

WI HAI in LTC 2017 Spring Conference
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Improving Antibiotic Prescribing in Nursing Homes through Nudges and Mental Judo

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Disclosures



- R18HS022465-01A1
- R18HS023779-01



- PPO 16-188 (HSR&D Pilot)
- HX001091-01 (HSR&D CREATE)

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 your sphere of influence
- Extending your sphere of influence
- Hypothetical scenario revisited



Hypothetical Situation

Mrs. Axel	Daughter / CNA
<ul style="list-style-type: none"> • 84 years old • Diagnoses: dementia, HTN, incontinence. 	<ul style="list-style-type: none"> • 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...

RN Assessment

- 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 / MD

- 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...

RN / MD

- 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"

Mrs. Axel

- 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

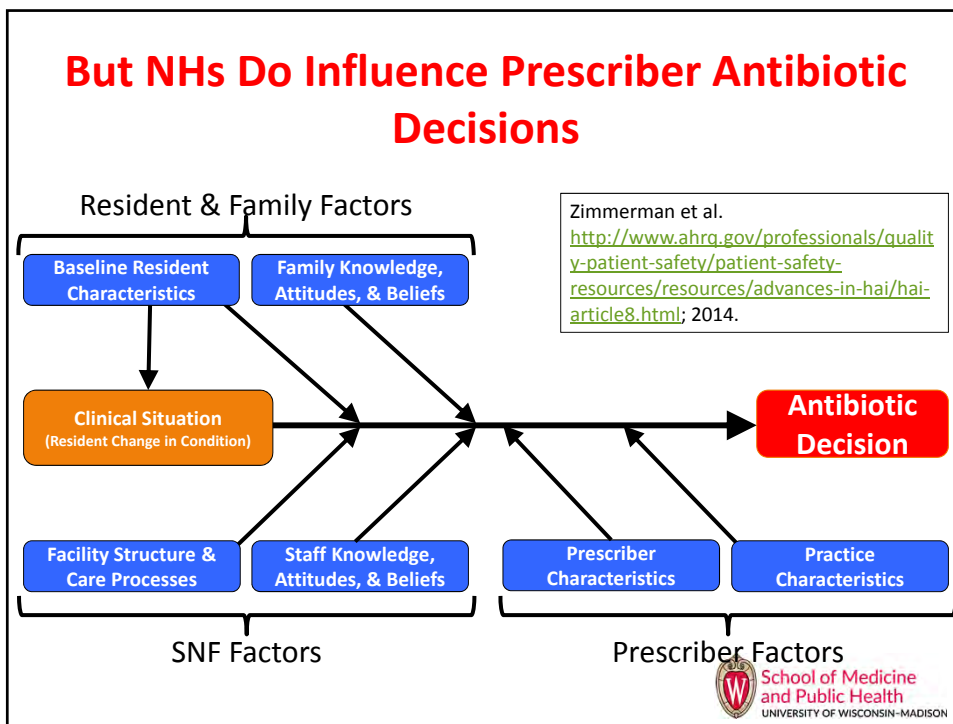


Prescriber Factors that Influence Antibiotic Threshold

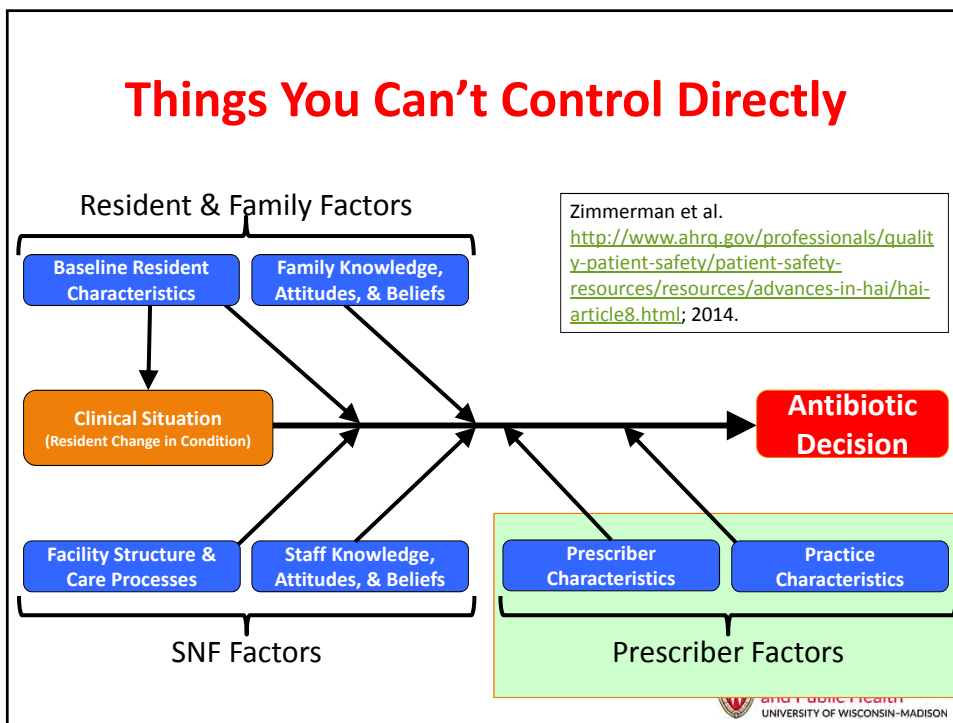
- Knowledge and skills
- Experience
- Outside NH workload and clinic environment
- Familiarity with resident
- Relationship with resident family
- Risk aversion
- Uncertainty tolerance



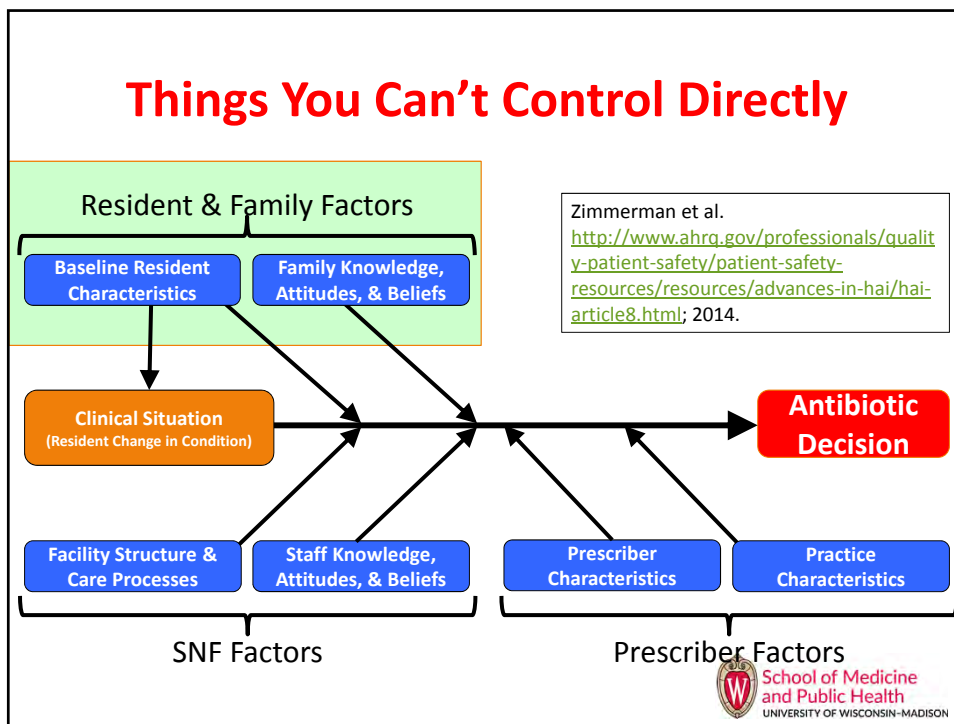
But NHs Do Influence Prescriber Antibiotic Decisions



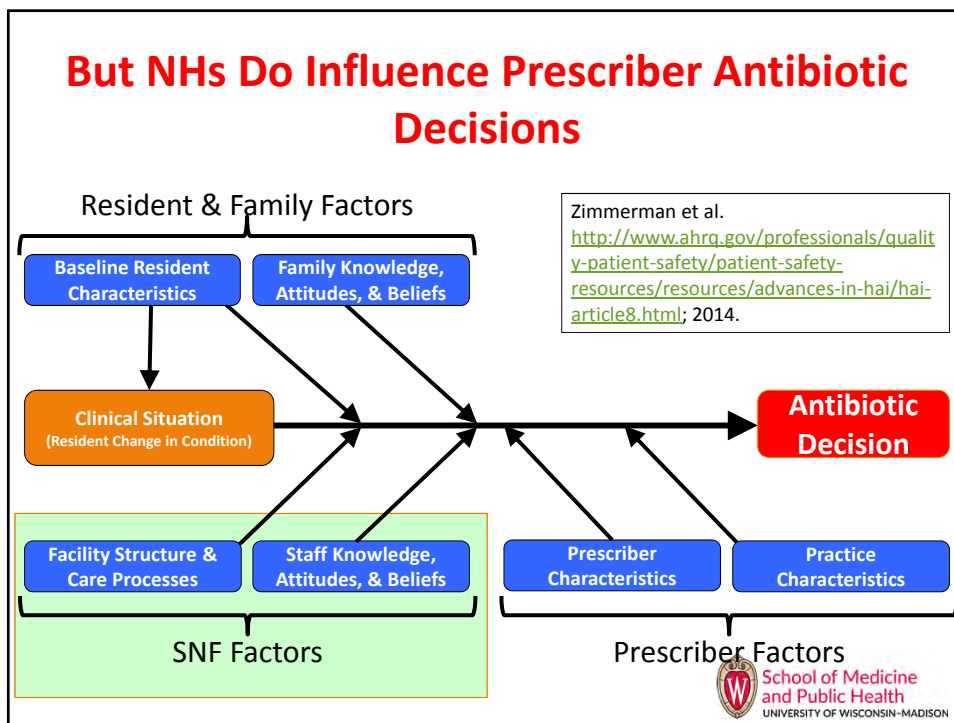
Things You Can't Control Directly



Things You Can't Control Directly



But NHs Do Influence Prescriber Antibiotic Decisions



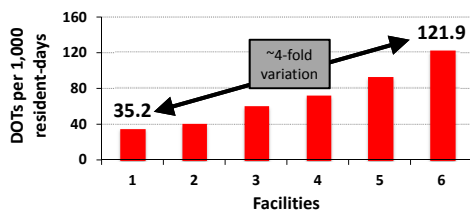
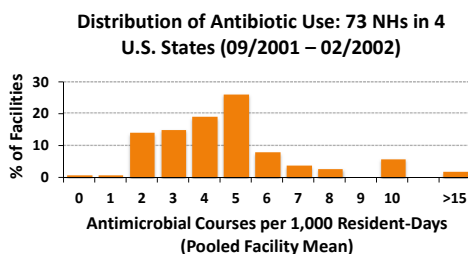
Antibiotic Start Process: Hospital versus Nursing Home



- Richards et al. *J Am Med Dir Assoc* 2005;6(2): 109-12
 - 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

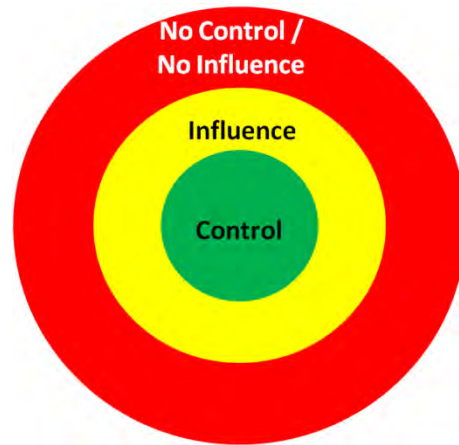


- Degree of variation not explained by clinical factors
 - Mylotte, *Am J Infect Control* 1999; 27: 10-19
- Inter-facility > Intra-facility level variation
 - Mylotte, *Am J Infect Control* 1999; 27: 10-19
- Contextual effects seen with other agents prescribed in NHs (i.e., anti-psychotics)
 - Hughes et al. *Drugs Aging* 2007; 24(2): 81-93
 - Tjia et al. *Am J Geriatr Pharmacother* 2012; 10(1): 37-46

Benoit et al., *J Am Geriatr Soc* 2008; 56(11): 2039-4
 Crnich et al., *ID Week* 2012



Understanding your Sphere of Influence



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Opportunities for NH Control

- Mrs. Axel



- Teach staff when to suspect UTI
- Eliminate rapid reagent test strip utilization & pre-call urine collection
- Improve quality of resident assessment and communication with providers
- Focus on improving the quality of the urine specimen obtained for culture



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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 UTI¹
- Infection can present atypically in the frail elderly (e.g., blunted fever response)²
- 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^{3,4}
- Non-specific symptoms are more strongly associated with a number of other conditions (think DELIRIUMS → why do we only look for the 1st “I”?)
 - **D**rug reactions
 - **D**iscomfort (pain)
 - **E**nvironmental change (sensory deprivation)
 - **L**ow oxygen
 - **I**nfection
 - **R**etention (urinary, fecal impaction)
 - **I**ctal (seizure)
 - **U**nderhydration (dehydration)
 - **M**etabolic (low/high BS, sodium)
 - **S**ubdural hematoma

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

1 Juthani-Mehta et al. *J Am Geriatr Soc* 2005; 53(11): 1986-90
 2 Yoshikawa T. *Clin Infect Dis* 2000; 30(6): 931-33
 3 Crnich & Drinka. *Ann Long Term Care* 2014; July: 43-7
 4 Nace et al. *J Am Med Dir Assoc* 2014; 15(2): 133-9
 5 Bostwick. *Postgr Med* 2000; 108(6): 60-72



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MYTH #2: UTI can be Diagnosed by Urine Test Results

- Bacteriuria is a natural part of the aging process¹
 - 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 same^{2,3}
 - Bacteriuria is not correlated with lethargy, confusion, weakness or incontinence⁴⁻⁹
 - Change in urine character does not predict bacteriuria¹⁰
- Tests for inflammation in the urinary tract (pyuria & bacteriuria) do not provide any meaningful information
 - Pyuria is seen in 90% of patients with bacteriuria
 - 30% of NH residents with pyuria do not have bacteriuria
 - Only 40-50% of patients with (+)LE have bacteriuria and pyuria

1 Nicolle L. *Clin Infect Dis* 1997; 11(3): 647-62

2 Nicolle et al. *Ann Intern Med* 1987; 106(5): 682-86

3 Abuyrt et al. *Ann Intern Med* 1994; 120(10): 827-33

4 Akhtar et al. *Age Aging* 1972; 1(1): 48-54

5 Boscia et al. *Am J Med* 1986; 81(6): 979-82

6 Mims et al. *J Am Geriatr Soc* 1990; 38(11): 1209-14

7 Ouslander et al. *Ann Intern Med* 1995; 122(10): 749-54

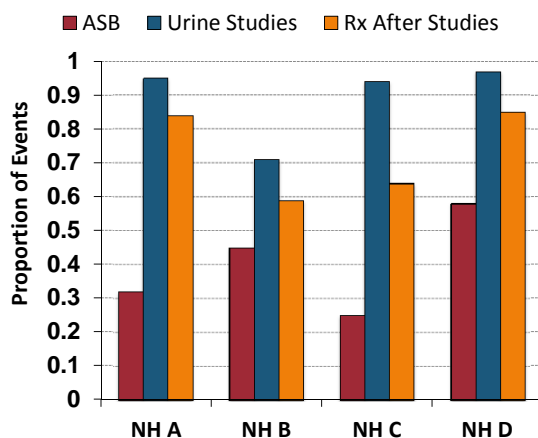
8 Juthani-Mehta et al. *J Am Geriatr Soc* 2009; 57(6): 963-70

9 Sundvall et al. *BMC Family Practice* 2011; 12: 36

10 Midthun et al. *J Gerontol Nurs* 2004; 30(6): 4-9



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

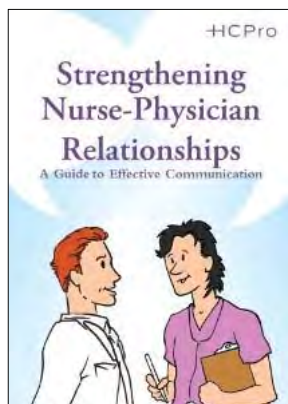
Juthani-Mehta et al. *J Am Geriatr Soc* 2009; 57(6): 963-70

Phillips et al., *BMC Geriatrics* 2012; 12: 73

Drinka & Crnich, *Ann Long Term Care* 2014; 22(9)



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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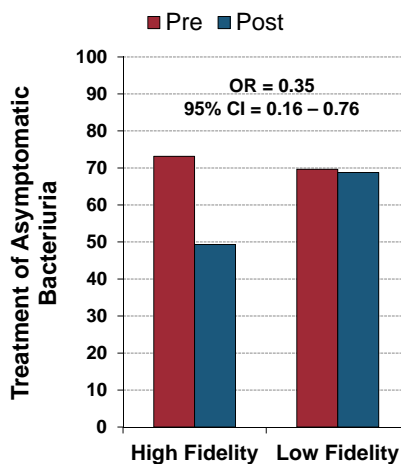
Step 1 - ASSESS

- 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)



American Institute for Research. Final Report to AHRQ 2012. ACTION Contract No. 290-2006-000-191-08.



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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

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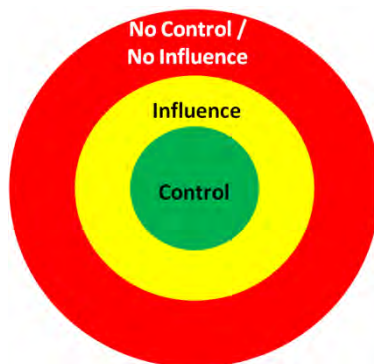
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https://www.coursesites.com/webapps/Bb-sites-course-creation-BBLEARN/courseHomepage.htmlx?course_id=348931_1



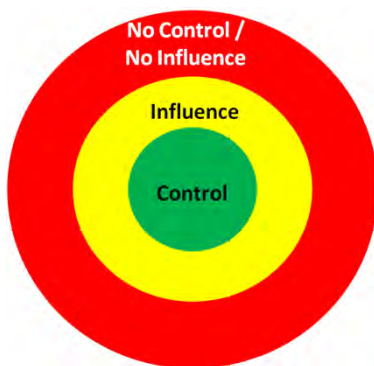
Expanding your Sphere of Influence



- 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)
- Work with pharmacist and medical director to develop prescribing guideline
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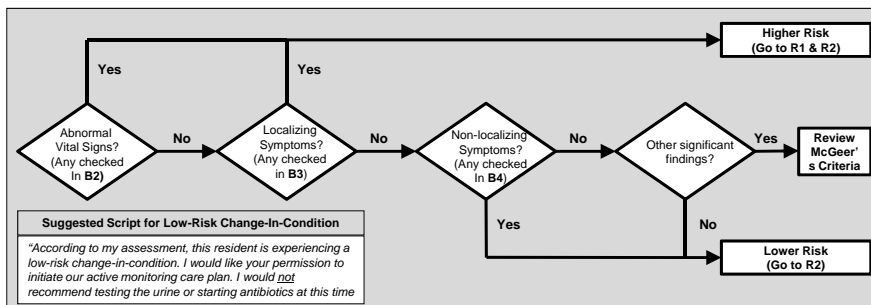


Pre-Prescribing Process Steps

1. ASSESS
- 2. ASSIGN**
- 3. RECOMMEND**
4. DOCUMENT



Step 2 - ASSIGN



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



Step 3 - RECCOMEND

Suggested Script for Low-Risk Change-In-

"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

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: _____
- _____
- _____

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.

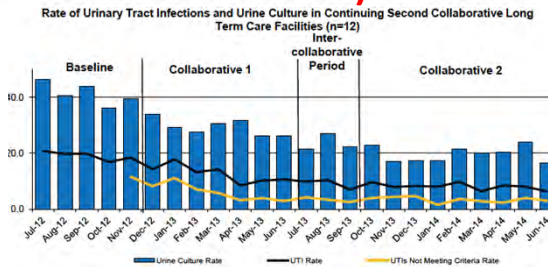
Example A: *Dr. Jones, Mrs. Sleepy is less interactive and not coming out of her room. Do you want me to send a urine culture?*

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 pushing 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.

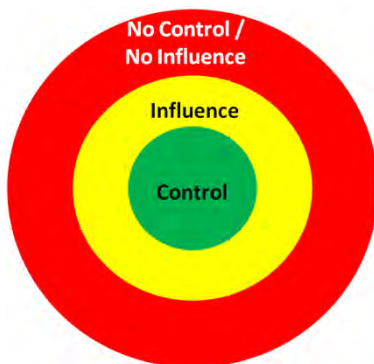


Measure	IRR (95% CI)
Urine Culture Rate	0.47 (0.42 – 0.52)
UTI Rate	0.42 (0.35 – 0.50)
C. Difficile Rate	0.85 (0.45 – 1.68)

Doron et al., *IDWeek* 2014 [poster abstract]
Trautner et al. *JAMA Intern Med* 2015; 175(7): 1120-7

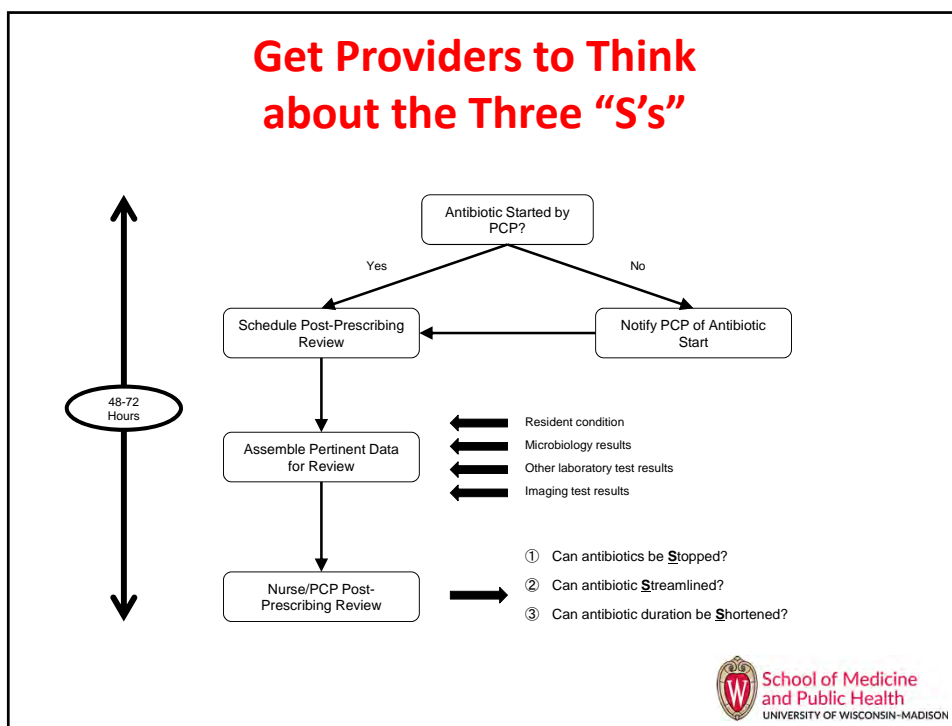


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Hypothetical Situation cont...

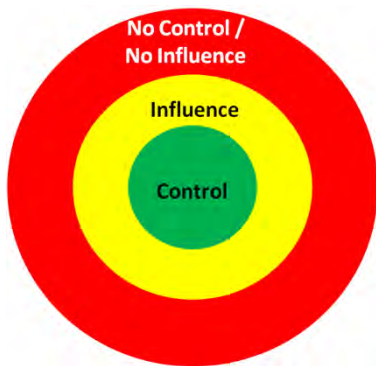
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- Was back to baseline the day ciprofloxacin started
- Daughter pleased "we caught" UTI early
- 4 weeks later Mrs. Axel develops significant diarrhea associated with confusion, fevers, and ↓BP
- Sent to hospital where *C. difficile* infection diagnosed

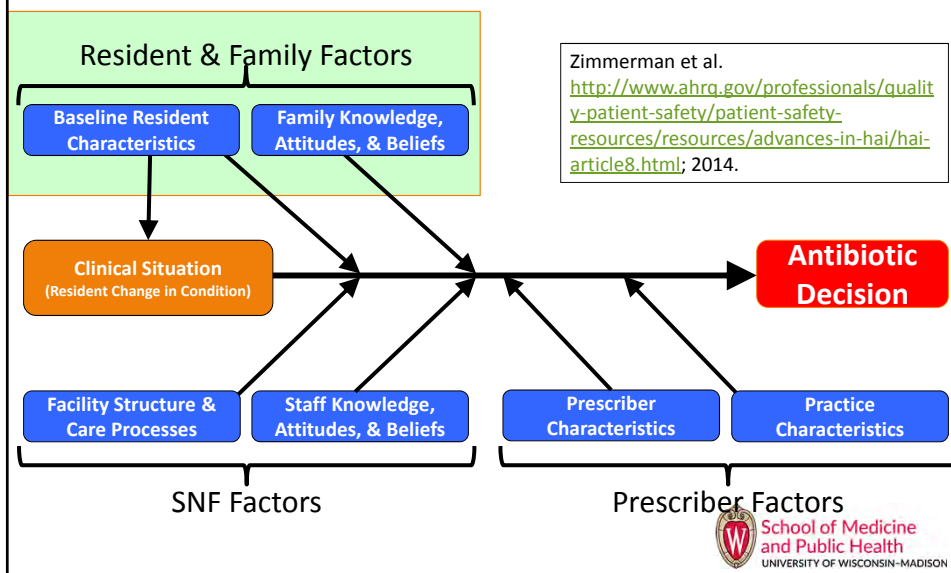
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Things You Can't Control Directly



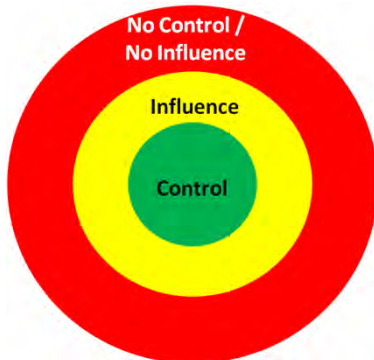
Resident & Family Education

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

AHRQ Antibiotic Stewardship Toolkit – available at <https://www.ahrq.gov/nhguid/index.html>
 Meeker et al. *JAMA Intern Med* 2014; 174(3): 425-31



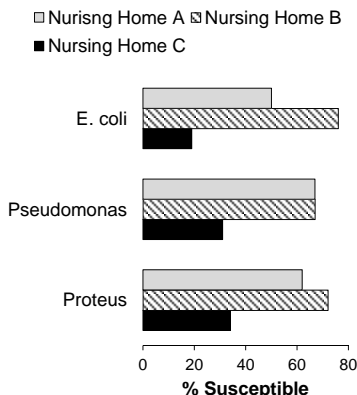
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Make Consequences more Visible to Providers



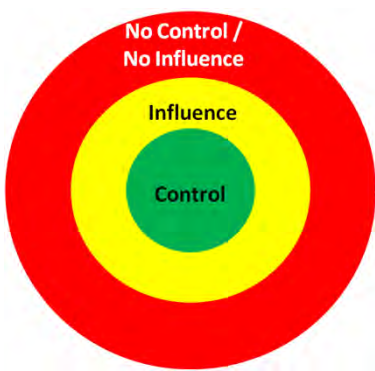
Organism	SW	First Culture			Second Culture			Third Culture			Fourth Culture			Fifth Culture			Sixth Culture			Seventh Culture			Eighth Culture			Ninth Culture			Tenth Culture								
		Number	Positive	%	Number	Positive	%	Number	Positive	%	Number	Positive	%	Number	Positive	%	Number	Positive	%	Number	Positive	%	Number	Positive	%	Number	Positive	%									
E. coli	1	14	85	61%	14	85	61%	14	85	61%	14	85	61%	14	85	61%	14	85	61%	14	85	61%	14	85	61%	14	85	61%	14	85	61%	14	85	61%	14	85	61%

- 80% of cultures from a urine sample
- 85% of the antibiotic use in the 3 NHs was empiric (before cultures)
 - 54% involved a fluoroquinolone antibiotics
 - 65% 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



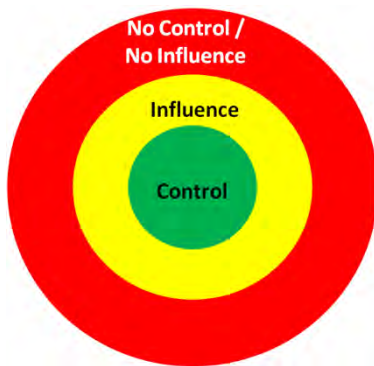
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Introducing Normative Influences



Provider Feedback

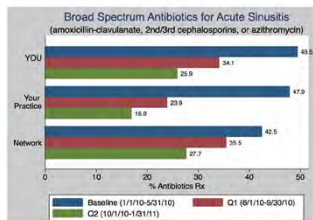
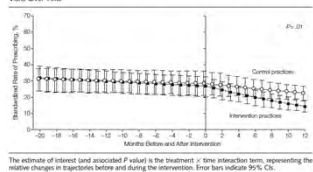


Figure 2. Standardized Rates of Broad-Spectrum Antibiotic Prescribing at Acute Care Office Visits Over Time

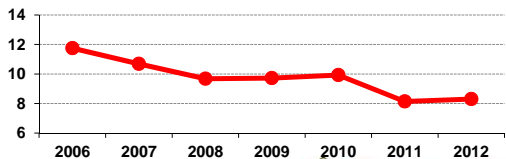


The estimate of interest (and associated P value) is the treatment x time interaction term, representing the net change in prescriptions before and during the intervention. Error bars indicate 95% CIs.

Gerber et al. *JAMA* 2013; 309(22): 2345-52
 Meeker et al. *JAMA* 2016; 315(6): 562-70

- 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

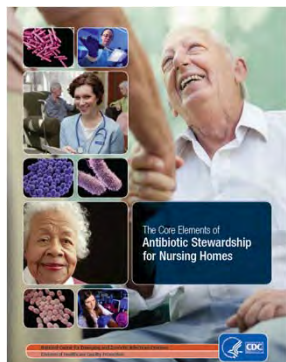
Abx Starts per 1,000 Resident-Days



The Pew Charitable Trusts – A path to better antibiotic stewardship, 2016



NH ASP Resources



- Centers for Disease Control and Prevention
 - <http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html>
- Wisconsin HAI in Long-Term Care
 - <https://www.dhs.wisconsin.gov/regulations/nh/hai-introduction.htm>
- UNC Nursing Home Infections
 - <https://nursinghomeinfections.unc.edu>
- Massachusetts Coalition
 - <http://www.macoalition.org/evaluation-and-treatment-uti-in-elderly.shtml>
- Minnesota Department of Health
 - <http://www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/asp/itc/>
- Agency for Healthcare Research and Quality ASP Toolkits
 - <https://www.ahrq.gov/nhguide/index.html>



Thank You

