Antibiotic Stewardship Is...
A set of commitments and activities designed to:
- optimize the treatment of infections and
- reduce the adverse events associated with antibiotic overuse

Why Antibiotic Stewardship Is Important for Society Overall and Specifically for Nursing Homes
**Worldwide Crisis of Antibiotic Resistance**

- Multi-drug resistance increasingly common
- Over 20,000 deaths annually in U.S.A. from multi-drug resistant infections
- Projected 317,000 deaths per year by 2050

---

**What’s Causing the Crisis?**

1. **Fewer New Antibiotics Being Developed**
2. **Resistant Strains Spread Rapidly**
3. **Antibiotics Are Overused**

---

**Why the Focus on Nursing Homes**

- Antibiotic usage tends to be quite high
- NHSs with the highest prescribing rates tend to also have the highest *Clostridium difficile* infection rates
- Residents LIVE there (as opposed to hospital)
Antibiotic Prescribing Rates across 31 North Carolina Nursing Homes

The Average: Nursing Home Resident

- 4.6 antibiotic prescriptions per year
- 1 prescription every 80 days
- On antibiotics 10% of the time

Average # Antibiotic Prescriptions Per Resident in One Year *

Nursing Home

Clostridium Difficile: an Indicator of Antibiotic Overuse

RISK

- People with antibiotics for 10 days or longer

- Long-term residents in a hospital setting

- Rapidly changing residents in hospital settings

- People with diarrhea

- People with skin lesions

IMPACT

- $200,000 in lost revenue in the deep setting the resident

- 2 to 4 additional residents diagnosed with C. difficile in a month

Resistant Bacteria Now Commonly Colonize Nursing Home Residents

- results of skin, airway, skin and wound cultures in 82 residents -

<table>
<thead>
<tr>
<th>Bacterial colonization</th>
<th>% of Nursing Home Residents with Positive Culture</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRSA</td>
<td>63%</td>
</tr>
<tr>
<td>CR- GNB</td>
<td>72%</td>
</tr>
<tr>
<td>VRE</td>
<td>18%</td>
</tr>
</tbody>
</table>

J Clin Micro 50(5); 1698-1703, 2012.

Presumed Urinary Infection

Presumed Skin and Soft Tissue Infection

Respiratory Infection

The most common "other" infection is C. difficile

Reasons Antibiotics Are Prescribed

CMS Mandate for Nursing Homes to Implement Antibiotic Stewardship

CMS Mandate

for Nursing Homes

to Implement

Antibiotic Stewardship

42 CFR Parts 405, 431, 447, 482, 483, 485, 488, and 489

Reform of Requirements for Long-Term Care Facilities

Infection Control (§ 483.80)

We are requiring facilities to develop an Infection Prevention and Control Program (IPCP) that includes an Antibiotic Stewardship Program and designate at least one infection Preventionist (IP). That program should include antibiotic use protocols and a system to monitor antibiotic use.

Implementation Timetable:

Antibiotic Stewardship – 11/28/2017
Infection Preventionist (IP) – 11/28/2019
IP on Quality Assessment and Assurance Committee - 11/28/2019
Prescribing antibiotics “just in case” was accepted in the past, but now antibiotics should be given after careful, evidence-based consideration of risks and necessity.

This session will provide guidance on key elements of antibiotic stewardship for your nursing home

Yes, This is a **policy change**

F Tags that Surveyors Can Cite to Enforce Antibiotic Stewardship

Federal Tag 441: Infection Control
Federal Tag 329: Unnecessary Drugs
Federal Tag 332/333: Medication Errors
Federal Tag 428: Drug Regimen Review

Can Antibiotic Use be Safely Reduced?

**Education and QI Works:**
Results from Randomized Trial
- Antibiotic Prescriptions Per 100 Resident-Days

Intervention Group All Indications
Comparison Group All Indications
Follow-Up ==>

24% Reduction in Intervention Group

Intervention Began

Average = 2.19 prescriptions per year

**Antibiotic Prescribing Rates in 28 Minnesota Nursing Homes**

Average for 31 North Carolina Nursing Homes

**Key Areas for Improvement in Nursing Home Antibiotic Use**
Decision-Making Can Be Complicated

I learned in nursing school back in 1968...

Every time mother [Does X] she needs antibiotics

Case #1

Mrs. Jenkins, a 79 year old with stroke, incontinence
* Wet incontinence pad has odor
* No complaints
* Normal vital signs

What would you do and why?

Is This Evidence-Based Practice?

What Causes Changes in Urine Color or Odor?

• Diet
• Medications
• Dehydration
• Bacteria in urine
  • If person is not sick, it’s asymptomatic bacteriuria

Is Cloudy or Smelly Urine a Reason To Give Antibiotics?

Colonization versus Infection: Why the Difference is Important in Nursing Home Care

© 2013 Program in Aging, Disability and Long-Term Care
Cecil G. Sheps Center for Health Services Research
University of North Carolina at Chapel Hill
Supported by a grant from the US Agency for Healthcare Research and Quality
What should you do for Mrs. Jenkins?

Should you get a urine culture ‘just in case’?

What Happened?

• Positive cultures were overtreated
• Negative cultures were ignored
• Most common reason cultures were ordered was “mental status change,” which is rarely due to urine infection

Interestingly.....The two sepsis cases that arose during 7 days post-culture in these 254 patients were from non-urinary sources and had negative urine cultures

Case #2: Two Different People

Mrs. White

• 84 year old with arthritis and moderate dementia
• Uncooperative with dressing
• Irritable
• Eats half of breakfast
• Says she’s tired

Ms. Blue

• 34 year old nurse
• Divorced, alone this weekend
• You were going to have lunch with her, but she cancels
• Low energy; not hungry
• Doesn’t want to get dressed
• Doesn’t want to deal with people

Both Have Similar Nonspecific Symptoms *

…don’t relate to any particular body part or body system
What You Might Say to Your Friend Ms. Blue

- Coming down with a virus?
- Too much to drink last night?
- Didn’t sleep well?
- Pain?
- Stress?
- Depression?

What the Nursing Supervisor Says About Ms. White

- Probably the urine. Needs an antibiotic.
- Turning to antibiotics as a knee jerk reaction.

Jumping to conclusions

- In nursing homes --- One of the biggest causes of unnecessary antibiotic use
- In medical decision-making – the most common reason for medical errors

What else could be causing Ms. White’s fatigue, irritability, and poor appetite?

The Big Seven: Common Reasons for Nonspecific Symptoms

- Dehydration
- Medication side effect
- Coming down with a virus
- Didn’t sleep well
- Pain
- Constipation
- Stress / anxiety / depression

Active Interventions for Non-Specific Symptoms

- Assess hydration status (and encourage fluids)
- Review current medications
- Look for signs of a respiratory or GI virus
- Think about sleep problems
- Ask about pain / discomfort
- Ask about constipation
- Look for sources of stress, anxiety or depression
- Monitor symptoms and vital signs (especially temperature)
- Use nursing interventions where appropriate

Should we get a urine culture “just in case”?

Case #3

- Mr. Leonard, 76 year old non-smoker
- 5 days of nasal congestion, sore throat and sneezing
- Hacking cough worse at night
- Decreased appetite, more tired
- Temp 99.4, other vitals normal, pulse ox 97%
- Placed on antibiotics
Research Result: Cough Alone Increases 3x the likelihood of a NH Patient Getting Antibiotics

**Question:** Is cough alone a reason to give antibiotics? Why or why not?

<table>
<thead>
<tr>
<th>Common Respiratory Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Infection Type</strong></td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Common Cold</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Acute bronchitis</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Pneumonia</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Influenza‐like illness</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>COPD exacerbation</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

---

**Case 4**

Does this need antibiotics? One week later

**Case 5**

Does this need antibiotics? Two weeks later

---

**Emergency Departments and Hospitals: Big Risk, Hard to Control**

Over Half of C Diff Infections in NHs Occur within a Month Post-Hospital Discharge

Source: Pawar et al. ICDHE 2012; 13:1107-12

---

**Which Antibiotics Pose the Highest Risk of Clostridium difficile?**

![Graph showing antibiotic risk index](image)

Reducing Antibiotic Overuse Works: Impact of fluoroquinolone restriction on rates of C. difficile infection in a Community Hospital

Empirically Chosen Antibiotics for UTI are Often Ineffective (except at promoting resistance)

Options Available to Reduce C. difficile

Recommended Duration of Antibiotic Therapy (non-hospitalized patients)

Summary: Situations Leading to Antibiotic Overuse

1. Try to Reduce Antibiotic Burden
   - Re-evaluate need for antibiotics in the first place
   - Re-evaluate duration of antibiotic treatment
   - Re-evaluate choice of antibiotic
2. Probiotics
   - Cochrane review (2013): “moderate quality evidence suggests that probiotics are both safe and effective for preventing Clostridium difficile-associated diarrhea”

Options Available to Reduce C Diff Post Hospitalization

Empirically Chosen Antibiotics for UTI are Often Ineffective (except at promoting resistance)

- Data from 75 prescriptions and 1,580 positive cultures in 31 NHs -

<table>
<thead>
<tr>
<th>Antibiotic Prescribed Empirically (% of the time)</th>
<th>Percent Resistant (% of isolates)</th>
<th>Escherichia Coli (44%)</th>
<th>Proteus (13%)</th>
<th>Klebsiella pneumoniae (13%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin (26%)</td>
<td>57%</td>
<td>69%</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>TMP-SMX (36%)</td>
<td>42%</td>
<td>45%</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>Nitrofurantoin (12%)</td>
<td>4%</td>
<td>98%</td>
<td>23%</td>
<td></td>
</tr>
<tr>
<td>Ceftriaxone (11%)</td>
<td>17%</td>
<td>7%</td>
<td>11%</td>
<td></td>
</tr>
<tr>
<td>Levofloxacin (7%)</td>
<td>58%</td>
<td>63%</td>
<td>8%</td>
<td></td>
</tr>
</tbody>
</table>

Recommended Duration of Antibiotic Therapy (non-hospitalized patients)

<table>
<thead>
<tr>
<th>Type of infection</th>
<th>Sanford Guide, 2015</th>
<th>ID Society</th>
<th>David Weber</th>
<th>Actual NH Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple UTI (cystitis)</td>
<td>3 days ¹</td>
<td>3 days²</td>
<td>3 days</td>
<td>7.5 days</td>
</tr>
<tr>
<td>COPD exacerbation</td>
<td>3-10 days ²</td>
<td>--</td>
<td>3-5 days</td>
<td>7.8 days</td>
</tr>
<tr>
<td>Pneumonia without sepsis</td>
<td>Until afebrile for 3d</td>
<td>25 days ³</td>
<td>5-7 days ⁴</td>
<td>9.6 days</td>
</tr>
<tr>
<td>Cellulitis (lower extremity)</td>
<td>10 days ³</td>
<td>5 days</td>
<td>5-7 days</td>
<td>9.6 days</td>
</tr>
</tbody>
</table>

Summary: Situations Leading to Antibiotic Overuse

1. Urine appearance and odor
2. Urine test results
3. Nonspecific symptoms
4. Cough
5. Wounds
6. Red and swollen legs
7. Emergency departments and hospitals
8. Empirical antibiotic choice
9. Antibiotic treatment too long

1. ¹ TMP-SMX – 3 days; Nitrofurantoin – 5 days; 2 Varies with drug; No therapy required in most cases; 3 Not diabetic; 4 Minimum 5 days (should be afebrile 48-72 hours); ¹ Non-ambulatory treat as HCAP; assess using score for severity

Recommended Duration of Antibiotic Therapy (non-hospitalized patients)

<table>
<thead>
<tr>
<th>Type of infection</th>
<th>Sanford Guide, 2015</th>
<th>ID Society</th>
<th>David Weber</th>
<th>Actual NH Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple UTI (cystitis)</td>
<td>3 days ¹</td>
<td>3 days²</td>
<td>3 days</td>
<td>7.5 days</td>
</tr>
<tr>
<td>COPD exacerbation</td>
<td>3-10 days ²</td>
<td>--</td>
<td>3-5 days</td>
<td>7.8 days</td>
</tr>
<tr>
<td>Pneumonia without sepsis</td>
<td>Until afebrile for 3d</td>
<td>25 days ³</td>
<td>5-7 days ⁴</td>
<td>9.6 days</td>
</tr>
<tr>
<td>Cellulitis (lower extremity)</td>
<td>10 days ³</td>
<td>5 days</td>
<td>5-7 days</td>
<td>9.6 days</td>
</tr>
</tbody>
</table>

Summary: Situations Leading to Antibiotic Overuse

1. Urine appearance and odor
2. Urine test results
3. Nonspecific symptoms
4. Cough
5. Wounds
6. Red and swollen legs
7. Emergency departments and hospitals
8. Empirical antibiotic choice
9. Antibiotic treatment too long

1. ¹ TMP-SMX – 3 days; Nitrofurantoin – 5 days; 2 Varies with drug; No therapy required in most cases; 3 Not diabetic; 4 Minimum 5 days (should be afebrile 48-72 hours); ¹ Non-ambulatory treat as HCAP; assess using score for severity
Antibiotic Stewardship Works ....sometimes

Antibiotic Use Jan-Apr 2015, by NH

Change in Antibiotic Use ‘15-’16, by NH

How to Develop an Antibiotic Stewardship Program in Your Nursing Home

#1: Commit Leadership / Create Team
- Agree to incorporate antibiotic stewardship into facility Quality Assurance and Performance Improvement goals, monitoring, and reporting
- Identify an infection preventionist (a.k.a. infection control nurse or infection specialist) and provide time
- Set up an antibiotic stewardship leadership team
- Communicate expectations to medical and nursing staff

Create an Antibiotic Stewardship Team and Make them Accountable
#2: Gather and Report Data

- Antibiotic prescriptions / 1,000 resident-days
- Percent of time on antibiotics
- C difficile infection rate
- Urine cultures: multidrug resistance rate
- Rate of hospitalization for sepsis

Rate of fever among persons who had antibiotics initiated in the nursing home, by infection site
- Proportion of prescriptions that are “high C diff risk” antibiotics, by infection site
- Urine cultures per 1,000 resident-days

Infection Tracking Excel Spreadsheets

Core Outcomes

Selected Process Measures

Antibiotic Prescribing Portion of Infection Tracking Spreadsheets

Infection Tracking Excel Spreadsheets

Infection Tracking Excel Spreadsheets

Infection Tracking Excel Spreadsheets
#3: Educate Everyone Involved in Decision-Making

- Nurses
- Providers
- Supervisors
- Residents and Family

Implementation Manual

- A step-by-step guide explaining how to incorporate our materials into a program that will improve outcomes

Training for Nursing Staff

- One-hour in-service DVD
- Pocket cards with key guidelines

Posters to Provide Periodic Reminders to Staff
Training for Medical Staff

- CD-ROM of case discussions by university experts
- Pocket cards with key guidelines

Educational Materials for Residents / Families

- Brochure entitled Why Not Antibiotics
- Website has 5-minute video

Training DVD for Emergency Department Staff

- Multidisciplinary case discussions from UNC faculty on emergency department management of nursing home residents

Free and Modestly-Priced Resources on the Web

nursinghomeinfections.unc.edu

#4: Set Goals and Establish Policies

- Timetable for implementing program
  - Data reporting
  - Education
  - Quality improvement reports
  - Involvement in collaborative
- Initial targets

Establishing Policies and Procedures

- Some say to do this first
- However, reviewing data and setting facility priorities may be better to do first
- Best policies and procedures are endorsed by facility staff and updated regularly
- AMDA will soon publish a report with sample policies and procedures for antibiotic stewardship
Evidence-Based Strategies That Work

- Communication guidelines for nursing staff around suspected infections – SBAR; protocols (e.g., asking for photos of skin problems)
- Publicizing antibiotic use statistics (QAPI)
- Antibiotic initiation protocols
- Antibiotic duration guidelines
- Antibiotic time-out
- Protocol for ordering of urine cultures
- Protocol for management of urine culture results

*CRITICAL ROLE OF LEADERSHIP CANNOT BE OVEREMPHASIZED*

Resources

https://nursinghomeinfections.unc.edu/