

Minnesota Guide to a Comprehensive Antimicrobial Stewardship Program

Getting Started

Antimicrobial Stewardship Program Strategies

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Introduction

Unfortunately, we are now encountering infections for which there are no good therapeutic options. Now more than ever, antimicrobial stewardship is of the utmost importance as a way to optimize the use of antimicrobials, stem the tide of antimicrobial resistance, and improve patient outcomes.

We think it is vital for there to be an antimicrobial stewardship program (ASP) in every Minnesota hospital. An institutional philosophy that supports these elements is critical to a successful and sustainable ASP, including the support and commitment of institutional leadership.

The *Minnesota Guide to Comprehensive Antimicrobial Stewardship Program (ASP)* is intended to guide the development and implementation of an ASP, taking into consideration the wide variation in financial and personnel resources within facilities. This Guide is comprised of three sections: 1) infrastructure to support the ASP; 2) ASP strategies – core and expanded; and 3) appendix with resources.

Antimicrobial Stewardship Program:

GETTING STARTED

At a minimum an ASP includes a physician and pharmacist at an institution, along with a few other staff members, who develop expertise in antimicrobial stewardship, educated staff, and have access to microbiology and antimicrobial use data. First steps for a program are outlined below.

- ❖ **Review key published antimicrobial stewardship program (ASP) literature (Appendix A).**
- ❖ **Look for clues of existing ASP elements:**
 - Microbiology lab:
 - Develops or has access to a local antibiogram
 - Pharmacy or pharmacy & therapeutics (P & T) committee:
 - Selects antimicrobials that are available on the facility formulary
 - Provides recommendations that reduce medication redundancy
 - Advises about parenteral-to-oral medication conversions
 - Medical leadership:
 - Involvement in patient safety committees
 - Reviews/debriefs on cases during morbidity and mortality rounds
 - Infection prevention:
 - Policies and procedures to prevent and control multidrug-resistant organisms
 - Information technology:
 - Ability to query electronic medical records
- ❖ **Acquire access to antimicrobial use and microbiology data:**
 - Coordinate with necessary staff to access baseline data (e.g. antimicrobial budget, antimicrobial utilization, antimicrobial resistance patterns)
- ❖ **Get the ear of senior leadership:**
 - Determine how ASP elements align with the facility's stated values
 - Identify an administrative advocate to promote the value of an ASP in your facility
- ❖ **Identify a physician to champion the ASP. Desirable qualities include:**
 - Basic knowledge of antibiotics
 - Interest in playing a leadership role in his/her local community
 - Respected by his/her peers
 - Good team player
 - Recognize the importance of a culture of patient safety

**Begin building an Antimicrobial Stewardship Program using the
*Guide to a Comprehensive Antimicrobial Stewardship Program***

ASP Infrastructure

In order for an ASP to be effective, a solid foundation is essential to identify and implement ASP strategies. This foundation includes the ASP infrastructure components (outlined below) such as clarifying the ASP charge; identifying ASP champions, team members, and key stakeholders; developing an implementation plan; and determining communication, education, and feedback channels.

1. Identify a physician champion for the ASP
 - a. Physician champion has infectious diseases training or expertise (preferred)
2. Identify a pharmacist co-champion
 - a. Clinical pharmacist with infectious diseases training (preferred)
3. Identify a member of senior leadership to serve on the ASP Team (may serve in a liaison role)
4. Establish an interdisciplinary ASP Team with a designated physician champion to oversee implementation
 - a. If an ASP Team is not feasible, utilize existing facility committees with expertise regarding ASP principles (e.g. Infection Prevention & Control, Medical Executive, Pharmacy & Therapeutics [P&T], etc.)
5. Develop, define and document facility expectations and ASP Team member roles and responsibilities (Appendix C)
 - a. Ensure that ASP Team members have dedicated/compensated time for ASP activities
6. Conduct baseline facility assessments (Appendix B)
 - a. Antimicrobial Stewardship Opinion Survey
 - b. Antimicrobial Use Prevalence Survey
 - c. Assessment of Antimicrobial Practices and Utilization
7. Utilize information gathered in baseline facility assessments to:
 - a. Determine goals and objectives that align with the facility mission/values
 - b. Review results for improvement opportunities
 - c. Identify and prioritize ASP strategies
8. Develop an ASP operational plan, including: timeline, budget, rollout of selected ASP strategies, frequency of ASP Team meetings, etc.
9. Communicate principles of antimicrobial stewardship to key stakeholders (i.e. prescribers, microbiologists, pharmacists, infection preventionists, direct patient care staff, administration, etc.)
 - a. Rationale for engaging in selected ASP strategies
 - b. Best practices for ASP as described in current literature
 - i. Tailored to stakeholders' roles

10. Develop a process to communicate ASP goals, objectives and facility expectations for implementation of ASP strategies to key stakeholders
 - a. Ensure a process to solicit feedback from stakeholders to ASP Team
 - b. Promote a culture that encourages feedback to prescribers regarding antimicrobial use

11. Develop a process for the ASP Team to regularly communicate with the Infection Prevention and Control Department/Committee regarding healthcare-associated infection surveillance data (e.g. hospital-onset bacteremias, CLABSI, CAUTI, MDRO)

12. Evaluate ASP Team membership on a regular basis (annually, at a minimum) and expand as needed.
Consider including staff from:
 - a. Clinical microbiology
 - b. Infection prevention
 - c. Hospital epidemiology
 - d. Information system technology
 - e. Patient Safety/quality improvement
 - f. P&T committee
 - g. Medical leadership committee

ASP Strategies

Implementation of ASP Strategies

The ASP strategies are presented as a two-tiered approach (core and expanded). This process allows facilities to identify, target, and monitor ASP strategies to their patient populations and/or units creating the potential for greater impact of antimicrobial stewardship on patient outcomes and costs. Core ASP strategies are baseline approaches that should always be in place as part of a comprehensive ASP. Expanded strategies should be implemented as possible and as are relevant to the hospital/unit.

1. Review formulary, pharmaceutical contacts, and identify restricted antimicrobials

Core strategies

- a) Review pharmacy formulary and pharmaceutical contracts at least annually
- b) Identify the costs associated with each antimicrobial
- c) Identify all antimicrobials available on the formulary and assess for duplicative agents
- d) Implement a process for removing duplicative antimicrobials from the formulary
- e) Determine antimicrobials that should be restricted
- f) Define criteria for use of restricted antimicrobials

Expanded strategies

- a) Determine a process for physicians to order restricted antimicrobials (e.g. physician/pharmacist consultation or preauthorization)
- b) Implement a process for communication and enforcement of the antimicrobial formulary
- c) Implement a process to prospectively audit (via rounds or remotely) use of restricted antimicrobials within the facility
- d) Implement a process to prospectively audit (via rounds or remotely) use of additional antimicrobials within the facility
- e) Identify mechanisms through revision of pharmaceutical contracts to reduce costs associated with specific antimicrobials
- f) Publish/communicate comparative cost/day information of antimicrobials

2. Review use of an antimicrobial within the facility (e.g. drug utilization evaluation [DUE])

Core strategies

- a) Select an antimicrobial of interest to the facility and complete a DUE; factors to consider: utilization, resistance, toxicity, cost, appropriateness of use
- b) Prospectively audit use of the selected antimicrobial on a specific hospital unit or throughout the hospital

- c) Identify trends, such as:
 - Utilization rates
 - Drug dose, route, frequency
 - Days of therapy
 - Indications for use
 - Appropriateness of use
 - Toxicity
 - Adverse drug events
 - Temporal utilization trends in the facility
 - Other notable prescribing trends
- d) Utilize standard antimicrobial definitions for analyses
- e) Communicate aggregate antimicrobial utilization data to stakeholders

Expanded strategies

- a) Expand antimicrobial audits
 - Identify and prospectively audit additional antimicrobials of concern to the facility
 - Consider audits by unit and/or prescriber
 - If previously limited to select units, broaden the audit to other units in the facility
- b) Utilize audit data to identify individual provider (e.g. surgeons, internal medicine, critical care) and/or provider group (e.g. medical ICU, emergency department) use of antimicrobial agents
- c) Provide prescriber-specific antimicrobial use data to prescribers
- d) Develop a process to communicate patient-specific ASP Team antimicrobial recommendations to prescribers
- e) Develop a process for tracking adherence to ASP Team recommendations for patient-specific antimicrobial treatment
- f) Utilize National Healthcare Safety Network (NHSN) to monitor and analyze antimicrobial use and/or resistance data (e.g., NHSN Antimicrobial Use and Resistance Module)

3. Utilize an antibiogram

Core

- a) Develop or gain access to a facility-specific antibiogram. If a facility-specific antibiogram is not feasible, utilize a regional antibiogram
- b) Utilize Clinical and Laboratory Standards Institute (CLSI) guidelines in development of an antibiogram
- c) Disseminate or ensure antibiogram is electronically available to prescribers and stakeholders
- d) Provide education to prescribers regarding the purpose and use of an antibiogram

Expanded

- a) Develop a process for periodically updating antibiogram components:
 - Organisms included
 - Antimicrobial susceptibility trends

- b) Develop antibiograms for patient groups/populations such as:
- Adult patients
 - Pediatric patients
 - Hospital units (e.g. medical ICU, emergency department)
 - Special patient-specific populations (e.g. patients with cystic fibrosis)
 - Inpatients
 - Outpatients
 - Long-term care patients
 - Specimen sources (e.g. urine, blood, respiratory)

4. Optimize antimicrobial prescribing

Core

- a) Adopt and communicate facility expectations that prescribers will follow evidence-based practice guidelines for infectious syndromes
- b) Review a sample of microbiologic test results to identify bug/drug mismatches
- Are prescribed antimicrobials indicated for identified organisms?
 - Are prescribed antimicrobials indicated based on antimicrobial susceptibility testing results for identified organisms?

Expanded

- a) Implement a process to identify bug/drug mismatches in real-time
- b) Develop a process to communicate parenteral-to-oral conversion opportunities to prescribers in a timely manner via phone, email, medical record, etc.
- c) Develop and implement a process for streamlining or de-escalating therapy
- d) Develop and implement a process for dose optimization
- e) Develop and implement a process for monitoring physiologic response to antimicrobials (e.g. serum levels, organ function, signs of toxicity)
- f) Develop and implement a process for reducing redundant therapy
- g) Develop and implement a process for establishing reasonable duration of therapy for infectious syndromes

5. Review clinical syndromes

Core

- a) Select 1 – 2 clinical syndromes/diagnoses of importance to the facility for which prescriber documentation of treatment indication will be reviewed using current evidence-based practice guidelines including use of antimicrobials for clinical infection vs colonization. Consider the following examples:
- Bacteriuria/urinary tract infection
 - Skin and soft-tissue infections
 - Intravascular catheter-related infections
 - Pneumonia
 - *Clostridium difficile* infection

Expanded

- a) Develop or adopt guidelines and clinical pathways/algorithms for antimicrobial treatment and management of selected syndrome(s); this may include the use of:
 - Documentation of clinical indications at time of order entry for antimicrobial treatment
 - Order sets and clinical pathways
 - Appropriate use of diagnostics
 - Electronic medical records
 - Computer physician order entry (CPOE)
 - Clinical decision support for ordering antimicrobials
- b) Select additional clinical syndromes
- c) Audit utilization of evidence-based practice guidelines for the selected clinical syndromes
- d) Implement a process for determining utilization of evidence-based practice guidelines for the selected clinical syndrome(s)

6. Review and analyze patient outcome data

Core

- a) Develop and implement a process for monitoring and analyzing patient safety indicators
 - a. Adverse events associated with specific antimicrobials
 - b. Days of unnecessary antimicrobial therapy

Expanded

- a) Develop and implement a process for monitoring and analyzing additional patient safety indicators
 - Hospital-onset *C. difficile* infection
 - ICU length of stay
 - Mortality index

7. ASP Evaluation

Core

- a) Develop and implement a process to evaluate the impact of the ASP; consider monitoring the following components over time (e.g. baseline, quarterly, annually) and comparing results to previous time points:
 - Cost of all antimicrobials within the facility
 - Utilization of all antimicrobials within the facility
 - Antimicrobial resistance within the facility
 - Adherence to strategies recommended by ASP Team

Expanded

- a) Expand the ASP evaluation; consider monitoring the additional components over time (e.g. quarterly, annually):
 - Trends of hospital-onset *C. difficile* infections
 - Trends of multidrug-resistant organisms (e.g. VRE, MRSA, CRE)
 - Utilization of specific antimicrobials within the facility
 - Utilization of specific antimicrobials within the facility by unit/specialty
 - Cost of all antimicrobials by unit/specialty
 - Cost of dedicated time of ASP Team members
 - Mean duration of antimicrobials over time (e.g. patients that received antimicrobials for < 3 days)
 - Cost per antimicrobial dose
 - Number of bug/drug mismatches over time
- b) Develop an annual antimicrobial stewardship report and disseminate to prescribers and stakeholders
 - Identify goals and needs
 - Identify successes
 - Identify challenges and threats to success

Next steps for the ASP

After the ASP has been implemented and evaluated, discuss plans with internal and external stakeholders regarding expansion of the ASP into facility-associated healthcare settings (e.g. ambulatory care, long-term care, ambulatory surgery centers). Additionally, ASP team members should consider serving as an expert resource for regional, state, or national ASP collaboratives/committees with the goal of assisting other facilities or healthcare delivery systems to establish or improve an ASP.

Appendix A. ASP Resources

Policy Statements, Position Papers, and Guidelines

SHEA / IDSA / PIDS. Policy statement on antimicrobial stewardship by the Society for Healthcare Epidemiology of America (SHEA), the Infectious Diseases Society of America (IDSA), and the Pediatric Infectious Diseases Society (PIDS). *Infection Control and Hospital Epidemiology* 2012; 33 (4): 322-327.

APIC / SHEA Position Paper. Moody JM, Cosgrove SE, Olmsted R, Septimus E, Aureden K, et al. Antimicrobial stewardship: A collaborative partnership between infection preventionists and healthcare epidemiologists. *Infection Control and Hospital Epidemiology* 2012; 33,(4): 328-330.

Dellit T H, Owens R C, McGowan JE, Gerding DN, Weinstein JPB, et al. IDSA and SHEA guidelines for developing an institutional program to enhance antimicrobial stewardship. *Clinical Infectious Diseases* 2007; 44: 159-77.

Additional Resources

Special issue: Antimicrobial stewardship. *The Journal of Human Pharmacology and Drug Therapy*, 2012; 32 (8). Available online at: <http://www.accp.com/pharmacotherapy>

Medscape Education Infectious Diseases. Cosgrove SE, Fishman NO, Rybak MJ, Seo SK, Septimus EJ, and Trivedi KK. Antimicrobial stewardship: Practical strategies for the healthcare team. 2012. CME/CE accessible online at: http://www.medscape.org/viewprogram/32553?src=0_mp_cmenl_0

Antimicrobial stewardship for the community hospital: Practical tools & techniques for implementation. *Clinical Infectious Diseases* 2011; 53 (S1)

IDSA Policy Paper. Combating antimicrobial resistance: Policy recommendations to save lives. *Clinical Infectious Diseases*, 2011; 52 (S5): S397-S428.

Greater New York Hospital Association / United Hospital Fund. Antimicrobial stewardship toolkit: Best practices from the GNYHA/UHF antimicrobial stewardship collaborative. 2011. Available online at: www.gnyha.org/antimicrobial

Institute for Healthcare Improvement / Centers for Disease Control and Prevention. Antibiotic stewardship drivers and change package. 2010.

Spellberg B, Guidos R, Gilbert D, Bradley J, Boucher HW, et al. The epidemic of antibiotic-resistant infections: A call to action for the medical community from the Infectious Diseases Society of America. *Clinical Infectious Diseases* 2008; 46: 000-000.

Fishman N. Antimicrobial stewardship. *American Journal of Medicine*, 2006; 119 (6A): S53-S61.

Cosgrove?. Core knowledge and skills: antimicrobial stewardship DRAFT. [Check with G Kravitz re: source].



Survey adapted from:

Appendix B

ANTIMICROBIAL STEWARDSHIP OPINION SURVEY¹

Please indicate your agreement or disagreement with the following statements about your institution.
Thank you very much for your time.

ANTIMICROBIAL RESISTANCE: SCOPE OF THE PROBLEM AND KEY CONTRIBUTORS

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1. Antibiotic resistance is a significant problem in this institution.	<input type="checkbox"/>				
2. Patient rooms are cleaned according to hospital cleaning protocol once a multidrug-resistant organism (MDRO) patient has been discharged.	<input type="checkbox"/>				
3. Adherence to hand-hygiene protocols is excellent at this institution.	<input type="checkbox"/>				
4. This institution does NOT do enough to control the development of resistant organisms through surveillance.	<input type="checkbox"/>				
5. This institution does NOT provide adequate staff education regarding MDROs.	<input type="checkbox"/>				
6. A patient is likely to develop a MDRO infection during their stay at this institution.	<input type="checkbox"/>				

ANTIBIOTIC PRESCRIBING PRACTICES

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
7. Microbiology lab results are efficiently communicated to the treating physician.	<input type="checkbox"/>				
8. I regularly refer to/consider the antibiotic susceptibility patterns at this institution (e.g., the institutional antibiogram) when empirically prescribing antibiotics.	<input type="checkbox"/>				
9. If medically appropriate, intravenous antibiotics should be stepped down to an oral alternative after three days.	<input type="checkbox"/>				
10. Restrictions on antibiotics impair my ability to provide good patient care.	<input type="checkbox"/>				
11. Antibiotics are overused at this institution.	<input type="checkbox"/>				
12. More judicious use of antibiotics would decrease antimicrobial resistance.	<input type="checkbox"/>				

¹ Antimicrobial Stewardship Survey based on the AHRQ Hospital Survey on Patient Safety Culture.
<<http://www.ahrq.gov/qual/patientsafetyculture/hospindex.htm>>

Survey adapted from:

ANTIMICROBIAL STEWARDSHIP PROGRAMS

(A formal program that monitors and manages the appropriate use of antibiotics.)

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
13. Antimicrobial stewardship programs improve patient care.	<input type="checkbox"/>				
14. Antimicrobial stewardship programs reduce the problem of antimicrobial resistance.	<input type="checkbox"/>				
15. Antimicrobial stewardship programs impact this institution's infection rates.	<input type="checkbox"/>				
16. This institution has an effective antimicrobial stewardship program.	<input type="checkbox"/>				
17. My individual efforts at antimicrobial stewardship minimally impact this institution's resistance problem.	<input type="checkbox"/>				
18. This institution does NOT provide adequate training on antimicrobial prescribing and use.	<input type="checkbox"/>				
19. Additional staff education on antimicrobial prescribing is needed.	<input type="checkbox"/>				
20. Prescribing physicians are the only disciplines who need to understand antimicrobial stewardship.	<input type="checkbox"/>				

BACKGROUND INFORMATION

1. What is your primary work area or unit in this institution? (Please check ONE answer)

- | | | |
|--|---|---|
| <input type="checkbox"/> Many different units/No specific unit | <input type="checkbox"/> Intensive care unit (any type) | <input type="checkbox"/> Radiology |
| <input type="checkbox"/> Medicine (non-surgical) | <input type="checkbox"/> Psychiatry/mental health | <input type="checkbox"/> Anesthesiology |
| <input type="checkbox"/> Surgery | <input type="checkbox"/> Rehabilitation | <input type="checkbox"/> Other (please specify _____) |
| <input type="checkbox"/> Obstetrics | <input type="checkbox"/> Pharmacy | |
| <input type="checkbox"/> Pediatrics | <input type="checkbox"/> Laboratory | |
| <input type="checkbox"/> Emergency department | | |

2. How long have you worked in this institution?

- | | |
|---|---|
| <input type="checkbox"/> Less than 1 year | <input type="checkbox"/> 11 to 15 years |
| <input type="checkbox"/> 1 to 5 years | <input type="checkbox"/> 16 to 20 years |
| <input type="checkbox"/> 6 to 10 years | <input type="checkbox"/> 21 years or more |

3. What is your staff position in this institution?

- | | |
|--|---|
| <input type="checkbox"/> Attending/Staff physician | <input type="checkbox"/> Physician assistant |
| <input type="checkbox"/> Resident physician/Intern | <input type="checkbox"/> Nurse practitioner |
| <input type="checkbox"/> Fellow | <input type="checkbox"/> Infection control practitioner |
| <input type="checkbox"/> Pharmacist | <input type="checkbox"/> Other (please specify _____) |

4. How long have you worked in your current specialty or profession?

- | | | |
|---|---|---|
| <input type="checkbox"/> Less than 1 year | <input type="checkbox"/> 6 to 10 years | <input type="checkbox"/> 16 to 20 years |
| <input type="checkbox"/> 1 to 5 years | <input type="checkbox"/> 11 to 15 years | <input type="checkbox"/> 21 years or more |

Appendix C: Antimicrobial Use Prevalence Survey (Under development)

APPENDIX D: ASSESSMENT OF ANTIMICROBIAL PRACTICES & UTILIZATION

This assessment was developed to evaluate antimicrobial practices and utilization in your facility.

ASP Team	
1. Has a physician been identified to champion the ASP?	Yes <input type="checkbox"/> No <input type="checkbox"/>
2. Have the ASP Team members been identified?	Yes <input type="checkbox"/> No <input type="checkbox"/> <i>If Yes, specify:</i> <input type="checkbox"/> Infectious diseases physician <input type="checkbox"/> Clinical pharmacist <input type="checkbox"/> Clinical microbiologist <input type="checkbox"/> Infection preventionist <input type="checkbox"/> Hospital epidemiologist <input type="checkbox"/> Administration/senior leadership <input type="checkbox"/> Other, specify: _____
3. Have the ASP Team members reviewed the key literature? (See <i>Getting Started</i> document, p. 4.)	Yes <input type="checkbox"/> No <input type="checkbox"/>
4. Has the ASP Team determined how ASP elements align with the facility's stated values?	Yes <input type="checkbox"/> No <input type="checkbox"/>
5. The ASP Team has approached senior leadership about the importance of an antimicrobial stewardship program?	Yes <input type="checkbox"/> No <input type="checkbox"/>
a. If yes, briefly describe outcome of the discussion and any resulting action items.	
Antimicrobial Data	
6. Does the ASP Team have access to antimicrobial use data?	Yes <input type="checkbox"/> No <input type="checkbox"/>
7. Does the ASP Team review the facility's formulary at least annually?	Yes <input type="checkbox"/> No <input type="checkbox"/>
8. Does the facility have defined criteria for use of limited-use antimicrobials?	Yes <input type="checkbox"/> No <input type="checkbox"/>
a. List limited-use antimicrobials:	
b. Describe the criteria for use of limited-use antimicrobials:	
Microbiology Practices	
9. Does your facility have an in-house microbiology lab?	Yes <input type="checkbox"/> No <input type="checkbox"/>
a. If no, where are microbiology services performed?	
10. Is your facility able to obtain unit-specific microbiology data?	Yes <input type="checkbox"/> No <input type="checkbox"/>
11. Is an antibiogram developed for your facility?	Yes <input type="checkbox"/> No <input type="checkbox"/>

a. If no , do you have access to an antibiogram at the regional or healthcare system level?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
b. If yes , how often (monthly, quarterly, annually)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
12. Can unit-specific antibiograms be developed?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
13. Is there a process in place to communicate microbiology testing results to providers (negative and positive results)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
a. If yes, describe the process (include how and in what timeframe)		
Infectious Clinical Syndromes		
14. What are the top three most common infectious clinical syndromes at your facility (known or estimated)?	1) _____ 2) _____ 3) _____	
15. Has the facility adopted or developed guidelines and clinical pathways/algorithms for antimicrobial treatment and management of common infectious clinical syndromes?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
a. If yes, list the guidelines and clinical pathways/algorithms		
Antimicrobial Prescribing		
16. Is there a process in place in your facility for infectious diseases physician or pharmacist to review antimicrobial prescribing?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
a. If yes, describe the process:		
17. Is there a process in place to identify bug/drug mismatches in your facility?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
a. If yes, is the process initiated by microbiology test results, antimicrobial prescribing, both, or other method?		
18. Is there a process to communicate parenteral-to-oral conversion opportunities to prescribers in a timely manner via phone, email, medical record, or other method?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
a. If yes, describe the process:		
19. Does the facility have computer physician order entry (CPOE)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
a. If yes, does it include antimicrobials?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
b. If yes, does it include all units/areas of the hospital?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
20. Does the facility have a process for monitoring adverse events associated with antimicrobials?		
21. What are the barriers to ASP implementation in your facility? <i>Check all that apply.</i>	<input type="checkbox"/> Financial considerations/cost <input type="checkbox"/> Opposition from prescribers <input type="checkbox"/> Resistance from administration <input type="checkbox"/> Other clinical initiatives of higher priority <input type="checkbox"/> Personnel shortages <input type="checkbox"/> None of the above <input type="checkbox"/> Other, <i>specify</i> : _____	

Appendix E: ASP Member Roles and Responsibilities (under development)