Presentation Objectives

- Discuss why antibiotic stewardship is important for nursing homes
  - Current use in this setting
  - Consequences of misuse
- Describe barriers and opportunities for implementing activities to improve antibiotic use
- Outline strategies for monitoring and implementing changes to antibiotic use
Antimicrobial use in NHs

- Antimicrobials are the most frequently prescribed drug class in nursing homes
  - Comprise ~40% of all prescriptions
- 50-70% of residents will receive a systemic antimicrobial during the course of a year
- 25-75% of antimicrobial use may be inappropriate

Benoit et al. JAGS 2008; 56: 2039-2044
Nicolle LE et al. ICHE 2000; 21:537-545
Antimicrobial use in NHs varies across facilities
- Pooled mean 4.8 courses/1,000 resident days, range 0.4-23.5

Primary indications are urinary and respiratory tract infections
- Fluoroquinolones are the most commonly used
  - 38% of all prescriptions

Benoit et al. JAGS 2008; 56: 2039-2044
Antibiotic use across care transitions

- Review of 221 (20%) of post-acute care admissions randomly selected from 7 skilled nursing facilities
- 48% of residents received a course of antibiotics during their stay (median LOS ~17 days)
  - 152 individual courses among 105 residents = 29 courses/1,000 resident days
- 50% of courses were initiated in hospitals
  - RTI was primary indication for hospital-initiated antibiotic
  - UTI was primary indication for NH-initiated antibiotic
  - 53% of residents on antibiotics received a fluoroquinolone as part of therapy

Risk factors for an adverse drug events in NHs

- 410 ADEs out of 2916 long-stay residents
- 55% deemed preventable
- In multivariate analysis, antibiotic use carried highest risk of ADE
- Antibiotics were also an independent risk factor for preventable ADEs (OR 3.0, CI 1.6-5.8)

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>New admission</td>
<td>2.8</td>
<td>(1.5 – 5.2)</td>
</tr>
<tr>
<td>No. of Scheduled Medications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;5</td>
<td>1.0</td>
<td>(referent)</td>
</tr>
<tr>
<td>5-6</td>
<td>2.0</td>
<td>(1.2 – 3.2)</td>
</tr>
<tr>
<td>7-8</td>
<td>2.8</td>
<td>(1.7 – 4.7)</td>
</tr>
<tr>
<td>≥9</td>
<td>3.3</td>
<td>(1.9 – 5.6)</td>
</tr>
<tr>
<td>Current Medications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antibiotic</td>
<td>4.0</td>
<td>(2.5 – 6.2)</td>
</tr>
<tr>
<td>Antipsychotic</td>
<td>3.2</td>
<td>(2.1 – 4.9)</td>
</tr>
<tr>
<td>Antidepressant</td>
<td>1.5</td>
<td>(1.1 – 2.3)</td>
</tr>
<tr>
<td>Supplements</td>
<td>0.4</td>
<td>(0.3 – 0.6)</td>
</tr>
</tbody>
</table>

Antibiotics and adverse drug events in NHs

- Antibiotics accounted for the highest number of "non-preventable" adverse drug events
  - *C. difficile* infection was considered "non-preventable by study investigators"

**Table 3. Frequency of Adverse Drug Events and Potential Adverse Drug Events by Drug Class**

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Adverse Drug Events (n = 546)</th>
<th>Preventable Adverse Drug Events (n = 276)</th>
<th>Nonpreventable Adverse Drug Events (n = 270)</th>
<th>Potential Adverse Drug Events (n = 188)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antipsychotics</td>
<td>125 (23)</td>
<td>72 (26)</td>
<td>53 (20)</td>
<td>1 (0.5)</td>
</tr>
<tr>
<td>Antibiotics/antiinfectives</td>
<td>109 (20)</td>
<td>13 (5)</td>
<td>96 (36)</td>
<td>13 (7)</td>
</tr>
<tr>
<td>Antidepressants</td>
<td>68 (13)</td>
<td>50 (18)</td>
<td>18 (7)</td>
<td>0</td>
</tr>
<tr>
<td>Sedatives/hypnotics</td>
<td>68 (13)</td>
<td>49 (18)</td>
<td>19 (7)</td>
<td>2 (1)</td>
</tr>
<tr>
<td>Anticoagulants</td>
<td>51 (9)</td>
<td>37 (13)</td>
<td>14 (5)</td>
<td>150 (80)</td>
</tr>
<tr>
<td>Antiseizure</td>
<td>47 (9)</td>
<td>27 (10)</td>
<td>20 (7)</td>
<td>0</td>
</tr>
</tbody>
</table>

C. difficile infection (CDI) and antibiotics

- CDI is the most common cause of acute diarrhea in LTC
- Antibiotics are a major driver of C. difficile acquisition and infection
  - Fluoroquinolone antibiotics have been associated with CDI with a more severe strain of C. difficile
  - Longer antibiotic exposure carries higher risk

McDonald LC et al Emerg Infect Dis 2006; Simor AS, J Am Geratrsc Soc. 2010
NHs are Reservoirs of MDROs

- NH residents colonized with MDR-Gram Negative Rods (~20% prevalence)
  - O’Fallon et al. *Infect Control Hosp Epidemiol* 2009; 30: 1172-1179
- NH residents colonized with MRSA (40-50% prevalence)
  - Stone et al. *Infect Control Hosp Epidemiol* 2012; 33(6): 551-7
- NH residents colonized with VRE (5-10% prevalence)
**Table 3. Association between antimicrobial exposure and resistance to antimicrobial agents and effect of institutional factors in 50 nursing homes in the United States and Canada, 1998–1999**

<table>
<thead>
<tr>
<th>Antimicrobial-resistant bacteria</th>
<th>Variables kept in the multivariable model</th>
<th>Unadjusted odds ratio†</th>
<th>95% confidence interval</th>
<th>Adjusted odds ratio†</th>
<th>95% confidence interval</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TMP-SMX†-resistant Enterobacteriaceae</strong></td>
<td>TMP-SMX</td>
<td>1.14</td>
<td>1.06, 1.22</td>
<td>1.14</td>
<td>1.06, 1.22</td>
</tr>
<tr>
<td></td>
<td>TMP-SMX at the facility level</td>
<td></td>
<td></td>
<td>2.83</td>
<td>1.05, 5.0</td>
</tr>
<tr>
<td></td>
<td>Use of intravenous therapy in the nursing home</td>
<td></td>
<td></td>
<td>3.5</td>
<td>1.1, 13.4</td>
</tr>
<tr>
<td></td>
<td>No. of hand-washing sinks per 100 residents</td>
<td></td>
<td></td>
<td>0.94</td>
<td>0.90, 0.98</td>
</tr>
<tr>
<td></td>
<td>No. of occupied beds per 100 residents</td>
<td></td>
<td></td>
<td>1.02</td>
<td>1.00, 1.03</td>
</tr>
<tr>
<td><strong>MRSA‡</strong></td>
<td>Penicillins</td>
<td>0.90</td>
<td>0.80, 1.02</td>
<td>0.97</td>
<td>0.85, 1.10</td>
</tr>
<tr>
<td></td>
<td>Use of antimicrobial soap in the nursing home</td>
<td></td>
<td></td>
<td>0.40</td>
<td>0.18, 0.90</td>
</tr>
<tr>
<td></td>
<td>Use of different soaps by staff and residents§</td>
<td></td>
<td></td>
<td>0.24</td>
<td>0.12, 0.47</td>
</tr>
<tr>
<td></td>
<td>Use of intravenous therapy in the nursing home</td>
<td></td>
<td></td>
<td>8.55</td>
<td>3.65, 20.0</td>
</tr>
<tr>
<td></td>
<td>No. of registered nurses per 100 residents</td>
<td></td>
<td></td>
<td>0.79</td>
<td>0.72, 0.87</td>
</tr>
<tr>
<td><strong>MRSA</strong></td>
<td>Fluoroquinolones</td>
<td>1.00</td>
<td>0.97, 1.03</td>
<td>1.00</td>
<td>0.97, 1.03</td>
</tr>
<tr>
<td></td>
<td>Use of different soaps by staff and residents§</td>
<td></td>
<td></td>
<td>0.22</td>
<td>0.13, 0.36</td>
</tr>
<tr>
<td><strong>Fluoroquinolone-resistant Enterobacteriaceae</strong></td>
<td>Fluoroquinolones</td>
<td>1.08</td>
<td>1.04, 1.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fluoroquinolone-resistant Pseudomonas aeruginosa</strong></td>
<td>Fluoroquinolones</td>
<td>1.04</td>
<td>1.01, 1.07</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Unadjusted odds ratios for antimicrobial exposures and adjusted odds ratios for variables kept in the final multivariable models are shown.
†Odds ratio for antimicrobial exposure per one defined daily dose per 100 resident-days.
‡TMP-SMX, trimethoprim-sulfamethoxazole; MRSA, methicillin-resistant Staphylococcus aureus.
§Use of antibacterial soap by staff and use of regular soap by residents.
Antibiotic Exposure and MDRO Acquisition in NH Residents


TABLE 5 Risk factors for not being colonized versus having new acquisition of AROs

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Not colonized with any ARO (n = 11)</th>
<th>Having new acquisition of any ARO (n = 57)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSMS, mean ± SD</td>
<td>15.9 ± 5.61</td>
<td>20.9 ± 5.35*</td>
</tr>
<tr>
<td>Charlson’s comorbidity score, mean ± SD</td>
<td>2.36 ± 2.34</td>
<td>2.51 ± 1.51</td>
</tr>
<tr>
<td>Any hospital visit, no./total (%)</td>
<td>1/11 (9)</td>
<td>16/57 (28)</td>
</tr>
<tr>
<td>Any antibiotic use, no./total (%)</td>
<td>6/11 (55)</td>
<td>42/57 (74)</td>
</tr>
<tr>
<td>Device use, no./total (%)</td>
<td>1/11 (9)</td>
<td>14/57 (25)</td>
</tr>
</tbody>
</table>

*P ≤ 0.05.

TABLE 4. Multivariable Analysis of Risk Factors Predictive of Methicillin-Resistant Staphylococcus aureus Acquisition among Long-Term Care Facility Residents (n = 195)

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>RR (95% CI)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimicrobial use during study</td>
<td>7.76 (2.1–28.56)</td>
<td>.002</td>
</tr>
<tr>
<td>Hospitalization during study</td>
<td>1.51 (0.48–4.72)</td>
<td>.48</td>
</tr>
<tr>
<td>Intravenous line during study</td>
<td>3.44 (0.87–13.58)</td>
<td>.08</td>
</tr>
<tr>
<td>Charlson index</td>
<td>1.20 (0.98–1.47)</td>
<td>.08</td>
</tr>
</tbody>
</table>

NOTE. CI, confidence interval; RR, risk ratio. Boldface indicates results that met statistical significance of P ≤ .05.
NH Regulations which Promote Antibiotic Stewardship

Federal Tag 329: Unnecessary Drugs

1. General. Each resident’s drug regimen must be free from unnecessary drugs. An unnecessary drug is any drug when used:

   (i) In excessive dose (including duplicate therapy); or
   (ii) For excessive duration; or
   (iii) Without adequate monitoring; or
   (iv) Without adequate indications for its use; or
   (v) In the presence of adverse consequences which indicate the dose should be reduced or discontinued; or
   (vi) Any combinations of the reasons above.

- **Goal:** To optimize medication use and monitoring to appropriately minimize exposure and prevent consequences

- **Applies to all medication categories**
NH Regulations which Promote Antibiotic Stewardship

Federal Tag 332 and 333: Medication Errors

The facility must ensure that--

[F332] §483.25(m)(1) It is free of medication error rates of 5 percent or greater; and

[F333] §483.25(m)(2) Residents are free of any significant medication errors.

Medication Error -- The observed preparation or administration of drugs or biologicals which is not in accordance with:

1. Physician’s orders;

2. Manufacturer’s specifications (not recommendations) regarding the preparation and administration of the drug or biological;

3. Accepted professional standards and principles which apply to professionals providing services. Accepted professional standards and principles include the various practice regulations in each State, and current commonly accepted health standards established by national organizations, boards, and councils.
NH Regulations which Promote Antibiotic Stewardship

Federal Tag 428: Drug Regimen Review

(1) The drug regimen of each resident must be reviewed at least once a month by a licensed pharmacist.

(2) The pharmacist must report any irregularities to the attending physician, and the director of nursing, and these reports must be acted upon.

The intent of this requirement is that the facility maintains the resident’s highest practicable level of functioning and prevents or minimizes adverse consequences related to medication therapy to the extent possible, by providing:

- A licensed pharmacist’s review of each resident’s regimen of medications at least monthly; or
- A more frequent review of the regimen depending upon the resident’s condition and the risks or adverse consequences related to current medication(s);
**Antibiotic Review**

Because of increases in MDROs, review of the use of antibiotics (including comparing prescribed antibiotics with available susceptibility reports) is a vital aspect of the infection prevention and control program. It is the physician’s (or other appropriate authorized practitioner’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 to the director of nursing and the attending physician. See the Guidance at §483.65, Tag F329 regarding use of a medication without adequate indication for use and at §483.65, Tag F428 regarding medication regimen review.
Exploring the antibiotic prescribing process in nursing homes
Process for determining whether/how to use an antibiotic

- “Do I start an antibiotic?”
  - Change in a resident’s condition
  - Type of change
  - Underlying patient/resident characteristics

- “Which antibiotic do I start?”
  - Type of infection suspected
  - Assessment of severity
  - Knowledge of antibiotic hx/ antibiotic susceptibility

- “Do I continue the antibiotic?”
  - Identification of alternate explanation
  - Availability of additional data
  - Assessment of response to initial choices
Additional factors influencing decisions about antibiotic use

- Knowledge, attitudes and perceptions of the clinical providers
- Characteristics of the patient/resident population
- Quality of the assessments and data available during the decision-making process
- Culture and expectations about antibiotic use established by the facility
Challenges to addressing antibiotic use in NHs

- Assessments are made by a surrogate rather than the prescriber
  - 67% of antibiotic prescriptions were ordered over the phone
- Limited documentation of assessments in medical record
  - 43% of NH-initiated antibiotic courses had no documentation of infection in medical record
- Limited access to diagnostics
- Inconsistent follow-up assessments
- Influence of resident, family, and other NH staff on the decision to start antibiotics

RN/MD telephone communication as a barrier to optimum antibiotic use

- Data from surveys of nursing home RNs and LPNs exploring nurse-physician communication
  - Several domains of the communication process were explored
- Logistics
  - 25% unable to find quiet place to make phone call
  - 21% difficulty reaching physician
- Openness and collaboration
  - 28% felt pressured/rushed on the phone
- Professionalism
  - 24% felt they were bothering the physician
  - 17% anticipated physician would be rude/unpleasant
  - 16% were interrupted by physician or felt disrespected

Other communication issues

- Lack of nurse preparation before the call – central issue
  - Long delays in call back resulted in nursing staff no longer having information readily available
- Lack of engagement from covering providers (unfamiliar with resident)
- Trust between healthcare team (based on familiarity)
- Lack of physician responsiveness
- Language barriers or misunderstanding of medical terminology could result in need for frequent clarification

Led to physician impatience, rudeness, unpleasant interactions

# Communication pathways between nurses and physicians

<table>
<thead>
<tr>
<th>Nurse (Sender)</th>
<th>Physician (Receiver)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ideal situation:</strong> The nurse is prepared with all relevant information at hand.</td>
<td><strong>Ideal situation:</strong> The physician (who knows the patient) is available when the nurse calls or calls back in a timely manner. The physician listens to the nurse without interruption.</td>
</tr>
<tr>
<td><strong>Challenges:</strong> Patient information may be hard to gather; patient assessment prior to call may be incomplete; delays in physician call back may prevent nurse from having chart available when call is returned.</td>
<td><strong>Challenges:</strong> The physician does not call back; physician interrupts nurse during the call.</td>
</tr>
<tr>
<td><strong>Recommendation:</strong> Be prepared.</td>
<td><strong>Recommendation:</strong> Return calls in a timely manner; listen without unnecessary interruption.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Channel (Telephone)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Challenges:</strong> Communication often requires timely callback; calls often reach a covering physician unfamiliar with the patient.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nurse (Receiver)</th>
<th>Physician (Sender)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ideal situation:</strong> Nurse understands orders, confirms and clarifies treatment plan. Nurse open to collaborative patient management and points out any safety issues when necessary.</td>
<td><strong>Ideal situation:</strong> The physician speaks at an understandable pace and clearly; repeats as needed. Explains reasoning if needed.</td>
</tr>
<tr>
<td><strong>Challenges:</strong> Nurse does not understand physician and unable to request clarification from the physician.</td>
<td><strong>Challenges:</strong> The physician often rushed, speaks quickly, and may be difficult to understand.</td>
</tr>
<tr>
<td><strong>Recommendation:</strong> Request clarification when necessary; be persistent when necessary.</td>
<td><strong>Recommendation:</strong> Speak clearly and slowly; be willing to repeat self if requested. Be open to requests for clarification.</td>
</tr>
</tbody>
</table>

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**FIGURE 1.** Communication-health information processing model of nurse-physician telephone communication in the long-term care setting.

Initial questions to consider

- What is our process for identifying, documenting, and communicating changes in resident condition?
  - Do we have standard protocols which may unintentionally drive antibiotic use?
  - Do we have good communication among front-line staff and clinical providers?
- Have we created expectations among residents, families, and NH staff about antibiotic use?
- What resources on antibiotic susceptibility and use do we receive from the consultant laboratory and pharmacy?
- Do we have a process to re-assess residents who have been started on an antibiotic?
- Do we monitor and provide feedback on provider antibiotic use?
What could be done in the NH setting to improve antibiotic use?
Antibiotic Stewardship Driver Diagram

Primary Drivers

- Timely and appropriate initiation of antibiotics
- Decreased incidence of antibiotic-related adverse drug events (ADEs)
- Decreased prevalence of antibiotic-resistant healthcare-associated pathogens
- Decreased incidence of healthcare-associated C. difficile infection
- Decreased pharmacy cost for antibiotics

Secondary Drivers

- Promptly identify patients who require antibiotics
- Obtain cultures prior to starting antibiotics
- Do not give antibiotics with overlapping activity or combinations not supported by evidence or guidelines
- Determine and verify antibiotic allergies and tailor therapy accordingly
- Consider local antibiotic susceptibility patterns in selecting therapy
- Start treatment promptly
- Specify expected duration of therapy based on evidence and national and hospital guidelines
- Make antibiotics patient is receiving and start dates visible at point of care
- Give antibiotics at the right dose and interval
- Stop or de-escalate therapy promptly based on the culture and sensitivity results
- Reconcile and adjust antibiotics at all transitions and changes in patient’s condition
- Monitor for toxicity reliably and adjust agent and dose promptly
- Monitor, feedback, and make visible data regarding antibiotic utilization, antibiotic resistance, ADEs, C. difficile, cost, and adherence to the organization’s recommended culturing and prescribing practices
- Develop and make available expertise in antibiotic use
- Ensure expertise is available at the point of care

Leadership and Culture

http://www.cdc.gov/getsmart/healthcare/improve-efforts/driver-diagram/index.html
Connecting back to antibiotic stewardship drivers

Overarching: Leadership and Culture
- Engage facility leadership in promoting antibiotic stewardship
- Educate residents, families and NH staff on safe antibiotic use

Timely and appropriate initiation
- Improve quality/documentation of changes in condition
- Standardize communication of change in condition

Appropriate administration and de-escalation
- Review antibiotic history and other medication use
- Utilize laboratory resources to track susceptibility data
- Improve/standardize quality and communication of follow-up assessments
- Standardize the laboratory data obtained prior to antibiotic start

Data monitoring, transparency, and stewardship infrastructure
- Measure and report antibiotic use including provider specific data
Leadership and culture

Utilize existing campaigns, resources, to make facility leadership, staff, and residents more aware of safe antibiotic use

http://www.cdc.gov/getsmart/healthcare/
Timely and appropriate initiation

- Standardize the process for assessing a resident when concern about new infection
  - Ensure all pieces of history and physical exam are assessed
  - Improve quality/documentation of assessments of change in condition
  - Communicate information about recent antibiotic and other medication use
- Standardize communication of change in condition to medical providers
- Improve the use of the laboratory data
  - Review existing protocols which might drive inappropriate diagnostic testing (e.g., send a UA for every resident who falls)
  - Ensure specimen for culture are obtained before antibiotics start
  - Use susceptibility data from your lab (e.g., NH antibiograms)
Differentiate colonization from true infection

- Decrease cultures obtained for non-specific changes in a resident’s condition (e.g., falls, altered behavior, “not acting like himself”)

- Decide to start antibiotics Often, antibiotics aren’t initiated until culture results have returned, however, the drug are initiated, even if the resident’s changes have resolved

*Treat the person not the laboratory test*
Appropriate administration and de-escalation

- Implement a process for a 72 hour antibiotic review
  - Diagnostic test and culture results are reviewed by nursing staff and provider
  - Nursing staff review resident’s response to therapy in conjunction with their provider
  - Empiric antibiotic is discontinued if data suggest an alternative explanation for change-in-condition
  - If indicated, antibiotics are narrowed based on culture results
  - Ensure adequate documentation of follow-up assessment, rationale for decisions for continuation or discontinuation
Appropriate administration and de-escalation

- Use evidence-based guidance to limit antibiotic use and prevent unnecessary follow-up testing
  - Pneumonia guidelines recommend short courses (5-8 days), not 14 days
  - Reduce antibiotic use for urinary tract infections (3-7 days), even when chronic indwelling catheters are present
  - Don’t allow follow-up micro cultures to “demonstrate clearance of infection” – treat the person not the lab test
Address the barriers to de-escalation

- Ensure that appropriate assessments and cultures are obtained in advance of antibiotic starts
  - Prevents the dilemma of not having data to guide changes
- Improve the communication between front-line staff and clinical providers
  - Prevents the anxiety of providers who are off-site and not performing their own assessments
- Implement processes to increase monitoring of residents when changes in condition occur
  - Prevents perceptions of family that “you’re not doing something for my loved one if you don’t give an antibiotic”
- Prevent inertia -- “well, it probably isn’t an infection, but let’s continue for 10 days just in case”
Make antibiotic use decisions well-informed

- Understand and address the knowledge, attitudes and perceptions of the clinical providers, staff and residents
  - Promote antibiotic use guidelines and training
  - Share provider specific antibiotic use data
  - Educate and empower front-line NH staff
  - Educate residents, families and NH staff on the risks of antibiotic use
Make antibiotic use decisions well-informed

**Clin Infect Dis 2009; 48:149-171**

Clinical Practice Guideline for the Evaluation of Fever and Infection in Older Adult Residents of Long-Term Care Facilities: 2008 Update by the Infectious Diseases Society of America

Kevin P. High,† Suzanne F. Bradley,‡§ Stefan Gravenstein,§‡§ David R. Mehry,† Vincent J. Onaghiarello,‡‡ Chosley Richards,†‡‡ and Thomas T. Yoshikawa§‡‡

**Infect Control Hosp Epidemiol 2001; 22:120-124**

Development of Minimum Criteria for the Initiation of Antibiotics in Residents of Long-Term–Care Facilities: Results of a Consensus Conference

Mark Loeb, MD, MSc; David W. Bentley, MD; Suzanne Bradley, MD; Kent Crossley, MD; Richard Garibaldi, MD; Nelson Gantz, MD; Allison McGee, MD; Robert R. Mader, MD; Joseph Mylotte, MD; Lindsay E. Nicolle, MD; Brenda Nurse, MD; Shirley Paton, RN; Andrew E. Simor, MD; Philip Smith, MD; Larry Strausbaugh, MD
Reviewed and updated the criteria outlined in the 1991 infection surveillance definition paper by McGeer et al.

Major topics/clinical syndromes addressed in the guidance:
- Constitutional criteria
- Respiratory tract infections
- Urinary tract infections
- Skin and soft tissue infections
- Gastrointestinal tract infections

Stone et al. Infect Contr Hosp Epi. 2012; 33: 965-977
Use infection surveillance data to inform antibiotic stewardship

- Surveillance definitions may not be the same as clinical criteria used to make treatment decisions
  - Sometimes diagnosis/treatment decisions are made before all the data is available
  - Sometimes insufficient documentation is available to demonstrate that surveillance criteria have been met
- Even events captured by the MDS may not correspond to the events meeting surveillance criteria
Gap between MD diagnosis and surveillance criteria

- 146 infections, UTI or pneumonia were diagnosed and treated by clinicians.
- 33/146 (23%) were also identified by applying either McGeer or Loeb minimum criteria.

Table 2: Incidence and attributable risk of infection

<table>
<thead>
<tr>
<th></th>
<th>Number of infections</th>
<th>Incidence rate (infections/1,000 resident-months)</th>
<th>Relative risk (95%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Device (263 f/u-mon)</td>
<td>Non-device (644 f/u-mon)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total infections</td>
<td>87</td>
<td>110</td>
<td>331</td>
<td>1.9 (1.4–2.6)</td>
</tr>
<tr>
<td>Urinary tract infections</td>
<td>49</td>
<td>54</td>
<td>186</td>
<td>2.2 (1.5–3.3)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>23</td>
<td>20</td>
<td>87</td>
<td>2.8 (1.5–5.4)</td>
</tr>
<tr>
<td>Other infections</td>
<td>15</td>
<td>36</td>
<td>57</td>
<td>1.0 (0.5–1.9)</td>
</tr>
<tr>
<td>McGeer’s criteria</td>
<td>8</td>
<td>15</td>
<td>30</td>
<td>1.3 (0.5–3.3)</td>
</tr>
<tr>
<td>Minimum criteria</td>
<td>12</td>
<td>10</td>
<td>46</td>
<td>2.9 (1.2–7.6)</td>
</tr>
<tr>
<td>McGeer’s or minimum criteria</td>
<td>15</td>
<td>18</td>
<td>57</td>
<td>2.0 (1.0–4.3)</td>
</tr>
</tbody>
</table>

- Clinical definition
- Includes skin and soft tissue infections, Clostridium difficile colitis, conjunctivitis, upper respiratory, and
- Includes pneumonia and/or urinary tract infections

Explore the gaps with clinical providers to improve antibiotic use

- Evaluate the discrepancies between surveillance data and clinical/MDS data as a process improvement exercise
- Ask for their input in identifying the reasons why events treated with antibiotics don’t meet surveillance (or other practice guideline) criteria
- Identify ways to improve:
  - Assessments
  - Documentation
  - Diagnostic testing
  - Follow-up after antibiotics have been initiated
Safer Antibiotic Use in NHs: The time is NOW

- The scope and consequence of antibiotic misuse in NHs is extremely high
  - NH regulations already set expectations for activities to improve antibiotic use
- Understanding the process for antibiotic use can identify opportunities for improvement
  - Standardizing the assessment and evaluation of residents
  - Improved documentation
  - Remove barriers to effective communication between nursing staff and providers
- Use existing infection surveillance data to inform providers of gaps in current antibiotic use practices
Thank you!!

Email: nstone@cdc.gov with questions/comments

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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.