

Surveillance of the ventilator associated pneumonia (VAP)

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Surveillance of the ventilator associated pneumonia (VAP)

- Incidence of VAP
- Etiology of respiratory infections in ICU
- Antibiotic resistance of respiratory pathogens

Methodology

Methods of VAP estimation

- **Number of episodes / 1000 days of MV**

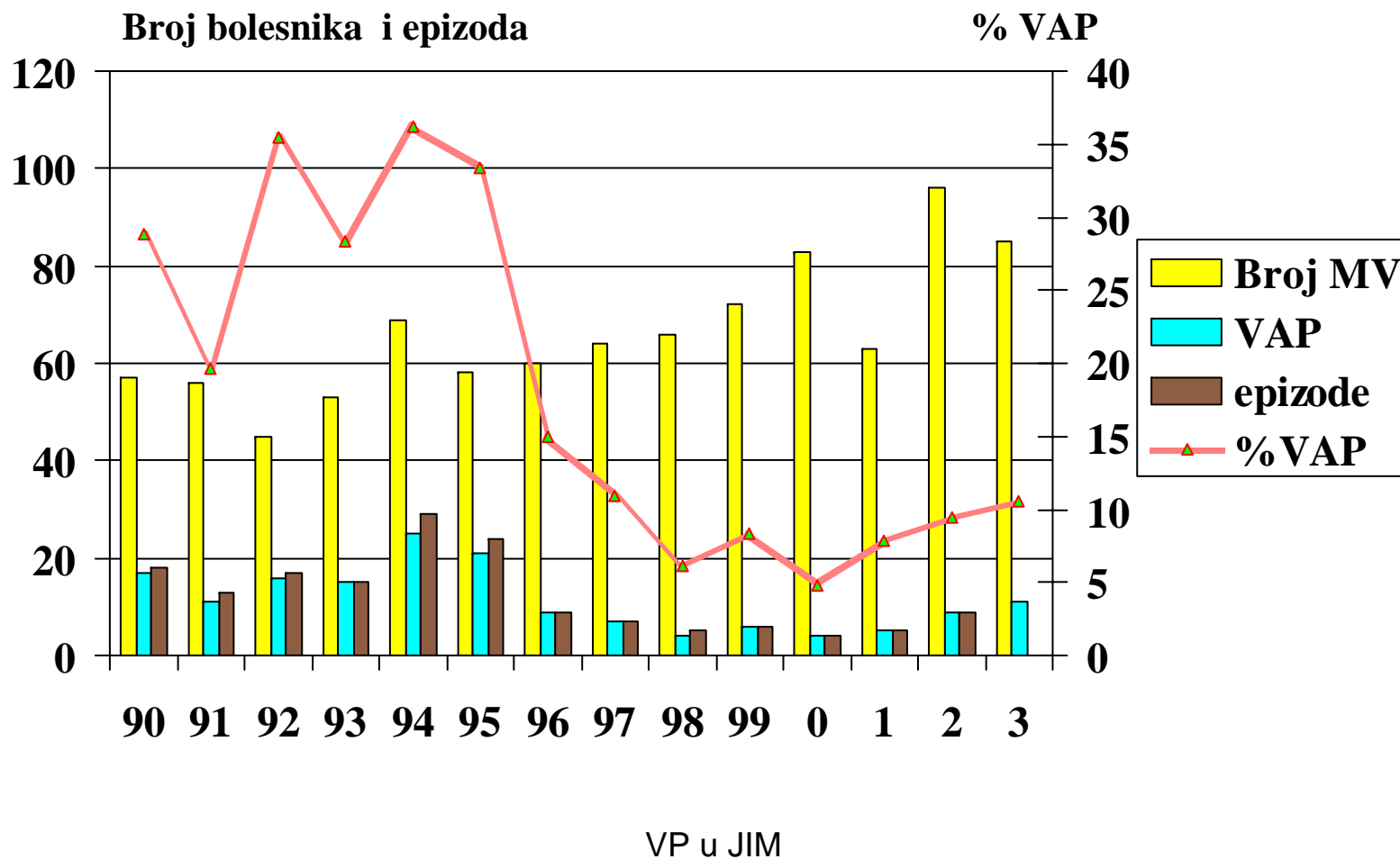


- **No of episodes/ No of days on MV x 1000**

- **% of MV patients who acquired VAP**

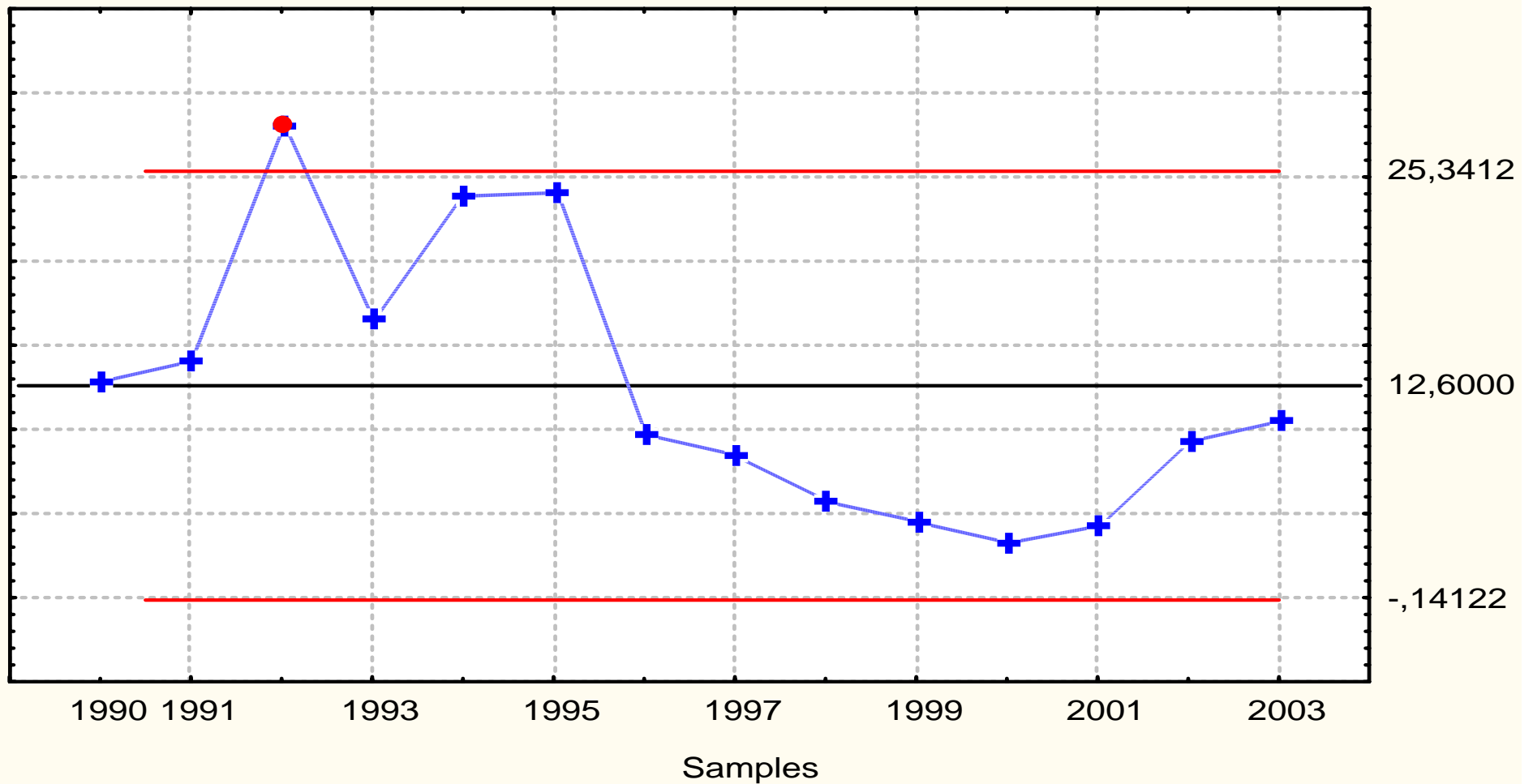
- **number of VAP episodes**

Broj bolesnika s ventilator pneumonijom (Razdoblje 1990-2002)



VAP/1000 MV days ICU-HID-1990-2003

X-BAR Mean: 12,6000 (2,6000) Proc. sigma: 4,24772 (4707) n: 1



Diagnosis of VAP

- Indication for diagnostic procedures
 - New onset of fever
 - New-onset purulent tracheal secretion
 - Change in secretion character
 - Rales or dullness to percussion heard in chest exam
 - Fighting the respirator
 - Increase in the % of band and forms in WBC
 - New onset hypoxaemia
 - New infiltrate on X ray of the chest

CDC Criteria for Nosocomial (Hospital- Acquired) Pneumonia

Signs & Symptoms in Adults

- Rales or dullness to percussion heard in chest exam PLUS any of the following:
 - New-onset purulent sputum
 - Change in sputum character
 - Isolation of organism from blood culture
 - Isolation of pathogen from transtracheal aspirate, bronchial brushing or biopsy

OR

- Chest x-ray shows new /progressive infiltrate, consolidation, cavitation or pleural effusion PLUS any of the following:
 - One additional criterion cited above
 - Viral isolation or viral antigen detected in respiratory secretion
 - Histopathologic evidence of pneumonia
 - Diagnostic single antibody titer (IgM) or fourfold increase in paired serum samples (IgG) for pathogen

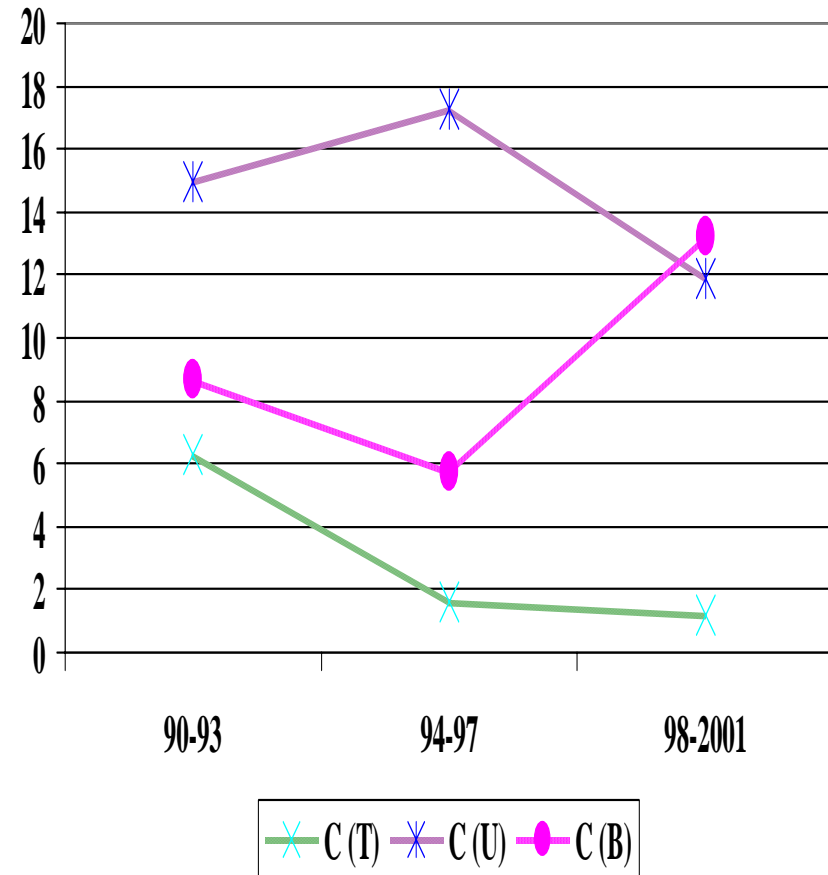
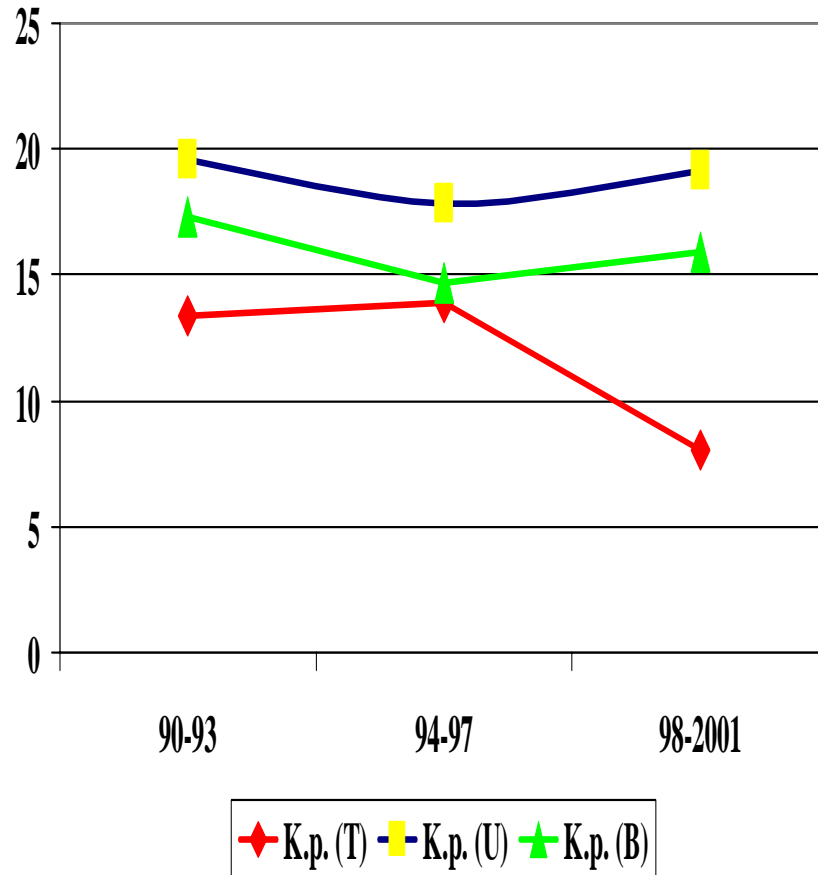
Surveillance of etiology of VAP

- Proper specimen
 - The best method of sampling?
- Rapid reporting of Gram-stain
- Quantitative evaluation
- Focal surveillance
- Influence choice of antibiotics

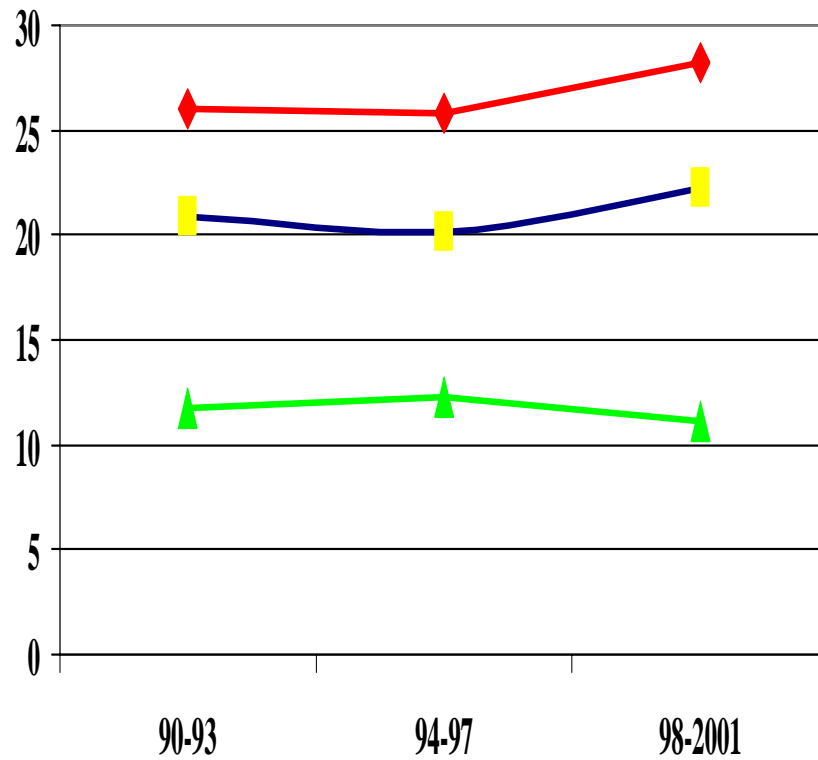
Sensitivity and specificity of diagnostic tests for VAP
(based on Wiblin TR, 1997)

Test	Sensitivity	Specificity
Aspiration	52-100%	29-100%
PBS	60-100%	62-100%
BAL	80-100%	76-100%

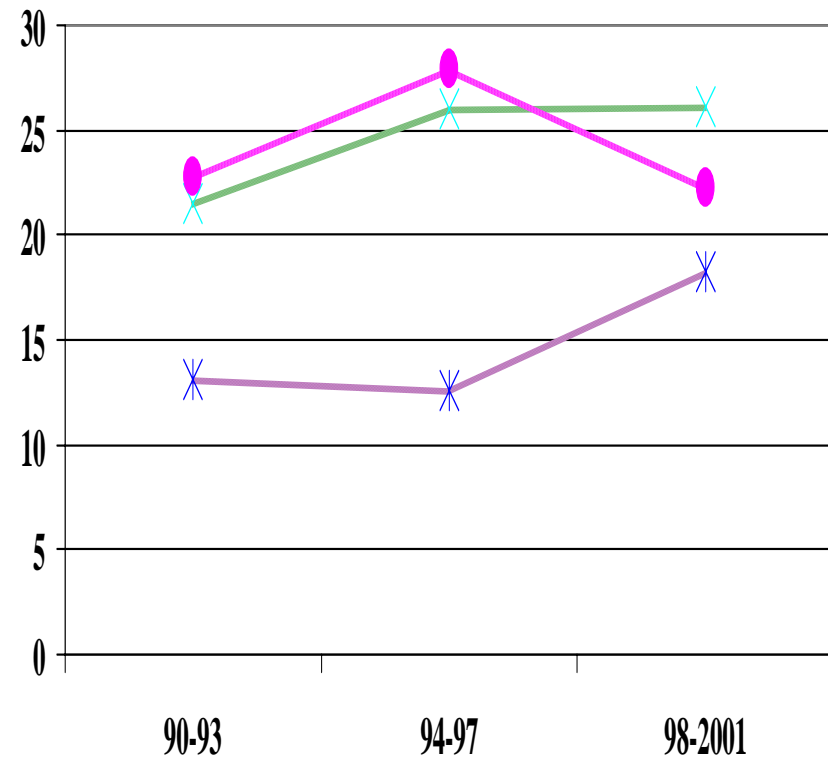
K.pneumoniae and Candida isolates from three types of specimen



P.aeruginosa and Acinetobacter isolates from three types of specimen

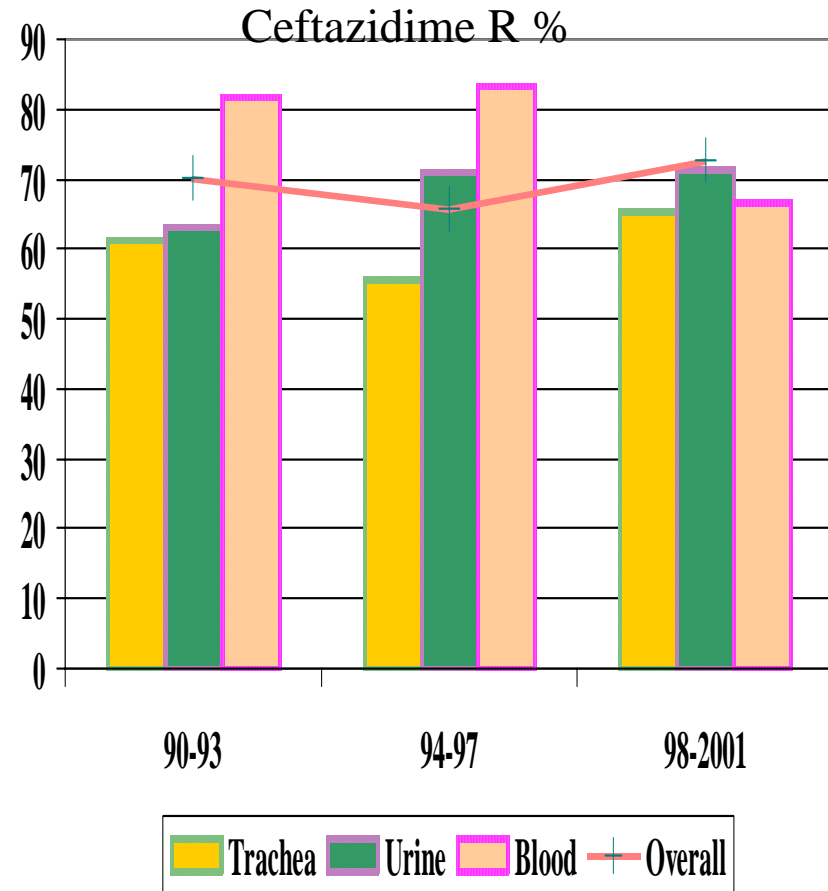
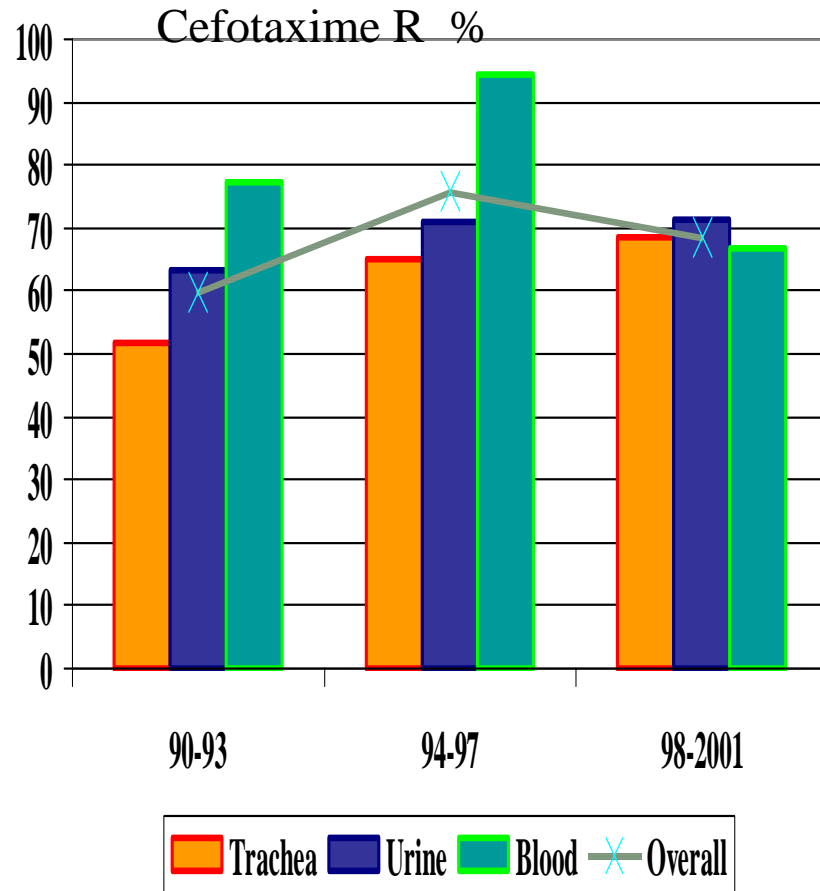


◆ P.a. (T) ■ P.a. (U) ▲ P.a. (B)

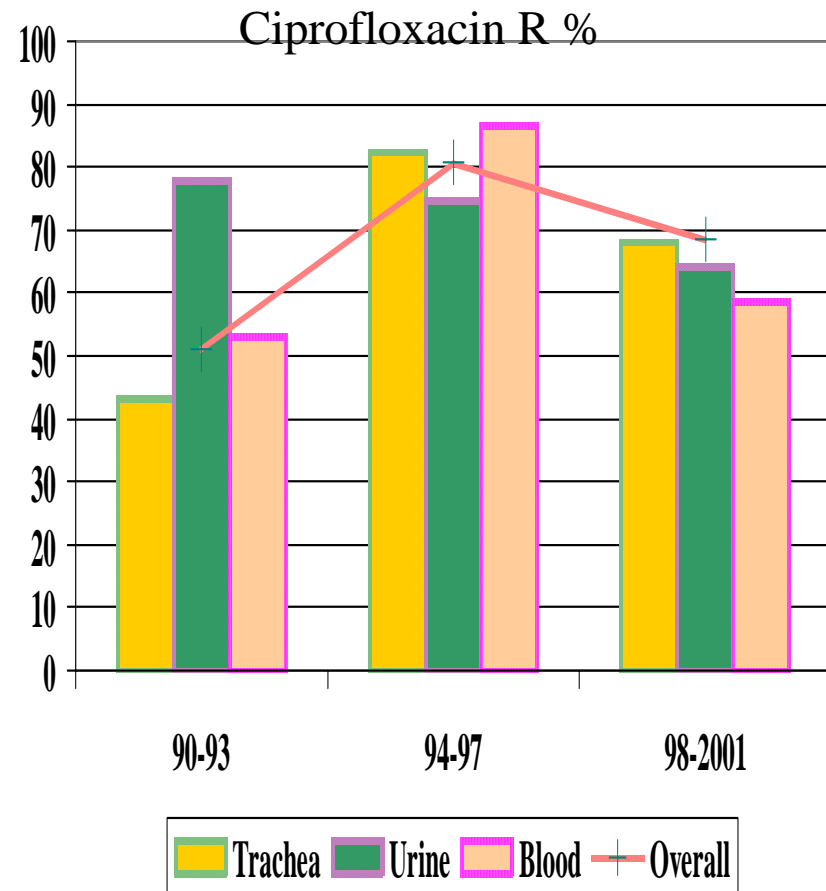
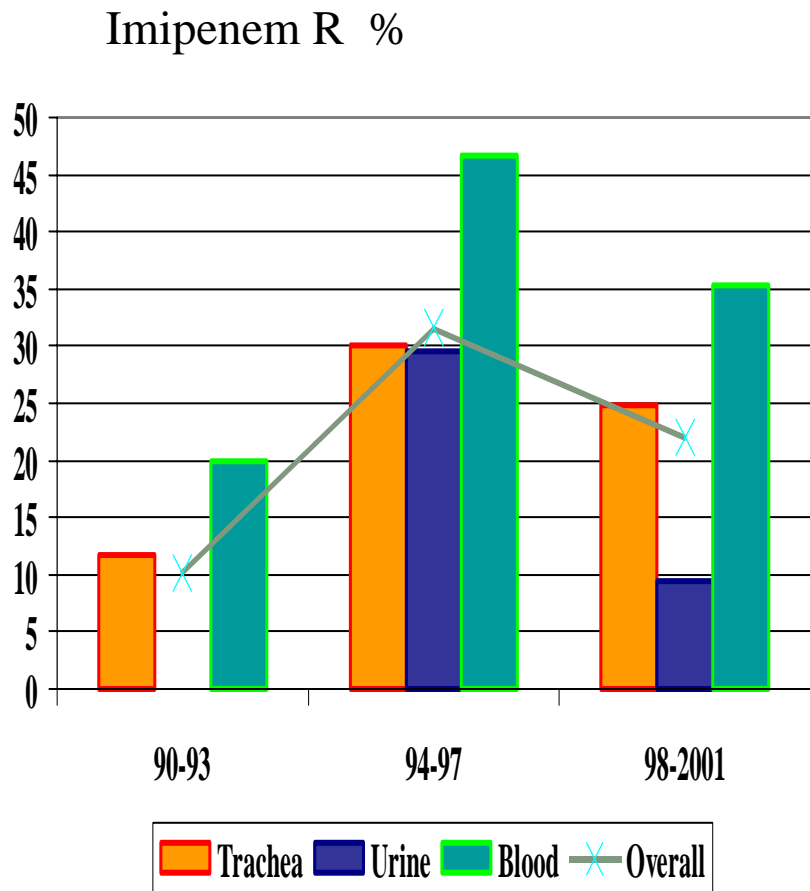


× A (T) * A (U) ● A (B)

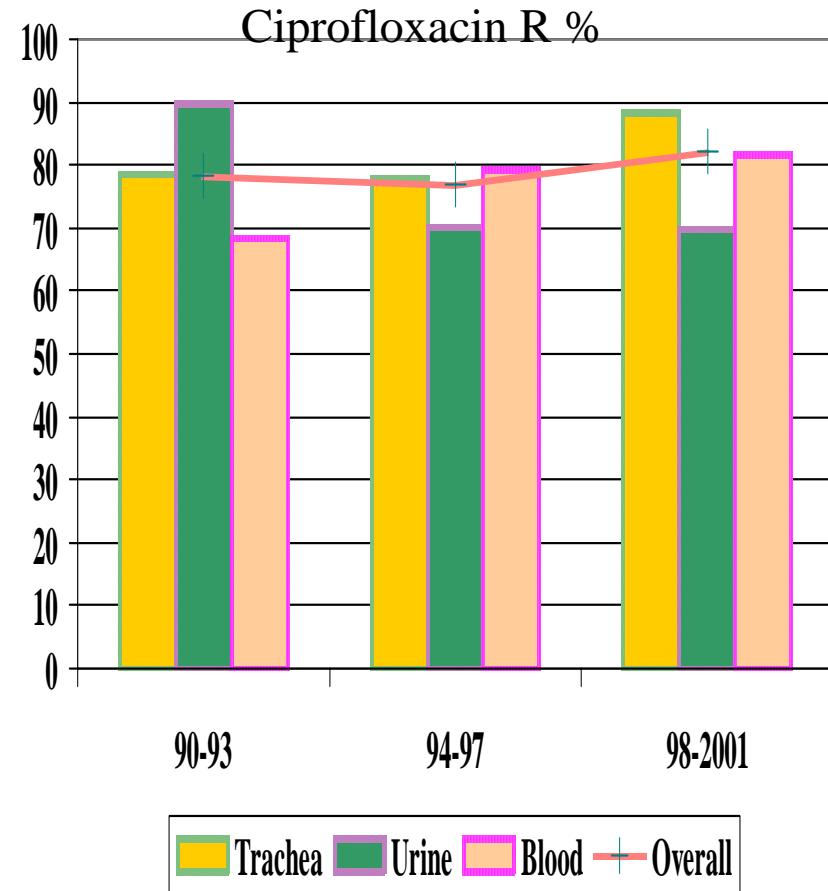
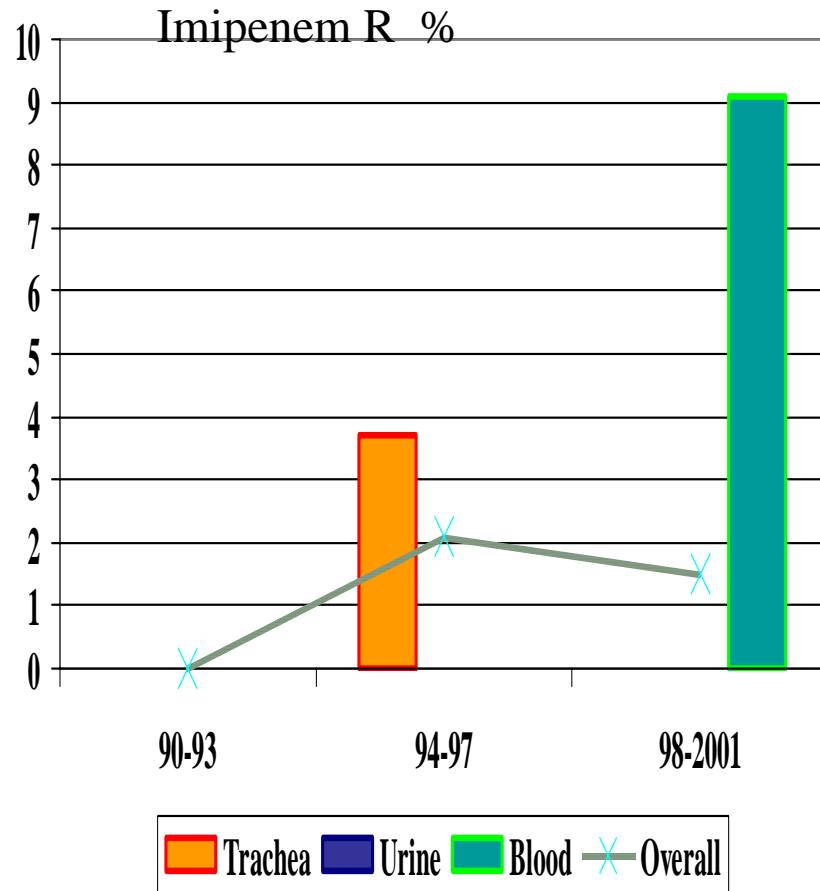
Resistance of *Klebsiella pneumoniae* on cefotaxime and ceftazidime



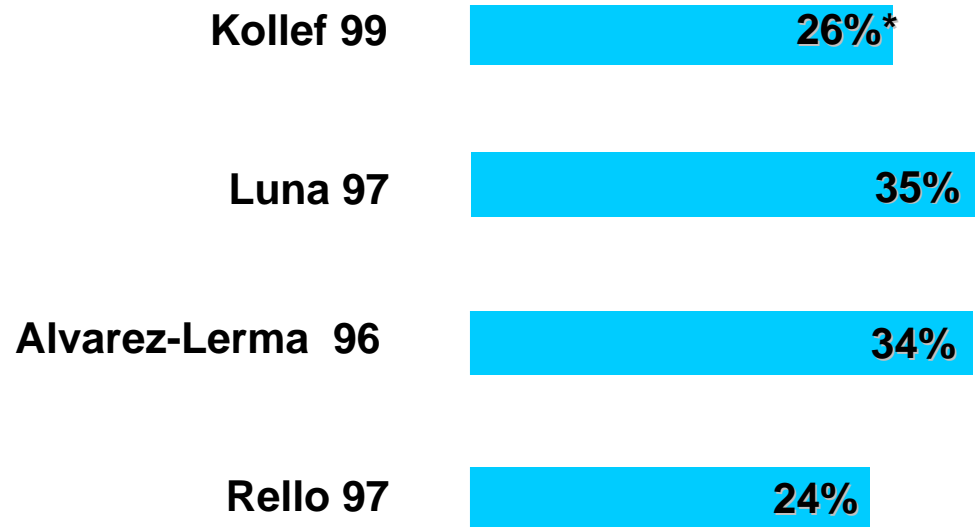
Resistance of P.aeruginosa on imipenem and ciprofloxacin



Resistance of Acinetobacter sp. on imipenem and ciprofloxacin



Initial Inadequate Therapy in VAP



% Patients Receiving Initial Inadequate Therapy

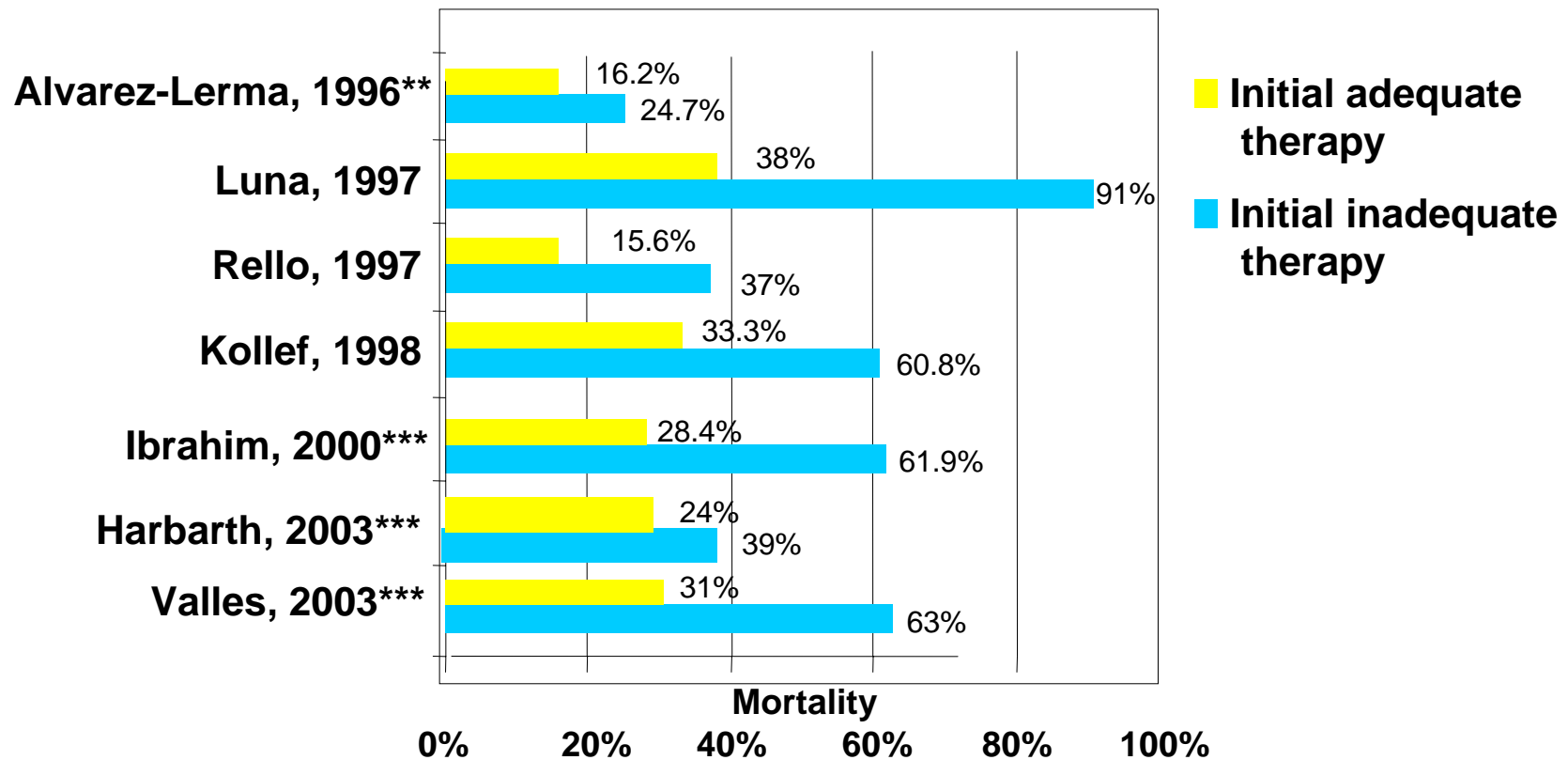
*Includes patients with HAP and VAP.

Kollef MH et al. *Chest* 1999;115:462-474. Luna CM et al. *Chest* 1997;111:676-685.

Alvarez-Lerma F et al. *Intensive Care Med* 1996;22:387-394.

Rello J et al. *Am J Resp Crit Care Med* 1997;156:196-200.

Mortality* Associated with Initial Inadequate Therapy in Critically Ill ICU Patients with HAP or Sepsis



*Mortality refers to crude or infection-related mortality. **Includes patients with HAP.

***Patients had blood stream infections rather than pneumonia as in the other studies.

Alvarez-Lerma F et al. *Intensive Care Med* 1996;22:387-394.

Luna CM et al. *Chest* 1997;111:676-685.

Rello J et al. *Am J Respir Crit Care Med* 1997;156:196-200.

Kollef MH et al. *Chest* 1998;113:412-420.

Ibrahim EH et al. *Chest* 2000;118:146-155.

Harbarth S et al. *Am J Med* 2003;115:529-535.

Valles J et al. *Chest* 2003;123:1615-1624.

How To Optimize De-Escalating: Use of Clinical Parameters To Modify or Stop Antibiotic Therapy (2)

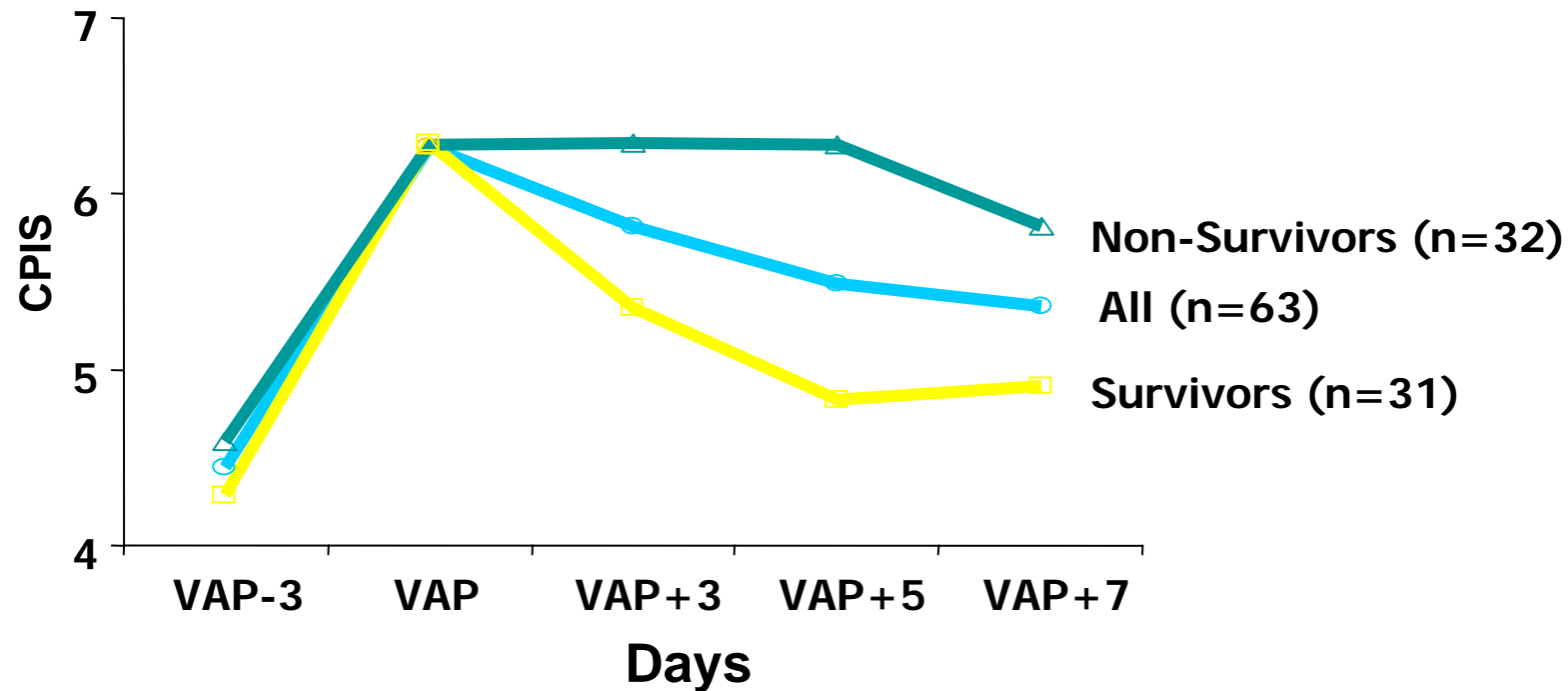
Use of the Clinical Pulmonary Infection Score (CPIS) to attempt to identify patients in whom antibiotic therapy can be stopped after 3 days.

- Factors in the calculation of the CPIS*:
 - Temperature
 - Blood leukocytes
 - Tracheal secretions
 - Oxygenation
 - Pulmonary radiography
 - Progression of pulmonary infiltrate
 - Culture of tracheal aspirate
- Score ≤ 6 (pneumonia unlikely)
Score > 6 (treat as having pneumonia)

*The first five criteria were used to calculate initial CPIS;
all 7 were use to calculate a repeat score on day 3.

How To Optimize De-Escalating: Use of Clinical Parameters To Modify or Stop Therapy (3)

Therapy Serial CPIS Measurements to Determine the Outcome in VAP



- Evolution of the CPIS correlated with mortality.
- $\text{PaO}_2/\text{FIO}_2$ ratio was the best correlate of clinical response and outcome.