

Improving antibiotic use in nursing homes... why and how

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North Dakota Webinar
June 5, 2013

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion



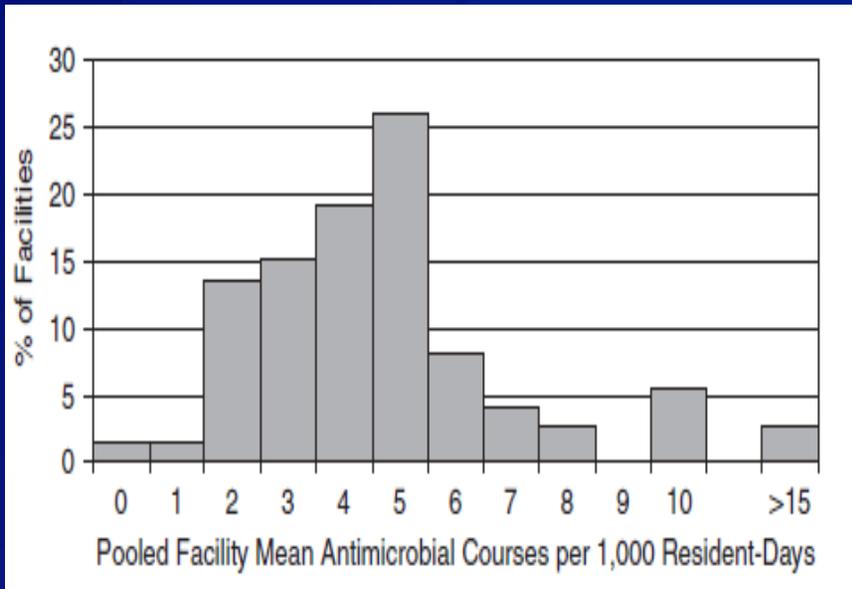
Presentation Objectives

- ❑ Discuss why antibiotic stewardship is important for nursing homes
 - ❑ Current use in this setting
 - ❑ Consequences of misuse
- ❑ Describe barriers and opportunities for implementing activities to improve antibiotic use
- ❑ Outline strategies for monitoring and implementing changes to antibiotic use

Antimicrobial use in NHs

- ❑ Antimicrobials are the most frequently prescribed drug class in nursing homes
 - Comprise ~40% of all prescriptions
- ❑ 50-70% of residents will receive a systemic antimicrobial during the course of a year
- ❑ 25-75% of antimicrobial use may be inappropriate

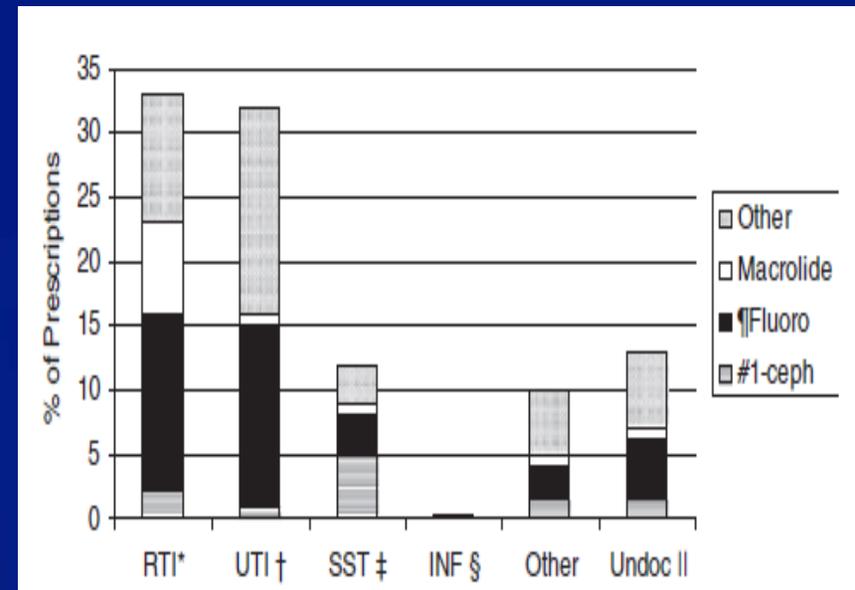
Benoit et al. JAGS 2008; 56: 2039-2044
Nicolle LE et al. ICHE 2000; 21:537-545



Antimicrobial use in NHs varies across facilities

Pooled mean 4.8 courses/1,000 resident days, range 0.4-23.5)

- Primary indications are urinary and respiratory tract infections
- Fluoroquinolones are the most commonly used
 - 38% of all prescriptions



Benoit et al. JAGS 2008; 56: 2039-2044

Antibiotic use across care transitions

- ❑ Review of 221 (20%) of post-acute care admissions randomly selected from 7 skilled nursing facilities
- ❑ 48% of residents received a course of antibiotics during their stay (median LOS ~17 days)
 - ❑ 152 individual courses among 105 residents = 29 courses/1,000 resident days
- ❑ 50% of courses were initiated in hospitals
 - ❑ RTI was primary indication for hospital-initiated antibiotic
 - ❑ UTI was primary indication for NH-initiated antibiotic
 - ❑ 53% of residents on antibiotics received a fluoroquinolone as part of therapy

Risk factors for an adverse drug events in NHs

| Risk Factor | OR | 95% CI |
|-------------------------------------|------------|--------------------|
| New admission | 2.8 | (1.5 – 5.2) |
| No. of Scheduled Medications | | |
| <5 | 1.0 | (referent) |
| 5-6 | 2.0 | (1.2 – 3.2) |
| 7-8 | 2.8 | (1.7 – 4.7) |
| ≥9 | 3.3 | (1.9 – 5.6) |
| Current Medications | | |
| Antibiotic | 4.0 | (2.5 – 6.2) |
| Antipsychotic | 3.2 | (2.1 – 4.9) |
| Antidepressant | 1.5 | (1.1 – 2.3) |
| Supplements | 0.4 | (0.3 – 0.6) |

- ❑ 410 ADEs out of 2916 long-stay residents
 - ❑ 55% deemed preventable
- ❑ In multivariate analysis, antibiotic use carried highest risk of ADE
 - ❑ Antibiotics were also an independent risk factor for preventable ADEs (OR 3.0, CI 1.6-5.8)

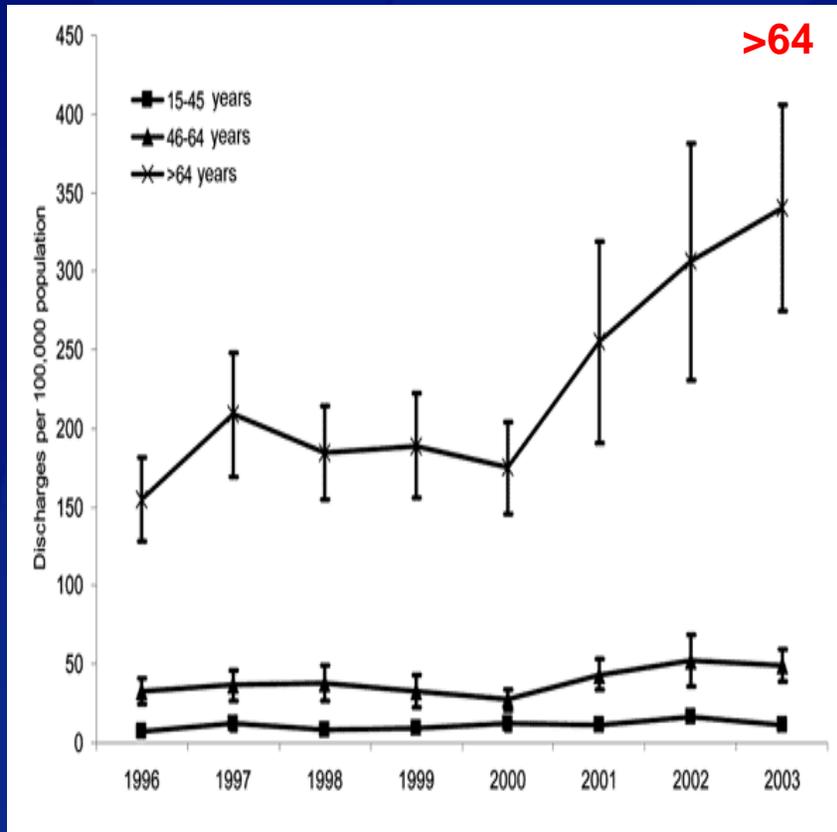
Antibiotics and adverse drug events in NHs

Table 3. Frequency of Adverse Drug Events and Potential Adverse Drug Events by Drug Class*

| Drug Class | Adverse Drug Events (n = 546) | Preventable Adverse Drug Events (n = 276) | Nonpreventable Adverse Drug Events (n = 270) | Potential Adverse Drug Events (n = 188) |
|----------------------------|----------------------------------|--|---|--|
| | Number (Percent) | | | |
| Antipsychotics | 125 (23) | 72 (26) | 53 (20) | 1 (0.5) |
| Antibiotics/antiinfectives | 109 (20) | 13 (5) | 96 (36) | 13 (7) |
| Antidepressants | 68 (13) | 50 (18) | 18 (7) | 0 |
| Sedatives/hypnotics | 68 (13) | 49 (18) | 19 (7) | 2 (1) |
| Anticoagulants | 51 (9) | 37 (13) | 14 (5) | 150 (80) |
| Antiseizure | 47 (9) | 27 (10) | 20 (7) | 0 |

- Antibiotics accounted for the highest number of “non-preventable” adverse drug events
 - *C. difficile* infection was considered “non-preventable by study investigators

C. difficile infection (CDI) and antibiotics



- CDI is the most common cause of acute diarrhea in LTC
- Antibiotics are a major driver of *C. difficile* acquisition and infection
 - Fluoroquinolone antibiotics have been associated with CDI with a more severe strain of *C. difficile*
 - Longer antibiotic exposure carries higher risk

McDonald LC et al Emerg Infect Dis 2006;
Simor AS, J Am Geriatr Soc. 2010

NHs are Reservoirs of MDROs

- ❑ NH residents colonized with MDR-Gram Negative Rods (~20% prevalence)
 - ❑ O'Fallon et al. *Infect Control Hosp Epidemiol* 2009; 30: 1172-1179
- ❑ NH residents colonized with MRSA (40-50% prevalence)
 - ❑ Mody et al. *Clin Infect Dis* 2008; 46(9): 1368-73
 - ❑ Stone et al. *Infect Control Hosp Epidemiol* 2012; 33(6): 551-7
- ❑ NH residents colonized with VRE (5-10% prevalence)
 - ❑ Pop-Vicas et al *J Am Geriatr Soc.* 2008 56(7):1276-80
 - ❑ Benenson et al. *Infect Control Hosp Epidemiol.* 2009 30:786-9

Antibiotic Exposure Drives Risk of Resistance in NHs

TABLE 3. Association between antimicrobial exposure and resistance to antimicrobial agents and effect of institutional factors in 50 nursing homes in the United States and Canada, 1998–1999*

| Antimicrobial-resistant bacteria | Variables kept in the multivariable model | Unadjusted odds ratio† | 95% confidence interval | Adjusted odds ratio† | 95% confidence interval |
|---|--|------------------------|-------------------------|----------------------|-------------------------|
| TMP-SMX‡-resistant Enterobacteriaceae | TMP-SMX | 1.14 | 1.06, 1.22 | 1.14 | 1.06, 1.22 |
| | TMP-SMX at the facility level | | | 2.83 | 1.05, 5.0 |
| | Use of intravenous therapy in the nursing home | | | 3.5 | 1.1, 13.4 |
| | No. of hand-washing sinks per 100 residents | | | 0.94 | 0.90, 0.98 |
| | No. of occupied beds per 100 residents | | | 1.02 | 1.00, 1.03 |
| MRSA‡ | Penicillins | 0.90 | 0.80, 1.02 | 0.97 | 0.85, 1.10 |
| | Use of antimicrobial soap in the nursing home | | | 0.40 | 0.18, 0.90 |
| | Use of different soaps by staff and residents§ | | | 0.24 | 0.12, 0.47 |
| | Use of intravenous therapy in the nursing home | | | 8.55 | 3.65, 20.0 |
| | No. of registered nurses per 100 residents | | | 0.79 | 0.72, 0.87 |
| MRSA | Fluoroquinolones | 1.00 | 0.97, 1.03 | 1.00 | 0.97, 1.03 |
| | Use of different soaps by staff and residents§ | | | 0.22 | 0.13, 0.36 |
| Fluoroquinolone-resistant Enterobacteriaceae | Fluoroquinolones | 1.08 | 1.04, 1.11 | 1.08 | 1.04, 1.11 |
| Fluoroquinolone-resistant <i>Pseudomonas aeruginosa</i> | Fluoroquinolones | 1.04 | 1.01, 1.07 | 1.04 | 1.01, 1.07 |

* Unadjusted odds ratios for antimicrobial exposures and adjusted odds ratios for variables kept in the final multivariable models are shown.

† Odds ratio for antimicrobial exposure per one defined daily dose per 100 resident-days.

‡ TMP-SMX, trimethoprim-sulfamethoxazole; MRSA, methicillin-resistant *Staphylococcus aureus*.

§ Use of antibacterial soap by staff and use of regular soap by residents.

Antibiotic Exposure and MDRO Acquisition in NH Residents

Any MDRO

TABLE 5 Risk factors for not being colonized versus having new acquisition of AROs

| Risk factor | Value for residents: | |
|---|---|--|
| | Not colonized with any ARO (<i>n</i> = 11) | Having new acquisition of any ARO (<i>n</i> = 57) |
| PSMS, mean ± SD | 15.9 ± 5.61 | 20.9 ± 5.35 ^a |
| Charlson's comorbidity score, mean ± SD | 2.36 ± 2.34 | 2.51 ± 1.51 |
| Any hospital visit, no./total (%) | 1/11 (9) | 16/57 (28) |
| Any antibiotic use, no./total (%) | 6/11 (55) | 42/57 (74) |
| Device use, no./total (%) | 1/11 (9) | 14/57 (25) |

^a *P* ≤ 0.05.

Specifically MRSA

TABLE 4. Multivariable Analysis of Risk Factors Predictive of Methicillin-Resistant *Staphylococcus aureus* Acquisition among Long-Term Care Facility Residents (*n* = 195)

| Risk factor | RR (95% CI) | <i>P</i> |
|--------------------------------|-------------------|----------|
| Antimicrobial use during study | 7.76 (2.1–28.56) | .002 |
| Hospitalization during study | 1.51 (0.48–4.72) | .48 |
| Intravenous line during study | 3.44 (0.87–13.58) | .08 |
| Charlson index | 1.20 (0.98–1.47) | .08 |

NOTE. CI, confidence interval; RR, risk ratio. Boldface indicates results that met statistical significance of *P* ≤ .05.

Fisch et al. *J Clin Micro* 2012; 50: 1698-1703

Stone et al. *Infect Control Hosp Epidemiol* 2012; 33(6): 551-7

NH Regulations which Promote Antibiotic Stewardship

Federal Tag 329: Unnecessary Drugs

1. General. Each resident's drug regimen must be free from unnecessary drugs.

An unnecessary drug is any drug when used:

- (i) In excessive dose (including duplicate therapy); or**
- (ii) For excessive duration; or**
- (iii) Without adequate monitoring; or**
- (iv) Without adequate indications for its use; or**
- (v) In the presence of adverse consequences which indicate the dose should be reduced or discontinued; or**
- (vi) Any combinations of the reasons above.**

- ❑ Goal: To optimize medication use and monitoring to appropriately minimize exposure and prevent consequences**
- ❑ Applies to all medication categories**

NH Regulations which Promote Antibiotic Stewardship

Federal Tag 332 and 333: Medication Errors

The facility must ensure that--

[F332] §483.25(m)(1) It is free of medication error rates of 5 percent or greater; and

[F333] §483.25(m)(2) Residents are free of any significant medication errors.

Medication Error -- The observed preparation or administration of drugs or biologicals which is not in accordance with:

1. Physician's orders;
2. Manufacturer's specifications (not recommendations) regarding the preparation and administration of the drug or biological;
3. Accepted professional standards and principles which apply to professionals providing services. Accepted professional standards and principles include the various practice regulations in each State, and current commonly accepted health standards established by national organizations, boards, and councils.

NH Regulations which Promote Antibiotic Stewardship

Federal Tag 428: Drug Regimen Review

- (1) The drug regimen of each resident must be reviewed at least once a month by a licensed pharmacist.**
- (2) The pharmacist must report any irregularities to the attending physician, and the director of nursing, and these reports must be acted upon.**

The intent of this requirement is that the facility maintains the resident's highest practicable level of functioning and prevents or minimizes adverse consequences related to medication therapy to the extent possible, by providing:

- A licensed pharmacist's review of each resident's regimen of medications at least monthly; or
- A more frequent review of the regimen depending upon the resident's condition and the risks or adverse consequences related to current medication(s);

NH Regulations which Promote Antibiotic Stewardship

Federal Tag 441: Infection Control

Antibiotic Review

Because of increases in MDROs, review of the use of antibiotics (including comparing prescribed antibiotics with available susceptibility reports) is a vital aspect of the infection prevention and control program. It is the physician's (or other appropriate authorized practitioner's) responsibility to prescribe appropriate antibiotics and to establish the indication for use of specific medications. As part of the medication regimen review, the consultant pharmacist can assist with the oversight by identifying antibiotics prescribed for resistant organisms or for situations with questionable indications, and reporting such findings to the director of nursing and the attending physician. See the Guidance at §483.65, Tag F329 regarding use of a medication without adequate indication for use and at §483.65, Tag F428 regarding medication regimen review.

Exploring the antibiotic prescribing process in nursing homes

Process for determining whether/how to use an antibiotic

- **“Do I start an antibiotic?”**
 - Change in a resident’s condition
 - Type of change
 - Underlying patient/resident characteristics
- **“Which antibiotic do I start?”**
 - Type of infection suspected
 - Assessment of severity
 - Knowledge of antibiotic hx/ antibiotic susceptibility
- **“Do I continue the antibiotic?”**
 - Identification of alternate explanation
 - Availability of additional data
 - Assessment of response to initial choices

Additional factors influencing decisions about antibiotic use

- ❑ Knowledge, attitudes and perceptions of the clinical providers
- ❑ Characteristics of the patient/resident population
- ❑ Quality of the assessments and data available during the decision-making process
- ❑ Culture and expectations about antibiotic use established by the facility

Challenges to addressing antibiotic use in NHs

- ❑ Assessments are made by a surrogate rather than the prescriber
 - ❑ 67% of antibiotic prescriptions were ordered over the phone
- ❑ Limited documentation of assessments in medical record
 - ❑ 43% of NH-initiated antibiotic courses had no documentation of infection in medical record
- ❑ Limited access to diagnostics
- ❑ Inconsistent follow-up assessments
- ❑ Influence of resident, family, and other NH staff on the decision to start antibiotics

RN/MD telephone communication as a barrier to optimum antibiotic use

- ❑ Data from surveys of nursing home RNs and LPNs exploring nurse-physician communication
 - ❑ Several domains of the communication process were explored
- ❑ Logistics
 - ❑ 25% unable to find quiet place to make phone call
 - ❑ 21% difficulty reaching physician
- ❑ Openness and collaboration
 - ❑ 28% felt pressured/rushed on the phone
- ❑ Professionalism
 - ❑ 24% felt they were bothering the physician
 - ❑ 17% anticipated physician would be rude/unpleasant
 - ❑ 16% were interrupted by physician or felt disrespected

Other communication issues

- ❑ Lack of nurse preparation before the call – central issue
 - ❑ Long delays in call back resulted in nursing staff no longer having information readily available
- ❑ Lack of engagement from covering providers (unfamiliar with resident)
- ❑ Trust between healthcare team (based on familiarity)
- ❑ Lack of physician responsiveness
- ❑ Language barriers or misunderstanding of medical terminology could result in need for frequent clarification

Led to physician impatience, rudeness, unpleasant interactions

Communication pathways between nurses and physicians

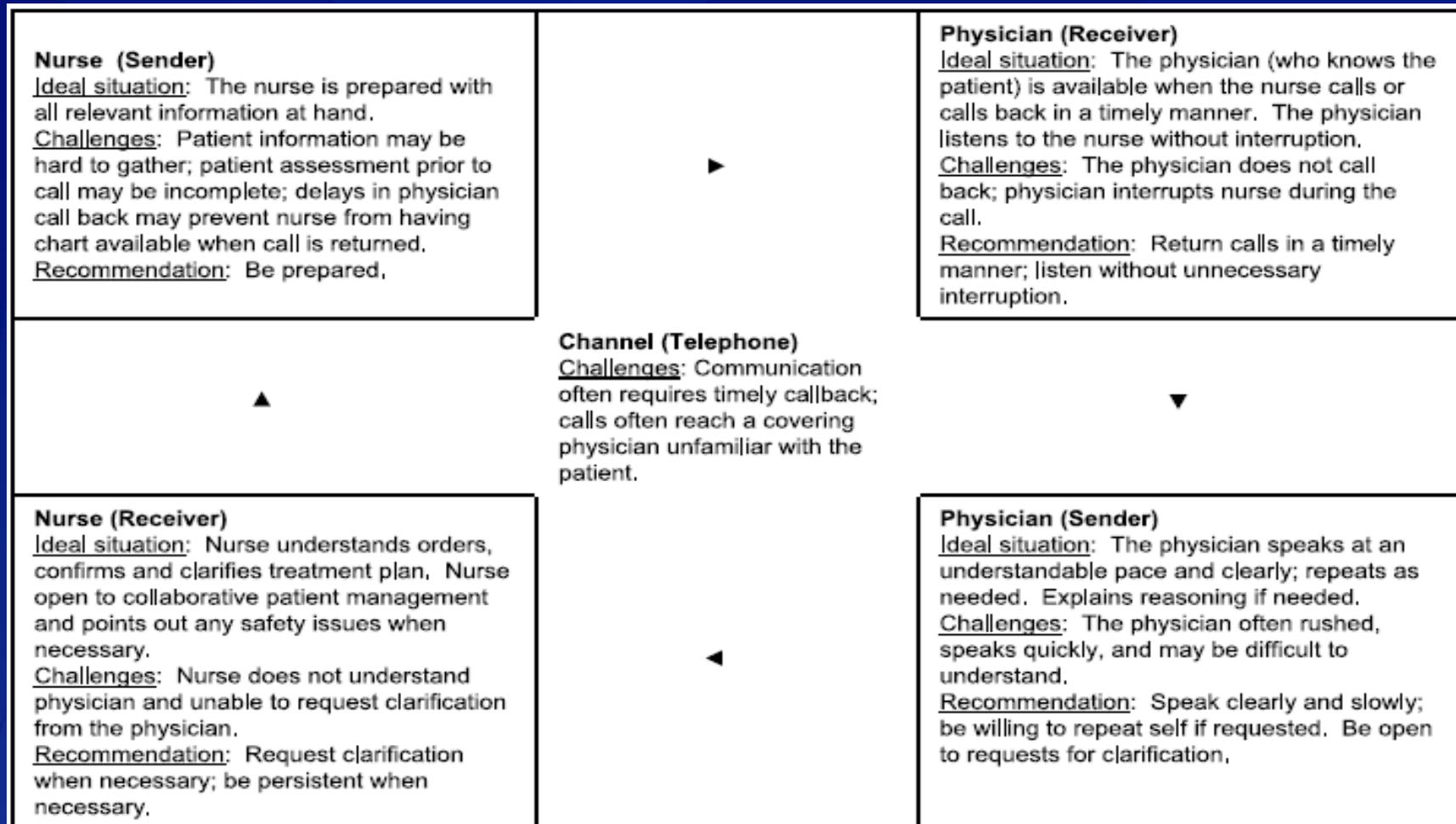


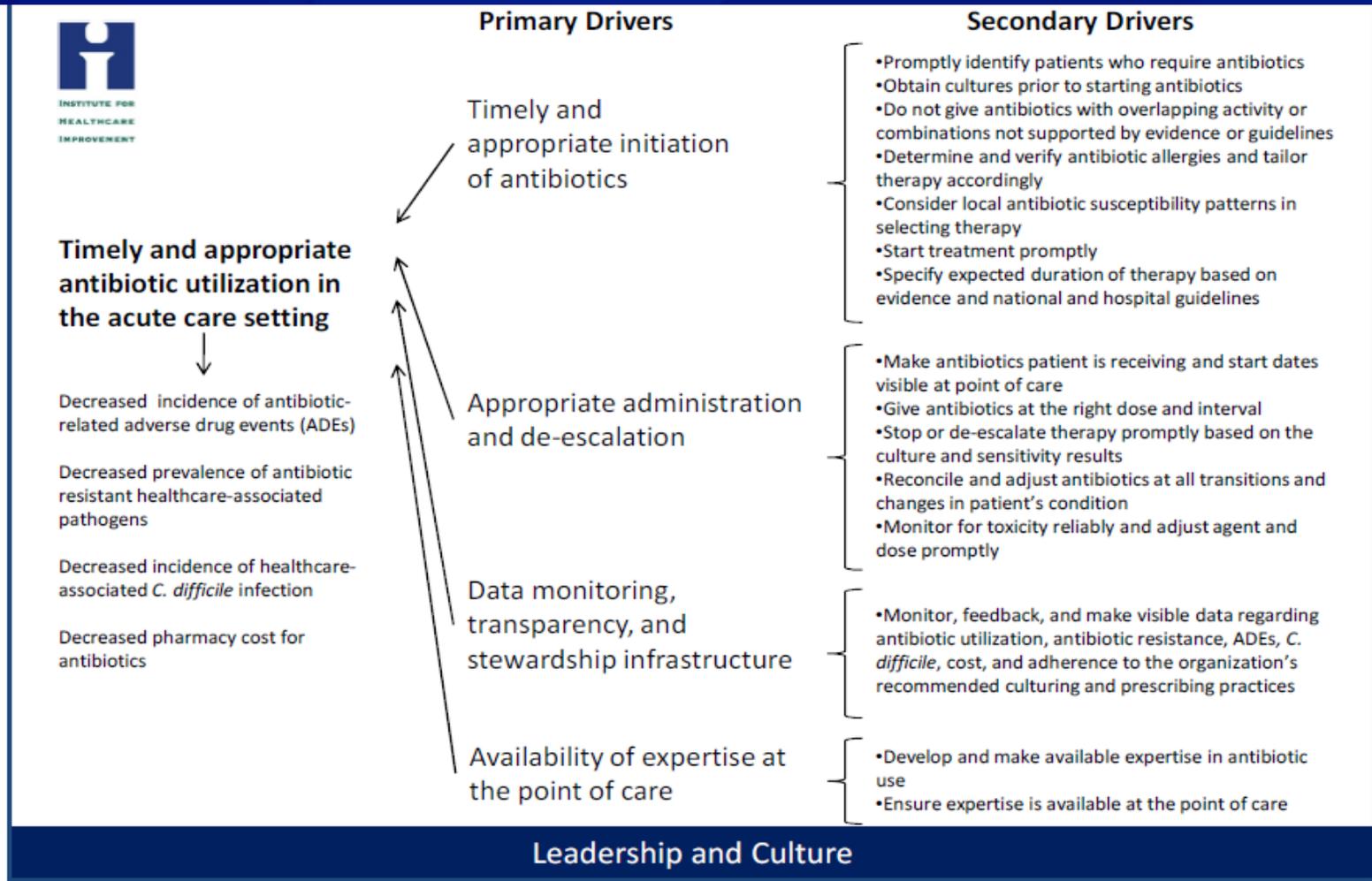
FIGURE 1. Communication–health information processing model of nurse-physician telephone communication in the long-term care setting.

Initial questions to consider

- ❑ What is our process for identifying, documenting, and communicating changes in resident condition?
 - ❑ Do we have standard protocols which may unintentionally drive antibiotic use?
 - ❑ Do we have good communication among front-line staff and clinical providers?
- ❑ Have we created expectations among residents, families, and NH staff about antibiotic use?
- ❑ What resources on antibiotic susceptibility and use do we receive from the consultant laboratory and pharmacy?
- ❑ Do we have a process to re-assess residents who have been started on an antibiotic?
- ❑ Do we monitor and provide feedback on provider antibiotic use?

**What could be done in the NH setting
to improve antibiotic use?**

Antibiotic Stewardship Driver Diagram



<http://www.cdc.gov/getsmart/healthcare/improve-efforts/driver-diagram/index.html>

Connecting back to antibiotic stewardship drivers

Overarching: Leadership and Culture

- Engage facility leadership in promoting antibiotic stewardship
- Educate residents, families and NH staff on safe antibiotic use

Timely and appropriate initiation

- Improve quality/documentation of changes in condition
- Standardize communication of change in condition

Appropriate administration and de-escalation

- Review antibiotic history and other medication use
- Utilize laboratory resources to track susceptibility data
- Improve/standardize quality and communication of follow-up assessments
- Standardize the laboratory data obtained prior to antibiotic start

Data monitoring, transparency, and stewardship infrastructure

- Measure and report antibiotic use including provider specific data

Leadership and culture

http://www.cdc.gov/getsmart/healthcare/

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A-Z Index A B C D E F G H I J K L M N O P Q R S T U V W X Y Z #

Get Smart for Healthcare

Studies indicate that nearly 50% of antimicrobial use in hospitals is unnecessary or inappropriate. There is no doubt that this overuse of antibiotics is contributing to the growing challenges posed by *Clostridium difficile* and other antibiotic-resistant bacteria in many hospitals. However, studies also demonstrate that improving the use of antibiotics in hospitals can not only help reduce rates of *Clostridium difficile* infection and antibiotic resistance, but can also improve individual patient outcomes, all while saving hundreds of thousands of dollars in healthcare costs. *Get Smart for Healthcare* is a CDC campaign focused on improving antibiotic use in inpatient healthcare facilities, starting with hospitals and then expanding to long-term care facilities.

As part of the 2012 Get Smart About Antibiotics Week activities, CDC and the nation's leading healthcare organizations have united to issue an important policy statement focused on preserving antibiotic effectiveness and combating resistance. To view the joint statement, [click here](#).

Get Smart for Healthcare Topics

- Why Inpatient Stewardship?**
Benefits of antibiotic stewardship, Overview, Slide sets, Fast facts...
- Implementing and Improving Stewardship Efforts**
Tools, Getting Started, CDC/IHI Driver Diagram and Change package...
- Evidence to Support Stewardship Efforts**
Annotated bibliography, References...
- Learn from others**
Success stories, Hospital Programs, CE Training

Fast Facts

Antibiotics are a shared resource – and

Antibiotic use in long-term care facilities

Get Smart
About Antibiotics Week
November 14-20, 2011

Did you know?

1. Antibiotic resistance is one of the world's most pressing public health threats.
2. Antibiotics are the most important tool we have to combat life-threatening bacterial diseases, but antibiotics can have side effects and complications.
3. Antibiotic overuse increases the development of drug-resistant germs.
4. Patients, healthcare providers, healthcare facility administrators, and policy makers must work together to employ effective strategies for improving antibiotic use – ultimately improving medical care and saving lives.

Scope of the Problem

- Antibiotics are among the most commonly prescribed medications in long-term care facilities.
- Up to 70% of long-term care facilities' residents receive an antibiotic every year.
- Estimates of the cost of antibiotics in the long-term care setting range from \$38 million to \$137 million per year.

Antibiotic resistance in long-term care is associated with:

- Increased risk of hospitalization
- Increased cost of treatments
- Increased risk of death

- Utilize existing campaigns, resources, to make facility leadership, staff, and residents more aware of safe antibiotic use

<http://www.cdc.gov/getsmart/healthcare/>

Timely and appropriate initiation

- ❑ Standardize the process for assessing a resident when concern about new infection
 - ❑ Ensure all pieces of history and physical exam are assessed
 - ❑ Improve quality/documentation of assessments of change in condition
 - ❑ Communicate information about recent antibiotic and other medication use
- ❑ Standardize communication of change in condition to medical providers
- ❑ Improve the use of the laboratory data
 - ❑ Review existing protocols which might drive inappropriate diagnostic testing (e.g., send a UA for every resident who falls)
 - ❑ Ensure specimen for culture are obtained before antibiotics start
 - ❑ Use susceptibility data from your lab (e.g., NH antibiograms)

Appropriate administration and de-escalation

- ❑ Differentiate colonization from true infection
 - ❑ Decrease cultures obtained for non-specific changes in a resident's condition (e.g., falls, altered behavior, "not acting like himself")
 - ❑ Decide to start antibiotics Often, antibiotics aren't initiated until culture results have returned, however, the drug are initiated, even if the resident's changes have resolved

Treat the person not the laboratory test

Appropriate administration and de-escalation

- ❑ Implement a process for a 72 hour antibiotic review
 - ❑ Diagnostic test and culture results are reviewed by nursing staff and provider
 - ❑ Nursing staff review resident's response to therapy in conjunction with their provider
 - ❑ Empiric antibiotic is discontinued if data suggest an alternative explanation for change-in-condition
 - ❑ If indicated, antibiotics are narrowed based on culture results
 - ❑ Ensure adequate documentation of follow-up assessment, rationale for decisions for continuation or discontinuation

Appropriate administration and de-escalation

- ❑ Use evidence-based guidance to limit antibiotic use and prevent unnecessary follow-up testing
 - ❑ Pneumonia guidelines recommend short courses (5-8 days), not 14 days
 - ❑ Reduce antibiotic use for urinary tract infections (3-7 days), even when chronic indwelling catheters are present
 - ❑ Don't allow follow-up micro cultures to “demonstrate clearance of infection” – treat the person not the lab test

Address the barriers to de-escalation

- ❑ Ensure that appropriate assessments and cultures are obtained in advance of antibiotic starts
 - ❑ Prevents the dilemma of not having data to guide changes
- ❑ Improve the communication between front-line staff and clinical providers
 - ❑ Prevents the anxiety of providers who are off-site and not performing their own assessments
- ❑ Implement processes to increase monitoring of residents when changes in condition occur
 - ❑ Prevents perceptions of family that “you’re not doing something for my loved one if you don’t give an antibiotic”
- ❑ Prevent inertia -- “well, it probably isn’t an infection, but let’s continue for 10 days just in case”

Make antibiotic use decisions well-informed

- ❑ Understand and address the knowledge, attitudes and perceptions of the clinical providers, staff and residents
 - ❑ Promote antibiotic use guidelines and training
 - ❑ Share provider specific antibiotic use data
 - ❑ Educate and empower front-line NH staff
 - ❑ Educate residents, families and NH staff on the risks of antibiotic use

Make antibiotic use decisions well-informed

Clin Infect Dis 2009; 48:149-171

IDSA GUIDELINES

Clinical Practice Guideline for the Evaluation of Fever and Infection in Older Adult Residents of Long-Term Care Facilities: 2008 Update by the Infectious Diseases Society of America

Kevin P. High,¹ Suzanne F. Bradley,^{2,3,4} Stefan Gravenstein,^{5,6,7,8} David R. Mehr,⁹ Vincent J. Quagliarello,¹⁰ Chesley Richards,^{11,12} and Thomas T. Yoshikawa^{13,14}

Infect Control Hosp Epidemiol 2001; 22:120-124

Development of Minimum Criteria for the Initiation of Antibiotics in Residents of Long-Term-Care Facilities: Results of a Consensus Conference

Mark Loeb, MD, MSc; David W. Bentley, MD; Suzanne Bradley, MD; Kent Crossley, MD; Richard Garibaldi, MD; Nelson Gantz, MD; Allison McGeer, MD; Robert R. Muder, MD; Joseph Mylotte, MD; Lindsay E. Nicolle, MD; Brenda Nurse, MD; Shirley Paton, RN; Andrew E. Simor, MD; Philip Smith, MD; Larry Strausbaugh, MD

CDC/SHEA infection surveillance definitions for LTC, 2012

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY OCTOBER 2012, VOL. 33, NO. 10

SHEA/CDC POSITION PAPER

Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria

- ❑ Reviewed and updated the criteria outlined in the 1991 infection surveillance definition paper by McGeer et al.
- ❑ Major topics/ clinical syndromes addressed in the guidance
 - ❑ Constitutional criteria
 - ❑ Respiratory tract infections
 - ❑ Urinary tract infections
 - ❑ Skin and soft tissue infections
 - ❑ Gastrointestinal tract infections

Use infection surveillance data to inform antibiotic stewardship

- ❑ Surveillance definitions may not be the same as clinical criteria used to make treatment decisions
 - ❑ Sometimes diagnosis/treatment decisions are made before all the data is available
 - ❑ Sometimes insufficient documentation is available to demonstrate that surveillance criteria have been met
- ❑ Even events captured by the MDS may not correspond to the events meeting surveillance criteria

Gap between MD diagnosis and surveillance criteria

Table 2 Incidence and attributable risk of infection

| | Number of infections | | Incidence rate (infections/1,000 resident-months) | | Relative risk (95%) | p-value |
|---|----------------------|--------------------------|---|-----------------|---------------------|---------|
| | Device (263 f/u-mon) | Non-device (644 f/u-mon) | Device (IRe) | No-device (IRu) | | |
| Total infections ^a | 87 | 110 | 331 | 171 | 1.9 (1.4–2.6) | <0.001 |
| Urinary tract infections ^a | 49 | 54 | 186 | 84 | 2.2 (1.5–3.3) | <0.001 |
| Pneumonia ^a | 23 | 20 | 87 | 31 | 2.8 (1.5–5.4) | 0.0004 |
| Other infections ^b | 15 | 36 | 57 | 56 | 1.0 (0.5–1.9) | 0.47 |
| McGeer's criteria ^c | 8 | 15 | 30 | 23 | 1.3 (0.5–3.3) | 0.27 |
| Minimum criteria ^c | 12 | 10 | 46 | 16 | 2.9 (1.2–7.6) | 0.007 |
| McGeer's or minimum criteria ^c | 15 | 18 | 57 | 28 | 2.0 (1.0–4.3) | 0.02 |

^a Clinical definition

^b Includes skin and soft tissue infections, *Clostridium difficile* colitis, conjunctivitis, upper respiratory, and

^c Includes pneumonia and/or urinary tract infections

- 146 infections, UTI or pneumonia were diagnosed and treated by clinicians
- 33/146 (23%) were also identified by applying either McGeer or Loeb minimum criteria

Explore the gaps with clinical providers to improve antibiotic use

- ❑ Evaluate the discrepancies between surveillance data and clinical/MDS data as a process improvement exercise
- ❑ Ask for their input in identifying the reasons why events treated with antibiotics don't meet surveillance (or other practice guideline) criteria
- ❑ Identify ways to improve:
 - ❑ Assessments
 - ❑ Documentation
 - ❑ Diagnostic testing
 - ❑ Follow-up after antibiotics have been initiated

Safer Antibiotic Use in NHs: The time is NOW

- ❑ The scope and consequence of antibiotic misuse in NHs is extremely high
 - ❑ NH regulations already set expectations for activities to improve antibiotic use
- ❑ Understanding the process for antibiotic use can identify opportunities for improvement
 - ❑ Standardizing the assessment and evaluation of residents
 - ❑ Improved documentation
 - ❑ Remove barriers to effective communication between nursing staff and providers
- ❑ Use existing infection surveillance data to inform providers of gaps in current antibiotic use practices

Thank you!!

**Email: nstone@cdc.gov with
questions/comments**

**For more information please contact Centers for Disease Control and
Prevention**

1600 Clifton Road NE, Atlanta, GA 30333

Telephone, 1-800-CDC-INFO (232-4636)/TTY: 1-888-232-6348

E-mail: cdcinfo@cdc.gov Web: www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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