Antibiotic Stewardship
In Post Acute and Long-Term Care-2017

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What is Antibiotic Stewardship

• “Coordinated program that promotes the appropriate use of antimicrobials, improves patient outcomes, reduces microbial resistance, and decreases the spread of infections caused by multidrug resistant organisms” APIC

• “Refers to a set of coordinated strategies to improve the use of antimicrobial medications with the goal of enhancing patient health outcomes, reducing resistance to antibiotics, and decreasing unnecessary costs” SHEA

• “Refers to a set of commitments and actions designed to “optimize the treatment of infections while reducing the adverse events associated with antibiotic use.” CDC
Antibiotic Stewardship—Why do We Care?

Antibiotic Use In LTCFs

- 4 – 7 antibiotic courses/1000 rcd
- Account for ~ 20% - 40% of systemic meds prescribed ¹
- Point prevalence 8% ²
- 50% - 70% likelihood of antibiotic use 1 yr. ³

Antibiotic Use in Nursing Homes and Residential Care Facilities

  - 4.0-7.3 courses/1000rcds
- Prevalence
  - 47%-79% over 1 year

Van Bull LW, et al 2012 568.ei JAMDA
Benoit SR et al 2008;56:2039J Am Geriatr Society

Antibiotic Use in PA/LTC

- Up to 75% of antibiotics utilized in LTCFs may be inappropriate
- Approximately 600,000 infections caused by resistant organisms and C. difficile could be prevented with the immediate and national implementation of antibiotic stewardship and infection control interventions.

Antibiotic Use in Long-Term Care

- 79% of residents exposed to $\geq$ 1 course in 12 months\(^1\)
- 50% of antibiotics are administered for unknown indications\(^2\)
- Majority are prescribed for urinary tract and respiratory infections\(^3\)


Antibiotic Use by Site of Infection

- Urinary Tract Infections (UTI)
  - 35%-65%
- Respiratory Tract Infections (RTI)
  - 15%-35%
- Skin and Soft Tissue Infections (SSTI)
  - 10%-20%

Risks of Inappropriate Antibiotic Use

- Adverse effects
  - Altered renal and liver function
  - Multidrug interactions
- Antibiotic resistant organisms
  - Colonization
  - Infection
- C. difficile infection
- High health care pharmacy costs
- Increases hospital readmissions
  - Infections with MDROs

Antibiotic Resistant Organisms in PA/LTC

- MRSA
- VRE
- MDR gram negative organisms
  - ESBL producing gram negatives
  - CRE
Prevalence of Antibiotic Resistant Organisms in Nursing Facilities

• 43% patients have at least one MDRO\textsuperscript{1}
• 11%-59% MRSA prevalence\textsuperscript{2}
• 39% patients acquire MDRO during a 1 year stay\textsuperscript{3}

\textsuperscript{1}Trick WE 2001; 49:270 J Am Geriatr Soc
\textsuperscript{2}Van Bull LW, et al 2012 568.e1 JAMDA
\textsuperscript{3}O’Fallon E et al 2010;31:1148 Infect Control Hosp Epidemiol

Infections with MDROs

• Increases poor outcomes
  • Morbidity and mortality
• Increases hospital readmissions
• Increases costs
  • Hospital readmission
  • Infection control enforcement
  • Antibiotic costs
• Reduced quality of life

O’Fallon E et al 2010;31:1148 Infect Control Hosp Epidemiol
Reducing Antibiotic Resistance in PA/LTC

- Infection Control Program
  - Prevents cross transmission of MDROs
  - Reduces incidence of infections
  - Reduces antibiotic use
  - Dedicated Infection Control leader
  - Education
  - Compliance

- Antibiotic Stewardship

  AMDA Common Infections in the LTC Setting Clinical Practice

Inappropriate Antibiotic Use in PA/LTC

- Treatment of microbial colonization
- Off site prescribing of antibiotics
- Inconsistent on site practitioner availability
- Incomplete clinical assessments
- Failure to recognize true clinical signs and symptoms of infection in elderly
- Practitioners often prescribe broad spectrum agents
Barriers to Appropriate Use of Antibiotics
Resident and Facility Issues

• Multiple co-morbidities
• Cognitive impairment
• Atypical presentation
• Diagnostic resources are limited
• Specimen collection is limited
• Empiric use of antibiotics is common
  • Appropriate diagnosis
  • Appropriate agent
  • Appropriate duration

Core Elements of Antibiotic Stewardship

CDC-2015
Six Core Elements

1. Leadership commitment
2. Accountability
3. Drug expertise
4. Action
5. Tracking
6. Reporting
7. Education

Develop an Antibiotic Stewardship Program

• No standard benchmarks exist
• Establish Facility benchmark if possible
• Guidelines for prescribing
  • Use evidence based guidelines
  • Commit guidelines to writing
  • Educate nursing staff and prescribers
• Establish reasonable expectations and goals
  • Seek improvement in performance
• Involve and empower the ICP
• Consider focusing on UTI prescribing patterns
Barriers to Antibiotic Stewardship

- Physician preferences
  - Variation in physician expertise
- Variation in infection prevention expertise
  - Variation in surveillance activity
- Variation in monitoring antibiotic use
  - Clinical guidelines
  - Education
    - Physician
    - Staff

Metrics

- # Antibiotic courses of therapy
  - # new antibiotic prescriptions after admission
    - # new prescriptions that met criteria for infection
      - % that met criteria
- Total antibiotic days of treatment
  - Average duration
  - Urine cultures ordered
- Residents with Facility Acquired Infections (Nosocomial)
  - UTI-LRI-SST
- Residents with MDROs- (CA/FA)
  - MRSA-ESBL-VRE-CRE-C. difficile (CA & FA)
Effectiveness of Antibiotic Stewardship Programs

- No standardization
  - Program components
  - Implementation strategies
  - Tracking methods or results
- Results vary
  - UTI>Pneumonia>SSTI
- Best results
  - Asymptomatic bacteruria
  - Symptomatic UTI

Lindsay E Nicolle Antimicrobial Resistance and Infection Control 2014;3:6

Interventions for Antibiotic Use in PA/LTC

- UTI
  - Efforts to improve antimicrobial use for presumed UTI may be successful
- LRTI/pneumonia
  - Data on optimizing antibiotic use less convincing
- SSTI
  - Data also not convincing
Antibiotic Stewardship Program

• Start Slow
• Start Somewhere
• Focus Plan and Process

The Many Faces of UTI

- Complicated UTI
- CAUTI
- Cystitis
- Asymptomatic Bacteruria
- Misdiagnosis
Asymptomatic Bacteriuria

- **Asymptomatic bacteriuria** - isolation of a specified quantitative count ($\geq 10^5$ cfu/ml) of bacteria in an appropriately collected urine from a person without symptoms or signs referable to infection.
  - Hemodialysis – 28%
  - Elderly females – 25%-50%
  - Elderly males – 15%-40%
  - Short term IBCs – acquire bacteriuria 2%-7%/day of catheter use

Pyuria

- **Pyuria** - elevated number of white blood cells in the urine and is evidence of an inflammatory response in the urinary tract.
- **Pyuria** accompanying asymptomatic bacteriuria is not an indication for antimicrobial treatment
  - > 95% in symptomatic UTI
  - Common in patients with asymptomatic bacteriuria
  - 90% of elderly institutionalized patients
  - 90% of hemodialysis patients
  - 35%-75% in patients with short-term catheters
  - 50%-100% in patients with long term indwelling bladder catheters
Asymptomatic Bacteriuria Treatment Outcomes

• Nursing home patients
  • No benefits of screening for or treating asymptomatic bacteriuria\(^1,2\)
    • Does not eradicate bacteriuria
    • Does not improve mortality
    • No ↓ in symptomatic infection or ↑ survival
    • No difference in genitourinary symptoms with treatment
    • ↑adverse antimicrobial reactions
    • ↑reinfection with increasingly resistant organisms

\(^1\)Nicolle LE et al CID 2005;40 (1March) 643. \(^2\)Nicolle LE et al CID 2000;31:757

Non-Catheter UTI Treatment Principles

• Urinary Tract Infections
  • Principles of treatment
    • Do not treat asymptomatic bacteruria
    • Do not culture unless clinical conditions dictate
    • Use narrow spectrum agents when possible
    • Adjust therapy based on culture results
    • Do not re-culture unless symptoms persist
UTI Antibiotic Use Intervention

• Multifaceted approach
  • Written guidelines
  • Education
  • Tracking
  • Feedback

Principles of Treatment CA-UTIs

• Avoid prolonged catheterization
• Discontinue catheter if possible
• Prophylaxis for patients with IBC is not recommended
  • Increases resistance
• If CA-UTI + catheter > 2 weeks
  • Culture prior to treatment
  • Replace catheter

Hooton TM et al. Clin Inf Diseases 2010:50;625
Facility Approach to Antibiotic Stewardship 2017

- No limit on choice of antimicrobial
- Promote understanding of the purpose of AS
- Keep the process “lazar focused”-start small
- Discuss prior benchmark data on antibiotic use
- Educate nursing staff and prescribers on approach to “when to culture” and “when to treat”
- Educate nursing staff and prescribers separately

Antibiotic Prescribing is a Process Multiple Decisions

[Diagram with decision-making processes]
Isolates from LTC Residents with UTI

- E. coli: 53.60%
- Proteus: 14.60%
- Klebsiella: 13.90%
- Providentia: 4.10%
- Enterococcus: 3.70%
- Staphylococcus: 2.60%
- Enterococcus: 0.40%
- Pseudomonas: 0.00%
- Acinetobacter: 0.00%


Urine Antibiograms 2016
Focused Antibiotic Stewardship Program
UTIs

- Pre-prescribing process

  **Do I Test?**

  **Do I Treat?**

  **How Do I Treat?**

2012 McGeer Criteria-UTI-No IBC

- Criteria 1 & 2 must be met
  - 1-At least one of the following:
    - Acute dysuria or acute pain, swelling or acute tenderness of the testes, epididymis or prostate
    - Acute CVA pain or tenderness
    - Suprapubic pain
    - Gross hematuria
    - New or marked increase in incontinence
    - New or marked increase in urgency
    - New or marked increase in frequency
    - Fever or leukocytosis – temp > 100°F; repeated temps >99°F or single temp > 2° F over baseline
      - If no then at least ≥ 2 of the above
  - 2- One of the following:
    - At least 10^6 cfu/ml of no more that 2 species of microorganisms in voided sample
    - At least 10^2 cfu/ml of any number of microorganisms in in-and-out catheter sample
2012 McGeer Criteria-UTI-IBC

• Criteria 1 & 2 must be present
  • 1-At least one of the following
    • Fever, rigors or new onset hypotension with no alternate site of infection
    • Either acute change in mental status or functional decline, with no alternate site of infection
    • New onset suprapubic pain or CVA pain or tenderness
    • Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis or prostate AND
  • 2-Urinary catheter specimen culture with at least $10^5$ cfu/ml of any organism
Post-Prescribing Process

Antibiotic Started by PCP

Yes

Schedule Post-Prescribing Review

Assemble Pertinent Data for Review

Nurse/PCP Post-Prescribing Review

Notify PCP of Antibiotic Start

Can Antibiotics be Stopped?
Can Antibiotic Spectrum be Narrowed?
Can Antibiotic Duration be Shortened?

Resident Condition
Micro Results
Other Lab Results
Duration of Antibiotic Therapy

• Traditional treatment durations
  • Poor evidence based studies
• Shorter duration may be effective and reduce certain risks associated with prolonged use
  • C. difficile
  • MDROs
  • ADRs

Duration of Antibiotic Therapy

• UTI- uncomplicated
  • 3-6 day treatment may be as effective as 10 day therapy¹
• CAP
  • ≤ 7 days treatment may be as effective as 10-14 day therapy²
• SSTI-cellulitis
  • 5 day treatment may be as effective as 10 day therapy³

¹ Lutters Cochrane Database Syst Rev 2008 Jul 16 (3):CD001535
² Dimopoulos Drugs 2008;68(13):1841
³ MAJ Hepburn 2004 Arch Intern Med 164:1669
Tracking

• Process
  • Incidence
    • # abx courses started/1000rcds
  • Antibiotic utilization Ratio
    • Total abx days/1000rcds
  • Duration of antibiotic therapy
    • Total abx days/antibiotic courses
  • Cost per Antibiotic Day
    • Total abx cost/total abx days
  • Cost per Resident Care Day
    • Total abx cost/total rcd

Mylotte 2016:672.e13-1E, JAMDA

Tracking

• Outcome
  • MDROs
  • C. difficile infections
Reporting

• Across staff continuum
  • Feed back to prescribers and stakeholders
    • Ongoing
    • “Real time”
    • By prescriber if possible
• Results of tracking efforts
  • Process
  • Outcomes
    • MDROs

Antibiotic Stewardship-Reporting

• Report results to QI team
• Report results to Prescribers
• Always seek to improve based on determined expectations
• If no improvement in performance
  • Understand why
  • Alternative approaches
• Get excited about positive results
• Share these results with all that will listen
• Use positive results to “sell” your Facility to insurers
Facility Characteristics

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<th>HCC</th>
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Antibiotic Stewardship Process

- **Before calling physician/NP or taking a V.O. for urine culture...** Please... use the appropriate AHRQ SBAR i.e. UTI, LRTI or SSTI to be sure the resident has appropriate signs and symptoms prior to culturing or initiating antibiotics.
- If criteria are not met... *Do Not Do a Culture.* Notify the physician/NP and inform him/her that criteria have not been met for culture.
- If antibiotics are initiated, please be sure the physician is aware of the facility antibiogram.
- If a covering physician or NP initiated the order for antibiotics, notify the primary the next day.
- Routine follow-up with the primary should be done 48-72 hours after initiation of antibiotics. Please have the following information available before this call:
  - Lab results
  - Culture results
  - Blood work if ordered
  - Clinical status of resident
    - Current status
      - Vital signs
      - Current clinical status
      - Response to treatment
      - How long did it take for signs & symptoms to resolve or improve?
  - Should antibiotic be changed to a narrower spectrum based on culture results?
  - Can antibiotic duration be shortened if patient responded rapidly to treatment?
- **Do not ask or accept orders for test of cure cultures!!!!** (Follow-up culture to be sure of cure) unless signs and symptoms persist.
### HCC-Results

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### AN&R-Results

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## WV-Results

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## Resources for Antibiotic Stewardship

- [www.ahrq.gov](http://www.ahrq.gov)
  - Antibiotic Stewardship Toolkit
- [www.cdc.gov/longtermcare/index.html](http://www.cdc.gov/longtermcare/index.html)
  - Core Elements of Antibiotic Stewardship for Nursing Homes
THANK YOU!

QUESTIONS?