Improving Antibiotic Prescribing in Nursing Homes through Nudges and Mental Judo

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Disclosures

Consultant Activities:
1. Zurex Pharmaceuticals (Madison, WI): provide strategic advice on development and testing of the company’s novel anti-septic platform (<$5,000).
2. Deb Group (SC Johnson Subsidiary, Charlotte, NC): provide strategic advice on evaluating the company’s automated hand hygiene monitoring technology (<$5,000).

Objectives

• Hypothetical scenario
• Antibiotic decision-making
• Understanding you sphere of influence
• Extending your sphere of influence
• Hypothetical scenario revisited
Hypothetical Situation

<table>
<thead>
<tr>
<th>Mrs. Axel</th>
<th>Daughter / CNA</th>
</tr>
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</table>
| • 84 years old  
• Diagnoses: dementia, HTN, incontinence. | • Daughter let’s the CNA know that her mom seems “a little off” today.  
• CNA confirmed that the urine appeared more cloudy during AM toileting.  
• CNA “dips” the urine and confirms presence of nitrates and leukocyte esterase. |

Hypothetical Situation cont...

<table>
<thead>
<tr>
<th>RN Assessment</th>
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| • Speech/response times slowed, agrees with daughter that she does not seem herself  
• VS: T97.8 BP 132/84, P84, R16, PaO2 = 94% RA  
• No complaints of cough, SOB, lungs clear  
• No c/o dysuria/back pain; abdominal exam (-) | • RN collects urine sample  
• Calls MD: “Mrs. Axel is a little off today, I collected a urine specimen, do you want me to send it for UA and UCx?”  
• MD agrees but does not start antibiotic, ↑ PO fluids  
• UA positive for pyuria and >5 sq. epis and UCx growing E. coli the next day |

Hypothetical Situation cont...

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| • RN notifies MD of positive UCx: Ciprofloxacin 500mg PO BID for 10 days ordered  
• MD asks for follow-up when susceptibilities come back  
• Report for pan-sensitive E. coli 2 days later.  
• RN contacts MD with culture results: “looks like we have the right antibiotic” | • Was back to baseline the day ciprofloxacin started  
• Daughter pleased “we caught” UTI early  
• 4 weeks later Mrs. Axel develops significant diarrhea associated with confusion, fevers, and ↓ BP  
• Sent to hospital where C. difficile infection diagnosed |
Who is to Blame?

The Doctor of Course!

Antibiotic Overuse:

Antibiotic Decision-Making

- Complexity
- Uncertainty
- Risk
- Social
- Context
Prescriber Factors that Influence Antibiotic Threshold

- Knowledge and skills
- Experience
- Outside NH workload and clinic environment
- Familiarity with resident
- Relationship with resident family
- Risk aversion
- Uncertainty tolerance

But NHs Do Influence Prescriber Antibiotic Decisions

Resident & Family Factors

Baseline Resident Characteristics

Family Knowledge, Attitudes, & Beliefs

Clinical Situation (Resident Change in Condition)

SNF Factors

Prescriber Factors

Prescriber Characteristics

Practice Characteristics


Things You Can’t Control Directly

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Prescriber Characteristics

Practitioner Characteristics

But NHs Do Influence Prescriber Antibiotic Decisions

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Antibiotic Start Process: Hospital versus Nursing Home

  - 221 post-acute care residents admitted to 7 Georgia NHs followed for a year
  - 105/221 (48%) received at least one course of antibiotics
  - 50% were NH-initiated
  - 43% of NH-initiated courses had no documentation of infection in medical record
  - 67% of NH started antibiotics initiated over the phone
NHs Have Culpability Too

- 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

Understanding your Sphere of Influence

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Opportunities for NH Control

- Teach staff when to suspect UTI
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Myth #1: Non-specific symptoms* are an indicator of UTI

- Non-specific symptoms are the most common reason for suspecting a UTI
- Infection can present atypically in the frail elderly (e.g., blunted fever response)
- Non-specific symptoms may commonly co-occur with other symptoms (e.g., fever, localizing symptoms) when infection is present
- There is no convincing data that isolated non-specific symptoms are an indicator of an underlying infection

- Non-specific symptoms are more strongly associated with a number of other conditions (think DELIRIUMS → why do we only look for the 1st “I”?)

* Non-specific symptoms: lethargy, confusion, incontinence, falls, not being himself/herself

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YOU CAN HAVE MY URINE DIPSTICK WHEN YOU PRY IT FROM MY COLD DEAD HANDS
MYTH #2: UTI can be Diagnosed by Urine Test Results

- Bacteriuria is a natural part of the aging process⁴
  - 25-50% of non-instrumented NH residents
  - 100% of instrumented NH residents
- Bacteriuria is not correlated with any meaningful clinical outcomes
  - Survival of bacteriuric and non-bacteriuric residents is the same²,³
  - Bacteriuria is not correlated with lethargy, confusion, weakness or incontinence⁵,⁶
  - Change in urine character does not predict bacteriuria⁷
- Tests for inflammation in the urinary tract (pyuria & bacteriuria) do not provide any meaningful information
  - Pyuria is seen in 90% of patients with bacteriuria
  - Only 40-50% of patients with (+) LE have bacteriuria and pyuria

Dipstick → UA → Urine culture → Antibiotic Prescription

- Urine testing automated in many NHs.
- Average time from recognition of change to antibiotic = 2-3 days
- 60-90% of antibiotics prescribed for UTI started after culture results are back

Opportunities for NH Control

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Prescriber Perspective

PHYSICIAN: “... I usually press for details. For example, what is the temperature? How long has she had the cough? ... is this a sudden change, or is this a gradual change? ... has it ever happened before ...? And some nurses will call, and they'll have all that available. Others do not. And it's highly variable.”

Prescriber Perspective

Interviewer: “Are there characteristics of either facility that the resident is in or the nursing staff caring for them that also influence your comfort level with holding off [on starting antibiotics]?”

Respondent: “... And so I probably would, you know, trust information from them, maybe at a little higher rate... So I know them, know what they're capable of, so would probably, you know, feel more comfortable with some of the judgments that they passed on one way or the other...”

Interviewer: “And so is it fair to say that that does have some influence on your decision to ...”

Respondent: “Oh, it is.”

Pre-Prescribing Process Steps

1. ASSESS
2. ASSIGN
3. RECOMMEND
4. DOCUMENT
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Step 1 - ASSESS
- SBAR process already “expected practice” in most SNFs but is not “actual practice”
- Why?
  - Not aware/not trained
  - Staff don’t understand the benefits
  - Lack of comfort with the “A” and the “R” (staff may feel it is beyond their scope of practice)
  - Poor user design
  - Poor peer influence (not a social norm)
  - Not a leadership priority (no accountability)

Effects of Improved Communication
- Quasi-experimental study in 12 NHs in Texas
- Intervention focused on use of an assessment/communication tool for suspected urinary tract infection
- Treatment of asymptomatic bacteriuria was 24% lower in NHs that implemented the communication tool with high fidelity (Figure)
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STEP 4 - DOCUMENT

- Documentation should be a means not an end
  - Should emphasize the key parts of the resident history and exam that are to be conveyed to the provider
  - Can be adapted to incorporate tools that facilitate the assessment
  - Is a way to audit if the process is being done

- Find ways to make documentation as easy as possible for the end user

- Develop education and action prompts that are visible and simple to understand.

- Provide timely and meaningful feedback to staff (was SBAR done, was risk of CIC assessed, was active monitoring recommended?)

- Identify social influencers and convince them to be champions rather than organizational constipators.

Opportunities for NH Control

Mrs. Axel

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Expanding your Sphere of Influence

- Recommending active monitoring
- Schedule an antibiotic review
- Work with medical director to develop family educational tools
- Work with lab and medical director to harness your microbiology data (antibiogram)
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Pre-Prescribing Process Steps

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Step 2 - ASSIGN

- Go to the “When to Test” session
- Spend the time combating the “UTI myths” through education and illustrative cases (particularly if there is bad outcome)

Step 3 - RECOMMEND

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.

Scenario: Mrs. Sleepy, an elderly long-term stay resident with dementia, appears more lethargic than usual and refusing to come out of her room for meals. Her vital signs are stable and she has no localizing complaints.

Example A: Dr. Jones, Mrs. Sleepy is less interactive and not coming out of her room. Do you want me to send a urine culture?

Example B: Dr. Jones, Mrs. Sleepy is less interactive and not coming out of her room. She has no fevers, her other vital signs are stable and she has no other concerning exam findings. Would you be okay with me assigning fluids and monitoring her closely over the next 48 hours?"
Reduced Testing → Reduced Treatment
(with no new adverse events)

- 12 NHs in Massachusetts participated in quality improvement collaborative
- Intervention focused on only sending urine cultures when residents met Loeb Criteria
- The decision to start an antibiotic was left up to the providers.

<table>
<thead>
<tr>
<th>Measure</th>
<th>IRR (95% CI)</th>
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<tbody>
<tr>
<td>Urine Culture Rate</td>
<td>0.47 (0.42 – 0.52)</td>
</tr>
<tr>
<td>UTI Rate</td>
<td>0.42 (0.35 – 0.50)</td>
</tr>
<tr>
<td>C. Difficile Rate</td>
<td>0.85 (0.45 – 1.68)</td>
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Doron et al., IDWeek 2014 [poster abstract]
Trautner et al. JAMA Intern Med 2015; 175(7): 1120-7

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Get Providers to Think about the Three “S’s”

- Antibiotic Started by PCP?
  - Yes
    - Schedule Post-Prescribing Review
    - Notify PCP of Antibiotic Start
  - No
- Residents/other medical results
- Imaging results
- Other laboratory results
- Can antibiotics be stopped?
- Can antibiotics be streamlined?
- Can antibiotic duration be shortened?
- Assemble Pertinent Data
- Nurse/PCP Post-Prescribing Review
- Resident condition
- Microbiology results
- Other laboratory test results
- Imaging test results
- 48-72 Hours
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  - Baseline Resident Characteristics
  - Family Knowledge, Attitudes, & Beliefs
  - Clinical Situation (Resident Change in Condition)
  - Staff Knowledge, Attitudes, & Beliefs
  - Prescriber Characteristics
  - Practice Characteristics

- SNF Factors

- Prescriber Factors

Zimmerman et al.  
Resident & Family Education

- Consider having your medical director or facility pharmacist do brief family in-services
- Include information in admission packets

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Make Consequences more Visible to Providers

- 80% of cultures from a urine sample
- 80% of the antibiotic use in the 3 NHs was empiric (before cultures)
- 45% of episodes associated with discordant (inappropriate) therapy
- Making antibiogram available reduced inappropriate use to 55%

Drinka et al. JAMDA 2013; 14(6): 443

Furuno et al. Infect Control Hosp Epidemiol 2014 0 2 04 06 08 0

Proteus

Pseudomonas

% Susceptible

Nursing Home A
Nursing Home B
Nursing Home C

School of Medicine and Public Health

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Introducing Normative Influences
• A MRSA outbreak in a 147-bed NH in WI led to an intensive review of facility microbiology and antibiotic prescribing data
• Review of urinary antibiogram identified 31/100 (27%) all isolates were Enterococcus sp.
• 87% of E. coli resistant to ciprofloxacin
• Facility embarked on several interventions:
  • Provided staff with antibiogram results
  • Guideline-concordant prescribing tracked by facility staff
  • Medical director sent out letters to outlier providers

Abx Starts per 1,000 Resident-Days

NH ASP Resources

• Centers for Disease Control and Prevention
• Wisconsin Bureau of Long-Term Care
  - https://www.dhs.wisconsin.gov/regulations/nh/hai-introduction.htm
• UNC Nursing Home Infections
  - https://nursinghomeinfections.unc.edu
• Minnesota Department of Health
  - http://www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/asp/ltc/
• Agency for Healthcare Research and Quality ASP Toolkits

Thank You