Using Data to Drive Antimicrobial Stewardship in Post-Acute and Long-Term Care Facilities

Dheeraj Mahajan, MD, MBA, MPH, FACP

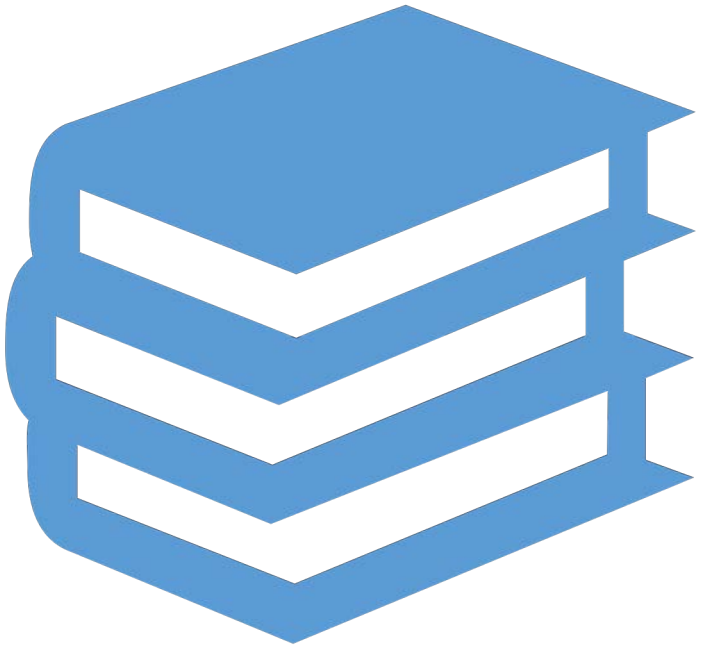
Muhammad Salman Ashraf, MBBS

Elizabeth Frentzel, MPH

Special Thanks !!

Learning Objectives

Describe	Describe core elements of an antibiotic stewardship program and the related CMS regulations.
Recognize	Recognize strategies of tracking and analyzing data along with its importance in development of a successful antimicrobial stewardship program
Demonstrate	Demonstrate practical steps that can be taken to implement each element of data-driven antibiotic stewardship program.
Identify	Identify different approaches to overcome commonly encountered barriers in antimicrobial stewardship program implementation.

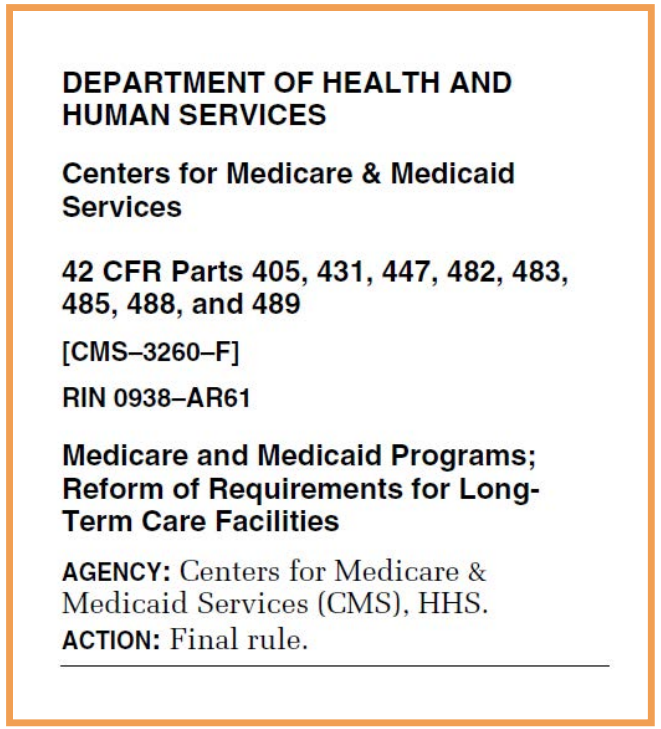


DEFINITION

“optimize the treatment of infections while reducing the adverse events associated with antibiotic use”

DATA POINTS

- **70%** of NH residents **receive** one or more courses of antibiotics in a year
- **40%-75%** of antibiotics prescribed in NH may be **unnecessary or inappropriate**
- **Cost** of antibiotic use in NHs is **$ 38 to 137 million** per year
- Residents with higher antibiotic use are at **24 % higher** risk of antibiotic related **harm**
- **20 %** of **providers prescribe 80 %** of antibiotics
- **40-75%** of antibiotics in NH are prescribed **incorrectly**
- **50 %** of antibiotics in NH are prescribed for **longer duration than necessary**



DEPARTMENT OF HEALTH AND HUMAN SERVICES

Centers for Medicare & Medicaid Services

42 CFR Parts 405, 431, 447, 482, 483, 485, 488, and 489

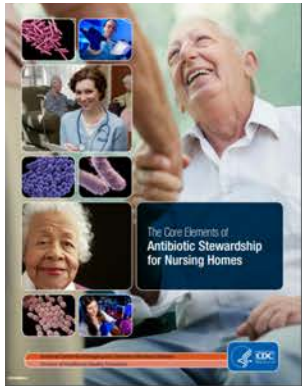
[CMS–3260–F]

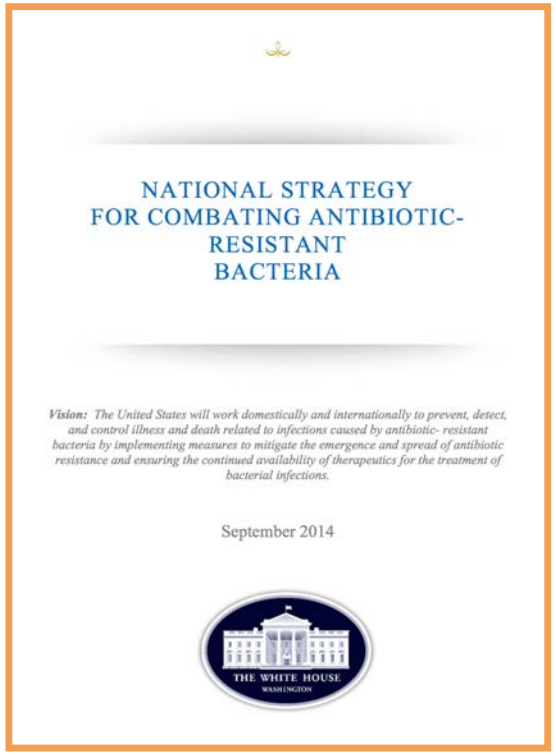
RIN 0938–AR61

Medicare and Medicaid Programs; Reform of Requirements for Long-Term Care Facilities

AGENCY: Centers for Medicare & Medicaid Services (CMS), HHS.

ACTION: Final rule.





NATIONAL STRATEGY
FOR COMBATING ANTIBIOTIC-RESISTANT
BACTERIA

Vision: The United States will work domestically and internationally to prevent, detect, and control illness and death related to infections caused by antibiotic- resistant bacteria by implementing measures to mitigate the emergence and spread of antibiotic resistance and ensuring the continued availability of therapeutics for the treatment of bacterial infections.

September 2014

THE WHITE HOUSE
WASHINGTON

Calls for Action

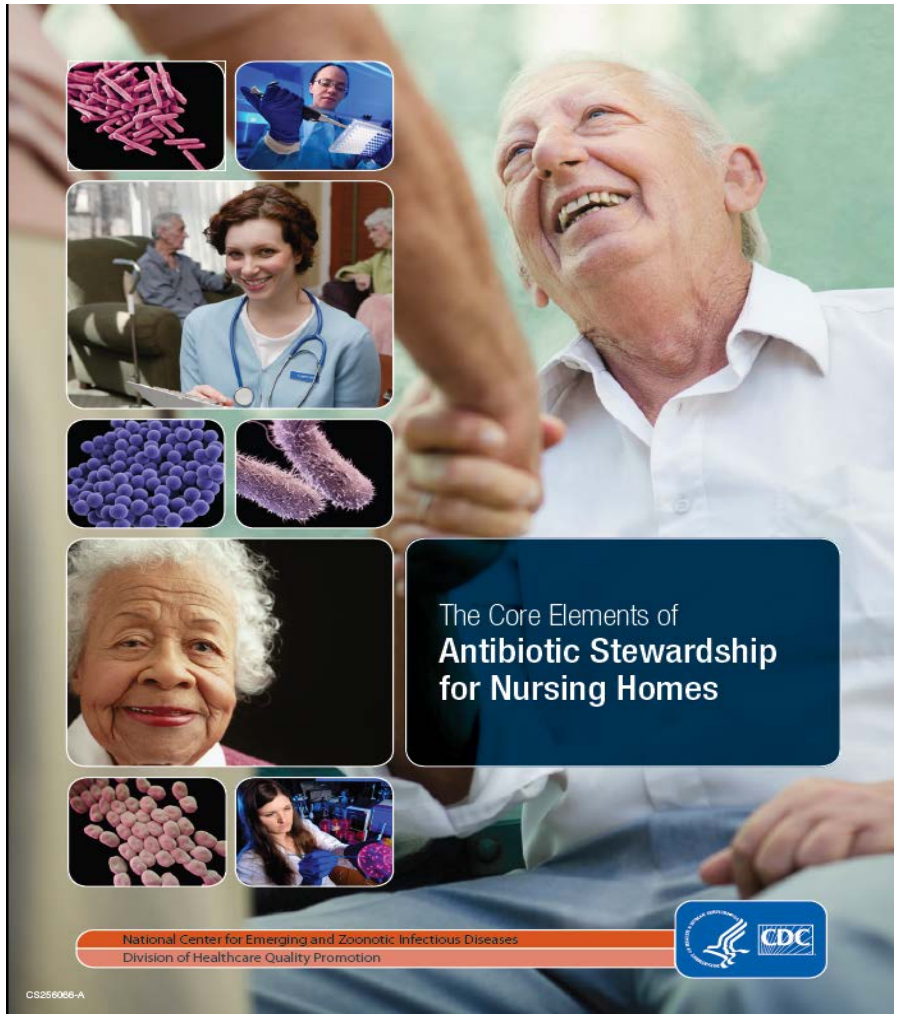
White House call for combating antibiotic resistant bacteria (2014)

CDC's Core Elements of Antibiotic Stewardship for Nursing Homes (2015)

CMS regulations on LTC antimicrobial stewardship (2016)

Joint Commission's 2017 standard on antimicrobial stewardship

Establishing ASP in Nursing Home: the CDC Core Elements



Summary of Core Elements for Antibiotic Stewardship in Nursing Homes

Leadership commitment
Demonstrate support and commitment to safe and appropriate antibiotic use in your facility

Accountability
Identify physician, nursing and pharmacy leads responsible for promoting and overseeing antibiotic stewardship activities in your facility

Drug expertise
Establish access to consultant pharmacists or other individuals with experience or training in antibiotic stewardship for your facility

Action
Implement **at least one** policy or practice to improve antibiotic use

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

http://www.gpo.gov/fdsys/pkg/FR-2015-07-16/pdf/2015-17207.pdf
http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html

Obtain Leadership Statement of Support

- Written statement of support for antimicrobial stewardship program (ASP)
- Outline duties of the ASP team members
- Communicate expectations with the nursing staff and prescribing providers
- Create culture that promote appropriate antibiotic use

[Facility Logo]

FROM: [Executive Director, Medical Director, Director of Nursing, etc.]

DATE: [Date]

RE: Antimicrobial Stewardship Program

Antibiotics are among the most commonly prescribed medications within long-term care facilities. However, misuse of antibiotics can lead to undesirable outcomes including emergence of multidrug resistant pathogens, development of *Clostridium difficile* infections, adverse drug reactions, increased mortality, and higher costs.

As part of the continuing commitment to provide high quality care to all our residents, the leadership team of [facility name] has created an Antibiotic Stewardship Program (ASP). This program will promote appropriate use of antibiotics in our facility. The overall goal of ASP is to prevent undesirable outcomes related to antibiotic misuse by optimizing the selection of drug, dose, route, and duration of therapy. Antibiotic use protocols and systems to monitor antibiotic use will be implemented to achieve ASP goals.

The ASP will be a part of the facility's Infection Prevention and Control Program. Infection preventionist will play a central role and the key leaders accountable for the program include [Medical Director, Director of Nursing, Consultant Pharmacist, etc.]. This multidisciplinary team will regularly review appropriateness of antibiotic courses and make recommendations for adjustment in practice where necessary, establish new or revise existing protocols relevant to appropriate antibiotic prescribing, monitor and report patterns of antibiotic use and resistance; and provide education on responsible use of antibiotics.

The success of this initiative requires the full participation and support of those who prescribe, prepare, administer, and receive antimicrobial therapy. The facility will provide adequate staffing and resources to support the functions and goals of the ASP. ASP team will engage prescribing providers, staff, residents, and residents' families to ensure that antibiotic use protocols can be implemented smoothly. Facility leadership is confident that with the help of frontline staff, support of prescribing providers, understanding of resident and families, and guidance of ASP team, we will improve quality of care and minimize untoward consequences of antibiotic therapy.

Leadership Support Statement

https://asap.nebraskamed.com

ASAP

Establish Accountability

Empower leaders of the program

- Medical Director
- Director of Nursing
- Consultant Pharmacist

Provide dedicated time for ASP activities to:

- Program leaders
- Infection Preventionists (who will support day to day activities of ASP)
- Infection Advisory Committee of AMDA has recommended Infection Preventionists should get 10 hours/week dedicated towards ASP activities

Partner With Local Experts

or

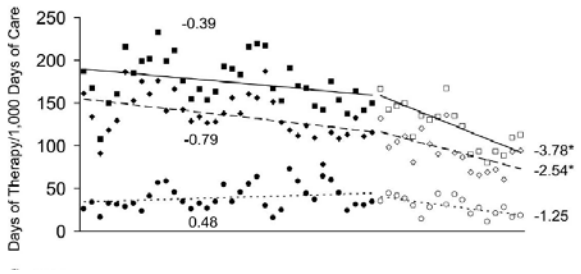
Develop Expertise Within The Facility

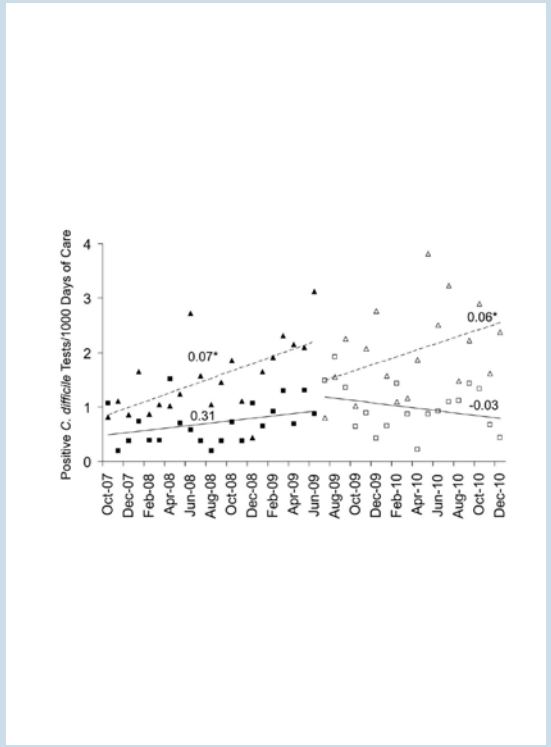
Establish access to individuals with antibiotic expertise to implement antibiotic stewardship activities

Examples of experts include:

- Consultant pharmacists who have received specialized infectious diseases or antibiotic stewardship training
  - Many Consultant Pharmacists are being trained by their companies on Antimicrobial Stewardship concepts and activities
  - Training is also being made available to consultant pharmacists by national societies.
- Antibiotic stewardship program leads at the hospitals within your referral network.
- Develop relationships with infectious disease consultants in your community
- Medical Directors and Lead Physicians can also take courses that can help them prepare for ASP activities including CDC/SHEA/AMDA course.

Impact of Partnership with ID Specialists





- 30% decrease in total antibiotic use
- 64% decline in tetracyclines use
- 61% decline in clindamycin use
- 38% decline in fluroquinolones & sulfamethoxazole/trimethoprim
- 28% decline in beta lactam/ beta lactamase inhibitor use
- Rate of positive *C. difficile* tests at LTCF also declined while rate were the same in the hospital

Jump RL et al. Infect Control Hosp Epidemiol. 2012 Dec;33(12):1185-92

Develop Antibiotic Stewardship Policy

Outline the goals of the Antibiotic Stewardship program, structure and procedures of the antimicrobial stewardship committee along with responsibilities of its members

JAMDA 18 (2017) 913–920

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

[Facility Logo]

SUBJECT:	**Antimicrobial Stewardship Program**
POLICY NO.:	[Policy number]
EFFECTIVE DATE:	[Policy effective date]
LAST REVISION DATE:	[Date of last policy revision]
RELEVANT REGULATION:	CFR § 483.80(a)(1)-(4)
APPROVED BY:	[Approving individual or committee]

Policy Statement:
The goal of the Antimicrobial Stewardship Program (ASP) is to promote the appropriate use of antimicrobials in order to maximize treatment outcome and minimize unintended consequences of antimicrobial therapy. The ASP aims to improve antibiotic prescribing practices through the development and implementation of antibiotic use protocols and a system to monitor antibiotic use.

Structure:
The Antimicrobial Stewardship Committee has been established to provide support and oversee activities of the ASP. This committee and the ASP will be part of the Infection Prevention and Control Program (IPCP). The IPCP will directly report all ASP-related activities and outcomes to the Quality Assurance and Performance Improvement (QAPI) Committee. QAPI Committee will in turn report all ASP activities and outcomes to nursing staff, prescribing clinicians, and other relevant staff.

Procedure:
1. Membership of the Antimicrobial Stewardship Committee
   a. Medical Director (required)
   b. Director of Nursing (required)
   c. Infection Preventionist (required)
   d. Consultant Pharmacist (required)
   e. Additional member as deemed appropriate by the Antimicrobial Stewardship Committee which may include Nurse representative, Nursing Aide representative, QAPI Director, Administrator or other healthcare workers

2. Meetings
   Antimicrobial Stewardship Committee will meet at least quarterly to review ASP-related activities and outcomes. The committee will also report its activities along with antibiotic use and resistance data to QAPI Committee at least on an annual basis.

3. Responsibilities
   a. Ensure appropriate use of antimicrobials through development and implementation of institutional policies, procedures, treatment algorithms, or other relevant initiatives

Some facilities prefer a brief **policy** version. A summarized modifiable version was developed by Nebraska ASAP and template is available at:

https://asap.nebraskamed.com/long-term-care/tools-templates-long-term-care/

Form an Antibiotic Stewardship Committee/Team

Required

- Infection Preventionist
- Medical Director or a designated lead physician
- Director of Nursing or Assistant Director of Nursing
- Consultant Pharmacist

Optional

- Administrator
- Prescribing Provider (Attending Physician, Nurse Practitioner or Physician Assistant)
- Nurse representative
- Nurse Aid representative
- Allied Health Professional
- Representative from the Resident and Family Council

Committee should meet at least quarterly and review policy/program annually and as needed

Task Antibiotic Stewardship Committee with Specific Responsibilities

Antibiotic Stewardship Committee should:

- Support and promote antibiotic use protocols
- Develop and maintain a system to monitor antibiotic use
- Develop and maintain a system to monitor resistance data
- Report antibiotic use and resistance data regularly to frontline staff and prescribing providers along with goals of antibiotic stewardship programs
- Provide education on antibiotic stewardship to prescribing providers and nursing staff in addition to residents and families

Antibiotic use protocols include:

- Requirement of specific dose, duration and indication with all antibiotic orders
- Introduction of standardized tools and criteria for assessment and communication of infections (tools may also include decision support algorithms)
- Guidance on prescribing based on national recommendations and facility specific data which also highlights choosing narrow-spectrum antibiotics whenever possible
- Emphasis on reassessment of empiric antibiotics after 2 to 3 days for appropriateness and necessity (Post-Prescribing Review or Antibiotic time out)

Antibiotic Use Protocols

Effectiveness of Assessment/ Communication Tool

A – Assessment (check boxes and determine recommendation prior to call)

Resident with indwelling catheter:

- ☐ fever of 100◦F (38◦C)or 2◦F (1◦C) greater than baseline
- ☐ new costovertebral tenderness
- ☐ rigors
- ☐ new delirium
- ☐ hypotension

Any one of the above present

Resident without indwelling catheter:

- ☐ Acute dysuria alone;

OR

- ☐ Single temperature of 100◦F (38◦C), multiple at 99◦F (37◦C) or above, or 2◦F (1◦C) degrees greater than baseline AND at least one new or worsening of the following:
  - ☐ urgency
  - ☐ suprapubic pain
  - ☐ frequency
  - ☐ gross hematuria
  - ☐ costovertebral angle tenderness
  - ☐ new/worsening urinary incontinence

Yes / No / Yes / No

R - Recommendation

☐ **Protocol criteria ARE met.**

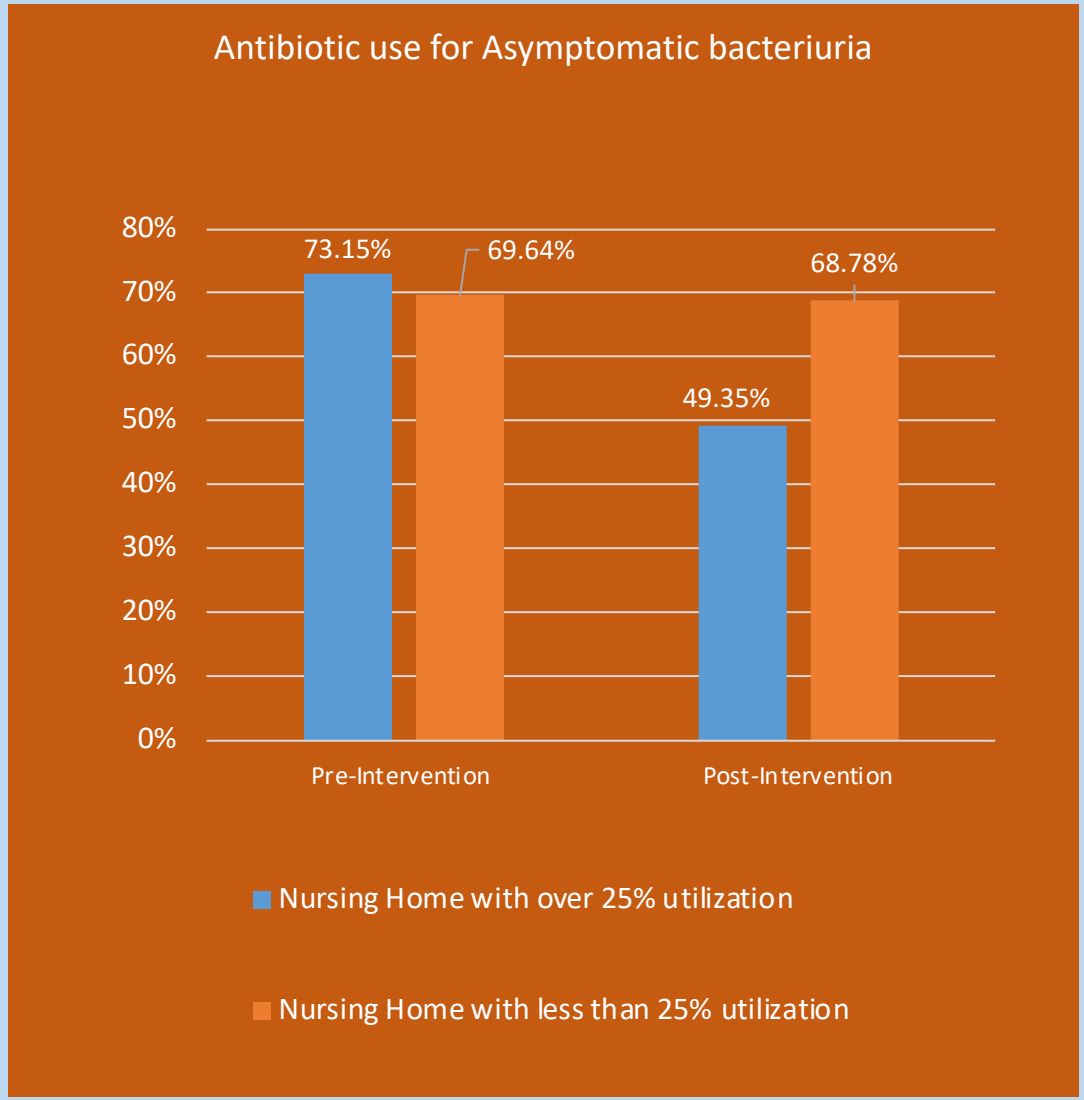
According to our understanding of best practices and our facility protocols the resident may have a urinary tract infection and need a prescription for an antibiotic agent.

Staff:

Please Check Box for Course of Action Recommended

☐ **Protocol criteria are NOT met.**

According to our understanding of best practices and our facility protocols, the information is insufficient to indicate an active urinary tract infection. The resident does NOT need an immediate prescription for an antibiotic, but may need additional observation.



McMaughan DK et al. BMC Geriatr. 2016 Apr 15;16:81

Available Assessment/ Communication Tools

Suspected LRI **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 _____

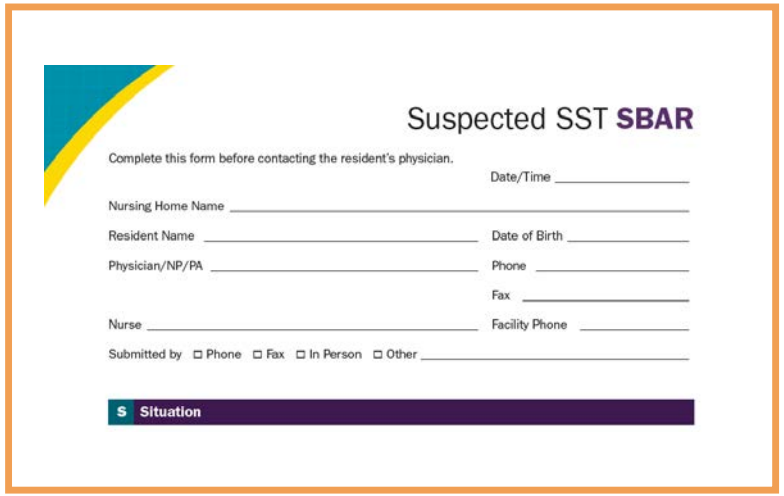
Nurse _____ Facility Phone _____

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

S Situation

I am contacting you about a suspected lower respiratory tract infection for the above resident.

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



Suspected SST **SBAR**

Complete this form before contacting the resident's physician.

Date/Time _____

Nursing Home Name _____

Resident Name _____ Date of Birth _____

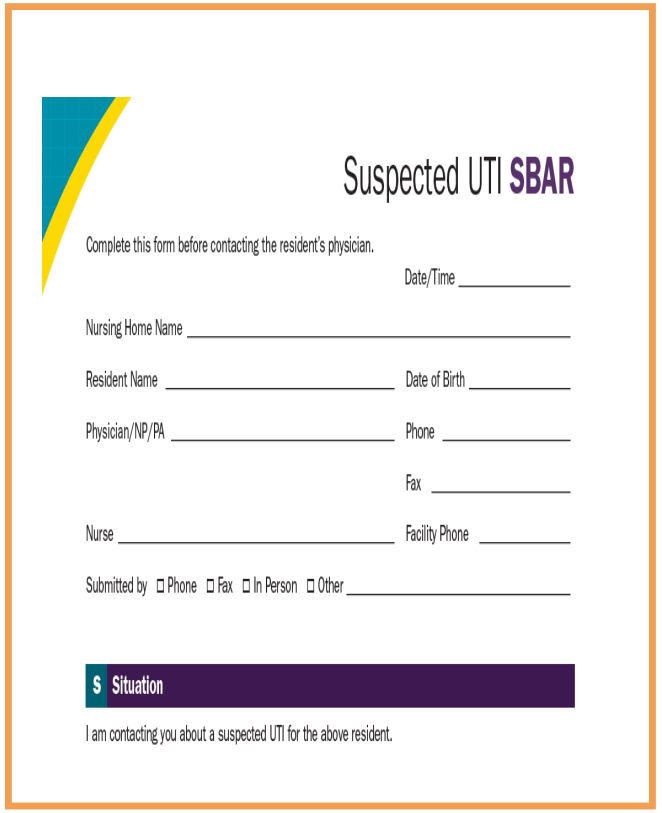
Physician/NP/PA _____ Phone _____

Fax _____

Nurse _____ Facility Phone _____

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

S Situation



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.

https://www.ahrq.gov/nhguide/toolkits/determine-whether-to-treat/toolkit3-minimum-criteria.html

Sample SBAR Tool for Suspected Urinary Tract Infection

[Facility Logo] | Resident Label

S — Situation
I am concerned about a suspected UTI for the above resident.

B — Background
Indwelling catheter ☐Yes ☐No If yes, ☐ Urethral ☐ Suprapubic
Incontinence ☐Yes ☐No If yes, is this new or worsening ☐Yes ☐No
UTI in last 6 months ☐Yes ☐No If yes, Date: _____ Organism: _____ Treatment: _____
Active diagnosis (especially bladder, kidney, genitourinary conditions; diabetes; receiving dialysis, anticoagulants):
_____
Advance directives for limiting treatment (especially antibiotic use): _____
Medication allergies: _____

A — Assessment
Vital signs: BP____ /____ HR_____ Resp. rate_____ Temp._____ O_2 Sats._____

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

No Yes
☐ ☐ Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C)
☐ ☐ New back or flank pain
☐ ☐ Rigors / shaking / chills
☐ ☐ New onset delirium (new dramatic change in mental status)
☐ ☐ Hypotension (significant change in baseline BP or SBP <90)
☐ ☐ Acute suprapubic pain
☐ ☐ Acute pain, swelling or tenderness of the scrotal area

Resident WITHOUT indwelling catheter
Criteria are met to initiate antibiotics if one of the three situations are met:

No Yes
☐ ☐ Any one of the following two:
- ☐ Acute dysuria alone (pain or burning while urinating)
- ☐ Acute pain, swelling or tenderness of the scrotal area

OR

☐ ☐ Single temp of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) **and** at least one of the following new or worsening symptoms:
- ☐ Urgency ☐ Suprapubic pain ☐ Frequency
- ☐ Gross hematuria ☐ Back or flank pain ☐ Urinary incontinence

OR

☐ ☐ No fever, but two or more of the following new or worsening symptoms:
- ☐ Urgency ☐ Suprapubic pain ☐ Frequency
- ☐ Gross hematuria ☐ Urinary incontinence

R — Recommendation
☐ **Protocol criteria met**. Resident may require UA and urine culture or an antibiotic.
☐ **Protocol criteria are NOT met**. Resident **DOES NOT** need immediate antibiotic but may need additional observation.

Nurse's Signature: _____ **Date/Time:** _____
☐ **Notification of Family/POA Name:** _____ **Date/Time:** _____
☐ **Faxed or ☐ Called to:** _____ **By:** _____ **Date/Time:** _____

Physician Orders/Response (Please check all that apply)
☐ I have reviewed the above **SBAR**.
☐ Urine culture (if indicated)
☐ Encourage 4oz of cranberry juice or another liquid (_____) TID, until symptoms resolve
☐ Record fluid intake & output until symptoms resolve (output can also be measured from urinal or by weighing diapers, etc.)
☐ Assess vital signs, including temp; every _____ hours for _____ hours
☐ Monitor and notify PCP if symptoms worsen or unresolved in _____ hours
☐ Other: _____
☐ For antibiotic orders (if needed) please complete script below:
Drug: _____ Dose: _____ Route: _____ Frequency: _____ Duration: _____ Indication: _____

Physician Signature: | **Date/Time:**

Please Fax Back To: _____ or ☐ **Telephone Order**

File Under Physician Order/Progress Notes

ASAP

Some facilities prefer to send a single page fax to the provider instead of a two-page form.

UTI SBAR

A modified single page version of communication tool for suspected UTI is available at Nebraska ASAP Website.

https://asap.nebraskamed.com/long-term-care/tools-templates-long-term-care

The North West London Hospitals NHS

NHS Trust

RAMP* Form Part B: Review of treatment

*Resident Antimicrobial Management Plan (part of StAUNCH Project)

Part B: Start to fill in 48-72 hours after commencing treatment
All sections should be completed by end of treatment period

Plan no.	Resident Name	Room no.

Good Practice Points		Nurse Records	Sign & Date
B 1	*Review clinical progress after 48-72 hours of treatment*	**Review of progress: due 48-72h after commencing treatment (See section A6)** **Time:** ..... : ..... [24 hr clock] **Date:** ..... / ..... / ..... **The resident:** [tick all applicable] ☐ now has no signs or symptoms of infection ☐ was in hospital ☐ has improved ☐ remains the same ☐ has new signs / symptoms [state details] ..... **Is resident worse? YES / NO If YES: State action taken**	
B 2	*Stop date of treatment confirmed or review date planned*	**Total number of days treatment prescribed:** ..... (days) **Treatment STOPPED: Time:** ..... : ..... [24 hr clock] **Date:** ..... / ..... / ..... OR **REVIEW of treatment planned for: Date:** ..... / ..... /	
B 3	*Resident re-examined by a doctor*	**Resident re-examined by a doctor for the same condition?** **YES / NO If YES was this:** ☐ Scheduled GP visit ☐ Extra GP visit ☐ Out of Hours Service visit ☐ Hospital A&E visit ☐ Hospital Admission ☐ Hospital Out-Patient visit **Time:** ..... : ..... [24 hr clock] **Date:** ..... / ..... /	
B 4	*Results of samples / swabs recorded*	**Sample results:** [tick all applicable] **See section A4 overleaf** ☐ No new samples or swabs sent before this treatment started ☐ Results not available yet ☐ Negative result (no growth) ☐ Positive result (micro-organisms grown) [state details if known] ..... **If positive result:** **Is this micro-organism sensitive to the antimicrobial prescribed?** [tick one option] ☐ Yes ☐ No ☐ Don't know ☐ Not tested by laboratory	
B 5	*Outcome of antimicrobial treatment documented*	**Treatment outcome (at end of course)** ☐ Symptoms completely resolved ☐ Symptoms partly resolved ☐ No improvement **Additional antimicrobial treatment prescribed? YES / NO** ***If YES: Commence new RAMP form***	

For Study Use Only	Ref. No.	B1	B2	B3	B4	B5	

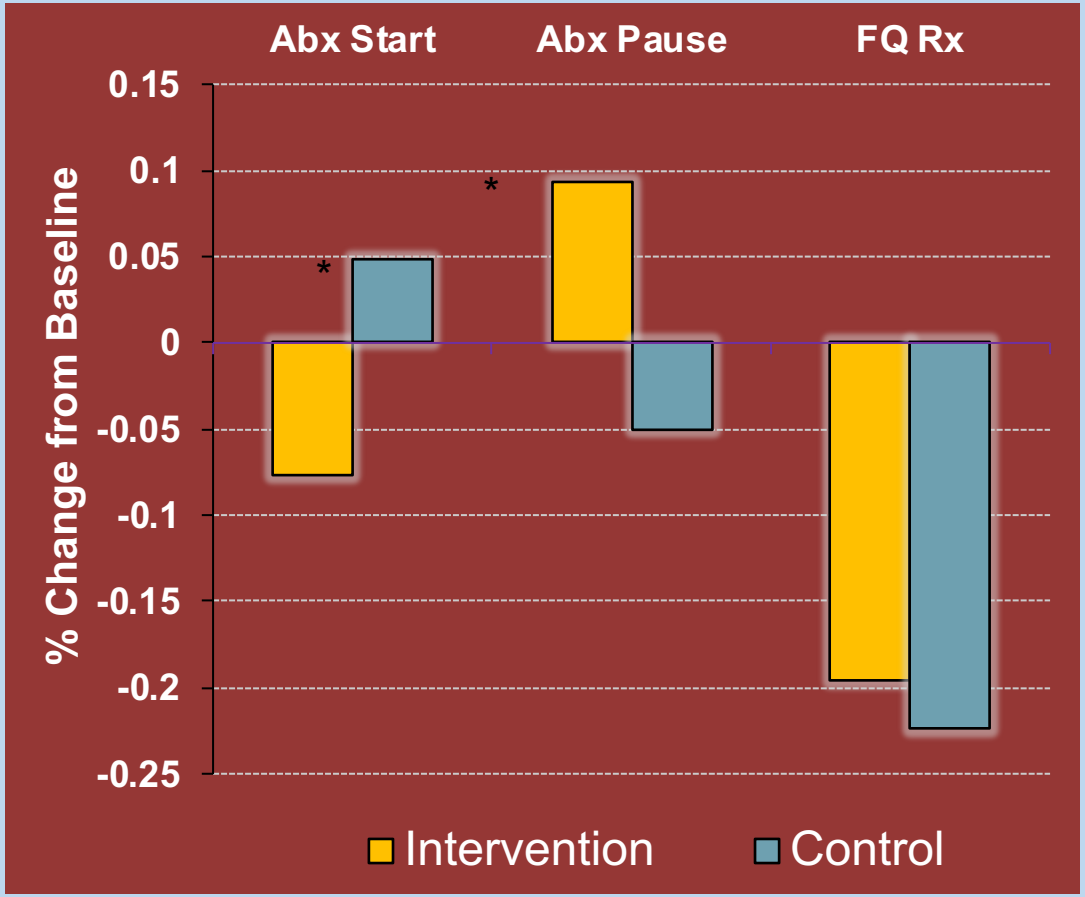
Post – Prescribing Review of Antibiotics

- Cluster RCT in 30 NHs in United Kingdom
- Introduced a form with Part A to be filled out at the start of antibiotic and Part B after 48 hour of treatment
- No additional intervention
- Part A was filled 86% of time and Part B 57% of time
- Antibiotic starts unchanged
- Antibiotic utilization decreased by 10%

Fleet E et al. J Antimicrob Chemother 2014; 69: 2265–73

Education of Nursing Staff and Providers

- Cluster RCT in 58 NHs in Sweden
- Prescribing guideline disseminated through interactive case-based sessions w/ nurses & providers
- Total antibiotic prescriptions decreased and wait and see approach by physicians increased



Pettersson E et al. J Antimicrob Chemother. 2011 Nov;66(11):2659-66.

Tracking and Monitoring Antibiotic Use

Require review of antibiotics:

- On admission to and transfer out of the facility.
- When it is prescribed by a provider not on facility's staff (like ED provider)
- Of all ongoing and completed courses of antibiotics by consultant

Periodic (quarterly) Tracking of adherence to antibiotic use protocols

Conduct at least an annual review of antibiotic use data in the facility to identify:

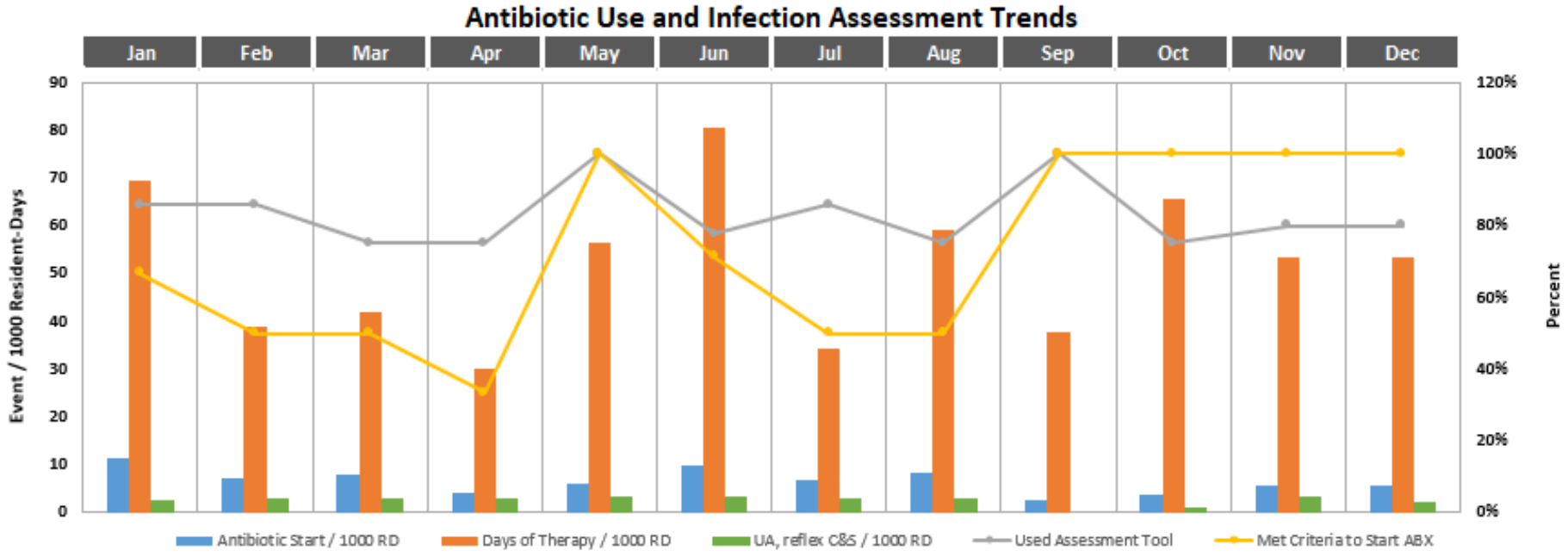
- Specific antibiotic that is being excessively used or
- Providers who are using excessive antibiotics as compared to their peers.

Reach out to pharmacy to provide antibiotic use data and/or use infection/ antibiotic start log to obtain antibiotic use measurements like:

- Antibiotic starts/ 1000 resident days
- Days of therapy/ 1000 resident days

ection and Antibiotic Start Log Template

rameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	Trend
ntibiotic Start / 1000 RD	11.29	7.14	7.98	3.99	5.88	9.78	6.67	8.42	2.44	3.76	5.56	5.56	78.46	
ays of Therapy / 1000 RD	69.35	38.78	41.87	29.91	56.47	80.43	34.29	58.95	37.80	65.73	53.33	53.33	620.25	
sed Assessment Tool	86%	86%	75%	75%	100%	78%	86%	75%	100%	75%	80%	80%	83%	
let Criteria to Start ABX	67%	50%	50%	33%	100%	71%	50%	50%	100%	100%	100%	100%	73%	
A, reflex C&S / 1000 RD	2.42	3.06	2.99	2.99	3.53	3.26	2.86	3.16	0.00	0.94	3.33	2.22	30.76	



Tracking and Monitoring Resistance Data

Perform at least annual review of surveillance data pertaining to microorganisms related to antibiotic use like:

- Methicillin-resistant *Staphylococcus aureus*
- Carbapenemase-resistant *Enterobacteriaceae*
- *Clostridium difficile*
- Any other drug resistant organism that a facility seems to be struggling with

Make sure that the facility's contract with laboratory includes provision of facility specific antibiogram

Resistance data/ antibiogram should also be considered when developing facility specific antibiotic use guidance

Reporting/ Feedback Process

Antibiotic Stewardship Committee/ team will be part of Infection Control and Prevention Program (IPCP).

It will report progress to the Quality Assessment and Assurance (QAA) Committee at least annually

New CMS rules mandate IPCP to be reviewed at least annually.

In addition to QAA committee, annual written feedback on facilty's antibiotic use and resistance data should be shared with:

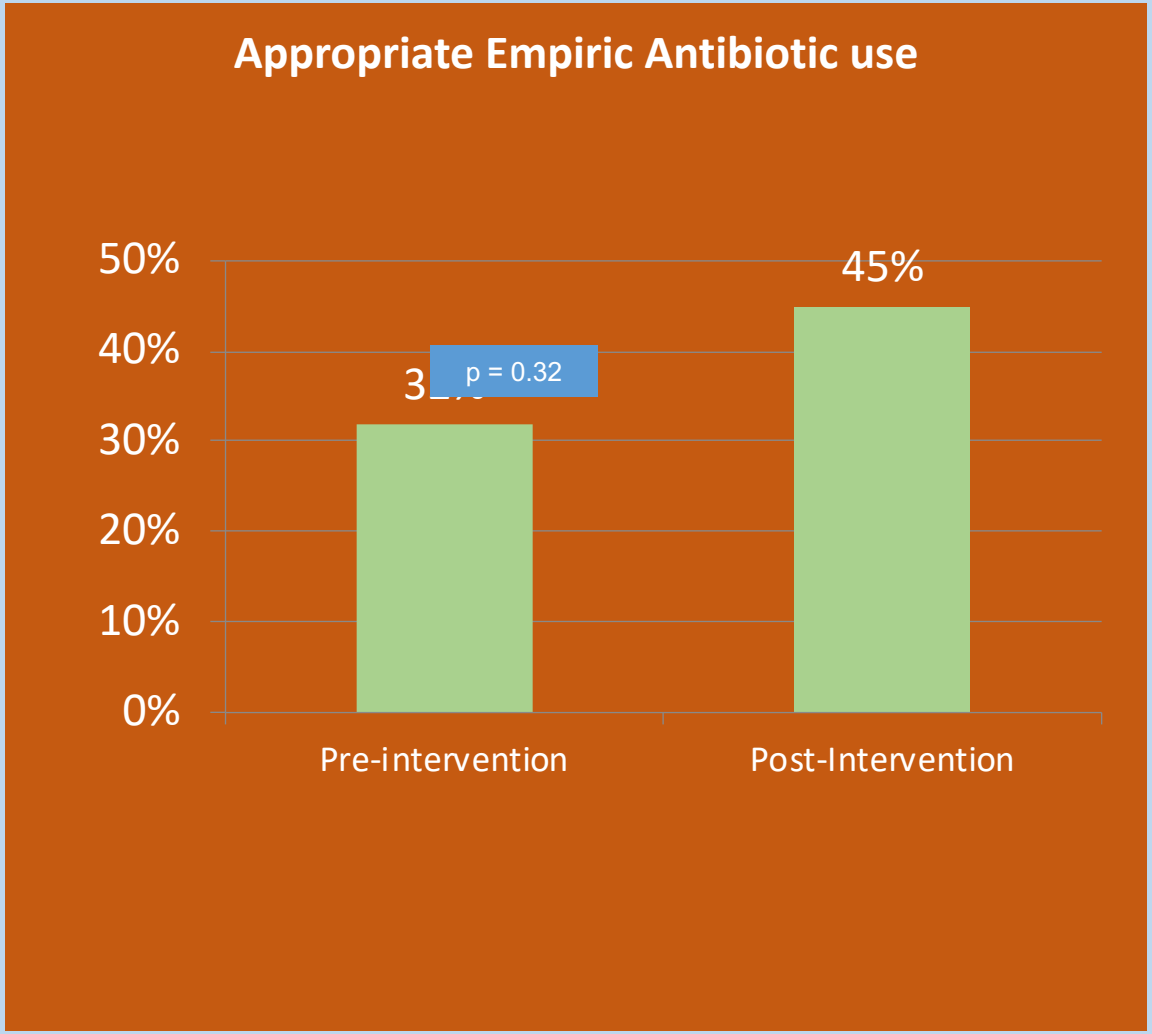
- Prescribing providers
- Nursing Staff
- Administration
- Resident and Family Council

Provide written feedback on antibiotic use for each provider on an annual basis

Also share facility specific antibiograms with all the prescribing providers

Use of Nursing Home Antibiogram

- Up to 85% of treatment started empirically
- Where cultures available
  - only 32% of empiric antibiotic appropriate
- Antibiogram was distributed to Nursing Staff, Administrators and Physicians in a meeting.
- 6 months later there was a modest increase in appropriateness; however, the difference was not statistically significant



Furuno JP et al. Infect Control Hosp Epidemiol. 2014 Oct;35 Suppl 3:S56-61

[Facility Logo]

Antibiotic Susceptibility Report for Most Frequently Isolated Gram-Negative Organisms (January 2015 to December 2016)

Pathogen	Isolate Tested	Percent Susceptible																			
		Ampicillin	Ampicillin/Sulbactam	Piperacillin/Tazobactam	Cefazolin	Cefepime	Cefoxitin	Ceftazidime	Ceftriaxone	Cefuroxime	Aztreonam	Ertapenem	Meropenem	Amikacin	Gentamicin	Tobramycin	Ciprofloxacin	Levofloxacin	Trimethoprim/Sulfa	Nitrofurantoin[1]	Tetracycline
Escherichia coli	111	53	59	99	86	98	92	98	97	91	98	100	100	100	91	91	58	59	76	99	77
Klebsiella pneumoniae	41	--	78	98	93	98	95	98	98	93	98	100	100	100	98	98	95	95	93	63	83
Proteus mirabilis	41	98	98	100	100	100	100	100	100	100	100	100	100	100	100	75	75	75	75	50	75
Pseudomonas aeruginosa	31	--	--	97	--	97	--	97	--	--	84	--	90	100	74	77	71	71	--	--	--

-- Denotes organism has intrinsic resistance to this antimicrobial

1. Nitrofurantoin is reported for urine sources only

Summary for Gram-Negative Organisms

During the 2-year period between January 2015 and December 2016, a total of 111 *E coli* were identified, making it the most commonly identified Gram-negative pathogen. Antibiotic susceptibility of these *E coli can be summarized as follow:*

1. Oral antibiotics with the ***highest*** susceptibilities (in descending order) were:
    a. Nitrofurantoin (99%)
    b. Cefuroxime (91%)
    c. Cephalexin (86%, as indicated by cefazolin susceptibility)
    d. Trimethoprim/sulfamethoxazole (76%)

2. Susceptibilities of antibiotics available only in intravenous formulation (e.g., ceftriaxone) exceed 90%, except:
    a. Ampicillin/sulbactam (59%)
    b. Cefazolin (86%)

Antibiotic susceptibility data can be useful for guiding selection of empiric antibiotic therapy for residents in whom culture and susceptibility data from the past few months are not available.

https://asap.nebraskamed.com/long-term-care/tools-templates-long-term-care

[Facility Logo]

Quarterly Antimicrobial Use Summary Report

This report summarizes all systemic antibiotics (IV, IM, PO) prescribed between [month/year] to [month/year]. A total number of [aa] antibiotic courses in [bb] patients were reviewed. During this three-month period, a total of [cc] antibiotic starts / 1000 resident-days (RD) and [dd] days of therapy (DOT) / 1000 RD were observed. The most common reasons for starting antibiotic therapy were [top 3 infectious syndromes]. The three most frequently prescribed antibiotics were [antibiotic names]. Of all the antibiotic courses initiated during this period, [ee]% of courses of therapy were appropriate based on [McGeer, Loeb] criteria. The table below further details antibiotic prescribing patterns and appropriateness during this period.

Cumulative Antimicrobial Use Summary Report for 20[XX]

Quarter	New Antibiotic Start / 1000 RD	DOT / 1000 RD	Top 3 Antibiotics with highest DOT / 1000 RD	Top 3 Indications for Starting Antibiotic Therapy	Met Criteria for Initiating Antibiotic Therapy
First Quarter: *January to March*	[cc]	[dd]	Ciprofloxacin (ff DOT/1000 RD) Cephalexin (gg DOT/1000 RD) Amoxicillin (hh DOT/1000 RD)	UTI (ii %) SSTI (jj %) ARI (kk %)	UTI (ll %) SSTI (mm %) ARI (nn %) Overall [ee]%
Second Quarter: *April to June*					
Third Quarter: *July to September*					
Fourth Quarter: *October to December*					

Abbreviations: RD = resident-day; DOT = days of therapy; UTI = urinary tract infection; SSTI = skin and soft tissue infection; ARI = acute respiratory infection

Sample **Antibiotic Use Summary Report** is available at Nebraska ASAP website

https://asap.nebraskamed.com/long-term-care/tools-templates-long-term-care

Education

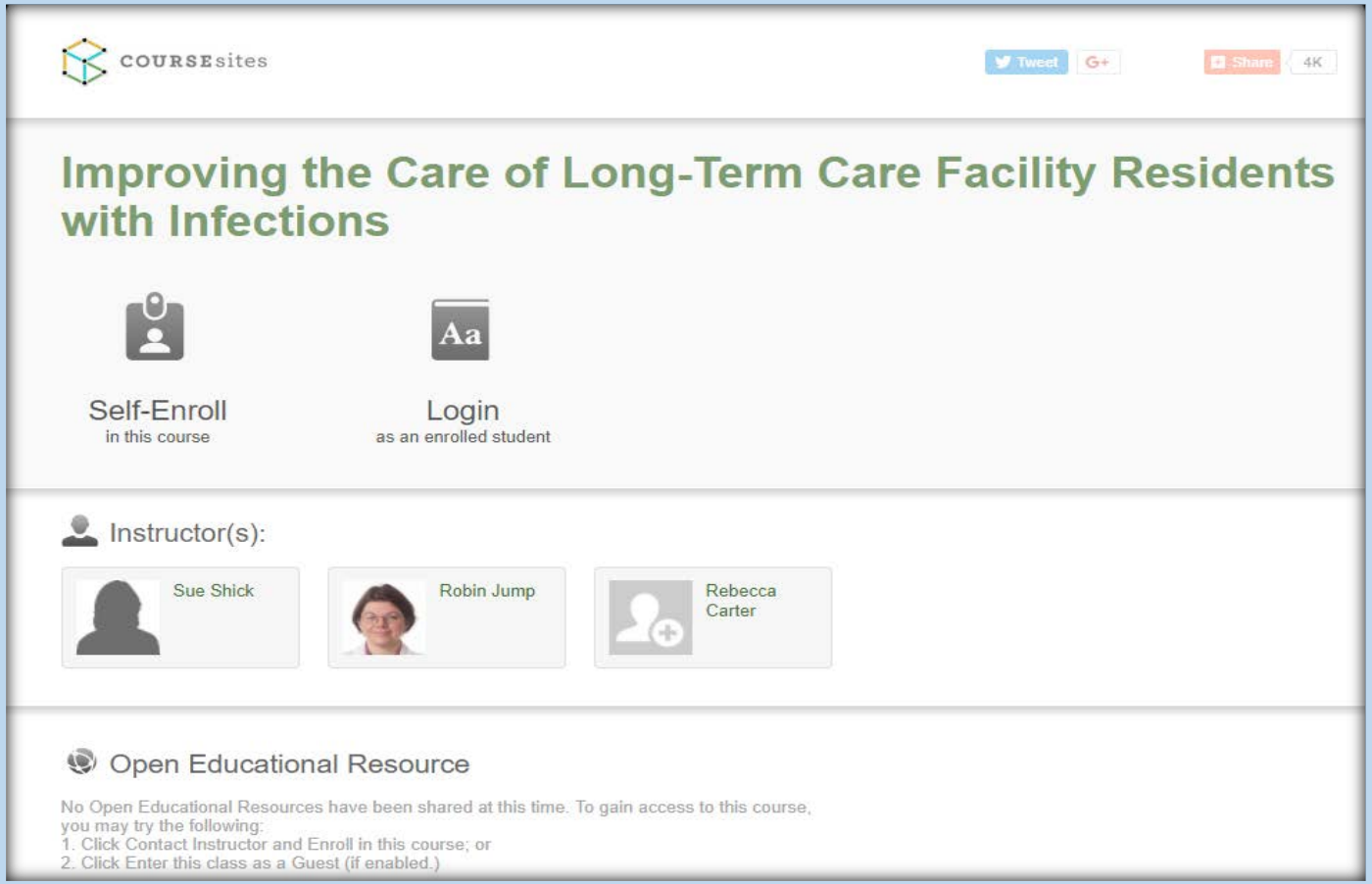
- **Nursing staff**
- **Prescribing providers**

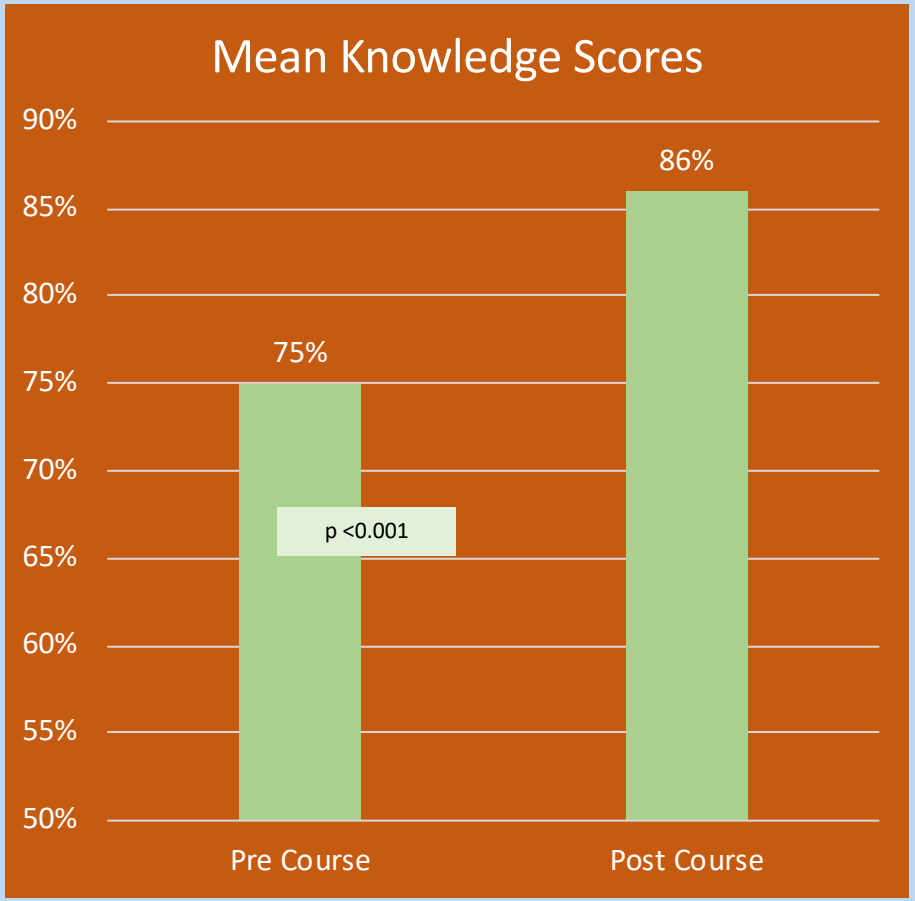
- Need of antibiotic stewardship program and its goals
- Understanding of antibiotic use protocols
- Responsibility of each healthcare worker for ensuring its implementation.

- **Families**
- **Residents**
- **Resident and Family Council**

- Dangers of antibiotic misuse
- Role of antibiotic stewardship program in promoting appropriate antibiotic use

Impact of On-Line Course for Nurses





After the course, nurses' agreement that their role influences whether residents receive antimicrobials also increased significantly

Wilson BM et al. Am J Infect Control. 2017 May 1;45(5):466-470
https://www.coursesites.com/webapps/Bb-sites-course-creation-BBLEARN/handleSelfEnrollment.htmlx?course_id=_348931_1
Accessed January 27. 2018

ANTIMICROBIAL STEWARDSHIP PROGRAM

What is an Antimicrobial Stewardship Program?

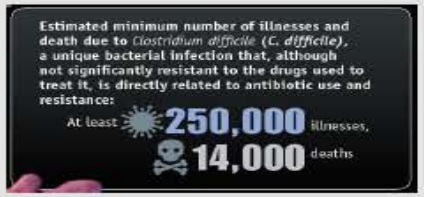
An Antimicrobial Stewardship Program is a set of systematic activities aimed to promote the appropriate use of antimicrobials.

The program goals are to:

- Improve quality of patient care and patient outcomes
- Minimize side effects from antimicrobials
- Limit the development of antimicrobial resistance
- Educate providers on when to prescribe antimicrobials, and the right drug, dose and duration to use

Why is Antimicrobial Stewardship Program needed?

- Up to 75% of antimicrobial use is considered inappropriate
- Inappropriate use will increase antimicrobial resistance and lead to unwanted side effects (*Clostridium difficile* infection)
- An Antimicrobial Stewardship Program can improve patient outcomes and reduce inappropriate antimicrobial use



How can Antimicrobial Stewardship Program be implemented?

Practical steps of implementation include:

1. Obtain program support from facility leadership
2. Partner with regional physicians or pharmacists with infectious diseases or antimicrobial stewardship expertise
3. Form an Antimicrobial Stewardship Committee
4. Review data on infection assessment practices, and antimicrobial use and resistance patterns
5. Determine program goals such as the types and extents of interventions (e.g., use assessment tools for all suspected infections, eliminate treatment of asymptomatic bacteriuria)
6. Educate prescribers and staff on the types, reasons and goals of the selected interventions
7. Track outcomes after implementation of interventions
8. Report and educate program activities and outcomes to prescribers, staff and residents/families

Who should be part of the program?

Ideally everyone who is involved in the antibiotic use process:

- Medical Directors: set standards for antibiotic prescribing practices
- Directors of Nursing: set standards for nursing practices
- Infection Preventionists: be responsible for the Infection Prevention and Control Program and support Antimicrobial Stewardship Program activities
- Consultant Pharmacists: perform drug use review, provide antibiotic use data and assist with developing treatment guidelines
- Prescribers: prescribe antimicrobials only when clearly indicated
- Nursing staff: evaluate patient using standardized assessment tools and communicate patients' symptoms to prescribers

ASAP
Nebraska Antimicrobial Stewardship Assessment and Promotion Program

Infection Control Assessment & Promotion Program

University of Nebraska Medical Center
Nebraska Medicine

NEBRASKA
Good Life. Great Mission.
DEPT. OF HEALTH AND HUMAN SERVICES

Content developed based on resources provided by the Centers for Disease Control and Prevention (CDC) – retrieved October 2017 from https://www.cdc.gov/drugresistance/threat-report-2013/index.html and https://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html.

This educational poster and other educational materials can be found at Nebraska ASAP website at following link:
https://asap.nebraskamed.com/long-term-care/educational-materials-long-term-care/

Summary of the Steps

Obtain leadership statement of support

Establish accountability

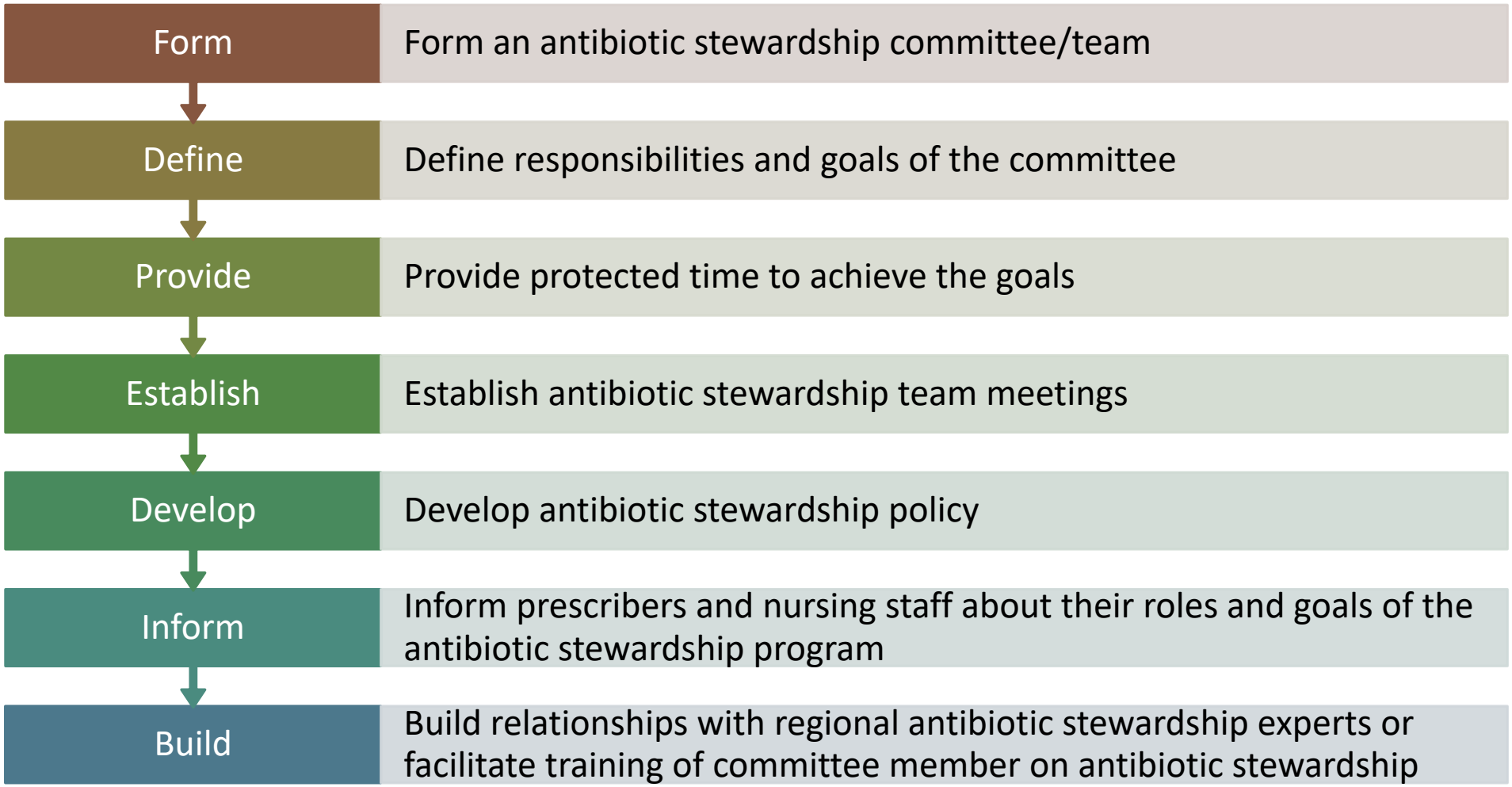
Partner with local experts or develop expertise within the facility

Develop Antibiotic Stewardship Protocol

Form an Antibiotic Stewardship Committee/Team

Task Antibiotic Stewardship Committee with Specific Responsibilities

- Support and promote antibiotic use protocols
- Develop and maintain a system to monitor antibiotic use
- Develop and maintain a system to monitor resistance data
- Report antibiotic use and resistance data regularly to frontline staff and prescribing providers along with goals of antibiotic stewardship programs
- Provide education on antibiotic stewardship to prescribing providers and nursing staff in addition to residents and families



- ✓ Leadership commitment
- ✓ Accountability
- ✓ Drug Expertise

Putting Antibiotic Stewardship Infrastructure in Place

Resources for ASP

https://asap.nebraskamed.com Accessed June 22, 2018

http://www.cdc.gov/longtermcare/prevention/antibiotic-stewardship.html Accessed June 22, 2018

http://www.ahrq.gov/professionals/quality-patient-safety/patient-safety-resources/resources/nh-aspguide/index.html Accessed June 22, 2018

https://nursinghomeinfections.unc.edu/Accessed June 22, 2018

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

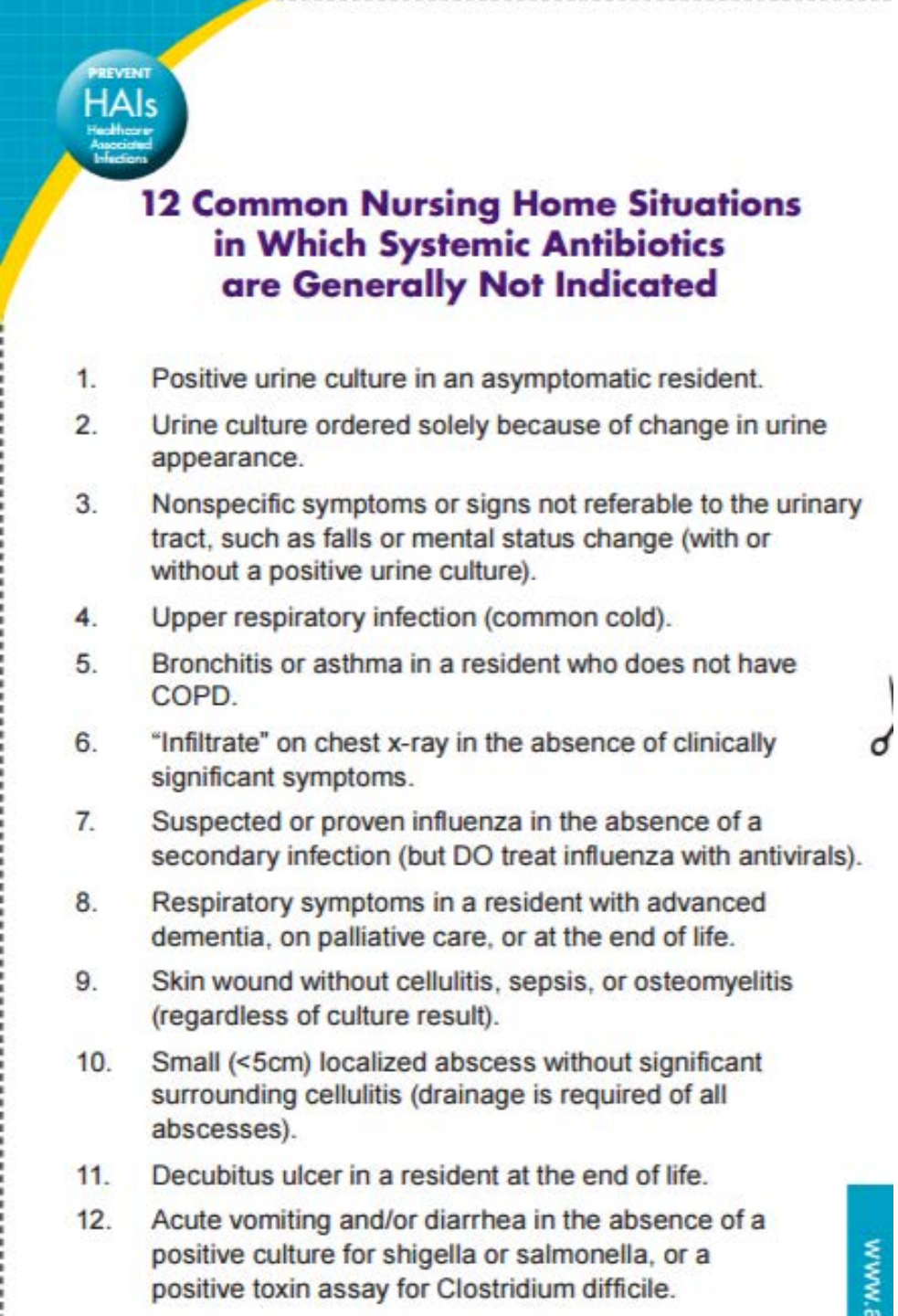
June 22, 2018

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

June 22, 2018

www.ahrq.gov/NH-ASPGuide

June 22, 2018



Additional Resources for Educational Materials

This pocket card is available at:

- https://www.ahrq.gov/sites/default/files/wysiwyg/nhguide/4_TK2_T2-Antibiotic_Pocket_Cards.pdf

Other Educational resources for physicians, nurses and families/ residents can be found at:

- https://asap.nebraskamed.com/long-term-care/educational-materials-long-term-care/
- http://www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/asp/ltc/
- https://nursinghomeinfections.unc.edu/
- https://www.cdc.gov/longtermcare/index.html
- www.ahrq.gov/NH-ASPGuide
- http://www.rochesterpatientsafety.com/index.cfm?Page=For%20Nursing%20Homes

Accessed June 22, 2018

Dissecting Data for Antibiotic Stewardship

Ask basic questions on antibiotic use:

- How much antibiotics are we using?
- For what reasons are we using antibiotics?
- Which antibiotics are we using the most?
- Who is prescribing antibiotics?
- What proportion of the use is

Broad Categories of Data Required for Antibiotic Stewardship Program

Antibiotic Use Measures

- Antibiotic Starts/ 1000 resident days
- Antibiotic days of therapy/1000 resident days

Process Measure

- Proportion of antibiotic orders with dose, duration and indication
- Proportion of antibiotic orders with related clinical documentation
- Proportion of antibiotic orders that meet standard criteria/guidelines

Outcome Measures

- Antimicrobial Resistance
- Antibiotic-associated adverse events
- *C. difficile* infections

Data Sources for Antibiotic Stewardship

Dispensing Pharmacy	Consultant Pharmacist	Microbiology Laboratory	Infection Preventionist
▪ Antibiotic starts ▪ Days of therapy ▪ Use by Class ▪ Use by Diagnosis ▪ Use by Provider ▪ Regional comparison	▪ Appropriateness of orders ▪ Orders meeting criteria/guidance ▪ Documentation compliance ▪ Bug-drug mismatches ▪ Adverse events	• Diagnostic test utilization • Antibiogram • List of positive test results for specific pathogens	• Antibiotic use information from infection log • Infection rates • Orders meeting standard criteria • Nursing protocol compliance • MDRO prevalence

Use	• Use a standardized approach in defining antibiotic appropriateness when performing surveillance:
Determine	• Determine whether meeting a standard criteria (such as Loeb's criteria)
Assess	• Assess whether facility protocol for prescribing is being followed (such as conditions for prescribing were met as per the adapted SBAR tool)
Evaluate	• Evaluate whether the order is consistent with published national guidelines or recommendations

Surveillance of Antibiotic Prescribing Practices

Published Guidance on Management of Common Infections

- Diagnosis and Management of Skin and Soft Tissue Infection: Stevens DL, et al. Clin Infect Dis 2014;59:e10-52
- Appropriate Antibiotic Use for Acute Respiratory Tract Infection in Adults: Harris AM, et al. Ann Intern Med 2016.
- Management of Community-Acquired Pneumonia in Adults: Mandell LA, et al. Clin Infect Dis 2007;44;S27-72.
- Treatment of Acute Uncomplicated Cystitis and Pyelonephritis in Women: Gupta K et al. Clin Infect Dis 2011;52:e103-20.
- Diagnosis, Prevention, and Treatment of Catheter-Associated Urinary Tract Infection in Adults: Hooton TM, et al. Clin Infect Dis 2010;50:625-63.
- Diagnosis of Uncomplicated Cystitis in Nursing Home Residents: Nace DA et al. J Am Med Dir Assoc. 2018 Sep;19(9):765-769.e3
- Decision Tool for the Empiric Treatment of Suspected Urinary Tract Infection in Frail Older Adults: van Buul LM et al. J Am Med Dir Assoc. 2018 Sep;19(9):757-764

Table 1. Recommended Duration of Therapy

Infection Syndrome	Typical Duration of Therapy
Uncomplicated cystitis[1,2]	5 days for Nitrofurantoin 3 days for TMP/SMX 1 dose for Fosfomycin 3 days for Fluoroquinolones 3-7 days for Beta-Lactams
Pyelonephritis[1]	7 days for Fluoroquinolones 14 days for TMP/SMX 10-14 days for Beta-Lactams
Catheter-associated urinary tract infection[3] or complicated* UTI[2,4]	7 days if prompt resolution of symptoms 10-14 days if delayed response to therapy
Pneumonia[5]	5-7 days
Bronchitis[6,7]	No antibiotic therapy is recommended
Acute exacerbation of COPD[8]	5 days if treatment criteria met
Influenza[9,10]	5 days for treatment Minimum of 2 weeks, continuing for at least 7 days after the last known case was identified for chemoprophylaxis in influenza outbreak
Pharyngitis, streptococcal[11]	Up to 10 days for penicillin, amoxicillin, 1st-generation oral cephalosporins, clindamycin 5 days for azithromycin
Sinusitis[12]	5-7 days if improvement after 3-5 days of treatment 7- 10 days if delayed response or switched to alternative therapy due to lack of response
Cellulitis or cutaneous abscess[13]	5-7 days
Shingles[14]	7 days for famciclovir, valacyclovir 7-10 days for acyclovir
Clostridium difficile infection[15]	10-14 days 10 days for fidaxomicin
Gastroenteritis, bacterial[16]	3-5 days if treatment criteria met

* Refer to Table 2 for factors associated with complicated UTI.

ASAP

Document summarizing **typical length of therapy recommendations** from various guidelines along with all the references is available at Nebraska ASAP Website.

https://asap.nebraskamed.com/long-term-care/guidance-document-long-term-care/

Loeb's Criteria Checklist for Surveillance

Patient Name: _____ **MRN:** _____ **Location:** _____

Date of Infection: _____ **Date of Review:** _____ **Reviewed by:** _____

UTI: ☐ evaluated ☐ criteria met **LRTI:** ☐ evaluated ☐ criteria met **SSTI:** ☐ evaluated ☐ criteria met **FUO:** ☐ evaluated ☐ criteria met

Suspected Infection Syndrome	Minimum Criteria for Starting Antibiotic Therapy
Urinary tract infection	
without catheter	Either one of the following criteria ☐ Acute dysuria, OR ☐ Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline, AND ≥1 of the following new or worsening symptoms ☐ Urgency ☐ Frequency ☐ Suprapubic pain ☐ Gross hematuria ☐ Urinary incontinence ☐ Costovertebral angle tenderness
with catheter	At least one of the following criteria ☐ Rigors ☐ Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline ☐ New onset delirium ☐ New costovertebral angle tenderness
Note: *Residents with intermittent catheterization or condom catheter should be categorized as 'without catheter'* *Urine culture should be sent prior to starting antibiotics* *Antibiotics should not be started for cloudy or foul smelling urine*	
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
afebrile with COPD and >65 years old	Both of the following criteria ☐ New or increased cough ☐ Purulent sputum production
afebrile without COPD	All of the following criteria ☐ New cough ☐ Purulent sputum production ☐ At least one of the following criteria ☐ Delirium ☐ Respiratory rate >25 breaths / minute
with new infiltrate on chest X-ray consistent with pneumonia	At least one of the following criteria ☐ Productive cough ☐ Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline ☐ Respiratory rate >25 breaths / minute
Note: *Consider ordering chest X-ray and CBC with differential for febrile residents with cough and any of these criteria (HR >100, worsening mental status, or rigors)* *Antibiotics should not be used for up to 24 h after large-volume aspiration in those without COPD but with temp ≤38.9°C (102 °F) and non-productive cough*	
Skin and soft-tissue infection	Either one of the following criteria ☐ New or increasing purulent drainage, OR ☐ At least two of the following criteria ☐ Redness (erythema) ☐ Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline ☐ Tenderness ☐ New or increasing swelling at affected site ☐ Warmth
Note: *These criteria do not apply to residents with burns* *Surgical consultation and hospitalization are required for certain soft-tissue infections (e.g., necrotizing fasciitis or gas gangrene)*	
Fever where the Focus of Infection is Unknown	Both of the following criteria ☐ Temp >37.9 °C (100 °F) or 1.5 °C (2.4 °F) above baseline, AND ☐ At least one of the following criteria ☐ Rigors ☐ Delirium
Note: *Antibiotic should not be started in residents with fever and altered mental status that does not meet delirium criteria (e.g., reduced functional activities, withdrawal, loss of appetite)*	

Reference: Loeb M, *et al*. Infect Control Hosp Epidemiol 2001;22:120-4.

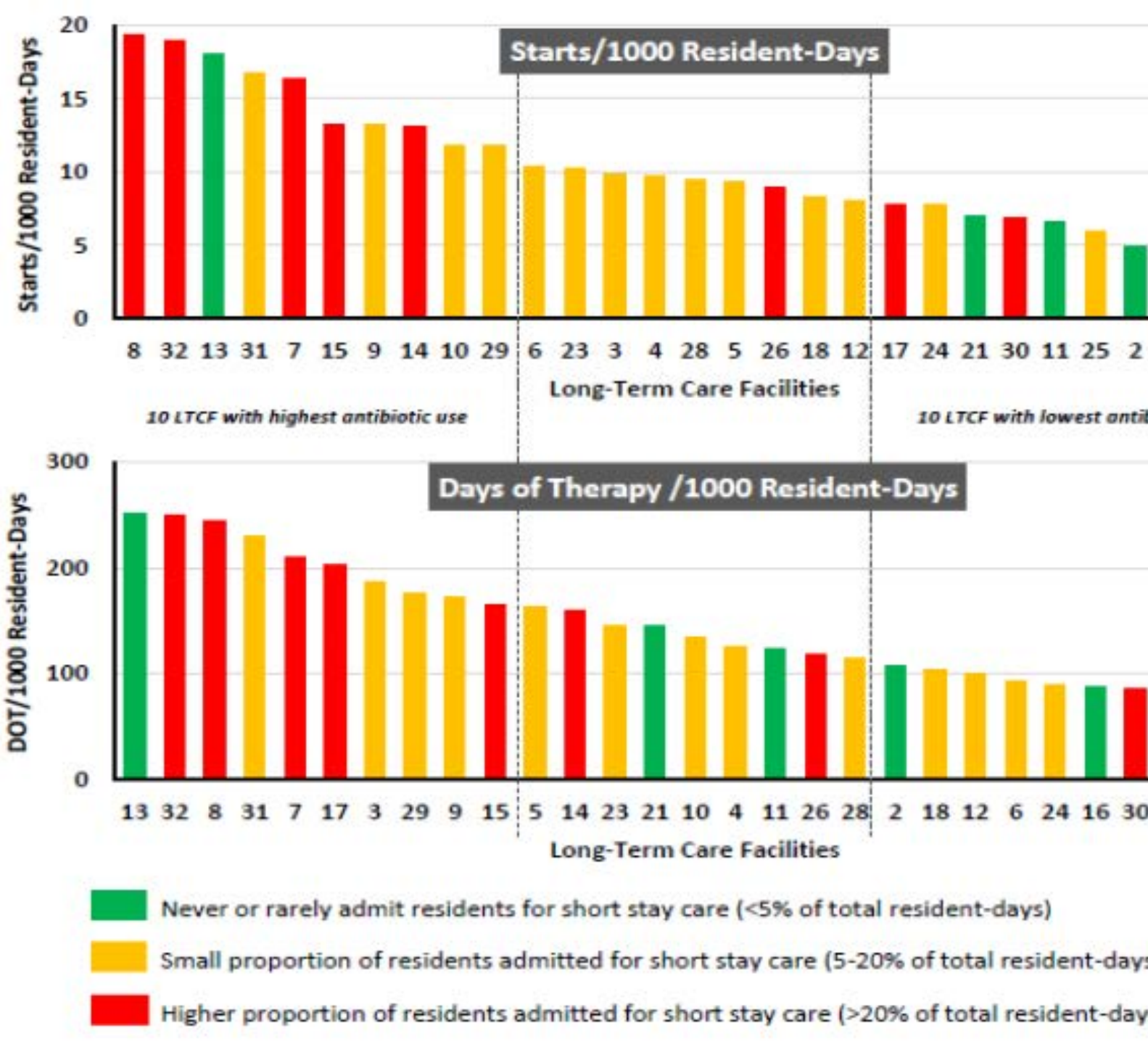
Loeb M, *et al*. Infect Control Hosp Epidemiol 2001;22:120-4

https://asap.nebraskamed.com/long-term-care/tools-templates-long-term-care/

ASAP

In conjunction with UNMC, NM, and Nebraska DHHS Epidemiology Unit

Comparing Antibiotic Use Among Regional LTCF



Chung P et al. Poster Presentation ID week 2018

Template for Tracking Antibiotic Use

January Infection and Antibiotic Start Log

Resident	Room	Diagnosis	Antibiotic	Start Date	Stop Date	Days of Therapy	Prescriber	Lab Sent	Test Date	Culture f/u at 48-72h?	Pathogen	Result Date	Community vs. Facility	Assessment / SBAR Tool Completed?	Criteria Met?
A	135B	UTI	nitrofurantoin	1/2/16	1/4/16	3	Dr. Lexin	UA, reflex C&S	1/30/16	Yes	Proteus mirabilis	1/2/16	Facility	Yes	No
B	156A	SSTI	cephalexin	1/15/16	1/21/16	7	PA Cillin	None	NA	NA	NA	NA	Facility	Yes	Yes
C	251B	UTI	ciprofloxacin	1/1/16	1/14/16	14	PA Cillin	UA, reflex C&S	1/30/16	Yes	E coli	2/1/16	Community	No	No
D	551A	Pneumonia	azithromycin	1/20/16	1/26/16	7	Dr. Lexin	None	NA	NA	NA	NA	Community	Yes	Yes
D	551A	UTI	nitrofurantoin	1/3/16	1/5/16	3	Dr. Lexin	UA, reflex C&S	1/3/16	Yes	E coli	1/5/16	Community	Yes	No
E	431B	Pneumonia	azithromycin	1/20/16	1/24/16	5	Dr. Peni	None	NA	NA	NA	NA	Community	Yes	Yes
E	431B	Pneumonia	amoxicillin-clavulanate	1/20/16	1/24/16	5	Dr. Peni	None	NA	NA	NA	NA	Community	Yes	Yes
F	251B	C difficile	vancomycin po	1/14/16	1/23/16	10	PA Cillin	C difficile PCR	1/13/16	No	C difficile	1/18/16	Facility	No	Yes
G	301A	Influenza	oseltamivir	1/1/16	1/5/16	5	Dr. Gripe	Flu swab	1/1/16	Yes	Influenza A	1/1/16	Facility	Yes	Yes
H	301B	Influenza	oseltamivir	1/2/16	1/6/16	5	Dr. Gripe	Flu swab	1/2/16	Yes	Influenza A	1/2/16	Facility	Yes	Yes
I	302A	Influenza	oseltamivir	1/1/16	1/5/16	5	Dr. Gripe	Flu swab	1/1/16	Yes	Influenza A	1/1/16	Facility	Yes	Yes
J	303A	Influenza	oseltamivir	1/1/16	1/5/16	5	Dr. Gripe	Flu swab	1/1/16	Yes	Negative	1/1/16	Facility	Yes	No
K	303B	Influenza	oseltamivir	1/1/16	1/5/16	5	Dr. Gripe	Flu swab	1/1/16	Yes	Negative	1/1/16	Facility	Yes	No
K	303B	Pneumonia	levofloxacin	1/2/16	1/8/16	7	Dr. Gripe	None	NA	NA	NA	NA	Facility	Yes	Yes

Type additional antibiotic start in the next row. Summary 1 & 2 data to the right of column "R" will automatically update in this tab and in the Summary tab.

This template is available at Nebraska ASAP website:
https://asap.nebraskamed.com/infection-and-antibiotic-start-log-template-2/

Different Antibiotic Tracking Template along with some other tools can also be found at:
http://www.rochesterpatientsafety.com/index.cfm?Page=For%20Nursing%20Homes
Accessed 1/27/19

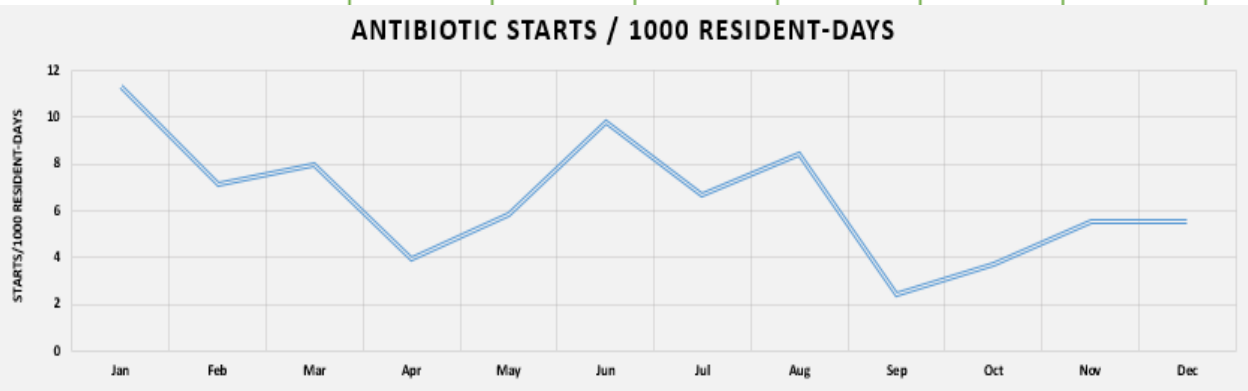
Summary | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec

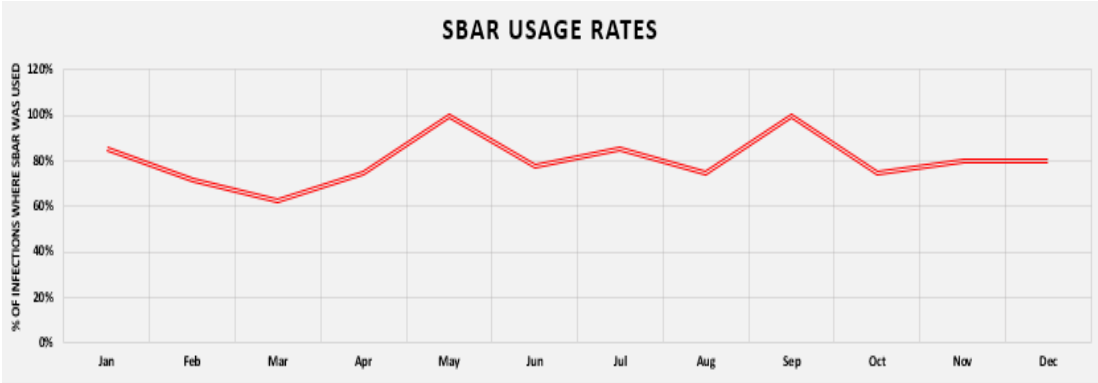
Examples of Reports Generated by the Excel Sheet

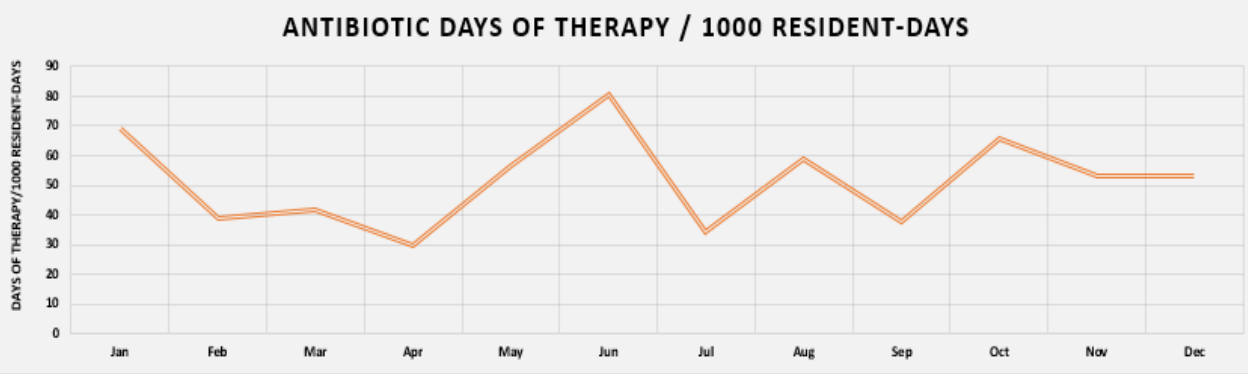
Infection and Antibiotic Start Log Template, Version 3

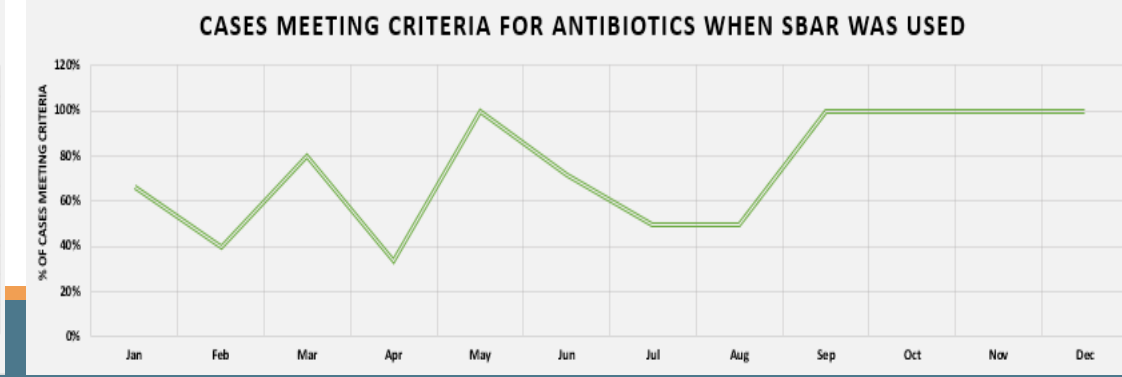
Year = 2018

Parameters	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Trend
Antibiotic Start / 1000 RD	11.29	7.14	7.98	3.99	5.88	9.78	6.67	8.42	2.44	3.76	5.56	5.56	6.54	
Days of Therapy / 1000 RD	69.35	38.78	41.87	29.91	56.47	80.43	34.29	58.95	37.80	65.73	53.33	53.33	51.69	
SBAR Used and Completed	86%	71%	63%	75%	100%	78%	86%	75%	100%	75%	80%	80%	81%	
Met Criteria to Start ABX	67%	40%	80%	33%	100%	71%	50%	50%	100%	100%	100%	100%	74%	









One-Day Point Prevalence Method for Tracking Antibiotic Use

- Useful in estimating antibiotic days of therapy
- Requires antibiotic tracking on one day of the week only
- Gives an estimate but not exact use
- Use the following equation to estimate days of therapy

$$\frac{\sum \text{Wednesday Point Prevalence AU}}{(\text{Average Daily Census} * \text{Number of Wednesdays in Month})} * 1{,}000$$

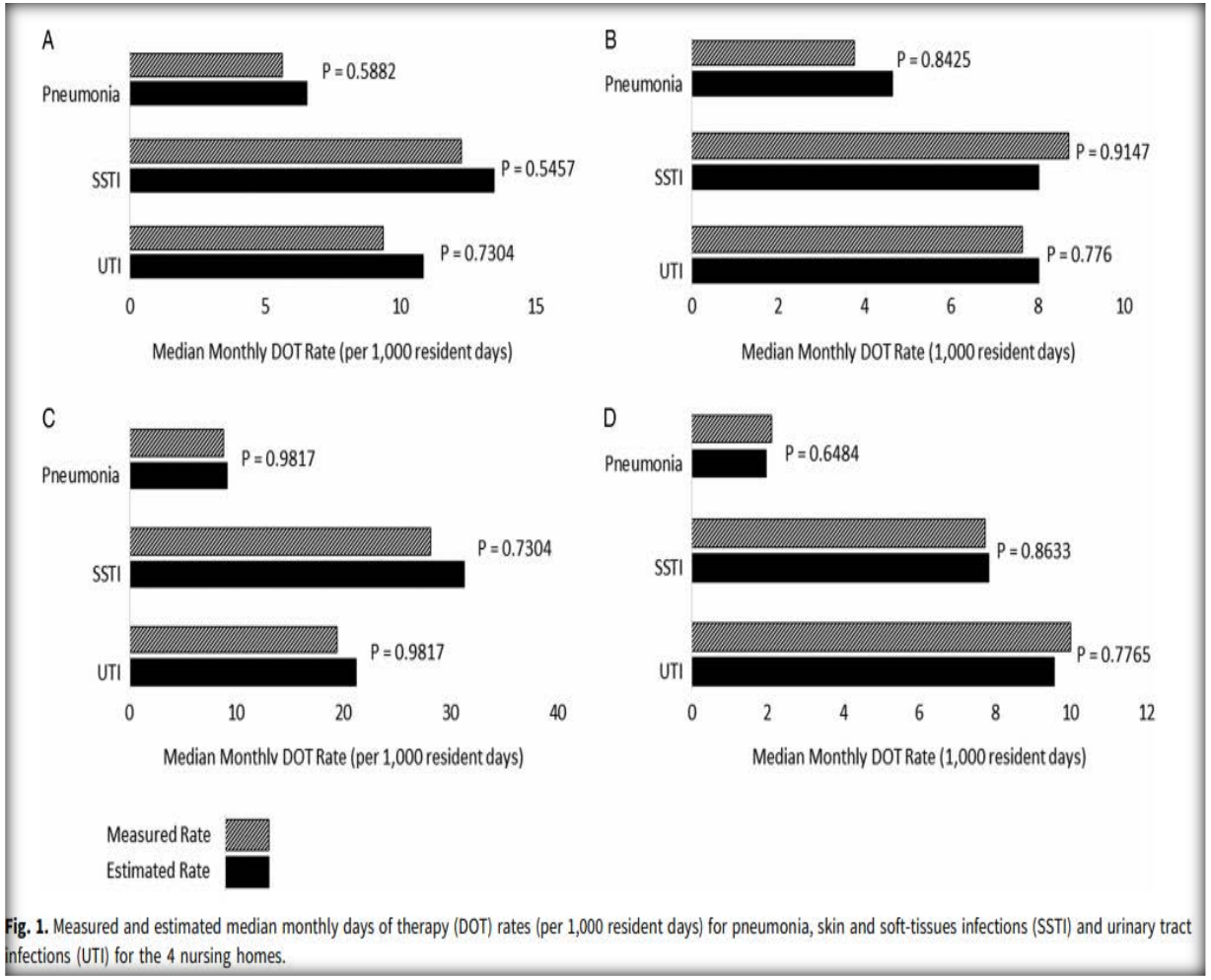


Fig. 1. Measured and estimated median monthly days of therapy (DOT) rates (per 1,000 resident days) for pneumonia, skin and soft-tissues infections (SSTI) and urinary tract infections (UTI) for the 4 nursing homes.

Barney GR et al. Infection Control & Hospital Epidemiology (2019), 40, 221–223

Understanding and Creating Antibiogram

Guidelines on creating antibiograms recommends to:

- report antibiogram at least annually
- include only verified final results
- include only species with data for 30 isolates
- include only diagnostic (not surveillance) isolates
- include the first isolate of a species obtained from a patient for each analysis period

Hypothetical Healthcare Facility
1 January-31 December 2017 Cumulative Antimicrobial Susceptibility Report+
Percent Susceptible

Gram (-) Organisms	# of Isolates	Amoxicillin/ Clavulanate	Cefazolin	Ceftriaxone	Cefepime	Nitrofurantoin	Piperacillin/ Tazobactam	Ciprofloxacin	Gentamicin	TMP/SMX
Escherichia coli	39	84	64	74	89	100	87	26	82	85
Klebsiella pneumoniae	17*	76	76	82	100	65	88	94	88	76
Proteus mirabilis	32	95	53	88	100	R	97	16	100	81
Pseudomonas aeruginosa	11*	--	R	--	73	--	57	64	64	--
Gram (+) Organisms	**# of Isolates**	**Ampicillin**	**Clindamycin**	**Oxacillin**	**Gentamicin**	**Linezolid**	**Nitrofurantoin**	**Tetracycline**	**TMP/SMX**	**Vancomycin**
Staphylococcus aureus	19*	--	50	36	79	100	100	79	100	93
Enterococcus	35	83	--	--	52	100	81	17	--	83

Tolg MA et al. J Am Med Dir Assoc. 2018 Sep;19(9):744-747

Approaches to Creating an Antibiogram with Limited Isolates

Table 1
Advantages and Limitations of the Potential Approaches to Creating a LTCF Antibiogram

Approach		
Extending the antibiogram data beyond 1 year	Advantages	• Simple and easy to create • Accurate susceptibilities over the given time period
	Limitation	• Resistance rates and patterns of bacteria may change from year to year
Creating a regional antibiogram	Advantage	• May be helpful if residents access healthcare facilities throughout that given region
	Limitations	• Requires coordination between multiple microbiology laboratories and healthcare facilities • Bacteria that infect residents may not have similar antimicrobial susceptibilities to those of that region's general population
Using antibiograms of nearby hospitals	Advantage	• Antibiograms that are already annually made by the hospitals could be used
	Limitations	• All residents go to different hospitals • Bacteria that infect LTCF residents may not have similar antimicrobial susceptibilities to those of the general hospital population
Collapsed antibiograms	Advantage	• May help guide infection-specific empiric antibiotic choices
	Limitation	• Intrinsic resistance of some bacteria to specific antibiotics would not be listed

Tolg MA et al. J Am Med Dir Assoc. 2018 Sep;19(9):744-747

Using Baseline Data to Form an Action Plan

Antibiotic Use Measures	Rate
Antibiotic Starts	7.35/1000 resident days
Days of Therapy	57.51/1000 resident days

Indications	Number (%)
Urinary tract infection	39 (35)
Skin/soft-tissue infection	28 (25)
Respiratory tract infection	9
No indication	8
Pneumonia	6
Gastrointestinal infection	4
COPD	3
Fever	2
Urinary tract infection prophylaxis	2
Others	9

Most frequently used antibiotics	Number (%)
Ciprofloxacin/Levofloxacin	27 (22)
Cephalexin	26 (21)
Nitrofurantoin	18 (15)
Doxycycline	11 (9)
Others	42 (34)

Met criteria to start antibiotic– 16 (41%)
Didn't Meet criteria - 23 (59%)

- ❑ What are the top improvement opportunities?
- ❑ What Actions would you like to take?

Antibiotic Time-Out

Goals are to determine:

- Whether initial symptoms were due to bacterial infection that requires antibiotic?
- If yes, is the current antimicrobial treatment appropriate (e.g ruling out bug-drug mismatch, reconfirming agent, dose, route)?
- Can antibiotics be deescalated?
- What will be the length of therapy?
- Is further evaluation required?

https://asap.nebraskamed.com/long-term-care/tools-templates-long-term-care/
https://www.cdc.gov/longtermcare/pdfs/core-elements-antibiotic-stewardship-appendix-a.pdf

SBAR Communication Tool Template for Antibiotic Time-Out

[Facility Logo] | Resident Label

S — **Situation:** I am calling to follow-up on [resident's name: _____] who was started on antibiotic(s) recently.

B — **Background:** This patient was started on:

Antibiotic #1: _____ Start date: _____

Antibiotic #2: _____ Start date: _____

For: ☐UTI ☐Pneumonia ☐Bronchitis ☐Skin infection ☐GI infection

☐Fever of unknown source ☐Other, specify: _____

Vitals at initial presentation were as follows: BP____/____ HR_____ Resp. rate_____ Temp._____ O_2 Sats.____

Symptoms and positive exam findings at that time were: _____

The diagnosis fits: ☐McGeer criteria ☐Loeb criteria ☐Neither ☐Assessment tool not used

A — **Assessment:**

Current vital signs: BP____/____ HR_____ Resp. rate_____ Temp._____ O_2 Sats.____

Since starting antibiotic(s), the resident:

☐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 ☐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 ☐Not yet performed by lab

Other antibiotics the organism is sensitive to: _____

R — **Recommendation:**

☐Patient **is not improving** and needs further evaluation.

☐Patient **has improved** and needs final antibiotic therapy plan.

Nurse's Signature: _____ **Date/Time:** _____

☐**Faxed or** ☐**Called to:** _____ **By:** _____ **Date/Time:** _____

Physician Orders/Response (Please check all that apply)

Example of Provider Feedback

PMNH Antibiotic Report Card for Treatment of Respiratory Infection, 2014

Provider	Antibiotic starts	Appropriate	Not appropriate*	Percent not appropriate
Provider 1	38	36	2	5.3
Provider 2	24	23	1	4.2
Provider 3	8	6	2	25
Provider 4	2	2	0	0
Provider 5	0	0	0	0
PMNH cumulative	72	67	5	6.9

* Nursing home residents' clinical symptoms met the McGeer Surveillance Criteria for diagnosis of viral respiratory infection.

This facility was highlighted in a report for successfully implementing ASP.

Multiple interventions were implemented including communication tools, vigorous review of antibiotic orders and introducing antibiograms

However, one of the main interventions were to provide Feedback to the providers in addition to one on one discussions by medical director

http://www.pewtrusts.org/~/media/assets/2016/04/apathtobetterantibioticstewardshipininpatientsettings.pdf , Accessed January 27, 2018

Choosing the Right Intervention

Target for Intervention	Intervention
Antibiotics being prescribed even when clinical criteria for infection are not met	• SBAR tool implementation
Diagnostic tests being sent unnecessarily	• SBAR tool implementation • Use of Decision-making algorithm
Broad spectrum agent being used unnecessarily	• Develop facility-specific guidance • Implement antibiotic time-out
Bug-drug mismatches	• Antibiogram use for empiric treatment
Continuation of empiric antibiotics even after infection ruled out	• Implement antibiotic time-out
Inappropriate length of therapy	• Develop facility-specific guidance • Implement antibiotic time-out
Unnecessary antibiotics being started by outside providers	• Implement mandatory review of necessity by medical directors for all outside antibiotic orders • Antibiotic time-out
Unnecessary antibiotics being started by specific providers	• Consider providing specific feedback to the providers

Provide relevant education to nursing staff and prescribers about the intervention

Engage consultant pharmacists in reviewing antibiotic orders and provide feedback to prescribers when improvement opportunities are found

Build partnership, whenever possible, with local antibiotic stewardship experts for their input on the interventions and facility specific protocols

Report the Data to Providers and Staff

What we have achieved so far?

2018 Antimicrobial Stewardship Program Report

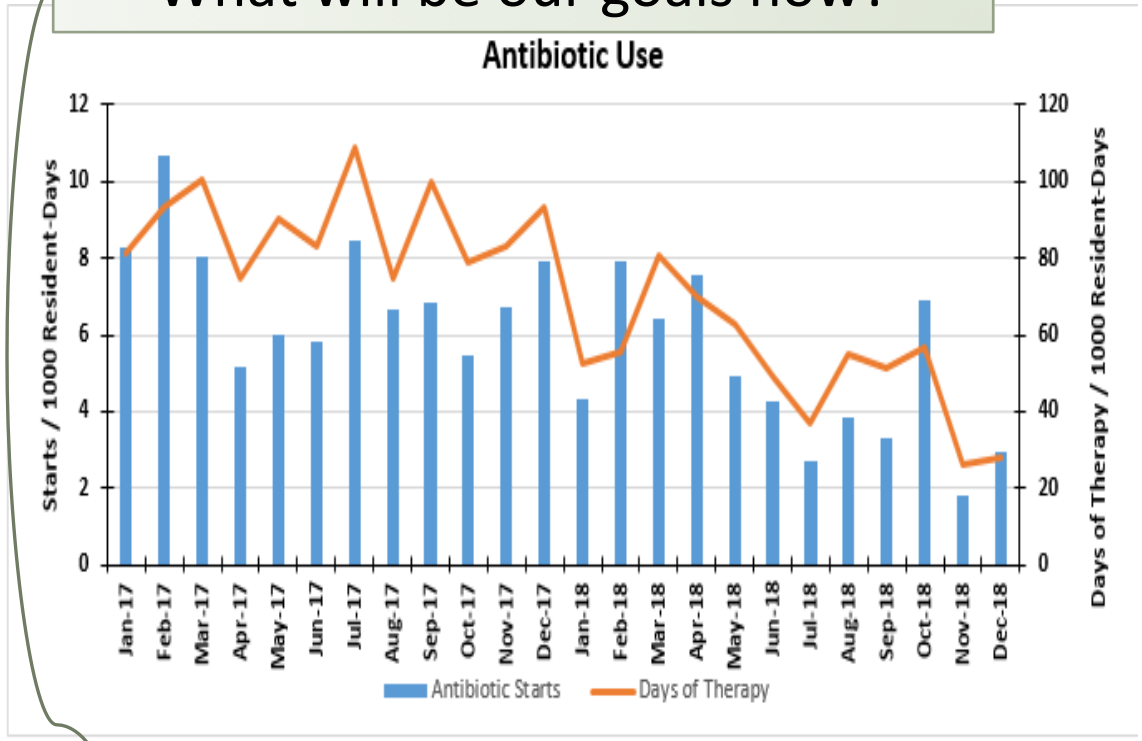
Purpose

The purpose of this brief report is to summarize [Facility Name] Antimicrobial Stewardship Program (ASP) accomplishments in 2018 and outline ASP goals for 2019.

Summary of Antimicrobial Stewardship Program Accomplishments in 2018

- Implemented the use of SBAR (standard staff-provider communication tools) for suspected urinary tract, respiratory tract and skin/soft-tissue infections
- Compliance with the use of SBAR for suspected urinary tract infection reached 85-90%
- Provided mandatory annual antimicrobial stewardship education to [number] facility staff
- Reduced antibiotic starts by 34% from 7.17 starts/1000 resident-days in 2017 to 4.73 starts/1000 resident-days in 2018
- Decreased antibiotic days of therapy by 41% from 88.52 days of therapy/1000 resident-days in 2017 to 51.99 days of therapy/1000 resident-days in 2018
- No facility-onset *Clostridioides difficile* infection (CDI) was identified
- Reviewed antibiotic prescribing for respiratory tract infections (50% orders meeting criteria)

What will be our goals now?



Antimicrobial Stewardship Program Goals for 2019

- Increase compliance to SBAR usage for suspected urinary tract infection to 95%
- Further reduce antibiotic starts and days of therapy by 20%
- Implement SBAR for respiratory tract infections

Concluding Remarks

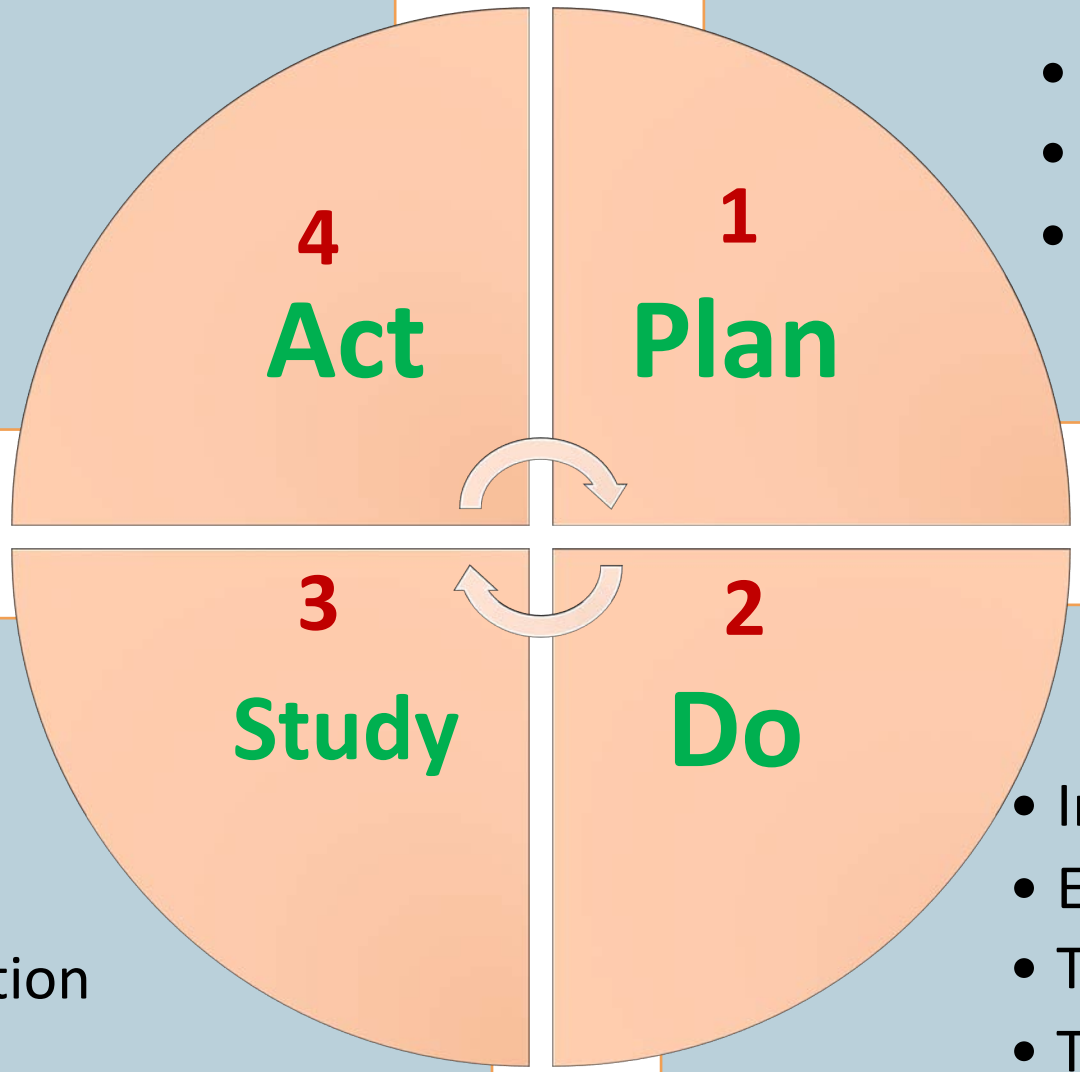
The Antimicrobial Stewardship Program successes accomplished in 2018 are due to the diligent work of facility staff and support of facility providers in an effort to continue to improve the quality of care for residents at [ ]. The ASP team hopes that staff and providers continues these efforts in 2019.

Where we can improve further?

How are we going to achieve it?

Antibiotic Stewardship: A Cycle of Reassessments and Readjustments

- Develop plans to address barriers
- Report/re-educate providers
- Execute mitigation plans



- Review data
- Identify opportunities
- Develop action plan
- Inform/report providers

- Analyze data
- Study outcomes
- Identify implementation barriers

- Implement Action
- Educate providers
- Track antibiotic use
- Track process measures

https://asap.nebraskamed.com

Stewardship: Overcoming Barriers

Key Challenges to Successful Antibiotic Stewardship Programs

Clinician resistance—nurse, physician, nurse practitioner, physician's assistants

Family pressure

Resources and turnover

Challenges related to beliefs and pressure

Belief in urinalysis as the gold standard

Cloudy or smelly urine as symptoms

The need to treat

Frentzel, E., Mangrum, R., Cowans, T., Kilany, M., Mcmaughan, D., Barber, D.,…Guo, J. (2016). Process evaluation of the guide to nursing home antimicrobial stewardship. *Open Forum Infectious Diseases, 3 (1,* suppl 1), 1890. https://doi.org/10.1093/ofid/ofw172.1438

Is a positive urinalysis really an indicator?

Nearly half of residents have bacteria in urine[1]

Vague symptoms (falling) and a urinalysis leads to an antibiotic

Likelihood of clean catch low; 14% clean[2]

[1]AMDA and Consumer Reports. 2014. Tests & Treatments for Urinary Tract Infections in Older People. Developed for ABIM Foundation's Choosing Wisely. Accessed from: http://www.choosingwisely.org/patient-resources/urinary-tract-infections-in-older-people/

[2]Juthani-Mehta M, Quagliarello V, Perrelli E, Towle V, Van Ness PH, Tinetti M. Clinical features to identify urinary tract infection in nursing home residents: a cohort study. *J Am Geriatr Soc*. 2009;57(6):963-70.

Cloudy or smelly urine

Dr. Google says so[1,2]

Cloudy = dehydration[3], infections, kidney problems, some chronic diseases.

Smelly = dehydration[3], specific foods, other disorders, infections

None of the current guidelines use them

Loeb and SHEA/CDC (aka Stone or revised McGeer)

[1]WebMD. (date unknown). Urinary Tract Infections (UTIs). Accessed from: https://www.webmd.com/women/guide/your-guide-urinary-tract-infections#1-3

[2]Mayo Clinic. Urinary tract infection (UTI). Accessed from: https://www.mayoclinic.org/diseases-conditions/urinary-tract-infection/symptoms-causes/syc-20353447

3Paulis, Simone & H.J. Everink, Irma & Halfens, Ruud & Dr. Lohrmann, Christa & Schols, Jos M.G.A.. (2018). Prevalence and Risk Factors of Dehydration Among Nursing Home Residents: A Systematic Review. Journal of the American Medical Directors Association. 19. 10.1016/j.jamda.2018.05.009.

The need to treat

Pressures from family and other clinicians to treat

Concerns about state surveyors—nursing home pressure to “treat”

Antibiotics seen as key

Addressing Challenges

Education and re-education

- Educate nurses and prescribing clinicians about true symptoms, risks of antibiotics, treatment alternatives to antibiotics

Institute supporting policies and procedures

- Improve communication
- Support for when state comes in

Education and Policy Support

Education: AHRQ Nursing Home Guide, Quality Innovation Networks Quality Improvement Organization, state health departments, CDC

Policy: Society's Antibiotic Stewardship Policy's Appendix 2 (sample policy), Minnesota Department of Health

R – Request for Physician/NP/PA Orders

Orders were provided by clinician through ☐ Phone ☐ Fax ☐ In Person ☐ Other _____

☐ Chest X-Ray

☐ For cough, consider using a cough suppressant Dose _____ Route _____ Duration _____

☐ For cough, consider using an inhaler/nebulizer Dose _____ Duration _____

☐ Acetaminophen _____ mg. Route _____ Duration _____

☐ Raise upper body (use multiple pillows) to sleep/rest

☐ Encourage _____ ounces of fluid by mouth or G-Tube for _____ hours

☐ Record fluid intake

☐ Encourage salt water gargles

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

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

☐ Initiate intravenous fluid hydration and/or ☐ initiate hypodermoclysis.

☐ Initiate the following antibiotic(s)

Antibiotic 1 _____ Dose _____ Route _____ Duration _____

Antibiotic 2 _____ Dose _____ Route _____ Duration _____

☐ No ☐ Yes Pharmacist to adjust for renal function

☐ Other, specify: _____

Family Pressure

- Family member's beliefs in knowledge about resident
- Pressure to treat

> "Family members do often ask for antibiotics and that some doctors are quick to prescribe or "cave in" to pressure from family members."[1]

[1]American Institutes for Research, Texas A & M Health Science Center, TMF Health Quality Institute, University of Wisconsin, University of Pittsburgh, Trivedi Consultants, David Mehr, M.D. Pilot Test Report. 2015. Report funded under contract no. HHSA HHSA290201000018I, Task Order 2 from the Agency for Healthcare Research and Quality (AHRQ).

Addressing Family Pressure

Educate and agree on antibiotic stewardship when residents move in

- CDC, AHRQ

Educate nurses and aides in engaging with family members

- AHRQ Nursing Home Antimicrobial Stewardship Guide Talking Points for Residents and Family Members

Sample: Prepare Families

Here at [FACILITY NAME], we take antibiotic use very seriously, so we are pleased to let you know that we have an antibiotic stewardship policy and program. Antibiotic stewardship is the practice of improving antibiotic use.

[FACILITY NAME] is taking action to make sure that our residents get the best care. Our antibiotic stewardship program goals include:

- making sure residents get antibiotics only when necessary—for bacterial infections, and
- making sure residents get the right antibiotic, at the right time, for the right length of time.

[1]Minnesota Department of Health. Sample Newsletter Article for Long0term Care Facilities. Accessed from: http://www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/hcp/ltcsamplearticle.pdf

Sample Talking Points

What are the risks—or harms—of antibiotics?

- Antibiotics are important for treating you when you definitely have an infection, but unneeded antibiotics can do more harm than good

- Before taking an antibiotic, it is important to understand how antibiotics could harm or hurt you. There are five potential health problems that occur as a result of taking an antibiotic.
  - Allergic reactions, like a rash or swelling.
  - Side effects, such as a stomach upset.
  - Drug interactions.
  - An infection called *Clostridium difficile* or *C. diff.*
  - Antibiotic resistance.

Challenges: Resources and turnover

Lack of money and staff

- Urge leadership to focus more infection preventionist time on antibiotic stewardship
- Make antibiotic stewardship a focus of monthly meetings
- Use free resources, obtain support from QIN-QIOs

Turnover/agency staff

- Institute processes everyone follows
  - Communication tools
  - Suspected UTI SBAR
- Constant education

What's Your Antibiotic IQ?

Take the quiz and find out!

Minnesota Antibiotic Resistance Collaborative

www.minnesotaarc.org

Members of MARC include Blue Cross and Blue Shield of Minnesota, HealthPartners, Medica, Minnesota Department of Health, Minnesota Medical Association, Minnesota Pharmacists Association, StratisHealth, and UCare Minnesota.

What's Your Antibiotic IQ? Quiz

Not secure | www.health.state.mn.us/divs/idepc/dtopics/antibioticresistance/hcp/asp/ltc/quizabxslides.pdf

What's Your Antibiotic IQ? Quiz (slides) 9 / 10

Question #8

True or False:

It's no big deal if a few bacteria become resistant to some kinds of antibiotics – there's always something else you can take.

Answer: False

- Don't count on being able to use something else if a "superbug" makes you sick.
- We only have a limited number of antibiotics available. Often, "superbugs" have to be treated with stronger antibiotics.
- These stronger drugs may have more side effects – and you may have to stay in the hospital, and have them given through a vein!

Share

50%

7:51 AM
Tuesday
2/5/2019