Assessment and Implementation of Antimicrobial Stewardship Programs in Long-Term Care Facilities

Philip Chung, PharmD, MS, BCPS1, Scott Bergman, PharmD, BCPS1,2, Trevor Van Schooneveldt, MD1,2, Regina Nallor, PhD, RN1, Mark E. Rupp, MD1,2, Kate Tyner, BSN, RN, CIC1, Michelle Schwedhelm, MSN, RN2, Maureen Tierney, MD, MSc3, Muhammad Salman Ashraf, MBBS1,2

1Nebraska Medicine and 2University of Nebraska Medical Center, Omaha, NE; 3Nebraska Department of Health and Human Services, Healthcare-Associated Infection Team, Lincoln, NE

BACKGROUND
- New Centers for Medicare and Medicaid Services (CMS) regulations require long-term care facilities (LTCF) to develop antimicrobial stewardship programs (ASP) that include antibiotic use protocols and systems to monitor antibiotic use.
- The Nebraska Antimicrobial Stewardship Assessment and Promotion Program (NE ASAP) is a statewide initiative supported by the NE Department of Health and Human Services, Healthcare-Associated Infection Team and CDC.
- The main goals of the program are to assess ASP in NE LTCF and provide facility-specific recommendations to implement new or augment existing ASP activities.

METHODS
- NE ASAP recruited 5 NE LTCF that were interested in initiating or improving ASP for participation.
- Participating facilities were required to perform self-assessment of ASP activities, and provide antimicrobial and antibiotic misuse (AU) data prior to onsite visit.
- During onsite visit, ASP team interviewed LTCF leadership to assess ASP efforts using a 64-item questionnaire based on CDC ASP core elements (CE)1.
- Items assessed included number of ASP CE implemented, barriers encountered and top areas of perceived antibiotic (AB) misuse.
- Written report with assessment findings and facility-specific recommendations were made available to LTCF.

RESULTS

Table 1. Characteristics of Long-Term Care Facilities Assessed (N = 5)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>No. of Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed size – median (range)</td>
<td>140 (125-215) beds</td>
</tr>
<tr>
<td>Average census – median (range)</td>
<td>127 (112-225) beds</td>
</tr>
<tr>
<td>Infectious disease physician availability</td>
<td>0</td>
</tr>
<tr>
<td>For antimicrobial stewardship activities</td>
<td>0</td>
</tr>
<tr>
<td>For consultation on specific infections</td>
<td>5</td>
</tr>
<tr>
<td>Medical director involved with antimicrobial stewardship activities</td>
<td>4</td>
</tr>
<tr>
<td>Pharmacist availability</td>
<td>1</td>
</tr>
<tr>
<td>At facility</td>
<td>1</td>
</tr>
<tr>
<td>From consultant pharmacy</td>
<td>4</td>
</tr>
<tr>
<td>Type of ownership</td>
<td>2</td>
</tr>
<tr>
<td>Not-for-profit, other</td>
<td>2</td>
</tr>
<tr>
<td>For profit, corporation</td>
<td>2</td>
</tr>
<tr>
<td>Not-for-profit, corporation</td>
<td>1</td>
</tr>
</tbody>
</table>

Data are presented as number of facilities except bed size and average census.

Figure 1. Frequency of Core Element Implementation According to Different Evaluators

<table>
<thead>
<tr>
<th>Antimicrobial Stewardship Core Elements</th>
<th>Facility Self-Evaluation</th>
<th>ASAP Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership Support</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Accountability</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Drug Expertise</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Action</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Tracking</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Reporting</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Education</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

Median (range) 4 (4–5) 4 (4–5)

Abbreviation: NE ASAP = Nebraska Antimicrobial Stewardship Assessment & Promotion Program

Figure 2. Baseline Antibiotic Starts and Days of Therapy Among Long-Term Care Facilities

<table>
<thead>
<tr>
<th>Antibiotic Starts</th>
<th>Days of therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1200</td>
</tr>
<tr>
<td>2</td>
<td>1000</td>
</tr>
<tr>
<td>3</td>
<td>800</td>
</tr>
<tr>
<td>4</td>
<td>600</td>
</tr>
<tr>
<td>5</td>
<td>400</td>
</tr>
</tbody>
</table>

Days of therapy was extrapolated for 16.8% of antibiotic starts using facility average days of therapy of 7.5 days

Table 2. Number of Core Elements Implemented Based on Different Evaluators

<table>
<thead>
<tr>
<th>Core Element</th>
<th>Facility Self-Evaluation</th>
<th>NE ASAP Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug expertise</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Action</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Tracking</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Reporting</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Education</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 3. Antimicrobial Susceptibilities of E. coli in Long-Term Care Facilities Evaluated

<table>
<thead>
<tr>
<th>Per cent Susceptible</th>
<th>No. of Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gentamicin</td>
<td>1 49</td>
</tr>
<tr>
<td>Tobramycin</td>
<td>2 72</td>
</tr>
<tr>
<td>Imipenem</td>
<td>3 22</td>
</tr>
<tr>
<td>Meropenem</td>
<td>4 41</td>
</tr>
<tr>
<td>TMP/SMX</td>
<td>5 111</td>
</tr>
</tbody>
</table>

Table 4. Barriers to Antimicrobial Stewardship Program and Areas of Antibiotic Misuse (N = 5)

<table>
<thead>
<tr>
<th>Perceived Barrier</th>
<th>No. of Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial considerations</td>
<td>4 Treatment of asymptomatic bacteriuria</td>
</tr>
<tr>
<td>Comparing resistance</td>
<td>4 Antibiotic for viral infections</td>
</tr>
<tr>
<td>Lack of expertise</td>
<td>4 Excessive duration of therapy</td>
</tr>
<tr>
<td>Lack of familiarity with resources</td>
<td>4 Diagnostic tests not sent before treatment</td>
</tr>
<tr>
<td>Personal shortage</td>
<td>4 Inadequate supplies</td>
</tr>
<tr>
<td>Opposition from administration/practitioners</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 5. Recommendations Provided by NE ASAP for Improvement of Facility ASP

<table>
<thead>
<tr>
<th>Recommendation Provided</th>
<th>Core Element</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership support</td>
<td>1 Draft leadership statement</td>
</tr>
<tr>
<td>Accountability</td>
<td>2 Form ASP committee or assign responsibility</td>
</tr>
<tr>
<td>Drug expertise</td>
<td>3 ASP training for pharmacists</td>
</tr>
<tr>
<td>Action</td>
<td>4 Interventions to reduce inappropriate antibiotic use</td>
</tr>
<tr>
<td>Tracking</td>
<td>5 Track antibiotic use</td>
</tr>
<tr>
<td>Reporting</td>
<td>6 Prepare facility-specific antibiotic policy</td>
</tr>
<tr>
<td>Education</td>
<td>7 Provide education to providers and staff</td>
</tr>
</tbody>
</table>

Abbreviation: NE ASAP = Nebraska Antimicrobial Stewardship Assessment & Promotion Program

CONCLUSIONS
- AU and AB resistance vary greatly among LTCF even though all facilities face similar challenges in ASP implementation.
- Baseline AU was lowest at the LTCF with onsite pharmacist.
- NE ASAP provided a number of recommendations to promote implementation of ASP with all CF.
- Further evaluation is needed to determine the impact of these recommendations on AU, AB resistance, and AU-associated adverse outcomes.

REFERENCE