Antibiotic Stewardship in Long-Term Care: The Path of Least Resistance

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Disclosures

• Premier
• American Institutes of Research
• Severson & Werson, LLP
• Natural Resources Defense Council
• Sutter Tracy Community Hospital
Objectives

• Understand the rationale for antibiotic optimization in long-term care
• Learn the current regulatory messages and requirements regarding antibiotic use in long-term care
• Describe examples of antibiotic stewardship programs in long-term care facilities

Rationale for Antimicrobial Use Optimization

• Antimicrobial resistance
  – Inherent
  – Antimicrobial exposure
• Patient safety
  – Arrhythmias, rhabdomyolysis, nephrotoxicity, Clostridium difficile infections, death
• Cost
  – Unnecessary use, switching from IV to PO, broad-spectrum to pathogen-directed therapy
Sir Alexander Fleming

“The time may come when penicillin can be bought by anyone in the shops. Then there is the danger that the ignorant man may easily under dose himself and, by exposing his microbes to non-lethal quantities of the drug, educate them to resist penicillin.”

Nobel lecture, 1945

Carbapenemase-producing CRE in the United States

CDC, unpublished data
KPC-producing CRE in the United States

http://www.cdc.gov/hai/organisms/cre/TrackingCRE.html

Rationale for Antimicrobial Use Optimization

- **Antimicrobial resistance**
  - Inherent
  - Antimicrobial exposure
- **Patient safety**
  - Arrhythmias, rhabdomyolysis, nephrotoxicity, *Clostridium difficile* infections, death
- **Cost**
  - Unnecessary use, switching from IV to PO, broad-spectrum to pathogen-directed therapy

- ED visits for antibiotic-related adverse effects
  - Estimated 142,000 per year (116K-168K)
  - Most prescriptions for URI, COPD, Otitis media and sinusitis
  - 78% due to allergic reactions (PCN)
  - Sulfas – highest rate of serious allergic reactions
  - 50% overall due to Sulfas and Clindamycin
  - Sulfas and quinolones associated with highest rate of neurological events

Rationale for Antimicrobial Use Optimization

- Antimicrobial resistance
  - Inherent
  - Antimicrobial exposure
- Patient safety
  - Arrhythmias, rhabdomyolysis, nephrotoxicity, *Clostridium difficile* infections, death
- Cost
  - Unnecessary use, switching from IV to PO, broad-spectrum to pathogen-directed therapy
### Cost of Antimicrobial-resistant Infections (ARI)

<table>
<thead>
<tr>
<th></th>
<th>All Patients</th>
<th>Patients with ARI</th>
<th>Patients without ARI</th>
</tr>
</thead>
<tbody>
<tr>
<td>n (%)</td>
<td>1391</td>
<td>188 (13.5)</td>
<td>1203 (86.5)</td>
</tr>
<tr>
<td>APACHE II score</td>
<td>42.1</td>
<td>54.8*</td>
<td>40.1*</td>
</tr>
<tr>
<td>LOS (days)</td>
<td>10.2</td>
<td>24.2*</td>
<td>8.0*</td>
</tr>
<tr>
<td>HAI (n)</td>
<td>260</td>
<td>135*</td>
<td>125*</td>
</tr>
<tr>
<td>Cost per day ($)</td>
<td>1651</td>
<td>2098*</td>
<td>1581*</td>
</tr>
<tr>
<td>Total cost ($)</td>
<td>19,267</td>
<td>58,029*</td>
<td>13,210*</td>
</tr>
<tr>
<td>Death [n (%)]</td>
<td>70</td>
<td>34 (18.1)*</td>
<td>36 (3.0)*</td>
</tr>
</tbody>
</table>

*p*<0.001


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### New Antibacterial Agents Approved 1983-2012

![Bar chart showing the number of new antibacterial agents approved from 1983 to 2012.](chart)

- 1983-1987: 18
- 1993-1997: 14
- 1998-2002: 12
- 2003-2007: 10
- 2008-2012: 8

The Pipeline is Dry

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Novel</th>
<th>Status</th>
<th>Activity</th>
<th>No or Uncertain Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ceftolozane/tazobactam</td>
<td>N</td>
<td>Phase 3</td>
<td>ESBL</td>
<td>KPC, MDR PAE &amp; Acinetobacter</td>
</tr>
<tr>
<td>Ceftazidime/avibactam</td>
<td>N</td>
<td>Phase 3</td>
<td>ESBL, KPC</td>
<td>MDR PAE &amp; Acinetobacter</td>
</tr>
<tr>
<td>Ceftaroline/avibactam</td>
<td>N</td>
<td>Phase 2</td>
<td>ESBL, KPC</td>
<td>MDR PAE &amp; Acinetobacter</td>
</tr>
<tr>
<td>Imipenem/MK-7655</td>
<td>N</td>
<td>Phase 2</td>
<td>ESBL, KPC</td>
<td>MDR PAE &amp; Acinetobacter</td>
</tr>
<tr>
<td>Plazomicin</td>
<td>N</td>
<td>Phase 2</td>
<td>ESBL, KPC</td>
<td>MDR PAE &amp; Acinetobacter</td>
</tr>
<tr>
<td>Eravacycline</td>
<td>N</td>
<td>Phase 2</td>
<td>ESBL, KPC</td>
<td>MDR PAE &amp; Acinetobacter</td>
</tr>
<tr>
<td>Brilacidin</td>
<td>Y</td>
<td>Phase 2</td>
<td>ESBL</td>
<td>KPC, MDR PAE &amp; Acinetobacter</td>
</tr>
</tbody>
</table>


Antimicrobial Use Optimization in Acute Care and Long-Term Care
US Long-Term Care Facilities (LTCFs)

• >15,000 Nursing Homes
  – Over 4 million individuals receive care every year
  – Infection prevalence: 5% on a single day
• 21% of the population will be >65 y/o by 2040

www.aoa.gov/AoARoot/Aging_Statistics/Profile/2012/4.aspx
US LTCFs

- Resistant organisms are common
  - Both infection and colonization
  - One study, >50% of patients with a resistant organism discharged to post-acute care (including LTCFs)


Acute Care vs. Post-Acute Care
Resistant Organisms are Common in Long-Term Care Facilities

Table 2. Frequency of Culture Positivity on the Initial Study Swab for All Participants, by Study Organism

<table>
<thead>
<tr>
<th>Organism</th>
<th>RG</th>
<th>IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSA</td>
<td>26/123 (21)</td>
<td>29/136 (21)</td>
</tr>
<tr>
<td>ESBL-producing <em>Klebsiella pneumoniae</em></td>
<td>19/114 (17)</td>
<td>16/117 (14)</td>
</tr>
<tr>
<td>ESBL-producing <em>Escherichia coli</em></td>
<td>29/114 (25)</td>
<td>14/117 (12)</td>
</tr>
<tr>
<td>Vancomycin-resistant enterococci</td>
<td>22/114 (19)</td>
<td>16/117 (14)</td>
</tr>
</tbody>
</table>

High Rates of Multidrug-Resistant Organisms in Long-Term Care

- Frequent transfer from acute care hospitals
- Horizontal transmission of resistant organisms
- Widespread (often inappropriate) use of antimicrobials
### Antibiotic Pressure from Hospital

<table>
<thead>
<tr>
<th>Variable</th>
<th>Relative Risk (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methicillin-resistant <em>Staphylococcus aureus</em></td>
<td></td>
</tr>
<tr>
<td>Levofloxacin receipt*</td>
<td>1.6 (1.1–2.2)</td>
</tr>
<tr>
<td>Third-generation cephalosporin receipt*</td>
<td>2.0 (1.0–4.0)</td>
</tr>
<tr>
<td>Vancomycin-resistant enterococci</td>
<td></td>
</tr>
<tr>
<td>Transfer to or from another OFH unit*</td>
<td>1.2 (1.1–1.4)</td>
</tr>
<tr>
<td>Levofloxacin*</td>
<td>1.2 (1.0–1.5)</td>
</tr>
<tr>
<td>ESBL-producing <em>Klebsiella pneumoniae</em></td>
<td></td>
</tr>
<tr>
<td>Gastrostomy tube</td>
<td>1.2 (1.0–1.4)</td>
</tr>
<tr>
<td>ESBL-producing <em>Escherichia coli</em></td>
<td></td>
</tr>
<tr>
<td>Total dependence for activities of daily living</td>
<td>1.2 (1.0–1.3)</td>
</tr>
<tr>
<td>Levofloxacin receipt*</td>
<td>1.2 (1.0–1.4)</td>
</tr>
<tr>
<td>Third-generation cephalosporin*</td>
<td>1.4 (0.9–2.2)</td>
</tr>
</tbody>
</table>

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### Horizontal Transmission

- LTCFs today can promote antimicrobial resistant infections and transmission to other high-risk residents
  - Invasive devices and procedures increased
    - Central lines, chronic resp therapy, feeding tubes, dialysis, IV antibiotics
  - Population includes more acute and subacute patients treated previously in hospitals
    - Staff not given appropriate education
  - Changing infection control provider without expertise

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**Antibiotic Use in LTC, Ontario, 2010**

- **Over a single year:**
  - 75% of residents (~50,000) received an antibiotic course
  - 44% of antibiotic courses exceeded 7 days in length

- **2601 different physicians prescribed antibiotics**
  - 21% of prescribers were responsible for ~80% of the antibiotic courses

- A subset of providers (n=145) were identified as “long-duration” prescribers (avg. treatment length 11.6 days)
  - Prescribing tendencies were not driven by differences in patient demographic characteristics, comorbidities, or care needs

Daneman N et al. JAMAIntMed 2013; 173:673-82

**Harms from Antibiotic use in Nursing Homes**

- Residents in high antibiotic use NHs had a 24% increased risk of antibiotic-related complications
  - Range: 20.4 – 192.9 antibiotic-days/1,000 resident days
  - High use: >62 antibiotic-days/1,000 resident days
  - Other predictors of antibiotic harms: recent hospitalization or ED visit, indwelling medical device, incontinence, functional dependence

Daneman N et al. JAMAIntMed 2013; 173:673-82
25-75% of systemic antimicrobial use and 60% of topical antimicrobial use in long-term care is considered inappropriate.


California Dept Public Health Investigation in LTCF: 2010
- Point prevalence study in LTCF with high rate of MDR *Acinetobacter baumannii*
  - Baseline colonization rate 19%
    - 36% colonized residents MDR (resistant to cephalosporins, FQ, aminoglycosides)
  - Implemented strict infection control practices
    - HH, cohorting, contact precautions
  - Enhanced environmental cleaning
  - Follow-up six month colonization rate remained 19%
    - 36% colonized residents negative 6 months previous
    - 71% colonized residents MDR

Mortensen E, KK Trivedi, J Rosenberg et al., *Infection Control Hosp Epi* 2014; 35(4):406-411
Baseline: CDPH in LTCF

- 104 residents treated for UTI were evaluated
- 8 (8%) met criteria for UTI
- Although most patients on UTI therapy did not meet consensus criteria for UTI, positive urine cultures led to antibiotic therapy
- Treatment was nurse driven


30% of antimicrobial use in acute care is either inappropriate or suboptimal

Unnecessary Use of Antimicrobials

• 5 center prospective study of post-prescription review of antibiotic use


Unnecessary Use of Antimicrobials

<table>
<thead>
<tr>
<th>Reasons for modified regimens (59%)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Organism not susceptible</td>
<td>9%</td>
</tr>
<tr>
<td>More appropriate agent</td>
<td>31%</td>
</tr>
<tr>
<td>Patient can take oral therapy</td>
<td>5%</td>
</tr>
<tr>
<td>Overlapping agents</td>
<td>15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reasons for stopping antibiotics (41%)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Antibiotics no longer needed</td>
<td>28%</td>
</tr>
<tr>
<td>Inappropriate prophylaxis</td>
<td>13%</td>
</tr>
</tbody>
</table>

What Can We Do?

• Sit around and wait for new antibiotics?

• Programmatic approach: optimize use of antimicrobials

• Point-of-care approach: teach prescribers to change their views and habits

• Regulatory requirements

Antimicrobial Use Optimization

• Widely accepted in acute care settings*:
  – Improve antimicrobial resistance patterns
  – Decrease patient toxicity
  – Decrease costs

• Limited literature and few studies in long-term care

• Working together across healthcare continuum may be ideal

*SHEA/IDSA Guidelines, CID 2007 Jan;44(2):159-77
**Chopra T and EJC Goldstein, CID 2015; 60(S2):S72-6
32 Mortensen E, KK Trivedi, J Rosenberg et al., Infection Control Hosp Epi 2014; 35(4):406-411
Antimicrobial Stewardship Program (ASP)

- Coordinated interventions to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy and route of administration

- Objective:
  - Minimize acquired resistance
  - Improve patient outcomes and toxicity
  - Reduce treatment costs

Regulatory Messages
Dept HHS: Antimicrobial Review in Long-Term Care

- With Center for Medicare and Medicaid Services (CMS)
- Effective September 30, 2009
- Interpretive Guidelines for Long-Term Care Facilities
  - “It is the physician’s responsibility to prescribe appropriate antibiotics and to establish the indication for use of specific medications. As part of the medication regimen review, the consultant pharmacist can assist with the oversight by identifying antibiotics prescribed for resistant organisms or for situations with questionable indications, and reporting such findings…”


Existing Regulations Promoting Antibiotic Stewardship in Nursing Homes

Federal Tag 441: Infection Control
  - Mentions performing antibiotic review

Federal Tag 329: Unnecessary Drugs
  - To optimize medication use and monitoring to appropriately minimize exposure and prevent consequences

Federal Tag 332/333: Medication Errors
  - To reduce preventable errors and adverse events

Federal Tag 428: Drug Regimen Review
  - Outlines role of pharmacist in scheduled reviews of medication use in high risk residents
PCAST Report: Rec 6 - Improve Antimicrobial Stewardship in Health Care

(1) CMS should use reimbursement incentives to drive antibiotic stewardship.

• By the end of 2017, CMS should have Federal regulations (Conditions of Participation) in place that will require U.S. hospitals, critical access hospitals, and long-term care and nursing home facilities to develop and implement robust ASPs that adhere to best practices.


California Senate Bill 361(Hill)

• 1275.4. (a) On or before January 1, 2017, each skilled nursing facility, as defined in subdivision (c) of Section 1250, shall adopt and implement an antimicrobial stewardship policy that is consistent with antimicrobial stewardship guidelines developed by the federal Centers for Disease Control and Prevention, the federal Centers for Medicare and Medicaid Services, the Society for Healthcare Epidemiology of America, or similar recognized professional organizations.

• Signed October 10, 2015

http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB361
CMS Proposed Regulations for Certified Nursing Homes, July 2015

Antibiotic stewardship integrated within pharmacy and infection prevention and control (IPC):
- Expanding pharmacy medication reviews to include antibiotics for monthly review; reviews also occur for all new admissions/re-admissions, (§ 483.45)
- Antibiotic use protocols and monitoring included in IPC (§ 483.80)
- Integrating IPC and antibiotic stewardship into QAPI activities (§ 483.75)

CMS Proposed Rule: Reform of Requirements for LTCFs

• Proposed July 2015
• 7000+ comments submitted awaiting CMS response

ASP Implementation

Differences in ASP Implementation

• Many acute care hospitals have developed ASPs due to:
  – Increasing prevalence of HAIs coupled with decreased reimbursement and public reporting
  – Lack of new antimicrobials under development

• LTCFs have been slower to adopt ASPs due to:
  – Lack of necessary personnel
  – Funding
  – Paucity of well-validated strategies specific to LTCFs

ASP Strategy Selection

- Facility dependent
  - Beds and acuity of care
  - Dedicated personnel
  - Funds
  - Pharmacy support
  - Electronic systems
  - Laboratory support
### Stewardship Hierarchy in LTCF

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Most Intrusive</strong></td>
<td>Requires most expertise, effort and expense</td>
<td>&quot;Back End&quot; approach – Review of already prescribed antibiotics</td>
</tr>
<tr>
<td></td>
<td>Individual cases are concurrently reviewed for appropriateness, usually by an expert, with feedback to the provider. Individual use data with comparators and benchmarks is provided to prescribers regarding appropriate use.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Front End&quot; approach—Active direction of antibiotic selection</td>
<td>Preauthorization of antibiotics based upon predetermined criteria. Review of case and immediate feedback on choice of antibiotics at initiation.</td>
</tr>
<tr>
<td></td>
<td>&quot;Front End&quot; approach—Passive direction of antibiotic selection</td>
<td>Guidelines, treatment algorithms, antibiotic formulary, antimicrobial order forms</td>
</tr>
<tr>
<td><strong>Least Intrusive</strong></td>
<td>Requires least expertise, effort and expense</td>
<td>Education</td>
</tr>
<tr>
<td></td>
<td>Classes or training sessions regarding antibiotic resistance, stewardship practices, etc. offered to LTCF employees or staff. Small group sessions with prescriber feedback and case discussions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Passive monitoring</td>
<td>Measuring types and quantities of antibiotics used in the facility, and the presence of antimicrobial resistance in cumulative laboratory culture and sensitivity reports.</td>
</tr>
</tbody>
</table>


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### CDC Core Elements of Antibiotic Stewardship

[Image: http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html]
CDC Core Elements of ASPs in Nursing Homes

• Adaptation of Core Elements for Hospital ASPs into practical ways to initiate or expand antibiotic stewardship activities in nursing homes
• Nursing homes are encouraged to work in a step-wise fashion, implementing one or two activities to start and gradually add new strategies from each element over time

47 http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html

CDC Core Elements of Antibiotic Stewardship in Nursing Homes

• Leadership Commitment
• Accountability – physician, nursing and pharmacy leads
• Drug Expertise
• Action – implement at least one policy or practice
• Tracking – monitor at least one process and at least one outcome measure
• Reporting – regular feedback
• Education – to clinicians, nursing staff, residents and families

48 http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html
26. In nursing homes and skilled nursing facilities, we suggest implementation of antimicrobial stewardship strategies to decrease unnecessary use of antimicrobials and improve clinical outcomes [Good practice recommendation]

- Comment: Implementing ASPs at nursing homes and SNFs is important and must involve point-of-care providers to be successful. The traditional physician-pharmacist team may not be available on-site and facilities might need to investigate other approaches to review and optimize antibiotic use, such as obtaining infectious diseases expertise through telemedicine consultation.

Education Can Work to Reduce Treatment of Asymptomatic Bacteriuria

<table>
<thead>
<tr>
<th>Parameter</th>
<th>3-Months Pre-intervention</th>
<th>7 to 30 Months Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total urine cultures sent/1000 patient days</td>
<td>3.7 (2.8 – 4.9)</td>
<td>1.3 (1.1 – 1.5)</td>
</tr>
<tr>
<td>Inappropriate cultures, n (%)</td>
<td>34 (69%)</td>
<td>75 (46%)</td>
</tr>
<tr>
<td>ASB treated, n. (%)</td>
<td>23 (68%)</td>
<td>33 (44%)</td>
</tr>
<tr>
<td>ASB treated/1000 patient days</td>
<td>1.7 (1.1 – 2.6)</td>
<td>0.3 (0.2 – 0.4)</td>
</tr>
<tr>
<td>Antimicrobial days of therapy/1000 patient days</td>
<td>167.7</td>
<td>109</td>
</tr>
</tbody>
</table>


CDPH: ASP in LTCF Study 2011-2012

- Goal: characterize the benefit of implementing a formal ASP in LTCF
- Establish ASP in three LTCFs
  - Post-prescriptive review and feedback with pharmacist and ID physician
  - Establish feasibility and effectiveness
  - Specify effects of ASP on antimicrobial utilization, susceptibility patterns and rates of Clostridium difficile over time

Doernberg, S et al., unpublished
Intervention Results

• Recommendations were made in 43 (41%), and 10 (23%) were accepted

• Recommendations were not made in 61 (59%) due to 20 (33%) on appropriate therapy and 41 (67%) who completed therapy between evaluations.

• None in whom recommendations were accepted experienced fever, leukocytosis, escalation of therapy, or death at 30 days.

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre</th>
<th>Post</th>
<th>IRR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All antibiotic starts</td>
<td>5.5</td>
<td>3.8</td>
<td>0.69 (0.60-0.80)</td>
</tr>
<tr>
<td>Antibiotic starts for UTI</td>
<td>2.5</td>
<td>1.6</td>
<td>0.65 (0.50-0.86)</td>
</tr>
<tr>
<td>Resistant organism¹</td>
<td>6.0</td>
<td>4.5</td>
<td>0.75 (0.55-1.01)</td>
</tr>
<tr>
<td><em>Clostridium difficile</em></td>
<td>2.2</td>
<td>1.5</td>
<td>0.68 (0.33-1.37)</td>
</tr>
<tr>
<td>ESBL, urine²</td>
<td>1.6</td>
<td>1.1</td>
<td>0.65 (0.31-1.37)</td>
</tr>
<tr>
<td>ESBL, all sites</td>
<td>1.6</td>
<td>1.2</td>
<td>0.76 (0.37-1.54)</td>
</tr>
<tr>
<td>FQ-R <em>P. aeruginosa</em>, urine³</td>
<td>1.1</td>
<td>0.7</td>
<td>0.66 (0.25-1.73)</td>
</tr>
<tr>
<td>FQ-R <em>P. aeruginosa</em>, all sites</td>
<td>1.7</td>
<td>1.0</td>
<td>0.58 (0.27-1.32)</td>
</tr>
<tr>
<td>VRE, urine⁴</td>
<td>0.5</td>
<td>0.8</td>
<td>1.57 (0.67-3.63)</td>
</tr>
<tr>
<td>VRE, all sites</td>
<td>0.5</td>
<td>0.8</td>
<td>1.56 (0.67-3.63)</td>
</tr>
</tbody>
</table>

¹Includes *Clostridium difficile*, extended-spectrum β-lactamase (ESBL) producing organism, fluoroquinolone (FQ)-resistant *Pseudomonas aeruginosa* (*P. aeruginosa*), and vancomycin-resistant Enterococci (VRE) from any site.
²ESBL – extended-spectrum β-lactamase (ESBL) producing organism
³FQ – fluoroquinolone
⁴VRE – vancomycin-resistant Enterococci
⁵N/1000 patient-days for antibiotic measurements; N/10,000 patient-days for resistant organism measurements

Doernberg SB, V Dudas and KK Trivedi. Antimicrob Resist Infect Control. 2015 December 1; 4:54.
NY Antimicrobial Stewardship Project 2009

• Greater NY Hospital Association, United Hospital Fund, NY State Department of Health

• Objectives:
  – Establish ASPs in 3 LTCFs using existing personnel through collaboration with acute care hospital partners
    • Emphasis on implementing strategies without expending significant new resources
  – Develop and pilot tools and materials for ASP development and implementation

55 Calfee DP, et al. SHEA Annual Meeting. 2011; poster presentation

NY Antimicrobial Stewardship Project 2009

• All LTCFs identified inappropriate treatment of asymptomatic bacteriuria

• 2/3 LTCFs reported qualitative improvement

• Successful implementation associated with:
  – Motivated team, support from administration and medical leadership, collaboration with hospital partner, ability to provide antimicrobial use and resistance data

56 Calfee DP, et al. SHEA Annual Meeting. 2011; poster presentation
Conclusions

ASPs in Long-Term Care

• Essential:
  – High rates of resistance, variable infection control, overuse of antimicrobials
• CMS established regulatory guidance to prioritize optimizing antimicrobials
  – California may require ASPs in every nursing home
• Implementation of ASPs difficult
  – Elderly population complex
  – Guidelines, expertise is sparse
  – Resources are limited
ASPs in LTCF

- Criteria such as syndromic approach may be “low hanging fruit”
  - E.g., Pneumonia or UTI
- Education strategies must include nurses, patients, and their families
- ASP interventions must be tailored to the environment

Recommendations: Partnership

- Goal is a standardized regional approach to ASP implementation and infection control
- Acute care and long-term care must work together
  - Provide drug expertise
  - Improve interfacility communication
  - Share resources