

Pneumonia Severity Assessment

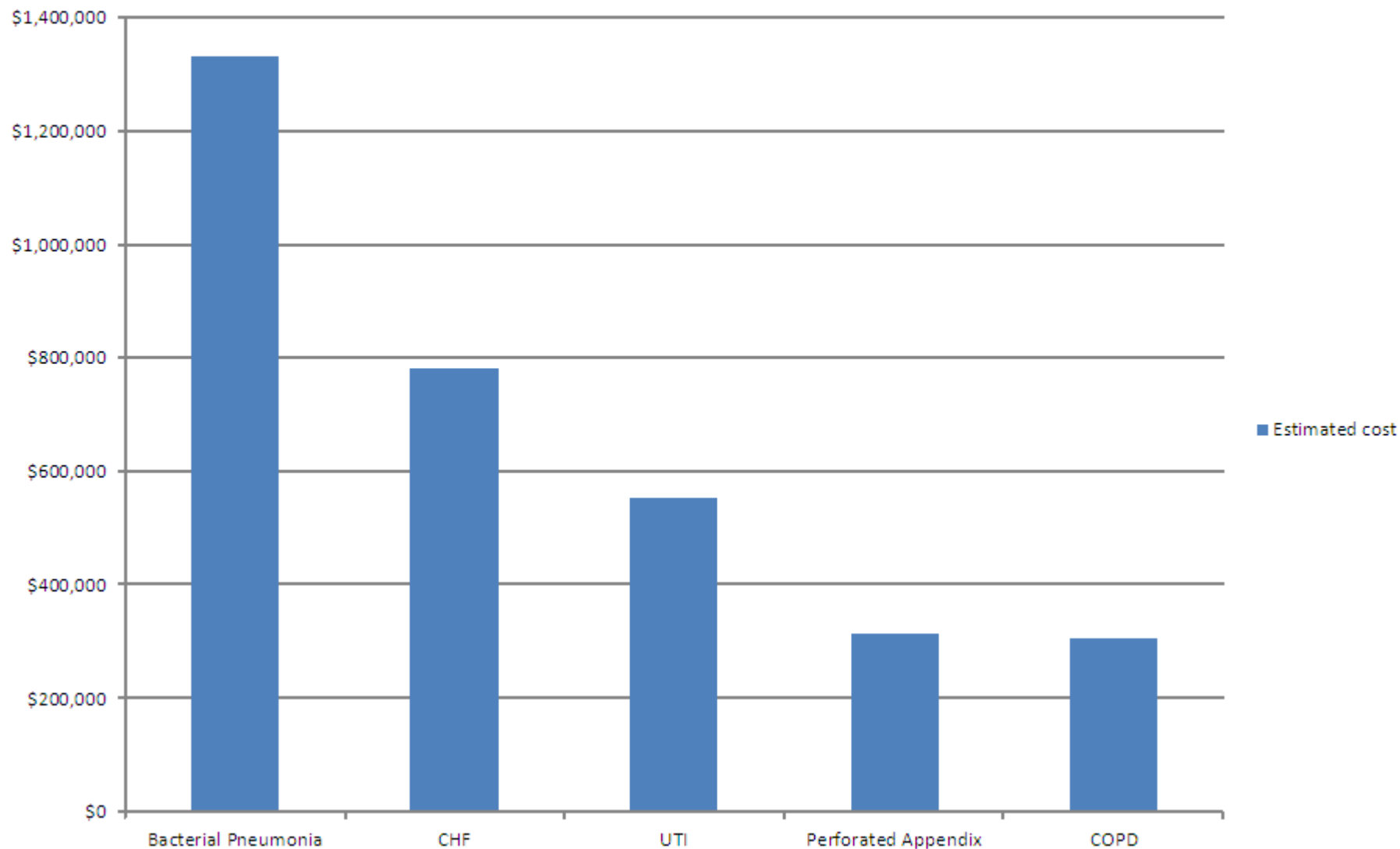
using predictive mortality tools for
patients diagnosed with pneumonia
on hospital admission

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Background & Significance

- Each year pneumonia affects over 6 million Americans*
- The total annual health care cost to treat these patients is \$8.4 billion*
- @ AltaMed:
 - In 2011, there were 226 hospital admissions due to pneumonia.
 - From January 2012 through May 2012, there were 96 hospital admissions due to pneumonia

**Estimated cost of Avoidable admits
ALTAMED-ALTAOC-SBC-ALTCHLA
Jan 2009-August 2011
Auths admits by date of Service**



The question is

How many of these hospital admissions are avoidable?

Introduction

to

Severity Assessment/Risk stratification tools

Pneumonia Severity Index (PSI)

- Widely validated
- Proven to improve patient care
- Useful research tool

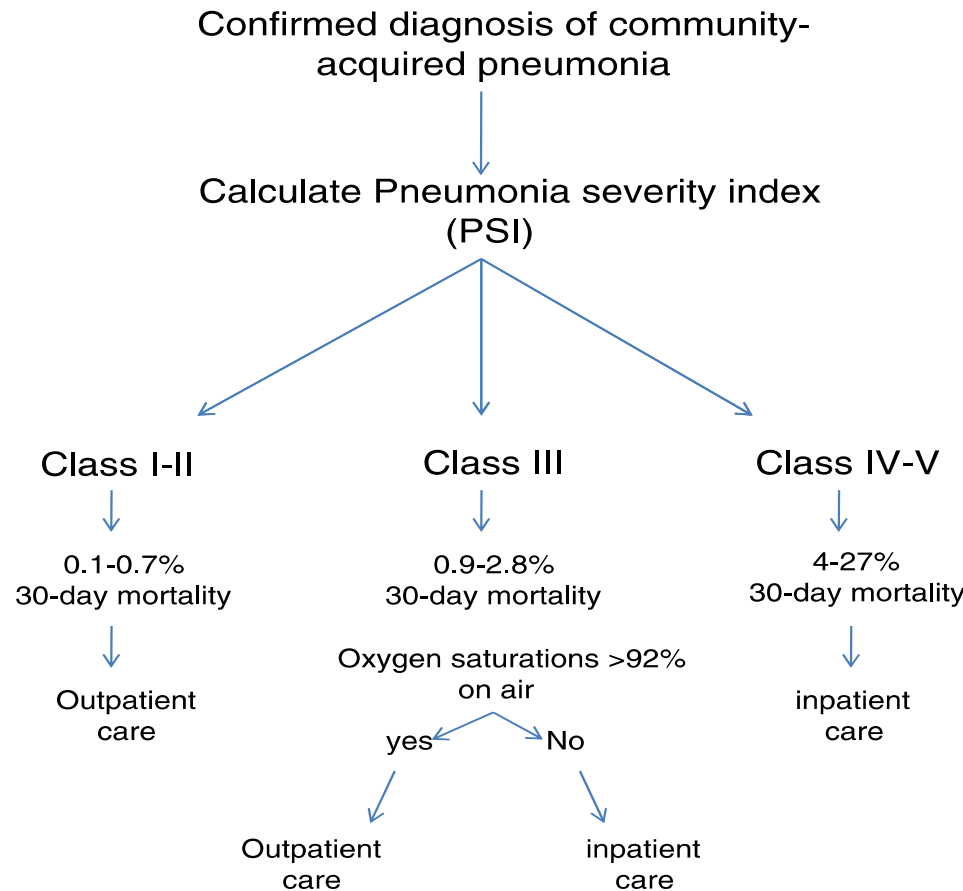
- Complex to calculate
- Underestimates severity in young people
- Does not predict need for ICU admission or other complications

CURB65

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Pneumonia Severity Index (PSI)



PSI CALCULATION- STEP 1

If patient is aged <50 years with none of the Co-morbid illnesses or clinical features listed below, assign to PSI class I. If aged >50 years or presence of 1 or more adverse features, proceed to step 2.

PSI CALCULATION- STEP 2

Demographics

Age (1 point/year, -10 if female)
Nursing home resident (10 points)

Co-morbid illnesses

Neoplastic disease (30 points)
Liver disease (20 points)
Congestive heart failure (10 points)
Cerebrovascular disease (10 points)
Renal disease (10 points)

Clinical features

Altered mental status (20 points)
Pulse ≥ 125 /min (10 points)
Respiratory rate > 30 /min (20 points)
Systolic blood pressure < 90 mmHg (20 points)
Temperature < 35 or ≥ 40 °C (15 points)

Laboratory results

Arterial pH < 7.35 (30 points)
Urea ≥ 30 mg/dl (20 points)
Sodium < 30 mmol/L (20 points)
Glucose ≥ 250 mg/dl (10 points)
Haemocrit $< 30\%$ (10 points)
PaO₂ < 60 mmHg (10 points)

Radiology

Pleural effusion (10 points)

<70 points=Class II 71-90 points=Class III
91-130 points=Class IV >130 points=Class V

Fig. 1. A typical protocol for the use of the pneumonia severity index to guide site of care decisions in community-acquired pneumonia.

CURB65

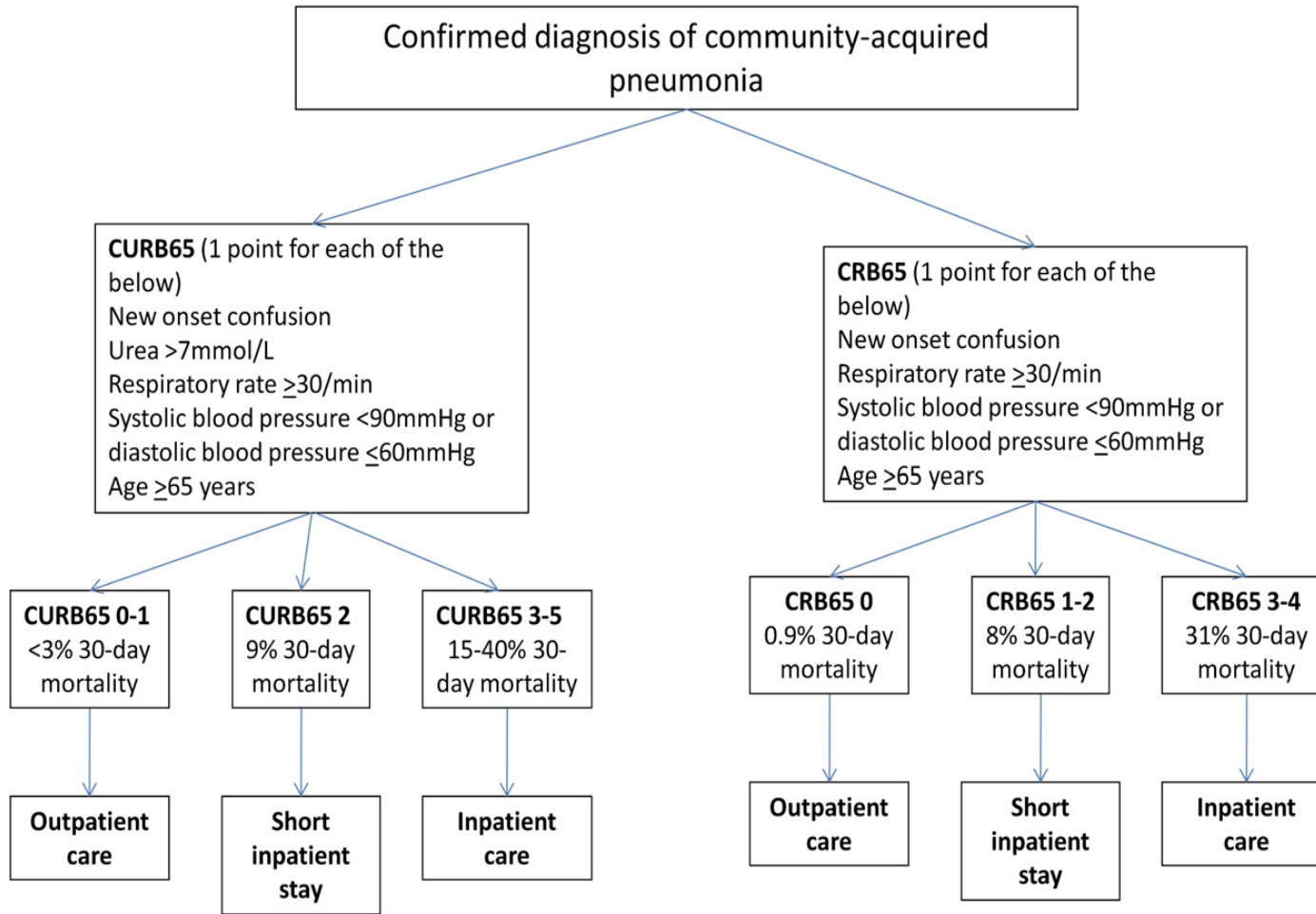


Fig. 2. A typical protocol for use of CURB65 or CRB65 to guide site of care decisions in community-acquired pneumonia.

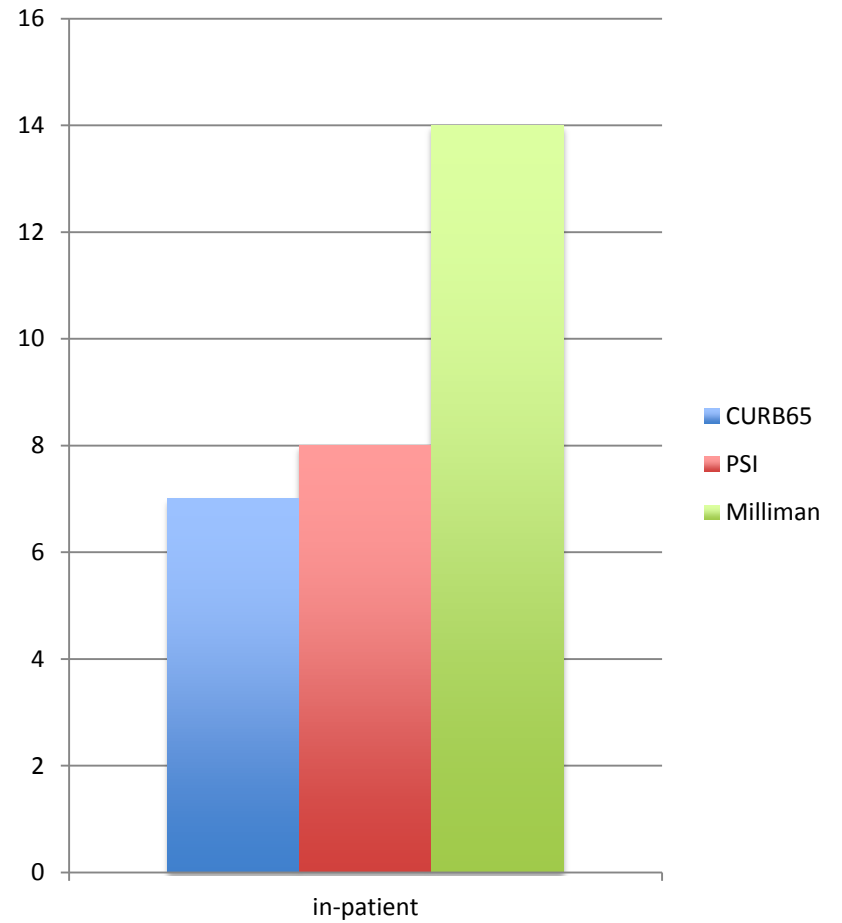
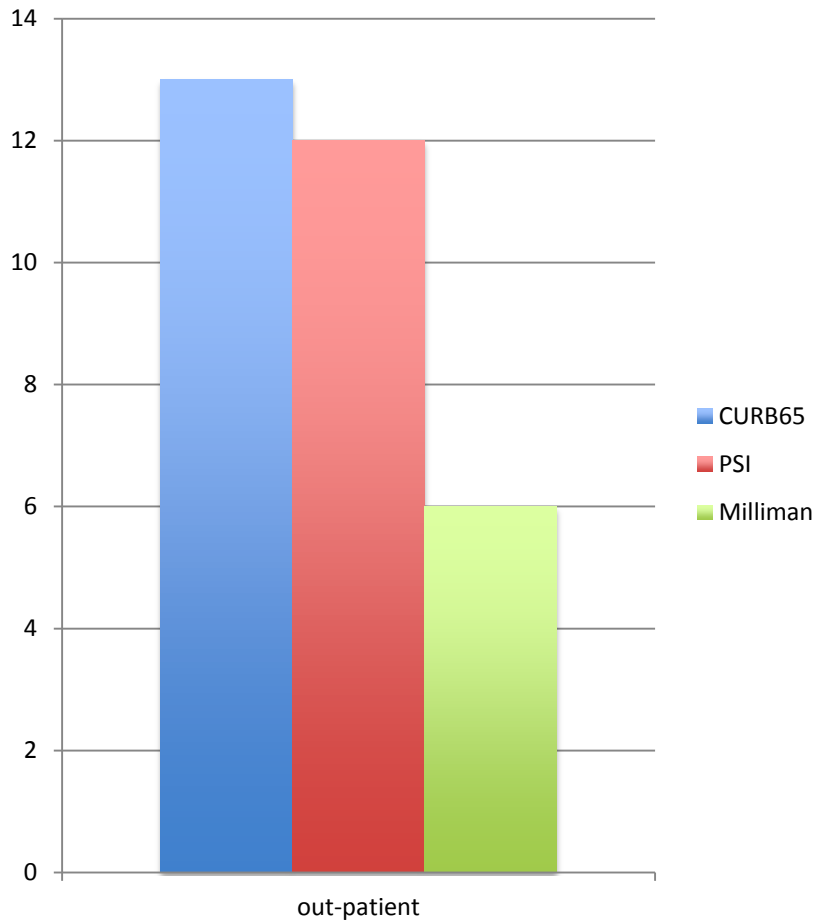
Milliman Criteria

- Hypoxia: O_2 sats $<90\%$ or $pO_2 <60$ or worsening chronic lung disease
- Outpatient management failure
- Complications of pneumonia (ie. Empyema)
- Appropriate diagnostic testing & tx unavailable
- Hemodynamic instability
- PSI class IV/V or CURB-65 score >3
- Immunocompromised

Research Project

- **Objective:** to compare tools used to measure pneumonia severity assessment to determine the appropriateness of patients admitted to hospital for pneumonia
- **Design:** Retrospective chart review
- **Setting:** White Memorial Medical Center (WMMC) is 353-bed not-for-profit, faith-based, teaching hospital that serves downtown Los Angeles and nearby communities.
- **Patients:** adults diagnosed with pneumonia upon admission to hospital from Jan 2012 – May 2012
- **Methodology:** hospital admission records for patients were reviewed to determine PSI, CURB65 & Milliman criteria for each patient.
- **Results:** (n=20)
 - low risk- PSI 60% CURB65 65% Milliman 30%

Results



Discussion

- Limitations
 - Retrospective design is a disadvantage for data availability
 - Small sample size
 - only hospitalized patients in a single center were included
 - Assumed missing values
 - Assumed community acquired pneumonia for each pneumonia diagnosis
 - Patients admitted during non-peak season
- Future direction
 - Predictive biomarkers such as procalcitonin

Conclusion

- 6 out of 20 of the hospital admissions did not meet the Milliman criteria, these 6 make up the potentially avoidable hospital admissions for pneumonia.
- Using the Milliman criteria as the Gold Standard, PSI & CURB65 were sensitive, making them good screening tools. The sensitivity of PSI was 100% and CURB65 was 86%.

References:

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