Ask the Expert: Strategies for Optimizing Antimicrobial Use in ABSSSI and CABP

Presented as a Live Webinar
Tuesday, March 25, 2014
1:00 p.m. – 2:00 p.m. EDT

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One person serving as the group coordinator should register for the webinar. That group coordinator will receive an e-mail confirmation with instructions for joining the webinar. A few minutes before the webinar begins, the group coordinator should launch the webinar link. Once the webinar has been activated, the coordinator will have the option to open the audio via VoIP (Voice Over IP) on the webinar toolbar or use a touch tone phone with the provided dial-in information. At the conclusion of the activity, the group coordinator will complete a brief online evaluation and report the number of participants at that site. Each participant will process his or her individual continuing education statement online.

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1. Computer with internet access and basic system requirements. When you register, the webinar system will assess your system to ensure compatibility.
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Webinar System Requirements
Be sure to view the webinar system requirements for Windows, Mac, iOS, and Android prior to the activity.
Activity Faculty

John Esterly, Pharm.D., BCPS (AQ-ID)
Assistant Professor, Pharmacy Practice
Chicago State University College of Pharmacy
Infectious Diseases Pharmacist
Northwestern Memorial Hospital
Chicago, Illinois

John Esterly, Pharm.D., BCPS (AQ-ID), is Assistant Professor of Pharmacy Practice at Chicago State University College of Pharmacy (CSU-COP) and Infectious Diseases Pharmacist at Northwestern Memorial Hospital in Chicago, Illinois. In these roles Dr. Esterly practices as a clinical pharmacist, specializing in the area of infectious diseases. He is also an integral member of the Antimicrobial Stewardship Program at Northwestern Memorial Hospital.

Dr. Esterly received his Doctor of Pharmacy degree from the University of Illinois-Chicago College of Pharmacy. He completed a pharmacy practice residency with comprehensive pharmacy services at Mercy Hospital and Medical Center in Chicago, Illinois. Dr. Esterly then completed a two-year infectious diseases pharmacotherapy fellowship with the Midwestern University Chicago College of Pharmacy in conjunction with Northwestern Memorial Hospital and Rush University Medical Center in Chicago, Illinois. He is a board certified pharmacotherapy specialist with added qualifications in infectious diseases.

Dr. Esterly’s research interests include antimicrobial resistance, pharmacokinetics and pharmacodynamics of antimicrobials, and antimicrobial stewardship related outcomes. His work has been presented at several national meetings and has been published in peer-reviewed journals. He also serves as a peer reviewer for both infectious diseases and pharmacy medical journals.
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- John Esterly, Pharm.D., BCPS (AQ-ID)
- Erika L. Thomas, M.B.A., B.S.Pharm.
- Susan R. Dombrowski, M.S., B.S.Pharm.

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Ask the Expert: Strategies for Optimizing Antimicrobial Use in ABSSSI and CABP

Activity Overview

This activity will focus factors integral to optimizing use of antimicrobials for acute bacterial skin and skin structure infections (ABSSSI) and community-acquired bacterial pneumonia (CABP). Evidence based guidelines and recommendations will be reviewed, and guidance for incorporating antimicrobial stewardship principles into decision making processes for selecting therapies for both empiric and targeted therapies will be emphasized. Particular emphasis will be placed on delineating the role of newer antibiotics that have gained FDA approval for ABSSSI and CABP since the most recent version of consensus treatment guidelines have been published.

The content for this live webinar is based on questions raised by participants in a recent educational symposium on this topic. Time for questions and answers from the webinar audience will be provided at the end of the presentation.

Learning Objectives

At the conclusion of this application-based educational activity, participants should be able to

- Compare and contrast at least one new FDA approved agent to current guideline endorsed therapies for ABSSSI and for CABP.
- Choose a first-line therapy and an alternative therapy recommendation for ABSSSI and CABP that are suitable for an institutional clinical pathway.

Continuing Education Accreditation

The American Society of Health-System Pharmacists is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. This activity provides 1.0 hour (0.1 CEU) of continuing pharmacy education credit (ACPE activity #0204-0000-14-463-L01-P).

Participants will process CE credit online at http://elearning.ashp.org/my-activities, with the option of printing a CE certificate. CPE credit will be reported directly to CPE Monitor.

Additional Educational Opportunities on this Topic

- Web-based activity “Applying Antimicrobial Stewardship Principles to the Treatment of CABP and ABSSSI: Complying with CMS Criteria and Clinical Guidelines” (2 hours CPE)
- Informational podcasts featuring interviews with the faculty
- e-Newsletters featuring tips for incorporating information from these activities into practice, and updates on emerging information on the treatment of CABP and ABSSSI
- A web-based activity based on today’s webinar (please note that individuals who claim CPE credit for the live webinar are ineligible to claim credit for the web-based activity)

www.ashpadvantage.com/id
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Chicago, Illinois

Relevant Guidelines - ABSSSI, CABP

  **Update in progress!**

Clarification of Definition for CABP

• According to FDA guidance for the study of CABP, definitions should exclude patients with:
  • Viral pneumonia
  • Aspiration pneumonia
  • Hospital-acquired bacterial pneumonia (HAP) and ventilator-associated bacterial pneumonia (VAP)
  • Prior receipt of antibacterials
  • Bronchial obstruction or a history of post-obstructive pneumonia NOT COPD
  • Primary or metastatic lung cancer
  • Cystic fibrosis, Pneumocystis jiroveci, active tuberculosis

Centers for Medicare & Medicaid Services (CMS) Measures for Pneumonia

Which of the following statements about the time of initiation of antibiotic therapy after hospital arrival is correct regarding CMS reimbursement tied to pneumonia?

a. Antibiotics must start within 4 hours
b. Antibiotics must start within 6 hours
c. Antibiotics must start within 8 hours
d. There is no longer a mandate to start therapy on a specific timeline

What Does CMS Care About?

<table>
<thead>
<tr>
<th>Set Measure ID#</th>
<th>Measure Short Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN-3a</td>
<td>Blood Cultures Performed Within 24 Hours Prior to or 24 Hours After Hospital Arrival for Patients Who Were Transferred or Admitted to the ICU Within 24 Hours of Hospital Arrival</td>
</tr>
<tr>
<td>PN-3b</td>
<td>Blood Cultures Performed in the Emergency Department Prior to Initial Antibiotic Received in Hospital</td>
</tr>
<tr>
<td>PN-4a</td>
<td>Initial Antibiotic Within 6 Hours of Arrival</td>
</tr>
<tr>
<td>PN-4b</td>
<td>Initial Antibiotic Selection for Community-acquired pneumonia (CAP) in Immunocompetent Patient</td>
</tr>
<tr>
<td>PN-6a</td>
<td>Initial Antibiotic Selection for CAP in Immunocompetent – ICU Patient</td>
</tr>
<tr>
<td>PN-6b</td>
<td>Initial Antibiotic Selection for CAP Immunocompetent – Non ICU Patient</td>
</tr>
</tbody>
</table>

How Does CMS Evaluate You?

• Blood cultures
  – Within 24 hours for all ICU patients
  – For patients admitted through the Emergency Department before initiation of antibiotics
• Guideline concordant antibiotic therapy
• 30-day risk-standardized measures
  – Mortality
  – 30-day readmission
    • “Higher than expected” readmissions can lead to reduced reimbursement rates

See enlargement, p. 15
Empiric Antibiotic Treatment?

**Non-ICU**
- β-lactam + Macrolide
- Antipseudomonal Quinolone
- β-lactam + Doxycycline

**ICU**
- β-lactam + Macrolide
- β-lactam + Quinolone
- β-lactam + Aminoglycoside + Macrolide
- β-lactam + Aminoglycoside + Quinolone

**Non-ICU with Pseudomonal Risk**
- Antipseudomonal β-lactam + Antipseudomonal Quinolone
- Antipseudomonal β-lactam + Aminoglycoside + Quinolone
- Antipseudomonal β-lactam + Aminoglycoside + Macrolide

How to Decide Who Gets What?

- **Pneumonia severity scoring guides treatment location and pathogen risk**
  - CURB-65 criteria/scores, PORT index
- **Risk factors requiring *Pseudomonas* coverage for CAP**
  - Bronchiectasis
  - Structural lung disease + either multiple antibiotic exposures or chronic steroid use within past 3 months
- **Healthcare-associated pneumonia qualifiers**
  - Hospitalization within 90 days, nursing home/long-term care, recent antibiotics or IV chemo or wound care, visited hemodialysis clinic past 30 days

How Can Antimicrobial Stewardship Efforts Be Complementary to CMS Measures?

- **Ensure appropriate use per guidelines**
  - Implementation of CAP order sets!
- **Avoid overuse of antibiotics**
  - CMS allows “cuts” for unsure diagnosis, antibiotic use within initial 24 hours for a different indication, transfer from other acute care facilities, immune-compromising conditions or therapies, study enrollment, comfort care patients
- **Define need for anti-pseudomonal therapy**
  - Differentiate CAP vs. HCAP

Pneumonia ED Order Set Example

De-escalation & Duration of Therapy?

- **For how long should azithromycin be continued to provide coverage for atypical pathogens in patients receiving the drug with a β-lactam antibiotic as empiric treatment of CAP in the absence of microbiologic test results?**
  - **Answer:** The addition of azithromycin to provide atypical coverage has not been shown to be beneficial except in critically ill patients with CAP, so clinical improvement and patient stability are key factors in deciding when to discontinue azithromycin (or atypical coverage) in non-critically ill patients with CAP.
Inpatient Treatment

- Cochrane review of 28 trials (n=5939) no benefit of atypical coverage in clinical efficacy or mortality in non-severe hospitalized CAP patients
- Combination therapy lowers 30-day mortality in moderate-severe but not in low severity disease
- ICU patients with CAP and shock had lower mortality with combination therapy (OR=1.69)
- Macrolide therapy may have immunomodulatory effect (modulating host inflammatory response) in addition to antimicrobial effect
- Comparative efficacy of β-lactam monotherapy, β-lactam + macrolide, or quinolone monotherapy unknown

De-escalation Strategies

- Definitively confirm diagnosis of pneumonia — Radiology, oxygenation, cultures, other supporting labs (e.g., procalcitonin, C-reactive protein)
- Target antibiotics with single-drug therapy when possible — Cultures/susceptibilities, PCR, antigen testing results
- Convert to oral therapy when clinically stable — Can discharge as soon as able to take medications orally if no other medical problems and a safe transition environment

Optimizing Duration of Therapy

- 5 days minimum recommended — Afebrile for 48-72 hours before discontinuation of therapy
  - ≤1 CAP-associated sign of clinical instability
  - No sign of extrapulmonary infection
- Shorter courses of therapy → reduced resistance, adverse events, costs for patients and the healthcare system — Education!!!

ABSSSI Follow-up Question

- Question: The rate of CA-MRSA rate is high in my area, so MDs are providing double coverage with a β-lactam (e.g., pip-tazo) + vancomycin as empiric therapy for ABSSSI. How should I address this?
- Answer: Create clinical pathways for clinicians. Stratify initial antibiotic selection and define specific criteria where double-coverage or Gram negative coverage may be appropriate!
### Guideline Recommendations - SSTIs

<table>
<thead>
<tr>
<th>Indication</th>
<th>Agent</th>
<th>Likely Pathogen(s)</th>
<th>Other Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutaneous (non-purulent)</td>
<td>Gentamicin</td>
<td>S. pyogenes, other β-hemolytic Strep spp.</td>
<td>PO for outpatient, initial IV for inpatient</td>
</tr>
<tr>
<td>Cellulitis (purulent or trauma-related)</td>
<td>Gentamicin</td>
<td>S. aureus</td>
<td>Coverage of β-hem Strep spp. not guideline recommended</td>
</tr>
<tr>
<td>Complicated with tissue infection requiring hospitalization</td>
<td>Linezolid</td>
<td>S. aureus and all β-hemolytic Strep spp.</td>
<td>IV therapy recommended initially</td>
</tr>
</tbody>
</table>

* Consider treatment for multiple sites, rapid spreading, systemic symptoms, comorbidities or unusual etiology, difficult to drain, non-response to drainage


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### Treatment

- **Non-purulent cellulitis**
  - 96% of patients still respond to beta-lactam
  - Higher failure rate with TMP-SMX
- **Consider MRSA**
  - Purulent infections (“spider bite”)
  - Clinically severe infections / systemic toxicity
  - Young patients, especially athletes
  - High local prevalence of colonization
  - Those with prior MRSA history or with treatment failure

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### Creating Local Pathways

- **Initiate contact with your local Infectious Diseases Specialist Physician(s)**
- **Establish an Antimicrobial Stewardship Committee**
- **Ask for institutional administrative buy-in!**
  - Reduce broad-spectrum antibiotic use
  - Reduce patient collateral harm
  - Reduce (potential) resistance ecology
  - Save healthcare costs

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### Empiric Recommendations/ Clinical Pathway - Skin

- **Empiric therapy against Gram-negative pathogens (including P. aeruginosa) is usually unnecessary except in high-risk patients**
  - High local prevalence (your antibiogram?)
  - Previous infection or antibiotic exposure
  - Other infectious exposures (e.g., surgery)
  - Moderate to severe diabetic foot infections
  - Necrotizing infections
  - Immunocompromised hosts

**TMP/SMX Dose for ABSSSI?**

What dose of trimethoprim/sulfamethoxazole (TMP/SMX) would you choose for an adult patient with a purulent cellulitis?

- a. 160/800mg (i.e., 1 DS tablet) PO q 12 hours
- b. 160/800mg (i.e., 2 DS tablet) PO q 12 hours
- c. 5 mg/kg/day trimethoprim PO in divided doses
- d. 10 mg/kg/day trimethoprim PO in divided doses

**TMP/SMX Adult Oral Doses for ABSSSI?**

- NOT labeled for skin/skin structure infections
- IDSA recommends 160/800mg or 320/1600mg (i.e. 1 or 2 DS tablets) PO q 12 hours
- Weight-based dosing of 5-10 mg/kg/day TMP in divided doses is frequently used in practice for ABSSSI and other non-labeled indications
- Little guidance for obese patients
  - How to calculate an appropriate dosing weight?
  - Maximum dosage limits?

Bactrim and Bactrim DS (sulfamethoxazole and trimethoprim) [Prescribing information]. 2013

**TMP/SMX Dose Comparison Study - ABSSSI**

- Prospective, observational cohort study of patients receiving oral monotherapy for MRSA SSTIs
- Compared TMP/SMX doses
  - 1 DS (160/800mg) PO BID vs.
  - 2 DS (320/1600mg) PO BID
- Study compared clinical characteristics of groups and treatment outcomes


**Comparison of select clinical characteristics and outcomes of patients treated with two different doses of TMP/SMX.**

<table>
<thead>
<tr>
<th>Clinical parameter</th>
<th>Result for TMP/SMX daily dose of</th>
<th>Odds ratio</th>
<th>95% confidence interval</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median weight (kg)</td>
<td>77 (44.5-156)</td>
<td>0.94</td>
<td>0.75–1.17</td>
<td>0.553</td>
</tr>
<tr>
<td>Median (range) BMI (kg/m²)</td>
<td>26 (16.8-50.8)</td>
<td>0.454</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. (%) Abscess</td>
<td>129 (75.4)</td>
<td>1.39</td>
<td>0.75–2.57</td>
<td>0.291</td>
</tr>
<tr>
<td>No. (%) Incision and drainage</td>
<td>92 (48.3)</td>
<td>1.88</td>
<td>1.07–3.30</td>
<td>0.009</td>
</tr>
<tr>
<td>No. (%) with clinical resolution</td>
<td>127 (74.7)</td>
<td>0.90</td>
<td>0.53–1.53</td>
<td>0.705</td>
</tr>
</tbody>
</table>


**Antibiotic Dosing in Obesity**

- Question: What oral dose of trimethoprim/sulfamethoxazole (TMP/SMX) do you use for obese adult patients? How high can you safely go?
- Answer: Some data suggest that excessive oral dose escalation in obese adult patients may not be necessary for treating ABSSSI

**Obesity and Treatment Failure?**

- 3-year retrospective study of 405 outpatients treated for cellulitis in Hawaii
  - Cephalexin 500 mg PO QID
  - TMP/SMX one DS tablet (160/800mg) PO BID
  - Clindamycin 300mg PO QID
- Primary outcome → treatment success
- Risk factors for treatment failure evaluated via logistic regression analysis

Obesity and Treatment Failure?

- 52% of patients in study BMI ≥ 30 kg/m²
  - Evenly distributed across groups (p=0.52)
- 44% of patients diagnosed “cellulitis with abscess” (most frequent diagnosis)
- 117 (29%) patients had a positive culture
  - 62% MRSA
  - 20% MSSA
  - 9% β-hemolytic Strep spp.
  - 9% Gram negative spp.


### Treatment Success Rates Among Patients Treated with Cephalexin, TMP/SMX, and Clindamycin

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Cephalexin (n=180)</th>
<th>TMP/SMX (n=152)</th>
<th>Clindamycin (n=40)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>114 (74%)</td>
<td>130 (85%)</td>
<td>34 (85%)</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Obese</td>
<td>67/99 (68%)</td>
<td>65/74 (88%)</td>
<td>30/40 (75%)</td>
<td>0.02*</td>
</tr>
<tr>
<td>Moderate severity</td>
<td>21/43 (49%)</td>
<td>45/56 (80%)</td>
<td>9/10 (90%)</td>
<td>0.001*</td>
</tr>
<tr>
<td>MRSA positive</td>
<td>6/25 (24%)</td>
<td>20/25 (80%)</td>
<td>1/5 (20%)</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

* p values displayed represent analysis of cephalexin vs. TMP/SMX (trimethoprim/sulfamethoxazole)

Logistic Regression Analysis of Risk Factors for Treatment Failure

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Adjusted OR (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapy not MRSA active</td>
<td>4.22 (2.25-7.92)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Severity of cellulitis</td>
<td>3.74 (2.06-6.79)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Upper extremity cellulitis</td>
<td>2.06 (1.06-4.01)</td>
<td>0.03</td>
</tr>
<tr>
<td>Lack of drainage of abscess</td>
<td>4.38 (1.91-10.05)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>


See enlargement, p. 19

### MRSA Treatment Options?

- **Question:** What would be a preferred antimicrobial agent for a pregnant inpatient with MRSA cellulitis?
- **Answer:** Antimicrobial agents classified pregnancy category B agents are preferred. Make selection based on the severity of infection and local MRSA susceptibilities.

### MRSA Cellulitis in Pregnancy

Which of the following is a pregnancy category B antibiotic with anti-MRSA activity?

a. Clindamycin  
b. Linezolid  
c. Telavancin  
d. Vancomycin

### Pregnancy Categories - MRSA Treatments

<table>
<thead>
<tr>
<th>Agent</th>
<th>Category</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clindamycin</td>
<td>B</td>
<td>Efficacy for purulent and non-purulent cellulitis, and dSSIs, association with C. difficile</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>B</td>
<td>Only indicated for dSSIs. Safety not established in children</td>
</tr>
<tr>
<td>Linezolid</td>
<td>C</td>
<td>Side effects include reversible myelosuppression and partial or non-reversible neurotoxicity with prolonged use (&gt;4 weeks)</td>
</tr>
<tr>
<td>Gentamicin-</td>
<td>C</td>
<td>Limited by side effects including severe infusion reactions</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>C</td>
<td>Indicated for dSSIs, Teratogenic in animals, high incidence of nephrotoxicity in initial studies</td>
</tr>
<tr>
<td>Tetracyclines</td>
<td>D</td>
<td>Teratogenic</td>
</tr>
<tr>
<td>Teicoplanin</td>
<td>C/D*</td>
<td>Or for purulent cellulitis. Lacks adequate skin coverage, not recommended for 2nd trimester or children &lt;2 months of age</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>C</td>
<td>Hospital medicine for most MRSA infections where IV therapy is indicated</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>B</td>
<td>Never agent (2012) as not in guidelines, indicated for ABSSIs but limited data, Mid beta-lactams very safe in pregnancy</td>
</tr>
</tbody>
</table>

*During Pregnancy


See enlargement, p. 20

### Role of Topical Agents

Which of the following is recommended in guidelines for the use of topical agents (e.g., mupirocin, chlorhexidine) in adults with MRSA SSTIs?

a. Use with systemic therapy for all MRSA SSTIs  
b. Use with systemic therapy only for “severe” MRSA SSTIs  
c. Use alone only for abscesses following incision and drainage  
d. There is no role for treatment of MRSA SSTIs
Role of Topical Agents

- Question: What is the role of a topical antimicrobial protocol (e.g., mupirocin nasal ointment, chlorhexidine body wash) for MRSA SSTIs?

- Answer: There is minimal evidence supporting the use of topical agents for treatment of MRSA SSTIs (mild infections only). Decolonization with topical agents can be considered in selected situations, but supporting evidence is weak.

Supported Indications – Topical Agents

<table>
<thead>
<tr>
<th>Indication</th>
<th>Topical Agent(s)</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric minor skin infections (impetigo, cuts)</td>
<td>Mupirocin 2% topical ointment</td>
<td>A-III</td>
</tr>
<tr>
<td>Neonatal pustulosis</td>
<td>Mupirocin 2% topical ointment</td>
<td>A-III</td>
</tr>
<tr>
<td>Decolonization for: Recurrent infection despite wound care/hygiene and/or Ongoing transmission among household or close contacts (symptomatic and asymptomatic)</td>
<td>Nasal Mupirocin 2% ointment BID x 5-10 days and Chlorhexidine skin solution BID for 5-14 days or dilute bleach solution bath for 15 min twice weekly for ~3 months</td>
<td>C-III</td>
</tr>
</tbody>
</table>

*Oral antimicrobials are not recommended for decolonization


Incorporating Newer Agents?

- Question: What is the role of antimicrobial agents recently approved by FDA for CABP and ABSSSI? How should they be positioned on institution formularies?

- Answer: Analysis of efficacy and safety data, followed by cost comparison with other evidence-based treatment options is where to start. This should be coupled with restricted use criteria to optimize use and meet institutional needs.

Ceftaroline fosamil

- Advanced generation cephalosporin
  - Approved in 2010
  - FDA-approved indications include:
    - ABSSSI
      - S. pyogenes, S. agalactiae, S. aureus (including MRSA), H. influenzae, E. coli, K. oxytoca and K. pneumoniae
    - CABP
      - S. pneumoniae, S. aureus (MSSA only), H. influenzae, E. coli, Klebsiella spp.
    - Recently approved in Europe for CAP and cSSTI

- Formulary Considerations - Ceftaroline?
  - Broadly active against most Staph spp., Strep spp., and some Gram-negative organisms
  - “Non-inferior” for ABSSSI compared with a regimen of vancomycin/aztreonam in 2 RCTs
  - Higher clinical response rates at Day 3??
    - FDA wants inclusion of this endpoint in all ABSSSI & CABP RCTs
    - Was vancomycin dosing (1 g IV q 12 hours) not optimal as “one-size fits all” in RCTs?

Activity of Ceftaroline against Contemporary Gram-Positive Organisms Collected in the USA in 2008

<table>
<thead>
<tr>
<th>Organism and phenotypes</th>
<th>Ceftaroline MIC (mg/L)</th>
<th>Streptococcus pneumoniae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penicillin susceptible (MIC ≤ 0.06 mg/L)</td>
<td>770</td>
<td>0.008–0.008 0.008 0.12</td>
</tr>
<tr>
<td>Penicillin non-susceptible (MIC 1–4 mg/L)</td>
<td>121</td>
<td>0.06–0.5 0.25 0.35</td>
</tr>
<tr>
<td>Macrolide resistant</td>
<td>8</td>
<td>0.10–0.12 NA NA</td>
</tr>
<tr>
<td>Ceftriaxone resistant</td>
<td>20</td>
<td>0.006–0.06 0.006–0.5</td>
</tr>
</tbody>
</table>

Staphylococcus aureus

<table>
<thead>
<tr>
<th>Drug class</th>
<th>Ceftaroline susceptibility</th>
<th>Daptomycin susceptibility</th>
<th>Vancomycin susceptibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vancomycin susceptible</td>
<td>1711</td>
<td>0.006–0.05 0.25 0.25</td>
<td></td>
</tr>
<tr>
<td>Vancomycin resistant</td>
<td>2354</td>
<td>0.12–2 1 1</td>
<td></td>
</tr>
</tbody>
</table>

Formulary Considerations - Ceftaroline?

- "Non-inferior" for CABP in 2 RCTs
  - Compared ceftaroline 600 mg IV q 12 hours with regimen of ceftriaxone 1 g IV daily x 5-7 days
- Higher response rates for S. pneumoniae???
  - 85.5% vs. 68.6% (n=~70 each arm)
  - Post-hoc sub-group analysis so results underpowered
- Too few multi-drug resistant strains to evaluate
- Too early to be guideline endorsed for either of FDA-approved indications!


Pros?
- Efficacious in RCTs
- Appears highly effective against pathogens of concern
- May offer one-drug therapy for mixed infections
- No therapeutic drug monitoring required
- Safety data from RCTs are acceptable
- Better early response rates than alternatives?

Cons?
- New drug with limited clinical data/experience
- Not yet guideline endorsed
- Only available as IV formulation
- Expensive compared with generic options
- Post-marketing safety still being established

Example of Restricted Use Criteria

- If added to formulary, consider establishing prescribing limitations
  - Use for FDA approved indications only?
  - Use in only specific patient scenarios per institutional policy/protocol?
  - Prescribing only by selected personnel (e.g., ID specialists, intensivists) after consultation?
- Create triggers for automatic pharmacist review for all orders!

Example of Restricted Use Criteria

- Use should be restricted to patients with one of the following:
  - MRSA infections in patients who exhibit a true allergy reaction to vancomycin
  - Documented or strongly suspected systemic S. pneumoniae infections that are empirically susceptible to IV penicillin or ceftriaxone
  - Documented or strongly suspected hospital-acquired pneumonia, ventilator-associated pneumonia, or healthcare-associated pneumonia with severe beta-lactam resistance obtained from a lower respiratory tract sample. Subsequent determination of MRSA from sputum is inadequate for threshold determination beyond 72 hours.
  - Critically ill (ICU) patients for whom respiratory sample gram stain results are unavailable or deemed unreliable and subsequent determination of initial hemocultures is hospital practice beyond 72 hours.
- Empirical use of hospital-acquired urinary tract infections must meet one of the following criteria:
  - Urinary catheter in place
  - C. difficile infection
  - Positive urine culture
- Failure of empiric treatment for suspected MRSA or other prone to failure pathogens

Other Antibiotic Stewardship Resources

- Centers for Disease Control and Prevention Get Smart for Healthcare campaign (URL in ref list)
- ASHP Advantage antimicrobial stewardship in CABP & ABSSSI initiative (URL in ref list)
- Nebraska Medical Center Antimicrobial Stewardship Program (URL in ref list)
- Northwestern Medicine Antimicrobial Stewardship Program (URL in ref list)
- Antimicrobial Stewardship Certificate programs
  - Society of Infectious Diseases Pharmacists
  - Making a Difference in Infectious Diseases Pharmacotherapy
Conclusion

• Create tools to help facilitate appropriate selection and use of antimicrobials for CABP and ABSSSI to meet CMS requirements
  – Clinical pathways, disease-specific order sets, etc.
• Use stewardship principles to optimize antimicrobial use at your institution
  – Obtain administrative support for AND resources to promote adherence to institutional policies/protocols for use of broad-spectrum and high-cost drugs in treating CABP & ABSSSI
• Consult available resources when help is needed!
What Does CMS Care About?

<table>
<thead>
<tr>
<th>Set Measure ID#</th>
<th>Measure Short Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>PN-3a</td>
<td>Blood Cultures Performed Within 24 Hours Prior to or 24 Hours After Hospital Arrival for Patients Who Were Transferred or Admitted to the ICU Within 24 Hours of Hospital Arrival</td>
</tr>
<tr>
<td>PN-3b</td>
<td>Blood Cultures Performed in the Emergency Department Prior to Initial Antibiotic Received in Hospital</td>
</tr>
<tr>
<td>PN-5c</td>
<td>Initial Antibiotic Within 6 hours of Arrival</td>
</tr>
<tr>
<td>PN-6</td>
<td>Initial Antibiotic Selection for Community-acquired pneumonia (CAP) in Immunocompetent Patient</td>
</tr>
<tr>
<td>PN-6a</td>
<td>Initial Antibiotic Selection for CAP in Immunocompetent – ICU Patient</td>
</tr>
<tr>
<td>PN-6b</td>
<td>Initial Antibiotic Selection for CAP Immunocompetent – Non ICU Patient</td>
</tr>
</tbody>
</table>


Pneumonia ED Order Set Example

<table>
<thead>
<tr>
<th>LAB</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Culture</td>
<td>Start, Add On = No</td>
</tr>
<tr>
<td>Blood Culture</td>
<td>Start, Add On = No</td>
</tr>
<tr>
<td>Respiratory Culture X/Gram Stain</td>
<td>Start, Once, Specimen type: Sputum</td>
</tr>
<tr>
<td>Influenza Antigen Test, Direct</td>
<td>Start, Specimen type: Nasopharyngeal</td>
</tr>
<tr>
<td>Influenza A/B &amp; RSV A/B Detection by PCR</td>
<td>Routine, Once, Specimen type: Nasopharyngeal</td>
</tr>
</tbody>
</table>

The 1-step immunoassay Pneumonia Antigen test should be ordered in patients with suspected CAP.

<table>
<thead>
<tr>
<th>Direct Pneumonia Antigen Test</th>
<th>Start, Urine, Once</th>
</tr>
</thead>
<tbody>
<tr>
<td>Legionella Urine Antigen</td>
<td>Start, Urine, Once</td>
</tr>
</tbody>
</table>

CAP – OUTPATIENT TREATMENT

Continue “2-Step” for 4 additional days

**Note:** 600 mg PO, PO, Oral

<table>
<thead>
<tr>
<th>CAP – INPATIENT FLOOR ADMISSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceftazidime (Rxsolvent)</td>
</tr>
<tr>
<td>Azithromycin (Zithromax)</td>
</tr>
<tr>
<td>or</td>
</tr>
</tbody>
</table>
Pneumonia ED Order Set Example

<table>
<thead>
<tr>
<th>CAP - ICU ADMISSION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceftriaxone (Rocephin)</td>
</tr>
<tr>
<td>McIvorloxacin (Avalox)</td>
</tr>
<tr>
<td>Vancomycin</td>
</tr>
</tbody>
</table>

**HEALTHCARE ASSOCIATED PNEUMONIA (HCAP)**

<table>
<thead>
<tr>
<th>Choose All 4 Antibiotics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cefepime</td>
</tr>
<tr>
<td>Vancomycin</td>
</tr>
<tr>
<td>Azithromycin (Zithromax)</td>
</tr>
<tr>
<td>Alternative to cefepime if Beta-lactam allergy</td>
</tr>
<tr>
<td>Aztreonam (Azactam)</td>
</tr>
</tbody>
</table>

**LUNG ABSSSI**

Choose both ampicillin and vancomycin for alternative to ampicillin for Beta-lactam allergy

Ampicillin | 3 g, IV/IM, Once |
Vancomycin | 15 mg/kg, IV/IM, Once | Rate: 250 mL/h, Infuse Over 80 Minutes |

For outpatients, efficacy of treatment is only proven if started within 48 hours of symptom onset (Continue BID for 5 days)

Ceftazidime (Tazidime) | 75 mg, QD, Cap, PO, Once |

ABSSSI Challenges

- **Diagnosis**
- **Severity of infection**
- **Antibiotic resistance of targeted pathogens**
  - Mostly *Staph, Strep* spp.
- **All of the above impact:**
  - Necessity, selection, and route of antibiotics!!!

### Guideline Recommendations - SSTIs

<table>
<thead>
<tr>
<th>Indication</th>
<th>Agent</th>
<th>Likely Pathogen(s)</th>
<th>Other Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erysipelas</td>
<td>β-lactam</td>
<td>S. pyogenes, other β-hemolytic Strep spp.</td>
<td>PO for outpatient, initial IV for inpatient</td>
</tr>
<tr>
<td>Cutaneous abscess (furuncle, carbuncle)</td>
<td>None following incision and drainage*</td>
<td>S. aureus</td>
<td>Decolonize with mupirocin for recurrence</td>
</tr>
<tr>
<td>Cellulitis (non-purulent)</td>
<td>β-lactam, Clindamycin, Linezolid, TMP/SMX or Doxycycline/Minocycline</td>
<td>S. pyogenes, other β-hemolytic Strep spp., MSSA? Role of CA-MRSA unknown</td>
<td>Rarely yields culture. Consider CA-MRSA coverage for non-response to β-lactam or systemic symptoms</td>
</tr>
<tr>
<td>Cellulitis (purulent or trauma-related)</td>
<td>Clindamycin, TMP/SMX, Doxycycline/Minocycline Linezolid</td>
<td>S. aureus</td>
<td>Coverage of β-hem Strep spp. not guideline recommended</td>
</tr>
<tr>
<td>Complicated soft-tissue infection requiring hospitalization</td>
<td>VANCOMYCIN, Linezolid, Daptomycin, Clindamycin, Telavancin</td>
<td>S. aureus and all β-hemolytic Strep spp.</td>
<td>IV therapy recommended initially</td>
</tr>
</tbody>
</table>

* Consider treatment for multiple sites, rapid spreading, systemic symptoms, comorbidities or immunosuppression, age extremes, difficult to drain, non-response to drainage

Empiric Recommendations/ Clinical Pathway - Skin

Northwestern Medicine. Antimicrobial stewardship. URL in ref list.
Comparison of select clinical characteristics and outcomes of patients treated with two different doses of TMP/SMX:

<table>
<thead>
<tr>
<th>Clinical parameter</th>
<th>Result for TMP/SMX twice-daily dose of:</th>
<th>Odds ratio</th>
<th>95% confidence interval</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median (range) wt (kg)</td>
<td>160/800 mg (n = 170)</td>
<td>77 (44.5-156)</td>
<td>86 (42-141)</td>
<td>0.553</td>
</tr>
<tr>
<td>Median (range) BMI (kg/m²)</td>
<td>320/1600 mg (n = 121)</td>
<td>28 (16.8-54)</td>
<td>30 (18-58.8)</td>
<td>0.454</td>
</tr>
<tr>
<td>No. (%) Abscess</td>
<td></td>
<td>135 (79.4)</td>
<td>102 (84.3)</td>
<td>0.75–2.57 0.291</td>
</tr>
<tr>
<td>No. (%) Receipt of incision and drainage</td>
<td></td>
<td>82 (48.2)</td>
<td>77 (63.6)</td>
<td>1.17–3.03 0.009</td>
</tr>
<tr>
<td>No. (%) with clinical resolution</td>
<td></td>
<td>127 (74.7)</td>
<td>88 (72.7)</td>
<td>0.53–1.53 0.705</td>
</tr>
</tbody>
</table>


Treatment Success Rates Among Patients Treated with Cephalexin, TMP/SMX, and Clindamycin:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Cephalexin (n=180)</th>
<th>TMP/SMX (n=152)</th>
<th>Clindamycin (n=40)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>134 (74%)</td>
<td>138 (91%)</td>
<td>34 (85%)</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Obese</td>
<td>67/99 (68%)</td>
<td>65/74 (88%)</td>
<td>19/21 (90%)</td>
<td>0.02*</td>
</tr>
<tr>
<td>Moderate severity</td>
<td>21/43 (49%)</td>
<td>45/56 (80%)</td>
<td>9/10 (90%)</td>
<td>0.001*</td>
</tr>
<tr>
<td>MRSA positive</td>
<td>6/25 (24%)</td>
<td>36/40 (90%)</td>
<td>5/6 (83%)</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

* p values displayed represent analysis of cephalexin vs. TMP/SMX (trimethoprim/sulfamethoxazole)

Logistic Regression Analysis of Risk Factors for Treatment Failure:

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Adjusted OR (95% CI)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapy not MRSA active</td>
<td>4.22 (2.25-7.92)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Severity of cellulitis</td>
<td>3.74 (2.06-6.79)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Upper extremity cellulitis</td>
<td>2.06 (1.06-4.01)</td>
<td>0.03</td>
</tr>
<tr>
<td>Lack of drainage if abscess</td>
<td>4.38 (1.91-10.05)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

## Pregnancy Categories - MRSA Treatments

<table>
<thead>
<tr>
<th>Agent</th>
<th>Category</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clindamycin</td>
<td>B</td>
<td>Endorsed for purulent and non-purulent cellulitis, and cSSTI. Association with <em>C. difficile</em></td>
</tr>
<tr>
<td>Daptomycin</td>
<td>B</td>
<td>Only indicated for cSSTI. Safety not established in children.</td>
</tr>
<tr>
<td>Linezolid</td>
<td>C</td>
<td>Side effects include reversible myelosuppression and partially or non-reversible neuropathies with prolonged use (&gt;2 weeks)</td>
</tr>
<tr>
<td>Quinupristin-dalfopristin</td>
<td>B</td>
<td>Limited by side effects including severe infusion reactions</td>
</tr>
<tr>
<td>Telavancin</td>
<td>C</td>
<td>Indicated for cSSTI. Teratogenic in animals, high incidence of nephrotoxicity in initial studies</td>
</tr>
<tr>
<td>Tetracyclines</td>
<td>D</td>
<td>Teratogenic</td>
</tr>
<tr>
<td>Trimethoprim/sulfamethoxazole</td>
<td>C/D*</td>
<td>OK for purulent cellulitis. Lacks adequate strep coverage. Not recommended for 3rd trimester or children &lt;2 months of age</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>C</td>
<td>Historical mainstay for most MRSA infections where IV therapy is indicated.</td>
</tr>
</tbody>
</table>

*Supported Indications – Topical Agents*

<table>
<thead>
<tr>
<th>Indication</th>
<th>Topical Agent(s)</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric minor skin infections (impetigo, cuts)</td>
<td>Mupirocin 2% topical ointment</td>
<td>A-III</td>
</tr>
<tr>
<td>Neonatal pustulosis</td>
<td>Mupirocin 2% topical ointment</td>
<td>A-III</td>
</tr>
<tr>
<td>Decolonization for: Recurrent infection despite wound care/hygiene and/or Ongoing transmission among household or close contacts (symptomatic and asymptomatic)</td>
<td>Nasal Mupirocin 2% ointment BID x 5-10 days and Chlorhexidine skin solution BID for 5-14 days or dilute bleach solution bath for 15 min twice weekly for ~3 months</td>
<td>C-III *Oral antimicrobials are not recommended for decolonization</td>
</tr>
</tbody>
</table>


### Activity of Ceftaroline against Contemporary Gram-Positive Organisms Collected in the USA in 2008

<table>
<thead>
<tr>
<th>Organism and phenotype</th>
<th>Ceftaroline MIC (mg/L)</th>
<th>50%</th>
<th>90%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N range</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Streptococcus pneumonia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penicillin susceptible (MIC ≤2 mg/L)</td>
<td>770</td>
<td>≤0.008–0.5</td>
<td>≤0.008</td>
</tr>
<tr>
<td>Penicillin non-susceptible (MIC ≥4 mg/L)</td>
<td>121</td>
<td>0.06–0.5</td>
<td>0.25</td>
</tr>
<tr>
<td>Levofloxacin resistant</td>
<td>4</td>
<td>≤0.008–0.12</td>
<td>NA</td>
</tr>
<tr>
<td>Multidrug resistant</td>
<td>123</td>
<td>0.06–0.5</td>
<td>0.25</td>
</tr>
<tr>
<td>Ceftriaxone resistant</td>
<td>20</td>
<td>≤0.008–0.5</td>
<td>0.25</td>
</tr>
<tr>
<td><strong>Staphylococcus aureus</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oxacillin susceptible</td>
<td>1711</td>
<td>≤0.008–0.5</td>
<td>0.25</td>
</tr>
<tr>
<td>Oxacillin resistant</td>
<td>2254</td>
<td>0.12–2</td>
<td>1</td>
</tr>
</tbody>
</table>


### Example of Restricted Use Criteria

**Linezolid**

Use should be restricted to patients with one of the following:

- MRSA infections in patients who exhibit a true allergic reaction to vancomycin
- Documented or strongly suspected systemic VRE infections that are also Ampicillin resistant, or systemic VRE infections that are Ampicillin susceptible in patients with a type-1 penicillin allergy
- Use of linezolid for VRE lower urinary tract infections must meet one of the following criteria:
  - Documented VRE in urine of a pregnant or immunocompromised (neutropenic or transplant) patient, or a patient undergoing a urologic procedure
  - Documented VRE in urine of an immunocompetent patient with systemic symptoms such as fever, elevated WBC, rigors, etc.
    - Asymptomatic bacteriuria in an immunocompetent patient should not be treated
- Culture-documented MRSA pneumonia
- Documented or suspected hospital acquired pneumonia, ventilator associated pneumonia, or healthcare associated pneumonia with gram positive cocci obtained from a lower respiratory tract sample. Subsequent documentation of MRSA from culture is required for linezolid continuation beyond 72 hours. Subsequent documentation of MRSA from culture is required for linezolid continuation beyond 72 hours.
  - Critically ill ICU patients for whom respiratory sample gram stain results are unavailable or deemed unreliable must obtain subsequent documentation of MRSA from cultures for linezolid continuation beyond 72 hours.
- Empiric use of linezolid for suspected MRSA pneumonia in hemodynamically stable (floor) patients should only occur for cystic fibrosis patients or patients that have a type 1 allergy to vancomycin or inability to tolerate vancomycin therapy due to a current episode of acute renal failure
- GPC bacteremia in a febrile neutropenic patient with VRE colonization until culture results available

Northwestern Medicine. Antimicrobial stewardship. URL in ref list.
Example of Restricted Use Criteria

**Micafungin**

Restricted to use in patients with the following conditions:

- documented aspergillosis who are refractory or intolerant to amphotericin products and voriconazole
- empiric antifungal therapy when necessary in neutropenic patients who remain febrile despite broad spectrum antibiotic therapy
- empiric use in patients with yeast bloodstream infections – if C albicans is identified, micafungin should be deescalated to fluconazole
- suspected candidiasis in patients with recent azole exposure, moderately severe to severe illness, or high risk of C glabrata or C krusei
- Candida isolates that have documented clinical or microbiologic resistance to fluconazole.

Micafungin should not be used for fungal lower urinary tract infections as it is not excreted in the urine.

**Tigecycline**

Restricted to use by Infectious Diseases consultation only.

**Posaconazole**

Restricted to use by Infectious Diseases consultation or continuation of outpatient posaconazole therapy.
Selected References


el Moussaoui R, de Borgie CA, van den Broek P et al. Effectiveness of discontinuing antibiotic treatment after three days versus eight days in mild to moderate-severe community acquired pneumonia: randomised, double blind study. *BMJ.* 2006; 332:1355.


Ask the Expert: Strategies for Optimizing Antimicrobial Use in ABSSSI and CABP


Teflaro (ceftaroline fosamil) prescribing information. St. Louis, MO: Forest Laboratories, Inc; 2013 Dec.
Ask the Expert: Strategies for Optimizing Antimicrobial Use in ABSSSI and CABP


Other Resources

ASHP Advantage Applying Antimicrobial Stewardship Principles to the Treatment of CABP and ABSSSI initiative (http://www.ashpadvantagemedia.com/id/)

Centers for Disease Control and Prevention Get Smart for Healthcare campaign (http://www.cdc.gov/getsmart/healthcare/)

Nebraska Medical Center antimicrobial stewardship program (http://www.nebraskamed.com/careers/education-programs/asp)


Antimicrobial Stewardship Certificate Programs

Society of Infectious Diseases Pharmacists (http://www.sidp.org/Default.aspx?pageId=1442823)

Making a Difference in Infectious Diseases Pharmacotherapy (http://mad-id.org/antimicrobial-stewardship-programs/)
Self-assessment Questions

1. Which of the following is no longer assessed by the Centers for Medicare & Medicaid Services in evaluating hospital care provided to patients with community-acquired pneumonia?
   a. Initial antibiotic within 6 hours of arrival
   b. Initial antibiotic selection in immunocompetent patients
   c. Initial antibiotic selection in immunocompetent ICU patients
   d. Initial antibiotic selection in immunocompetent non-ICU patients

2. Which of the following is the most common pathogen in patients with complicated skin and soft tissue infection?
   a. Beta-hemolytic streptococci
   b. Pseudomonas aeruginosa
   c. Staphylococcus aureus
   d. Streptococcus pneumoniae

3. Which of the following is recommended for a non-pregnant woman with recurrent skin and soft tissue infection caused by methicillin-resistant Staphylococcus aureus despite wound care and hygiene measures?
   a. Dilute bleach solution baths and oral trimethoprim-sulfamethoxazole
   b. Mupirocin 2% nasal ointment and chlorhexidine topical solution
   c. Oral clindamycin and mupirocin 2% topical ointment
   d. Intravenous vancomycin and mupirocin 2% topical ointment

Answers
1. a
2. c
3. b
Instructions for Processing CE Credit with Enrollment Code

Pharmacists and Technicians:
All ACPE accredited activities which are processed on the eLearning site will be reported directly to CPE Monitor. To claim pharmacy credit, you must have your NABP e-profile ID, birth month, and birth day. If you do not have an NABP e-Profile ID, go to www.MyCPEMonitor.net for information and application. Please follow the instructions below to process your CPE credit for this activity.

1. The ASHP eLearning site allows participants to obtain statements of continuing education conveniently and immediately using any computer with an internet connection. Type the following link into your web browser to access the e-Learning site: http://elearning.ashp.org/my-activities

2. If you already have an account registered with ASHP, log in using your username and password. If you have not logged in to any of the ASHP sites before and/or are not a member of ASHP, you will need to set up an account. Click on the Register link and follow the registration instructions.

3. Once logged in to the site, enter the enrollment code for this activity in the field provided and click Redeem.
   Note: The Enrollment Code was announced at the end of the live activity.
   Please record the Enrollment Code in the grid below for your records.

4. The title of this activity should now appear in a pop-up box on your screen. Click on the Go button or the activity title.

5. Complete all required elements. A green checkmark should appear as each required element is completed. You can now claim your credit.

6. Available credit(s) will appear beneath the completed required activities. Look for your profession in the list of available credits and click the appropriate Claim button. You might have to click to see more credit options if you don’t see your profession listed.
   CPE Credit for Pharmacists and Technicians: To claim continuing pharmacy education (CPE) credit, you will need to enter your NABP e-Profile ID, birth month, and birth day. Once you have entered this information the first time, it will auto fill in the future. Please note: All CPE credit processed on the eLearning site will be reported directly to CPE Monitor.

7. Review the information for the credit you are claiming. If all information appears to be correct, check the box at the bottom and click Claim. You will see a message if there are any problems claiming your credit.

8. After successfully claiming credit, you may print your statement of credit by clicking on Print. If you require a reprint of a statement of credit, you can return here at any time to print a duplicate. Please note that for CPE credit, printed statements may not be necessary because your credit will be reported directly to CPE Monitor.

<table>
<thead>
<tr>
<th>Date of Activity</th>
<th>Activity Title</th>
<th>Enrollment Code</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 25, 2014</td>
<td>Ask the Expert: Strategies for Optimizing Antimicrobial Use in ABSSSI and CABP</td>
<td>_ _ _ _ _</td>
<td>1.0</td>
</tr>
</tbody>
</table>

NEED HELP? Contact eLearning@ashp.org.