Antibiotic Stewardship in the LTC Setting

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Objectives

- Describe the Antibiotic Stewardship Care Elements of tracking and the specific interventions and outcomes that can be monitored
- Understand how the pharmacy (consultant and provider pharmacy) can be included in antibiotic stewardship policies

Antibiotic Stewardship

"...a set of commitments and actions designed to optimize the treatment of infections while reducing the adverse events associated with antibiotic use."

-Centers for Disease Control and Prevention

Goals:

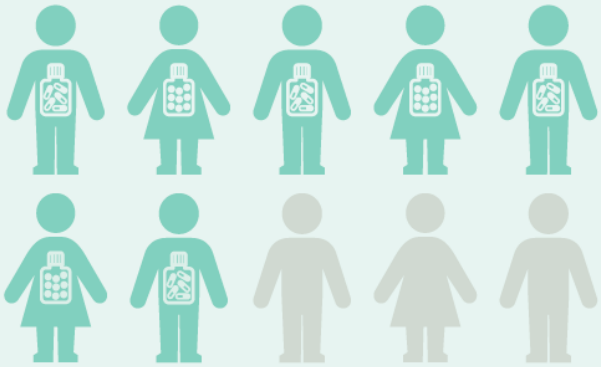
- Prevent antibiotic overuse
- Decrease the incidence of multi-drug resistant organism (MDRO) infections

CDC. "The Core Elements of Antibiotic Stewardship for Nursing Homes." Atlanta, GA: US Dept. of Health and Human Services, CDC; 2015.

Action for Improvement:
Infection-Specific Management Plans

- Most common types of infections
  - UTI
  - Respiratory infections
  - Skin and soft tissue infections
  - Gastroenteritis

Why is it important?



UP TO **70%**
of nursing home residents
received antibiotics during a year

UP TO **75%**
of antibiotics are
prescribed incorrectly

CDC. "The Core Elements of Antibiotic Stewardship for Nursing Homes." Atlanta, GA: US Dept. of Health and Human Services, CDC; 2015.

Why is it important?

Reduce Risk

- **Prevent drug-resistant infections**
- ***C. difficile* related diarrhea**
- **Drug interactions**
- **Medication side effects**

Antimicrobial Resistance

Prevent drug-resistant infections

- Microbes are constantly evolving, which enables them to adapt to new environments. Antimicrobial resistance is the microbe's ability to grow in the presence of a chemical (Antibiotic) that would usually kill them, or limit their growth.
  - Leading Causative Factors:
    - Antibiotic overuse
    - Antibiotic misuse

National Institute of Allergy and Infectious Diseases. Definitions of Antimicrobial (Drug) Resistance Terms. 2009. Referenced from: https://www.niaid.nih.gov/topics/antimicrobialresistance/understanding/Pages/definitions.aspx

Antimicrobial Resistance Statistics

Prevent drug-resistant infections

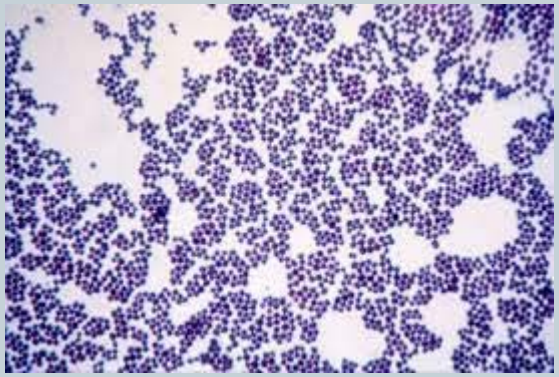
- Each year, 2 million people in the United States become infected with antibiotic-resistant bacteria.
  - Of those, 23,000 people die each year due to these infections.
- An estimated $20 billion in healthcare costs goes towards treating these infections.
  - Due to prolonged and costlier treatments
  - Extended hospital stays
  - Additional doctor visits
- 50% of the antibiotics prescribed are either not necessary, or are not optimally effective as prescribed

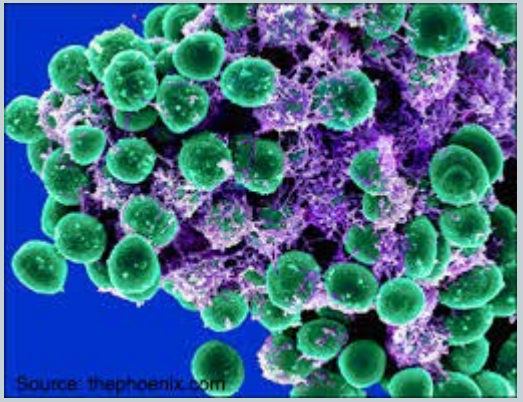
Health Research Funding. 11 Scary Statistics on Antibiotic Resistance. 2013. Referenced from: http://healthresearchfunding.org/11-scary-statistics-on-antibiotic-resistance/

Antimicrobial Resistance: Strains of Concern

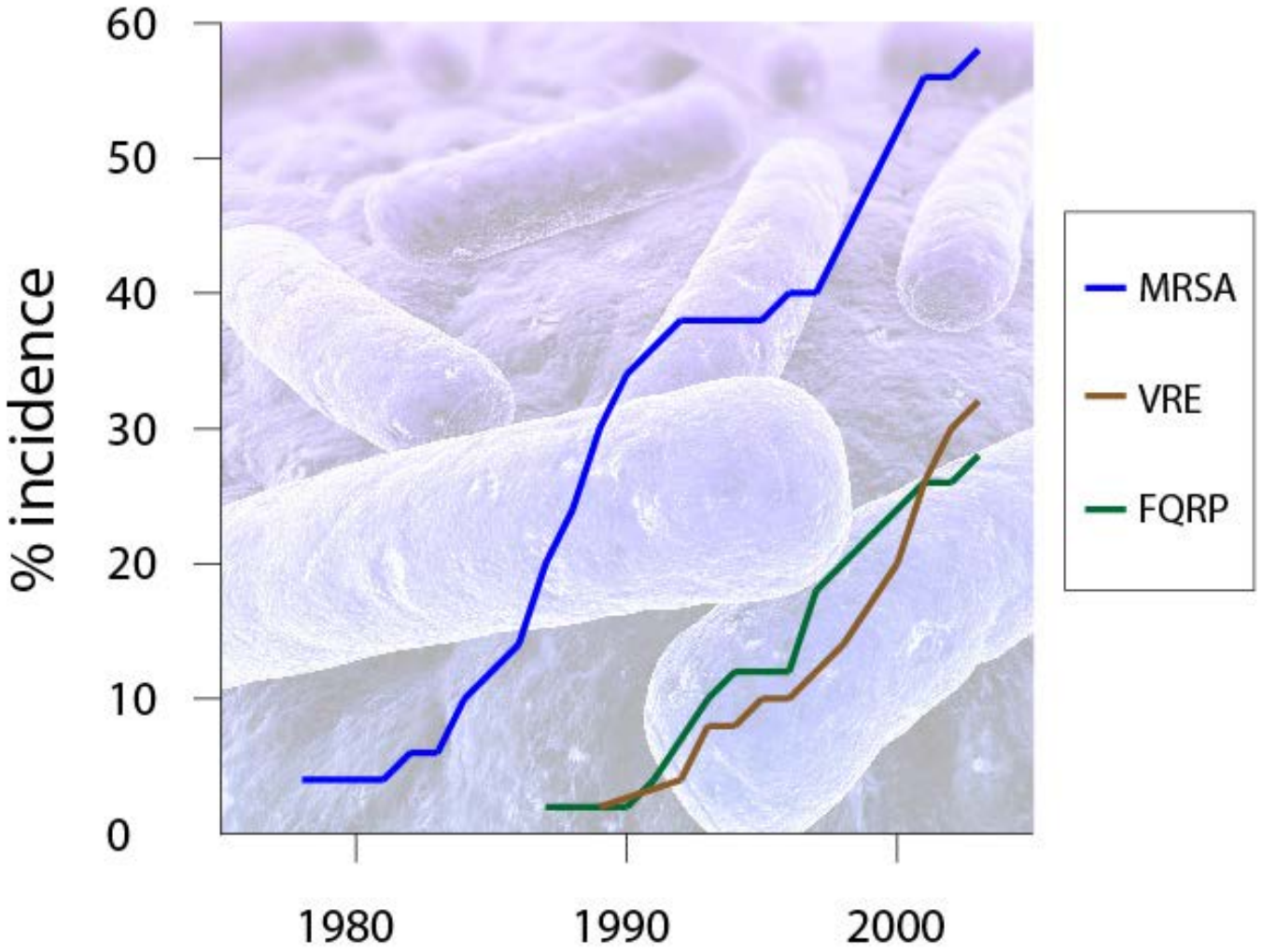
Prevent drug-resistant infections

- Methicillin-resistant Staphylococcus aureus (MRSA)
- Vancomycin-resistant Enterococci (VRE)
- Fluoroquinolone-resistant Pseudomonas aeruginosa (FQRP)
- Drug-resistant Mycobacterium tuberculosis (TB)
- Multidrug-resistant Neisseria gonorrhoeae (Gonorrhea)





Antibiotic-resistant infections



Source: Centers for Disease Control and Prevention

Antibiotic induced *C. difficile* agents

C. difficile related diarrhea

- clindamycin
- fluoroquinolones (for example, levofloxacin ciprofloxacin
- Penicillins (Augmentin)
- Cephalosporins (Keflex, Rocephin)

Drug Interactions Examples

Drug interactions

- Calcium/Magnesium/Iron interactions
  - Tetracyclines
  - Fluroquinolones
- Zyvox and SSRIs- increased risk for serotonin syndrome
  - Agitation/Restlessness/Confusion
  - Tachycardia/Hypertension
  - Fever/HA/Shivering/Sweating
  - Seizures/Irregular heartbeat/unconsciousness
- Warfarin
  - Fluroquinolones/Bactrim

Side effect examples

Medication side effects

- Levaquin- dose to high…risk for spontaneous tendon rupture

- Nitrofurantoin with reduced kidney function- risk for pulmonary fibrosis and confusion

Antibiotic Stewardship Core Elements

1. Leadership commitment
2. Accountability
3. Drug expertise
4. Action

5. Tracking
6. Reporting
7. Education

CDC. “The Core Elements of Antibiotic Stewardship for Nursing Homes.” Atlanta, GA: US Dept. of Health and Human Services, CDC; 2015.

Antibiotic Stewardship Core Elements

- 1. Leadership Commitment
  - Facility dedicating support and commitment to safe and appropriate antibiotic use
  - Providing resources:
    - Staffing
    - Financial
    - Technological
- 2. Accountability
  - Designating leaders among the health care team
    - Physician
    - Nurse
    - Pharmacist
  - Promote and oversee stewardship throughout the facility

Antibiotic Stewardship Core Elements

- 3. Drug Expertise
  - Utilization of pharmacists or other individuals trained in antibiotic stewardship
    - Consultant Pharmacist
    - Provider Pharmacy/Pharmacist
- 4. Action
  - Implement at lease one policy to improve abx use within the facility
  - Do not initiate too many interventions at the same time
  - Start with broad interventions:
    - Document dose, duration, and indication
    - Develop treatment recommendations that are facility specific

Antibiotic Stewardship Core Elements

- 5. Tracking
  - Monitor at least:
    - One process measure
    - One outcome measure
- 6. Reporting
  - Share information on antibiotic use and resistance with prescribers, nursing, and pharmacists

- 7. Education
  - Provide resources for prescribers and nurses
  - Don't forget to educate families and residents (especially upon admission)
    - General information about antibiotic resistance
    - Facility guidelines on antibiotic prescribing
  - Use data gathered to develop further opportunities to improve antibiotic use

Tracking Interventions and Outcomes

- Process Measures- How and why antibiotics are prescribed
  - Determine if facility is following prescribing policies
    - Clinical assessment
    - Prescription Documentation
    - Antibiotic selection, dose, duration of therapy
- Antibiotic Use Measures: How often and how many antibiotics are prescribed
  - Facility started antibiotics
  - Days of therapy
  - Antibiotic time outs.
- Antibiotic Outcome Measures:
  - Adverse outcomes
    - C. difficile infections; MDRO; other side effects
  - Costs from antibiotics

The “Mega Rule”

- Regulation will be implemented in three phases
  - Phase 1: November 2016
  - Phase 2: November 2017
    - An ABX stewardship program that includes ABX use protocols and a system to monitor antibiotic use.
  - Phase 3: November 2019
    - Facility must designate one or more individual(s) as the IP who is responsible for the facility’s IPCP – with specialized training.

Infection Prevention and Control Program (IPCP)

- Phase 2:
  - **Antibiotic Stewardship (F881)**
- Phase 3:
  - **Infection Preventionist (IP) (F882)**
    - Facility designates one or more individuals as the IP who is responsible for the facility's infection control (with specialized training)

CMS State Operations Manual

"The Antibiotic Stewardship Program in Relation to Pharmacy Services

The assessment, monitoring, and communication of antibiotic use shall occur by a licensed pharmacist in accordance with §483.45(c), F756, Drug Regimen Review. A pharmacist must perform a medication regimen review (MRR) at least monthly, including review of the medical record and identify any irregularities, including unnecessary drugs."

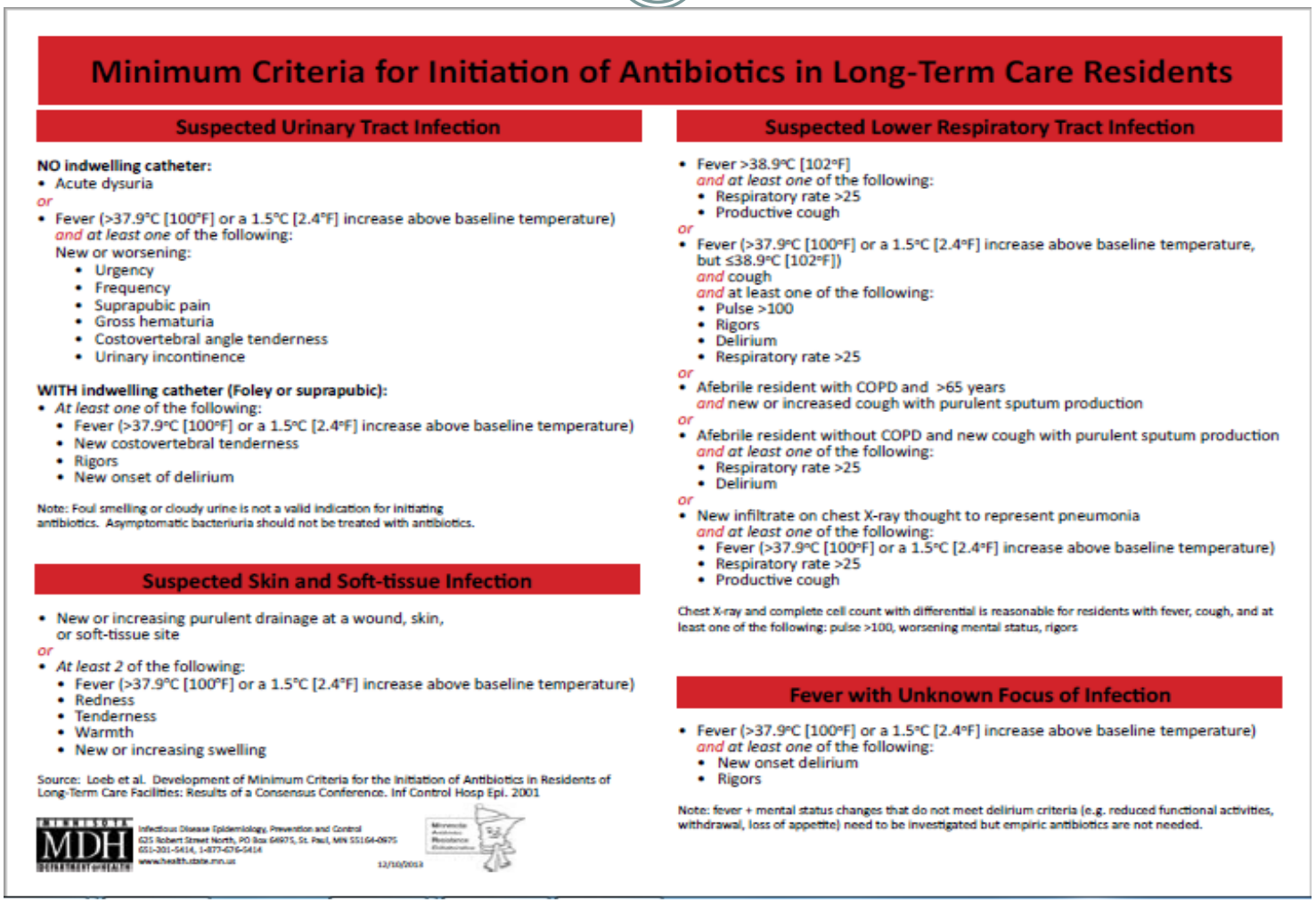
Consultant Pharmacist Involvement

- Education
  - Assist facility in forming standardized assessment and communication tools
    - SBARs (Situation, Background, Assessment, Recommendation)
    - Loeb Minimum Criteria for Initiation of Antibiotics
- Review of antibiotic prescriptions
- Establish standards on laboratory testing
- Review of microbiology culture results
- Vaccination Protocols
  - CDC ACIP guidelines

Consultant Pharmacist Involvement

- Documentation – “The 5 D’s”
  - Diagnosis
  - Drug
  - Dose
  - Duration (specific start/end date)
  - De-Escalation
- Assist facilities in choosing best empiric treatment options for various conditions
  - IDSA Guidelines
  - Antibiograms

Loeb Criteria



Minimum Criteria for Initiation of Antibiotics in Long-Term Care Residents

Suspected Urinary Tract Infection

NO indwelling catheter:
- Acute dysuria

or
- Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
  and at least one of the following:
  New or worsening:
  - Urgency
  - Frequency
  - Suprapubic pain
  - Gross hematuria
  - Costovertebral angle tenderness
  - Urinary incontinence

WITH indwelling catheter (Foley or suprapubic):
- *At least one* of the following:
  - Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
  - New costovertebral tenderness
  - Rigors
  - New onset of delirium

Note: Foul smelling or cloudy urine is not a valid indication for initiating antibiotics. Asymptomatic bacteriuria should not be treated with antibiotics.

Suspected Skin and Soft-tissue Infection

- New or increasing purulent drainage at a wound, skin, or soft-tissue site

or
- *At least 2* of the following:
  - Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
  - Redness
  - Tenderness
  - Warmth
  - New or increasing swelling

Source: Loeb et al. Development of Minimum Criteria for the Initiation of Antibiotics in Residents of Long-Term Care Facilities: Results of a Consensus Conference. Inf Control Hosp Epi. 2001

MDH Minnesota Department of Health
Infectious Disease Epidemiology, Prevention and Control
625 Robert Street North, PO Box 64975, St. Paul, MN 55164-0975
651-201-5414, 1-877-676-5414
www.health.state.mn.us

12/10/2013

Suspected Lower Respiratory Tract Infection

- Fever >38.9°C [102°F]
  and at least one of the following:
  - Respiratory rate >25
  - Productive cough

or
- Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature, but ≤38.9°C [102°F])
  and cough
  and at least one of the following:
  - Pulse >100
  - Rigors
  - Delirium
  - Respiratory rate >25

or
- Afebrile resident with COPD and >65 years
  and new or increased cough with purulent sputum production

or
- Afebrile resident without COPD and new cough with purulent sputum production
  and at least one of the following:
  - Respiratory rate >25
  - Delirium

or
- New infiltrate on chest X-ray thought to represent pneumonia
  and at least one of the following:
  - Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
  - Respiratory rate >25
  - Productive cough

Chest X-ray and complete cell count with differential is reasonable for residents with fever, cough, and at least one of the following: pulse >100, worsening mental status, rigors

Fever with Unknown Focus of Infection

- Fever (>37.9°C [100°F] or a 1.5°C [2.4°F] increase above baseline temperature)
  and at least one of the following:
  - New onset delirium
  - Rigors

Note: fever + mental status changes that do not meet delirium criteria (e.g. reduced functional activities, withdrawal, loss of appetite) need to be investigated but empiric antibiotics are not needed.

http://www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/asp/ltc/

SBAR

Suspected UTI SBAR

Complete this form before contacting the resident's physician.

Date/Time _____

Nursing Home Name _____

Resident Name _____ Date of Birth _____

Physician/NP/PA _____ Phone _____

Fax _____

Nurse _____ Facility Phone _____

Submitted by ☐ Phone ☐ Fax ☐ In Person ☐ Other _____

S Situation

I am contacting you about a suspected UTI for the above resident.

Vital Signs BP _____ /_____ HR _____ Resp. rate _____ Temp. _____

B Background

Active diagnoses or other symptoms (especially, bladder, kidney/genitourinary conditions)

Specify _____

☐ No ☐ Yes The resident has an indwelling catheter

☐ No ☐ Yes Patient is on dialysis

☐ No ☐ Yes The resident is incontinent **If yes,** new/worsening? ☐ No ☐ Yes

☐ No ☐ Yes Advance directives for limiting treatment related to antibiotics and/or hospitalizations

Specify _____

☐ No ☐ Yes Medication Allergies

Specify _____

☐ No ☐ Yes The resident is on Warfarin (Coumadin®)

AHRQ Agency for Healthcare Research and Quality
Advancing Excellence in Health Care • www.ahrq.gov

www.ahrq.gov/NH-ASPGuide • June 2014
AHRQ Pub. No. 14-0010-2-EF

Nursing Home Name _____ Facility Fax _____

Resident Name _____

A Assessment Input (check all boxes that apply)

Resident WITH indwelling catheter
The criteria are met to initiate antibiotics if one of the below are selected

No Yes
- ☐ ☐ Fever of 100°F (38°C) or repeated temperatures of 99°F (37°C)*
- ☐ ☐ New back or flank pain
- ☐ ☐ Acute pain
- ☐ ☐ Rigors /shaking chills
- ☐ ☐ New dramatic change in mental status
- ☐ ☐ Hypotension (significant change from baseline BP or a systolic BP <90)

Resident WITHOUT indwelling catheter
Criteria are met if one of the three situations are met

No Yes
- ☐ ☐ 1. Acute dysuria alone

OR

- ☐ ☐ 2. Single temperature of 100°F (38°C) **and** at least one new or worsening of the following:
  - ☐ urgency ☐ suprapubic pain
  - ☐ frequency ☐ gross hematuria
  - ☐ back or flank pain ☐ urinary incontinence

OR

- ☐ ☐ 3. No fever, but two or more of the following symptoms:
  - ☐ urgency ☐ suprapubic pain
  - ☐ frequency ☐ gross hematuria
  - ☐ incontinence

Nurses: Please check box to indicate whether or not criteria are met

☐ **Nursing home protocol criteria are met.** Resident may require UA with C&S or an antibiotic.†

☐ **Nursing home protocol criteria are NOT met.** The resident does NOT need an immediate prescription for an antibiotic, but may need additional observation.††

R Request for Physician/NP/PA Orders

Orders were provided by clinician through ☐ Phone ☐ Fax ☐ In Person ☐ Other_____

☐ Order UA

☐ Urine culture

☐ Encourage _____ ounces of liquid intake _____ times daily until urine is light yellow in color.

☐ Record fluid intake.

☐ Assess vital signs for _____ days, including temp, every _____ hours for _____ hours.

☐ Notify Physician/NP/PA if symptoms worsen or if unresolved in _____ hours.

☐ Initiate the following antibiotic

Antibiotic: _____ Dose: _____ Route: _____ Duration: _____

☐ No ☐ Yes Pharmacist to adjust for renal function

☐ Other _____

Physician/NP/PA signature _____ Date/Time _____

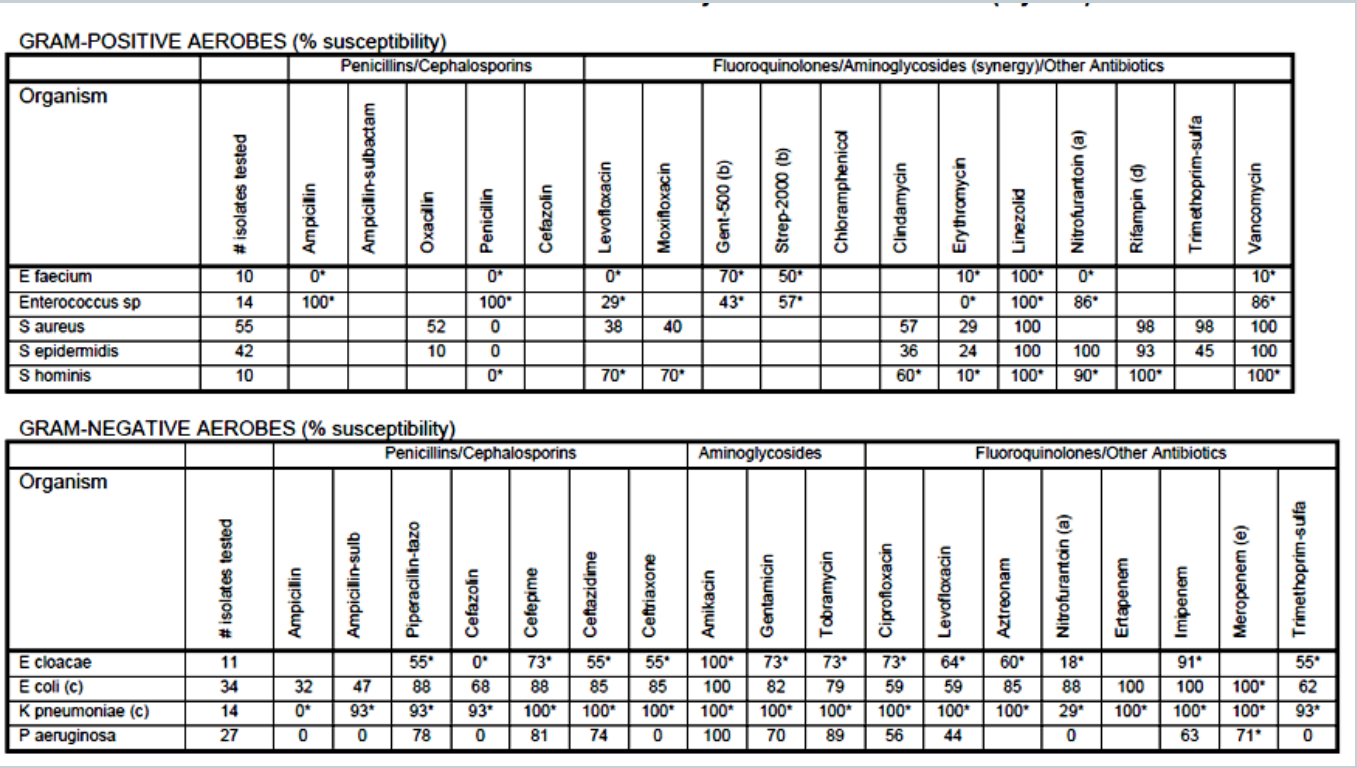
Telephone order received by _____ Date/Time _____

Family/POA notified (name)_____ Date/Time _____

* For residents that regularly run a lower temperature, use a temperature of 2°F (1°C) above the baseline as a definition of a fever.
† This is according to our understanding of best practices and our facility protocols. Minimum criteria for a UTI must meet 1 of 3 criteria listed in box.
†† This is according to our understanding of best practices and our facility protocols. The information is insufficient to indicate an active UTI infection.

"Suspected UTI SBAR Form." Agency for Healthcare Research Quality. https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/4_TK1_T1-SBAR_UTI_Final.pdf

Sample Antibiogram



GRAM-POSITIVE AEROBES (% susceptibility)

		Penicillins/Cephalosporins					Fluoroquinolones/Aminoglycosides (synergy)/Other Antibiotics										
Organism	# isolates tested	Ampicillin	Ampicillin-sulbactam	Oxacillin	Penicillin	Cefazolin	Levofloxacin	Moxifloxacin	Gent-500 (b)	Strep-2000 (b)	Chloramphenicol	Clindamycin	Erythromycin	Linezolid	Nitrofurantoin (a)	Rifampin (d)	Trimethoprim-sulfa	Vancomycin
E faecium	10	0*			0*		0*		70*	50*			10*	100*	0*			10*
Enterococcus sp	14	100*			100*		29*		43*	57*			0*	100*	86*			86*
S aureus	55			52	0		38	40				57	29	100		98	98	100
S epidermidis	42			10	0							36	24	100	100	93	45	100
S hominis	10				0*		70*	70*				60*	10*	100*	90*	100*		100*

GRAM-NEGATIVE AEROBES (% susceptibility)

		Penicillins/Cephalosporins							Aminoglycosides			Fluoroquinolones/Other Antibiotics							
Organism	# isolates tested	Ampicillin	Ampicillin-sulb	Piperacillin-tazo	Cefazolin	Cefepime	Ceftazidime	Ceftriaxone	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin	Levofloxacin	Aztreonam	Nitrofurantoin (a)	Ertapenem	Imipenem	Meropenem (e)	Trimethoprim-sulfa
E cloacae	11			55*	0*	73*	55*	55*	100*	73*	73*	73*	64*	60*	18*		91*		55*
E coli (c)	34	32	47	88	68	88	85	85	100	82	79	59	59	85	88	100	100	100*	62
K pneumoniae (c)	14	0*	93*	93*	93*	100*	100*	100*	100*	100*	100*	100*	100*	100*	29*	100*	100*	100*	93*
P aeruginosa	27	0	0	78	0	81	74	0	100	70	89	56	44		0		63	71*	0

Stanford School of Medicine. Palo Alta VA Antibiogram.
http://errolozdalga.com/medicine/pages/OtherPages/PAVAAntibiogram.html

1	Patient	Age/BD	Unit/room	Antibiotic start date	Indication / Type of infection	Antibiotic	Dose / frequency	Duration
	Minimum Tx guidelines Met? (Y/N) (LOAB or McGreer's Criteria)	Culture/ sensitivity results				Resolved (Y/N)	Other/ notes	
2	Patient	Age/BD	Unit/room	Antibiotic start date	Indication / Type of infection	Antibiotic	Dose / frequency	Duration
	Minimum Tx guidelines Met? (Y/N) (LOAB or McGreer's Criteria)	Culture/ sensitivity results				Resolved (Y/N)	Other/ notes	
3	Patient	Age/BD	Unit/room	Antibiotic start date	Indication / Type of infection	Antibiotic	Dose / frequency	Duration
	Minimum Tx guidelines Met? (Y/N) (LOAB or McGreer's Criteria)	Culture/ sensitivity results				Resolved (Y/N)	Other/ notes	
4	Patient	Age/BD	Unit/room	Antibiotic start date	Indication / Type of infection	Antibiotic	Dose / frequency	Duration
	Minimum Tx guidelines Met? (Y/N) (LOAB or McGreer's Criteria)	Culture/ sensitivity results				Resolved (Y/N)	Other/ notes	

Appendix C: Antibiotic Tracking Log

Transitions of Care

The coordination and continuity of health care as patients move from one care setting to another

http://healthy-transitions-colorado.org
Accessed 8/14/16

Transitions Example: Hospital to Skilled Nursing Facility

- Patient's orders include antibiotics
- Generally, the pharmacy has no information other than:
  - Name of drug
  - Dose
  - Directions
  - Length of therapy
- Missing:
  - Indication!
  - Cultures
  - Patient history

Provider Pharmacy Involvement

- Prospective Review of Antibiotic Prescriptions
  - Ensure antibiotic is prescribed correctly
  - Evaluate renal function
  - Recommend Dose Adjustments
  - Screen for Drug Interactions
- Information given to pharmacy every time an antibiotic is prescribed:
  - Drug / Dose / Duration (specific start/end date)
  - Specific indication (prophylaxis or therapy)
  - Specific organism (if known)
- Allows pharmacist to clinically interpret antibiotic appropriateness
- Consistent documentation allows for tracking trends within facility

Provider Pharmacy

Patient/Resident Last Name	First Name	Date of Birth	Medical Record Number	M/F
		_____/_____/_____		□ MALE □ FEMALE

Allergies: _____

Weight	Height	Most Recent Serum Creatinine or GFR

<u>Antibiotic information</u> (* = Required information)

***Antibiotic**	
***Route of Admin.**	
***Dose and Duration**	
***Specific Indication for use**	
Optional: **Additional information:** **(e.g. culture and sensitivity results, etc..)**	**Site of Culture:** □ Blood □ Skin/Wound □ Sputum □ Urine □ Other: _____ **Culture Results / Pathogen(s):** _____ **Sensitivity Results:** _____ **Other:**

Guiding Principles and Results of Stewardship

- Prompt initiation of therapy
- Better empiric coverage of pathogen; streamlined coverage of known pathogen
- Optimally dosed and timed antibiotics
- Reduced adverse events and complications

Resources for Action

- Lake Superior Quality Innovation Network
- CDC Core Elements of Antibiotic Stewardship
- MN Department of Health
  - Additional information and fact sheets
  - Toolkits for implementation

References

"Long Term Care Antimicrobial Stewardship Program Resources." Lake Superior Quality Innovation Network. MetaStar. Accessed Dec. 15th, 2016. https://www.lsqin.org/wp-content/uploads/2016/03/LTC-ASP-Resources-2016.pdf

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"Toolkits." Agency for Healthcare Research and Quality. U.S. Department of Health and Human Services. Accessed Dec 15th, 2016.
https://www.ahrq.gov/nhguide/toolkits.html