ANTIBIOTIC STEWARDSHIP IN NURSING HOMES

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(with thanks to Phil Sloane, MD, MPH for his slides)
Crisis of Antibiotic Resistance

- Multi-drug resistance increasingly common
- Over 23,000 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
‘Superbugs’ Kill India’s Babies and Pose an Overseas Threat

By GARDINER HARRIS

AMRAVATI, India — A deadly epidemic that could have global implications is quietly sweeping India, and among its many victims are tens of thousands of newborns dying because once-miraculous cures no longer work.

These infants are born with bacterial infections that are resistant to most known antibiotics, and more than 58,000 died last year as a result, a recent study found. While that is still a fraction of the nearly 800,000 newborns who die annually in India, Indian pediatricians say that the rising toll of resistant infections could soon swamp efforts to improve India’s abysmal infant death rate. Nearly a third of the world’s newborn deaths occur in India.
Deadly, Drug-Resistant ‘Superbugs’ Pose Huge Threat, W.H.O. Says

By DONALD G. McNEIL Jr. FEB. 20, 2017

The World Health Organization warned on Monday that a dozen antibiotic-resistant “superbugs” pose an enormous threat to human health, and urged hospital infection-control experts and pharmaceutical researchers to focus on fighting the most dangerous pathogens first.

The rate at which new strains of drug-resistant bacteria have emerged in recent years, prompted by overuse of antibiotics in humans and livestock, terrifies public health experts. Many consider the new strains just as dangerous as emerging viruses like Zika or Ebola.

“We are fast running out of treatment options,” said Dr. Marie-Paule Kieny, the W.H.O. assistant director general who released the list. “If we leave it to market forces alone, the new antibiotics we most urgently need are not going to be developed in time.”

Britain’s chief medical officer, Sally C. Davies, has described drug-resistant pathogens as a national security threat equivalent to terrorism, and Dr. Thomas R. Frieden, the recently retired director of the Centers for Disease Control and Prevention, called them “one of our most serious health threats.”
Questions

1. Is antibiotic resistance a problem in your nursing home? If so, how do you know?
2. Are Antibiotics overused in your nursing home? If so, why and how does this happen?
3. If you were designing a program to reduce inappropriate antibiotic use, what behaviors would you most want to change?
Questions

1. Is antibiotic resistance a problem in your nursing home? If so, how do you know?

2. Are Antibiotics overused in your nursing home? If so, why and how does this happen?

3. If you were designing a program to reduce inappropriate antibiotic use, what behaviors would you most want to change?
Step One: Know the context

Question: Is antibiotic resistance a problem?
Antibiotic Prescribing Rates across 31 U.S. Nursing Homes

The Average: Nursing Home Resident
- 4.6 antibiotic prescriptions per year
- 1 prescription every 80 days
- On antibiotics 10% of the time
Reasons Antibiotics Are Prescribed

Presumed Urinary Infection

Presumed Skin and Soft Tissue Infection

Respiratory Infection

Other Infection

The most common “other” infection is C. difficile

14% 14% 30% 42%
Clostridium Difficile: an Indicator of Antibiotic Overuse

**IMPACT**

- Caused close to half a million illnesses in one year.
- Comes back at least once in about 1 in 5 patients who get *C. difficile*.
- 1 in 11 people 65 and older died within a month of *C. difficile* infection diagnosis.

**RISK**

- People on antibiotics are 7-10 times more likely to get *C. difficile* while on the drugs and during the month after.
- Being in healthcare settings, especially hospitals or nursing homes.
- More than 80% of *C. difficile* deaths occurred in people 65 and older.
Resistant Bacteria Galore

Results of skin, airway, skin and wound cultures in 82 residents of a Michigan nursing home

% of Nursing Home Residents with Positive Culture

- MRSA: 63%
- CR-GNR: 72%
- VRE: 18%

J Clin Micro 50(5); 1698-1703, 2012.
The NEW NURSING HOME MANDATE

**JULY, 2015:** CMS proposed to require long-term care facilities to have an **antibiotic stewardship** program.

**SEPTEMBER, 2015:** CDC identified core elements of antibiotic stewardship.

**CMS 2016-17 ACTION PLAN:** developing and pilot test a worksheet for surveyors to "assess the new antibiotic stewardship requirement."

**Implementation will include a key role for infection control nurses**
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
Existing Regulations Promoting Antibiotic Stewardship

**Federal Tag 441: Infection Control**
Mentions performing antibiotic review

**Federal Tag 329: Unnecessary Drugs**
To optimize medication use and monitoring to appropriately minimize exposure and prevent consequences

**Federal Tag 332/333: Medication Errors**
To reduce preventable errors and adverse events

**Federal Tag 428: Drug Regimen Review**
Outlines role of pharmacist in scheduled reviews of medication use in high risk residents
Yes, This is a policy change

Prescribing antibiotics “just in case” was accepted in the past, but now antibiotics should be given after careful, evidence-based consideration of risks and benefits.

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

1. Is antibiotic resistance a problem in your nursing home? If so, how do you know?

2. Are Antibiotics overused in your nursing home? If so, why and how does this happen?

3. If you were designing a program to reduce inappropriate antibiotic use, what behaviors would you most want to change?
Step Two: Understanding the Problem

Question: Why and how does antibiotic overuse happen in nursing homes?
How are antibiotic prescribing decisions made?

Factors Influencing Antibiotic Prescribing Decisions

Clinical Situation

Nursing Homes and Staff

Patients and Families

Health Care Providers

Prescribing Decision
The Web of Decision-Making

Nurse

Provider

Supervisor

Family

Every time mother [Does X] she needs antibiotics

Probably the urine. Needs an antibiotic.
Situations Leading to Antibiotic Overuse

1. Urinary
   - Urine appearance and odor
   - Urine test results

2. Respiratory: Cough

3. Skin
   - Wounds
   - Red and swollen legs

4. Nonspecific symptoms

5. Emergency departments and hospitals

6. Empirical antibiotic choice and duration
People are predictably irrational. The basic wiring of our brains makes us return to the same mistakes again and again. This work has been enunciated by Kahneman and Tversky, Dan Ariely, and others. People are susceptible to natural decision-making bias and the use of heuristics, through a dual process of decision-making.

How do people make decisions?
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?
Colonization versus Infection:
Why the Difference is Important in Nursing Home Care

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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 Causes Changes in Urine Color or Odor?

- Diet
- Medications
- Dehydration
- Bacteria in urine
  - If person is not sick, it’s asymptomatic bacteriuria
Yes, Bacteria Are Often Normal in the Bladder of Older Persons

Changes in:
- Anatomy
- Hormones
- Immunity
- Personal hygiene

Asymptomatic Bacteriuria

Leaving the situation alone does NOT increase risk of illness, hospitalization, or death.....but antibiotic treatment DOES.
How Common is Asymptomatic Bacteriuria?

- Diabetic Adults: Up to 30%
- Community Elderly: Up to 50%
- LTC Elderly: Up to 75%
- Indwelling Catheter: Nearly 100%

What should you do for Mrs. Jenkins?

Should you get a urine culture ‘just in case’?
Ordering a Urine Culture: A “Gateway” to Overprescribing? - results of 254 randomly sampled cultures from 31 nursing homes -

### Antibiotic Prescribing Decision when the Culture was Ordered

- **No antibiotic**
  - 179 cases (70%)
  - **Neg = 68**
  - **Pos = 111**
  - 17 (25%) were prescribed antibiotic
  - 99 (89%) were prescribed antibiotic
  - 2 (10%) stopped and 19 (90%) continued or changed antibiotic

- **Antibiotic**
  - 75 cases (30%)
  - **Neg = 21**
  - **Pos = 54**
  - 0 (0%) stopped and 54 (100%) continued or changed antibiotic

### Received Full Antibiotic Course

- 17
- 99
- 19
- 54

**Bottom Line:** 189 (74%) received a course of antibiotics, although 86% had a temperature less than 99°F, 74% lacked documentation of any urinary tract-specific signs or symptoms, and only 18% met the modified McGeer criteria for urinary tract infection. Why?
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
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?
# Common Respiratory Infections

<table>
<thead>
<tr>
<th>Infection Type</th>
<th>Common Cause</th>
<th>Common Symptoms</th>
<th>Distinguishing Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Cold</td>
<td>Virus</td>
<td>Nasal congestion/sneezing</td>
<td>Nasal symptoms</td>
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<tr>
<td></td>
<td></td>
<td>Sore throat</td>
<td>Normal vitals (+/- fever)</td>
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<tr>
<td></td>
<td></td>
<td><strong>Dry cough</strong></td>
<td>Unchanged lung exam</td>
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<td></td>
<td></td>
<td>+/-fever</td>
<td></td>
</tr>
<tr>
<td>Acute bronchitis</td>
<td>Virus</td>
<td><strong>Cough (+/- sputum)</strong></td>
<td>Normal chest X-ray</td>
</tr>
<tr>
<td></td>
<td></td>
<td>+/-Fever</td>
<td>Normal vitals (+/- fever)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Bacteria or Virus</td>
<td><strong>Cough (+ sputum)</strong></td>
<td>Abnormal vital signs</td>
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<tr>
<td></td>
<td></td>
<td>Pleuritic chest pain</td>
<td>Abnormal lung exam</td>
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<tr>
<td></td>
<td></td>
<td>Fever</td>
<td>Infiltrate on chest X-ray</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mental status changes</td>
</tr>
<tr>
<td>Influenza-like illness</td>
<td>Virus</td>
<td>Sore throat</td>
<td>Chills</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Dry cough</strong></td>
<td>Body aches</td>
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<tr>
<td></td>
<td></td>
<td>Fever</td>
<td>Malaise</td>
</tr>
<tr>
<td>COPD exacerbation</td>
<td>Virus or bacterial</td>
<td><strong>Cough (+/- sputum)</strong></td>
<td>Normal chest X-ray</td>
</tr>
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<td>+/-Fever</td>
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</tr>
</tbody>
</table>
Why the Act of Ordering a Chest X-Ray Usually Leads to an Antibiotic
- results of 226 randomly sampled X-Rays from 31 NHs -

**Radiologist Report**

- No mention of infiltrate or pneumonia or Atelectasis (42%)
- Atelectasis (10%)
- Ambiguous possibility of infiltrate or pneumonia (18%)
- Probably or definite pneumonia (30%)

**ABX Rx Rate**

- 31%
- 45%
- 71%
- 78%
Skin Case- wound

Does this need antibiotics? One week later
Skin Case- Lower Extremity Edema

Does this need antibiotics?  Two weeks later
Ms. 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

Ms. 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
- Divorced, alone this weekend
- Low energy; not hungry
- Doesn’t want to deal with people
- Doesn’t want to get dressed
What You Might Think About 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 Thinks 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?
Oh no! She’s been possessed by satan!

Nope. Worse. It’s a urine infection. I’ll write her a script for antibiotics.
The Big Seven: Common Reasons for Nonspecific Symptoms in Ms. White

• 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”
Recommendations for Practice: Sepsis Detection Program

1. If status change → document vital signs at least 2x / day
2. Apply two screens to vital signs:
   - 100-100-100
   - Temperature ≥99.0°F
3. If either screen is positive:
   - urgent in-person or virtual visit with medical provider
   - rapid diagnostic testing – e.g., WBC, blood culture, serum lactate and possibly serum calcitonin; others per symptoms
   - begin scheduled vital sign recordings every four hours
Over Half of C Diff Infections in NHs Occur within a Month Post-Hospital Discharge

Pawar et al, ICDHE 2012; 33:1107-12
Options Available to Reduce C Diff Post Hospitalization

1. Reduce Antibiotic Burden
   – Re-evaluate need for antibiotics in the first place
   – Re-evaluate duration of antibiotic treatment
   – Re-evaluate choice of antibiotic
Which Antibiotics Pose the Highest Risk of *Clostridium difficile*?

![Graph showing antibiotic risk index and odds ratio](image-url)

Wenisch et al. *Antimicrob Ag Chemother* 2014; 58(9): 5079-83
Reducing Antibiotic Overuse Works: Impact of fluoroquinolone restriction on rates of *C. difficile* infection in a Community Hospital

# Antibiotic Choice and Duration Case

- 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>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Escherichia Coli (44%)</td>
</tr>
<tr>
<td>Ciprofloxacin (26%)</td>
<td>57%</td>
</tr>
<tr>
<td>TMP-SMX (16%)</td>
<td>42%</td>
</tr>
<tr>
<td>Nitrofurantoin (12%)</td>
<td>4%</td>
</tr>
<tr>
<td>Ceftriaxone (11%)</td>
<td>17%</td>
</tr>
<tr>
<td>Levofloxacin (7%)</td>
<td>58%</td>
</tr>
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**Recommended Duration of Antibiotic Therapy**  (non-hospitalized patients)

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<tr>
<th>Type of infection</th>
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<tr>
<td>Simple UTI (cystitis)</td>
<td>3 days (^1)</td>
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<td>3 days</td>
<td></td>
</tr>
<tr>
<td>COPD exacerbation</td>
<td>3-10 days (^2)</td>
<td>--</td>
<td>3-5 days</td>
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<tr>
<td>Pneumonia without sepsis</td>
<td>Until afebrile for 3d</td>
<td>(\geq5) days (^4)</td>
<td>(\geq5) days</td>
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<tr>
<td>Cellulitis (lower extremity)</td>
<td>10 days (^3)</td>
<td>5 days</td>
<td>5-7 days</td>
<td></td>
</tr>
</tbody>
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\(^1\) 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);’ non-ambulatory treat as HCAP; assess using score for severity
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<td>7.5 days</td>
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<td>COPD exacerbation</td>
<td>3-10 days $^2$</td>
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<td>3-5 days</td>
<td>7.8 days</td>
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<td>Cellulitis (lower extremity)</td>
<td>10 days $^3$</td>
<td>5 days</td>
<td>5-7 days</td>
<td>9.6 days</td>
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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);’ non-ambulatory treat as HCAP; assess using score for severity
Options Available to Reduce C Diff Post Hospitalization

1. 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”

Infection Control Is Important!!!
- Preventing C Diff Infection and Spread-

**SPREAD**
- Touching unclean surfaces, especially those in healthcare settings, contaminated with feces from an infected person.
- Dirty hands.
- Failing to notify other healthcare facilities when patients with *C. difficile* transfer from one facility to another.

**PREVENT**
- Improve prescribing of antibiotics.
- Use best tests for accurate results to prevent spread.
- Rapidly identify and isolate patients with *C. difficile*.
- Wear gloves and gowns when treating patient with *C. difficile*. Remember that hand sanitizer doesn’t kill *C. difficile*.
- Clean room surfaces with EPA-approved, spore-killing disinfectant (such as bleach), where *C. difficile* patients are treated.

[Source](http://www.cdc.gov/HAI/organisms/cdiff/Cdiff_infect.html)
[Website](http://www.cdc.gov/media)
Situations Leading to Antibiotic Overuse

1. Urinary
   - Urine appearance and odor
   - Urine test results
2. Respiratory: Cough
3. Skin
   - Wounds
   - Red and swollen legs
4. Nonspecific symptoms
5. Emergency departments and hospitals
6. Empirical antibiotic choice and duration
Questions

1. Is antibiotic resistance a problem in your nursing home? If so, how do you know?

2. Are Antibiotics overused in your nursing home? If so, why and how does this happen?

3. If you were designing a program to reduce inappropriate antibiotic use, what behaviors would you most want to change?
Step Three: Developing an Antibiotic Stewardship Program in Your Nursing Home
Antibiotic Stewardship Works ....sometimes
What Would YOU Prioritize?

1. Urinary
   - Urine appearance and odor
   - Urine test results
2. Respiratory: Cough
3. Skin
   - Wounds
   - Red and swollen legs
4. Nonspecific symptoms
5. Emergency departments and hospitals
6. Empirical antibiotic choice and duration
The CDC’s Seven Key Elements of Antibiotic Stewardship
CDC’s Core Elements of Antibiotic Stewardship in Nursing Homes
#1. Leadership Commitment

- Identify an antibiotic stewardship leadership team, including an infection preventionist (a.k.a. infection control nurse or infection specialist) and provide time
- Communicate expectations to medical and nursing staff
- Create a culture of antibiotic stewardship
- Agree to incorporate antibiotic stewardship into facility Quality Assurance and Performance Improvement goals, monitoring, and reporting
### The Challenge of Leadership Turnover

<table>
<thead>
<tr>
<th>Position</th>
<th>Turnover Rate</th>
</tr>
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<tbody>
<tr>
<td>Administrator</td>
<td>25%</td>
</tr>
<tr>
<td>Director of Nursing</td>
<td>54%</td>
</tr>
<tr>
<td>Infection Control Nurse</td>
<td>57%</td>
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</tbody>
</table>

One year turnover rate in NC Nursing Homes:
Create an Antibiotic Stewardship Team and Make them Accountable

- Medical Director
- Infection Preventionist
- Director of Nursing
- Consultant Pharmacist
- Laboratory
- ID Consultant
The Consultant Pharmacist Can Be Your Friend

- Pharmacists are increasingly aware of antibiotic stewardship issues
- Work with consultant pharmacist with infectious disease or antibiotic stewardship training
- Also ally yourself with programs and experts in hospitals or medical centers
# 2. Gather and Report Data

**Suggested QAPI Measures**

- Antibiotic prescriptions / 1,000 resident-days
- Percent of time on antibiotics per resident
- 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 or chest xrays per 1,000 resident-days
# Infection Tracking Excel Spreadsheets

**UNC Antibiotic Stewardship Start-Up Package**

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## Facility-Level Indicators Worksheet 2017

**2017**

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<tbody>
<tr>
<td>Number of residents treated for c. difficile</td>
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<td>Number of resident treated for MRSA</td>
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<td>Number of residents hospitalized overnight</td>
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<td>Of these hospitalizations, the number that were readmissions within 30 days</td>
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</table>

### Rates per 1,000 resident days

<table>
<thead>
<tr>
<th>All Advs</th>
<th>Urine</th>
<th>Respiratory</th>
<th>Skin</th>
<th>Other</th>
<th>Hospital</th>
<th>Readmit</th>
</tr>
</thead>
<tbody>
<tr>
<td>January - March</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
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<tr>
<td>April - June</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
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<td>July - September</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
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<td>October - December</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
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<tr>
<td>Overall (Year 2017)</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
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<td>No Data</td>
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### Rates per 10,000 resident days

<table>
<thead>
<tr>
<th>All Advs</th>
<th>Urine</th>
<th>Respiratory</th>
<th>Skin</th>
<th>Other</th>
<th>Hospital</th>
<th>Readmit</th>
</tr>
</thead>
<tbody>
<tr>
<td>January - March</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>April - June</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>July - September</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
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</tr>
<tr>
<td>October - December</td>
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<td>No Data</td>
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</tr>
<tr>
<td>Overall (Year 2017)</td>
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<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
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</tbody>
</table>

### Antibiotic Prescription Duration (Median Days)

<table>
<thead>
<tr>
<th>All Advs</th>
<th>Urine</th>
<th>Respiratory</th>
<th>Skin</th>
<th>Other</th>
<th>Hospital</th>
<th>Readmit</th>
</tr>
</thead>
<tbody>
<tr>
<td>January - March</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>April - June</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
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<td>No Data</td>
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<tr>
<td>July - September</td>
<td>No Data</td>
<td>No Data</td>
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<tr>
<td>October - December</td>
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<td>Overall (Year 2017)</td>
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<td>No Data</td>
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<td>No Data</td>
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</tr>
</tbody>
</table>

---

**Percentage of Antibiotic Prescriptions (2017)**

- Infection Management
- C. difficile
- MRSA

**Location of Prescription (2017)**

- Infection Management
- Hospital
- ED
- Medical Office

**Quarterly Trends (2017)**

- Rate per 1,000 resident days
- Rate per 10,000 resident days

---

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### Antibiotic Prescribing Portion of Infection Tracking Spreadsheets

#### Monthly systemic antibiotic list - January 2017

<table>
<thead>
<tr>
<th>Start Date</th>
<th>Name of Antibiotic</th>
<th>Duration (Days)</th>
<th>Resident Name</th>
<th>Room #</th>
<th>Reason Antibiotic was Prescribed</th>
<th>If other, please state specific diagnosis</th>
<th>Where prescribed</th>
<th>Prescriber’s Last Name</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
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## Infection Tracking Excel Spreadsheets

### UNC Antibiotic Stewardship Start-Up Package

<table>
<thead>
<tr>
<th>Nursing Home:</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of residents</td>
<td></td>
</tr>
<tr>
<td>Average census for short-stay</td>
<td>0</td>
</tr>
<tr>
<td>Average census for long-stay</td>
<td>76</td>
</tr>
<tr>
<td>Number of urine cultures</td>
<td>5</td>
</tr>
<tr>
<td>Number of residents treated for c. difficile</td>
<td>0</td>
</tr>
<tr>
<td>Number of resident treated for MRSA</td>
<td>1</td>
</tr>
<tr>
<td>Number of residents hospitalized overnight</td>
<td>5</td>
</tr>
<tr>
<td>Of these hospitalizations, the number that were readmissions within 30 days</td>
<td>1</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Enter Antibiotics for Jan</th>
<th>Enter Antibiotics for Feb</th>
<th>Enter Antibiotics for March</th>
<th>Enter Antibiotics for April</th>
<th>Enter Antibiotics for May</th>
<th>Enter Antibiotics for June</th>
<th>Enter Antibiotics for July</th>
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</thead>
<tbody>
<tr>
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</tbody>
</table>
## Monthly systemic antibiotic list - March 2017

<table>
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<tr>
<th>Start Date</th>
<th>Name of Antibiotic</th>
<th>Duration (Days)</th>
<th>Resident Name</th>
<th>Room #</th>
<th>Reason Antibiotic was Prescribed</th>
<th>If other, please state specific diagnosis</th>
<th>Where prescribed</th>
<th>Prescriber’s Last Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/6/2017</td>
<td>ciprofloxacin</td>
<td>7</td>
<td></td>
<td></td>
<td>Urinary</td>
<td></td>
<td>Nursing Home</td>
<td>Smith</td>
</tr>
<tr>
<td>3/6/2017</td>
<td>levofloxacin</td>
<td>7</td>
<td></td>
<td></td>
<td>Respiratory</td>
<td></td>
<td>Nursing Home</td>
<td>Smith</td>
</tr>
<tr>
<td>3/6/2017</td>
<td>Rocephin</td>
<td>7</td>
<td></td>
<td></td>
<td>Respiratory</td>
<td></td>
<td>Nursing Home</td>
<td>Smith</td>
</tr>
<tr>
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<td>Other</td>
<td>Elevated WBCs</td>
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<td>Smith</td>
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<td></td>
<td>Urinary</td>
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<td>Nursing Home</td>
<td>Jones</td>
</tr>
<tr>
<td>3/16/2017</td>
<td>doxycycline</td>
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<td></td>
<td></td>
<td>Respiratory</td>
<td></td>
<td>Nursing Home</td>
<td>Smith</td>
</tr>
<tr>
<td>3/17/2017</td>
<td>doxycycline</td>
<td>7</td>
<td>Respiratory</td>
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<td></td>
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<td>Nursing Home</td>
<td>Smith</td>
</tr>
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<td>3/20/2017</td>
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<td>Jones</td>
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<td>3/21/2017</td>
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<td>Hospital</td>
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<td>3/21/2017</td>
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<td></td>
<td>Hospital</td>
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</tr>
<tr>
<td>3/22/2017</td>
<td>doxycycline</td>
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<td>Respiratory</td>
<td></td>
<td></td>
<td></td>
<td>Nursing Home</td>
<td>Smith</td>
</tr>
<tr>
<td>3/22/2017</td>
<td>aztreonam</td>
<td>7</td>
<td>Skin</td>
<td></td>
<td></td>
<td></td>
<td>Nursing Home</td>
<td>Johnson</td>
</tr>
<tr>
<td>3/23/2017</td>
<td>clindamycin</td>
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<td>Respiratory</td>
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<td></td>
<td>Hospital</td>
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</tr>
<tr>
<td>3/24/2017</td>
<td>cefdinir</td>
<td>7</td>
<td>Respiratory</td>
<td></td>
<td></td>
<td></td>
<td>Hospital</td>
<td></td>
</tr>
<tr>
<td>3/24/2017</td>
<td>doxycycline</td>
<td>7</td>
<td>Respiratory</td>
<td></td>
<td></td>
<td></td>
<td>Nursing Home</td>
<td>Smith</td>
</tr>
<tr>
<td>3/24/2017</td>
<td>levofloxacin</td>
<td>5</td>
<td>Respiratory</td>
<td></td>
<td></td>
<td></td>
<td>Nursing Home</td>
<td>Jones</td>
</tr>
<tr>
<td>3/27/2017</td>
<td>cefdinir</td>
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<td>Urinary</td>
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<td>3/28/2017</td>
<td>Rocephin</td>
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<td>Urinary</td>
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<td></td>
<td>Nursing Home</td>
<td>Smith</td>
</tr>
<tr>
<td>3/31/2017</td>
<td>ciprofloxacin</td>
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<td>Urinary</td>
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<td></td>
<td>Nursing Home</td>
<td>Smith</td>
</tr>
<tr>
<td>3/31/2017</td>
<td>Rocephin</td>
<td>4</td>
<td>Urinary</td>
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<td>Hospital</td>
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</tbody>
</table>
### Facility-Level Indicators Worksheet 2017

#### Infection Tracking Excel Spreadsheets

**UNC Antibiotic Stewardship Start-Up Package**

<table>
<thead>
<tr>
<th>Nursing Home:</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Residents</td>
<td>123</td>
</tr>
<tr>
<td>Average census for short-stay</td>
<td>76</td>
</tr>
<tr>
<td>Average census for long-stay</td>
<td>77</td>
</tr>
<tr>
<td>Number of urine cultures</td>
<td>5</td>
</tr>
<tr>
<td>Number of residents treated for c. difficile</td>
<td>1</td>
</tr>
<tr>
<td>Number of residents treated for MRSA</td>
<td>0</td>
</tr>
<tr>
<td>Of those hospitalizations, the number that were readmissions within 30 days</td>
<td>1</td>
</tr>
</tbody>
</table>

### Rates per 1,000 resident days

<table>
<thead>
<tr>
<th>All ARIs</th>
<th>Urine</th>
<th>Respiratory</th>
<th>Skin</th>
<th>Other</th>
<th>Hospital</th>
<th>Readmit</th>
</tr>
</thead>
<tbody>
<tr>
<td>January - March</td>
<td>6.88</td>
<td>2.39</td>
<td>3.74</td>
<td>0.45</td>
<td>0.15</td>
<td>1.60</td>
</tr>
<tr>
<td>April - June</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>July-September</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>October - December</td>
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<tr>
<td>Overall (Year 2017)</td>
<td>6.88</td>
<td>2.39</td>
<td>3.74</td>
<td>0.45</td>
<td>0.00</td>
<td>1.69</td>
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</tbody>
</table>

### Rates per 10,000 resident days

<table>
<thead>
<tr>
<th>C. Difficile</th>
<th>MRSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan-Mar</td>
<td>1.50</td>
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<tr>
<td>Apr-Jun</td>
<td>No Data</td>
</tr>
<tr>
<td>Jul-Sept</td>
<td>No Data</td>
</tr>
<tr>
<td>Oct-Dec</td>
<td>No Data</td>
</tr>
<tr>
<td>Overall</td>
<td>1.50</td>
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</table>

### Antibiotic Prescription Duration (Median Days)

<table>
<thead>
<tr>
<th>All ARIs</th>
<th>Urine</th>
<th>Respiratory</th>
<th>Skin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan-Mar</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Apr-Jun</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Jul-Sept</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Oct-Dec</td>
<td>No Data</td>
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</tr>
<tr>
<td>Overall</td>
<td>7</td>
<td>7</td>
<td>7</td>
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</tbody>
</table>

### Quarterly Trends (2017)

- **Rate per 1,000 resident days**
- **Rate per 10,000 resident days**

- **Location of Prescription (2017)**
- **Percentage of Antibiotic Prescriptions (2017)**
  - 2% Urine
  - 35% Respiratory
  - 6% Skin
  - 5% Other
  - 87% Nursing Home
  - 4% Hospital
  - 7% ED
  - 1% Medical office
### Facility-Level Indicators Worksheet 2017

#### Nursing Home: 2017

<table>
<thead>
<tr>
<th>Number of residents</th>
<th>17-Jan</th>
<th>17-Feb</th>
<th>17-Mar</th>
<th>17-Apr</th>
<th>17-May</th>
<th>17-Jun</th>
<th>17-Jul</th>
<th>17-Aug</th>
<th>17-Sep</th>
<th>17-Oct</th>
<th>17-Nov</th>
<th>17-Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average census for short-stay</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Average census for long-stay</td>
<td>76</td>
<td>77</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>76</td>
<td>76</td>
<td>76</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>76</td>
</tr>
<tr>
<td>Number of urine cultures</td>
<td>5</td>
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<td>6</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>3</td>
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<tr>
<td>Number of residents treated for c. difficile</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Number of residents treated for MRSA</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Number of residents hospitalized overnight</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Of those hospitalizations, the number that were readmissions within 30 days</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>3</td>
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<td>3</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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</tbody>
</table>

#### Rates per 1,000 resident days

<table>
<thead>
<tr>
<th>Category</th>
<th>All ABXs</th>
<th>Urine</th>
<th>Respiratory</th>
<th>Skin</th>
<th>Other</th>
<th>Hospital</th>
<th>Readmit</th>
</tr>
</thead>
<tbody>
<tr>
<td>January - March</td>
<td>6.88</td>
<td>2.39</td>
<td>3.74</td>
<td>0.45</td>
<td>0.15</td>
<td>1.65</td>
<td>0.15</td>
</tr>
<tr>
<td>April - June</td>
<td>4.26</td>
<td>1.12</td>
<td>0.90</td>
<td>1.12</td>
<td>0.90</td>
<td>0.90</td>
<td>0.90</td>
</tr>
<tr>
<td>July - September</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>October - December</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Overall (Year 2017)</td>
<td>5.84</td>
<td>1.89</td>
<td>2.60</td>
<td>0.72</td>
<td>0.54</td>
<td>1.35</td>
<td>0.45</td>
</tr>
</tbody>
</table>

#### Rates per 10,000 resident days

<table>
<thead>
<tr>
<th>Category</th>
<th>C Difficile</th>
<th>MRSA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan-Mar</td>
<td>0.00</td>
<td>1.50</td>
</tr>
<tr>
<td>Apr-Jun</td>
<td>2.24</td>
<td>0.00</td>
</tr>
<tr>
<td>Jul-Sep</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Oct-Dec</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Overall</td>
<td>0.90</td>
<td>0.90</td>
</tr>
</tbody>
</table>

#### Antibiotic Prescription Duration (Median Days)

<table>
<thead>
<tr>
<th>Category</th>
<th>All ABXs</th>
<th>Urine</th>
<th>Respiratory</th>
<th>Skin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan-Mar</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>10</td>
</tr>
<tr>
<td>Apr-Jun</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Jul-Sep</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Oct-Dec</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
<td>No Data</td>
</tr>
<tr>
<td>Overall</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>7</td>
</tr>
</tbody>
</table>

#### Quarterly Trends (2017)

- **Rate per 1,000 resident days**
  - All ABXs
  - Urine
  - Respiratory
  - Skin
  - Other
  - Hospital
  - Readmit

- **Quarterly Trends (2017)**
  - C Difficile
  - MRSA

- **Percentage of Antibiotic Prescriptions (2017)**
  - Urine: 12%
  - Respiratory: 32%
  - Skin: 32%
  - Other: 45%

- **Location of Prescription (2017)**
  - Hospital: 32%
  - ED: 12%
  - Medical Office: 85%

- **Quarterly Trends**
  - January - March
  - April - June
  - July - September
  - October - December
Create an Antibiotic Stewardship Team and Make them Accountable

Medical Director

Infection Preventionist

Director of Nursing

Consultant Pharmacist

Laboratory

ID Consultant
#3 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 has published 2-page template
Take Action!!

• Create policies to improve antibiotic prescribing and use
  – Require prescribers to document a dose, duration, and indication for all antibiotic prescriptions
  – Develop algorithms for assessing, testing and treating infected residents
• Implement practices to improve antibiotic use
  – Standardize assessment and communication tool for potentially infected residents
  – Standardize process for communication of antibiotic use information during transfers
  – Develop antibiograms
  – Take an antibiotic “time out”
Special Article

Template for an Antibiotic Stewardship Policy for Post-Acute and Long-Term Care Settings

Robin L.P. Jump MD, PhD, Swati Gaur MD, MBA, CMD, Morgan J. Katz MD, Christopher J. Crnich MD, PhD, Ghinwa Dumyati MD, Muhammad S. Ashraf MBBS, Elizabeth Frentzel MPH, Steven J. Schweon RN, MPH, MSN, CIC, HEM, Philip Sloane MD, MPH, David Nace MD, MPH, CMD on behalf of the Infection Advisory Committee for AMDA—The Society of Post-Acute and Long-Term Care Medicine
Approaches That Are More Difficult to Implement

• Communication guidelines for nursing staff around suspected infections – SBAR; protocols (e.g., asking for photos of skin problems)
• Antibiotic initiation protocols
• Infection Control Nurse leadership role (“infection preventionist”)
• Antibiograms

- CRITICAL ROLE OF LEADERSHIP CANNOT BE OVEREMPHASIZED -
Improving Care Processes:
Approaches That Work

• Guidelines for urine testing, including what to do when cultures come back
• Pharmacist involvement in evaluating antibiotic starts and/or antibiotic duration
• Excel spreadsheet to chart antibiotic use – and regularly publicizing statistics

- CRITICAL ROLE OF LEADERSHIP CANNOT BE OVEREMPHASIZED -
Enhanced Decision Making Techniques:

- Use a structured evaluation and know prescribing criteria: SBAR, etc.
- Watchful waiting and periodic re-evaluation (once cultures result): de-prescribe
- Use first line agents: TMP/SMX, Nitrofurantoin, Fosfomycin, or pivmecillinam (and NOT fluoroquinolones)
- Only prescribe for 3-5 days

Respiratory Tract Infections

Enhanced Decision Making Techniques:

• Use a structured evaluation and know when to prescribe and when not to:
  – a head cold or chest cold do not need antibiotics
  – COPD is best treated with steroids
  – CHF is best treated with diuretics

• Deprescribe in the face of a low-risk chest x-ray

Skin and Soft Tissue Infections

Enhanced Decision Making Techniques:

• Mark the wound and follow over time
• Treat superficial infections (e.g. impetigo, mild wound infections) with topical antibiotics
• Treat small abscesses with I&D (though recent NEJM showed benefit with oral abx treatment)

• Treat for only 5-7 days and know your antibiogram: consider Cephalexin or Penicillin, or Clindamycin

Conclusions: Improve Your Decision-Making

• Know the evidence-based signs and symptoms of infections: Fever is 1.2°F above baseline (usually around 99 °F -99.5 °F)
• Consider all possible diagnoses and treatments
• Use watchful waiting and re-evaluation
• Prescribe first-line agents and the lowest appropriate duration

Suggested Policies and Procedures

• Improved communication with providers – SBAR; protocols; photos of skin problems
• Improved decision-making – algorithms; standing orders
• Improved antibiotic selection – protocols; standing orders
• Improved use of urine culture data, including negative cultures -- protocols
#4. Education

- Clinical providers (MD, DO, NP, PA, PharmD)
- Nursing staff (RNs, LPNs, CNAs)
- Residents and families
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

Why Not Antibiotics?

Taking antibiotics when they are *not needed* is like leaving the lights on all the time...

The lights may burn out, leaving us in the dark when we need them most.

If we use antibiotics when we don’t need them, they may not work when we get sick.

Read more inside...
• 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
#5. Making the Change: Policies and Procedures
Track Processes

• Clinical assessment documentation with change of condition
• Prescribing documentation
• Adherence to facility-specific treatment recommendations
  – Staff process
  – Prescriber process
Track Outcomes

Antibiotic Prescribing
- Point prevalence surveys of antibiotic use
- New antibiotic starts/1,000 resident-days
- Antibiotic days of therapy/1,000 resident-days

Adverse Events
- Rates of *C. difficile* infections
- Rates of antibiotic-resistant organisms
- Rates of adverse drug events due to antibiotics
- Hospitalizations and Emergency Department visits for infections
Education and QI Works: 
Results from Randomized Trial
- Antibiotic Prescriptions Per 100 Resident-Days

Mar Apr May Jun Jul Aug Sep Oct Nov

Intervention Group All Indications
Comparison Group All Indications

Follow-Up =>
Baseline <=>

How did we do it?
Can You Take the Lead in Your Facility?