

# Antimicrobial Stewardship

*The UW Health Antimicrobial Stewardship program was rated as a top 13 program by the Infectious Diseases Society of America and is listed as a resource by the CDC Antimicrobial Stewardship Program.”*

CY16 Annual Report January 2017 Issue

The antimicrobial stewardship enters its 15th year of existence!

Fiscal year 2016 was another successful year for the Antimicrobial Stewardship Program. We continued to reduce unnecessary antimicrobial utilization, improve clinical decision support tools, mitigate the emergence of antimicrobial resistance, and provide fiscally responsible and effective care to our patients.

The stewardship team continued to monitor and improve antimicrobial use throughout the UW Health enterprise. With the opening of The American Center and UW Rehab Center, the stewardship team responsibilities expanded. 60% of patients at UW Health receive antimicrobials on a daily basis which results in between 260 and 340 patients per day that require prospective audit and review. Stewardship interventions continue to focus on encouraging antimicrobial de-escalation and early pathogen identification (which facilitates de-escalation 24 to 72 hours after). Acceptance of ASP interventions remains high at over 80%. The educational work, including fellow lectures, medical resident and intern training sessions, and educational guidelines linked to antimicrobial orders ensures that prescribers choose correctly early and often.

In 2013 the Centers for Disease Control released a antimicrobial resistance threats report. At the top of the list of threats was Clostridium difficile and carbapenem-resistant Enterobacteriaceae (CRE) extended-spectrum  $\beta$ -lactamase producing Enterobacteriaceae (ESBL) and other multi-drug resistant pathogens. The ASP team manages twenty-five restricted antimicrobial agents. These agents are either used in the treatment of highly drug resistant pathogens or their use is associated with antimicrobial resistance. The management of this program is instrumental in optimally treating highly resistant pathogens and in mitigating the emergence of resistant pathogens.

Finally, the stewardship team has been faced with many challenges this year due to antimicrobial shortages. The ASP managed eighteen drug shortages, including shortages of critically important broad-spectrum antimicrobial agents. Shortages often results in the need to use sub-optimal, expensive alternatives; however, the ASP mitigation strategies successfully preserved supply and provided safe, effective, and fiscally responsible alternative therapies.

Fiscal year 2016 was a very successful year and we look forward to our 16th successful year. It promises to bring new opportunities to impact and improve patient care at the University of Wisconsin and throughout the state of Wisconsin.

Sincerely,



Barry Fox, MD



David Andes, MD



Alexander Lepak, MD



Luke Schulz, PharmD

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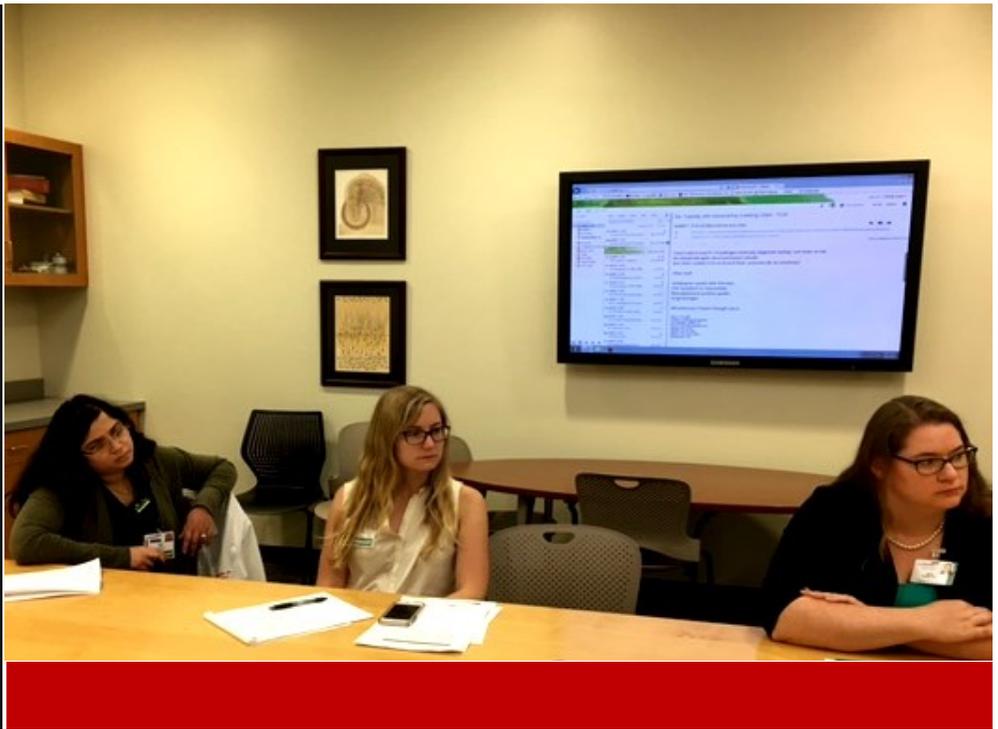




# Introducing Qlikview

An important aspect of antimicrobial stewardship is measuring and reporting of antimicrobial use. Historically, this is a very difficult metric to report. The antimicrobial stewardship program developed a new reporting tool called Qlikview that can be used to monitor antimicrobial use in realtime with on-the-fly reporting capabilities. This tool can simplify data collection for on-going research projects or provide data needed to support the implementation of new projects.

The antimicrobial days of therapy Qlikview program allows the stewardship team to report antimicrobial utilization to prescribers, services, units, and hospitals.



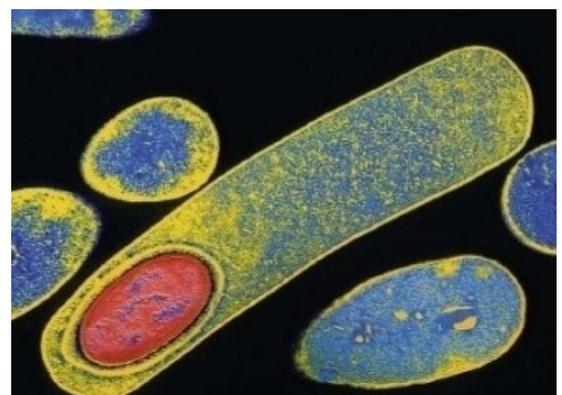
## *Clostridium difficile* prevention efforts

*Clostridium difficile* infection (CDI) is a growing global concern. In fact, it is the most common bacterial healthcare-associated infection in the United States, affecting approximately half a million Americans in 2011. *Clostridium difficile* is an important health-care associated infection at UW Health which effects both patient outcomes and hospital financial outcomes.

Antibiotic exposure is an important risk factor for CDI. In conjunction with the infection control committee, the stewardship program as asked to implement several projects aimed at reducing the hospital-acquired *Clostridium difficile* infection rate. In 2016, the Antimicrobial Stewardship Program implemented two programs to help combat this growing infection rate.

First, the stewardship team worked to restrict fluoroquinolone antibiotics on transplant and critical care units. The program reduced fluoroquinolone use by 80% and reduced the hospital-acquired *Clostridium difficile* infection rates to 7.7 cases/10000 patient days from 16.8 cases/10000 patient days ( $p=0.12$ ).

Second, the stewardship program increased the use of probiotics on General Medicine, Hospitalist, and Family Practice units. Probiotics have been shown to have potential for primary prevention of *Clostridium difficile* infection. A pre/post retrospective review was conducted to assess a new probiotic prescribing protocol. Pharmacists prescribed protobiotics to 63% of appropriate patients via a delegation protocol within 24 hours. Greater than 80% of eligible patients received probiotics during their hospitalization per protocol. The hospital-acquired *Clostridium difficile* infection rate for the entire hospital decreased to 5.65 cases per 10000 patient days from 8.36 cases per 10000 patient days ( $p=0.05$ ).



## Guidelines and Protocols to Improve Antimicrobial Prescribing

The Antimicrobial Stewardship Program improves prescribing through multiple methods, including daily prospective audit (chart review) and feedback, antimicrobial restriction/pre-authorization policies, and guidelines and protocols. Guidelines create a standard from which to compare prescribing and standardize practice. Protocols empower nurses, respiratory therapists, and pharmacists to improve antimicrobial prescribing when specific conditions are met. Guidelines and protocols improve the efficiency of clinical care. The stewardship program oversees and manages 21 clinical practice guidelines and 21 protocols.

### Clinical Practice Guideline

Anti-infective Lock Therapy – Adult/Pediatric – Inpatient/Ambulatory  
Antifungal prophylaxis in Liver transplant Recipients – Adult – Inpatient  
Clinical Monitoring of Outpatient Parenteral Antimicrobial Therapy (OPAT) and selected oral antimicrobial agents – Adult – Inpatient/Ambulatory  
Continuous Renal Replacement Therapy Dose Adjustment – Adult – Inpatient  
Diagnosis and management of sepsis – Adult – Emergency Department/Inpatient  
Diagnosis and management of infections of the urinary tract – Adult – Inpatient/Ambulatory  
Dosing of medications in patients receiving continuous enteral feedings – Adult – Inpatient  
Hepatitis B Prophylaxis for non-thoracic solid organ transplant – Adult – Inpatient  
Infective Endocarditis – Adult – Inpatient  
Influenza and Pneumococcal Vaccination – Adult/Pediatric – Inpatient/Ambulatory  
Intravenous Vancomycin Use – Adult – Inpatient  
Management of Neutropenic Fever – Adult – Inpatient/Ambulatory  
Medication Route Interchange – Adult – Inpatient  
Pharmacokinetic/Pharmacodynamic Dose Optimization of Antibiotics for the treatment of Gram-negative Infections – Adult – Inpatient  
Prevention, Diagnosis, and Treatment of Clostridium difficile infection – Adult/Pediatric – Inpatient/Ambulatory  
Renal Function-based Dose Adjustments – Adult – Inpatient/Ambulatory  
Skin, Skin Structure, and Soft Tissue Infection Diagnosis and Treatment – Adult – Inpatient/Ambulatory  
Surgical and Interventional Radiology Antimicrobial Prophylaxis – Adult/Pediatric – Inpatient/Ambulatory  
Treatment and Prevention of Influenza with Antiviral Medications – Adult/Pediatric – Inpatient  
Treatment of Patients with Reported Allergies to Beta-lactam Antibiotics – Adult – Inpatient  
Use of Procalcitonin Monitoring Related to the Diagnosis and Treatment of Respiratory Tract and Emerging Sepsis – Adult – Inpatient/Ambulatory

### Delegation/Practice Protocols

Antibiotic Therapy for Urodynamics Testing – Adult – Ambulatory  
Antimicrobial Dosing Based on PK/PD Principles – Adult – Inpatient  
Asymptomatic Bacteriuria Preoperative Screening and Treatment – Adult – Ambulatory  
Candida Intertrigo and/or Cutaneous Candidiasis and Peristomal Yeast Infection Medicated Topical Treatment - Adult – Inpatient  
Clostridium Difficile - Adult - Inpatient/Emergency Department  
Clostridium Difficile Testing – Adult – Infectious Disease Clinic  
Continuous Renal Replacement Therapy (CRRT)-Based Dose Adjustment - Adult – Inpatient  
Hepatitis B Prophylaxis for Non-Thoracic Solid Organ Transplant – Adult – Inpatient  
Immunization - Adult/Pediatric - Inpatient  
Immunization Ordering – Adult/Pediatric – Ambulatory  
Influenza Screening and Treatment – Adult/Pediatric – Ambulatory  
Liver Transplant Invasive Fungal Infection Prophylaxis – Adult – Inpatient  
Lyme Disease Prophylaxis – Adult/Pediatric – Ambulatory  
Management of Streptococcal Cultures of the Throat, Rectum or Vagina - Pediatric – Ambulatory  
Non-Thoracic Solid Organ Transplant Antiviral Prophylaxis – Adult – Inpatient  
Non-Thoracic Solid Organ Transplant Rejection Antimicrobial Prophylaxis – Adult – Ambulatory  
Perioperative Antimicrobial Prophylaxis Adjustment – Adult/Pediatric – Inpatient/Ambulatory/Emergency Department  
Pharmacist Medication Route Interchange – Adult – Inpatient  
Probiotic Ordering to Reduce Primary Clostridium difficile Incidence - Adult- Inpatient  
Treatment of Sexually Transmitted Infections (STIs) or Genital Infections – Adult/Pediatric – Ambulatory  
Vancomycin Dosing and Monitoring – Adult – Inpatient

## Publications

National Comprehensive Cancer Network Clinical Practice Guidelines Workgroup. Prevention and Treatment of Cancer-Related Infections. Version 1.2017. Published December 21, 2016.

Badowski M; Mazur J, Lam SW, Miyares M, Schulz LT, Michienzi S. Engaging in Collaborative Research: Focus on the Pharmacy Practitioner. Hosp Pharmacy. Accepted for publication October 2016

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Liebenstein T. Schulz LT, Viesselmann C, Bingen E, Musuuza J, Safdar N, Rose WE. Effectiveness of tigecycline compared to a matched treatment group in abdominal transplant patients with polymicrobial intra-abdominal infections. Pharmacotherapy. Accepted for publication October 2016

Brennan MB; Osterby K; Schulz LT; Lepak A. Impact of Low Procalcitonin Results on Antibiotic Administration in Hospitalized Patients at a Tertiary Care Center. Infect Dis Ther June 2016 5:185-191

Dela-Pena ; McCreary E; Schulz LT. Pharmacist's role in diagnosis and treatment of infective endocarditis: a 2015 guideline update. Journal of the Pharmacy Society of Wisconsin. Feb/March 2016

Schulz LT; Hoffman RJ; Pothof J; Fox B. Diagnosis of UTI – Top Ten Myths. JEM. Feb 2016.

Schulz LT. Antibiotic-resistant Gram-negative infections: Epidemiology and treatment considerations for the Wisconsin pharmacist. Journal of the Pharmacy Society of Wisconsin. December 2015.

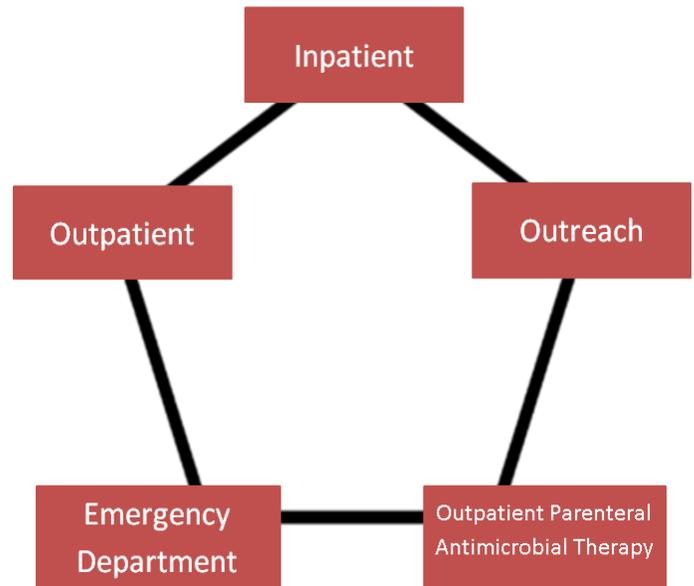
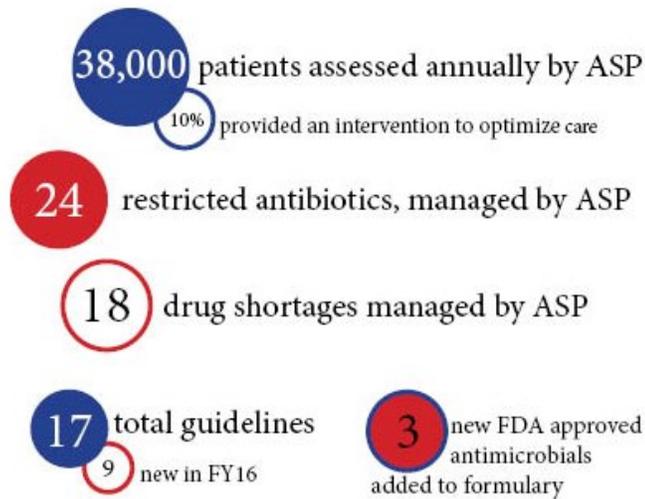
Heid C; Knobloch MJ; Schulz LT; Safdar N. Use of the Health Belief Model to Study Patient Perceptions of Antimicrobial Stewardship in the Acute Care Setting. ICHE. May 2016: 34(5):576-582

Buss B, Schulz LT, Reed KD, Fox B. Clinical utility of MALDI-TOF in a region with low bacterial resistance rates? Clin Infect Dis. 2016 Mar 1;62(5):666-7. Epub 2015 Nov 17

Fox B, McAllister E, Holm C, Handley J, Schulz LT. Use of Ertapenem at an Academic Medical Center: Defining Ertapenem's role in Outpatient Infusion Antimicrobial Therapy (OPAT): An Observational Study. Infect Diseases in Clinical Practice. Jan 2016: 24(1) 43-48

## Leaders in Antimicrobial Stewardship

# Fiscal Year 2016 By the Numbers



## Challenges in 2017 and beyond for the antimicrobial stewardship program

1. In 2017, The Joint Commission requires Antimicrobial Stewardship as a Condition for Participation
2. Implementation of Epic Antimicrobial Stewardship and Infection Control Module will improve the efficiency of the stewardship program and provide clinical decision support to providers
3. Outpatient antimicrobial prescribing monitoring and improvement program begins
4. Outpatient parenteral antimicrobial therapy (OPAT) clinical service development to improve safety and use of infusion center resources
5. Development of outreach stewardship program to assist regional hospitals provide optimal antimicrobial therapy.

## The Antimicrobial Stewardship Team

Barry Fox, MD – Antimicrobial Stewardship Medical Director  
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**Need help with antimicrobial therapy decisions?**

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-or-

Page 4321—Antimicrobial stewardship PharmD