Implementing Antibiotic Stewardship in Rural and Critical Access Hospitals

Denise Cardo, MD
Director, Division of Healthcare Quality Promotion, CDC
Federal Office of Rural Health Policy Reverse Site Visit
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Antibiotic Resistance Threatens Every Person, Modern Medicine, and Industries

- Antibiotic resistant germs avoid the effects of the drugs designed to kill them
- AR affects all communities and, without action, will continue to get worse
- AR is not stoppable but its spread can be contained
- We still have time to make a difference
- CDC is the 9-1-1 for emerging antibiotic resistance

Estimated minimum number of illnesses and deaths caused annually by antibiotic resistance*:

At least

- 2,049,442 illnesses
- 23,000 deaths

*bacteria and fungus included in this report
Prevent Infections: Where Do We Want To Be

- Every patient gets optimal care

- All healthcare providers are expected to practice infection control, use antibiotics correctly, and recognize sepsis as part of good clinical practices

- All initiatives in healthcare incorporate infection control and appropriate antibiotic use (e.g., sepsis)

- All healthcare facilities work with public health and have prevention of infections, appropriate antibiotic use, and sepsis management as part of their priorities
Build and Expand HAI Prevention Success: AR Solutions Initiative Continues Focus on Patients

Policies – Programs – Practices
Building on Success: Healthcare-Associated Infections

- Many HAIs are caused by the most urgent and serious antibiotic-resistant bacteria and may lead to sepsis or death.
- CDC uses data for action to prevent infections, improve antibiotic use, protect patients.
- Combination of CDC data, guidelines, state support, and collaborations with CMS & AHRQ provide a unique opportunity to make major gains in reducing healthcare-associated infections and drug resistant infections to meet national goals.
HAI/AR Prevention Strategy

- Prevent HAIs and control transmission
- Detect, respond and control
- Improve antibiotic use

- Data for Action
  - NHSN
  - Emerging Infections Program (EIP)
  - Outbreaks

- Guidelines and Tools
- Programs & Partnerships for Implementation
- Innovation
Rationale for Antibiotic Stewardship

- Improve Patient Care and Safety
  - Prevent *C. difficile* infections
  - Minimize adverse events
  - Good clinical practices

- Reduce Resistance
  - Decrease deaths
  - Preserve antimicrobial effectiveness
Community Antibiotic Prescribing Rates per 1000 Population — United States, 2014

Lowest state: 501 per 1000

Highest state: 1,285 per 1000

Data: IMS Health Xponent
http://www.cdc.gov/getsmart/community/programs-measurement/measuring-antibiotic-prescribing.html
National Trends in Inpatient Antibiotic Use Among US Hospitals From 2006 to 2012

- During the years 2006 to 2012 55.1% of patients received at least one dose of antibiotics during their hospital visit
- The overall national days of therapy was 755 per 1,000 patient-days
- Overall antibiotic use did not change significantly over time
- However, the mean change for the following antibiotic classes increased significantly: Third- and fourth-generation cephalosporins, macrolides, glycopeptides, carbapenems

Source: [http://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2553294](http://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2553294)
Importance of Antibiotic Stewardship

- Small hospitals are using similar antibiotics as their larger counterparts – All groupings of hospitals bed size had the following drugs present in their 7 most commonly used agents, although order of these 7 drugs differed

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Hospitals with 25 beds or fewer</th>
<th>Hospitals with 26 - 50 beds</th>
<th>Hospitals with &gt;50 beds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean rate</td>
<td>Median rate</td>
<td>Mean rate</td>
</tr>
<tr>
<td>Metronidazole</td>
<td>29.1</td>
<td>19.7</td>
<td>35.96</td>
</tr>
<tr>
<td>Cefazolin</td>
<td>29.7</td>
<td>17.4</td>
<td>52.94</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>59.5</td>
<td>52.4</td>
<td>53.09</td>
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<tr>
<td>Vancomycin</td>
<td>61.2</td>
<td>44.7</td>
<td>80.37</td>
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<tr>
<td>PipTazo</td>
<td>64.3</td>
<td>40.8</td>
<td>87.51</td>
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<tr>
<td>Fluoroquinolones</td>
<td>93.7</td>
<td>57.8</td>
<td>99.75</td>
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<tr>
<td>Ceftriaxone</td>
<td>123.0</td>
<td>98.0</td>
<td>102.01</td>
</tr>
</tbody>
</table>

- Individual agent rates of use are similar across hospitals of varying bed size

Source: AU Option of AUR Module in NHSN
Median SAAR values by SAAR agent category and hospital bed size

- Broad spectrum agents for hospital onset/MDRO infections
- Broad spectrum agents for community-acquired infections
- Anti-MRSA agents
- Agents for surgical site infection prophylaxis
- All antimicrobial agents

Source: AU Option of AUR Module in NHSN
Current Nationwide Antibiotic Stewardship Programs in US Hospitals, National Healthcare Safety Network

Percentage of U.S. Acute Care Hospitals (n=4,569) responding to the 2015 National Healthcare Safety Network Annual Survey that meet all 7 of CDC’s Core Elements for Hospital Antibiotic Stewardship Programs

- Bed Size:
  - 0-50 beds: 31.1%
  - 51-200 beds: 49.6%
  - >200 beds: 66.1%

- Facility Type:
  - Children’s hospital: 53.2%
  - General acute care hospital: 53.1%
  - Surgical hospital: 45.4%
  - Critical access hospital: 26.3%
  - Major teaching: 63.4%
  - Non-teaching: 42.4%

- Teaching Status:
  - T: 23%
  - 18: 46%
  - 14: 54%
  - 62: 77%
Current Antibiotic Stewardship Programs in CAH

- Of 4,569 hospitals responding to the 2015 NHSN Annual Hospital Survey:
  - 1,054 reported ≤25 beds
    - 304 (29%) met all 7 core elements
  - 801 critical access hospitals
    - 211 (26%) met all 7 core elements
- Hospitals with ≤25 beds were 2.4 times less likely to meet all 7 core elements compared with hospitals having ≥270 beds (95% CI: 2.17 – 2.67)
- Beginning in 2017, Antibiotic Stewardship reporting will be required in MBQIP for Critical Access Hospitals (CAH)
Supporting Implementation of the Core Elements

- Partnership with CMS quality improvement efforts to support implementation across the spectrum of healthcare.
- Collaborating with professional organizations, including nurses.
- Expanding patient engagement and education, including a new educational effort with a focus on patients.
- New incentives/requirements for antibiotic stewardship in all healthcare settings:
  - Hospitals: Joint Commission standard and proposed CMS requirement
  - Nursing homes: New CMS requirement
  - Outpatient: Stewardship including in new payment system.
Forming Antibiotic Stewardship Programs

- CAHs can implement antibiotic stewardship programs and CDC has provided practical guidance, support, and technical assistance to help achieve this, along with extensive input from CAH representation (in green below) and other partners (American Hospital Association, Pew Charitable Trust)

https://www.cdc.gov/getsmart/healthcare/implementation/core-elements-small-critical.html
Antibiotic Stewardship Program Core Elements

Core elements for hospital Antibiotic Stewardship Programs include:

1) Leadership commitment
2) Accountability for program outcomes
3) Drug Expertise
4) Action
5) Tracking
6) Reporting AU data
7) Education
Core Elements 1 and 2: Leadership Commitment/Accountability

- Examples of CAH Implementation Strategies:
  - Enrolling in multi-hospital, collaborative efforts to improve antibiotic use. Consider contacting state hospital associations, state or local public health agencies, and/or large academic medical centers to identify existing antibiotic stewardship collaboratives.
  - Funding remote consultation or telemedicine with experts in antibiotic stewardship (e.g., infectious diseases physicians and pharmacists).
  - Placing stewardship requirements into the contractual responsibilities of any external pharmacy services including a requirement that pharmacy contractors have formal stewardship training.
Core Element 3: Drug Expertise

Examples of CAH Implementation Strategies:

- Appoint a pharmacist leader, ideally someone who is on-site either full- or part-time.
- Appoint a physician leader to provide physician support to the antibiotic stewardship program ideally someone who is on-site either full- or part-time.
- Offer access to training courses in antibiotic stewardship to help develop local expertise.
- Seek additional expertise by joining multi-hospital improvement collaboratives or through remote consultation (e.g. telemedicine).
Core Element 4: Action

There are a number of evidenced based interventions that can improve antibiotic use. The majority of all antibiotic use in hospitals is driven by just three conditions: community-acquired pneumonia (CAP), urinary tract infections (UTIs) and skin and soft tissue infections (SSTIs).

- Community-acquired Pneumonia
- Urinary Tract infections
- Skin and Soft Tissue infections
Core Element 5: Tracking

Examples of CAH Implementation Strategies:

– Submit antibiotic use and resistance through CDC NHSN AU and Resistance Module.

– Monitor the performance of antibiotic time-outs to see how often these are being done and if opportunities to improve use are being realized during time-outs.

– Perform a medication use evaluation to assess courses of therapy for selected antibiotics (e.g., piperacillin-tazobactam, carbapenems, vancomycin, fluoroquinolones) to see if there are opportunities to improve use.

– Monitor how often patients are converted from intravenous to oral therapy and assess to see if there are missed opportunities to convert.
Core Element 6: Reporting

- Examples of CAH Implementation Strategies:
  - Prepare regular reports on the measures being tracked related to antibiotic use. Include these data as a standing report to key stakeholders within the facility, e.g., pharmacy and therapeutics, patient safety/quality, medical staff leadership/committees, and hospital board.
  - If feasible, share provider-specific reports with individual clinicians confidentially.
  - Distribute data and key messaging through staff newsletters and emails.
Core Element 7: Education

- Examples of CAH Implementation Strategies:
  - Integrate regular updates on antibiotic stewardship and resistance into communications tools with particular focus on interventions related to CAP, UTI and SSTI (e.g., blogs, website, intranet, and employee newsletters).
  - Provide targeted in-person or web-based educational presentations and messages to key provider, pharmacist and nursing groups at least annually.
  - Incorporate antibiotic stewardship into (re)credentialing education.
  - Ask the patient-family advisory committee for input on patient education material.
  - Develop stories to share how patients’ lives are affected by complications of antibiotic use (e.g. *C. difficile* infection).
  - Include information on antibiotics in patient education materials.
CMS- CDC Collaborations to Prevent Infections and Improve Antibiotic Use

*Policies – Programs – Practices*

- Clinical Standards (e.g., CoPs)
- Quality and Public Reporting
- Value-based Purchasing
- Payment
- Quality Improvement: QIN, HIINs etc
- Survey and Certification
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Policies – Programs – Practices
Patients Move – And Bacteria & Infections Move With Them
HAI Progress: *Clostridium difficile* (CDI) and Methicillin-resistant *Staphylococcus aureus* (MRSA) Infections
Understanding Epidemiology of *CDI* and MRSA Infections at the Regional Level in the United States

**CDI**
- 33% Community-onset with recent outpatient exposures\(^1\)
- 41% Community-Associated
- 20% Community-onset with recent inpatient exposures
- 59% Healthcare-Associated
- 1% LTACH-onset
- 22% Hospital-onset
- 8% Community-onset with no healthcare exposures\(^1\)

**MRSA**
- Unknown 1%
- Hospital onset 14%
- Healthcare associated community onset 65%
- Community associated 20%

Source: 2014 EIP data
C. difficile: Connectedness of Healthcare Facilities, Washington and Oregon
Prevention of *Clostridium difficile* Infections (CDI) in England

http://www.hpa.org.uk/web/HPAweb&Page&HPAwebAutoListName/Page/1179745282408
Spread of Carbapenem-resistant Enterobacteria (CRE) and Emerging Resistant Threats

Resistant microorganisms do not respect borders

- Emerging resistant infection identified outside of large metropolitan areas
  - Imported from healthcare facilities in higher prevalence areas

- Some healthcare facilities are “amplifiers” of resistance spread

- Some patients with new resistant infection mechanism had international travel in year prior
Preventing Transmission: Regional Approach to Controlling CDI and other Multidrug-Resistant Organisms

- **Traditional approach**
  - Promotion of prevention efforts independently implemented by individual health care facilities
  - Does not account for inter-facility spread through movement of colonized/infected

- **Regional Approach**
  - Recognizes that individual facilities are components of integrated and dynamic networks connected via patient movement
    - Occurrences in one healthcare facility may affect many other healthcare facilities
Expanding HAI/AR Programs to Every State

CDC is expanding implementation of prevention networks—where public health and healthcare work together—to better prevent and stop spread of infections and improve antibiotic use.

- **Detection & Contain:** In all 50 states, 6 cities and Puerto Rico, CDC is supporting local AR expertise and lab capacity to improve identification and response to all emerging threats, leading to synchronized action across healthcare and communities to quickly protect patients and control spread.

- **Prevention & Stewardship:** In 25 states and 3 cities, CDC is aggressively expanding CRE, *C. difficile*, and other MDRO prevention and antibiotic stewardship programs, implementing proven strategies in healthcare facilities to prevent infections and transmission across healthcare settings.
Thinking Holistically to Protect Patients

- Prevent Infections
  - Implement current recommendations
  - Innovation

- Early Detection
  - Faster diagnostic tools
  - Sepsis

- Appropriate Treatment
  - Antibiotic Stewardship

- Emerging Resistant Bacteria
- Inter-facility Transmission

Protecting Across the Patient Care Spectrum
Prevention is our Goal and Responsibility

Act locally to protect patients Now and Always