Antimicrobial Stewardship
Clinical Approach

Presbyterian supports antimicrobial stewardship activities that proactively reinforce the appropriate use of antimicrobial agents in all hospitals, with plans to extend the stewardship program to all care settings.

Essentials

- A multidisciplinary team conducts antimicrobial stewardship activities.
- The electronic medical record enables a Pharmacist to monitor the use of antimicrobials throughout all Presbyterian hospitals.
- Providers are able to consult infectious disease specialists to assist them in ordering appropriate courses of antimicrobial therapy for hospitalized patients.
- With initiatives to extend support to all care settings and to advance the Pharmacist’s role in antimicrobial therapy, Presbyterian strives to be on the forefront of antimicrobial stewardship.

PHS Success and Impact

Every day a Pharmacist with expertise in Antimicrobial Stewardship receives phone calls from Providers and Pharmacists, asking for assistance in determining appropriate antimicrobial therapies. Whether the hospitalized patient is receiving care inside or outside the central delivery system, the Provider can get a consultation with such a Pharmacist, and, if the case is complex, with an Infectious Disease Physician.

This access to infectious disease specialists helps to optimize clinical outcomes, while minimizing the negative, unintended consequences of antimicrobial use.

What We Know about Antimicrobial Stewardship

Misuse and overuse of antimicrobials is one of the world’s most demanding public health problems. Bacteria will inevitably find ways of resisting our antibiotic armamentarium, which is why aggressive action is needed now to keep new resistance from developing and to prevent the resistance that already exists from spreading. People infected with antimicrobial-resistant organisms are more likely to have longer, more expensive hospital stays, and may be more likely to die as a result of an infection. The CDC estimates each year in the United States, at least 2 million people become infected with bacteria that are resistant to antibiotics and at least 23,000 people die each year as a direct result of these infections. The use of antibiotics is the single most important factor leading to antibiotic resistance around the world. Simply using antibiotics creates resistance.

Antimicrobial stewardship is a coordinated program that promotes the appropriate use of antimicrobials (including antibiotics), improves patient outcomes, reduces microbial resistance, and decreases the spread of infections caused by multidrug-resistant organisms. Hospital antimicrobial stewardship programs have been shown to improve appropriate antibiotic use, reduce adverse events, and enhance quality of care by ensuring
the appropriate selection, dose, route and duration of antimicrobial therapy. In addition, antimicrobial stewardship programs have been shown to decrease overall antimicrobial expenditures, resulting in cost savings for the healthcare delivery system.

**PHS’ Approach to Antimicrobial Stewardship**

Presbyterian maintains an antimicrobial stewardship program in which a multidisciplinary team is responsible for the promotion of rational and appropriate antimicrobial therapy for patients at all Presbyterian hospitals. An Infectious Disease (ID) Pharmacist, an Antimicrobial Stewardship Pharmacist, and several Infectious Disease Physicians proactively support these patients.

**Antimicrobial Stewardship Program (ASP) Team**

According to policy, the Antimicrobial Stewardship Program team meets regularly to develop order sets and treatment guidelines, manage the antimicrobial formulary, plan clinician education, recommend optimization of the electronic medical record for antimicrobial surveillance and support, and review of antimicrobial resistance patterns. The team shares evidence-based treatment guidelines with all clinicians in the enterprise via the ASP Website on PresNet. They also monitor the interventions and consultations offered by the ID Pharmacist and ID Physicians. The team includes infection preventionists and microbiology specialists, and is championed by Dr. Thomas Roberts.

**Surveillance and Intervention**

Using the Epic medical record and the ICON program, the ID Pharmacist and Antimicrobial Stewardship Pharmacist monitor the use of antimicrobials throughout the PHS hospitals. When a medication order falls outside of the guidelines for antimicrobial stewardship, the Pharmacist may choose to call a Provider to offer advice, and to suggest alternative courses of therapy. For example, the Pharmacist may suggest a different antibiotic (de-escalating from broad spectrum antimicrobials, or avoiding restricted drugs), an alternative form of administration (oral instead of intravenous), or a modified duration, among other things. The Provider may choose to accept the intervention or not. In 2018, Providers have accepted interventions 92% of the time.

**Clinical Education**

The Antimicrobial Stewardship Pharmacist is on call for a Provider who would like direct assistance with determining an appropriate course of antimicrobial therapy for a hospitalized patient. In addition, the ID Pharmacist and the ID Physician may visit hospitals to conduct medical grand rounds; so far, clinicians at Presbyterian Hospital, Plains Regional Medical Center, and Presbyterian Espanola Hospital have benefitted from this onsite education.

> “A complex patient at a regional hospital was confirmed with an infection of resistant Staph aureus in the bloodstream, which is associated with high morbidity and mortality. These infections require several weeks of intravenous antibiotics. When I contacted the Provider, he informed me that the patient did not want to stay in hospital for therapy. So, I consulted the ASP team, and we recommended a regimen using a once daily antibiotic so the patient could receive therapy at an ambulatory clinic.”
> ~Justin Schmetterer, ID Pharmacist
Patient Education and Shared Decision Making

A coordinated effort among health care team members enhances patients’ adherence to pharmacotherapeutic regimens, monitoring of drug effects, and feedback to the health system. Presbyterian strives for thorough patient education in all practice settings, including acute inpatient care, ambulatory care, home care, and long-term care.

Key Tools and Clinician Training

**ASP Website on PresNet**
The Antimicrobial Stewardship Program maintains an intranet site (see link on page 7) for clinicians to access antibiograms, guidelines, and clinical pathways for treating specific infections, restrictions that may apply to certain antimicrobials, and how to dose specific antibiotics.

**Epic ICON ASP Technology**
The Epic EHR has a program embedded into it to assist the ASP team in identifying interventions and monitoring patients on antimicrobials. The program identifies patient on restricted antimicrobials, opportunities to narrow antibiotics, bug-drug mismatches, and numerous other factors that may help the Pharmacist see the need for intervention.

**Antimicrobial Stewardship Workshop**
This training is offered by the ASP team to provide Pharmacists with knowledge on emerging topics in infectious disease.

**Antimicrobial Stewardship Certificate Program**
The Society of Infectious Diseases Pharmacists’ (SIDP) Antimicrobial Stewardship Program is a practice-based certificate program focused on the role pharmacists play in the appropriate use of antimicrobial agents. The year-long, intensive activity includes online self-study modules, live webinars, and skills application in the clinical setting. By 2019 there will be more than six Presbyterian pharmacists who will have completed this training.

Leadership

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<tr>
<th>Process Owners</th>
<th>Justin Schmetterer, PharmD, PhC, BCIDP</th>
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<tr>
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<td>Kelley Merrick, PharmD</td>
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<td>Clinical Champion</td>
<td>Thomas Roberts, MD</td>
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<td>Infectious Disease</td>
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<td>Governance Body</td>
<td>The Antimicrobial Stewardship Program (ASP) team is comprised of the members of the Infectious Disease (ID) Subcommittee of the PDS Pharmacy, Therapeutics, and Laboratory Committee.</td>
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Antimicrobial Stewardship Program (ASP) – Inpatient

**ASP Team Members**
- **ID Physician Champion:** Thomas Roberts, MD
- **ID Pharmacist Specialist:** Justin Schmetterer, PharmD, PhC, BCIDP
- **Antimicrobial Stewardship Pharmacist:** Kelley Merrick, PharmD
- **Infection Preventionist:** Allison Paul, BSN
- **Antimicrobial Stewardship Pharmacist and PGY-2 Infectious Disease Pharmacy Resident:**
  - ID Physicians: Joe Gorvetzian, MD; Christine Boehringer, DO; Andrea Demeter, MD; David Stryker, MD; Felix Cerna, MD; Jeff Ross, MD
- **Clinical Pharmacy Services:** Tanja Jelic, PharmD BCPS, Director
- **Inpatient Clinical Services:** Nancy S. Jordan, PharmD BCPS, Director
- **Medical Director (Hospitalist Physician):** Fernando Jumalon, MD
- **Clinical Microbiologist:** Karissa Culbreath, PhD
- **Information Technology (Epic) Specialist:** Joyce Sugiyama, PharmD, BCPS

**Structure**
- **ASP Team meets on a bi-monthly basis**
- **Activities:**
  - Development of order sets and treatment guidelines
  - Antimicrobial formulary management
  - Clinician education
  - Optimization of the electronic medical record for ASP
  - Periodic review of antimicrobial susceptibility rates
  - Communicate utilization data to appropriate committees and individuals as appropriate

**Measures of Success**

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<th>Objective</th>
<th>Measure</th>
<th>Aligns with Aim</th>
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| Optimize clinical outcomes involving the use of antimicrobials | • Number of cases reviewed, per site  
• Number of interventions, per site  
• Acceptance rate  
• Number of Provider-initiated consultations  
• Utilization rates of broad spectrum and restricted antimicrobials | Better Health  
Exceptional Experience |
| Avoid unnecessary cost                   | • Total savings in drug costs                                          | Cost Leadership          |
| Provide clinical education regarding antimicrobials | • Number and location of grand medical rounds and other educational activities  
• Utilization of the ASP Website  
• Number of certified Pharmacists | Better Health |

These measures are reported to the ID Subcommittee and to Pharmacy leadership.
Hundreds of infectious disease cases are reviewed each month, resulting in as many as 260 interventions per month. These interventions are widely accepted by Providers.

In 2018, 2,554 interventions regarding antimicrobial utilization were offered to Providers at all Presbyterian hospitals, with the majority occurring at Presbyterian Hospital and Rust Medical Center.

The primary reason for intervention has been to de-escalate the use of broad spectrum antibiotics.
Total cost avoidance due to antimicrobial stewardship interventions reached $142,576 in 2018. These are drug costs only; additional cost savings due to decreased length of stay, avoided lab costs, prevented C. diff infections, and prevented adverse events from antibiotics, etc., are not included.

Future Work

Presbyterian’s goal is to perform leading-edge antimicrobial stewardship — to optimize clinical outcomes, avoid cost, and provide clinical education across all care settings.

Expanding Stewardship in the Inpatient Setting

In addition to the two full time (Infectious Disease and Antimicrobial Stewardship) Pharmacists at Presbyterian Hospital, a postgraduate year two (PGY2) pharmacy residency in infectious disease was developed at PH. In 2019 the program obtained accreditation from American Society of Health-System Pharmacists. Also, pharmacists from the regional and central delivery system hospitals continue to participate in the SIDP certificate program, which enables them to assist in appropriate interventions. Furthermore, Kelley Merrick will advance antibiotic stewardship in the pediatric inpatient population. The ASP team will continue to create and share tools (flow diagrams, recommendations, and order sets) for managing infectious diseases.

Developing Stewardship in the Ambulatory Setting

Kelley Merrick led the development of educational materials in alignment with the CDC’s National Antibiotic Awareness Week. These materials include patient facing posters differentiating bacterial and viral illnesses as well as commitment letters written from the prescriber perspective declaring a commitment to using antibiotics appropriately. They will be available (via Marketing Express) for use in Presbyterian’s Primary Care and Urgent Care settings.

Advancing the Role of the Pharmacist

Currently undergoing approval is a protocol, written by Scott Graham, to expand the role of the ID Pharmacist in managing infectious disease. A pilot program led by Justin Schmetterer studied the potential impact of an ID Pharmacist Clinician using their prescriptive authority to manage antimicrobial medications over 8 weeks in an inpatient hospital setting.
Glossary

antimicrobial stewardship  A multidisciplinary approach to selecting the optimal drug, dosage, and duration of therapy that will result in the best clinical outcome for the prevention or treatment of infection, with minimal toxicity to the patient and minimal development of resistance.

antibiogram  The hospital antibiogram is a periodic summary of antimicrobial susceptibilities of local bacterial isolates submitted to the hospital’s clinical microbiology laboratory. Antibiograms are often used by clinicians to assess local susceptibility rates, as an aid in selecting empiric antibiotic therapy, and in monitoring resistance trends over time within an institution. Also, an antibiogram can be used to compare susceptibility rates across institutions and to track trends in resistance.

Additional References

Clinical Practice Guidelines
- CPM: Asymptomatic Bacteriuria (ASB)
- CPM: C. diff Infection (CDI)
- CPM: Skin and Soft Tissue Infections (SSTI)
- Presbyterian's Antimicrobial Stewardship Program on PresNet [PHS login required]

Training
- Antimicrobial Stewardship for Clinical Staff 2017 [PHS login required]
- Society of Infectious Diseases Pharmacists: Antimicrobial Stewardship Certificate Program

Policies and Procedures
- Antimicrobial Stewardship Program (ASP) [PHS login required]

Other Resources
- CDC: Antibiotic/Antimicrobial Resistance