Kansas
Department of Health and Environment

Long-Term Care Facility Antimicrobial Stewardship Program Start-Up Toolkit

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Healthcare-Associated Infections & Antimicrobial Resistance Program

Kansas Department of Health and Environment
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Executive Summary

Antimicrobials are deemed as one of the most important discoveries in the history of medicine. Innumerable lives have been saved by antimicrobials, yet many unintended consequences have arisen from both appropriate and inappropriate use. As antimicrobial resistance spreads silently across human and animal healthcare settings, agriculture, grocery stores, and even schools - there is virtually no place that exists free from the threat of antimicrobial resistance. Curtailing our antimicrobial hunger starts with judicious antimicrobial use, and the most efficient way in which to achieve this goal is by way of an antimicrobial stewardship program.

The Kansas Department of Health and Environment's Healthcare-Associated Infections and Antimicrobial Resistance Program, along with our partner organizations involved in the Kansas Healthcare-Associated Infection and Antimicrobial Resistance Advisory Group, strive to assist Kansas healthcare facilities in developing their own stewardship programs. This toolkit serves as a multifaceted guide to streamline both the start-up process, and to build on current programs in the long-term care setting. The toolkit is not meant to serve as an exhaustive reference of stewardship ideas and efforts, and we encourage facilities to tailor components within this toolkit to their facility. There is no "one size fits all" stewardship program. Successful programs often start with a solitary initiative and build from that. Stewardship coordinators should consider which components of this toolkit will work best in their facility, tailor implementation plans to institutional or provider concerns, and strategize based on activities already in development or practice.

Finally, antimicrobial stewardship is distinct from infection prevention and control; however, the sum of both are greater than their parts. Many who serve on stewardship committees are part of the infection prevention and control program, and if they are separate entities, we suggest coordinating efforts to tackle targeting of the lowest hanging fruit. After all, the ultimate goal of both entities is the same: to provide the safest care for patients/residents to reduce morbidity and mortality from infections.

Introduction

The purpose of this antimicrobial stewardship program (ASP) development and start-up workbook is to provide skilled nursing facilities (SNF) and other types of long-term care facilities (LTCF) with the tools and guidance needed to develop and implement practical, small-scale stewardship programs tailored to their unique population and needs.

Much of the antimicrobial stewardship (AS) efforts over the past few decades have been directed towards acute care hospitals, yet on any particular day, there are many more people residing in LTCF than that admitted to acute care hospitals (1). Further, the amount of people relying on long-term care (LTC) services is anticipated to nearly double by 2050 (2). It is essential we address stewardship efforts today rather than in 2050. Beyond providing care to a greater amount of people, individuals residing in LTCFs are more commonly colonized with resistant pathogens, receive more antibiotics on average, and at baseline suffer from a greater number of comorbidities (2,3). Multidrug-resistant organisms (MDRO) have been found colonizing up to 50% of LTC residents, greatly surpassing the 6-12% colonization rate among patients in general hospital wards (3,4).

The Centers for Medicare and Medicaid Services (CMS) recognized the need for stewardship efforts in LTC settings, prompting a series of directives to all national LTC settings:

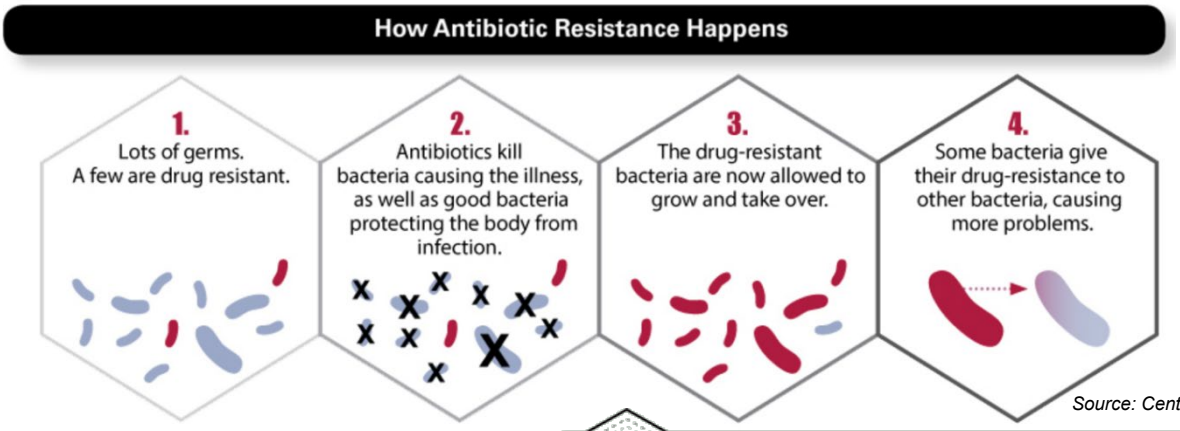
- By November 28, 2016 CMS mandated all nursing homes incorporate an infection control program.
- By November 28, 2017 all facilities were required to implement an antibiotic stewardship program.

The Centers for Disease Control and Prevention (CDC), American Medical Directors Association, Association for Professionals in Infection Control and Epidemiology (APIC), Infectious Disease Society of America (IDSA), and the Society for Healthcare Epidemiology of America (SHEA) encourage all LTCFs to develop policies and procedures establishing antimicrobial prescribing standards, ensure that antimicrobials are being used in a credible infectious disease scenario, are not treating colonization or contamination, and that the correct dose is used for the appropriate purpose and duration (1,27). The Kansas Department of Health and Environment's (KDHE) Healthcare-Associated Infections and Antimicrobial Resistance (HAI/AR) Program aims to assist facilities in limiting antimicrobial resistance within the state of Kansas by developing tailored stewardship programs to promote interagency education, surveillance, and prevention strategies.

What is Antimicrobial Resistance and Why Does It Matter?

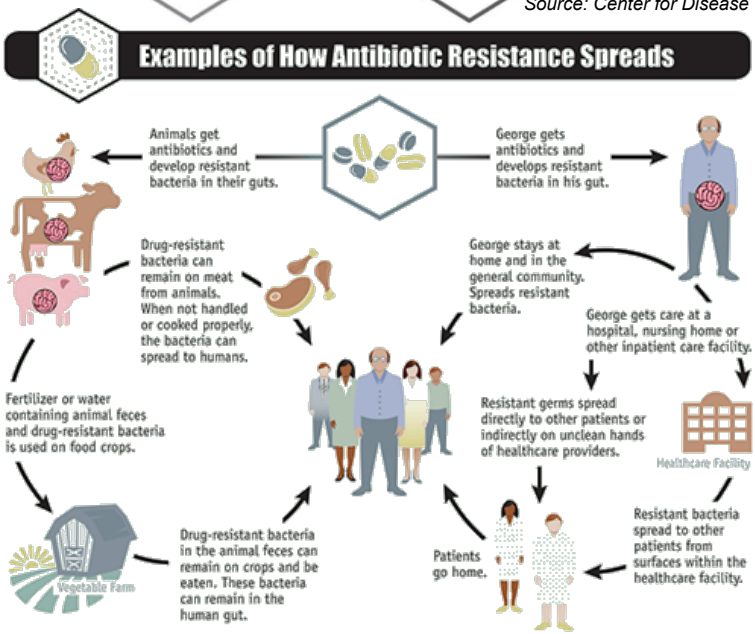
Only 70 years ago, antibiotics were discovered, and with them, a medical and surgical revolution followed. Many of the infections we think of as relatively benign in this era (e.g., pneumonia, soft tissue infections) were the leading causes of death less than a century ago (7). Shortly after the mass distribution of penicillin, Sir Alexander Fleming warned "the public will demand [the drug and] then will begin an era of abuses" (6). We have in fact now found ourselves approaching a post-antibiotic era; the number of currently available or approved antimicrobials is limited, and with increasingly resistant organisms, soon there will be no antimicrobials left to treat illnesses as simple as urinary tract infections.

Antibiotics are medicines intended for use against bacterial infections; resistance arises when a certain subset of "immune" bacteria survive the treatment course. These immune bacteria continue to grow, thrive, and spread their survival genes on to other bacteria. This same process is not limited just to bacteria, also occurring among viruses, fungi and protozoa alike, creating resistance to the antimicrobials used to treat them. These resistant organisms can then spread from person to person (or animal to animal, or person to animal) driving the cycle of resistance.



Source: Center for Disease Control

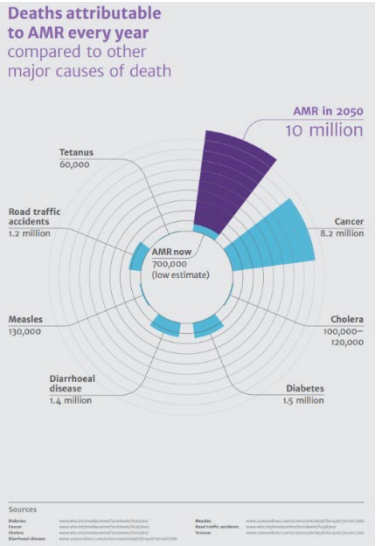
Resistant pathogens spread silently across a host of settings, including LTCFs, clinics, hospitals, dental practices, veterinary practices, feedlots, farms, schools, and many other sites, ultimately affecting society at large. Most people are asymptomatic, in which no signs of infection are exhibited at all; however, when an infection does develop treatment is more complex, costlier, and often associated with greater morbidity and mortality.



Simply using antibiotics creates resistance. These drugs should only be used to treat infections.

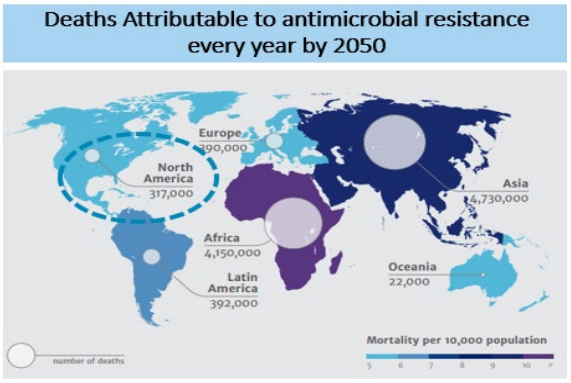
Current and Future Antimicrobial Resistance Landscape

MDROs are not a future or theoretical threat, but in fact, a clear and present danger. The World Health Organization (WHO) deems antimicrobial resistance (AMR) as one of the three most significant threats to human health in the coming decade, and CDC's 2013 Antibiotic Resistance (AR) Threats Report indicated AMR as one of the top impending human public health threats necessitating action (3). Nationally, AMR contributes to 2 million infections and 23,000 deaths (3). Review of AMR trends projects the annual death toll may reach 317,000 in the US by 2050 if the spread of resistance continues at current rates (7).



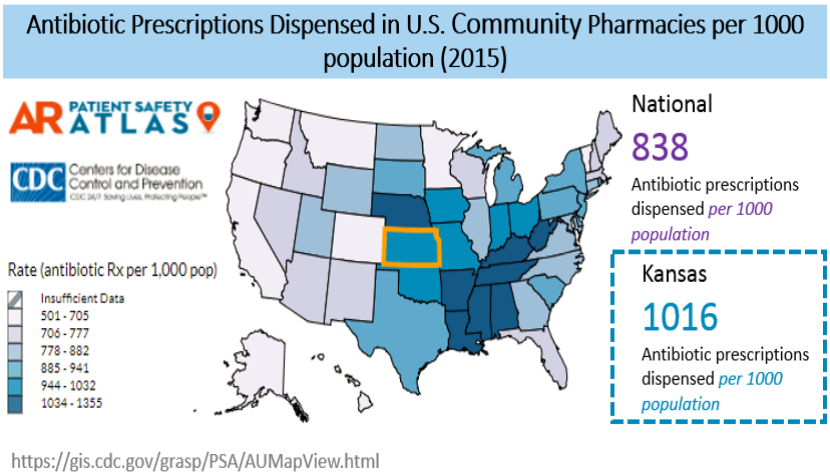
Drivers of Antimicrobial Resistance

Resistance is largely attributed to unnecessary or overused antimicrobials. Over-prescribing is an issue across the United States, and KS is currently ranked as one of the leading antimicrobial-prescribing states (8). No KS LTCF data is presently available pertaining to antimicrobial prescriptions, yet it is known that LTC residents are among those most heavily prescribed antibiotics (1,9). Review of medical records from 2013-2014 by CDC researchers found that on any single day, 11% of nursing home residents were on an antibiotic (23). The average LTC resident completes a course of antibiotics less than once every 2.5 months, with 40-75% of those prescriptions deemed inappropriate or unnecessary (9).



Review on Antimicrobial Resistance 2014

Antimicrobial use (AU), both appropriate and inappropriate, contribute to a host of problems beyond just resistance. Among both the elderly and the young, 205,000 emergency department visits occur annually as a result of antimicrobial side effects or adverse events, with over half of those visits necessitating an inpatient admission (9). Antimicrobials are among the most commonly prescribed agents contributing to adverse events among LTC residents, and the most significant factor in preventable infections (i.e., *Clostridioides difficile*) (3,9). Further, when MDROs contribute to true infection, more costly and toxic antimicrobials are generally required. With the



Source: Center for Disease Control

antimicrobial pipeline dwindling over the past few decades, concerns of an impending post-antibiotic era, in which no antimicrobials will be available for many infections, remains a significant concern to public health practitioners and clinicians alike (7).

Core Components of an Antimicrobial Stewardship Program

SHEA and IDSA define AS, as the "set of coordinated strategies to improve the use of antimicrobial medications with the goal of enhancing patient health outcomes, reducing antibiotic resistance, and decreasing unnecessary costs" (27). The CDC recommends a set of seven core elements be applied when developing any ASP: commitment, accountability, expertise, actions to improve AU, tracking, reporting and education (1). Successful LTC ASPs set their goals and stewardship activities using these seven core elements, with long-term objectives intending to decrease antimicrobial misuse, adverse events, AMR, and costs. The ultimate goal is to reduce AMR associated morbidity and mortality. LTC stewardship coordinators should consider which components of this toolkit will work best for their facility, tailoring implementation plans to institutional and/or provider concerns, and strategizing based on activities already in development or in practice.

CDC: Core Elements of Antibiotic Stewardship for Nursing Homes

1. Leadership Commitment

For an ASP to become established, the institution must recognize stewardship's value. Successful ASPs must be supported and endorsed by facility leadership including owners, administrators, governing boards, medical and nursing directors, and clinicians. Commitment can be demonstrated by means of written statements of support, allocation of dedicated time and resources, or financial support to stewardship activities. Formal statements and guidance are generally more influential and perceived by staff as more official than newsletters or e-mails.

Examples of ASP commitment by leadership may include:

- Develop and issue formal statements of commitment to stewardship
- Include the statement of ASP commitment in annual reports
- Appoint a facility executive or administrator to serve as an additional ASP “champion”
- Oversee ASP practices and policies
- Monitor ASP practices, targets, and progress towards goals
- Enforce ASP practices and policies
- Allocate stewardship educational time and resources to clinicians, staff, and patients
- Engage nursing home staff in ASP practices
- Create a culture by way of messaging, education, and celebrating achievements of ASP activities and goals
- Ensure ongoing communication of ASP targets and progress towards goals
- Include AS in provider education and annual competencies

Formal statements Examples

Formal Statements and oversight of ASP practices nationally, including local Kansas surveys, indicate one of the greatest predictors of ASP success is leadership support (28).

Examples of stewardship nursing home statements committing to ASP:

- **Brookdale Senior Living** "embraces the importance of an infection prevention and control program in each of our 69 skilled nursing communities. This includes an antibiotic stewardship program, providing antibiotic use protocols and monitoring to prevent antibiotic resistance. We are committed to the prudent use of antibiotics on behalf of all residents through a sustainable ASP. We take our role in the judicious use of antibiotics seriously. Our communities' executive leadership teams are committed to continued involvement with the antibiotic stewardship goals, policies and monitoring program. We facilitate communication between the antibiotic stewardship team with our quality and safety initiatives. The Brookdale ASP is a collaborative effort of community leadership, nursing staff, physicians and pharmacists focused on continuous improvement on use of antibiotic agents in an effort to combat the emergence of resistant organisms. Brookdale realizes the importance of this process as a necessary component of an overall patient/resident safety program. This program utilizes the CDC Core Elements of Antibiotic Stewardship for Nursing Homes. Key to this program is the commitment on the part of the organization to actively evaluate the use of antimicrobial agents based on standards for diagnosis, prescribing and appropriate usage, with ongoing assessments of the program's strong interdisciplinary approach."

- **Providence St. Joseph Health Systems** "By the end of 2017, Providence St. Joseph's Health will have ASP work in progress in all care settings, and will fully implement the CDC core elements of an ASP in all acute care and skilled nursing facilities, including the following three key improvements: resources sufficient to develop, support and maintain an ASP throughout the system; evidence-based clinical practice guidelines and electronic health record pathways for the most frequent infections; as well as data and education on critical elements of the ASP, including individual prescribing patterns and guideline adherence."

These statements, among many other institutional formal commitment statements, can be found through the CDC's database: https://www.cdc.gov/drugresistance/federal-engagement-in-ar/stewardship-commitment/index.html

ASP Proposal Examples

Nursing home administration and organizational support of ASP for resource allocation is largely dependent upon making a persuasive business case. Administrators want to see that ASP will cut costs and increase revenues (among improving quality and health outcomes).
SHEA provides an excellent tutorial for drafting your business case at: https://www.shea-online.org/images/priority-topics/Business_Case_for_ASP.pdf (19).

Examples of proposals:

- https://www.shea-online.org/images/priority-topics/AS_Program_Proposal.pdf
- https://www.shea-online.org/images/priority-topics/ASP_proposal_blinded_K__Kuper_.pdf

ASP Policy Examples

University of Nebraska's ASP website provides modifiable templates for institutional policies and statements of leadership support:

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

Stakeholder Identification

When considering ASP start-up strategies, start by considering which departments and disciplines are most affected by antimicrobial overuse and resistance. Stakeholders are individuals or groups of individuals who are affected by, or can affect, the ASP – they have a vested interest in stewardship success because they stand to gain in some way from reducing AU or AMR. Because these stakeholders have the most to gain (or lose), they should be commissioned when developing the ASP. Potential stakeholders may include LTC owners, administrators, directors, governing boards, medical and nursing directors, financial and operating staff, as well as residents and their family members.

Stakeholder Identification Worksheet

To assist in identifying stakeholders, consider groups or individuals who are affected by ASP activities, are involved in ASP operations, who may impact program success or are critical in meeting ASP goals. A mix of roles, expertise, skills, and perspectives is important among stakeholders. Finally, consider what role they may play in your ASP development or in which ways they may assist in AS activities, and at what stage (i.e., planning, implementation, scale-up or evaluation) these potential stakeholders could contribute. In identifying key stakeholders, consider the following questions:

Table 1

Stakeholder Identification	Who? (name or role)	How? (which core element(s) or other means of assistance)	When? (planning, implementation, scale-up, evaluation stage)
Who is affected by the program?	1. *ex) nursing staff* 2. 3. 4. 5.	1. *ex) education (awareness of symptoms of infection vs colonization, facility issues), engagement (ASP planning [i.e. what do staff perceive as significant drivers of misuse] barriers [i.e. provider prescribing norms, communication])* 2. 3. 4. 5.	1. *ex) all stages, especially development, implementation, evaluation* 2. 3. 4. 5.
Who is involved in the program's operations?	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Who will benefit from the program?	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Adapted from ERASE Clostridium difficile project questionnaire (10) and Washington State Department of Health JumpStart Stewardship in Nursing Homes (15)

Find complete tool in Appendix, Table 1.

Stakeholder Engagement

Once you have identified key stakeholders at your LTCF, consider how best to engage those individuals or groups in planning and implementing the ASP. Use the following table to fill out which stakeholders fit into each category to round out your team.

Table 2

Find complete tool in Appendix, Table 2.

Key Stakeholder engagement ("what's in it for them?")			
	List key stakeholders identified above	**Which activities or outcomes are most important to this stakeholder**	**How can the facility address this stakeholder's needs?**
1.	*ex) nursing staff*	*ex) implementation and leadership (i.e., administrative, medical and nursing roles are clearly delineated) ASP direction & goals (i.e., provision of materials, meetings regarding ASP expectations, guidelines, education)*	*ex) allocated educational time, auditing and feedback*
2.			
3.			
4.			
5.			

Adapted from ERASE Clostridium difficile project questionnaire (10) and Washington State Department of Health JumpStart Stewardship in Nursing Homes (15)

2. Accountability and Team Building

ASP Team Development

The next stage involves building the ASP team. Choosing team members is critical to any program's success, and members should be passionate about improving the quality of your facility and reducing AMR and antimicrobial misuse. Chosen members should be invested in program activities, have some degree of clinical, pharmaceutical, laboratory, technical, or environmental services expertise (or interest). Generally, ASP members should be trusted and known to the facility and willing to work with others as part of a team. Depending on the size of the nursing home, the team may be composed of two to three members or up to six or more for larger facilities.

Identifying the team Leader and Core Members

ASP leaders should be knowledgeable and respected among both the team members and the facility at large. As stewardship is a quality improvement and care matter, the medical director may be a relevant member to set goals, monitor intervention effectiveness, and serve as the liaison to facility clinicians and nursing staff. Selecting an esteemed and informed leader is critical to developing an efficient and effective ASP team. IDSA's AS guidelines recommend infectious disease specialists as effective leaders when available (27). Contracting infectious disease consultants or clinicians specializing in ASP through telehealth services is becoming a popular way to add this expertise to the ASP team (resources on page 20). However, if your facility's medical director or physician advocate has a passion for their patients and facilities, knowledge of AMR and antimicrobials, and has the will to learn about AS, they may be a more effective ASP leader than an outside consultant.

Teams are generally recommended to include at a minimum:

- Medical Director
- Nursing Director or Charge Nurse
- Infection Preventionist

Core members should include physicians, clinicians, nursing leadership, nursing staff, infection preventionists, pharmacists, and microbiologists (when available, especially if your facility is associated with larger health systems). Additional members may include those in information technology (for assistance with electronic health record ASP interventions), residents, and family representatives. Successful ASPs (among hospitals) increasingly report a transition from the top-down model to a diffuse structure, whereby clinicians, pharmacists, and multidisciplinary staff share responsibility for antimicrobial prescribing under the ASP's leadership (14).

Informal leaders also should be sought after to engage in the ASP team, as they are quite effective in influencing workplace attitudes and behaviors. Although these individuals may not be designated as an official leader in the institution, they may carry more clout and influence on the program than that of a formal leader. Informal leaders are often opinion leaders in the workplace who have attained a certain degree of social status and respect within the workplace, are accessible, tend to be innovative and influential, have strong interpersonal and communication skills, and informally influence their peers' attitudes or behaviors (12). It is a good strategy to investigate who the informal leaders are within your institution, and ensure they are in alignment with ASP activities before implementing changes. Evidence suggests when informal leaders are not on board with changes and exhibit skepticism towards ASP activities, there is poor acceptance among other staff (13).

Delineating Roles

After identifying team members, assign roles. The ASP leader should set practice standards and empower the Director of Nursing or nursing staff to set nursing practice standards. Infection Preventionists perform the day to day data collection and review of infection data, coordinate education of staff, and implementing strategies to optimize antimicrobial use. Pharmacists may review antimicrobial utilization, suggest alternatives, and help determine facility treatment guidelines. Nursing leaders may be able to coordinate education for licensed and unlicensed nursing staff, set expectations for standards of practice and actions consistent with ASP's goals, and help residents and families understand the ASP and the intended impact on resident care and health outcomes. Microbiologists may provide surveillance data and resistance patterns for assistance in creating an antibiogram, also

guide the proper use of tests and results (i.e., diagnostic stewardship). Information technology staff assist in integrating ASP protocols into existing workflow, facilitate collection and reporting of AU, create protocols at the point of care.

Team Identification Worksheet

After identifying which members will make up the ASP team, fill out the following table to delineate roles and responsibilities. Identify potential barriers members may have in completing AS activities and possible solutions to those barriers. Estimate the weekly hours members should dedicate to AS activities. Finally, address which needs are to be met for those members to serve (e.g., compensation, time).

Table 3

Find complete tool in Appendix, Table 3.

Team member	Activities this member is accountable for	Estimation of weekly hours	What needs are to be met for this person to serve as an ASP team member?
Medical Director			
Pharmacist			
Nurse leader			
Infection preventionist			
Microbiologist			
Physician / Clinician			
Nurse			
Nurse aids			
Resident or family members			
Environmental service staff			
Other			
Other			

Adapted from ERASE Clostridium difficile project questionnaire (10)

Small or rural facilities often may not employ individuals matching all of the roles described above. Partnership with local hospitals, community pharmacies, or labs may allow for individuals with those particular skill sets or expertise to be contracted or compensated upon ASP membership, serving to diversify and strengthen your program. Infectious disease physicians or infectious disease trained pharmacists provide high-level expertise to ASP program development and implementation, however are not always accessible locally. Again, infectious disease, stewardship-experienced physicians, or pharmacists are available by way of telehealth services. Local or community pharmacists interested in serving on ASP teams can be provided with infectious disease continuing education (page 20 for resources).

RESOURCE PLANNING

Resources, both operational and functional, will be needed over the course of the first year to assist in ASP activities. In considering logistics of developing a program, consider the following functions and add others which are anticipated for the first year of the ASP.

Table 4

Find complete tool in Appendix, Table 4.

Resource	Needed	Frequency of need	Description of need	Actions	Cost estimates
Education (for ASP team members)	☐ Yes ☐ No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)	*Ex) 1) courses on prescribing practices (i.e., antibiotic indications, duration, institutional misuse), 2) ASP processes (i.e., approaches to technology uses, stop orders, development guidelines, and algorithms)*	*Ex) 1) surveys / assessments ASP members (for deficiencies), 2) survey attitudes (for needs), 3) determine number of educational programs, 4) determine number attendees for each (and when)*	*Ex) antibiotic or process course = [assemble materials (5hr x $/hr)] + [create power point & materials (7hr x $/hr)] + [print materials x $/attendee] + [attendees (# attendees x $/hr salary compensated)] = $950 per event for est. 15 attendees*
Education (for ASP members)	☐ Yes No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)			
Education (for staff)	☐ Yes No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)			

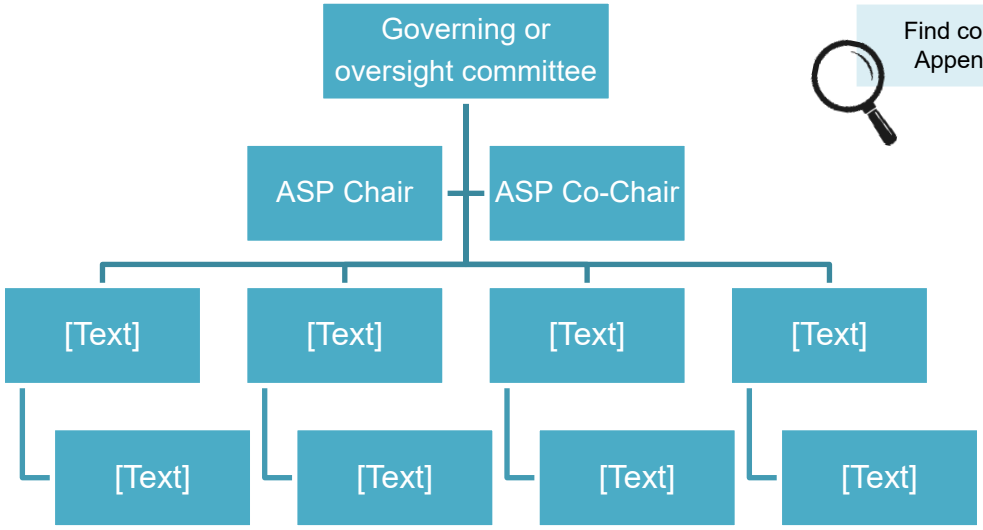
Adapted from ERASE Clostridium difficile project questionnaire (10) and Washington State Department of Health JumpStart Stewardship in Nursing Homes (15)

Committee Oversight

Regular and timely meetings with discussion of progress are critical in achieving goals. By outlining the ASP hierarchy roles and activities, your program and program members are more likely to be held accountable for their designated activities. Additional oversight of the ASP provides an even higher degree of accountability to the team in general. Oversight committees may be larger groups such as Quality Improvement, Risk, or Pharmacy and Therapeutics committees. If there is no committee available for oversight, a new committee could also be developed to oversee both antimicrobial stewardship and infection control programs.

Consider filling out an operational structure of the ASP team members, so the roles within the ASP are made explicit. It is helpful to outline an organizational structure. Successful ASP programs utilizing multidisciplinary programs with shared responsibility are more effective than a top-down approach (14).

Table 5



Find complete tool in Appendix, Table 5.

Accountability

Together, the facility leadership and ASP team as a whole are responsible for ensuring implementation of AS. The first step in creating accountability is developing the stewardship team. Facility leadership should empower the program by offering support and providing resources.

Facility ASP actions of accountability examples:

- ASP team oversight by governing body.
- Post a statement of leadership support for AS in the facility, and in public view for residents and their families.
- The medical director sets antimicrobial prescribing standards (e.g., symptomatic treatment of acute bronchitis, no intervention for asymptomatic bacteriuria).
- The nursing director ensures staff are aware of and engaged in ASP activities and goals.
- The pharmacist reviews and provides audits of AU.
- Laboratory engagement - generally labs are contracted, however, requests can be made for surveillance data (e.g., MRSA, VRE patterns from the preceding 6 months) for antibiograms.

3. Drug Expertise

Pharmacist and infectious disease specialist support (where available) can assist in ASP policy development and local educational efforts. Pharmacists are crucial to ASP efforts as they are experts on antimicrobials and the standards of prescribing. Larger hospitals usually have more availability of pharmacists and can therefore more easily enlist those members to the ASP team, however this is usually more complex in the LTC setting. Pharmacists having received additional infectious disease training may be available for partnership, and if not, offer infectious disease continuing pharmaceutical education. If possible, your consulting pharmacist's ASP membership could be specified as part of their contract.

Infectious disease specialists (if available) in the community may be interested in supporting facility stewardship efforts for a negotiated rate. Infectious disease specialists are experts in MDROs and appropriate treatment guidelines, generally have familiarity with stewardship activities, contribute to ASP and IP policy development, prepare outbreak response plans, assist with complicated cases or challenging prescribers, and may also provide peer-to-peer education.

If no local infectious disease specialists or pharmacists are available for partnership, telehealth opens up contracting possibilities for involving this expertise in your ASP. Consultants can be utilized to assist in ASP development and implementation.

Examples of actions stewardship programs can take toward improving drug expertise:

- Pharmacist and physician champion partner to develop practices towards improving AU.
- If no pharmacist with AMR and ASP expertise is available, continuing pharmacy education and training opportunities could be provided by facility (below).

OPTIONS FOR CONTINUING PHARMACEUTICAL INFECTIOUS DISEASE EDUCATION:

- **Making a Difference in Infectious Disease (MAD-ID) stewardship**, *course cost of program is $500 per pharmacist, $350 per trainee (resident, fellow, graduate student) with discounts available for larger groups; 19 ACPE accredited CE hours are available, with online, teleconference and practical components included:* https://mad-id.org/antimicrobial-stewardship-programs/

- **Society for Infectious Disease Pharmacists (SIDP) antibiotic stewardship certificate for pharmacists** *is a more rigorous curriculum, cost is $850 per pharmacist, $500 per trainee, with discounts for larger groups. The curriculum entails phase 1 self-study, phase 2 live webinars (phases 1 & 2 must be completed within 8 months of registration) and phase 3 includes a skills component at the practice site; 40-43 ACPE accredited CE hours are applicable*, https://www.sidp.org/LTCStewardship/

ASP AND INFECTIOUS DISEASE SPECIALISTS MAY BE UTILIZED VIA TELEHEALTH:

- **The Heartland Telehealth Resource Center:** http://heartlandtrc.org/
- **University of Arizona telemedicine agency directory:** https://telemedicine.arizona.edu/servicedirectory

- Engage community infectious disease specialists in your program or consider contracting expertise by way of telehealth services (potentially in conjunction with local hospital ASPs).

4. Actions to Improve Antimicrobial Use

Stewardship prescribing practices and policies should support optimal AU. Reducing antimicrobial overuse occurs by directing policies and education towards identified areas of misuse. Identify areas to improve antimicrobial prescribing and utilization by first conducting the current state assessment (page 31) and collect data before setting targets.

Steps in determining and implementing your facility's highest yield ASP interventions

1. **Needs assessment:** Every institution is different. Some facilities may have high rates of unnecessary AU for situations not generally necessitating antimicrobials (e.g., colonized wounds, asymptomatic bacteriuria), other facilities may notice they seem to be reacting to unnecessary tests (e.g., positive urine cultures or *C. difficile* tests without symptoms). The key to determining your facility's strengths and weakness is to conduct a current state assessment (page 31) to examine your facility profile, rate of MDROs, adverse events and secondary infection rates (i.e., *C. difficile*)
    a) **Fill out the AU tables** below to gain a better understanding of what prescribing practices at your facility.
    b) **Fill out your facility profile** to ensure facility accountability of organizational infrastructure and prescribers, and to develop a rough idea of potential barriers in antimicrobial de-escalation attempts and/or areas for infection control practices (e.g., increasing rates of catheterized residents, decubitus wounds).
    c) **Fill out the facility pathogen profile** for the past 12 months for treated infections. If infections are redundant (same pathogen for persistent UTI) include only once. Gather as much as you can, and if only able to compile a month or two (or a week or two) of data, this will be a starting board for your facility's data tracking.

2. **After filling out the tables,** review this data in the first ASP meeting. Brainstorm strategies to target identified issues, assign members a specific task before the next meeting.

3. **After further data and exploration have been investigated**, options can be discussed at subsequent meetings to formalize ASP actions.

Antibiotic Use Profile

Before identifying how and which antimicrobials to target, first examine the prescribing practices which will need to be addressed. The templates below will help you get started if you do not already have a process in place to monitor these components.

Table 6

Facility antimicrobial utilization	
Last 12 months *(alternatively, start with one month)*	
What are the 3 most common infections (or conditions, i.e., asymptomatic bacteriuria) for which residents receive antimicrobials	1. _____ 2. _____ 3. _____
What proportion of asymptomatic bacteriuria cases are treated with an antimicrobial	_____%
What are the 3 most common antimicrobials prescribed for UTIs (including asymptomatic bacteriuria)	1. _____ 2. _____ 3.
What proportion of acute bronchitis cases are treated with an antimicrobial (in those without emphysema or other lung conditions)	_____%
What are the 3 most common antimicrobials prescribed for acute bronchitis	1. _____ 2. _____ 3.
What proportion of acute URI (rhinitis, sinusitis, laryngitis, pharyngitis) are treated with an antimicrobial	_____%
What are the 3 most common antimicrobials prescribed for acute URI	1. _____ 2. _____ 3. _____
What proportion of physician visits (clinics, emergency department, return from hospitalization) result in an antimicrobial prescription	_____%
What proportion of nurse – physician calls result in an antimicrobial prescription	_____%

Adapted from Jump Start Stewardship in Nursing Homes, Washington Department of Health (15)

Find complete tool in Appendix, Table 6.

After completing the table above, list the three most commonly prescribed antimicrobial regimens for those infections above (and any other infection deemed significant at your facility, such as wounds, cellulitis, etc.) within the past 12 months (alternatively, one month) using Table 6 below. By identifying the most common infections for which antimicrobials are prescribed (and misused), you can use this data in targeting guideline and policy development, as well as target educational efforts.

Find complete tool in Appendix, Table 7.

Table 7

Infection	# cases	Antibiotic regimen most often prescribed		
		Antibiotic 1	Antibiotic 2	Antibiotic 3
Ex) acute sinusitis	*Ex) 6/mo (avg)*	**Drug**: *Azithromycin* **Dose**: *500→250mg* **Route**: *oral* **Duration**: *5 days*	**Drug**: *Amoxicillin/clavulanate* **Dose**: *875/500 mg* **Route**: *oral* **Duration**: *7-10 days*	**Drug**: *levofloxacin* **Dose**: *500 mg or 750 mg (2/3 Rx were 750)* **Route**: *oral* **Duration**: *5-7 days*
		Drug: **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**
		Drug: **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**

Adapted from ERASE Clostridium difficile project questionnaire (10) and Washington State Department of Health JumpStart Stewardship in Nursing Homes (15)

Complete the following tables for the five ***most frequently prescribed*** intravenous (if applicable) and oral antibiotics in your facility within the past month (or week). Additionally, if able, estimate an associated cost of the parenteral and oral antibiotic regimens. This information may be more easily compiled by the dispensing pharmacy (or with assistance of a pharmacist), and calculation of cost savings may be presented in your business case.

Table 8

IV Antimicrobial	Utilization last calendar month (days of therapy)	Cost of utilization last calendar year	Notes

Find complete tool in Appendix, Table 8.

Table 9

PO Antimicrobial	Utilization last calendar year (days of therapy)	Cost of utilization last calendar year	Notes

Adapted from Jump Start Stewardship in Nursing Homes, Washington Department of Health (15)

Find complete tool in Appendix, Table 9.

Your Facility Profile

To determine barriers to ASP actions, review your facility's organizational infrastructure, prescribers, and the chronic conditions among your facility's residents which affect antimicrobial de-escalation attempts (indwelling urinary catheters, decubitus wounds, foot ulcers).

Table 10

Last 12 months or last calendar year	Number
Licensed beds	
Admissions	
Resident days	
Average daily census	
Number of prescribers	
Clinical pharmacists (hours per month)	
Resident characteristics	**Average daily census**
Residents with indwelling urinary catheters	
Residents with pressure injury ○ Stage 1-2 ○ Stage 3-4 ○ Unstageable / unable to determine	_____ _____ _____
Residents with chronic foot or leg ulcers	

Adapted from Jump Start Stewardship in Nursing Homes, Washington Department of Health (15)

Find complete tool in Appendix, Table 10.

Facility Pathogen Profile

To determine which infections are most critical for your ASP to target for interventions, investigate which infections are the most common within your facility. List how many isolates were identified among all LTC residents. If infections are redundant (i.e. same pathogen for persistent UTI) include only once. Try your best, and if only able to gather a month or two's data (or a week or so), this will be a starting board for your facility's data tracking.

Find complete tool in Appendix, Table 11.

Table 11

Last 12 months or last calendar year	Number
Clostridioides difficile	
○ Facility onset infections	
○ Community onset infections	
Numbers of non-duplicate isolates of following isolates:	
MDR Gram-Negative Bacteria	
○ Carbapenem-resistant *Acinetobacter spp*	
○ Carbapenem-resistant Enterobacteriaceae	
○ Carbapenem-resistant *Pseudomonas aeruginosa*	
○ ESBL *Acinetobacter baumannii*	
○ ESBL *Escherichia coli*	
○ ESBL *Klebsiella spp*	
○ ESBL *Pseudomonas aeruginosa*	
○ ESBL *Proteus spp*	
Methicillin-Resistant Staphylococcus aureus (MRSA)	
○ MRSA - number of non-duplicate isolates	
Vancomycin-Resistant Enterococcus (VRE)	
○ VRE - number of non-duplicate isolates	
Other MDROs of concern:	

Adapted from Jump Start Stewardship in Nursing Homes, Washington Department of Health (15)

5. Antimicrobial Tracking

SHEA and IDSA guidelines recommend improvement in antimicrobial prescribing conditions within the facility (e.g., identification of conditions in which antibiotics are over-prescribed, under-prescribed or infections that are mis-identified or over-diagnosed), with identification and establishment of standards for prescribing and auditing (27).

Measurement is a key component to stewardship and should be undertaken as one of the first steps in every LTCF ASP. Many readers of this toolkit will be familiar with the phrase: “what gets measured gets managed” (24). LTCFs participating in CDC’s National Healthcare Safety Network (NHSN) should consider using the Antimicrobial Use and Resistance (AUR) modules, which provide a mechanism for facilities to report and analyze use and resistance patterns. Reporting data also helps local and regional efforts in reducing AMR, and facility transmission interruption and antibiogram development.

For further information on AUR model, visit the AUR model: https://www.cdc.gov/nhsn/pdfs/pscmanual/11pscaurcurrent.pdf, or contact the KDHE HAI/AR Program for more information.

For LTCFs without a current means of AUR surveillance we have provided Excel spreadsheets for collecting facility level indicators, infection incidence, and AUR data in a systematic and standardized manner. By tracking monthly data your facility will improve the ability to efficiently calculate key rates. Data can be collected monthly, and rates calculated quarterly.

Spreadsheet 1

Cumulative Antimicrobial Susceptibility Report Commonly Isolated Bacteria, January to December 2019

Numbers below represent percent of susceptible isolates

		# of Isolates	Ampicillin	Ampicillin-sulbactam	Amoxicillin-Clavulanate	Piperacillin-tazobactam	Cefazolin	Ceftriaxone (2)	Cefepime	Ertapenem	Meropenem	Gentamicin	Levofloxacin	Nitrofurantoin (1)	Trimethoprim-Sulfamethoxazole
Gram Negative	*Acinetobacter baumannii*		IR		IR										
	Citrobacter freundii complex		IR	IR	IR		IR								
	Enterobacter cloacae complex		IR	IR	IR		IR								
	Escherichia coli														
	Klebsiella aerogenes		IR	IR	IR		IR								
	Klebsiella oxytoca														
	Klebsiella pneumoniae		IR												
	Morganella morganii		IR		IR		IR							IR	
	Proteus mirabilis													IR	
	Pseudomonas aeruginosa		IR	IR	IR		IR	IR		IR				IR	IR
	Serratia marcescens		IR	IR	IR										
	Stenotrophomonas maltophilia		IR	IR	IR	IR	IR	IR		IR	IR	IR		IR	

Gray = not routinely tested; Gray "IR" = intrinsic resistance

2. Prolonged therapy with 3rd generation cephalosporins may result in development of resistance in isolates intially testing susceptible, alternative therapy with cefepime may be considered (*citrobacter, K.aerogenes, E.cloacae, Serratia marcescens*)

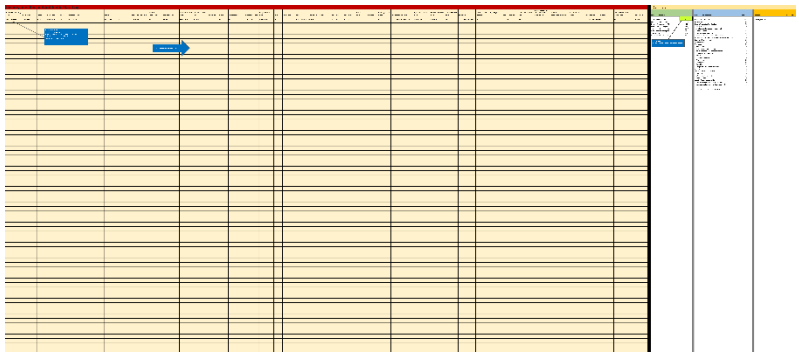
1. For treatment of uncomplicated urinary tract infection only

Aerobic gram positie bacteria (% susceptible)		# of Isolates	Oxacillin	Vancomycin	Secondary Agents: TMP/SMX	Tetracycline	Clindamycin	Linezolid
Gram Positive	*Staphylococcus aureus*							
	Methicillin-susceptible S.aureus							
	Methicillin-resistant S.aureus							
	Coaglase-negative *Staphylococcus* spp.							
	Staphylococcuslugdenensis							

Aerobic gram positie bacteria (% susceptible)		# of Isolates	Penicillin: non-meningitis	Penicillin: meningitis	Ceftriaxone: non-meningitis	Ceftriaxone: meningitis	Clindamycin	Levofloxacin
Gram Positive	*Streptococcus pneumoniae*							
	Viridans group *Streptococcus spp*							
	Strep mitis group							

Aerobic gram positie bacteria (% susceptible)		# of Isolates	Ampicillin	Vancomycin	Linezolid	Daptomycin
Gram Positive	*Enterococcus spp*					
	E.faecalis					
	E.faecium					

Spreadsheet 2



Find complete tools in Appendix, Spreadsheets 1 & 2.

Find associated tool in Appendix, Table 12.

Examples of optimal antimicrobial prescribing and use policy or practice standards include:

AU guidelines

Systematically review evidence on clinical and cost effectiveness, drug monographs for indications, recommendations for dosage, frequency and route**.** Identify and target scenarios of inappropriate use (e.g., asymptomatic bacteriuria, rashes masquerading as cellulitis).

- https://asap.nebraskamed.com/wp-content/uploads/sites/3/2017/07/Loeb-minimum-criteria-for-initiating-antibiotic-therapy-checklist.docx
- https://asap.nebraskamed.com/wp-content/uploads/sites/3/2018/04/SBAR-communication-tool-template-for-suspected-lower-respiratory-tract-infection.docx
- https://asap.nebraskamed.com/wp-content/uploads/sites/3/2019/01/SBAR-communication-tool-template-for-suspected-skin-soft-tissue-infection.docx

Establish antimicrobial formulary

Preferred antimicrobials selected by medical director and pharmacist**.** Closed formulary to limit access of some medications to specific physicians.

- https://www.ashp.org/-/media/store%20files/p2371-sample-chapter-4.pdf

IV to PO policy

If patient meets set of approved criteria for oral therapy transition, pharmacist will determine if appropriate to convert.

- http://med.stanford.edu/bugsanddrugs/guidebook/_jcr_content/main/panel_builder_0/panel_0/download_1/file.res/IV_to_PO_Conversion_Policy.pdf

De-escalation policy

Discontinuing redundant or inappropriate antimicrobial regimens.

- https://www.ashp.org/-/media/store%20files/p4023-sample-chapter-32.pdf

Audit utilization

Pharmacy audits, reports antimicrobial utilization **|** Audit provided for clinician review with peer comparisons.

- https://asap.nebraskamed.com/wp-content/uploads/sites/3/2018/08/Annual-ASP-Activity-Report-for-LTCF-Prescribers-081418.docx

Antibiogram development

Optimization of which antimicrobials to test and report with assistance of microbiologist or Infectious disease specialist (16).

- https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/patient-safety-resources/resources/nh-aspguide/module2/toolkit1/cat_sources.pdf
- https://asap.nebraskamed.com/wp-content/uploads/sites/3/2017/07/Antibiogram-template.xlsx
- https://doi.org/10.1016/j.jamda.2018.05.006

Time out for each new prescription

Reassess antimicrobials at a set period (e.g., 48 or 72 hours) to determine ongoing need and/or adjustments based on new diagnostic information or clinical change.

- https://www.publichealthontario.ca/-/media/documents/asp-scheduled-reassessments.pdf?la=en

Transfer review

Review antimicrobials for residents returning from emergency department, clinic or hospital with new antimicrobial prescriptions.

- https://doi.org/10.1016/j.jamda.2017.07.018

Diagnostic testing standards (aka Diagnostic stewardship)

Appropriate ordering of tests (e.g., urinalysis only if symptomatic, *C.diff* testing only in presence of certain criteria such as 3 watery stools, absence of laxatives).

6. Reporting and Utilization

After tracking the above facility profiles, next report on the findings at the second or third ASP meeting. Based on the facility pathogen and infection profiles, discuss which issues are most critical within your facility, and focus initial ASP efforts on initiatives which will make the most significant impact on those areas. The Institute for Healthcare Improvement in conjunction with CDC have created a framework for developing interventions based on primary and secondary drivers. A "driver" is a key step in the pathway to achieving a desired goal.

Table 13: Examples Of Drivers Leading To Specific Change Ideas

Primary driver: Timely and appropriate antimicrobial initiation

Secondary driver	Change concepts	Specific change ideas
Promptly identify patients requiring antimicrobials	Standardized process to identify patients needing antimicrobials	1. Develop diagnostic algorithm based on signs and symptoms suggesting specific types of infections (UTI, skin infections, community acquired pneumonia, blood stream infections etc.), criteria should clearly specify situations when antimicrobials are NOT indicated (acute bronchitis) 2. Develop algorithm guiding appropriate treatment for the most common infections 3. Consider computerized decision support system assisting clinicians in identification of patients needing antimicrobials
Obtain cultures prior to starting antimicrobials	Standardized protocols for ordering and obtaining cultures (or other diagnostic tests) prior to antimicrobial initiation	1. Order sets or default EMR antimicrobial orders prompt appropriate culture order reminders 2. Guidance on common inappropriate culturing practices (e.g., swabs of wounds, urine cultures from asymptomatic patients, *C. difficile* testing from patients on laxatives) 3. Develop standards for and assess reliability of processes for ordering and obtaining a culture for: a. Appropriate specimen b. Appropriate collection (i.e., before antibiotics) c. Transport to lab (time from specimen to lab receipt) d. Processing specimen (lab receipt to start of processing)
Avoid antibiotics with overlapping activity, combinations	Develop a way to inform clinicians about unnecessary combinations	1. Develop list of agents generally not combined, potentially with a mechanism to flag inappropriate combinations (e.g., double anaerobic coverage) 2. Standardize a system for review and follow-up of combinations of agents not recommended

not supported by evidence or guidelines	("double coverage")	3. Develop guidelines for treatment of specific conditions in which combination therapy indicated
Consider local antimicrobial susceptibility in selecting therapy	Develop standardized process for antimicrobial selection	1. Develop facility guidelines for most commonly treated infections or for most commonly used antimicrobials and most common treatment errors (e.g., when anaerobic coverage is needed) 2. Utilize EMR clinical decision support functionality to support antimicrobial selection 3. Ensure antimicrobial guidelines consider: a. Site infection b. Pharmacokinetics / dynamics c. Pathogens most likely responsible for the infection d. Toxicity e. Possible complicating comorbidities f. Severity of infection g. Hospital formulary and cost 4. Ensure facility guidelines make antimicrobial susceptibility patterns and cost of antimicrobials visible to clinicians at point of care
Starting treatment promptly	Develop processes supporting prompt treatment with antimicrobials	1. Develop standard order sets/pathways for common infections a. specifying appropriate time from ordering to administration b. monitor adherence to these standards 2. Identify patients who have had delays in antibiotic ordering and administration and perform root cause analysis 3. Define a process to expedite the decision making if the on-call physician is not immediately available to order treatment
	Ensure antibiotics are readily available	1. Consider keeping frequently used antibiotics available on-site
Appropriate treatment duration	Develop protocol based on guidelines	1. Develop evidence-based clinical pathways standardizing the treatment duration 2. Permit prescriber opt-out of the standardized duration, but require documentation of the rationale 3. Consider requiring re-ordering of antimicrobials after a specified period (e.g., 7-10 days) 4. Reassess need for and prescribed duration of antimicrobials daily, and upon care transition/return

Primary driver: Appropriate treatment

Secondary driver	Change concepts	change ideas
Give antibiotics at correct dose, interval	Develop process for delivery customized to antimicrobials and to patient	1. Imbed dose and interval in clinical pathways or order sets, and if EMR utilized, the clinical decision functionality 2. Ensure those pathways, order sets include alerts on when dosing adjustments are indicated (e.g., kidney dysfunction)
Stop treatment promptly or de-escalate based on culture results	Develop process for prompt notification of culture and susceptibility results	1. Standardize notification process – set time frame within which culture results must be reported, and to whom 2. Establish a list of "critical results" (e.g., *C. difficile*, ESBL pathogens), reportable via page or texting systems a. Ensure reporting system includes alerting mechanisms to re-route to responsible clinical staff if attending unavailable b. Monitor the timeframe and routes in which these results are being relayed, adjust the procedures depending on findings
Reconcile and adjust antimicrobials at all care transitions	Examine all opportunities to stop or de-escalate antimicrobials	1. Standardize a process to discontinue antimicrobials a. When cultures are deemed more likely to be reflecting colonization than infection b. If cultures are negative at 48-72 hours c. If alternative (non-infectious) etiology is diagnosed or suspected 2. Include de-escalation guidelines in standard pharmacy training

Adapted from IHI and CDC's Antibiotic Stewardship Driver Diagram and Change (17)

Find complete tool in Appendix, Table 13.

7. Education

Antimicrobial prescribing practices are a multifactorial process driven by more than simply the clinician's knowledge. Physician attitudes and beliefs greatly affect prescribing habits. Among physicians, advanced practitioners, and nurses, AMR has been perceived to be a macro problem instead of a local issue (9). When considering whether or not to prescribe antimicrobials, AMR was ranked last as a barrier to prescribing practices, while diagnostic tests (to assist in whether to prescribe or not) were often viewed as too invasive, expensive, or time-consuming rather than simply prescribing an antibiotic (9,10). Clinicians also tend to overestimate a patient's expectations and underestimate the desire for reassurance (20, 21).

Most LTC prescribers rely on accurate assessments by nursing as they are infrequently on-site. Therefore, nursing education is a vital component of ASP. Educational initiatives should focus on not just antimicrobial prescribing and resistance, but also infections which necessitate antimicrobials versus those which do not (e.g., uninfected wounds, asymptomatic bacteriuria). Knowledge of the Nursing staff can also affect attitudes and beliefs not just among their peers, but also among patients and families, so being aware of what constitutes a true infection over colonization is vital.

Nursing communication also strongly influences prescriber's practices. When nursing staff call an off-site prescriber informing them of positive cultures without context, providers often feel pressured to "do something".

AHRQ (Agency for Healthcare Research and Quality) provides "*Toolkits to Determine Whether It Is Necessary to Treat a Potential Infection with Antibiotics*" which can be incorporated into nursing in-service training curricula, accessible at: https://www.ahrq.gov/nhguide/toolkits/determine-whether-to-treat/index.html (20)

Targeting deficiencies in this complex interaction has been shown amenable to more dramatic and lasting AS improvements than that provided by education alone (20,21). A curriculum should be developed for both clinicians and nursing staff with dedicated in-service training. The nursing or medical director should also be present for questions as well as reinforcement of the facility's ASP commitment.

Beyond setting standards and developing policies, ASP team leaders should be aware of the impact social norms and culture have on antimicrobial prescribing practices. Restrictive or persuasive prescribing policies, auditing and feedback, pre-authorization, restricted formularies and educational campaigns are traditional methods used in ASP interventions. Interventions targeting education alone to improve the spectrum or duration of antimicrobials have been shown to have limited success in nursing homes without culture change (22).

Examples of educational initiatives:

- Nursing director sets standards for assessment of resident clinical conditions (e.g., avoidance of checking urinalysis if asymptomatic or "test of cure" for *C. difficile*)
- Nursing director sets standards for relaying resident assessment information to clinicians
- Allocation of time and resources for clinician and nursing education

Current State Assessment

It is often not feasible to implement all seven core elements upon start-up. It is critical to identify the current state of your facility's infrastructure, prescribing practices, resistance profile, and personnel to prioritize which element(s) should be focused upon initially. The following questionnaire will assist in delineating which areas need the most work.

7 Core Elements Worksheet

After reviewing the above seven core elements, examine the current state of your own facility's stewardship activities and readiness by filling out the following table:

Find complete tool in Appendix, Table 14.

Table 14

1. Leadership Support / Commitment		
Can your facility demonstrate leadership support for AS through one or more of the following ways?	☐ Yes ☐ No	If yes, indicate which actions (selecting all that apply) ☐ Written statement of leadership support to improve antibiotic use ☐ Written and displayed public commitment in support of antibiotic stewardship ☐ Antibiotic stewardship duties included in Medical Director position description ☐ Antibiotic stewardship duties included in Director of Nursing position description ☐ Leadership monitors whether antibiotic stewardship policies are followed ☐ Antibiotic use and resistance data are reviewed in quality / performance improvement meetings ☐ Clinician(s) completed stewardship continuing education in the prior 12 months ☐ Other:
2. Accountability		
Has your facility identified 1+ leaders for antibiotic stewardship activities?	☐ Yes ☐ No	If yes, indicate who is accountable for stewardship activities (selecting all that apply) ☐ Medical Director ☐ Director or Assistant Director of Nursing ☐ Pharmacist ☐ Infection Preventionist ☐ Quality Improvement Officer ☐ Staff Development Coordinator ☐ Other: _____
Has your facility demonstrated dedication to and accountability for optimizing prescribing and patient safety related to antibiotics?	☐ Yes ☐ No	If yes, indicate which are in place (select all that apply) ☐ Identify a single leader to direct antibiotic stewardship activities within the facility ☐ Include AS related duties in position descriptions or job evaluation criteria ☐ Communicate with all facility nursing staff members to assist in educating patients regarding antibiotics
3. Drug Expertise		
Does your facility have access to individual(s) with antibiotic stewardship expertise?	☐ Yes ☐ No	If yes, indicate which individuals are providing expertise (select all that apply) ☐ Consultant pharmacist ☐ Stewardship team at local hospital ☐ Infectious disease / stewardship consultant ☐ Medical Director ☐ Corporate support/nurse consultant ☐ Other:
4. Actions to Improve Antibiotic Use		
Has your facility implemented at least one policy or practice to improve antibiotic prescribing?	☐ Yes ☐ No	If yes, indicate which policies are in place (select all that apply) ☐ Require explicit written justification in medical record for antibiotic prescribing that deviates from guidelines ☐ Require prescribers to document indication for all antibiotic prescriptions ☐ Provide support for clinical decisions (e.g. electronic clinical decision support in order entry, written clinical practice guidelines) ☐ Facility specific treatment recommendations or order sets for one or more infectious syndromes ☐ Antibiotic use limited to agents listed on the formulary ☐ Pre-approval for certain antibiotics ☐ Use delayed prescribing practices or watchful waiting (when appropriate) ☐ Routinely assess symptoms associated with antibiotic allergy to determine if allergy claim is credible (e.g. penicillin allergy listed in chart but have safely received amoxicillin-clavulanate or piperacillin-tazobactam) ☐ Other: _____
Has your facility implemented practices to improve antibiotic use?	☐ Yes ☐ No	If yes, indicate which practices are in place (select all that apply) ☐ Facility approved algorithm for assessing residents ☐ Facility approved algorithms for appropriate diagnostic testing (e.g. obtaining urine cultures only if symptomatic, avoidance *C. difficile* testing in setting of laxatives etc.) ☐ Facility approved algorithms or decision support tools are routinely used to assess residents suspected of having an infection (e.g., AHRQ UTI SBAR tool) ☐ Delirium assessment tool is routinely used for residents to aid in differentiating infectious from non-infectious causes of delirium ☐ Staff routinely communicate antibiotic use, infection and colonization status when residents are transferred to/from other healthcare facilities ☐ Staff routinely use a local or facility-specific antibiogram to guide selection of an antibiotic treatment ☐ Staff routinely review antibiotic orders in conjunction with culture results and an updated assessment of clinical symptoms within 72 hours of starting antibiotics ("antibiotic timeout") to determine whether de-escalation or stopping therapy is indicated ☐ Staff routinely document clinical assessment with all antibiotic starts ☐ Staff routinely document whether residents with suspected UTI have signs and symptoms of a UTI ☐ Staff routinely use antibiotic order sets for common infectious syndromes to improve antibiotic use Indicate for which conditions: ☐ Other: _____
Is your consultant pharmacist involved with ASP activities?	☐ Yes ☐ No	If yes, indicate activities performed by the consultant pharmacist (select all that apply) ☐ Reviews antibiotic courses for appropriateness of administration and/or indication ☐ Establishes standards for clinical/laboratory monitoring for adverse drug events from antibiotic use ☐ Reviews microbiology culture data to assess and guide antibiotic selection If Yes, how often do pharmacy consults occur? ☐ Monthly ☐ Weekly ☐ On antibiotic order ☐ Other: _____

Developing the Plan

After building your ASP team, designating roles, and examining current state assessment and resource needs, you now have a better understanding where your facility is in terms of ASP infrastructure and readiness. Using data from the above worksheets, select (as a team) your long-term (2-3 year), intermediate (6 months to 1 year), and short term (next few months) goals.

Timeline

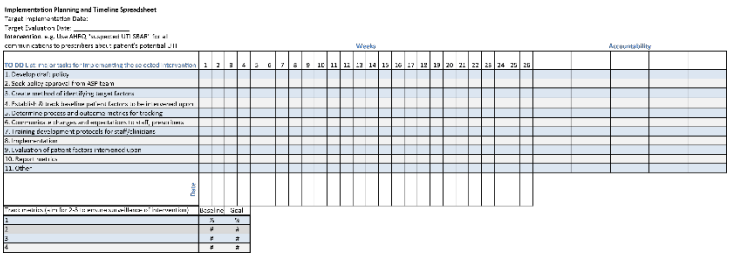
Once the team has determined the goals make the goals and the timeline explicit. CDC recommends each facility focus on one goal at a time (1). For the initial goal review performance data and set benchmarks. Upon review of your facility pathogen profile, antimicrobial practices and standards, and current state assessment worksheets you should be able to identify gaps and prioritize most needed interventions to implement up front. Below are examples of timelines provided by the Washington Department of Health for ASP activity planning (15). Include in your timeline the activities which are to be completed, target dates of completion, tools needed to complete the activities, how activities will be implemented, ASP members responsible for which activity, and some description of monitoring and oversight.

A potential schedule for the first year may resemble the following:

- **Month 1**: First meeting – review this toolkit and other designated materials, discuss areas of interest among team members, and create a plan for monthly data collection
- **Month 4**: Second meeting – review the 3-month data, set goals, plan education
- **Month 7:** Third meeting – review the 6-month data, re-visit overall goals, begin to discuss policy or practice standards (e.g., develop a delayed antibiotic prescribing policy for acute sinusitis or UTI, policy on review of residents returning from emergency department or clinic with diagnosis of "UTI", avoidance of *C. difficile* testing in setting of laxative use or non-diagnostic diarrhea)
- **Month 10:** Fourth meeting – review 9-month data, plan additional education, review policy draft, adopt and implement policy and practice standards
- **Month 13:** Fifth meeting – review 1-year data and progress towards the primary goal, set new goals

Adapted from University of North Carolina, Cecil Sheps Center for Health Services Research. *Implementing an Antibiotic Stewardship Program in a Nursing home, 2016.*

Find complete tools in Appendix, Spreadsheet 3.



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Appendix – Tools

Table 1

Stakeholder Identification	Who? (name or role)	How? (which core element(s) or other means of assistance)	When? (planning, implementation, scale-up, evaluation stage)
Who is affected by the program?	1. *ex) nursing staff* 2. 3. 4. 5.	1. *ex) education (awareness of symptoms of infection vs colonization, facility issues), engagement (ASP planning [i.e. what do staff perceive as significant drivers of misuse] barriers [i.e. provider prescribing norms, communication])* 2. 3. 4. 5.	1. *ex) all stages, especially development, implementation, evaluation* 2. 3. 4. 5.
Who is involved in the program's operations?	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.
Who will benefit from the program?	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.	1. 2. 3. 4. 5.

Adapted from ERASE Clostridium difficile project questionnaire (10) and Washington State Department of Health JumpStart Stewardship in Nursing Homes (15)

Table 2

Key Stakeholder engagement ("what's in it for them?")			
	List key stakeholders identified above	**Which activities or outcomes are most important to this stakeholder**	**How can the facility address this stakeholder's needs?**
1.	*ex) nursing staff*	*ex) implementation and leadership (i.e., administrative, medical and nursing roles are clearly delineated) ASP direction & goals (i.e., provision of materials, meetings regarding ASP expectations, guidelines, education)*	*ex) allocated educational time, auditing and feedback*
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Adapted from ERASE Clostridium difficile project questionnaire (10) and Washington State Department of Health JumpStart Stewardship in Nursing Homes (15)

Table 3

Team member	Activities this member is accountable for	Estimation of weekly hours	What needs are to be met for this person to serve as an ASP team member?
Medical Director			
Pharmacist			
Nurse leader			
Infection preventionist			
Microbiologist			
Physician / Clinician			
Nurse			
Nurse aids			
Resident or family members			
Environmental service staff			
Other			
Other			

Adapted from ERASE Clostridium difficile project questionnaire (10)

Table 4

Resource	Needed	Frequency of need	Description of need	Actions	Cost estimates
Education (for ASP team members)	☐ Yes ☐ No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)	*Ex) 1) courses on prescribing practices (i.e., antibiotic indications, duration, institutional misuse), 2) ASP processes (i.e., approaches to technology uses, stop orders, development guidelines, and algorithms)*	*Ex) 1) surveys / assessments ASP members (for deficiencies), 2) survey attitudes (for needs), 3) determine number of educational programs, 4) determine number attendees for each (and when)*	*Ex) antibiotic or process course = [assemble materials (5hr x $/hr)] + [create power point & materials (7hr x $/hr)] + [print materials x $/attendee] + [attendees (# attendees x $/hr salary compensated)] = $950 per event for est. 15 attendees*
Education (for ASP members)	☐ Yes No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)			
Education (for staff)	☐ Yes No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)			
Supplies	☐ Yes ☐ No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)			

Office space, meeting space	☐ Yes ☐ No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)			
Campaign materials, graphic design	☐ Yes ☐ No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)			
EMR / IT support	☐ Yes ☐ No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)			
Other:	☐ Yes ☐ No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)			
Other:	☐ Yes ☐ No	☐ Once ☐ Ongoing: _____ (monthly, annually, other)			

Adapted from ERASE Clostridium difficile project questionnaire (10) and Washington State Department of Health JumpStart Stewardship in Nursing Homes (15)

Table 5

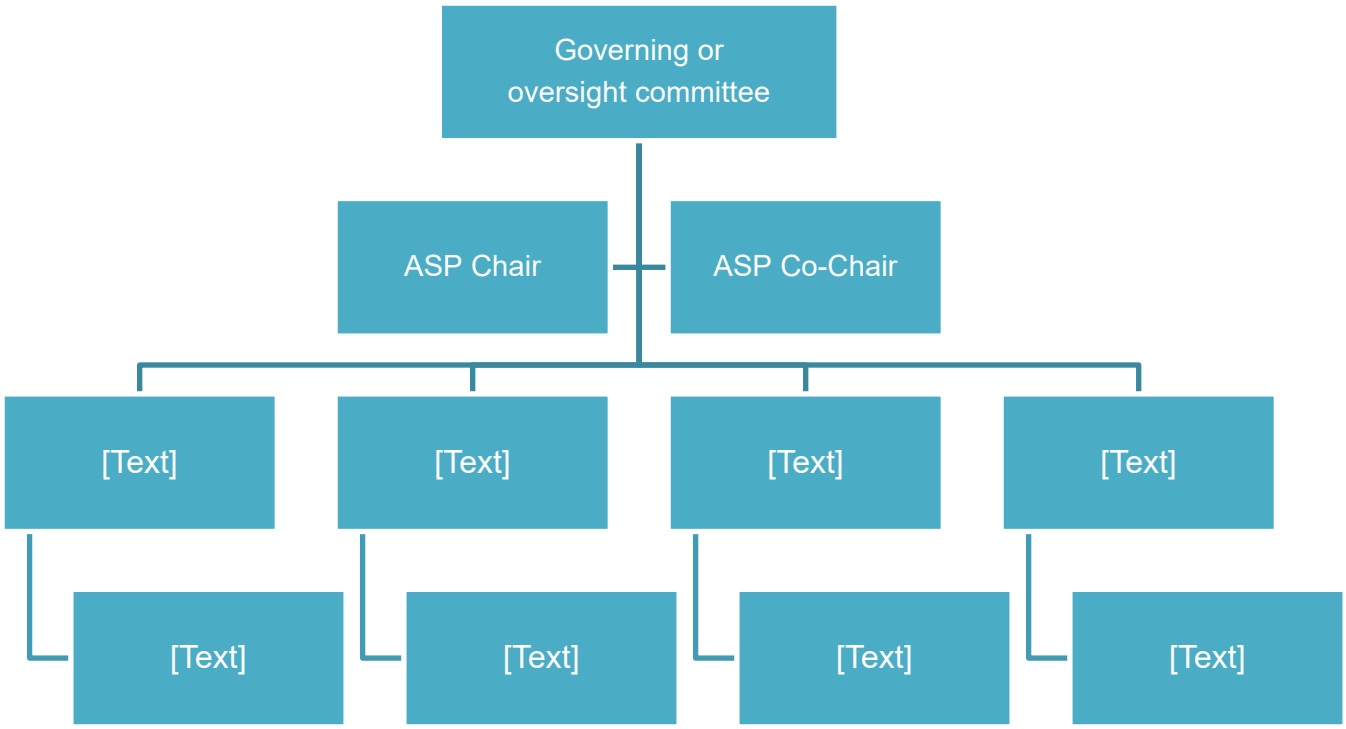
Governing or oversight committee
ASP Chair
ASP Co-Chair
[Text]
[Text]
[Text]
[Text]
[Text]
[Text]
[Text]
[Text]

Table 6

Facility antimicrobial utilization	
Last 12 months *(alternatively, start with one month)*	
What are the 3 most common infections (or conditions, i.e., asymptomatic bacteriuria) for which residents receive antimicrobials	1. _____ 2. _____ 3. _____
What proportion of asymptomatic bacteriuria cases are treated with an antimicrobial	_____%
What are the 3 most common antimicrobials prescribed for UTIs (including asymptomatic bacteriuria)	1. _____ 2. _____ 3. _____
What proportion of acute bronchitis cases are treated with an antimicrobial (in those without emphysema or other lung conditions)	_____%
What are the 3 most common antimicrobials prescribed for acute bronchitis	1. _____ 2. _____ 3. _____
What proportion of acute URI (rhinitis, sinusitis, laryngitis, pharyngitis) are treated with an antimicrobial	_____%
What are the 3 most common antimicrobials prescribed for acute URI	1. _____ 2. _____ 3. _____
What proportion of physician visits (clinics, emergency department, return from hospitalization) result in an antimicrobial prescription	_____%
What proportion of nurse – physician calls result in an antimicrobial prescription	_____%

Adapted from Jump Start Stewardship in Nursing Homes, Washington Department of Health (15)

Table 7

Infection	# cases	Antibiotic regimen most often prescribed		
		Antibiotic 1	Antibiotic 2	Antibiotic 3
Ex) acute sinusitis	*Ex) 6/mo (avg)*	**Drug**: *Azithromycin* **Dose**: *500→250mg* **Route**: *oral* **Duration**: *5 days*	**Drug**: *Amoxicillin/clavulanate* **Dose**: *875/500 mg* **Route**: *oral* **Duration**: *7-10 days*	**Drug**: *levofloxacin* **Dose**: *500 mg or 750 mg (2/3 Rx were 750)* **Route**: *oral* **Duration**: *5-7 days*
		Drug: **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**
		Drug: **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**
		Drug: **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**
		Drug: **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**
		Drug: **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**
		Drug: **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**
		Drug: **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**	**Drug:** **Dose:** **Route:** **Frequency:** **Duration:**

Adapted from ERASE Clostridium difficile project questionnaire (10) and Washington State Department of Health JumpStart Stewardship in Nursing Homes (15)

Table 8

IV Antimicrobial	Utilization last calendar month (days of therapy)	Cost of utilization last calendar year	Notes

Adapted from Jump Start Stewardship in Nursing Homes, Washington Department of Health (15)

Table 9

PO Antimicrobial	Utilization last calendar year (days of therapy)	Cost of utilization last calendar year	Notes

Adapted from Jump Start Stewardship in Nursing Homes, Washington Department of Health (15)

Table 10

Last 12 months or last calendar year	Number
Licensed beds	
Admissions	
Resident days	
Average daily census	
Number of prescribers	
Clinical pharmacists (hours per month)	
Resident characteristics	**Average daily census**
Residents with indwelling urinary catheters	
Residents with pressure injury ○ Stage 1-2 ○ Stage 3-4 ○ Unstageable / unable to determine	_____ _____ _____ _____
Residents with chronic foot or leg ulcers	

Adapted from Jump Start Stewardship in Nursing Homes, Washington Department of Health (15)

Table 11

Last 12 months or last calendar year	Number
Clostridioides difficile	
○ Facility onset infections	
○ Community onset infections	
Numbers of non-duplicate isolates of following isolates:	
MDR Gram-Negative Bacteria	
○ Carbapenem-resistant *Acinetobacter spp*	
○ Carbapenem-resistant Enterobacteriaceae	
○ Carbapenem-resistant *Pseudomonas aeruginosa*	
○ ESBL *Acinetobacter baumannii*	
○ ESBL *Escherichia coli*	
○ ESBL *Klebsiella spp*	
○ ESBL *Pseudomonas aeruginosa*	
○ ESBL *Proteus spp*	
Methicillin-Resistant Staphylococcus aureus (MRSA)	
○ MRSA - number of non-duplicate isolates	
Vancomycin-Resistant Enterococcus (VRE)	
○ VRE - number of non-duplicate isolates	
Other MDROs of concern:	

Adapted from Jump Start Stewardship in Nursing Homes, Washington Department of Health (15)

Table 12

Policies	Interventions	Tools & Templates
AU guidelines		
Establish antimicrobial formulary		
IV to PO policy		
De-escalation policy		
Audit utilization		
Antibiogram development		
Time out for each new prescription		
Transfer review		
Diagnostic testing standards		

Adapted from IHI and CDC's Antibiotic Stewardship Driver Diagram and Change (17)

Table 13

Primary driver	Secondary driver	Change concepts	Specific change ideas

Adapted from IHI and CDC's Antibiotic Stewardship Driver Diagram and Change (17)

Table 14

1. Leadership Support / Commitment		
Can your facility demonstrate leadership support for AS through one or more of the following ways?	☐ Yes ☐ No	If yes, indicate which actions (selecting all that apply) ☐ Written statement of leadership support to improve antibiotic use ☐ Written and displayed public commitment in support of antibiotic stewardship ☐ Antibiotic stewardship duties included in Medical Director position description ☐ Antibiotic stewardship duties included in Director of Nursing position description ☐ Leadership monitors whether antibiotic stewardship policies are followed ☐ Antibiotic use and resistance data are reviewed in quality / performance improvement meetings ☐ Clinician(s) completed stewardship continuing education in the prior 12 months ☐ Other: _____
2. Accountability		
Has your facility identified 1+ leaders for antibiotic stewardship activities?	☐ Yes ☐ No	If yes, indicate who is accountable for stewardship activities (selecting all that apply) ☐ Medical Director ☐ Director or Assistant Director of Nursing ☐ Pharmacist ☐ Infection Preventionist ☐ Quality Improvement Officer ☐ Staff Development Coordinator ☐ Other: _____
Has your facility demonstrated dedication to and accountability for optimizing prescribing and patient safety related to antibiotics?	☐ Yes ☐ No	If yes, indicate which are in place (select all that apply) ☐ Identify a single leader to direct antibiotic stewardship activities within the facility ☐ Include AS related duties in position descriptions or job evaluation criteria ☐ Communicate with all facility nursing staff members to assist in educating patients regarding antibiotics
3. Drug Expertise		
Does your facility have access to individual(s) with antibiotic stewardship expertise?	☐ Yes ☐ No	If yes, indicate which individuals are providing expertise (select all that apply) ☐ Consultant pharmacist ☐ Stewardship team at local hospital ☐ Infectious disease / stewardship consultant

		☐ Medical Director ☐ Corporate support/nurse consultant ☐ Other: _____
4. Actions to Improve Antibiotic Use		
Has your facility implemented at least one policy or practice to improve antibiotic prescribing?	☐ Yes ☐ No	If yes, indicate which policies are in place (select all that apply) ☐ Require explicit written justification in medical record for antibiotic prescribing that deviates from guidelines ☐ Require prescribers to document indication for all antibiotic prescriptions ☐ Provide support for clinical decisions (e.g. electronic clinical decision support in order entry, written clinical practice guidelines) ☐ Facility specific treatment recommendations or order sets for one or more infectious syndromes ☐ Antibiotic use limited to agents listed on the formulary ☐ Pre-approval for certain antibiotics ☐ Use delayed prescribing practices or watchful waiting (when appropriate) ☐ Routinely assess symptoms associated with antibiotic allergy to determine if allergy claim is credible (e.g. penicillin allergy listed in chart but have safely received amoxicillin-clavulanate or piperacillin-tazobactam) ☐ Other: _____
Has your facility implemented practices to improve antibiotic use?	☐ Yes ☐ No	If yes, indicate which practices are in place (select all that apply) ☐ Facility approved algorithm for assessing residents ☐ Facility approved algorithms for appropriate diagnostic testing (e.g. obtaining urine cultures only if symptomatic, avoidance *C. difficile* testing in setting of laxatives etc.) ☐ Facility approved algorithms or decision support tools are routinely used to assess residents suspected of having an infection (e.g., AHRQ UTI SBAR tool) ☐ Delirium assessment tool is routinely used for residents to aid in differentiating infectious from non-infectious causes of delirium ☐ Staff routinely communicate antibiotic use, infection and colonization status when residents are transferred to/from other healthcare facilities ☐ Staff routinely use a local or facility-specific antibiogram to guide selection of an antibiotic treatment ☐ Staff routinely review antibiotic orders in conjunction with culture results and an updated assessment of clinical symptoms within 72 hours of starting antibiotics (“antibiotic timeout”) to determine whether de-escalation or stopping therapy is indicated ☐ Staff routinely document clinical assessment with all antibiotic starts

		☐ Staff routinely document whether residents with suspected UTI have signs and symptoms of a UTI ☐ Staff routinely use antibiotic order sets for common infectious syndromes to improve antibiotic use Indicate for which conditions: _____ ☐ Other: _____
Is your consultant pharmacist involved with ASP activities?	☐ Yes ☐ No	If yes, indicate activities performed by the consultant pharmacist (select all that apply) ☐ Reviews antibiotic courses for appropriateness of administration and/or indication ☐ Establishes standards for clinical/laboratory monitoring for adverse drug events from antibiotic use ☐ Reviews microbiology culture data to assess and guide antibiotic selection If Yes, how often do pharmacy consults occur? ☐ Monthly ☐ Weekly ☐ On antibiotic order ☐ Other: _____
5. Tracking antibiotic prescribing, use, resistance		
Does your facility monitor one or more measure of antibiotic prescribing and/or use?	☐ Yes ☐ No	If yes, indicate which are being tracked (select all that apply) ☐ Adherence to clinical assessment documentation (e.g. signs/symptoms, vital signs, physical exam findings) ☐ Adherence to prescribing documentation (dose, duration, indication) ☐ Self-evaluate antibiotic prescribing practices ☐ Adherence to facility specific treatment recommendations ☐ Track and report antibiotic prescribing for one or more high-priority condition or antibiotic ☐ Track and report percentage of all nurse – physician calls leading to antibiotic prescriptions ☐ Track and report percentage of all visits (primary care, urgent care, emergency department) leading to antimicrobial prescriptions ☐ Track and report complications of antimicrobial use and AMR trends for the most common bacteria ☐ Regular point prevalence surveys of antibiotic use ☐ Number new antibiotic starts per 1,000 resident days ☐ Number antibiotic days of therapy per 1,000 resident days (all antibiotic or by select antibiotic class) ☐ Assess and share performance on quality measures and established reduction goals addressing appropriate antibiotic prescribing ☐ Other: _____

Does your facility monitor one or more outcomes of antibiotic use?	☐ Yes ☐ No	If yes, which of the following are being tracked (select all that apply) ☐ Monitoring rates of *C. difficile* infection ☐ Monitoring rates of MDROs ☐ Monitoring rates of antibiotic related adverse drug events ☐ Other: _____
6. Improvement in antibiotic use and resistance reporting to staff		
Does your facility provide facility-specific reports on antibiotic use and outcomes to clinical providers and nursing staff?	☐ Yes ☐ No	If yes, indicate which of the following are being tracked (select all that apply) ☐ Measures of antibiotic use at the facility ☐ Measures of outcomes related to antibiotic use (i.e., *C. difficile* rates) ☐ Report of facility antimicrobial susceptibility patterns (within last 18 months) ☐ Personalized feedback on antimicrobial prescribing practices (to clinical providers) ☐ Monitoring of clinical assessment documentation ☐ Other: _____
7. Education		
Does your facility provide educational resources and materials about antibiotics, guidelines, resistance or other opportunities aiming to improve antimicrobial use?	☐ Yes ☐ No	If yes, indicate which groups receive these resources (select all that apply) ☐ Clinical providers (MDs, DOs, ARNPs, PAs, PharmDs) ☐ Nursing staff (RNs, LPNs, CMAs, CNAs) ☐ Residents and families ☐ Other: _____ If yes to the above, indicate which activities are in place (select all that apply) ☐ Education of patients about when antimicrobials are needed (and when not needed) ☐ Education regarding potential harms of antimicrobial treatment ☐ Provide patient education materials ☐ Received stewardship education in the past 12 months If yes, how often does your facility provide education on antimicrobial stewardship (select all that apply) ☐ At hire ☐ Annually ☐ Quarterly ☐ Monthly ☐ As needed

Questionnaire adapted from CDC's Core Elements of Antibiotic Stewardship Programs in Nursing Homes (1).

Spreadsheet 1:

Facility Name

Cumulative Antimicrobial Susceptibility Report Commonly Isolated Bacteria, January to December 2019

Numbers below represent **percent of susceptible isolates**

		# of Isolates	Ampicillin	Ampicillin-sulbactam	Amoxicillin-Clavulanate	Piperacillin-tazobactam	Cefazolin	Ceftriaxone (2)	Cefepime	Ertapenem	Meropenem	Gentamicin	Levofloxacin	Nitrofurantoin (1)	Trimethprim-Sulfamethoxazole
Gram Negative	*Acinetobacter baumannii*		IR		IR										
	Citrobacter freundii complex		IR	IR	IR		IR								
	Enterobacter cloacae complex		IR	IR	IR		IR								
	Eshcerichia coli														
	Klebsiella aerogenes		IR	IR	IR		IR								
	Klebsiella oxytoca														
	Klebsiella pneumoniae		IR												
	Morganella morganii		IR		IR		IR							IR	
	Proteus mirabilis													IR	
	Pseudomonas aeruginosa		IR	IR	IR		IR	IR		IR				IR	IR
	Serratia marcescens		IR	IR	IR										
	Stenotrophomonas maltophilia		IR	IR	IR	IR	IR	IR		IR	IR	IR		IR	

Gray = not routinely tested;
Gray "IR"= intrinsic resistance

2. Prolonged therapy with 3rd generation cephalosporins may result in development of resistance in isolates intiially testing susceptible, alternative therapy with cefepime may be considered (*citrobacter, K.aerogenes, E.cloacae, Serratia marcescens)*

1. For treatment of uncomplicated urinary tract infection only

Spreadsheet 1:

Aerobic gram positie bacteria (% susceptible)			
			# of Isolates
			Oxacillin
			Vancomycin
		TMP/SMX	Secondary Agents
		Tetracycline	
		Clindamycin	
		Linezolid	
Gram Positive	*Staphylococcus aureus*		
	Methicillin-susceptible S.aureus		
	Methicillin-resistant S.aureus		
	Coaglase-negative *Staphylococcus* spp.		
	Staphylococcuslugdenensis		

Aerobic gram positie bacteria (% susceptible)		
		# of Isolates
	Penicillin	non-meningitis
		meningitis
	Ceftriaxone	non-meningitis
		meningitis
		Clindamycin
		Levofloxacin
Gram Positive	*Streptococcus pneumoniae*	
	Viridans group *Streptococcus spp*	
	Strep mitis group	

Aerobic gram positie bacteria (% susceptible)	
	# of Isolates
	Ampicillin
	Vancomycin
	Linezolid
	Daptomycin
Gram Positive	*Enterococcus* spp
	E.faecalis
	E.faecium

Spreadsheet 2:

Resident Name (Last, First)	Date of Birth	Gender	Onset Date	Room	Infection Type	Symptoms	Illness Resolved Date	Isolation Precautions	Precautions Type	Precautions Start Date

Spreadsheet 2:

Precautions End Date	Clinicians Visit	ER Visit	Hospitalization	Hospitalized Date	Hospital Release Date	Death	Death Date	Antibiotic	Antibiotic Start Location	Start Date

Spreadsheet 2:

Stop Date	Days of Therapy	Prescriber	Radiologic Tests Done	Microbiology Test Sent	Specimen Collection Date	Microbiology Test Sent	Culture f/u at 48-72h?	Pathogen	Is pathoen CRE, CRPA, CRAB, ESBL, MRSA or VRE?

Spreadsheet 2:

Date of Final Result	Location of Infection Onset	Re-assessment within 48-72 hours of antibiotic start	Antibiotic changes due to re-assessment	Appropriateness of abx used	SBAR Usage and Completeness	Criteria Met to Start Antimicrobials?	Comments

Spreadsheet 3:

Implementation Planning and Timeline Spreadsheet

Target Implementation Date: _____

Target Evaluation Date: _____

Intervention: e.g. Use AHRQ "suspected UTI SBAR" for all communications to prescribers about patient's potential UTI

	Weeks																									Accountability				
TO DO List: major tasks for implementing the selected intervention	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26					
1. Develop draft policy																															
2. Seek policy approval from ASP team																															
3. Create method of identifying target factors																															
4. Establish & track baseline patient factors to be intervened upon																															
5. Determine process and outcome metrics for tracking																															
6. Communicate changes and expectations to staff, prescribers																															
7. Training development protocols for staff/clinicians																															
8. Implementation																															
9. Evaluation of patient factors intervened upon																															
10. Report metrics																															
11. Other																															
Date																															

Track metrics (aim for 2-3 to ensure surveillance of intervention)	Baseline	Goal
1	%	%
2	#	#
3	#	#
4	#	#

Kansas Department of Health and Environment

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