

2016 LLSA Article Review

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### The Articles

- Wunderink RG, Waterer GW. Clinical practice. **Community-acquired pneumonia**. N Engl J Med 2014;370:543- 51.
- Azari AA, Barney NP. **Conjunctivitis: a systematic review of diagnosis and treatment**. JAMA 2013;310.1721-29.
- Jesus JE, et al. ACEP Ethics Committee. **Physicians orders for life-sustaining treatment and emergency medicine**. Ann Emerg Med 2014;64:140-44.
- Article 10 - Yealy DM, et al. **The ProCESS Investigators. A randomized trial of protocol-based care for early septic shock**. N Engl J Med 2014;370:1683-93.

### Community Acquired Pneumonia

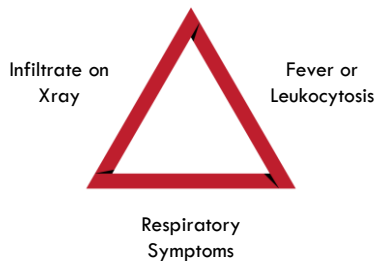
# Community Acquired Pneumonia

### Background

50,000



### Diagnosis



### Differential Dx

Can be difficult to diagnose and missed on radiographs 15% of the time

Table 1. Differential Diagnosis of Community-Acquired Pneumonia.
<b>Abnormal chest radiograph</b>
Congestive heart failure with associated viral syndrome to explain infectious symptoms
Aspiration pneumonitis
Pulmonary infarction
Acute exacerbation of pulmonary fibrosis
Acute exacerbation of bronchiectasis
Acute eosinophilic pneumonia
Hypersensitivity pneumonitis
Pulmonary vasculitis
Cocaine-induced lung injury ("crack lung")
<b>Normal chest radiograph</b>
Acute exacerbation of chronic obstructive pulmonary disease
Influenza
Acute bronchitis
Pertussis
Asthma with associated viral syndrome to explain infectious symptoms

## Antibiotic Coverage CAP

<p><b>Bacteria to cover:</b></p> <p>Typical: streptococcus pneumoniae</p> <p>Atypical: mycoplasma, chlamydothila, and legionella</p>	<p><b>Antibiotic coverage:</b></p> <p>Outpatient: Fluoroquinolone, Macrolide, or Doxycycline</p> <p>Inpatient: Fluoroquinolone OR combination 2<sup>nd</sup> or 3<sup>rd</sup> generation Cephalosporin with Macrolide*</p>
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## Timing of Antibiotic Administration



## Duration of Therapy



## Hospital Acquired Pneumonia

<p><b>Table 2. Criteria for Health Care-Associated Pneumonia.</b></p> <p><b>Original criteria*</b></p> <ul style="list-style-type: none"> <li>Hospitalization for ≥2 days during the previous 90 days</li> <li>Residence in a nursing home or extended-care facility</li> <li>Long-term use of infusion therapy at home, including antibiotics</li> <li>Hemodialysis during the previous 30 days</li> <li>Home wound care</li> <li>Family member with multidrug-resistant pathogen</li> <li>Immunosuppressive disease or therapy†</li> </ul> <p><b>Pneumonia-specific criteria‡</b></p> <ul style="list-style-type: none"> <li>Hospitalization for ≥2 days during the previous 90 days</li> <li>Antibiotic use during the previous 90 days</li> <li>Nonambulatory status</li> <li>Tube feedings</li> <li>Immunocompromised status</li> <li>Use of gastric acid suppressive agents</li> </ul>
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## Antibiotic Coverage HAP

<p><b>Bacteria to cover:</b></p> <p>MRSA (can be CAP)</p> <p>Pseudomonas</p>	<p><b>Table 3. Clinical Features Suggesting Community-Acquired MRSA Pneumonia.*</b></p> <ul style="list-style-type: none"> <li>Cavitary infiltrate or necrosis</li> <li>Rapidly increasing pleural effusion</li> <li>Gross hemoptysis (not just blood-streaked)</li> <li>Concurrent influenza</li> <li>Neutropenia</li> <li>Erythematous rash</li> <li>Skin pustules</li> <li>Young, previously healthy patient</li> <li>Severe pneumonia during summer months</li> </ul>
<p><b>Antibiotic coverage:</b></p> <p>MRSA – add linezolid or clindamycin to vancomycin regimen</p>	

## Diagnostic Testing

<p>CAP</p> <p>No other testing</p>
<p>Severe CAP</p> <p>Blood culture</p> <p>Influenza</p> <p>Respiratory culture</p> <p>Urinary pneumococcal</p> <p>Urinary Legionella</p> <p>Pleural fluid culture</p>

## Site of Care

Clinical factor	Points
Confusion	1
Blood urea nitrogen > 19 mg per dl.	1
Respiratory rate ≥ 30 breaths per minute	1
Systolic blood pressure < 90 mm Hg or Diastolic blood pressure ≤ 60 mm Hg	1
Age ≥ 65 years	1
<b>Total points:</b>	

**CAP: CURB-65**

CURB-65 Score	Mortality Rate	Tx Location
0	0.7%	Outpatient
1	2.1%	Outpatient
2	9.2%	Inpatient
3	14.5%	Inpatient - ICU
4	40.0%	ICU
5	57.0%	ICU

## ICU versus floor

More attention in ED can decrease admission to ICU

1. Aggressive fluid resuscitation
2. Prompt antibiotic treatment
3. ABG measurement in borderline hypoxia, lactate, or hypotension
4. Treatment of coexisting illness

Decrease from **23% to 6%** mortality in QI projects

## Overshooting on Antibiotics

Studies show increased mortality in CAP when overshooting on antibiotics so most basic antibiotic best unless risk factors for resistance or pathogenic bacteria

## Conclusions

- CAP is still a leading cause of death in US
- Treat with same antibiotics as have been recommended for years
- Not all HAP is HAP – over treating can cause harm
- Aggressive treatment in the ED is key

Conjunctivitis

## Conjunctivitis

## Background

6,000,000

\$377-857 million/year

## Background

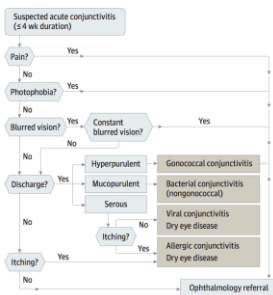
70%



## Most Common Causes

**Most Common:**  
 Viral (up to 80%)  
 65%-90% caused by adenovirus  
 Bacterial (2<sup>nd</sup> most common)  
 Allergic

## Algorithm



## Methods

- Systematic Review
- Reviewed literature published through 2013
- 86 articles included with first in 1982 and last 2012
- Articles assigned levels of evidence A, B, and C

## History and Physical Exam

Most predictive of Bacterial Conjunctivitis

1. Mattering and adherence of the eyelids on waking
2. Lack of itching
3. Absence of a history of conjunctivitis

Most resolve 1-2 weeks

Variable



## Lab Testing

Generally not necessary, however...



## Viral Conjunctivitis

- Most adenovirus
- Lymphadenopathy observed in 50% which is much higher than bacterial conjunctivitis
- Direct contact spread
- Incubation 10-14 days
- Communicability 5-12 days
- Drops not indicated and can actually cause spread of infection to other eye



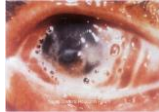
## Herpes Simplex and Zoster

- Topical and oral antivirals recommended
- Avoid steroids unless recommended by ophthalmology
- Refer to Ophthalmology



## Bacterial Conjunctivitis

- Most common pathogens
  - ▣ Staph
  - ▣ Then Strep pneumo and Haemophilus Influenza
  - ▣ In kids, Strep pneumo and HI dominate
- Lasts 7-10 days
- Remove contact lenses
- Hyperacute with severe purulence can be gonorrhoea – treat with ceftriaxone as well as meds for concurrent chlamydia



## Antibiotics in Bacterial Conjunctivitis

- 60% of cases are self limiting resolving in 1-2 weeks
- Reduce duration of illness
- Outcomes unchanged in meta-analysis
- All topical antibiotics seem to work similarly
- Avoid topical steroids
- Wait and see approach is acceptable in bacterial conjunctivitis



DO YOU USE TOPICAL ANTIBIOTICS?  
WILL YOU NOW?

## Special issues

- MRSA – need fortified vancomycin if suspected



- Chlamydia
  - ▣ Most unilateral and have genital infection
  - ▣ Symptoms weeks to months
  - ▣ Oral azithromycin or doxycycline recommended

## Special issues

- Gonorrhoea
  - ▣ Treat with topical and oral/parenteral
  - ▣ High risk corneal perforation
- Chlamydia trachoma
  - ▣ Leading cause of blindness worldwide
  - ▣ Single dose azithromycin effective

## Allergic Conjunctivitis

- Affects 40% of population in US
- Seasonal - itching most common symptom
- Saline solution to dilute antigens
- Topical antihistamines and mast cell stabilizers



## Steroid drops



## Conclusions

- Viral most common
- Usually self-limiting without topical antibiotics
- Severe purulence could be gonorrhea or other significant bacterial infection, treat topicals and consider oral antibiotics

## POLST

# POLST And Emergency Medicine

## Background

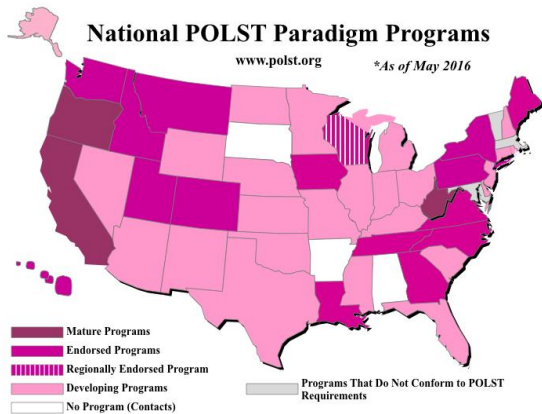
- We make quick decisions in the ED
- Often do not have end of life care orders
- Advance Directives and DNR/DNI orders do not often adequately guide emergency physicians
- Physician Orders for Life-Sustaining Treatment (POLST) was created to provide clarity when death is imminent



## State Adoption

- Oregon first to adopt in 2009
- 16 states by 2013
- 27 more states in development of POLST

<http://polst.org/resources/resource-library>



## DNR and Advance Directive Problems

- Only 18% of population have them and only 5.6% bring them to ED
- Do not allow change over time, DNR/DNI too specific, advanced directives too general
- Patients do not understand critical illness or the treatment given in dire circumstances
- Do not allow for preferences based on context and survivability
- Physicians typically interpret more broadly – less admissions to ICU, less transfer to hospital, treatment not per guidelines, etc.

## POLST

- Created for:
  - Seriously ill or frail patients with life-limiting advanced illness
  - Patients who have the threat of losing their decisionmaking capacity
  - Anyone with strong treatment preferences

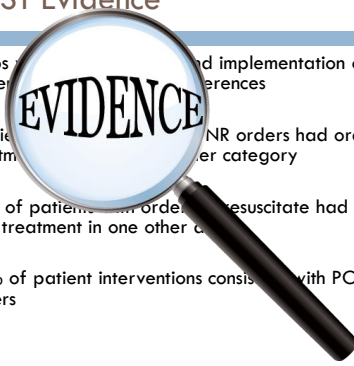
## POLST

- Break into categories
  - CPR
  - Medical interventions including intubation
  - Antibiotics
  - Artificial hydration and nutrition
- Asks for patient goals

Physician Orders for Life-Sustaining Treatment (POLST)	
Follow these medical orders until further change. Any action not completed requires full treatment for that section.	
Patient name (last, first, middle) _____ Date of birth (month/year) _____ Sex <input type="checkbox"/> M <input type="checkbox"/> F	
<b>A</b>	<b>CARDIOPULMONARY RESUSCITATION (CPR):</b> <input type="checkbox"/> <b>Attempt Resuscitation/CPR</b> if patient is not in cardiopulmonary arrest. <input type="checkbox"/> <b>Do Not Attempt Resuscitation/DNR</b> if patient is not in cardiopulmonary arrest.
<b>B</b>	<b>MEDICAL INTERVENTIONS:</b> <input type="checkbox"/> <b>Comfort Measures Only</b> Provide treatments to relieve pain and suffering through the use of any medication by any route, sedation, wound care and other measures. Use oxygen, suction and manual treatment of airway obstruction as needed for comfort. <b>Patient prefers no transfer to hospital for resuscitating treatments.</b> <input type="checkbox"/> <b>Limited Treatment</b> In addition to care described in Comfort Measures Only, use medical treatment, antibiotics, IV fluids and cardiac monitor as indicated. No intubation, mechanical airway interventions, or mechanical ventilation. May consider less invasive airway interventions. <input type="checkbox"/> <b>Full Treatment</b> In addition to care described in Comfort Measures Only and Limited Treatment, use intubation, advanced airway strategy, mechanical ventilation as indicated. Transfer to hospital and/or intensive care and/or other facility as indicated. <b>Additional Orders:</b> _____
<b>C</b>	<b>ARTIFICIALLY ADMINISTERED NUTRITION:</b> <input type="checkbox"/> <b>Long term artificial nutrition</b> <input type="checkbox"/> <b>Do not feed by mouth if feasible.</b> <input type="checkbox"/> <b>Do not feed by mouth if feasible.</b> <input type="checkbox"/> <b>Do not feed by mouth if feasible.</b>
<b>D</b>	<b>DOCUMENTATION:</b> (REQUIRED) <input type="checkbox"/> <b>Signature of patient or surrogate</b> (must check in box below) <input type="checkbox"/> <b>Signature of physician</b> (must check in box below) <input type="checkbox"/> <b>Signature of Health Care Representative</b> (legally appointed by advance directive or court) <input type="checkbox"/> <b>Signature of facility policy or Surgeon</b> for patient with developmental disabilities or significant mental health conditions (Note: Special requirements for completion - see reverse side) <input type="checkbox"/> <b>Signature of Surrogate</b> Name: _____ Relationship: _____
<b>E</b>	<b>PRINTED OR SIGNATURES (SIGNATURES AND OPTIONS POLST REVISIONS ONLY):</b> <input type="checkbox"/> <b>Signature of patient or surrogate</b> <input type="checkbox"/> <b>Signature of physician</b> <input type="checkbox"/> <b>Signature of Health Care Representative</b> <input type="checkbox"/> <b>Signature of facility policy or Surgeon</b> <input type="checkbox"/> <b>Signature of Surrogate</b>
<b>F</b>	<b>ATTESTATION OF MD/DO/NP/PA (REQUIRED)</b> I certify that I am a duly licensed medical professional and, to the best of my knowledge, consistent with the patient's current medical condition and preferences, I have completed this POLST form. <input type="checkbox"/> <b>Signature of MD/DO/NP/PA</b> _____ <input type="checkbox"/> <b>Signature of MD/DO/NP/PA</b> _____ <input type="checkbox"/> <b>Signature of MD/DO/NP/PA</b> _____

## POLST Evidence

- Helps with implementation of patient preferences
- Studies show DNR orders had orders for treatment per category
- Half of patients with orders to resuscitate had orders to limit treatment in one other category
- 94% of patient interventions consistent with POLST orders



## Ideal Approach to using POLST

- Filled out with PCP after informed discussion
- Always accompanies patients
- Has authority to represent patient preferences (state laws, etc.)
- In ED, always communicate with competent patient to confirm POLST preferences as patients with decision making capacity can change their preferences in different situations

## Challenges

- Insufficient completion of the form or lack of authorizing provider signature
- Failure to transport POLST form with a patient across treatment settings, including the emergency department.
- Inadequate education regarding authorizing statute and legal protections for following POLST within the patient's respective state.
- Failure to read the contents of the POLST form, and assuming to know its contents and how they apply to a patient's end-of-life care.
- Following a POLST to the letter without confirming its contents with a patient with preserved decision-making capacity or their surrogate decisionmakers when available.

## Conclusion

- POLST can provide increased quality at end-of-life
- POLST more accurately describes patient preferences
- Technology may allow increased adoption of POLST throughout the country

## ProCESS

# ProCESS Trial

## Early Goal-Directed Therapy

The New England Journal of Medicine

EARLY GOAL-DIRECTED THERAPY IN THE TREATMENT OF SEVERE SEPSIS AND SEPTIC SHOCK

EMANUEL RIVERE, M.D., M.P.H., BRYANT NEUVEN, M.D., SUZANNE HAYTAG, M.A., JULIE REISLER, B.S., ALEXANDRA MUEZIN, B.S., BISHWAS KOSLOV, M.D., EDWARD POTRUSAL, Ph.D., AND MICHAEL TOROKOVICH, M.D., FOR THE EARLY GOAL-DIRECTED THERAPY COLLABORATIVE GROUP\*

- Rivers landmark trial in 2001
- 6-hour protocol
- Central venous monitoring
- Fluids
- Vasopressors
- Packed RBC transfusions
- Showed decreased mortality compared to standard therapy

## Goal

### Protocol-Based Care for Early Septic Shock

Specifically, we tested whether protocol-based resuscitation was superior to usual care and whether a protocol with central hemodynamic monitoring to guide the use of fluids, vasopressors, blood transfusions, and dobutamine was superior to a simpler protocol that did not include these elements.



## Simplified Goal

In light of the advances in sepsis care, is EGDT still necessary, or is usual care sufficient?

## Methods

- Multicenter trial (31 hospitals)
- All sites were academic
- **18 or older, sepsis suspected, 2 or more SIRS, BP <90 refractory to fluids (1L) or lactate >4**
- Enrolled within 2 hrs of shock and less than 12 hours after arrival
- Fluids 20ml/kg in 30 min but changed to 1000ml within 30 min

## Methods

- 3 randomized groups
  - **Protocol-based EGDT**
  - **Protocol-based standard therapy**
  - **Usual care**
- All physicians trained in EM or CC

## What is Usual Care?

- Following Surviving Sepsis Campaign Guidelines
- Use lactate as measure of screening septic shock
- No routine protocol for septic shock care
- DO NOT use Scvo2 catheter monitoring

## What is Protocol-Based Standard Therapy?

- Specified amount and timing of fluids, but not type of resuscitation fluids (normal saline)
- Specified thresholds for vasopressor use but not specific vasopressors like Rivers study (dobutamine)
- Protocol only guided resuscitation, not other aspects of care like antibiotic choice, choice to use central venous access, and only using RBCs if Hb <7.5

## OUTCOME

- Primary outcome was rate of in-hospital death from any cause at 60 days.
- Secondary mortality outcomes included the rate of death from any cause at 90 days and cumulative mortality at 90 days and 1 year.

## Results



- 1341 patients from 2008-2013 – even numbers in 3 groups with similar demographics
- Less fluids and vasopressors in usual care versus protocol based groups in first 6 hours but no different at 72 hours
- Mortality at 60 and 90 days did not differ between groups
- No differences in LOS in ICU, hospital, or discharge disposition

## Potential problems with study

- Eligible sites could not have protocols, but 18 of 31 had guidelines they were following
- Physicians had already heard of sepsis guidelines and EGDT, so usual care wasn't the same as in the Rivers study standard care
- Refractory hypotension defined as only blood pressure not responsive to 1L fluid – low compared to standard

## Potential problems with study

- ProCESS
  - EGDT: 21%
  - Protocol-based: 18.2%
  - Usual care: 18.9%
- Rivers Study
  - EGDT: 44.3%
  - Standard: 56.9%

*Different Patient Populations*

## Potential problems with study

- Mean ScvO<sub>2</sub> was 71%
  - EGDT (Rivers): 49%
- Mean Lactate was 4.9
  - EGDT (Rivers): 7.7

*Different Patient Populations*

## Conclusion

Protocol-based resuscitation of patients in whom septic shock was diagnosed in the emergency department did not improve outcomes.

## My Conclusion

- What does the ProCESS trial prove?

EGDT is not inferior to EGDT

- Usual care is actually fairly protocol-based
- The study does confirm the need for early intervention in sepsis
- Perhaps all interventions are not necessary including Scvo<sub>2</sub> monitoring with central access