

IX congresso nazionale

simeu

TORINO 6-8 NOVEMBRE 2014



Approccio ragionato della terapia ATB delle polmoniti in ED

Giovanna Guiotto

Medicina d'Urgenza, OM e PS
Ospedale San Paolo - Napoli

OUTLINE

1

Diagnosis

- CAP
- HCCAP
- MRSA-MRD CAP

2

Where to treat

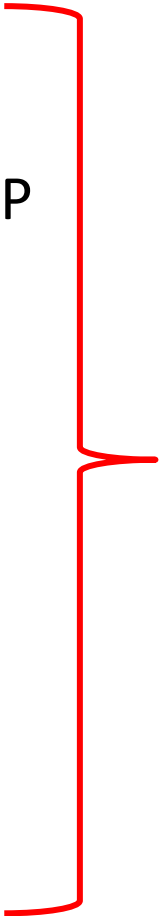
- Home
- Ward
- Em Med
- ICU

3

How to treat

- 1-2-3 AB
- NIV/MV

Outcome



The NEW ENGLAND JOURNAL of MEDICINE

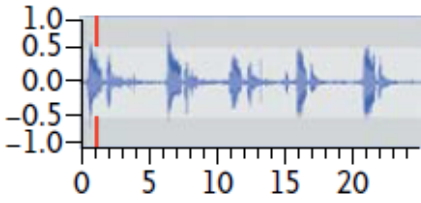
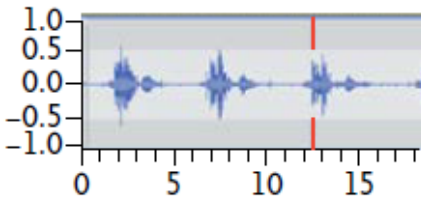
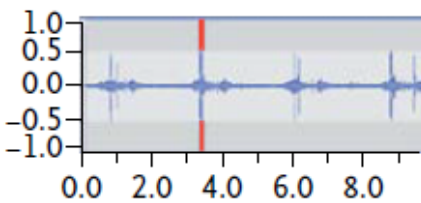
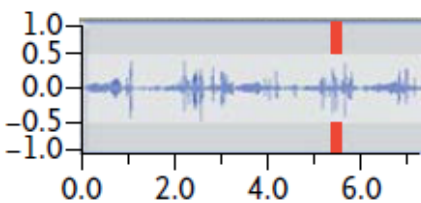
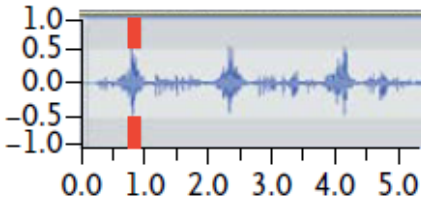
REVIEW ARTICLE

Edward W. Campion, M.D., *Editor*

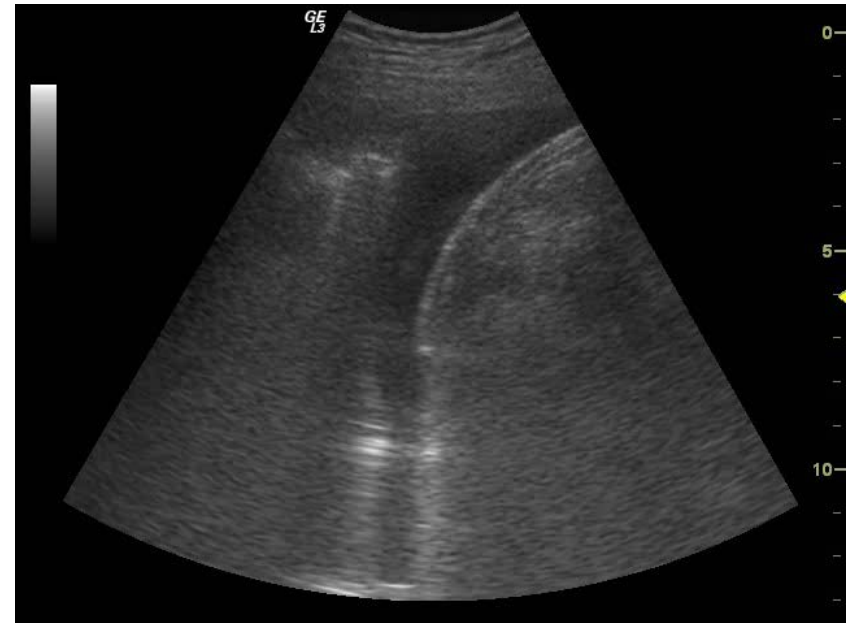
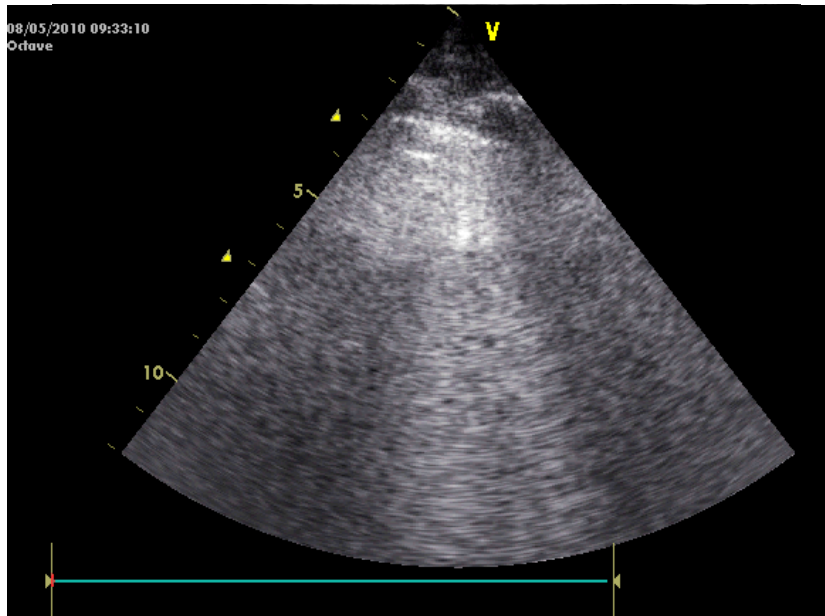
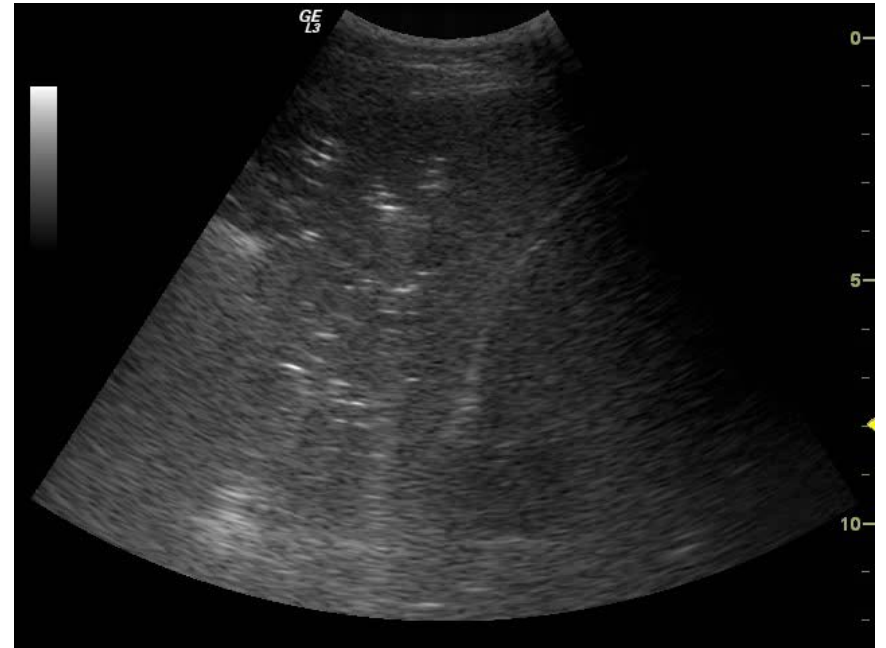
Fundamentals of Lung Auscultation

Abraham Bohadana, M.D., Gabriel Izbicki, M.D., and Steve S. Kraman, M.D.

N Engl J Med 2014;370:744-51

Respiratory Sound	Amplitude–Time Plot	
Acoustics	Unexpanded time	Expanded time
F Rhonchus Sinusoid Typical frequency, about 150 Hz Typical duration, >80 msec		
G Fine Crackle Rapidly dampened wave deflection Typical frequency, about 650 Hz Typical duration, about 5 msec		
H Coarse Crackles Rapidly dampened wave deflection Typical frequency, about 350 Hz Typical duration, about 15 msec		
I Pleural Friction Rub Rhythmic succession of short sounds Typical frequency, <350hz Typical duration, >15 msec		
J Squawk Sinusoid Typical frequency, 200–300 Hz Typical duration, about 200 msec Followed or preceded by crackles		

CXR /ECHO PATTERNS





ELSEVIER

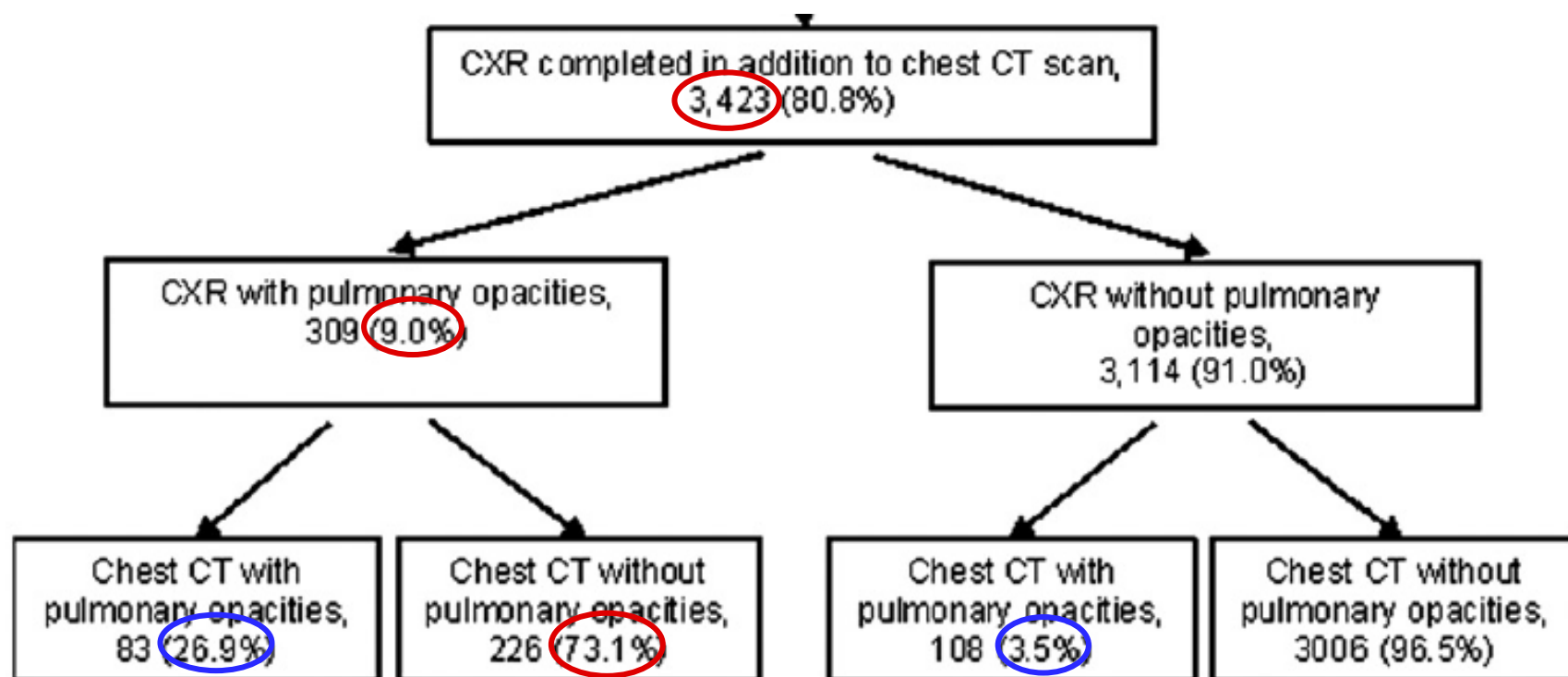
The
American Journal of
Emergency Medicine

www.elsevier.com/locate/ajem

Brief Report

High discordance of chest x-ray and computed tomography for detection of pulmonary opacities in ED patients: implications for diagnosing pneumonia☆

Wesley H. Self MD MPH^{a,*}, D. Mark Courtney MD MSCI^b, Candace D. McNaughton MD MPH^a, Richard G. Wunderink MD^c, Jeffrey A. Kline MD^d





Original Contribution

Performance comparison of lung ultrasound and chest x-ray for the diagnosis of pneumonia in the ED[☆]

Jean-Eudes Bourcier, MD^{a,*}, Julie Paquet, MD^a, Mickael Seinger, MD^a, Emeric Gallard, MD^a, Jean-Philippe Redonnet, MD^a, Fouad Cheddadi, MD^a, Didier Garnier, MD^a, Jean-Marie Bourgeois, MD, PhD^b, Thomas Geeraerts, MD, PhD^c

144 pts:

- Cough
- Dyspnea
- CT>38°C
- SpO₂ ≤ 92%
- HR > 100

↓
123 +

	Sonography	Chest x-ray	
Sensitivity	0.95	0.60	$P < .01$
Specificity	0.57	0.76	$P = .09$
Positive predictive value	0.93	0.93	ns
Negative predictive value	0.67	0.25	$P < .01$
	Positive sonography	Positive chest x-ray	P
Signs <24 h, n = 44	43 (76%)	13 (23%)	<.001
Signs >24 h, n = 79	74 (93%)	61 (77%)	.003
Pneumonia on thoracic CT scan	Positive sonography	Positive chest x-ray	P
N = 23	23	12	< .01

Lung ultrasound



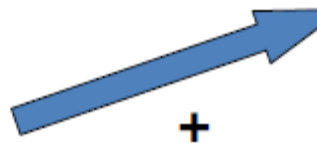
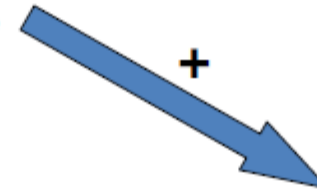
alveolar-interstitial
Unilateral syndrome
And/or effusion



Thoracic CT scan



other diagnosis



Pneumonia

Criteria for Health Care–Associated Pneumonia

- Residence in a nursing home
- Hospitalization for ≥ 2 days (previous 90 days)
- Antibiotic use (previous 90 days)
- Hemodialysis (previous 30 days)
- Home wound care
- Nonambulatory status
- Tube feedings
- Immunocompromised status
- Use of gastric acid suppressive agents

Clinical Features Suggesting Community-Acquired MRSA Pneumonia

- Young, previously healthy patient
- Severe pneumonia during summer months
- Concurrent influenza
- Cavitory infiltrate or necrosis
- Rapidly increasing pleural effusion
- Gross hemoptysis (not just blood-streaked)
- Neutropenia
- Erythematous rash
- Skin pustules

Clinical indications for more extensive diagnostic testing

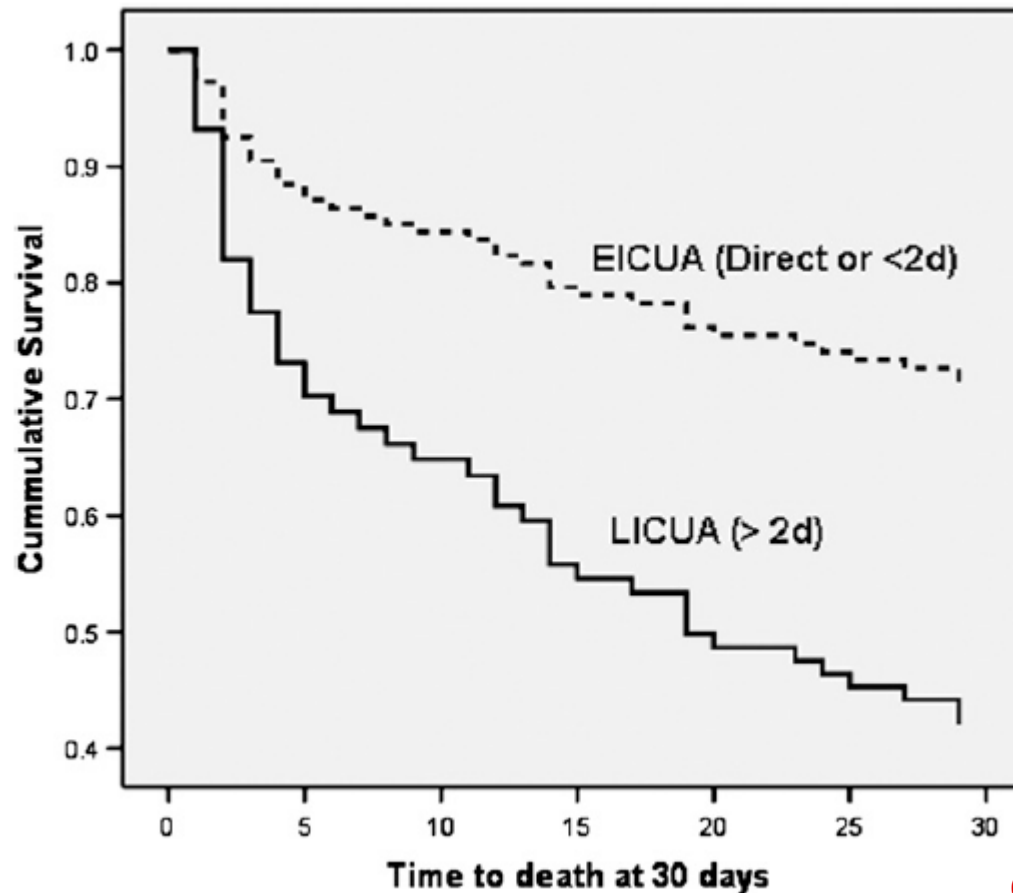
Indication	Blood culture	Sputum culture	<i>Legionella</i> UAT	Pneumococcal UAT	Other
Intensive care unit admission	X	X	X	X	X ^a
Failure of outpatient antibiotic therapy		X	X	X	
→ Cavitory infiltrates	X	X			X ^b
→ Leukopenia	X			X	
→ Active alcohol abuse	X	X	X	X	
Chronic severe liver disease	X			X	
Severe obstructive/structural lung disease		X			
→ Asplenia (anatomic or functional)	X			X	
Recent travel (within past 2 weeks)			X		X ^c
Positive <i>Legionella</i> UAT result		X ^d	NA		
Positive pneumococcal UAT result	X	X		NA	
→ Pleural effusion	X	X	X	X	X ^e

- **CURB-65**: Confusion, Uremia, Respiratory rate, low Blood pressure, age ≥ 65 y (≥ 3)
- **CURXO-80**: confusion, urea, respiratory rate, X-ray, oxygen, age ≥ 80 y
- **SMART-COP**: systolic BP, multilobar CXR involvement, albumin, respiratory rate, tachycardia, confusion, oxygenation, and pH
- **PSI**: pneumonia severity index ($\geq IV$)
- **REA-ICU**: Risk of Early Admission to ICU
- **PIRO**: predisposition, infection, response, and organ dysfunction



Late Admission to the ICU in Patients With Community-Acquired Pneumonia Is Associated With Higher Mortality

Marcos I. Restrepo, MD, MSc, FCCP; Eric M. Mortensen, MD, MSc; Jordi Rello, MD, PhD; Jennifer Brodu, MD; and Antonio Anzueto, MD



ICU admission criteria (IDSA-ATS 2007)

Major criteria:

- Invasive mechanical ventilation
- Septic shock with the need for vasopressors

Minor criteria:

CID 2011;53(6):503–511

MAJOR ARTICLE

Validation of the Infectious Diseases Society of America/American Thoracic Society **Minor Criteria** for Intensive Care Unit Admission in Community-Acquired Pneumonia Patients Without Major Criteria or Contraindications to Intensive Care Unit Care

James D. Chalmers,¹ Joanne K. Taylor,¹ Pallavi Mandal,¹ Gourab Choudhury,² Aran Singanayagam,³ Ahsan R. Akram,² and Adam T. Hill^{1,2}

ENZO, 25 y

ACIDO-BASE 37.0 °C 21/
pH 7.413
pCO₂ 39.3 mmHg
pO₂ 47.6↓ mmHg
HCO₃⁻act 24.5 mmol/L
HCO₃⁻std 24.3 mmol/L
BE(B) 0.1 mmol/L
BE(ecf) -0.1 mmol/L
ctCO₂ 25.7 mmol/L

CO-OSSIMETRIA
Hct 48 %
tHb 16.4 g/dL
sO₂ 87.6 %
FO₂Hb 84.7↓ %
FCOHb 3.0↑ %
FMetHb 0.3 %
FHHb 12.0↑ %

OSSIGENAZIONE 37.0 °C
BO₂ 22.0 mL/dL
p50 23.9 mmHg
ctO₂(a) 19.5 mL/dL

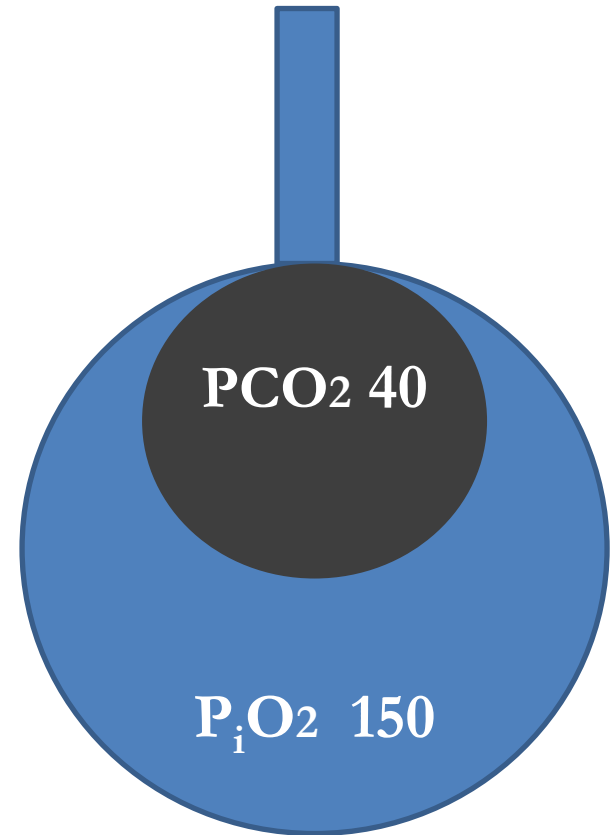
ELETTROLITI
Na⁺ 139.4 mmol/L
Ca⁺⁺ 1.22 mmol/L
Cl⁻ 104 mmol/L

METABOLITI
Glu 112↑ mg/dL
Lac 2.11↑ mmol/L

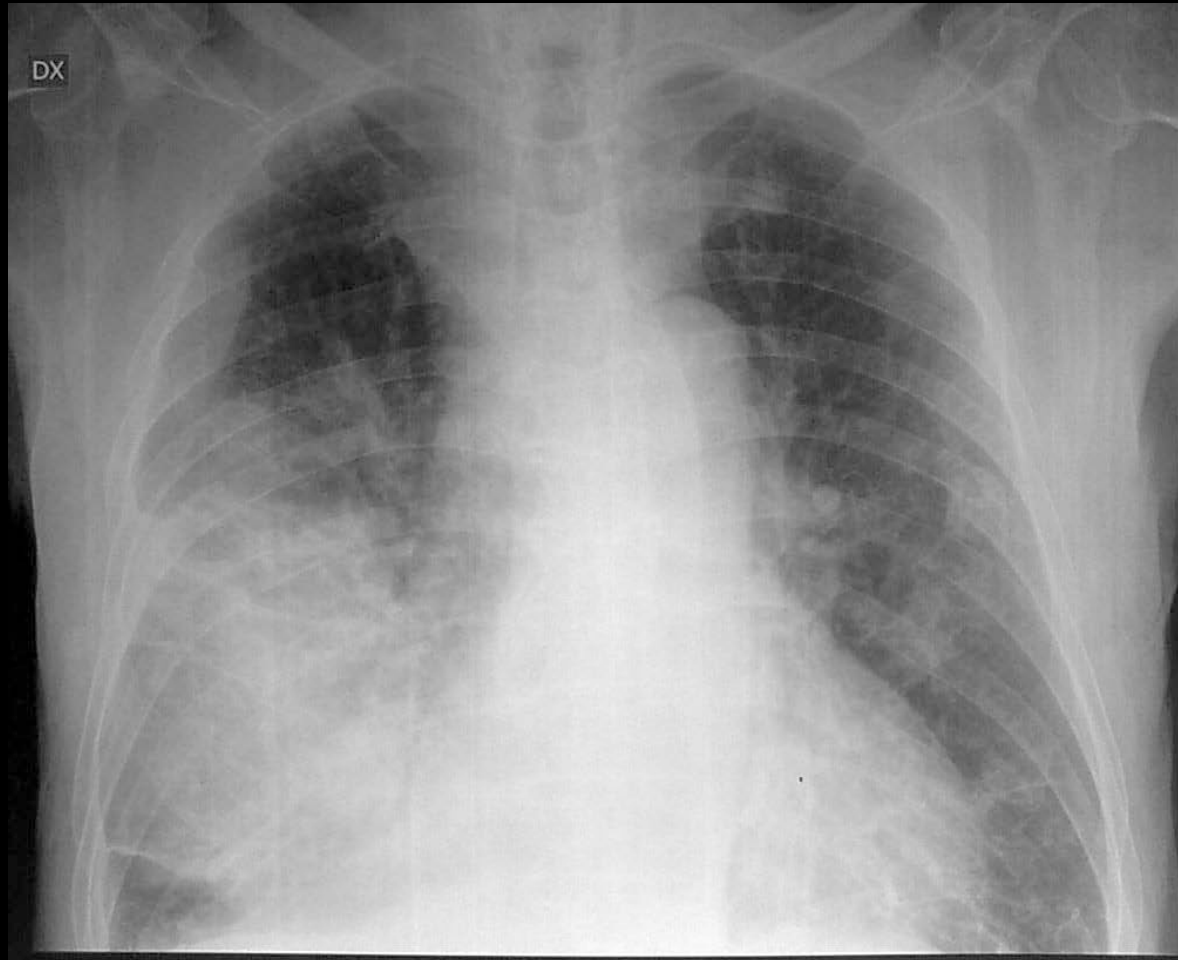
P/F 230

PAO₂ 100

$\Delta (A-a)O_2 = 52$



**Amoxicillin-Clav
+
Clarithromycin**



Maria 41 yo

FiO₂ 40%

FR 40

NIDDM

Smoker

➤ 5 days fever and cough

➤ Amoxicillin-Clav (48 H)

• T 41°C

• BP 140/80

• HR 110

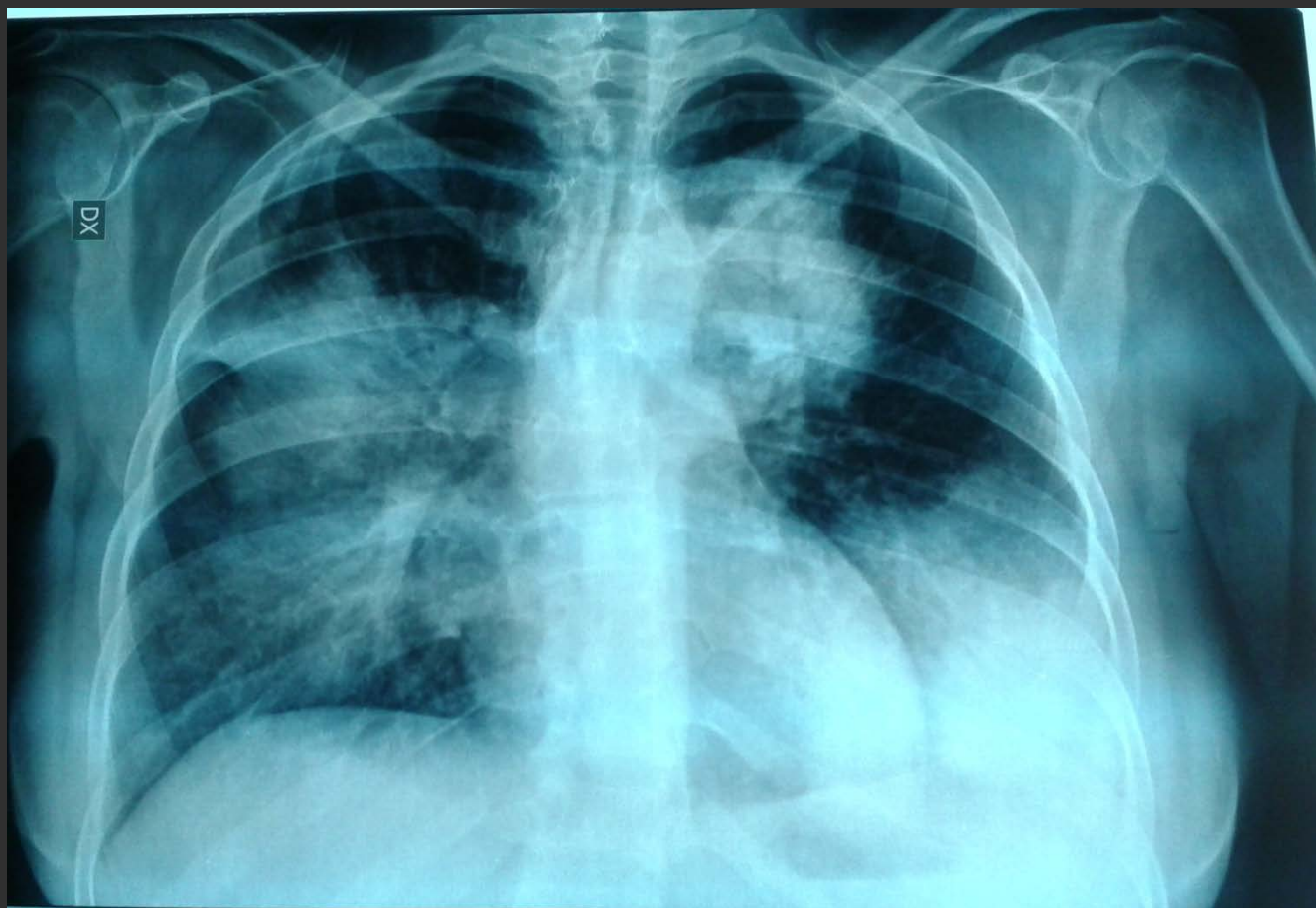
• SpO₂ 75% on FiO₂ 40%

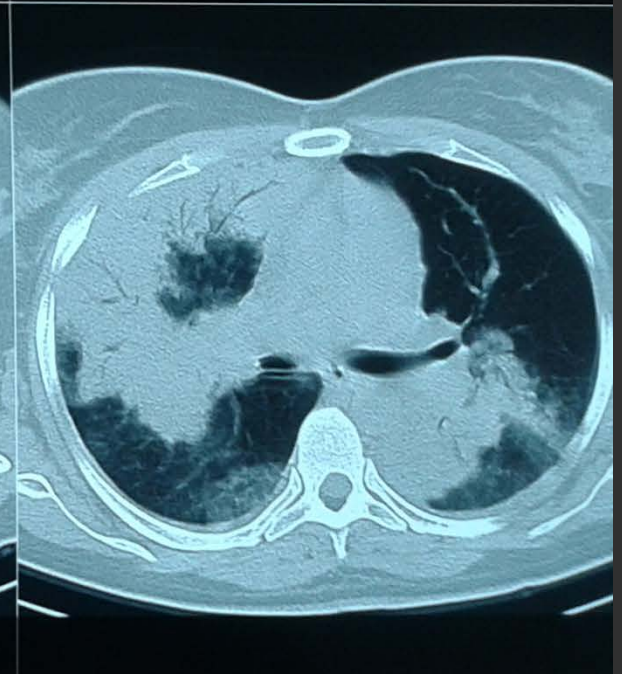
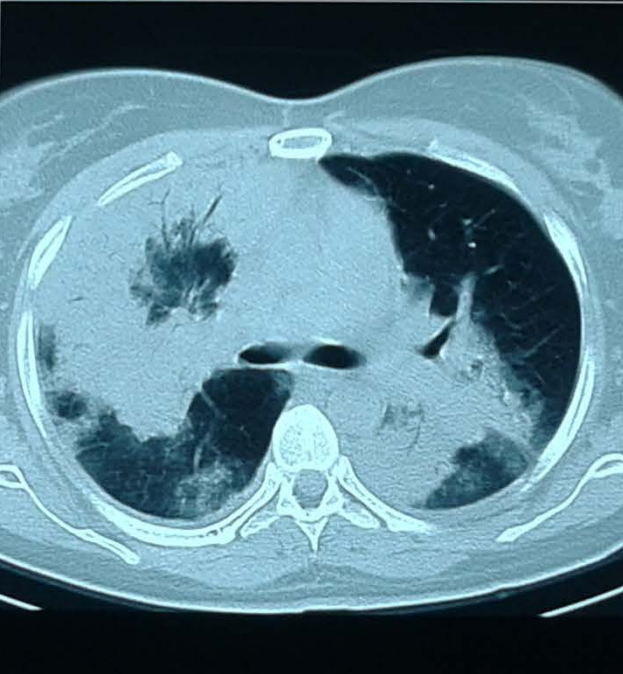
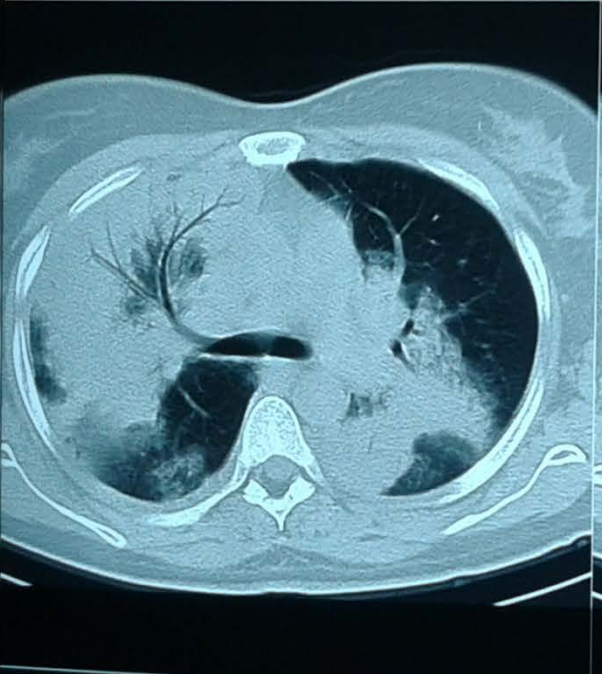
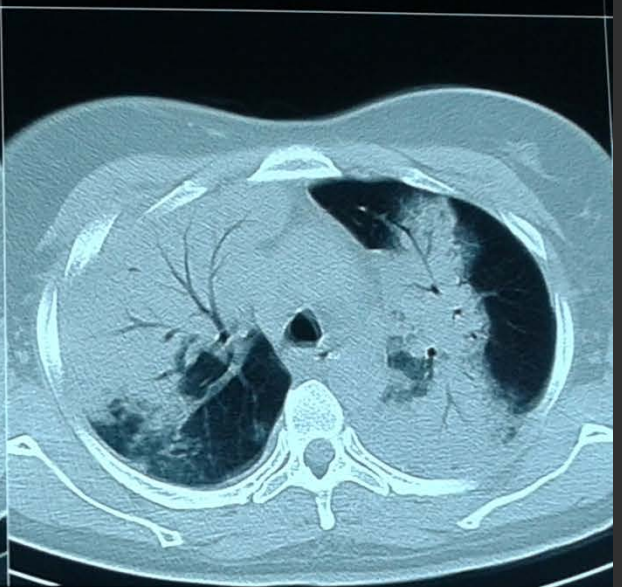
pH	7.52	
pCO ₂	28	mmHg
pO ₂	37	mmHg
Na+	123	mmol/L
K+	3.4	mmol/L
Ca++	1.05	mmol/L
Glu	264	mg/dL
Lat	3.7	mmol/L
Hct	31	%

Parametri derivati		
Ca++(7.4)	1.10	mmol/L
HCO ₃ -	22.9	mmol/L
HCO ₃ std	25.0	mmol/L
TCO ₂	23.8	mmol/L
BEecf	0.0	mmol/L
BE(B)	0.6	mmol/L
S0 ₂ c	78	%
THbc	9.6	g/dL
PA-aD0 ₂	---	

P/F 92

Δ (A-a) O₂ = 213





FR 28

- Levoxacin
- Piperacillin-tazobactam
- CPAP FiO₂ 100%

PEEP 10



Legionella UAT

pH	7.49	
pCO ₂	35	mmHg
pO ₂	60	mmHg
Na ⁺	126	mmol/L
K ⁺	3.6	mmol/L
Ca ⁺⁺	1.07	mmol/L
Glu	176	mg/dL
Lat	1.6	mmol/L
Hct	33	%

Parametri derivati		
Ca ⁺⁺ (7.4)	1.11	mmol/L
HCO ₃ ⁻	26.7	mmol/L
HCO ₃ std	27.4	mmol/L
TCO ₂	27.8	mmol/L
BEecf	3.4	mmol/L
BE(B)	3.3	mmol/L
SO ₂ c	93	%
THbc	10.2	g/dL

P/F 60

Infectious Diseases Society of America/American Thoracic Society Consensus Guidelines on the Management of Community-Acquired Pneumonia in Adults

Lionel A. Mandell,^{1,a} Richard G. Wunderink,^{2,a} Antonio Anzueto,^{3,4} John G. Bartlett,⁷ G. Douglas Campbell,⁸ Nathan C. Dean,^{9,10} Scott F. Dowell,¹¹ Thomas M. File, Jr.^{12,13} Daniel M. Musher,^{5,6} Michael S. Niederman,^{14,15} Antonio Torres,¹⁶ and Cynthia G. Whitney¹¹

Clinical Infectious Diseases 2007; 44:S27–72

Outpatient

- Previously **healthy** and no use of ATB last 3 months
- Presence of **comorbidities** or use of ATB last 3 months

macrolide

fluoroquinolone
or
 β -lactam + macrolide

Inpatients (non-ICU)

Inpatients (ICU)

cefotaxime, ceftriaxone, or ampicillin-sulb
+
Azithromycin or fluoroquinolone

Pseudomonas

pip-tazo, cefepime, or carbapenemic
plus
ciprofloxacin or levofloxacin (750 mg)
or
aminoglycoside and azithromycin
or
aminoglycoside and fluoroquinolone

MRSA

add vancomycin or linezolid

Legionella

fluorquinolone



British Thoracic Society guidelines for the management of community acquired pneumonia in adults: update 2009

W S Lim, S V Baudouin, R C George, A T Hill, C Jamieson, I Le Jeune, J T Macfarlane, R C Read, H J Roberts, M L Levy, M Wani, M A Woodhead, Pneumonia Guidelines Committee of the BTS Standards of Care Committee

Thorax 2009;64(Suppl III)

Outpatient

- Suspected severe CAP (GP) → Penicillin G 1.2 g iv or amoxicillin 1 g po
- Previously **healthy** and no use of AB last 3 months → Amoxicillin 500 mg x 3 po
↓ iv

Inpatient

- Low-severity → Amoxicillin or Penicillin + Clarithromycin iv
- Moderate-severity → Doxycycline po or Levofloxacin po /iv
- High-severity → Amoxi-Clav + Clarithromycin iv
→ III Cephalosporin + Clarithromycin iv

Pneumonia

Diagnosis and management of community- and hospital-acquired pneumonia in adults

Clinical guideline <...>

Methods, evidence and recommendations

June 2014

Draft for Consultation

*Commissioned by the National Institute for
Health and Care Excellence*

CRP { $<20 \text{ mg/L}$ $\rightarrow$ no ATB
 $20\text{-}100 \text{ mg/L}$ $\rightarrow$ wait
 $>100 \text{ mg/L}$ $\rightarrow$ give ATB

Low-severity CAP: Amoxicillin (pref. to macrolide) $\rightarrow$ 5 days
No fluoroquinolone and dual ATB therapy

Moderate CAP: Amoxicillin + Macrolide
High-severity CAP: Amoxi-Clav + Macrolide } 7-10 days

Low serum procalcitonin ($<0.1 \mu\text{g/L}$) $\rightarrow$ withhold or discontinue antibiotics

CLINICAL PRACTICE

Caren G. Solomon, M.D., M.P.H., *Editor*

Community-Acquired Pneumonia

Richard G. Wunderink, M.D., and Grant W. Waterer, M.B., B.S., Ph.D.

N Engl J Med 2014;370:543-51

REVIEW ARTICLE

Dan L. Longo, M.D., *Editor*

Community-Acquired Pneumonia

Daniel M. Musher, M.D., and Anna R. Thorner, M.D.

N Engl J Med 2014;371:1619-28

Table 3. Empirical Treatment of CAP.

Outpatient*

For syndromes suggesting typical bacterial pneumonia: amoxicillin–clavulanate with the addition of azithromycin if legionella species are a consideration; levofloxacin or moxifloxacin may be used instead

For syndromes suggesting influenza pneumonia: oseltamivir with observation for secondary bacterial infection

For syndromes suggesting viral pneumonia other than influenza: symptomatic therapy

For syndromes suggesting mycoplasma or chlamydia pneumonia: azithromycin or doxycycline

Inpatient†

For initial empirical therapy: a beta-lactam (ceftriaxone, cefotaxime, or ceftaroline) plus azithromycin; levofloxacin or moxifloxacin may be used instead

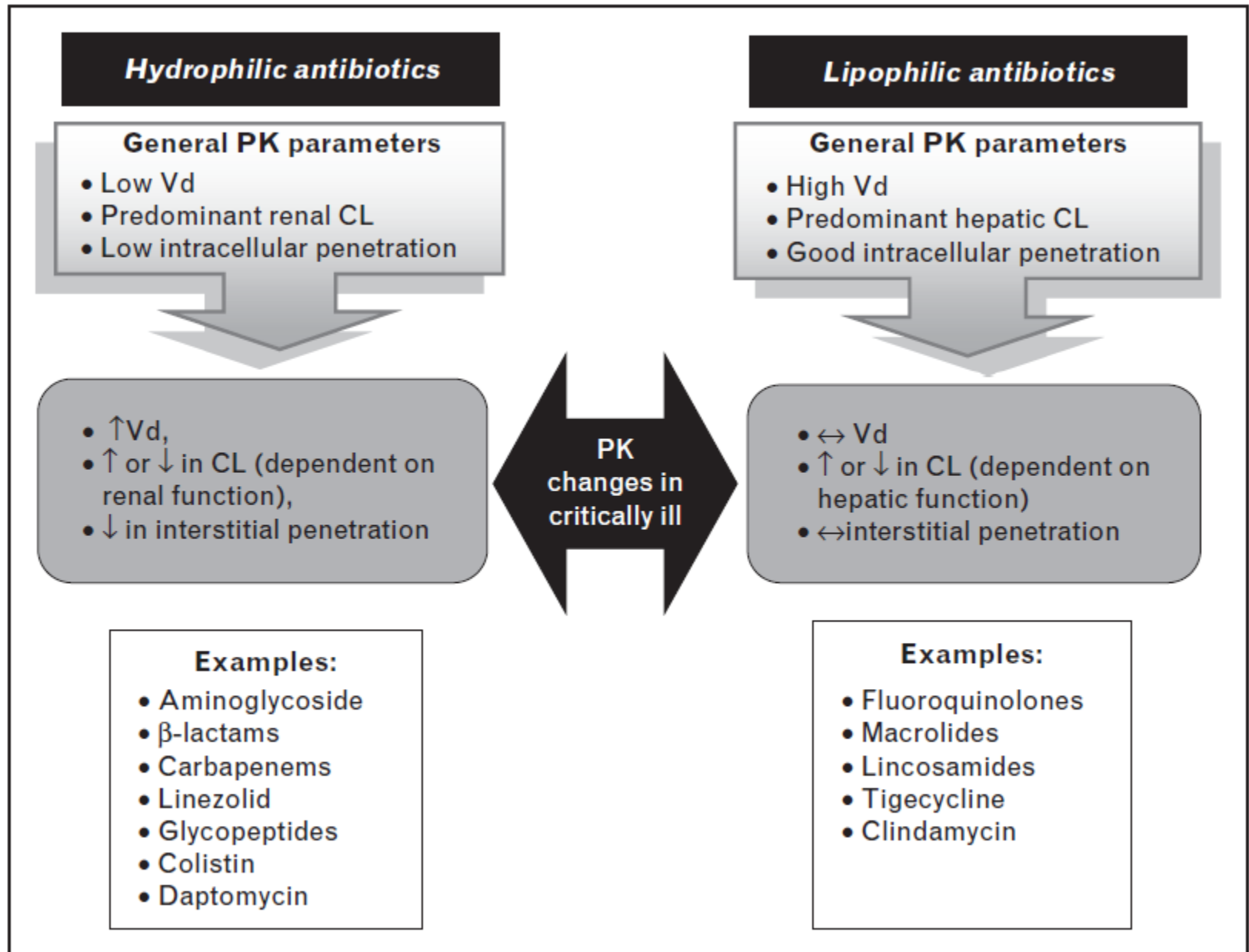
If influenza is likely: oseltamivir‡

If influenza is complicated by secondary bacterial pneumonia: ceftriaxone or cefotaxime plus either vancomycin or linezolid in addition to oseltamivir

If *Staphylococcus aureus* is likely: vancomycin or linezolid in addition to the antibacterial regimen

If pseudomonas pneumonia is likely: antipseudomonal beta-lactam (piperacillin–tazobactam, cefepime, meropenem, or imipenem–cilastatin) plus azithromycin

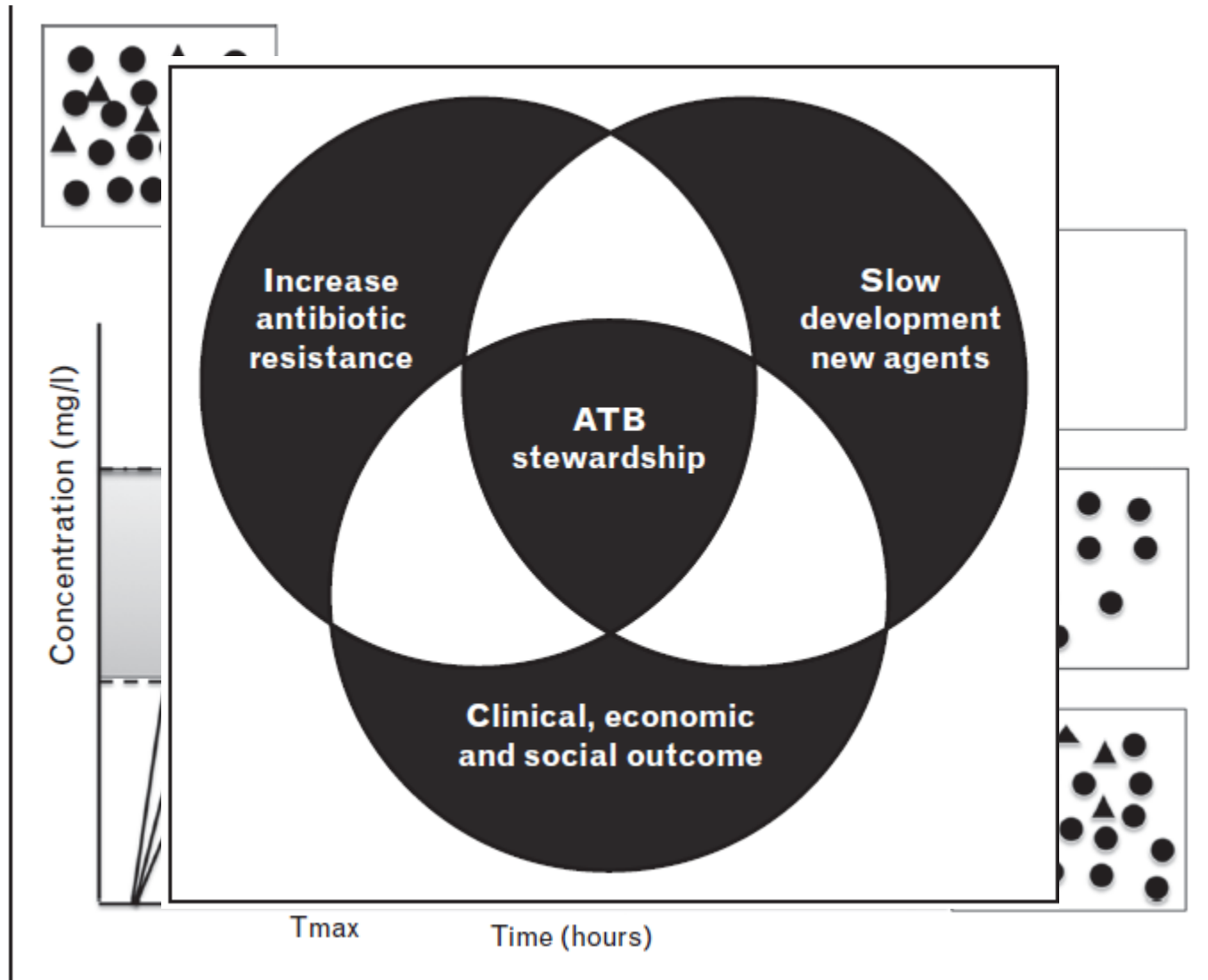
Antibiotics PK and dosing





Risks for multidrug-resistant pathogens in the ICU

Ignacio Martín-Loeches^{a,b}, Emili Diaz^b, and Jordi Vallés^b





Effects of systemic steroids in patients with severe community-acquired pneumonia

C. Garcia-Vidal*, E. Calbo*, V. Pascual*, C. Ferrer*, S. Quintana[#] and J. Garau*

Journal of Critical Care (2010) 25, 420–435



Journal of

Efficacy of Corticosteroids in Community-acquired Pneumonia

A Randomized Double-Blinded Clinical Trial

Dominic Snijders¹, Johannes M. A. Daniels², Casper S. de Graaff¹, Tjip S. van der Werf³, and Wim G. Boersma¹

Am J Respir Crit Care Med Vol 181. pp 975–982, 2010

Dexamethasone and length of hospital stay in patients with community-acquired pneumonia: a randomised, double-blind, placebo-controlled trial



Lancet 2011; 377: 2023–30

Sabine C A Meijvis, Hans Hardeman, Hilde H F Remmelts, Rik Heijligenberg, Ger T Rijkers, Heleen van Velzen-Blad, G Paul Voorn, Ewoudt M W van de Garde, Henrik Endeman, Jan C Grutters, Willem Jan W Bos, Douwe H Biesma

Corticosteroids?

- More side effects
- No better outcome in low-intermediate risk
- Longer LOS (?)
- Worse outcome in H1N1
 - Low doses
 - < 7 days
 - Severe CAP
 - Pneumocystis J.

NIV ?

Andres Carrillo
Gumersindo Gonzalez-Diaz
Miquel Ferrer
Maria Elena Martinez-Quintana
Antonia Lopez-Martinez
Noemi Llamas
Maravillas Alcazar
Antoni Torres

Non-invasive ventilation in community-acquired pneumonia and severe acute respiratory failure

184 pts with CAP and ARF

worse outcome

82 cardio-resp disease

Successful NIV was strongly associated with better survival

- worsening CXR infiltrate at 24 h
- higher SOFA score
- higher HR
- lower P/F and HCO₃

after 1H NIV

NIV failure

KEY POINTS

1. Old and new tools for diagnosis
2. Risk assessment
3. The right place for the right treatment
4.at the right time!