Reducing Time to Initial Antibiotic Dose in Pneumonia Patients

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Mountain View CA
El Camino Hospital

- 395 bed not-for-profit District hospital located in the Silicon Valley of California
- 489 active physicians
- 2250 Employees
Why this topic

- Pneumonia is the second highest volume medical diagnosis at El Camino (after CHF)
- Core measures related improvement efforts have been successful for AMI, CHF
  - Uncontroversial, evidence based care standards
  - Well accepted benchmarks
- Strong evidence of efficacy for antibiotic within 4 hours
- We saw a clear opportunity to improve…
Well Established Evidence

- **Kahn (1990)**: antibiotics within 4 hours of admission → improved survival
- **McGarvey (1993)**: time-to-first-dose 4 hours → improved survival
- **Meehan (1995)**: antibiotic within 3 hours → 15% lower 30 day survival compared with antibiotic 8+ hours following arrival
- **Bratzler (2001)**: first antibiotic administered within 4 hours → reduced in-hospital and 30-day mortality 10% to 17%
- **Infectious Diseases Society of America (2000), American Thoracic Society (2001)**: recommends 8 hours maximum time to first antibiotic administration
Baseline Performance

Average Minutes to Initial Antibiotic

Below 50th pctle for 4 Hour window

At or worse than national average for mean time

Initial Antibiotic Received within 4 Hours of Hospital Arrival

ECH  HQA 50th Percentile  HQA 10th Percentile

58%  74%  89%
Baseline Performance

Simply reporting the results to physicians produced some early progress in reducing the “9+ Hour tail”, but more progress is needed…
Our “Quick Antibiotic Team”

- Susan Bukunt RN (leader), **Director Clinical Effectiveness**
- Chris Hunter RN (facilitator), **Manager Clinical Decision Support**
- Michael Podlone MD, **Internist, Vice Chief Medicine**
- Josie Tang MD, **Hospitalist**
- Mary Anderson RN, **Manager Emergency Department**
- Kathy Fox, **Core Measures chart abstractor**
- Penny Takizawa RN, **Infection Control**
- Dan Fox MD, **Assistant Medical Director, Emergency Dept**
- Becky Smith, **Manager Patient Registration**
Our Method

- Set Aims: What are we trying to accomplish?
- Define Outcome Measures: How will we know a change is an improvement?
- Develop & Test Changes: What changes can we make that will result in improvement?

Our Method Diagram:

1. **Measure** (DO)
2. **Assess** (STUDY)
3. **Design** (PLAN)
4. **Improve** (ACT)

Diagram arrows indicate the cyclical nature of the process.
Our Aims

• Increase the percent of patients receiving antibiotics within 4 hours to 80% by June 30, 2005
• Decrease mean minutes to initial dose to 220 by June 30, 2005
First look: Entry Point of Pneumonia Patients, Oct-Nov 2004

45 pneumonia patients qualifying for rapid antibiotic administration

- ED via ambulance: 49%
- Walk-in to ED: 42%
- Direct Admit: 9%
Tools

- Chart reviews by team members and Dept of Medicine officers
- Log sheet to collect key info concurrent with Core Measures abstraction

**Core Measure** Pneumonia Patients Qualifying for Antibiotic Timing Measure

<table>
<thead>
<tr>
<th>Encounter #</th>
<th>Arrival Date/Time*</th>
<th>A/N/D **</th>
<th>Blood Cx (Y/N)</th>
<th>Blood Cx Time</th>
<th>CXR Order</th>
<th>Abx Order Time</th>
<th>Abx Admin Time</th>
<th>Abx Given in ED?</th>
<th>Admitting MD</th>
<th>ED MD</th>
<th>Comments</th>
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Process Flow (ED Focus)

- Direct Admit
- To ED via Ambulance
- Walk in to ED
  - Triage
  - Assessment
  - Testing
  - Diagnosis
  - Treatment orders
  - Treatment
- Registration

Assess later
Delay in Administering Initial Antibiotic Dose to a Pneumonia Patient

**Patient Issues**
- Unclear diagnosis
- Multiple immediate problems
- Delay in blood draw (Culture, WBC)
- Delay in Patient Registration delays order entry

**Ancillary Issues**
- Ordered antibiotic not available
- Weekday unavailability of community MD
- Ordered antibiotic not available

**ED Operations Issues**
- Delay in starting an ordered antibiotic
- Delay in admit to floor
- Misinterp of CXR (Pneumonia vs CHF)
- Weekday unavailability of community MD

**Other Issues**
- “Ready for transfer to floor” then delayed
- Low use of Pneumonia Clinical Path
- Gap between blood culture draw & Antibiotic orders

**Physician Issues**
- Delay in CXR read
- Delay in admit to floor

**Other Issues**
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<th>Status</th>
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<tbody>
<tr>
<td>1  Always start antibiotic in ED</td>
<td>started 1/28/05</td>
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<tr>
<td>2  Physician at ED Triage: Get CXR from Triage if pneumonia suspected</td>
<td>started 3/15/05: 1-11pm, 7 days per week</td>
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<td>3  Add Zosyn &amp; Azithromycin to MIS ED order screens to streamline antibiotic ordering</td>
<td>in place 3/1/05</td>
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<td>4  Do EQT Quick Registration concurrent with Triage</td>
<td>started 3/15/05: averaging 5-10 min</td>
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<td>5  Pneumonia ED protocol</td>
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<td>6  Educate physicians about new blood culture medium insensitive to abx</td>
<td>Lab wrote a brief for the 3/23/05 physician fax newsletter</td>
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Minutes to Initial Antibiotic Dose in Consecutive Pneumonia Patients, arriving 12/24/03 to 11/30/04

Data initially reported to Medicine
Next Steps

• Update performance data
  – just beginning Jan 2005 chart review

• Monitor & support March changes
  – Antibiotic started in ED
  – Quick Registration to speed ordering
  – Physician Triage

• Implement ED Pneumonia protocol by 5/1/05

• Assess the Direct Admit process
ED Pneumonia Protocol

• Goal: To have diagnostic tests completed prior to MD Evaluation
  – *Pt identified at triage with cough and fever*
  – *Chest x-ray ordered, labs ordered and drawn*
  – *MD able to diagnose and treat immediately*
Thank you

- Your questions?
- Your suggestions?