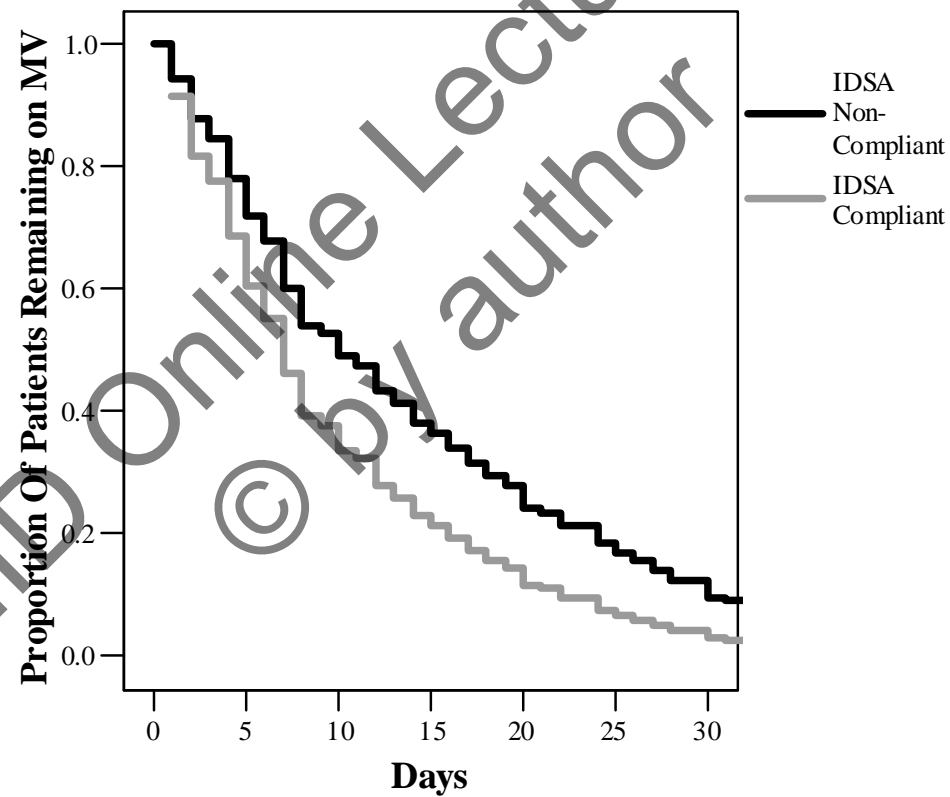
Delay by:

 - Microbiologic cultures?
 - Due to prescription?
 - Due to administration?

Survival and LOS in SCAP influenced by IDSA guidelines compliance

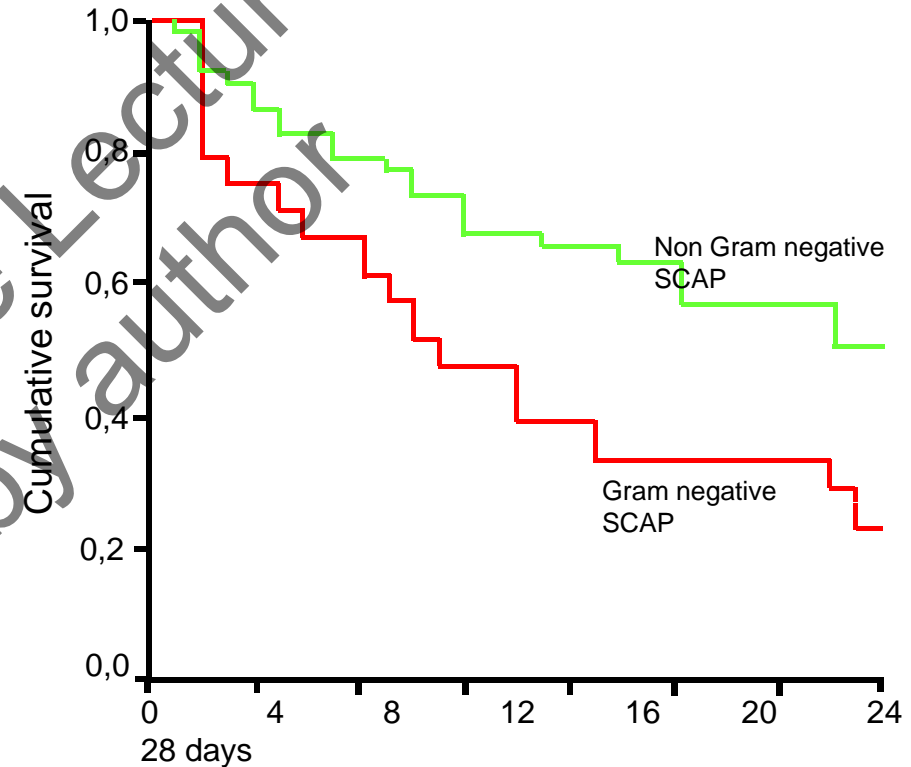


MV and LOS in SCAP influenced by IDSA guidelines compliance



Which antibiotic?

- *Streptococcus pneumoniae*
- *Legionella*
- Non-typeable *Haemophilus*
- GNB – *Pseudomonas*?
- Opportunistic: PCP, *Aspergillus*.

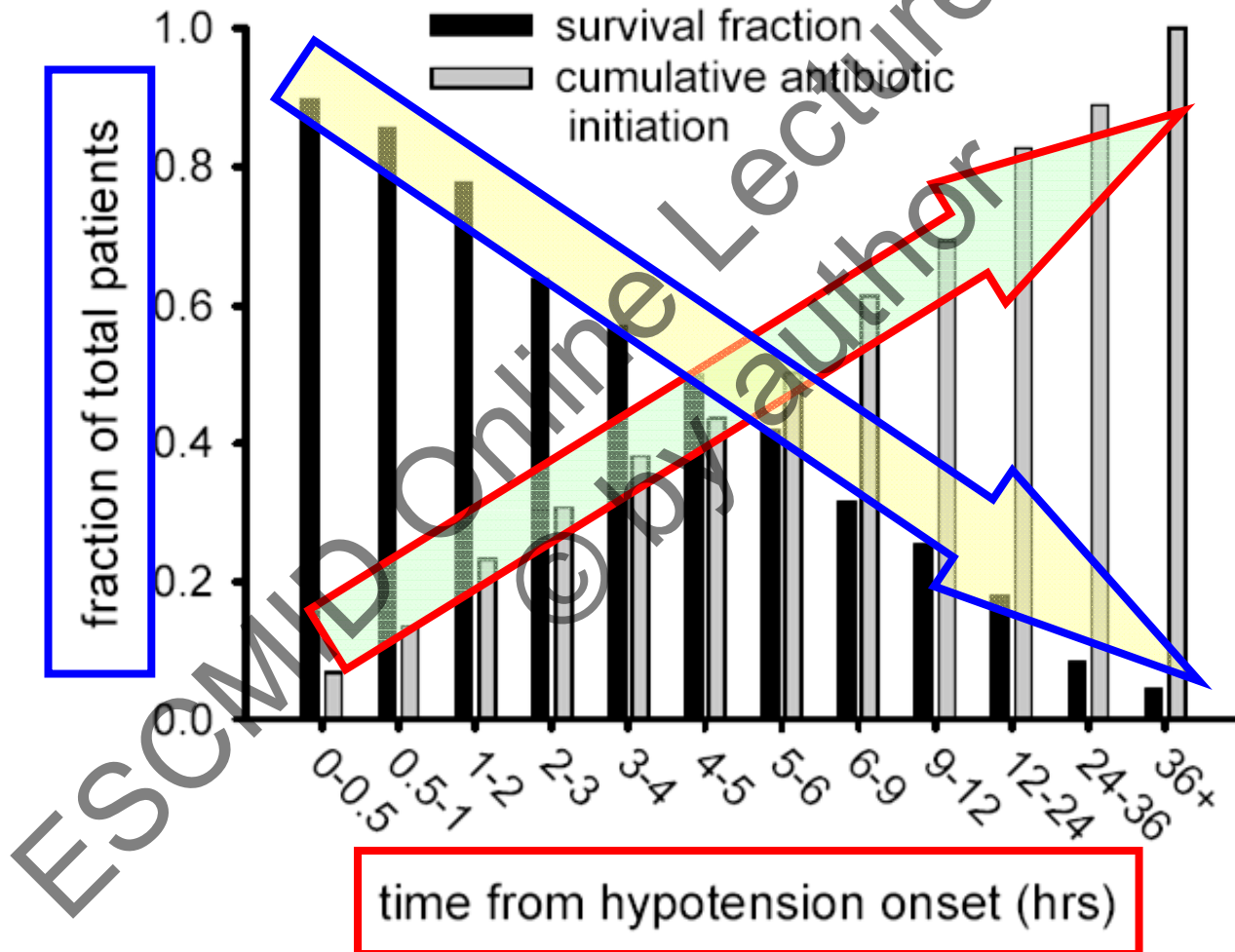


n=270 patients with shock

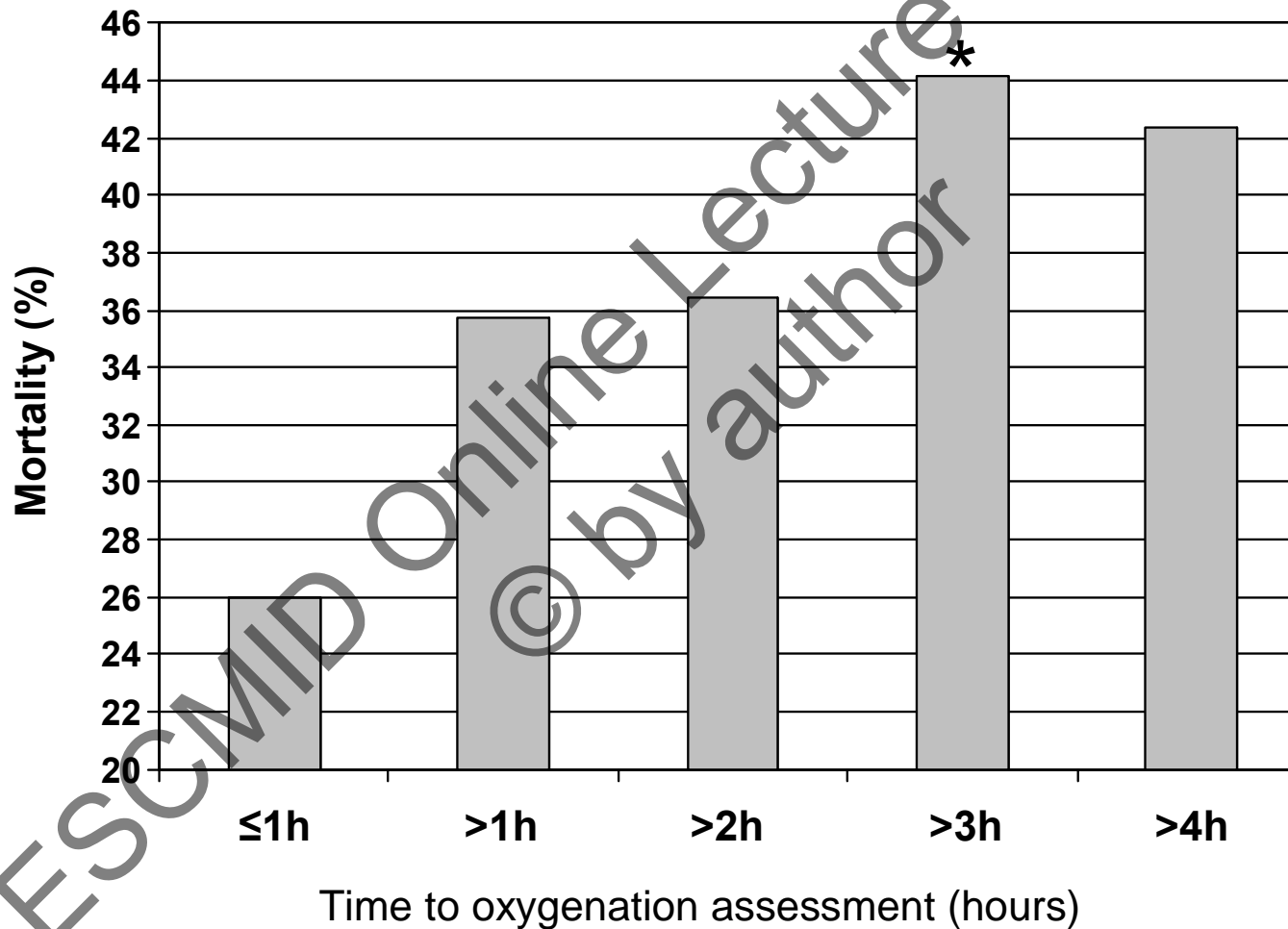
(Capuci Study)

Rodriguez A et al, Crit Care Med 2007; (6): 1493-1498

Cumulative initiation of effective antimicrobial therapy and survival in septic shock

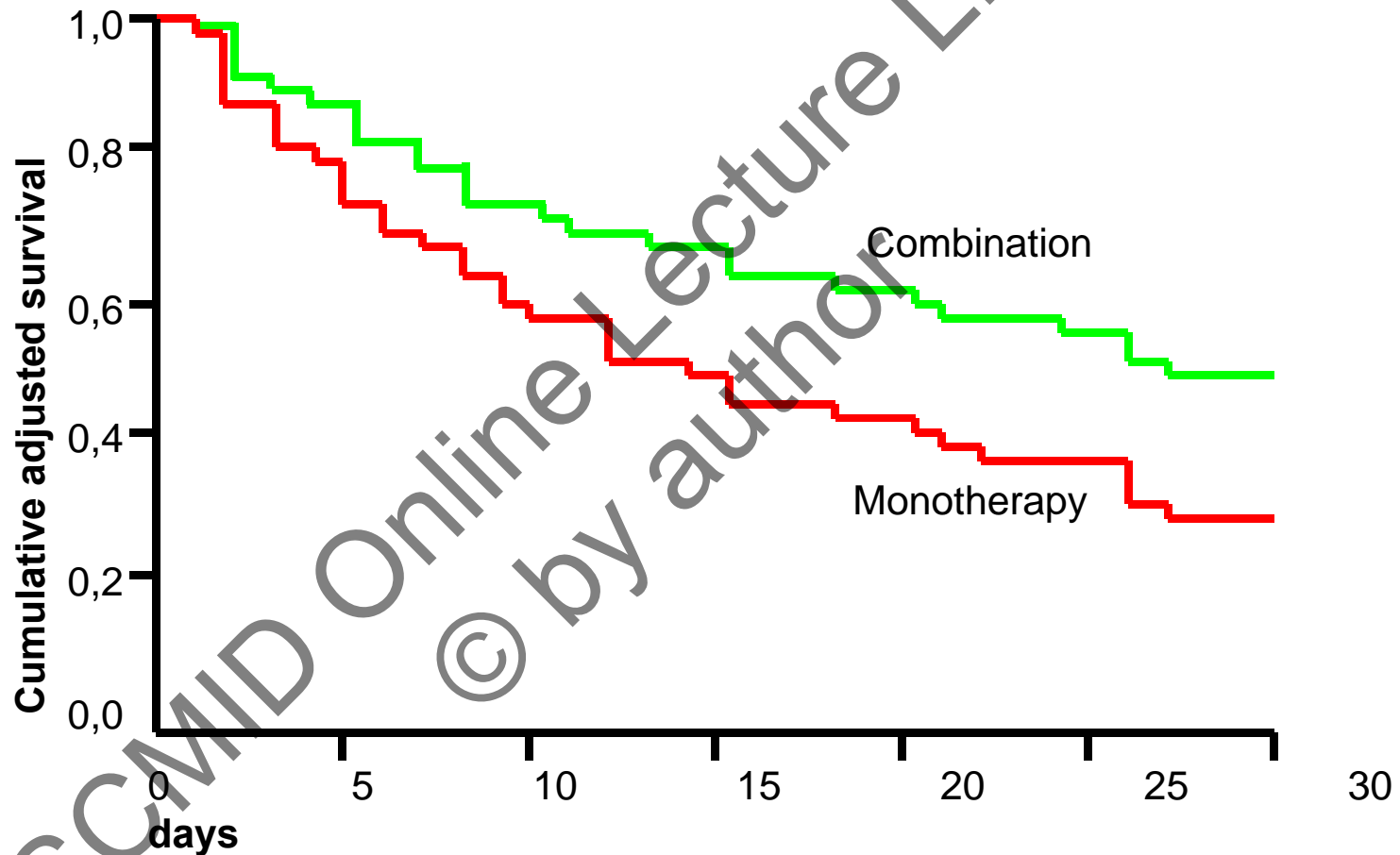


Delayed oxygenation assessment increases mortality



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Combination therapy superior to monotherapy in shock (CAPUCI Study)



HR 1,72 (95%IC= 1,09 – 2,60)

Follow-up: Day 2

- Intubated + MV
- Shock
- ARDS criteria
- Acute Renal Failure
- Blood cultures - negative
- Pleural effusion – neg culture

CAP-PIRO Score

P	Comorbidities (COPD or Immunocompromised) <input type="checkbox"/>	1 point
	Age > 70 yrs <input type="checkbox"/>	1 point
I	Bacteremia <input type="checkbox"/>	1 point
	Multilobar opacities <input type="checkbox"/>	1 point
R	SBP < 90 mmHg <input type="checkbox"/>	1 point
	Severe Hypoxemia <input type="checkbox"/>	1 point
O	ARDS <input type="checkbox"/>	1 point
	Acute renal failure <input type="checkbox"/>	1 point

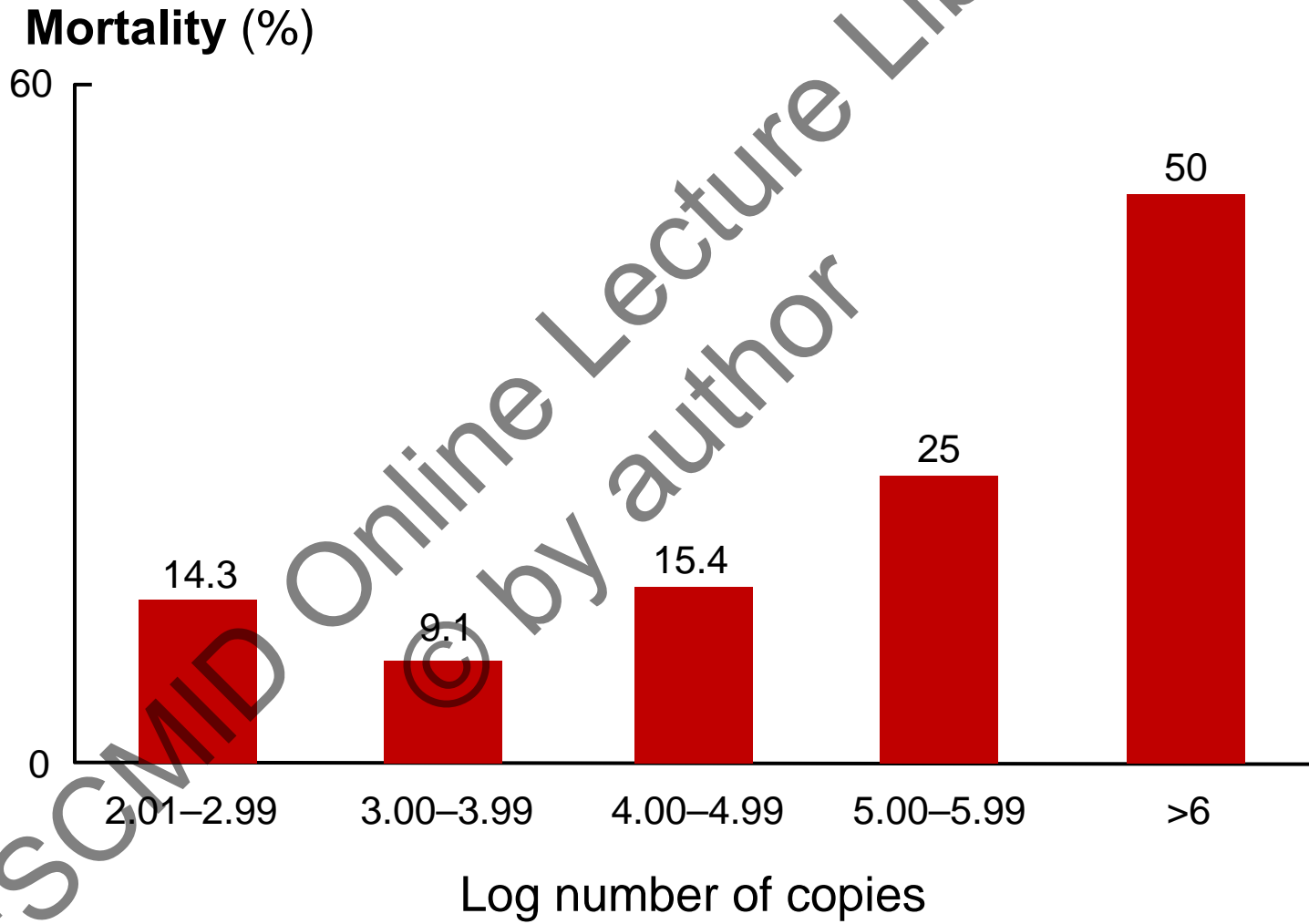


Total Score **points**

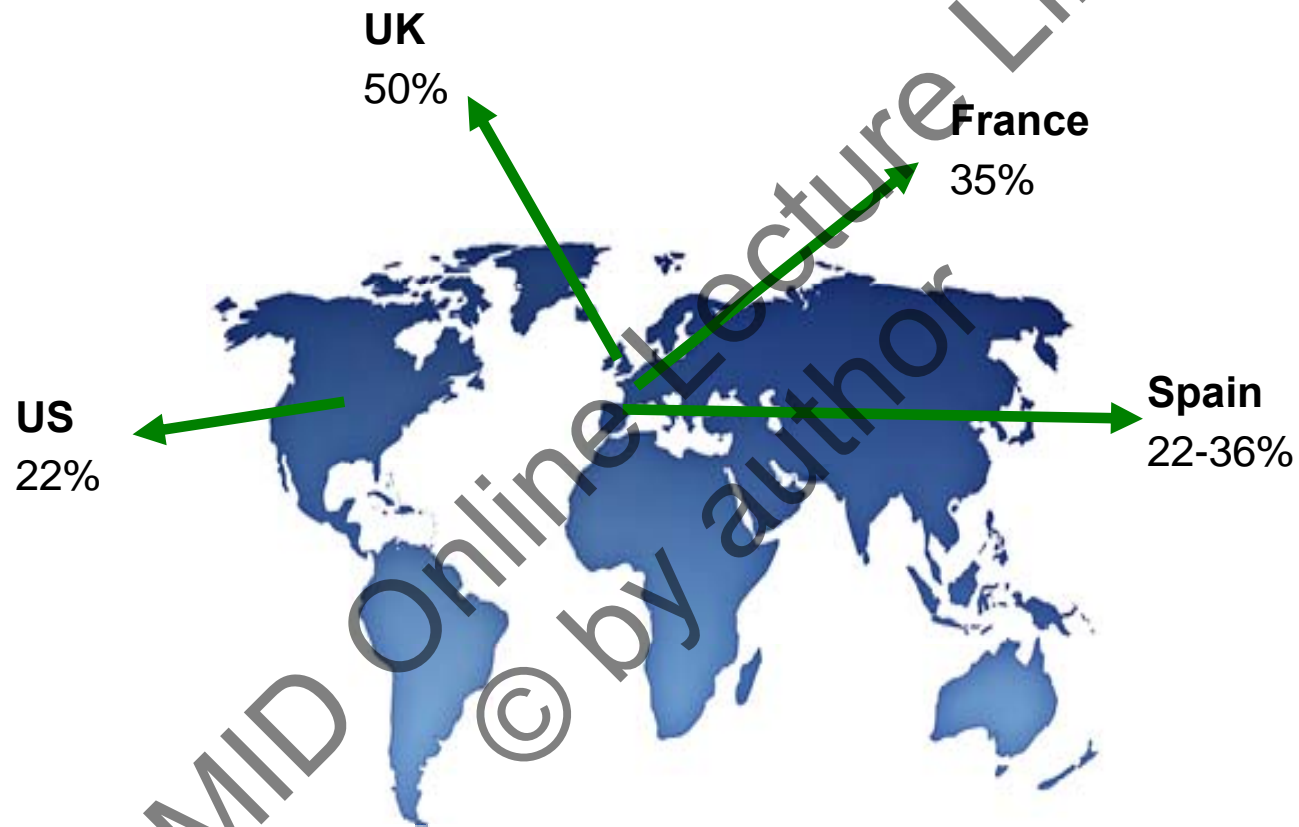
Interpretation

0-2 point	Low risk (1 in 30) for ICU mortality
3 points	Mild risk (1 in 8) for ICU mortality
4 points	High risk (2 in 5) for ICU mortality
5-8 points	Very high risk (3 in 4) for ICU mortality

Q-RT PCR: *S. pneumoniae*



sCAP mortality is high worldwide



sCAP is the 8th leading cause of death in the US, and accounts for 0.3% of all deaths

McFarlane et al, Thorax 2001; 56 (S IV): 1-96
Mandell et al, Clin Infec Dis 2007; 44 (S2): S27-S72