Point Prevalence Survey of Healthcare Associated Infection (HAI) and Antimicrobial use (AU) in US nursing homes: Summary of Antimicrobial use (AU) data

Data from Centers for Disease Control and Prevention (CDC) & the Emerging Infections Program (EIP)

July 11, 2019

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Division of Healthcare Quality Promotion, CDC
Primary objectives:
CDC 2017 NH prevalence survey

- Measure number/proportion of HAIs and HAI types in nursing homes
  - Using revised McGeer criteria for residents in LTC$^1$
- Identify number/proportion and types of antimicrobial drugs used in nursing home residents
CDC Prevalence Survey: Definition of Antimicrobial Use

- Systemic antimicrobial(s) received by residents at the time of the survey
  - Drug name and class
  - Administration route
  - Rationale: Treatment of infection, Prophylaxis, Non-infectious
  - Therapeutic body site
  - First date and End date: Planned duration

- **Systemic:** Oral/Enteral, Intravenous, Intramuscular or Inhaled route of administration
  - Main exclusions: Topical, Ophthalmic, Otic, Intranasal

- **Antimicrobial:** List of 130 eligible agents
  - Mostly antibiotics, but also selected antifungal or antiviral agents
Prevalence of systemic antimicrobial use (AU) in nursing homes, 2017

<table>
<thead>
<tr>
<th># NH</th>
<th># NH residents</th>
<th># residents ≥1 AU</th>
<th>AU prevalence 100 residents</th>
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<tbody>
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<td>161</td>
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Thompson et al. Abstract Presented at IDWeek 2018. San Francisco, CA
Prevalence of systemic antimicrobial use (AU) in nursing homes compared to U.S acute care hospitals

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<td>183</td>
<td>11,282</td>
<td>5,635</td>
<td>49.9%</td>
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Prevalence of systemic antimicrobial use (AU) in nursing homes compared to LTCF in European

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<th>Year</th>
<th>Size of prevalence survey</th>
<th>AU Prevalence per 100 residents</th>
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<td>European CDC, 2010</td>
<td>700 LTCF, 25 countries, 62,000 residents</td>
<td>4.3%</td>
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<td>European CDC, 2013</td>
<td>1,181 LTCF, 19 countries, 77,000 residents</td>
<td>4.4%</td>
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<tr>
<td>European CDC, 2016</td>
<td>1,778 LTCF, 24 countries, 102,000 residents</td>
<td>4.9%</td>
</tr>
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</table>

Percent of antimicrobial drugs by route of administration

- Oral/enteral: 80%
- Intravenous: 20%
- Intramuscular: 0%
- Inhaled: 0%

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Percent of antimicrobial drugs by rationale for use

- Tx. active infection
- Medical proph
- Non-infectious
- Surgical prophy
- Not documented

0% 20% 40% 60% 80% 100%

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Top 10 antibiotic classes – overall

- Fluoroquinolones
- 1st-gen cephalosp.
- Comb. sulfonamides & trimethroprim, derivatives
- Tetracyclines
- Antibiotics, Intestinal anti-infectives
- Comb. penicillins, inc. beta-lactamase inhibitors
- Nitrofuran derivatives
- Glycopeptides
- Penicillins with Extended Spectrum
- 3rd-gen cephalosp.

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Percent of antimicrobial drugs by treatment site(s)

- Eye
- Genital tract
- Sepsis
- Bloodstream
- Ear, nose, mouth
- Gastrointestinal
- Other
- Bone/joint
- Respiratory tract
- Skin or wound
- Uninary tract

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UTI almost 1/3
Urinary tract infection: a leading cause of antimicrobial use in nursing homes


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<th>Infection type</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Respiratory tract</td>
<td>36</td>
</tr>
<tr>
<td>2. Urinary tract</td>
<td>33</td>
</tr>
<tr>
<td>3. Skin/soft tissue</td>
<td>13</td>
</tr>
</tbody>
</table>

European CDC: Prevalence Survey in Long-term Care Facilities, 2013. Antimicrobials Used

- Urinary tract, 48%
>10-fold variation in NH-specific prevalence of antibiotic use for UTI

Summary Statistics
No. Nursing Homes 161
25th Percentile 1.064
Median prev. rate 2.190
75th Percentile 4.348

>10-fold variation in NH-specific prevalence of antibiotic use for UTI

Summary Statistics
No. Nursing Homes 161
25th Percentile 1.064
Median prev. rate 2.190
75th Percentile 4.348

Top 10 antibiotic classes for UTI

1. Fluoroquinolones
2. Comb. Sulfonamides & Trimethoprim
3. Nitrofuran Derivatives
4. 1st-Gen Cephalosporins
5. Combinations of Penicillins
6. Other Antibacterials
7. 3rd-Gen. Cephalosporins
8. 2nd-Gen. Cephalosporins
9. Carbapenems
10. Penicillins with Extended Spectrum

Top 10 antibiotic classes for UTI, n=419

Number of drugs
Antibiotic for UTI ≠ UTI Surveillance Event

- NHSN LTCF Component provides criteria to identify UTI Events for surveillance purposes

- Clinical guidelines are used to guide decisions on when to initiate antibiotics for suspected UTI, one example
  - Loeb Minimum Criteria for Initiation of Antibiotics
    - Undergoing an update

- They are different!
  - Because they not used for the same purpose
The Core Elements of Antibiotic Stewardship for Nursing Homes
Self-reported data on implementation of 15 activities in 7 domains of the CDC Core Elements, 161 NH

**Leadership**
- Written statements from leadership in support of improved antibiotic use: 48%

**Tracking**
- Review antibiotic use and resistance data in quality/performance improvement meetings: 84%
- Routinely receive reports on antibiotic use from pharmacy service: 76%

**Accountability**
- Facility Medical Director reviews antibiotic use data: 75%
- An individual is responsible for overseeing activities to improve antibiotic use: 68%

**Reporting**
- Receive antibiogram from the lab: 75%
- Provide feedback on prescribing practices to medical personnel: 55%
## Factors associated with higher stewardship score

<table>
<thead>
<tr>
<th>Facility-level factor*</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ownership: For-profit, not for-profit, Government</td>
<td>0.6623</td>
</tr>
<tr>
<td>Number certified beds: Continuous, range 12-540</td>
<td>0.5656</td>
</tr>
<tr>
<td>Average daily census: Continuous, range 10-495</td>
<td>0.7874</td>
</tr>
<tr>
<td>Infection Preventionist (IP) full time: Yes, No</td>
<td>0.1132</td>
</tr>
<tr>
<td><strong>IP completed certified</strong> training course: Yes (56), No (101)</td>
<td><strong>0.0296</strong></td>
</tr>
<tr>
<td>CMS staffing score: 1-5 points</td>
<td>0.3436</td>
</tr>
<tr>
<td><strong>Number attending physicians per 100 beds: Top vs lower 3 quartiles</strong></td>
<td><strong>0.0293</strong></td>
</tr>
<tr>
<td>CMS Overall NH Score: 1-5 points</td>
<td>0.5489</td>
</tr>
<tr>
<td><strong>CMS Quality Measure Score: 1-5 points</strong></td>
<td><strong>0.0296</strong></td>
</tr>
<tr>
<td>CMS % long-stay residents with UTI: Continuous 1-100</td>
<td>0.3606</td>
</tr>
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</table>

*Only selected factors analyzed shown in table

#SHEA, APIC or State Health Department certification

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**Summary**

- AU prevalence in US nursing homes was 8.2 per 100 NH residents
  - *On a given day, 1 in 12 residents receiving an antimicrobial*
  - Much lower than in US acute hospitals
  - But, double prevalence in European LTC facilities

- Most commonly given for urinary tract infection, 30% of all AU
  - UTI AU prevalence varies across NHs
    - More than 10-fold difference in NH prevalence rates
    - Remember, antibiotic given for UTI is not the same as UTI Event for surveillance

- CDC Core Elements for Antibiotic Stewardship are being adopted by nursing homes, opportunities for improvement remain
Acknowledgements:

- All 161 participating NHs
- All EIP site staff

Thank you!

CDC Project lead: Dr. Nicola Thompson  ndthompson@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.