Emerging infections program: Healthcare associated infections and antimicrobial use prevalence survey in nursing homes

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Key policy drivers for infection prevention and antibiotic stewardship in nursing homes, recent examples

  - 2015 – CDC Core Elements of Antibiotic Stewardship for Nursing Homes: Defines, promotes stewardship for Nursing Homes
- 2016 – CMS Regulatory Requirements for Long-term care facilities are finalized, including new infection prevention and antibiotic stewardship activities
  - 2017 implementation
Understanding the impact of policy

- DATA are essential to evaluate impact or measure progress
- Types of questions that need to be answered
  - How many HAIs are there in NH? What types of HAI?
    - Between year x and year y did HAIs: ↑ ↔ ↓
  - How many residents in NHs get antibiotics?
  - What antibiotics are most common?
  - How and why are antibiotics used?
    - What % of antibiotic use is unnecessary?
    - Between year x and y did unnecessary use: ↑ ↔ ↓
Prevalence surveys: an efficient approach to surveillance

- Faster to implement, easier to conduct compared to ongoing surveillance
  - Short duration: Less staff time, less costly
  - Can include large numbers of NHs residents
  - Rapidly provide data for analysis and feedback

- Ideal for data collection on HAI and antimicrobial use (AU)
  - CDC performed HAI and AU prevalence surveys in ~180 acute care hospitals in 2011 and 2016

- Ideal for data collection in nursing homes
 CDC NH prevalence survey design informed by
  – European CDC
  – U.S. Dept. Veterans Affairs in LTCF
  – CDC in acute care hospitals
Overview: U.S. Nursing Home HAI and AU Prevalence Surveys

- **Planning**: 2012
- **Pilot Survey 4 States**: 2013/14
- **Planning**: 2015/16
- **Full Scale Survey 10 states**: 2017
CDC NH prevalence survey pilot, 2013-14

- 1-day HAI and AU prevalence survey pilot
  - 9 NHs in 4 states: CT, MN, NM, NY
  - Facility eligibility: Certified nursing home, voluntary participation

- Goals
  - Test data collection forms and procedures
  - Gain experience using revised McGeer infection definitions for use in LTC, published in 2012
  - Inform design and implementation of large scale prevalence survey in US

- Participating facilities
  - Median number of beds 130, range 104 – 229
  - 1,272 residents
  - Median age 85 years, range 22 – 91
  - 14% “Short stay” → post-acute care population
**Key findings: HAI & AU prevalence**

- **HAI prevalence** 5.3 per 100 residents
  - 2-times prevalence of HAI in residents with devices

- **AU prevalence** 11.7 per 100 residents
  - 2-times prevalence of antimicrobials in short-stay* residents
  - Most common antimicrobials used

<table>
<thead>
<tr>
<th>Rank</th>
<th>Rationale: Treatment</th>
<th>Rationale: Prophylaxis</th>
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<tbody>
<tr>
<td>1</td>
<td>Cephalexin</td>
<td>Oseltamivir</td>
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<td>2</td>
<td>Doxycycline</td>
<td>Sulfamethoxazole/trimethoprim</td>
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<tr>
<td>3</td>
<td>Ciprofloxacin and sulfamethoxazole/trimethoprim</td>
<td>Nitrofurantoin</td>
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*Post acute care population

Epstein et al. *Infect Control Hosp Epidemiol.* 2016 Dec;37(12):1440-1445
Thompson et al.; *J Am Med Dir Assoc.* 2016 Dec 1;17(12):1151-1153
Antimicrobial use assessments

- Among 160 drugs given, documentation of 5 prescribing elements assessed\(^1\)
  - Start date, duration, route, rationale & therapeutic site
    - 62% had all 5 prescribing elements documented
  - Range 50% - 84% per nursing home

- UTI most common therapeutic site, 1/3 of all drugs given\(^1\)
  - 1/3 of antibiotics for UTI documented as prophylaxis
    - Limited evidence to support this practice in elderly NH residents

- Appropriateness for antibiotic *initiation for UTI*\(^2\)
  - 45% deemed appropriate
CDC NH Prevalence Survey, 2017

- Expansion to 10 Emerging Infections Program (EIP) states

- Unique expertise of EIP staff
  - Highly trained surveillance officers
  - HAI and AU data collection via medical chart review
  - Experienced in survey methods and data collection approaches
  - Local proximity to NHs being recruited

- Within each state, EIP staff implement the project
  - NH project promotion and recruitment
  - Performed most of survey data collection & applied surveillance definitions
    - Reduce burden on participating NH
    - Increase likelihood of NH participation
    - High quality & standardized data collection
Primary objectives

- Measure number and types of HAIs in nursing homes
  - Using revised McGeer criteria for residents in LTC
    - Urinary tract infections
    - Respiratory tract infections
    - Gastrointestinal infections
    - Skin & mucosal infections
    - Systemic infections

- Identify number and types of antimicrobial drugs used

- *Estimate burden of HAIs in US nursing homes*
## Project timeline

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<th>Month</th>
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<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<tbody>
<tr>
<td><strong>Enrollment</strong></td>
<td><strong>Ongoing</strong></td>
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<td><strong>Survey dates</strong></td>
<td>Begin</td>
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<td><strong>Data collection</strong></td>
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### 2018 key milestones:
- Completed data collection & data entry
- Data cleaning
- Preliminary data analysis
2017 NH Prevalence Survey: Recruitment & Participation

NH in project catchment area (1,089)
7% NH in US

NH contacted (392, 36%)

NH Enrolled (175)
45% NH contacted

NH Dropped Out (14)

NH Participated (161)
15% NH in catchment area

NH Declined (123)
31% NH contacted

NH Not Contacted (688, 63%)

NH No Response (94)
24% NH contacted

Ineligible (9, 1%)
2017 NH Prevalence Survey: Recruitment & Participation

<table>
<thead>
<tr>
<th>NHs</th>
<th>NH beds</th>
<th>Avg. census</th>
<th>Eligible residents</th>
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<tbody>
<tr>
<td>161</td>
<td>18,342</td>
<td>15,768</td>
<td>15,295</td>
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Sample size goal: ≥15,000 eligible residents

Georgia EIP
- 16 NH
- ~1,600 residents
How NH prevalence survey data have/can be used

- Pilot data informed survey design, approaches to data collection, data collection burden, sample size estimate for full scale effort
  - Manuscript on data collection in NHs¹

- While small, one of the larger efforts to describe antimicrobial use within US nursing homes, peer reviewed manuscripts on
  - AU prevalence/epidemiology²
  - Appropriateness for initiation of antibiotics for UTI³

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2: Thompson et al.; J Am Med Dir Assoc. 2016 Dec 1;17(12):1151-1153
3: Eure et al. ICHE 2017 38(8); 998-1001
Participating Nursing Homes

- Data from NH participating in 2017 survey to be summarized in a “Facility Feedback Report”
- EIP staff spend time with NH staff reviewing, understanding data
- Help NH identify appropriate next steps for infection surveillance, infection prevention, or stewardship activity

Assessment of Healthcare-Associated Infections & Antimicrobial Use in Nursing Homes or Skilled Nursing Facilities

Characteristics of Residents Included in Assessment

<table>
<thead>
<tr>
<th>Facility, Total</th>
<th>Participating Facilities, Average</th>
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<tbody>
<tr>
<td><strong>Residents</strong></td>
<td><strong>Residents</strong></td>
</tr>
<tr>
<td>81</td>
<td>82</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td><strong>Female</strong></td>
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<tr>
<td>28%</td>
<td>59%</td>
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<tr>
<td><strong>Male</strong></td>
<td><strong>Male</strong></td>
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<tr>
<td>72%</td>
<td>41%</td>
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- Age Range, Yrs.: 38 to 87
  - Average Age, Yrs.: 63
  - # Short Stay Residents: 0
  - # With Diabetes: 22
  - # Wheelchair Bound or Bedridden: 29
  - % With Pressure Ulcers: 1
  - % Receiving Wound Care: 8

- Age Range, Yrs.: 59 to 82
  - Average Age, Yrs.: 75
  - % Short Stay Residents: 12
  - % With Diabetes: 23
  - % Wheelchair Bound or Bedridden: 38
  - % With Pressure Ulcers: 6
  - % Receiving Wound Care: 15
Anticipated data uses: State Health Departments

- Provide local/regional NH data on HAI and AU

- EIP site participation in NH prevalence survey established or strengthened relationships with state-based NH partners, e.g.
  - NH corporate groups
  - Professional organizations
  - State Quality Improvement Organizations

- New opportunities to bring NH into existing HAI surveillance, infection prevention or stewardship work

- Propagate lessons learned from working with NH to other states, share use of prevalence survey data collection tools and resources
Anticipated data uses: CDC, Nationally

- Essential descriptive data on epidemiology of HAIs and AU in NH
- Working to develop an approach for national HAI burden estimate
  - Last performed in 1990
- Inform developments to CDC NHSN surveillance for long-term care facilities\(^1\)
  - Additional HAIs should be under surveillance
    - Evaluation of revised the McGeer Criteria for surveillance
    - Which variables are important for risk adjustment of surveillance data
- Identify antibiotic stewardship priorities in NH
- Inform design and implementation of additional NH-based projects

1: [www.cdc.gov/nhsn/ltc/index.html](http://www.cdc.gov/nhsn/ltc/index.html)
Thank you