North Carolina SPICE
Statewide Program for Infection Control & Epidemiology

ANTIBIOTIC STEWARDSHIP IN NURSING HOMES

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(with thanks to Chrissy Kistler, MD, MASc, the CDC, and AHRQ)

April 15, 2023

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NO CONFLICT OF INTEREST

Dr. Sloane has no conflicts of interest.

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ANTIBIOTIC STEWARDSHIP IS…

A set of commitments and activities designed to:

- **optimize the treatment of infections**

  And

- **reduce the adverse events associated with antibiotic overuse**

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IN OPERATIONAL TERMS, ANTIBIOTIC STEWARDSHIP IS….

- A system of informatics, data collection, personnel, policies and procedures designed to assure that patients get:
  - the right drug
  - at the right time
  - for the right duration

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If you were trained 10 or more years ago, attitudes are different now….and these newer attitudes underpin much of antibiotic stewardship

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"New" Attitude #1

Prescribing antibiotics **"just in case"** was accepted in the past, but now antibiotics should be given after **careful, evidence-based consideration** of risks and benefits.

6

"New" Attitude #2

A **Longer is Better** approach to antibiotic duration was accepted in the past, but now the **evidence-based shortest effective course** is considered optimal.

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WHY THIS CHANGE HAS OCCURRED…. AND WHY IT'S ESPECIALLY IMPORTANT IN NURSING HOME MEDICINE

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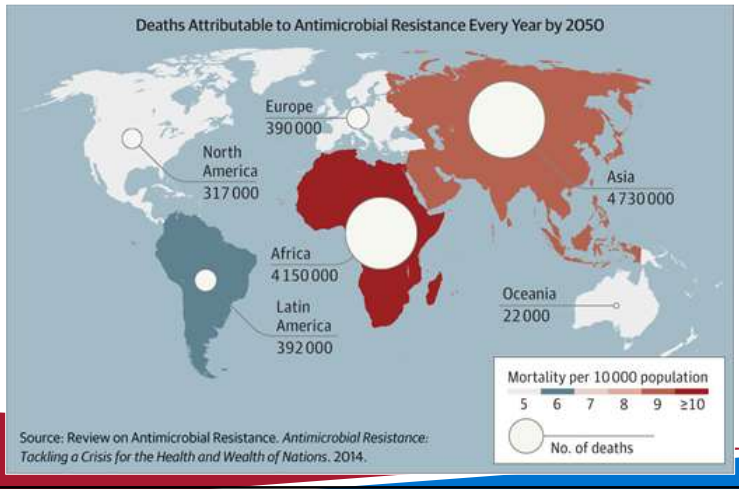
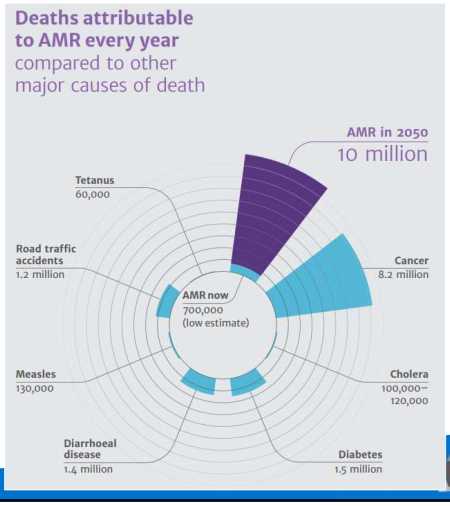
WORLDWIDE CRISIS OF ANTIBIOTIC RESISTANCE

- Multi-drug resistance increasingly common
- Projected 10 million deaths per year worldwide by 2050





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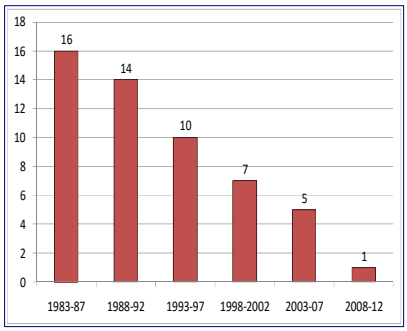
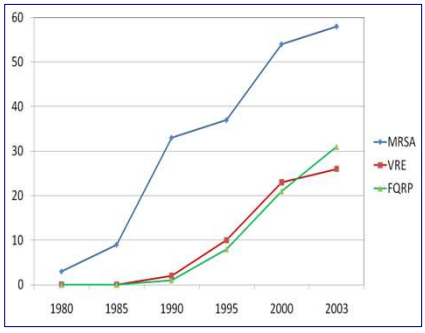
WHAT'S CAUSING THE CRISIS?

Fewer New Antibiotics Being Developed



Resistant Strains Spread Rapidly



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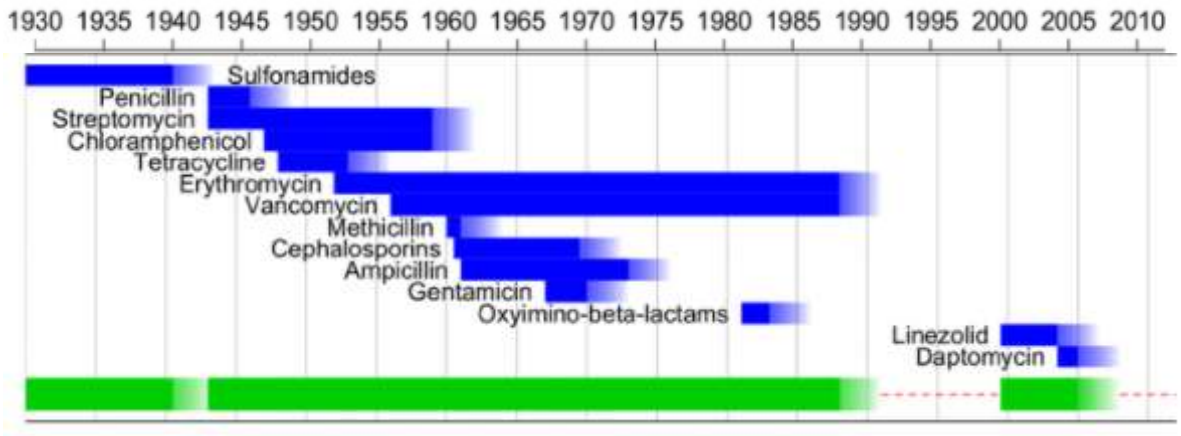
DRUG DEVELOPMENT HAS ALMOST STOPPED



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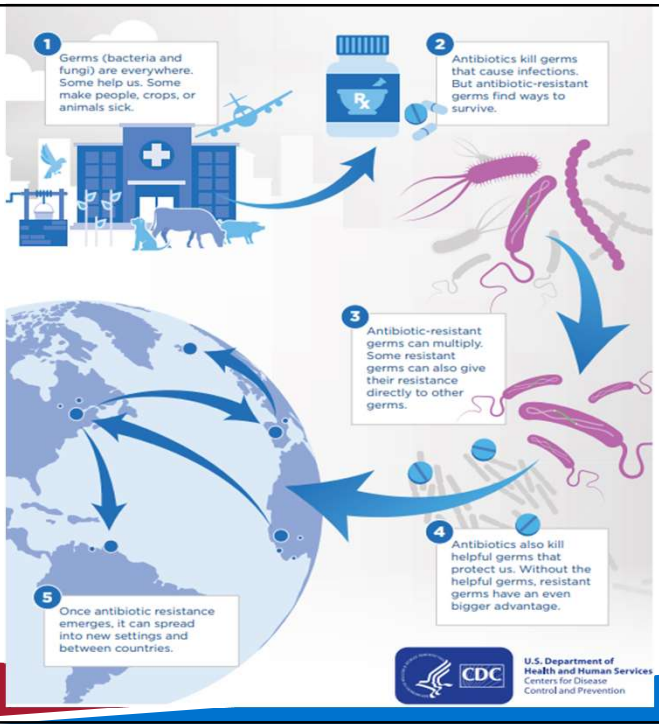
MANY CAUSES OR ANTIBIOTIC RESISTANCE ARE OUT OF OUR CONTROL



Veterinary Use

Agricultural Use

International Use and Travel

Bacteria Have Learned to Pass Resistance to Each Other (e.g., with Plasmids)

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SIDE EFFECTS ARE BETTER RECOGNIZED

And then of course *C. Difficile*

The Dark Side of Antibiotics: Serious Side Effects

Antibiotics	Side Effect
Aminoglycosides	Oto-Nephrotoxicity
Tetracyclines	Photosensitivity/ Teeth Stains
Macrolides	Qt Prolongation
Fluoroquinolones	Tendon Damage
Vancomycin	Red Man Syndrome
Nitrofurantoin	Lung Effects/ Brown Urine
Linezolid	Serotonin Syndrome
Penicillins	Allergies
Clofazimine	Brown-Pink Skin Discoloration
Isoniazid	Peripheral Neuropathy

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THE OLDER AND SICKER THE PATIENT, THE MORE LIKELY ARE SIDE EFFECTS

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WHY THE FOCUS ON NURSING HOMES

- In recent years, NHs have surpassed hospitals in prevalence of antibiotic resistance
- Antibiotic usage tends to be quite high
- NHs with the highest prescribing rates tend to also have the highest rates of MDR infections, including *clostridium difficile*
- Residents LIVE there (as opposed to hospital)

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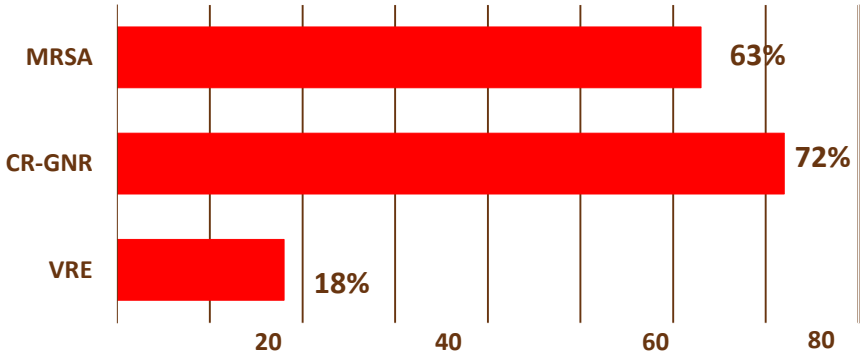
ANTIBIOTIC RESISTANCE IS A PROBLEM IN ALL NURSING HOMES

Results of skin, airway, skin and wound cultures in 82 residents of a Michigan nursing home



J Clin Micro 50(5); 1698-1703, 2012.

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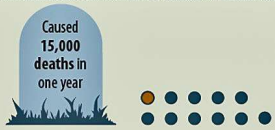
Clostridium Difficile:
an Indicator of Antibiotic Overuse

IMPACT

Caused close to half a million illnesses in one year.

Comes back at least once in about 1 in 5 patients who get *C. difficile*.



1 in 11 people 65 and older died within a month of *C. difficile* infection diagnosis.

RISK

People on antibiotics are 7-10 times more likely to get *C. difficile* while on the drugs and during the month after.

Being in healthcare settings, especially hospitals or nursing homes.

More than 80% of *C. difficile* deaths occurred in people 65 and older.

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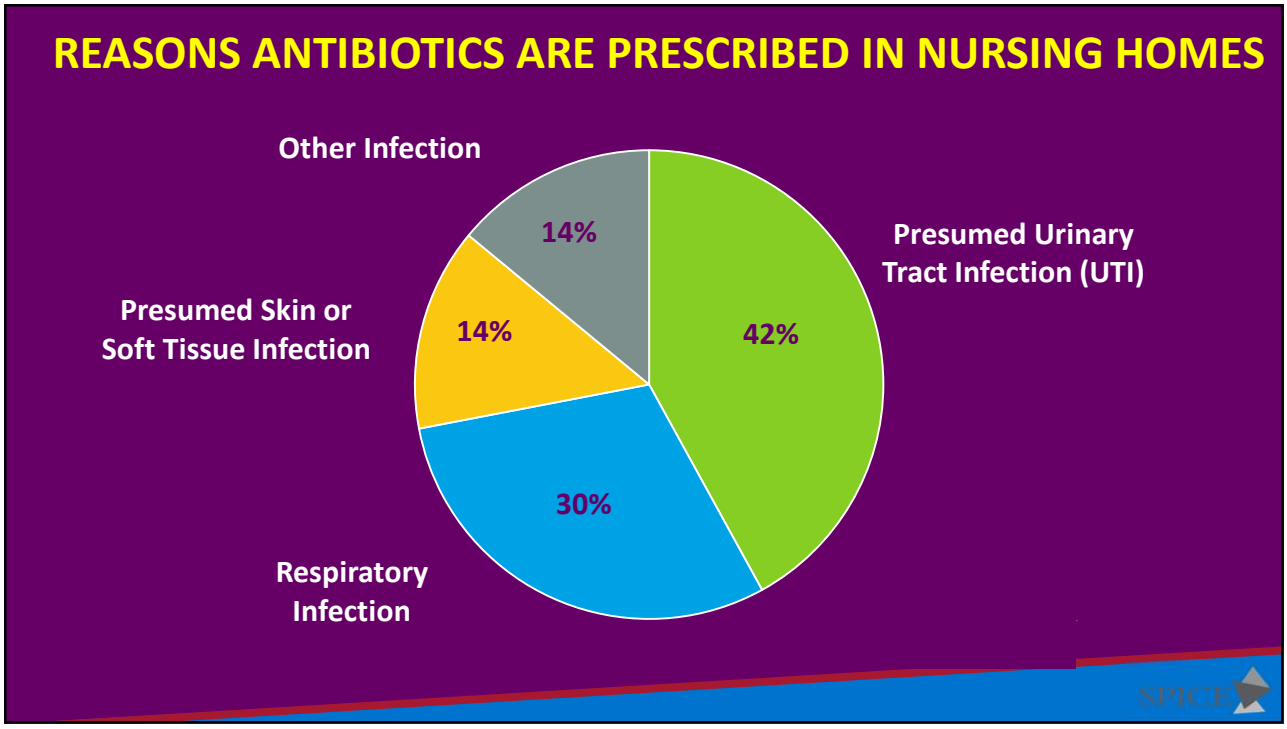
REASONS ANTIBIOTICS ARE PRESCRIBED IN NURSING HOMES
Other Infection
14%
Presumed Urinary Tract Infection (UTI)
42%
Presumed Skin or Soft Tissue Infection
14%
30%
Respiratory Infection
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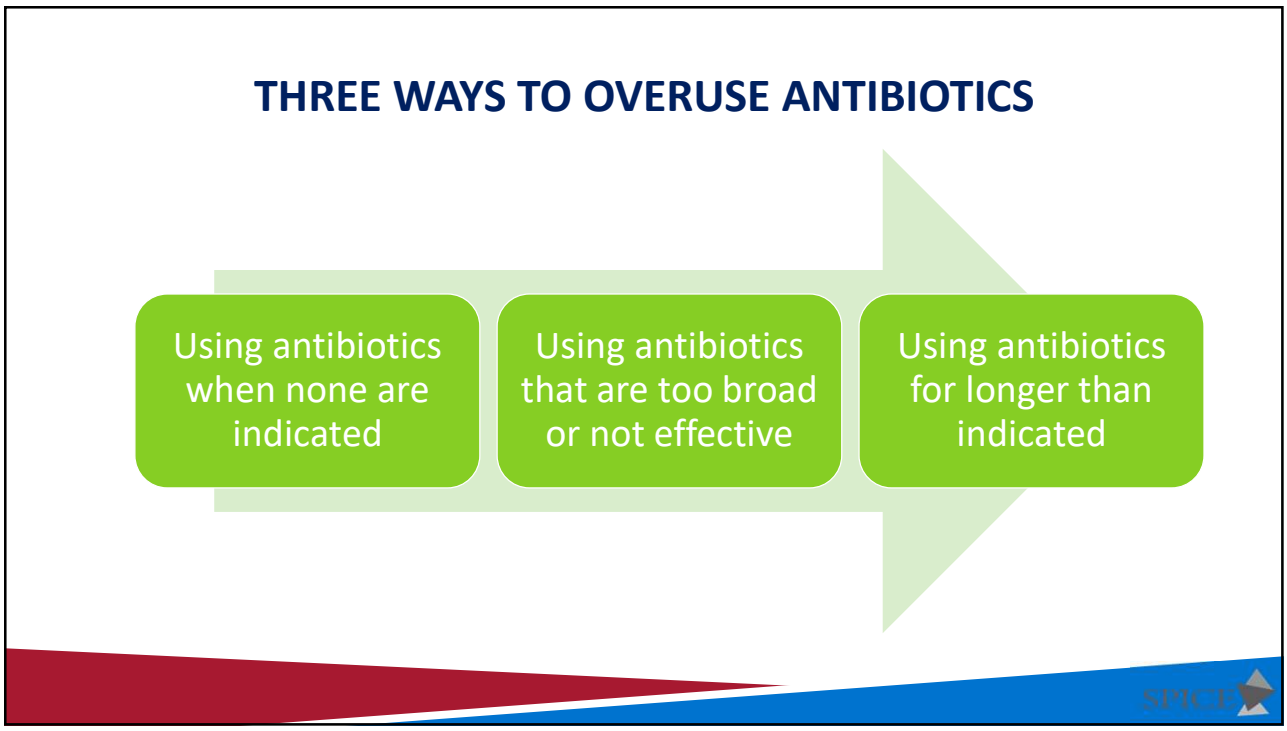
THREE WAYS TO OVERUSE ANTIBIOTICS
Using antibiotics when none are indicated
Using antibiotics that are too broad or not effective
Using antibiotics for longer than indicated
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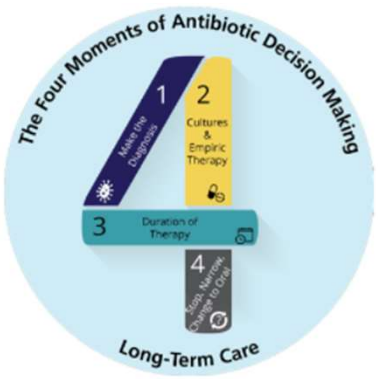
JUMPING TO CONCLUSIONS

- In nursing homes --- One of the biggest causes of unnecessary antibiotic use
- In medical decision-making – the most common reason for medical errors



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THE WEB OF DECISION-MAKING

Nurse

Provider

Supervisor

Probably the urine. Needs an antibiotic.

Family

Every time mother [Does X] she needs antibiotics

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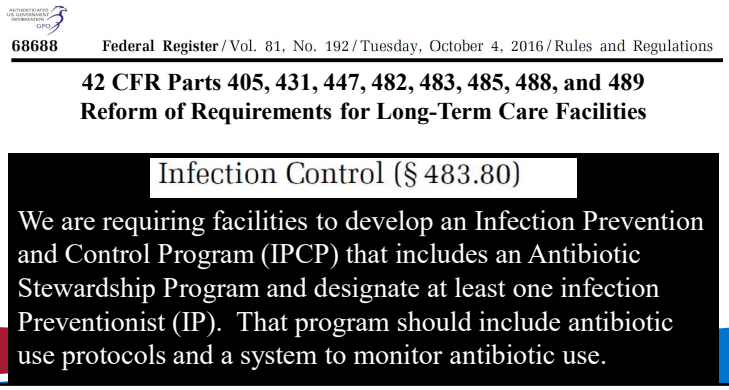
THE CMS NURSING HOME INFECTION CONTROL MANDATE

SEPTEMBER 2015: CDC identified core elements of antibiotic stewardship.

CMS 2016-17 ACTION PLAN: developing and pilot test a worksheet for surveyors to "assess the new antibiotic stewardship requirement."

November 2019: All NHs must have a trained infection preventionist



68688 Federal Register / Vol. 81, No. 192 / Tuesday, October 4, 2016 / Rules and Regulations

42 CFR Parts 405, 431, 447, 482, 483, 485, 488, and 489
Reform of Requirements for Long-Term Care Facilities

Infection Control (§ 483.80)

We are requiring facilities to develop an Infection Prevention and Control Program (IPCP) that includes an Antibiotic Stewardship Program and designate at least one infection Preventionist (IP). That program should include antibiotic use protocols and a system to monitor antibiotic use.

Agarwal M. *JAMDA*. 2019

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EXISTING REGULATIONS PROMOTING ANTIBIOTIC STEWARDSHIP

Federal Tag 483.80: Infection Control

Mentions performing antibiotic review

- **F880 Infection Prevention & Control**
- **F881 Antibiotic Stewardship Program**
- **F882 Infection Preventionist Qualifications**

Federal Tag 483.5 Pharmacy Services

Outlines role of pharmacist in scheduled reviews of medication use in high-risk residents

- **F756: Drug Regimen Review**
- **F757: Drug Regimen is Free From Unnecessary Drugs**
- **F759: Free of Medication Error Rates of 5% or More**

https://www.cms.gov/Medicare/Provider-Enrollment-and-Certification/GuidanceforLawsAndRegulations/Downloads/List-of-Revised-FTags.pdf

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HOW TO MOVE FROM KNOWING TO DOING

ASK: IS ANTIBIOTIC USE A PROBLEM IN YOUR FACILITY?

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SITUATIONS LEADING TO ANTIBIOTIC OVERUSE

1. Urinary: Urine appearance and odor and urine test results
2. Respiratory: Cough
3. Skin: Wounds, Red and swollen legs
4. Emergency departments and hospitals
5. Prophylaxis
6. Nonspecific symptoms
7. Empirical antibiotic choice and duration

Khandelwal C. Annals of Long-Term Care: Clinical Care and Aging. 2012;20(4):23-29.

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WHERE TO START

- Know and apply the CDC Key Elements
- Meet with your antibiotic stewardship team to identify problems as opportunities for improvement
- Identify a problem to work on

We seem to have a lot of residents who return from the emergency department on antibiotics for "UTI" when we sent them to check for an injury.

https://www.ahrq.gov/antibiotic-use/long-term-care/improve/program.html

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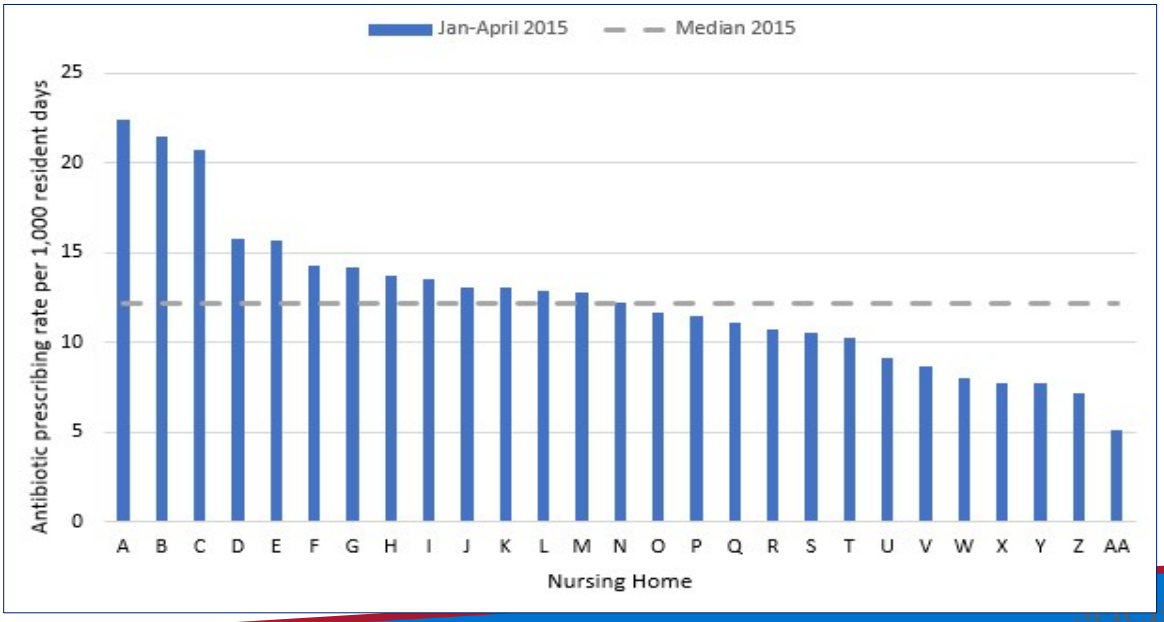
VARIATION IN ANTIBIOTIC PRESCRIBING



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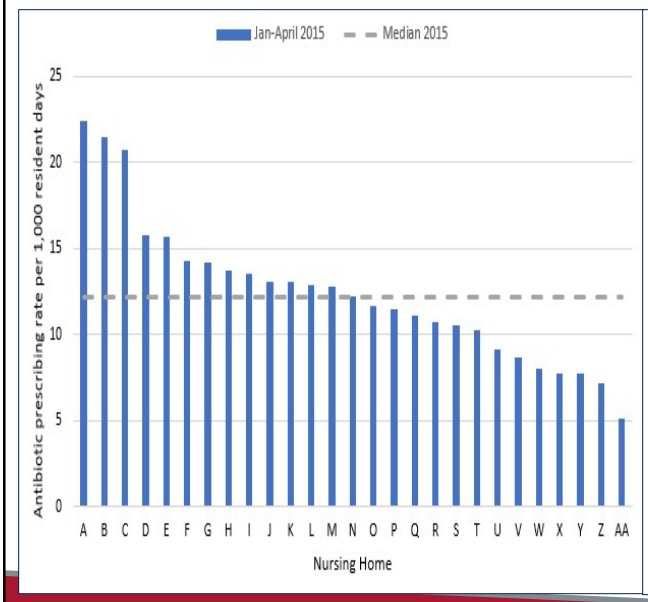
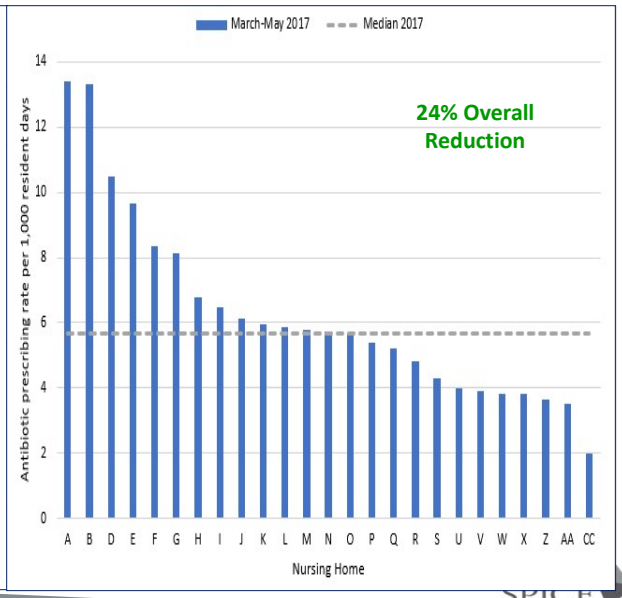
ANTIBIOTIC STEWARDSHIP CAN CHANGE NH ANTIBIOTIC PRESCRIBING





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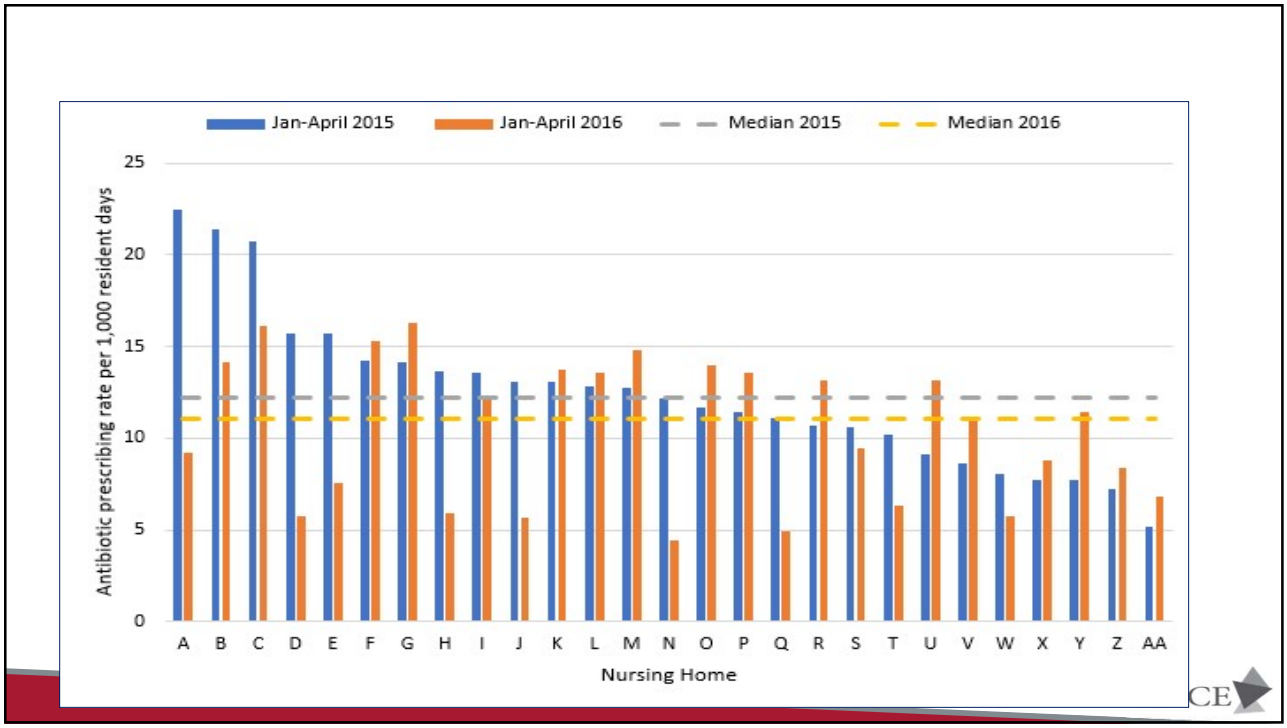
Jan-April 2015
Jan-April 2016
Median 2015
Median 2016
Antibiotic prescribing rate per 1,000 resident days
25
20
15
10
5
0
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA
Nursing Home

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ANTIBIOTIC STEWARDSHIP OPPORTUNITY 1: DON'T BE FOOLED BY NONSPECIFIC SYMPTOMS

- Does the resident have symptoms suggestive of an infection?
  - Systemic signs or symptoms: fever, tachycardia, hypotension
  - Localizing signs or symptoms: productive cough, dysuria, purulence, spreading redness
- If symptoms are vague or nonspecific, do we have an active intervention plan that does not include antibiotics?

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ACTIVE INTERVENTIONS FOR NON-SPECIFIC SYMPTOMS

- ✓ Assess hydration status (and encourage fluids)
- ✓ Review current medications
- ✓ Look for signs of a respiratory or GI virus
- ✓ Think about sleep problems
- ✓ Ask about pain / discomfort
- ✓ Ask about constipation
- ✓ Look for sources of stress, anxiety or depression
- ✓ Monitor symptoms and vital signs (especially temperature)
- ✓ Use nursing interventions where appropriate

Should we get a urine culture "just in case"

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ANTIBIOTIC STEWARDSHIP OPPORTUNITY 2: CULTURES & EMPIRIC THERAPY

- What type of infection is it?
- Have we collected appropriate cultures before starting antibiotics?
- Do we have a plan that includes:
  - ✓An antibiotic time out?
  - ✓What to do when cultures come back:
- What empiric antibiotics should we initiate?

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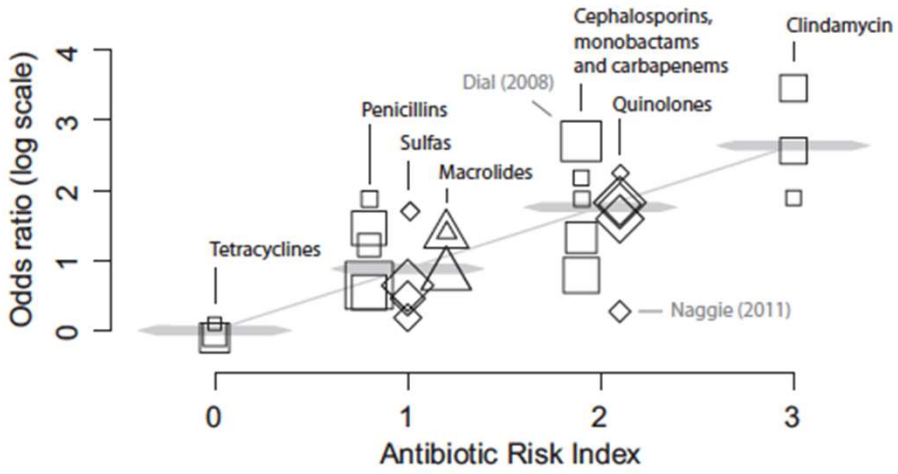
WHICH ANTIBIOTICS POSE THE HIGHEST RISK OF *CLOSTRIDIUM DIFFICILE?*



Wenisch et al. *Antimicrob Ag Chemother* 2014; 58(9): 5079-83

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Why Cultures and Antibiograms Matter

- Data from 75 prescriptions and 1,580 positive cultures in 31 NHs -

Antibiotic Prescribed Empirically (% of the time)	**Percent Resistant** (% of isolates) **Escherichia Coli** (44%)	**Proteus** (13%)	**Klebsiella pneumoniae** (13%)
Ciprofloxacin (26%)	57%	69%	11%
TMP-SMX (16%)	42%	45%	14%
Nitrofurantoin (12%)	4%	98%	23%
Ceftriaxone (11%)	17%	7%	11%
Levofloxacin (7%)	58%	63%	8%

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ANTIBIOTIC STEWARDSHIP OPPORTUNITY 3: LENGTH OF THERAPY

- What duration of antibiotic therapy is needed for the resident's diagnosis?
- Most bacterial infections need 7 days or less of antibiotics!

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RECOMMENDED DURATION OF ANTIBIOTIC THERAPY (NON-HOSPITALIZED PATIENTS)

Type of infection	Sanford Guide, 2015	ID Society	David Weber	
Simple UTI (cystitis)	3 days [1]	3 days[1]	3 days	
COPD exacerbation	3-10 days [2]	--	3-5 days	
Pneumonia without sepsis	Until afebrile for 3d	≥5 days [4]	≥5 days	
Cellulitis (lower extremity)	10 days [3]	5 days	5-7 days	

1 TMP-SMX – 3 days; Nitrofurantoin – 5-days; 2 Varies with drug, No therapy required in most cases; 3 Not diabetic; 4 Minimum 5 days (should be afebrile 48-72 hours);' non-ambulatory treat as HCAP; assess using score for severity

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RECOMMENDED DURATION OF ANTIBIOTIC THERAPY (NON-HOSPITALIZED PATIENTS)

Type of infection	Sanford Guide, 2015	ID Society	David Weber	Actual NH Practice
Simple UTI (cystitis)	3 days [1]	3 days[1]	3 days	7.5 days
COPD exacerbation	3-10 days [2]	--	3-5 days	7.8 days
Pneumonia without sepsis	Until afebrile for 3d	≥5 days [4]	≥5 days	
Cellulitis (lower extremity)	10 days [3]	5 days	5-7 days	9.6 days

1 TMP-SMX – 3 days; Nitrofurantoin – 5-days; 2 Varies with drug, No therapy required in most cases; 3 Not diabetic; 4 Minimum 5 days (should be afebrile 48-72 hours);' non-ambulatory treat as HCAP; assess using score for severity

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ANTIBIOTIC STEWARDSHIP OPPORTUNITY 4: DE-ESCALATION. HAVE A POLICY AND PLAN TO STOP, NARROW, OR CHANGE TO ORAL

- Active Surveillance is KEY:
- It's been 2-3 days since antibiotics were started
- Take an Antibiotic Time Out -- Re-evaluate the resident and review the results
  - Can we stop antibiotics?
  - Can we narrow therapy?
  - Can we change from IV to oral therapy?

ANTIBIOTIC STEWARDSHIP OPPORTUNITY 5: REDUCE PROPHYLACTIC ANTIBIOTICS FOR RECURRENT UTI BY ENCOURAGING THESE EFFECTIVE ALTERNATIVES

- Drinking plenty of fluids
- Perineal hygiene (front to back), consider non-scented wipes
- Reduce constipation
- Timed toileting- ideally every 2 hours (consider 2 x a shift)
- Cranberry tablets
- Vaginal estrogen cream

https://www.auanet.org/guidelines-and-quality/guidelines/recurrent-uti#x14424
https://www.nottsapc.nhs.uk/media/1815/uti-prophylaxis.pdf
https://d56bochluxqnz.cloudfront.net/documents/full-guideline/EAU-Guidelines-on-Urological-infections-2022.pdf

ANTIBIOTIC STEWARDSHIP OPPORTUNITY 6: RESIDENTS AT THE END OF LIFE

- Goals of care discussions should include antibiotics
- "Do everything" should be clarified
- Benefit versus potential harms
- If to relieve symptoms – define end point and take a time out after 2-3 days to evaluate whether they are helping

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DEVELOPING AN ANTIBIOTIC STEWARDSHIP PROGRAM IN YOUR NURSING HOME

START WITH THIS QUESTION: To improve antibiotic use in your nursing home, what behaviors would you <u>most</u> want to change?

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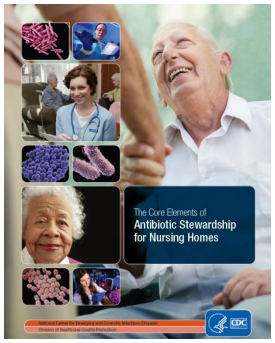
CDC's Core Elements of Antibiotic Stewardship in Nursing Homes



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#1. LEADERSHIP COMMITMENT

- Identify an antibiotic stewardship leadership team, including an infection preventionist (a.k.a. infection control nurse or infection specialist) and provide time
- Communicate expectations to medical and nursing staff
- Create a culture of antibiotic stewardship
- Agree to incorporate antibiotic stewardship into facility Quality Assurance and Performance Improvement goals, monitoring, and reporting

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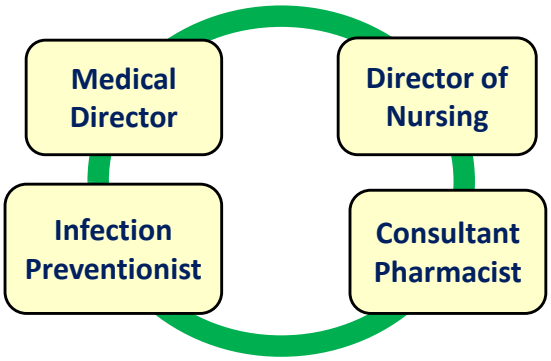
#2. ACCOUNTABILITY

CREATE AN ANTIBIOTIC STEWARDSHIP TEAM AND MAKE THEM ACCOUNTABLE



Laboratory | **ID Consultant**

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3. DRUG EXPERTISE

THE CONSULTANT PHARMACIST CAN BE YOUR FRIEND

- Pharmacists are increasingly aware of antibiotic stewardship issues
- Work with consultant pharmacist with infectious disease or antibiotic stewardship training
- Also ally yourself with programs and experts in hospitals or medical centers

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#4 ESTABLISH POLICIES AND PROCEDURES

- Some say to do this first
- However, reviewing data and setting facility priorities may be better to do first
- Best policies and procedures are endorsed by facility staff and updated regularly
- AMDA has published 2-page template

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HTTP://WWW.JAMDA.COM/ARTICLE/S1525-8610(17)30430-9/FULLTEXT

JAMDA 18 (2017) 913–920

ELSEVIER

JAMDA

journal homepage: www.jamda.com

Special Article

Template for an Antibiotic Stewardship Policy for Post-Acute and Long-Term Care Settings

Robin L.P. Jump MD, PhD [a,b,*], Swati Gaur MD, MBA, CMD [c], Morgan J. Katz MD [d], Christopher J. Crnich MD, PhD [e,f], Ghinwa Dumyati MD [g], Muhammad S. Ashraf MBBS [h], Elizabeth Frentzel MPH [i], Steven J. Schweon RN, MPH, MSN, CIC, HEM [j], Philip Sloane MD, MPH [k], David Nace MD, MPH, CMD [l] on behalf of the Infection Advisory Committee for AMDA—The Society of Post-Acute and Long-Term Care Medicine

CrossMark

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PRE-PRESCRIPTION INTERVENTIONS

Examples

- Checklist of signs and symptoms for nurses to use before calling a provider about a resident with a change in status
- Prescribing guidelines distributed to staff and clinicians
- Pocket cards distributed to staff indicating minimum criteria for starting antibiotics
- Electronic medical record “stops” to notify providers if a resident does not meet criteria for antibiotic therapy or needs monitoring
- Dose recommendations for residents with decreased kidney function
- Requirement that all antibiotic orders have an indication, dose, and duration

POST-PRESCRIPTION INTERVENTIONS

Examples:

- Electronic alert or pharmacy institutes antibiotic "time out" at 48 or 72 hours
  - Require the prescriber to reassess antibiotic prescriptions and verify the need to continue them
- Provider reviews culture results and diagnostic tests to make sure antibiotics are necessary and effective
- Formal review of appropriateness of antibiotic prescriptions by infectious disease–trained consultants 24 to 72 hours after the initial prescription
  - Consultants can be pharmacists or physicians

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CARE PROCESSES INTERVENTIONS

- Guidelines for urine testing, including what to do when cultures come back
- Pharmacist involvement in evaluating antibiotic starts and/or antibiotic duration
- Excel spreadsheet to chart antibiotic use – and regularly publicizing statistics

- CRITICAL ROLE OF LEADERSHIP CANNOT BE OVEREMPHASIZED -

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INFECTION CONTROL IS IMPORTANT!!!

-Preventing C Diff Infection and Spread-

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5. TRACK PROCESSES

- Clinical assessment documentation with change of condition
- Prescribing documentation
  - Antibiotic type
  - Frequency
  - Duration
- Adherence to facility-specific treatment recommendations
  - Staff process
  - Prescriber process

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#6. TRACK OUTCOMES

Antibiotic Prescribing

- Point prevalence surveys of antibiotic use
- New antibiotic starts/1,000 resident-days
- Antibiotic days of therapy/1,000 resident-days

Adverse Events

- Rates of *C. difficile* infections
- Rates of antibiotic-resistant organisms
- Rates of adverse drug events due to antibiotics
- Hospitalizations and Emergency Department visits for infections

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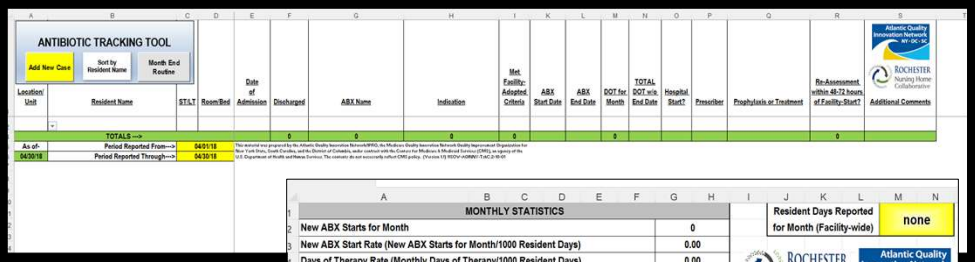
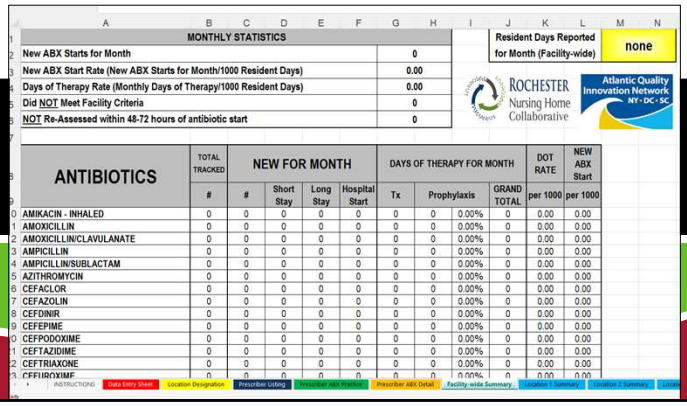
INFECTION TRACKING EXCEL SPREADSHEETS


ANTIBIOTIC TRACKING TOOL

Add New Case | Sort by Resident Name | Month End Routine

Location/ Unit	Resident Name	ST/LT	Room/Bed	Date of Admission	Discharged	ABX Name	Indication	Met Facility-Adopted Criteria	ABX Start Date	ABX End Date	DOT for Month	TOTAL DOT w/o End Date	Hospital Start?	Prescriber	Prophylaxis or Treatment	Re-Assessment within 48-72 hours of Facility-Start?	Additional Comments
TOTALS --->					0	0	0	0			0					0	

As of-	Period Reported From--->	04/01/18
04/30/18	Period Reported Through--->	04/30/18


MONTHLY STATISTICS

New ABX Starts for Month	0
New ABX Start Rate (New ABX Starts for Month/1000 Resident Days)	0.00
Days of Therapy Rate (Monthly Days of Therapy/1000 Resident Days)	0.00
Did NOT Meet Facility Criteria	0
NOT Re-Assessed within 48-72 hours of antibiotic start	0

Resident Days Reported for Month (Facility-wide): none

ROCHESTER Nursing Home Collaborative

Atlantic Quality Innovation Network NY-DC-SC

ANTIBIOTICS	TOTAL TRACKED	NEW FOR MONTH				DAYS OF THERAPY FOR MONTH				DOT RATE	NEW ABX Start
	#	#	Short Stay	Long Stay	Hospital Start	Tx	Prophylaxis		GRAND TOTAL	per 1000	per 1000
AMIKACIN - INHALED	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
AMOXICILLIN	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
AMOXICILLIN/CLAVULANATE	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
AMPICILLIN	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
AMPICILLIN/SUBLACTAM	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
AZITHROMYCIN	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
CEFACLOR	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
CEFAZOLIN	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
CEFDINIR	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
CEFEPIME	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
CEFPODOXIME	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
CEFTAZIDIME	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
CEFTRIAXONE	0	0	0	0	0	0	0	0.00%	0	0.00	0.00
CEFUROXIME	0	0	0	0	0	0	0	0.00%	0	0.00	0.00

INSTRUCTIONS | Data Entry Sheet | Location Designation | Prescriber Listing | Prescriber ABX Practices | Prescriber ABX Detail | Facility-wide Summary | Location 1 Summary | Location 2 Summary

http://www.rochesterpatientsafety.com/index.cfm?Page=For%20Nursing%20Homes

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AN ABUNDANCE OF FREE HELP!

- http://www.rochesterpatientsafety.com/index.cfm?Page=For%20Nursing%20Homes
- https://www.health.state.mn.us/diseases/antibioticresistance/hcp/asp/ltc/index.html
- https://www.cdph.ca.gov/Programs/CHCQ/HAI/Pages/SNF_ASP_Toolkit.aspx
- https://asap.nebraskamed.com/long-term-care/tools-templates-long-term-care/
- https://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html
- https://www.ahrq.gov/nhguide/index.html

Many tools (156!) available for free on the internet, mostly about education, patient assessment and outcome measurement.

Belan M. J Antimicrob Chemother. 2020 Jun

SPICE

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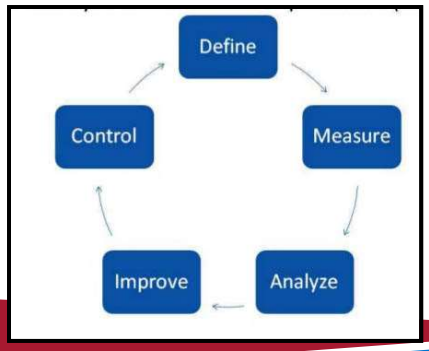
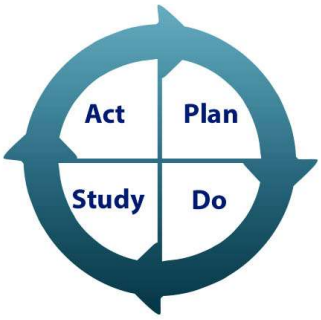
REPORT OUTCOMES!

- Time should be set aside to report on the data you've tracked
- Let providers know how they're doing





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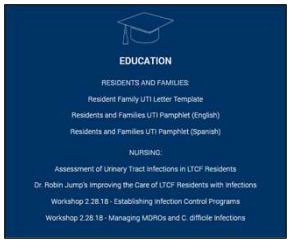
#7. EDUCATION

- Nursing staff (RNs, LPNs, CNAs)
- Residents and families
- Clinical providers (MD, DO, NP, PA, PharmD)



https://www.cdc.gov/antibiotic-use/pdfs/AU-nursing-home-trifold-brochure-P.pdf
http://www.rochesterpatientsafety.com/index.cfm?Page=For%20Nursing%20Homes

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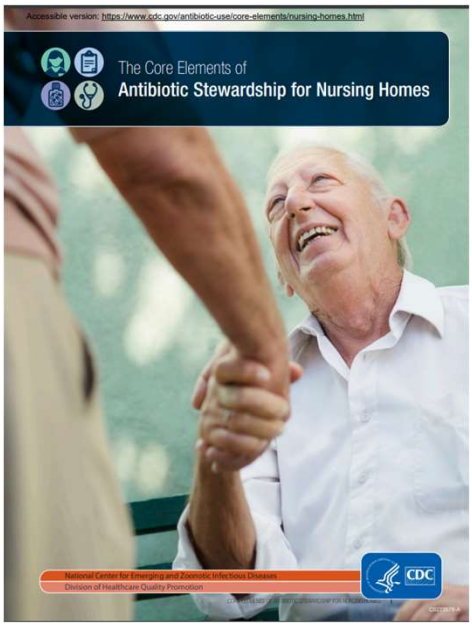
IMPLEMENTATION MANUAL

- A step-by-step guide explaining how to incorporate our materials into a program that will improve outcomes



https://www.cdc.gov/antibiotic-use/core-elements/pdfs/core-elements-antibiotic-stewardship-H.pdf

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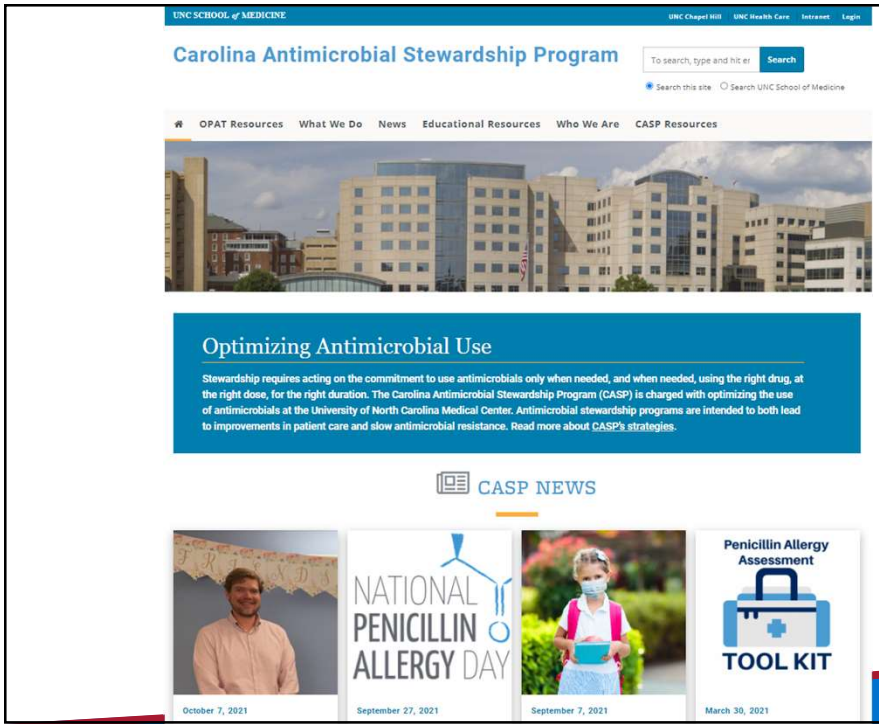

UNC has local resources too!

https://www.med.unc.edu/casp/

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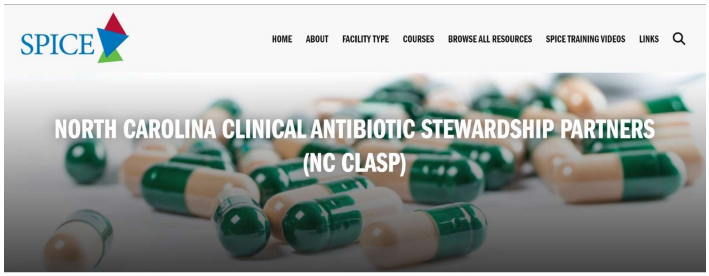
THE NORTH CAROLINA CLINICAL ANTIBIOTIC STEWARDSHIP PARTNERS (NC CLASP)

- Holding free online sessions – info at https://spice.unc.edu/ncclasp/



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Antibiotic Stewardship in Nursing Homes
4.1 MILLION
Americans are admitted to or reside in nursing homes during a year[1]
UP TO 70%
of nursing home residents received antibiotics during a year[2,3]
UP TO 75%
of antibiotics are prescribed incorrectly*[4,5]
CDC recommends
7 CORE ELEMENTS
for antibiotic stewardship in nursing homes
Leadership Commitment
Accountability
Drug Expertise
Action
Tracking
Reporting
Education
*Incorrectly = prescribing the wrong drug, dose, duration or reason
[1] AHCA Quality Report 2013.
[2] Lim CJ, Kong DCM, Stuart RL. Reducing inappropriate antibiotic prescribing in the residential care setting: current perspectives. Clin Interven Aging. 2014; 9: 165–177.
[3] Nicolle LE, Bentley D, Garibaldi R, et al. Antimicrobial use in long-term care facilities. Infect Control Hosp Epidemiol 2000; 21:537–45.
CDC
Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases
North Carolina
SPICE
Statewide Program for Infection Control & Epidemiology
CAN YOU TAKE THE LEAD IN YOUR FACILITY?
SPICE

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