Intersection of Infection Prevention and Antibiotic Stewardship Roles

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Infection Control Assessment and Promotion Program
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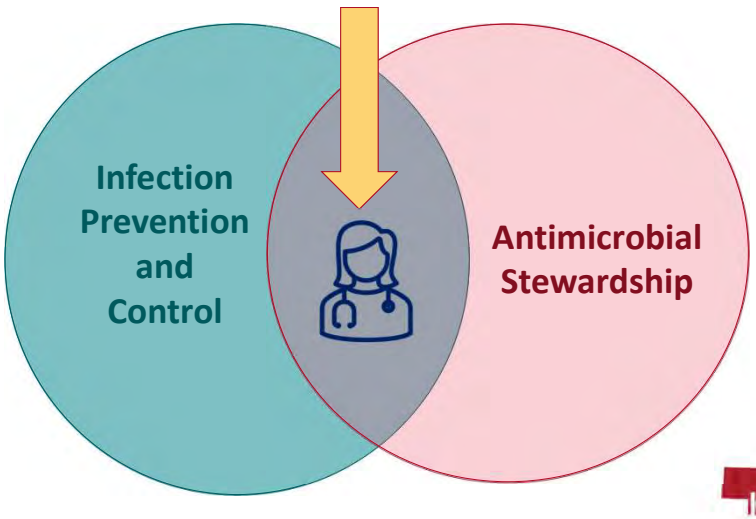
We are here



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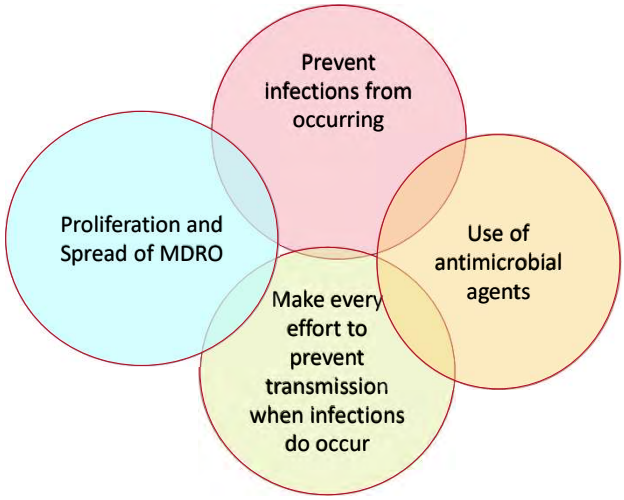
Intrinsic Relationship of Infection Prevention and Antimicrobial Stewardship Program



Manning, M.L., et al. Antimicrobial stewardship and infection prevention- leveraging the synergy: A position paper update. American Journal of Infection Control 46 (2018)

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Infection Tracking and Response

Identification, Isolation/Communication, and Containment

"Make every effort to prevent transmission when infections do occur."

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Infection Tracking and Resp

Which includes stewardship

Surveillance

Data Collection and Tracking

Rapid Response to Antibiotic Use

Identification of opportunity, Assessment & Data collection and Communication

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Intake procedures

Identify upon admission
potentially infectious people
Infectious status and isolation needs
Current antibiotic courses

IPC and Stewardship plan

Plan outlines the activities of monitoring residents, tracking infections, and antibiotic stewardship activities

Notification of IPC

A system is in place to notify the infection control and prevention team/ coordinator when
- antibiotic-resistant organisms or C. difficile are reported by a clinical laboratory
- Antibiotics are started or an intervention is possible

Alerts to frontline

Computer alerts to identify
Previously infected and colonized patients
Residents on antibiotic courses
New infection diagnostic test results

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Orientation and Accountability

42 CFR 483.80(a)(3)–pertaining to antibiotic stewardship program
Intent of the regulation is to ensure facility
•optimizes treatment of infection through use of protocols
•reduces risk of adverse events from antibiotic use
•monitors facility-wide antibiotic use
ASP should include leadership support and accountability via the participation of
•the medical director
•consulting pharmacist
•nursing
•administrative leadership, and
•individual with designated responsibility for the infection control program if different.
ASP protocols must
•be incorporated in the infection prevention and control program
•be reviewed on an annual basis
•contain a system of reports to monitor antibiotic usage and resistance data
•incorporate monitoring of antibiotic use
•assess residents for suspected infection using standardized tools and criteria
•include mode and frequency of prescribers and nursing education on ASP
Review by surveyor will determine if facility's ASP includes
•antibiotic use protocol(s) to address antibiotic prescribing practices such as
  - documentation of indication, dose, duration of antibiotic
  - review of laboratory reports to determine if antibiotic is indicated or needs adjustment
  - use of an infection assessment tool or management algorithm
•system to monitor antibiotic use such as
  - antibiotic use reports
  - antibiotic resistance reports

https://www.ecfr.gov/current/title-42/chapter-IV/subchapter-G/part-483/subpart-B/section-483.80
Code of Federal Regulations, Title 42, Chapter IV Subchapter G, Part 483, Subpart B

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Accountability

Assign one or more individuals with training in IPC to provide on-site management of the IPC program

- This should be a full-time role for at least one person in facilities that have more than 100 residents or that provide on-site ventilator or hemodialysis services. Smaller facilities should consider staffing the IPC program based on the resident population and facility service needs identified in the IPC risk assessment.

Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID-19) Pandemic,
CDC Updated May 8, 2023
See Setting-Specific considerations Nursing Homes" Infection Control: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) | CDC

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Principle of Safe Design	Nonclinical Example	Clinical Example
Standardize Care	image 	Order sets for when to order urine tests. Communication forms for sharing clinical information
Independent Checks		Is the order set being used? Is the communication form completed properly.
Learn from Problems	image 	• Post diagnostic criteria for a UTI at the nurses' station • Fire alerts in the EHR when new results are available • Decision support in EHR

Figure based and adapted from AHRQ Antibiotic Stewardship Toolkit for LTC

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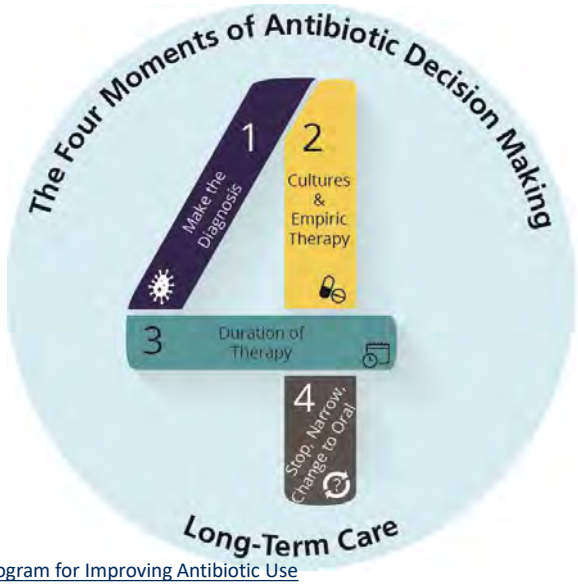
Stewardship is not "all or nothing"



AHRQ Safety Program for Improving Antibiotic Use

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Loeb vs. McGeer Criteria Clinical and Surveillance Criteria – Why do we have both?

Loeb Criteria

- Clinical criteria = inform decisions on individual patients when care is needed.

McGeer and NHSN Criteria

- Surveillance criteria = count true case events and to estimate incidence/prevalence

Loeb and McGeer Criteria: A Practical Guide for Use in Long-term Care (state.mn.us), slide courtesy of Jenna Preusker @NebraskaASAP

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Resident Case Example: GH

- GH is an 84 yo male
  - Did not come to breakfast, says he does not have an appetite
  - Temperature of 38°C (100.4 °F)
  - New onset cough this morning, small amounts of white mucus noted
  - Respiratory rate 26 breaths/minute
  - History of Stage II Congestive Heart Failure
  - Provider ordered a chest x-ray for that afternoon suspecting pneumonia
  - COVID-19 AG test is negative

Is it reasonable to initiate antibiotic therapy at this point? Are IP interventions needed?

Lower respiratory tract infection *with temp >38.9 °C (102 °F)*	At least one of the following criteria ☐ Productive cough ☐ Respiratory rate >25 breaths / minute
with temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline	Both of the following criteria ☐ Cough, AND ☐ At least one of the following criteria ☐ Pulse >100 beats / minutes ☐ Delirium ☐ Rigors ☐ Respiratory rate >25 breaths / minute

Yes- Loeb Clinical Criteria for lower respiratory tract infection = It is **MET**

Loebs-Minimum-Criteria-for-Initiating-Antibiotic-Therapy-Checklist_new-template.docx (google.com)
This worksheet is available on the Nebraska ASAP website. Example from Jenna @ASAP

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Resident Case Example GH, continued

- After two days of antibiotics, GH remains unimproved
  - Chest X-ray did not show pneumonia or new infiltrates
  - COVID-19 PCR negative, isolation discontinued
  - Nurse noted shortness of breath has worsened overnight
  - Continues to lack an appetite
  - Nurse noted increased swelling in his lower extremities
  - Nurse decides to update provider on resident's status

SBAR-Communication-Tool-Template-for-Antibiotic-Time-Out.docx (google.com)
This worksheet is available on the Nebraska ASAP website. Example from Jenna @ASAP

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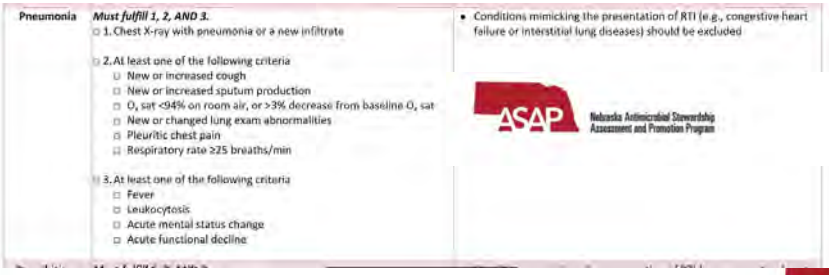
Resident Case Example GH, continued

- Provider suspected congestive heart failure exacerbation
  - Provider ordered increased dose of GH's routine furosemide x 4 doses
  - GH showed improvement after one day of diuretics
  - Antibiotics were discontinued early on day 4
- Upon retrospective review by the infection preventionist, GH did not meet criteria for infection per the McGeer Surveillance Criteria



Pneumonia ***Must fulfill 1, 2, AND 3.***

☐ 1. Chest X-ray with pneumonia or a new infiltrate

☐ 2. At least one of the following criteria
- ☐ New or increased cough
- ☐ New or increased sputum production
- ☐ O_2 sat <94% on room air, or >3% decrease from baseline O_2 sat
- ☐ New or changed lung exam abnormalities
- ☐ Pleuritic chest pain
- ☐ Respiratory rate ≥25 breaths/min

☐ 3. At least one of the following criteria
- ☐ Fever
- ☐ Leukocytosis
- ☐ Acute mental status change
- ☐ Acute functional decline

- Conditions mimicking the presentation of RTI (e.g., congestive heart failure or interstitial lung diseases) should be excluded

ASAP Nebraska Antimicrobial Stewardship Assessment and Promotion Program

Revised-McGeer-Criteria-for-Infection-Surveillance-Checklist_new-template.docx (google.com)
This worksheet is available on the Nebraska ASAP website. Example from Jenna @ASAP

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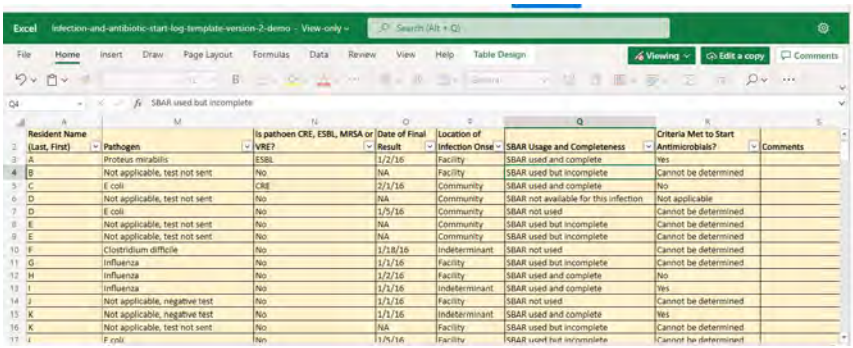
Resident Case Example GH, continued

- Does this example exhibit a success or failure
  - A: For the Resident? **Success. Safe Antibiotic care is safe resident care.**
  - B: For the antibiotic stewardship program? **Yes. Let's talk about how to "count it"**



Excel infection-and-antibiotic-start-log-template-version-2-demo - View-only

Resident Name (Last, First)	Pathogen	Is pathoen CRE, ESBL, MRSA or VRE?	Date of Final Result	Location of Infection Onset	SBAR Usage and Completeness	Criteria Met to Start Antimicrobials?	Comments
A	Proteus mirabilis	ESBL	1/2/16	Facility	SBAR used and complete	Yes	
B	Not applicable, test not sent	No	NA	Facility	SBAR used but incomplete	Cannot be determined	
C	E coli	CRE	2/1/16	Community	SBAR used and complete	No	
D	Not applicable, test not sent	No	NA	Community	SBAR not available for this infection	Not applicable	
D	E coli	No	1/5/16	Community	SBAR not used	Cannot be determined	
E	Not applicable, test not sent	No	NA	Community	SBAR used but incomplete	Cannot be determined	
E	Not applicable, test not sent	No	NA	Community	SBAR used but incomplete	Cannot be determined	
F	Clostridium difficile	No	1/18/16	Indeterminant	SBAR not used	Cannot be determined	
G	Influenza	No	1/1/16	Facility	SBAR used but incomplete	Cannot be determined	
H	Influenza	No	1/2/16	Facility	SBAR used and complete	No	
I	Influenza	No	1/1/16	Indeterminant	SBAR used and complete	Yes	
J	Not applicable, negative test	No	1/1/16	Facility	SBAR not used	Cannot be determined	
K	Not applicable, negative test	No	1/1/16	Indeterminant	SBAR used and complete	Yes	
K	Not applicable, test not sent	No	NA	Facility	SBAR used but incomplete	Cannot be determined	

Infection-and-antibiotic-start-log-template-version-2-demo.xlsx (live.com)
This worksheet is available on the Nebraska ASAP website. Example from Jenna @ASAP

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TLK0

Acknowledge the Wins

1. RN correctly did a "time out" to reassess the resident after he was not improving on antibiotics and contacted the provider to have them reassess the resident.
2. Time out led the proper diagnosis. So, the resident received treatment for a CHF exacerbation.
3. Diagnosis recognition may have prevented an ER visit or hospitalization, especially if they had not reassessed symptoms
4. Saved 1 day of antibiotic therapy (antibiotic was originally ordered x5 days)
5. Potentially avoided antibiotic adverse drug event (ADE: the longer someone is on an antibiotic, the more likely they are to have a side effect), this included future resistance if he needs an antibiotic in the future.

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Does 1 more day of therapy really matter?

Table 2
Odds ratios of antibiotic-associated harms outcomes with each additional day of antibiotic therapy

Outcome	Number of studies ($n = 71$)	Number of patients ($n = 23\ 174$)	Odds ratio (95% CI)
Total adverse events, *n* (%)	60 (84.5)	4039/20 345 (19.9)	1.04 (1.02–1.07)
Severe adverse events	18 (25.1)	125/9049 (1.4)	1.09 (1.00–1.19)
Adverse events leading to discontinuation of therapy	45 (63.3)	445/14 613 (3.0)	1.02 (0.98–1.07)
Adverse events by System, *n* events			
Immunological	2 (2.8)	2/424 (0.5)	0.99 (0.49–2.01)
Dermatological	17 (23.9)	197/5645 (3.5)	1.13 (1.05–1.21)
Musculoskeletal	3 (4.2)	11/769 (1.4)	0.89 (0.58–1.36)
Gastrointestinal	44 (62.0)	1836/12 715 (6.6)	1.03 (1.00–1.06)
Central nervous system	28 (39.4)	643/9090 (7.1)	1.03 (0.97–1.09)
Genitourinary	6 (8.4)	25/1294 (1.9)	0.99 (0.82–1.18)
Hepatic	5 (7.0)	94/2005 (4.7)	0.84 (0.67–1.05)
Other	16 (22.5)	178/5038 (3.5)	1.03 (0.96–1.11)
Antimicrobial resistance, *n* (%) (colonization or infection)	9 (12.7)	246/2330 (10.6)	1.03 (0.98–1.07)
Superinfection, *n* (%)	20 (28.1)	280/5776 (4.8)	0.98 (0.92–1.06)
Clostridioides difficile infection	4 (5.6)	5/280 (1.8)	1.04 (0.77–1.40)
Candidiasis	11 (15.5)	127/280 (45.4)	1.05 (0.93–1.17)
Other	20 (28.1)	154/280 (55.0)	1.03 (0.96–1.11)

"Each additional day of antibiotic therapy is associated with measurable antibiotic harm, particularly adverse events. These data may provide additional context for clinicians when weighing benefits versus risks of prolonged antibiotic therapy."

Jennifer Curran, Clin Microbiol Infect 2022;28:479 https://doi.org/10.1016/j.cmi.2021.10.022

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Slide 17

TLK0 Measurement: ASAP recommends Antibiotic days of therapy or something else? Please help me with the metric.
Tyner, Laura Kate, 2023-05-26T17:55:16.229

Resident case example, KB

Symptoms
- KB is an 85-year-old nursing home resident
- He develops lethargy, leg swelling, increased O2 requirement, and a nonproductive cough

Evaluation
- He is transferred to the emergency department for evaluation
- EKG changes indicate recent heart attack
- Bilateral lower legs are painful, red, and swollen. Significant serous fluid weeping

Treatment
- KB is admitted to the hospital
- He is started on IV vancomycin for lower extremity cellulitis
- After 3 days at the hospital, he is transferred back to the nursing home
  - Heart medications are adjusted
  - 14-day course of oral amoxicillin/clavulanic acid (Augmentin) for cellulitis

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Resident case example, KB continued

Intake
- At the time of transfer, KB is written for 14-day course of oral antibiotics. He already received 3 days of antibiotics in the hospital

Assessment
- KB's legs are improved but not better
  - They are no longer weeping
  - Still somewhat swollen
  - Still discolored
  - No adjustment in medications is made

Update
- 10 days later, KB reports itching to the point that he is losing sleep

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Resident case example, KB continued

Assessment

- Nursing assessment reveals rash over his chest, trunk, upper arms and thighs
- Nurse contacts provider, and the provider suspects allergic reaction and orders additional diagnostics

Diagnostic Evaluation

- WBC 7,200 cells/mL (normal 4,500 – 11,000)
- Absolute eosinophil count of 600 cell/mL (normal 0-500)
- Creatinine 1.9 mg/dL, Baseline is 1.0 mg/dL

Problem statement

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Problem Statement(s)

Moment 1:
While the decision to prescribe antibiotics was made in the hospital, it should be reassessed by the facility upon transfer back, especially with lack of clinical improvement after IV antibiotics (Use ASAP Antibiotic Time Out Tool)

Discoloration in LE is common, but true cellulitis in BOTH extremities is very rare. Was more likely stasis dermatitis due to inadequate venous function during cardiac event that led to hospitalization. Diuretics, elevation, compression stockings more appropriate.

Moment 2:
Cultures - there is nothing to culture. Legs were weeping, but not purulent. (Use ASAP SSTI SBAR Tool)

Moment 3:
Duration of prescription at discharge - 14 days is too long! (should be 5-7 days (10 at most).
should subtract the 3 days he already received in the hospital.
(Use ASAP Recommended Duration of Therapy for Common Infectious Syndromes Guidance Document)

Moment 4:
Re-evaluation
If antibiotics were stopped earlier at the facility, rash and kidney injury would not have occurred.
(Again, Use ASAP Antibiotic Time Out Tool)

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In addition…

- Adverse antibiotic reactions should be recorded and reported
- This is a huge opportunity for the consultant pharmacist to assist the facility AS team/IP

Table 1. List of Common Adverse Antimicrobial Reactions*

Drug Class	Class Member	Common Adverse Reaction
Penicillins +/- Beta-Lactamase inhibitors	Ampicillin, Ampicillin-Sulbactam, Amoxicillin, Amoxicillin-Clavulanate, Cloxacillin, Dicloxacillin, Nafcillin, Oxacillin, Penicillin, Piperacillin-Tazobactam	Nausea, vomiting, diarrhea, *C difficile* infection, allergic reactions (including rash, hemolytic anemia), elevated serum creatinine, bone marrow suppression with long-term use, phlebitis with IV therapy
Cephalosporins +/- Beta-Lactamase Inhibitors	Cefaclor, Cefazolin, Cefdinir, Cefditoren, Cefepime, Cefixime, Cefotetan, Cefoxitin, Cefpodoxime, Cefprozil, Ceftaroline, Ceftazidime, Ceftazidime-Avibactam, Ceftibuten, Ceftolozane-Tazobactam, Ceftriaxone, Cefuroxime, Cephadroxil, Cephalexin	Nausea, vomiting diarrhea, *C difficile* infection, allergic reactions (including rash, serum sickness), altered mental status
Carbapenems	Doripenem, Ertapenem, Imipenem-Cilastatin, Meropenem	Nausea, vomiting, diarrhea, *C difficile* infection, seizure
Fluoroquinolones	Ciprofloxacin, Delafloxacin Levofloxacin, Moxifloxacin	Disorientation, delirium, agitation, seizure, hypo- or hyper-glycemia, peripheral neuropathy, tendon rupture, QT prolongation, nausea, vomiting, *C difficile* infection, increased in liver function tests, aortic dissection
Macrolides	Azithromycin, Clarithromycin, Erythromycin	Nausea, vomiting, elevation in liver function tests, reversible tinnitus or deafness, taste alteration, phlebitis with IV therapy
Tetracyclines	Doxycycline, Minocycline, Tetracycline	Nausea, vomiting, sunburn, esophageal ulcer, phlebitis with IV therapy, teeth discoloration

https://asap.nebraskamed.com/wp-content/uploads/sites/3/2020/02/Adverse-Drug-Reaction-Worksheet-011419.pdf

This worksheet is available on the Nebraska ASAP website.

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Antibiotic Reviews and Feedback	Provision of Tools for AS	Assistance with Data Tracking & Reporting	Monthly Meeting to Address Challenges	Educational Sessions at LTCF
• Review all antibiotics order retrospectively; are they appropriate? • Provide written feedback to providers using standard templates • Reference relevant guidelines when advice is provided	• Provide templates for leadership statement of support, ASP policy, and reporting • Share SBAR form and assist with implementation • Assist facilities with getting an antibiogram • Make guidelines and resources available to support ASP, as needed	• Track and inform facility of their antibiotic use data compared to others • Track and report appropriateness using nationally established criteria and guidelines • Track and report SBAR use	• Help establish ASP committee • Meet monthly with IP to provide updates and address barriers • Join QAA committee meetings	• Provide education to LTCF staff on ASP related topics • Share specific guidelines with prescriber, as needed • Provide basic orientation on stewardship related activities to new IP

Various Ways Consultant Pharmacist Can Assist with CDC Core Element Implementation

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Final Case: MM's trip to the ER

MM lives in memory support

- Fell overnight
- Laceration to face
- Reported hip pain
- Transferred acutely to the ER

Spent the day in ER

- No fracture to hip
- No concussion
- Laceration addressed with sutures
- UA included with diagnostic workup in the ER

Admitted back to facility

- UA positive for leukocyte esterase
- Discharged with 7 days of ciprofloxacin
- ASAP Antibiotic Time out form pulled and completed

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S	**Situation:** I am calling to follow-up on M. M. who was started on antibiotics recently
B	**Background:** This patient was started on: Antibiotic #1: ciprofloxacin Start date: 5/26/23 Antibiotic #2: _____ Start date: _____ For: X UTI ☐ Pneumonia ☐ Bronchitis ☐ Skin infection ☐ GI infection ☐ Fever of unknown source ☐ Other, specify: Vitals at Initial presentation were as follows: BP 115/82 HR 88 Resp Rate 32 Temp 37.2 O2 Sat 93% Symptoms and positive exam findings at that time were: ER visit after fall with laceration and hip pain. No dysuria, urgency, flank pain, or other indications of urinary tract infection The diagnosis fits: ☐McGeer criteria ☐Loeb criteria X Neither ☐Assessment tool not used
A	Assessment: Current vital signs: BP 116/ 83 HR 70 Resp. rate 20 Temp. 37 0 2 Sat. 93% Since starting antibiotic(s), the resident: X now has no signs or symptoms of infection ☐ has remained the same ☐has improved but continues to have signs and symptoms of: _____ ☐has new or worsening signs/symptoms of: _____ Microbiology culture result (fax microbiology report if available): ☐has not returned yet X has no growth ☐was not obtained ☐has positive Gram stain/growth of [specify Gram stain/microorganism:] Is susceptible to the antibiotic(s) prescribed: ☐Yes ☐No ☐Don't know ☐Not tested by lab X Not yet performed by lab Other antibiotics the organism is sensitive to:

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R	Recommendation: ☐Patient is not improving and needs further evaluation. X Patient has improved and needs final antibiotic therapy plan.
Physician Orders/Response (Please check all that apply) X I have reviewed the above SBAR.	

☐Continue current antibiotic to complete a total antibiotic course of ___ days.
Specify Antibiotic End date:
☐Change antibiotic therapy to:
Drug: _____Dose:_____ Route:_____ Frequency: ____Duration: _____

X Stop antibiotic now

☐Other (Please specify):

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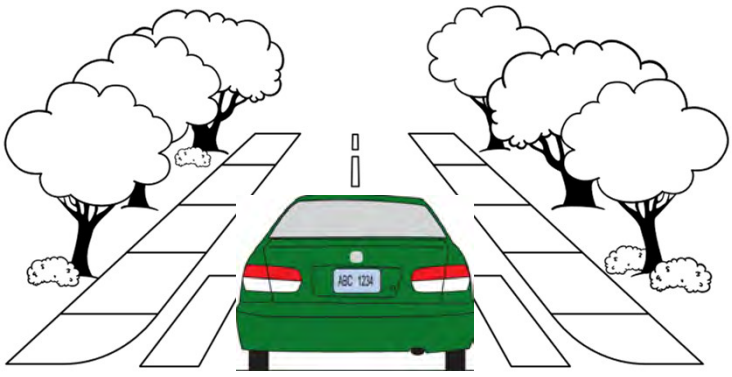
In conclusion:
Try to make it easy to do the right thing



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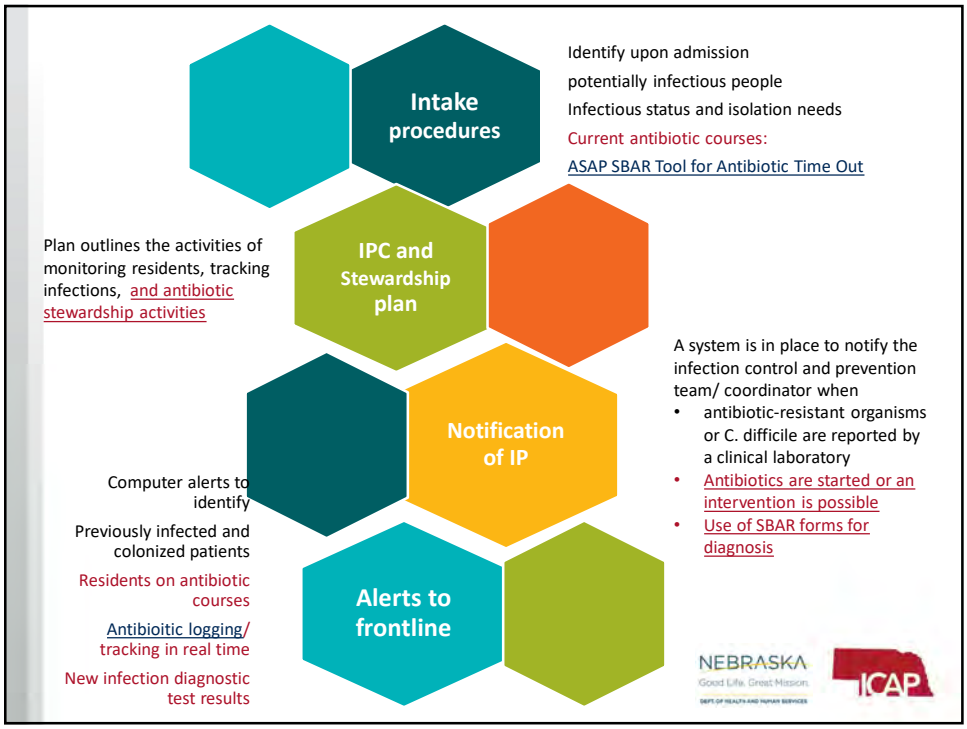
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Previously infected and colonized patients
Residents on antibiotic courses
Antibioitic logging/ tracking in real time
New infection diagnostic test results
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Questions?
Thank you for attending the Summit!
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