

“Antibiotic Stewardship NOW!”

The More We Use Antibiotics, the More We Lose Antibiotics

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Antimicrobial Stewardship

Coordinated interventions designed to improve and measure the appropriate use of antimicrobial agents by promoting the selection of the optimal antimicrobial drug regimen

Patients receive the right antibiotic, at the right dose, at the right time, and for the right duration



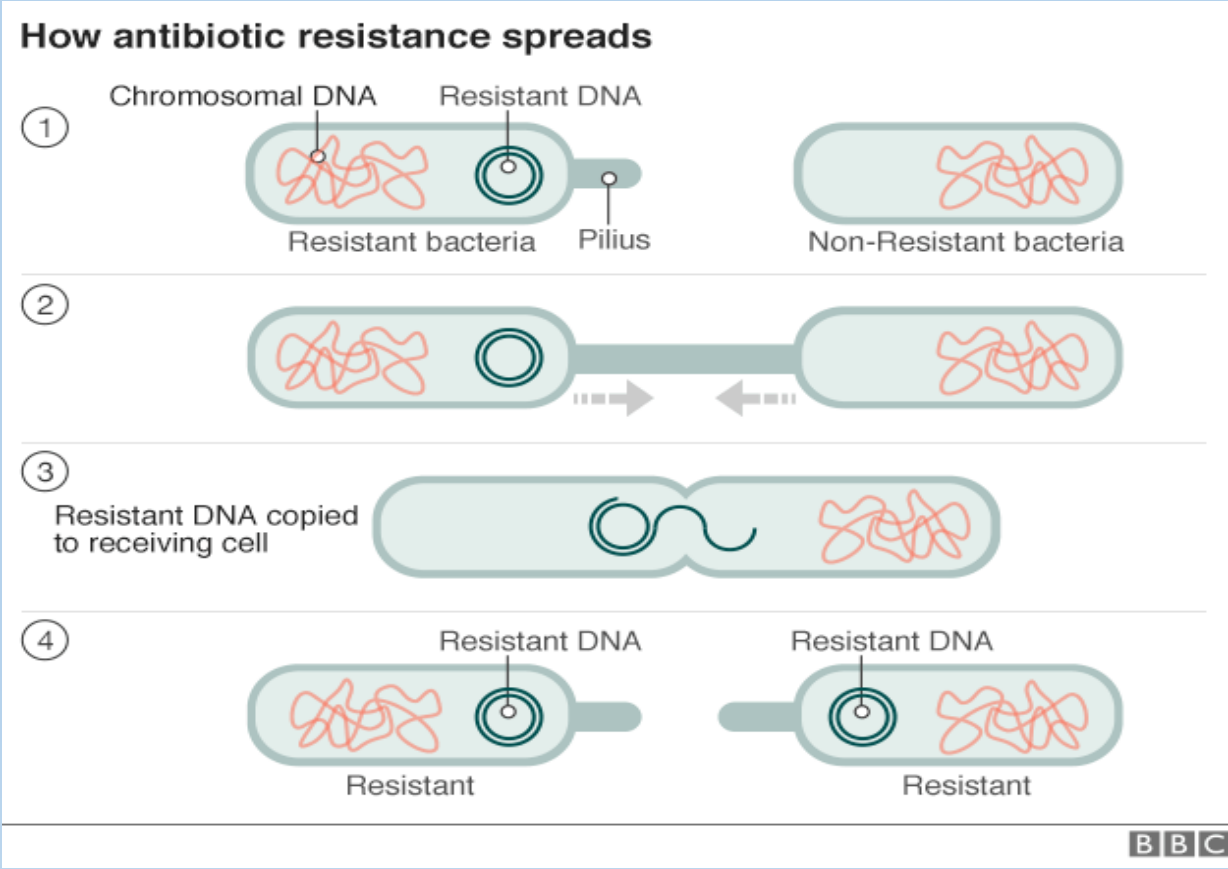
Why Antibiotic Stewardship NOW?

- 30-50% of antibiotic Prescriptions are inappropriate and are likely prolonged and not scaled back.
- Antibiotic Stewardship Programs (ASPs) have been shown to reduce antibiotic use by almost 20%.
- 2003 study in the US and Canada showed nearly 80% of LTC residents received at least one course of antibiotics over a 12-month period.
 - Antibiotics are frequently prescribed in the absence of appropriate diagnostic exams and in the absence of real infections.
 - Extensive use of antibiotics can lead to emergence of antibiotic resistant infections, Clostridium difficile infections (a growing threat) in LTC facilities and

WARNING

- This next slide is intended for mature audiences only ! And may not be suitable for some younger audiences.
- Viewer discretion is ADVISED !
- Parenteral Supervision is Suggested!
- Kids under 18 please leave the room → I mean it!

An Affair to RememberThe Deadly “Affair”



Evolution of Bacteria

How long does it take for bacteria to develop resistance???

Why Antibiotic Stewardship NOW in LTC facilities ?

- Approximately 15,000 LTC facilities in the US provide care to an estimated 1.7 million people.
- Patients often have complex medical needs putting them at risk to illnesses that can lead to death and ↑ health care costs.
- Infection rates nationwide are estimated to be as high as 12% with pneumonia and urinary tract infections being most common in LTC.



Harris-Kojetic et al. "Long-Term Care services in the United States", 1-107

Why Antibiotic Stewardship NOW?

- Antibiotic resistance continues to grow:
 - 700,000 deaths/yr. worldwide because of resistant bacteria
 - (Ohio stadium capacity 100,000)
 - >2 million infections /yr. in the USA



Summary of Core Elements of Antibiotic Stewardship for Nursing Homes

- Leadership commitment
 - Demonstrate support & commitment to safe , appropriate antibiotic use
- Accountability
 - Identify Dr., nursing and pharmacy leads responsible for program
- Drug expertise
 - Establish access to consultant pharmacists or other individuals with experience or training in antibiotic stewardship
- Action
 - Implement at least one policy or practice to improve antibiotic use.

Summary of Core Elements of Antibiotic Stewardship for Nursing Homes

- Tracking
 - Monitor at least one process measure of antibiotic use and at least one outcome from antibiotic use in your facility.
- Reporting
 - Provide regular feedback on antibiotic use and resistance to prescribing clinicians, nursing staff, and other relevant staff.
- Education
 - Provide resources to clinicians, nursing staff, residents, and families about antibiotic resistance and opportunities for improving antibiotic use.

Source: Reproduced from The Core Elements of antibiotic Stewardship for Nursing Homes published by the Centers for Disease Control and Prevention

The First Steps:



- Ensure all orders have dose, duration, and indications
- Get cultures before starting antibiotics
- Take an “antibiotic timeout,” reassessing antibiotics after 48–72 hours
- Implement policies that encourage best practices
 - Establishment of minimum criteria for prescribing antibiotics
 - SBARS
 - Review of antibiotic appropriateness/resistance patterns
 - Antibiograms
 - Nursing protocols for monitoring patients’ status for an evolving condition if there is no specific indication for antibiotics

What are Antibiograms?

- Tables showing susceptibilities of a series of organisms to different antimicrobials.
- A collection of information obtained from C&S performed in an institution within a given time frame.
- They summarize cumulative proportions of pathogenic organisms that are susceptible to particular antimicrobials.
- They give us a profile of the susceptibilities of specific bacteria to antibiotics.
- Antibiograms help support appropriate and prudent use of antibiotics

ANTIBIOGRAMS

Antibiogram laminated sheet

Hospital XXX <u>Antibiogram</u>										
		% of n isolates susceptible to each antibiotic listed								
Bacteria	Number of isolates tested (n)	TOB	CFP	CTZ	PTZ	IMI	CIP	OXA	VAN	DAP
<i>E. cloacae</i>	192	65	77	66	79	96	85			
<i>E. coli</i>	1462	86	94	90	90	99	65			
<i>K. pneumoniae</i>	379*	78	80	79	86	97	81			
<i>A. baumannii</i>	117	63	61	57	69	73	66			
<i>P. aeruginosa</i>	928	65	73	71	88	76	44			
<i>S. aureus</i>	1178						44	41	100 [‡]	100
<i>E. faecalis</i>	572								99	100
<i>E. faecium</i>	206								43	96

^{*}20% of isolates are ESBL-positive
[‡]23% of isolates have vancomycin MIC = 2mcg/mL
 TOB = tobramycin; CFP = cefepime; CTZ = ceftazidime; PTZ = piperacillin/tazobactam; IMI = imipenem;
 CIP = ciprofloxacin; OXA = oxacillin; VAN = vancomycin; DAP = daptomycin
 Example adapted from Utilization of the Antibiogram in Clinical Practice accessed at <http://www.bugsvsdrugs.com>

Primary Purpose of the Antibiogram

- Help guide empiric selection of antimicrobials
- An educational tool for prescribers
- To monitor antibiotics resistance trends in bacteria common among the patient populations and in the community
 - Caution here ! reviewing data can vary significantly among institutions even when in close proximity to each other. There can be vast difference in the type of patient population.

Parts of an Antibiogram

- **Far left column:** Name of bacteria isolated in the lab & tested
- **Second column from left:**-Number of isolates
 - reflects the number of isolates which were positive for a given organism.
- **Remaining columns (left to right):** susceptibility rates in (%) to each of the different antibiotics tested.
- % Susceptible
 - Percentage of isolates of a given organism that are sensitive to a given antibiotic
- Resistance
 - Reflects the percentage of the organism which are resistant to certain antibiotics
 - Resistance = $100 - \% \text{ Susceptible}$ (from the antibiogram)

WEST MORELAND HOSPITAL ANTI BIOGRAM (INPATIENT)

January 2015- December 2015

Data listed is % susceptible

GRAM NEGATIVE	Number Tested	Penicillins			Cephalosporins			Carbapen		Quinolones		Aminoglyc		Fosfomycin (Urine)	Nitrofurantoin (Urine)	Trimeth/Sulfa
		Ampicillin	Ampicillin/Sulbactam	Piperacilin/Tazo	Cefazolin	Cefepime	Ceftriaxone	Imipenem	Ertapenem	Ciprofloxacin	Levofloxacin	Gentamicin	Tobramycin			
<i>Acinetobacter baumannii</i>	35	---	46	20	---	31	9	40	---	21	20	31	48	Mino = 73		31
<i>Citrobacter freundii</i>	19	---	---	93	0	100	95	100	100	89	89	89	89	---	100	89
<i>Enterobacter aerogenes</i>	20	---	---	79	0	100	80	100	100	85	85	85	85	---	7	90
<i>Enterobacter cloacae</i>	49	---	---	67	0	96	71	100	100	82	84	86	86	---	27	75
<i>Escherichia coli</i>	513	51	59	95	92	99	98	100	100	64	64	95	95	---	94	74
<i>Klebsiella oxytoca</i>	38	0	58	77	66	97	97	100	100	100	100	100	100	---	76	100

Lets try it !

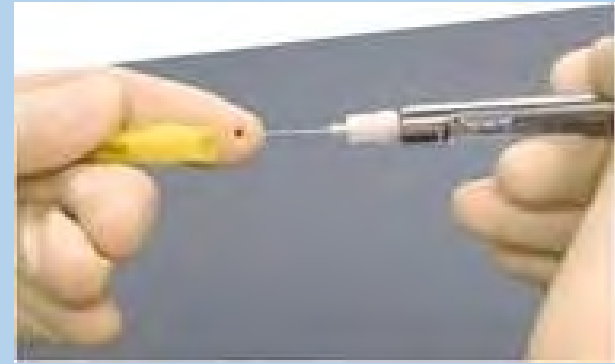
- Pt. has a UTI (no cultures yet). From the following choices of Ampicillin, Cefazolin, or Cipro which is your best bet for empiric therapy to start?
- You got back a culture from another patient and the sputum shows "*Stenotrophas. Maltophilia*". What do you order?
- Pt. at high risk for pseudomonas infections. Lab confirms the patient has Gram negative rods that are non-lactose fermenting. (assume it is Pseudomonas) which Abx is better to start Cipro or Zosyn?
 - Non-lactose fermenting rods - usually one of the 3 "Ps"
 - Proteus, Providencia, Pseudomonas
- Patient has an ESBL E.Coli in the urine. You would like to treat the patient at home with an ORAL antibiotic only. What do you recommend?

Bottom line- We're losing our effective antibiotics & have to visualize the enormous impact antibiotic resistance will have.



- A scratch could become deadly
- Minor illness won't be minor anymore
- Surgery would become nearly impossible
- Antibiotics could be rationed or only available to those with means
- IT'S ALREADY HAPPENING
 - 2015- approx. 1.8 million people died of tuberculosis – part because drugs weren't available and in part the drugs didn't work.

What if there were no antibiotics.....
would you try this?



Pre-op antibiotics decrease risk of infections
.....but must be given appropriately

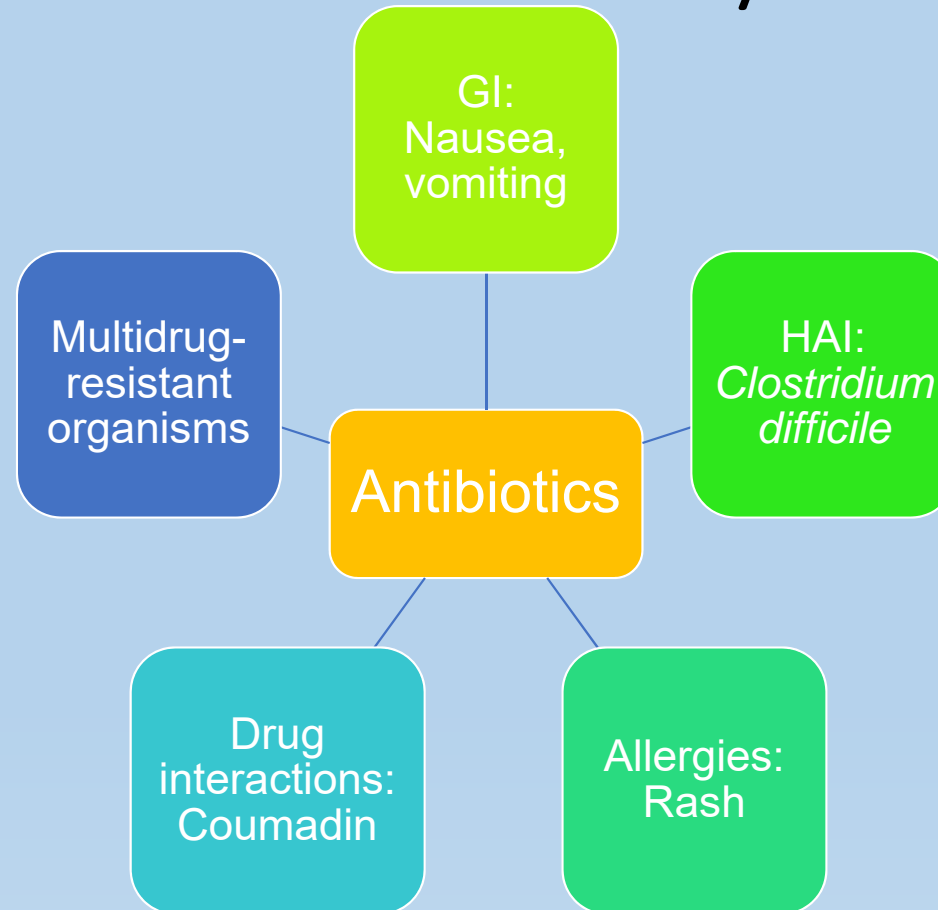


THINK or Imagine.....

What if there were no antibiotics given before surgery

- C- section - 1 in 100 chance of dying if no antibiotic is given pre-incision
 - Antibiotics decrease risk of obstetric procedures for infection by 70%
- Orthopedic surgery /joint replacement - 1 in 6 chance of infection and possibly dying if no antibiotic is given pre-op
- Dialysis
 - 2008 CDC reported 37,000 bloodstream infections & 1 in 4 of these patients may have died from the infection
 - 2013 CDC reported ↓32% in blood stream infections & ↓54% in vascular access related infections in part from antibiotic use.

Are Antibiotics really safe?



C.Difficile - Treatment

Drug Treatment:

- Metronidazole \$
- Vancomycin \$\$-\$\$\$
- Fidaxomicin (Dificid) \$\$\$\$



Recurrence -can occur in up to 25% of patients (another episode of *C. difficile* within 8 weeks)

- Relapse of the initial infection
- Re-infection with a new strain

Recurrence Treatment:

- **First recurrence**- the same medication
- **Second recurrence**, a tapered or pulsed oral vancomycin
- **Third recurrence** fecal transplant should be considered

Long-term care facility residents are particularly at risk for C. Difficile complications

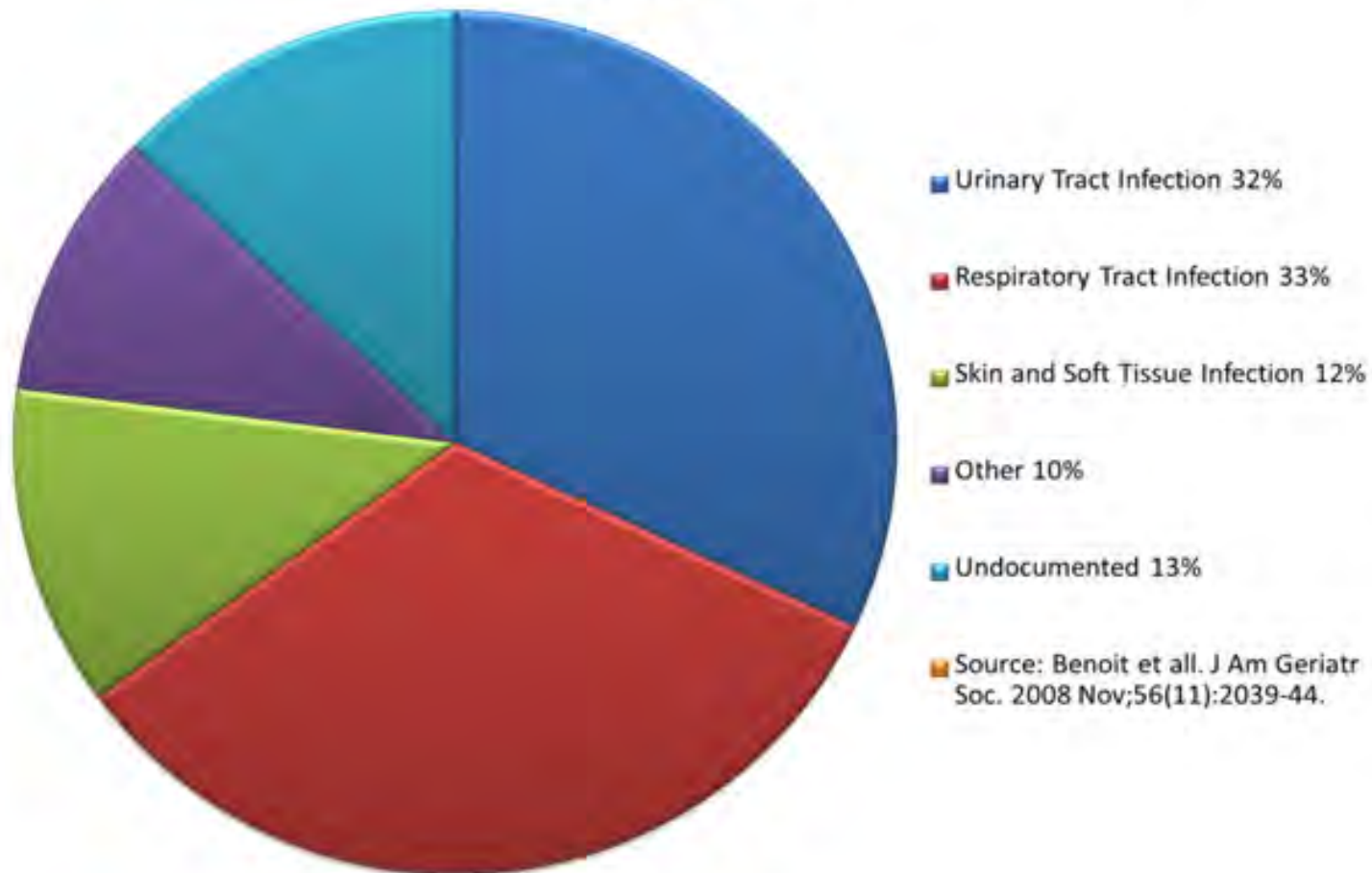
Rethinking How Antibiotics are Prescribed

(please share with your physicians)

- 4 critical time points/Moments of antibiotic prescribing
 - MOMENT 1 – “Does this patient have an infection that requires Antibiotics?”
 - MOMENT 2 – “Have I ordered appropriate cultures before starting Antibiotics?”
 - MOMENT 3 - “A day or more has passed. Can I stop antibiotics?” or “Can I narrow therapy?” or “Can I change from IV to oral therapy?”
 - MOMENT 4 - “What duration of antibiotic therapy is needed for this patient’s diagnosis?”

*Tamma PD. MD, Miller MA. MD, Cosgrove SE MD,
“Rethinking How Antibiotics Are prescribed, Incorporating the 4 Moments of Antibiotic prescribing”*

Most common infections treated with antibiotics in nursing homes



BRONCHITIS



Example: Acute Bronchitis

- Routine use of antibiotics is NOT recommended and they don't alter clinical outcomes.
- Acute bronchitis is a Self-limited viral syndrome characterized by:
 - Cough up to 3 weeks duration with or without sputum
 - Absence of signs of pneumonia on chest x-ray
 - Inflammation and irritation inside bronchial tubes
 - Lasts 10-21 days
 - Treatment: Drink fluids, Get lots of rest, humidifier, OTC= Motrin, Tylenol and maybe Bronchodilators (inhaler) if breathing is difficult.
 - Antibiotics? if patient has COPD, asthma, Heart failure or cystic fibrosis
- Common Organisms
 - **Viral** – Influenza, Rhinovirus, Coronavirus, parainfluenza virus, Adenovirus etc.
 - **Bacterial** – Account for < 10% of cases

CELLULITIS



Cellulitis

Cellulitis is a bacterial skin infection. In severe cases, infection can spread to other parts of the body.

Redness and warmth of the skin

A clinician may mark the edge of the red area to monitor whether the infection is getting better or worse.

Get medical care immediately

- if the involved area grows rapidly
- if blisters or an abscess form
- if you develop a fever or flu-like symptoms

Abscess

Blisters

K. BUCHER

IDSA Practice Guidelines for SSTI

- “Cellulitis” arises when microbes breach the cutaneous surface, especially in patients with fragile skin or diminished local host defenses from :
 - Obesity
 - Previous cutaneous trauma
 - Prior episodes of cellulitis
 - Edema from venous insufficiency or lymphedema

Skin infections are 2 main categories

- Purulent = *Staphylococcus*

- Uncomplicated abscesses
 - Furuncles, carbuncles
- Purulent cellulitis



- Non-purulent = *Streptococcus*

- Necrotizing skin and soft tissue infections
- Nonpurulent cellulitis
 - Erysipelas, cellulitis



Streptococcus versus Staphylococcus

Streptococcus

- Non- purulent (no pus)
- Margins/ Borders usually seen
- Rapid onset
- Toxin secreted
 - Bright Red area demarcated

Staphylococcus

- Purulent – creates pus
- Usually appears as scattered
- Slower onset – days and days
- Usually no toxin
 - Red but scattered appearance

Let's check your knowledge....
Which is Strep and which is Staph?



Treatment of most cases of (Uncomplicated) Cellulitis

In cases of uncomplicated cellulitis, a 5 day course is as effective as 10 day course.

Large % of patients can receive PO from the start of therapy.

STREPTOCOCCUS

- Antibiotic active against Streptococci (cefazolin or cephalexin)

STAPHYLOCOCCUS (MSSA) not MRSA

- Antibiotic active against Staphylococcus (cefazolin or cephalexin)

- If coverage for **both Strep and MRSA** is desired for oral therapy:
 - Combination of either BACTRIM OR DOXYCYCLINE with a Beta-Lactam (Cephalexin)
 - Beta lactams = Penicillin- like drugs:

Ancillary treatments for Cellulitis

- Motrin 400 mg PO QID X 5 days scheduled
 - Check if renal function ok and no contraindications for Motrin use.
 - Drug interactions with Coumadin or any bleeding.
 - Low doses of prednisone also have been recommended.
- ELEVATE the affected Limb.
 - Destruction occurs to the lymphatics which impairs resorption of inflammatory fluids. Gravity helps with this drainage.
 - Wrapping/compression of area often helps with the drainage
- CHECK for tinea pedis (fungal infection between toes or fingers)
 - Pathogens invade through cracked skin.
 - If present, treat with lotrimin or mycostatin between toes BID X 1-2 months.

Overview of SBAR forms

- Suspected UTI/SSTI/LRTI SBAR forms:
 - Are to guide communication regarding the potential need for antibiotic use between nursing staff and prescribing clinicians in long-term care facilities.
 - Are based on the **S**ituation, **B**ackground, **A**ssessment, and **R**equst form of communication, or SBAR.
 - Are based on clinical practice guidelines.

Template : SBAR

S	SITUATION: What is the situation you are calling about ? <ul style="list-style-type: none">- Identify self, unit, patient, room number- Briefly state the problem , what is it , when it happened, or started, and how severe
B	BACKGROUND: Pertinent background information related to the situation could include: <ul style="list-style-type: none">- The admitting diagnosis and date of admission- List of current medications, allergies, IV fluids, and labs- Most recent vital signs- Lab results: Provide the date and time test was done & results of previous tests for comparison- Other clinical information... Code status etc.
A	ASSESSMENT: What is the nurse's assessment of the situation?
R	RECOMMENDATION: What is the nurse's recommendation or what does he/she want? Examples: <ul style="list-style-type: none">- Notification that patient has been admitted- Patient needs to be seen now- Order changes

Summary - SBARs

- The Suspected Infection SBAR forms are the home's protocol to communicate with prescribing clinicians.
- They are used in all instances in which nursing staff communicate to seek treatment guidance from clinicians about suspected UTIs, SSTIs, and LRTIs.
- If a prescribing clinician is on site, then a Suspected Infection SBAR form should still be completed for the prescribing clinician's review.
- The information on the Suspected Infection SBAR form should be provided to the prescribing clinician before the decision to initiate treatment with antibiotics.

In the Crosshairs: Urinary Tract “Infections”



“Don’t obtain a urine culture unless there are clear signs and symptoms that **localize to the urinary tract.**”

- A patient with advanced dementia may be unable to report urinary symptoms ... In this situation, it is reasonable to obtain a urine culture if there are signs of systemic infection such as fever ... leukocytosis, or a left shift or chills in the absence of additional symptoms (e.g., new cough) to suggest an alternative source of infection.

In the Crosshairs: Urinary Tract “Infections”

- “Don’t obtain a urine culture unless there are clear signs and symptoms that **localize to the urinary tract.**”
- “Don’t use antimicrobials to treat bacteriuria in older adults unless **specific urinary tract symptoms are present.**”
 - Asymptomatic Bacteriuria is usually only treated for:
 - PREGNANT WOMEN
 - Patients prior to a urologic procedure for which mucosal bleeding is anticipated.
 - Kidney transplant patients are a group where the data is unclear and no recommendation can be made.



Antibiotic Use in Nursing Homes for Suspected UTIs = Are you treating Asymptomatic Bacteriuria ????

- In a recent study, more than half of the prescriptions of antibiotics for a suspected UTI were for residents who were asymptomatic.
- No evidence indicates that antibiotics help with asymptomatic bacteriuria. (*bacteria in urine culture but no symptoms*)
- There is evidence that they can do harm.

Mental Status changes Do NOT always = UTI

- Other causes of Altered Mental Status:

- Urinary retention
- High ammonia levels
- DEHYDRATION
- Environmental changes
- Sensory Impairment
 - Hearing
 - Vision
- Constipation
- Kidney Disease
- Low sodium
- Drugs/alcohol
- Hepatic Disease
- Depression

UTI SBAR Form Page 1

S – Situation

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

Resident Signs and Symptoms (check all that apply):

- | | |
|---|---|
| <input type="checkbox"/> Increased urgency | <input type="checkbox"/> Hypotension |
| <input type="checkbox"/> Increased frequency | <input type="checkbox"/> Dysuria (painful, burning, or difficult urination) |
| <input type="checkbox"/> Hematuria | <input type="checkbox"/> Suprapubic pain: <input type="checkbox"/> based on complaint or
<input type="checkbox"/> based on exam finding |
| <input type="checkbox"/> Rigors (shaking, chills) | <input type="checkbox"/> Costovertebral angle tenderness (flank pain/
tenderness) <input type="checkbox"/> based on complaint or
<input type="checkbox"/> based on exam finding |
| <input type="checkbox"/> Delirium (sudden onset of confusion,
disorientation, dramatic change in
mental status) | |

Vital Signs: BP _____ / _____ Pulse _____ Resp. rate _____ Temp. _____

UTI SBAR Form Page 1

B – Background

The resident has an indwelling catheter: NO YES

The resident is incontinent: NO YES If yes, new/worsening? NO YES

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

Specify: _____

Advance directives for limiting treatment (especially antibiotics): NO YES

Specify: _____

UTI SBAR Form Page 2

A – Assessment (check boxes and determine recommendation)

Resident WITH indwelling catheter:
(check all that apply)

- Fever of 100°F (38°C) or repeated temperatures of 99°F (37°C)*
- New costovertebral angle tenderness
- New suprapubic pain
- Rigors
- New delirium
- Hypotension (significant change from baseline BP or a systolic BP <90)

Any one of the above present

UTI SBAR Form Page 2

A – Assessment (check boxes and determine recommendation)

Resident WITHOUT indwelling catheter: (check at least 1 of 3)

- Acute dysuria alone; **OR**
- Single temperature of 100°F (38°C), or repeated temperatures of 99°F (37°C)*
AND at least **one** new or worsening of the following:
 - urgency suprapubic pain
 - frequency gross hematuria
 - costovertebral angle tenderness
 - urinary incontinence
- No fever, then two or more of:
 - urgency suprapubic pain
 - frequency gross hematuria
 - incontinence

Yes

Protocol criteria **ARE** met

The resident may have a urinary tract infection and needs a prescription for an antibiotic agent.[†]

No

Protocol criteria are **NOT** met

The resident does NOT need an immediate prescription for an antibiotic, but may need additional observation.^{††}

UTI SBAR Form Page 2

R – Request for Physician/NP/PA Orders

- Orders were provided by clinician through: Phone Fax In Person Other _____
- Ordered U/A (with C&S if indicated) 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
- Other: _____
- Initiate the following antibiotic:
- Antibiotic: _____ Dose: _____ Route: _____ Duration: _____
- Pharmacist to adjust for renal function: NO YES

Physician/NP/PA signature: _____ Date/Time: _____

Telephone order received by: _____ Date/Time: _____

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

Take Home Messages

1. Inappropriate antibiotic use causes resistant bacteria
2. There are strategies that nursing homes can implement to be good antibiotic stewards. Implement what needs fixed at your facility.
3. Antibiotic stewardship helps reduce inappropriate antibiotic use.
4. Everyone in the nursing home plays a role in how antibiotics are used in preventing antibiotic resistance.
5. Nursing homes need to work together to support judiciously using antibiotics; making sure cultures are used and antibiograms are used to help guide empiric treatment.
6. Nurses in LTC have a big responsibility to run the antibiotic stewardship programs:
 1. They are with the residents more than anyone else
 2. Please give them the training and education so they can carry out this responsibility with skill and confidence.
7. ***“Tackle one strategy or initiative at a time; Track the progress, get comfortable with it before moving forward.”***



Resources for Antibiotic Stewardship:

We have assembled this list of resources for you and your staff to reference. You will find more detailed information that may prove to be quite useful at your organization. If you prefer a link to these sites, please visit our website - RemediRx.com/news-events/news/ for this issue of the *Remedi Pulse*.

1. Advancing Excellence; Infections/C.Difficile Tracking
<https://www.nhqualitycampaign.org/goalDetail.aspx?g=inf#tab1>
2. AHA Antimicrobial Stewardship Program
<http://www.ahaphysicianforum.org/resources/appropriate-use/antimicrobial/index.shtml>
3. AHRQ Toolkit for Reduction of Clostridium difficile Infections Through Antimicrobial Stewardship
<http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/cdifftoolkit/index.html>
4. AMDA "Choose Wisely" Program
<https://www.amda.com/tools/choosingwisely.cfm>
5. Association for Professionals In Infection Control and Epidemiology: Antimicrobial Stewardship
<http://www.apic.org/Professional-Practice/Practice-Resources/Antimicrobial-Stewardship>
6. CDC Antibiotic Stewardship for Long Term Care
<http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html>
7. CDC Antibiotic Stewardship for Long Term Care- Core Elements Checklist
<http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html>



References

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- CDC Antibiotic Stewardship for Long Term Care. <http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.thml>
- IDSA/SHEA ‘Implementing an Antibiotic Stewardship Program
- *Practice Guidelines for the Diagnosis & Management of Skin & Soft Tissue Infections : 2014 Update* by IDSA. *Clin Infect Dis.* 2014;59(2)
- CDC – Core elements of an Antibiotic Stewardship Program