Improving Antibiotic Prescribing in Nursing Homes through Work System Redesign

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Speaker Disclosures

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FCC1043 – Civil Monetary Penalty Fund
Learning Objectives

By the end of the session, participants will be able to:

• Identify different opportunities for affecting antibiotic utilization in nursing homes
• Identify aspects of the nursing home work system that impact antibiotic prescribing decisions
• Identify strategies to modify the nursing home work system to alter antibiotic utilization patterns
“Don’t forget to take a handful of our complimentary antibiotics on your way out.”
The White House

Office of the Press Secretary

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Executive Order -- Combating Antibiotic-Resistant Bacteria

EXECUTIVE ORDER

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COMBATING ANTIBIOTIC-RESISTANT BACTERIA

By the authority vested in me as President by the Constitution and the laws of the United States of America, I hereby order as follows:

Sec. 5. Improved Antibiotic Stewardship. (a) By the end of calendar year 2016, HHS shall review existing regulations and propose new regulations or other actions, as appropriate, that require hospitals and other inpatient healthcare delivery facilities to implement robust antibiotic stewardship programs that adhere to best practices, such as those identified by the CDC. HHS shall also take steps to encourage other healthcare facilities, such as ambulatory surgery centers and dialysis facilities, to adopt antibiotic stewardship programs.
Antimicrobial Use: NHs

Crnich et al. ID Week 2012, San Diego, CA

20% of subjects responsible for:
- 48% of antibiotic days
- 60% of antibiotic starts
Inappropriate Abx Use in NHs

“Appropriateness” of Antibiotic Use in Five Wisconsin Nursing Homes

Antibiotic Prescribing – Multiple Rather than One Decision

Do I Treat? → How Do I Treat? → Can I Refine?

What Antibiotic?
Loeb et al. *BMJ* 2005; 331(7518): 669
Zabarsky et al. *AJIC* 2008; 36(7): 476-80
AIR - AHRQ Report 2012 (# 290-2006-000-191-8)

How Long?
Naughton et al. *JAGS* 2001; 49(8): 1020-24

Can I Refine?

Jump et al. *ICHE* 2012; 48(1): 82-8
Den Hlth - AHRQ Rep 2012 (# 290-2006-000-191-20)
Fleet et al. *JAC* 2014; 69(8): 2265-73
Harm of Broad-Spectrum Abx: *Clostridium difficile*

Wenisch et al. *Antimicrob Ag Chemother* 2014; 58(9): 5079-83
Antibiotic Spectrum in NHs
Often Unnecessarily Broad

- Random chart review of a sample of all ciprofloxacin orders (100 of 323)
- 72/100 orders deemed inappropriate by implicit review
  - 23/72 due to indication
  - 49/72 due to better alternative

- Treatment initiation often delayed until culture results available (69/96 starts [72%])
- 56% of starts involved an unnecessarily broad antibiotic (e.g., FQ when TMP/SMX or NFT active)
- Duration: too short [3%] / too long [67%]
Duration of Therapy in NHs

Crnich et al. APIC Wisconsin 2015
Factors Influencing Antibiotic Decision

Zimmerman et al.
Context Influences Prescribing

Distribution of Antibiotic Use: 73 NHs in 4 U.S. States (09/2001 – 02/2002)

- Degree of variation not explained by clinical factors

- Inter-facility > Intra-facility level variation

- Contextual effects seen with other agents prescribed in NHs (i.e., anti-psychotics)
  - Hughes et al. *Drugs Aging* 2007; 24(2): 81-93

Crnich et al., *ID Week* 2012
Systems Engineering Initiative for Patient Safety (SEIPS)

Desired Process & Outcome Changes

**STRUCTURE**

Requires introduction or modification of:
1) Tasks
2) Tools
3) Internal adaptive influences (environment)

**DESIRED PROCESSES**

Delay testing & treatment of residents with low-risk CIC

Post-prescribing antibiotic optimization ("Antibiotic Timeout")

**UPSTREAM OUTCOMES**

↓ Abx Starts

↓ Abx Duration
↓ Abx Spectrum

**DOWNSTREAM OUTCOMES**

↓ C. difficile
↓ Abx Resistance
Pre-Prescribing Component

Suggested Script for Low-Risk Change-In-Condition

“According to my assessment, this resident is experiencing a low-risk change-in-condition. I would like your permission to initiate our active monitoring care plan. I would not recommend testing the urine or starting antibiotics at this time.”

R1. Diagnostic and Therapeutic Orders

- Urinalysis
- Urine Culture
- CBC w/Diff
- Chest X-Ray
- Start Antibiotic(s) for this indication: _______________________
  - Antibiotic: ________ Dose: ________ Frequency: ________ Days: ________
  - Other: __________________________
- Other orders: __________________________

R2. Monitoring and Supportive Care Orders

- Monitor vital signs every _____ hours
- Oral fluids for hydration: _____ cc _____ hr.
- IV fluids for hydration _____ cc _____ hr.
- Monitor fluid intake/urine output every _____ hours
- Notify provider if symptoms worsen or if unresolved in _____ hours / days
- Other orders: __________________________

Yes

No

Abnormal Vital Signs? (Any checked in B2)

Yes

Localizing Symptoms? (Any checked in B3)

No

Yes

Non-localizing Symptoms? (Any checked in B4)

No

Other significant findings?

Yes

Non-Low Risk CIC (R1)

Low Risk CIC (R2)
Post-Prescribing Component

- Antibiotic Started by PCP?
  - Yes → Schedule Post-Prescribing Review
  - No → Notify PCP of Antibiotic Start

- Assemble Pertinent Data for Review
  - Resident condition
  - Microbiology results
  - Other laboratory test results
  - Imaging test results

- Nurse/PCP Post-Prescribing Review
  - Can antibiotics be stopped?
  - Can antibiotic spectrum be narrowed?
  - Can antibiotic duration be shortened?

48-72 Hours
Decision-Support Tool

A. NOTIFY & SCHEDULE

B. RE-ASSESS RESIDENT

C. NURSE REVIEW

D. PROVIDER REVIEW

E. PROVIDER ORDERS

D1. Is there a non-infectious explanation for the resident's original change-in-condition?
   □ Yes □ No
   STOP THERAPY
   D2. Stopping antibiotics when risk of infection is low reduces risk of future adverse events (resistance, clostridium difficile)

D3. Is this asymptomatic bacteriuria?
   □ Yes □ No
   BROADEN THERAPY
   D4. Broaden if you feel resident has symptomatic UTI

D5. Is the urine culture positive for bacteria that are susceptible to narrower antibiotics?
   □ Yes □ No
   NARROW THERAPY **
   D6. Switching to narrow spectrum alternative will reduce risk of clostridium difficile

D7. Does this particular resident need antibiotics for more than 7 days?
   □ Yes □ No
   SHORTEN THERAPY ***
   D8. A majority of nursing home infections can be safely treated with 7 days or less of antibiotics

C1. Has the resident's change-in-condition resolved?
   □ Yes □ No
   Go to C2

C2. Is the resident being treated for UTI?
   □ Yes □ No

C3. Is the urine culture negative for bacteria?
   □ Yes □ No

C4. Is the urine culture positive for bacteria that are resistant to the antibiotic the resident is on?
   □ Yes □ No

C5. Is the resident on ciprofloxacin, levofloxacin, or moxifloxacin?
   □ Yes □ No

C6. Is the resident currently scheduled to receive more than 7 days of antibiotics?
   □ Yes □ No

C7. Is the resident being treated for UTI, bronchitis, pneumonia, or cellulitis?
   □ Yes □ No

C8. Is the resident's change-in-condition improving or resolved?
   □ Yes □ No
Audit & Feedback Components

Clinical Stand-Up (Meso-Level)
- **PERSONS:** RN Lead, NCM or DON
- **TASKS:**
  - Assess completion of frontline tasks
  - Near-time feedback to frontline staff
  - Aggregate performance for review at QAPI
- **TOOLS:**
  - Checklist integrated into 24-hour report
  - Spreadsheet mapping to 24-hour report data elements

QAPI (Macro-Level)
- **PERSONS:** MDir, DON, ICP, Admin
- **TASKS:**
  - Review process and outcome measures
  - Identify barriers to change at frontline
  - Provide resources and strategies for overcoming barriers
- **TOOLS:**
  - Trended outcome and process reports
  - Coaching
  - Collaborative learning
Optimizing Antibiotic Stewardship in Skilled Nursing Facilities (OASIS) Study

**Facilitated Implementation**

- Pre-intervention facility work flow analyses
- Kickoff meetings
- Educational materials
- Collaborative meetings
- Coaching & mentorship

**Top-Level Management**
- Monthly review of process and outcome data
- Identification of barriers to change
- Provision of resources and support for change

**Mid-Level Management**
- Daily assessment of pre- and post-prescribing tool utilization
- Reinforcement of tool utilization with frontline staff
- Preparation of process reports for top-level management

**Frontline Staff**

**Pre-Prescribing Tasks**
- [Nurse] Standardized assessment of resident CIC
- [Nurse] Assign CIC risk-level (low vs. high)
- [Nurse] Communicate findings and CIC risk-level
- [Prescriber] Avoid testing and antibiotics for low-risk CIC

**Post-Prescribing Tasks**
- [Nurse] Communicate antibiotic start to PCP
- [Nurse] Reassess resident
- [Nurse] Assess eligibility for antibiotic change
- [Nurse] Communicate findings
- [Prescriber] Change (discontinue, narrow, shorten) antibiotic if appropriate
OASIS Study Overview

Facilitated Implementation

- Pre-intervention facility work flow analyses
- Kickoff meetings
- Educational materials
- Collaborative meetings
- Coaching & mentorship

BASELINE WORK STATE ASSESSMENT

Wisconsin

Pennsylvania

OUTCOMES

I. Clinical
   A. (1') DOTs per 1,000 resident-days
   B. (1') % of AS meeting Loeb
   C. (2') AS per 1,000 resident-days
   D. (2') FQD per 1,000 resident-days
   E. (2') CDI per 1,000 resident-days

II. Safety
   A. (2') Unplanned transfers per 1,000 resident-days
   B. (2') Deaths per 1,000 resident-days

III. Exploratory
   A. % of FQR urinary isolates
   B. % of enterococcal urinary isolates
   C. % of Candida urinary isolates

FOLLOW-UP WORK STATE ASSESSMENT

I. Assessment of intervention fidelity
   A. Quantitative
      • Tool use
      • Collaborative participation
   A. Qualitative
      • Walkthroughs
      • Interviews

II. Assessment of intervention sustainability

DOT = days of antibiotic therapy
AS = antibiotic starts
FQD = fluoroquinolone days of therapy
CDI = laboratory confirmed *Clostridium difficile* infections
FQR = fluoroquinolone-resistant bacteria
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