

Antibiotic Awareness Week

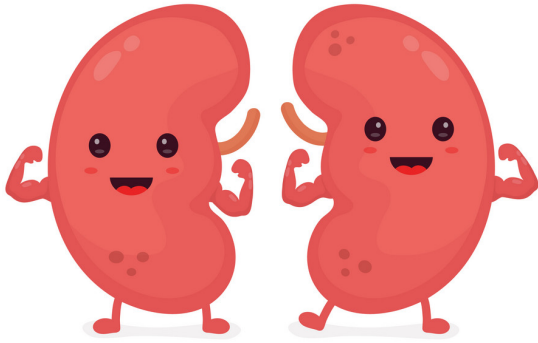


A message from the Carolina Antimicrobial Stewardship Program...

Thank you for taking the time to read our Antibiotic Awareness Week Newsletter! We hope that you find this article both informational as well as encouraging to continue being antimicrobial stewards so that patients at UNC Medical Center may continue to receive the utmost care.

The Carolina Antimicrobial Stewardship Program (CASP) works collaboratively to optimize patient care outcomes by promoting the effective use of antimicrobials. Services provided by CASP include antimicrobial therapy consultations, clinical interventions, clinical guideline and protocol development, and antimicrobial stewardship education. Antimicrobial resistance is a growing problem, and we are all part of the solution. CASP is committed to providing the support and tools needed for all clinicians to participate in antimicrobial stewardship activities.

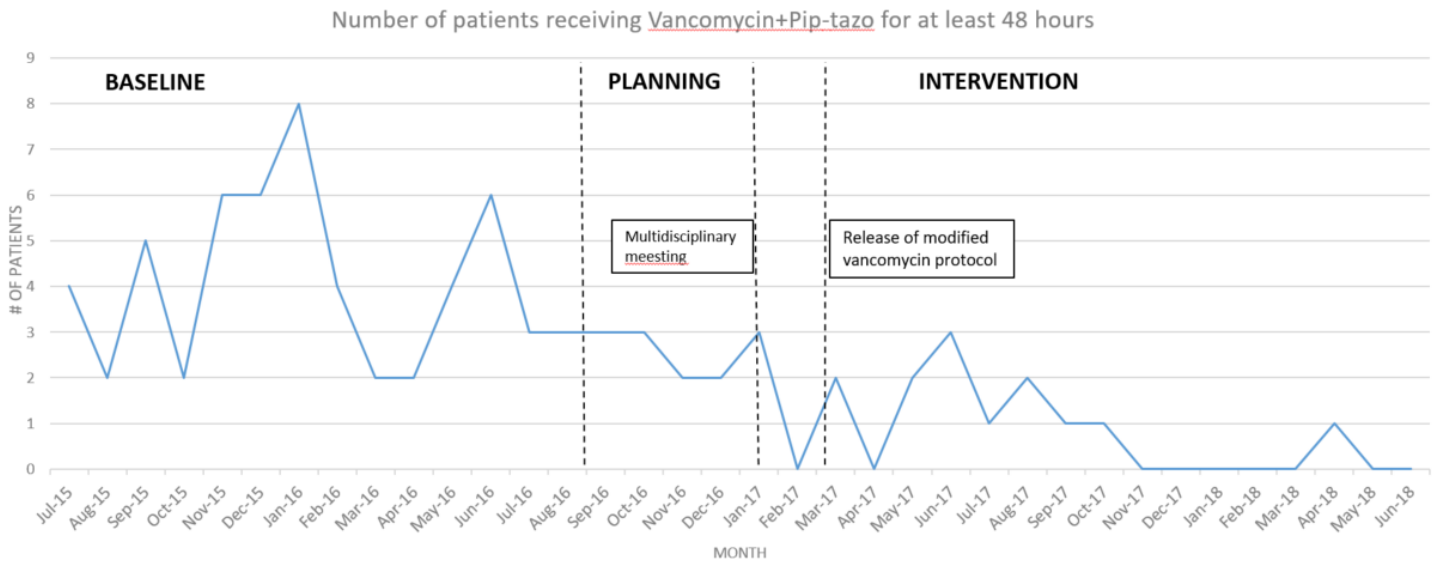
What has the Antimicrobial Stewardship Program been up to?



Save the KIDneys! Preventing Vancomycin-related Nephrotoxicity in the Children's Hospital

Vancomycin is one of the most commonly used antibiotics for hospitalized patients, but it can often cause acute kidney injury (AKI). Recent studies have shown that patients are at highest risk of AKI when vancomycin is combined with another commonly used antibiotic: piperacillin-tazobactam. Additionally, the risk of AKI increases as higher trough concentrations are targeted.

In January of 2017, a group of pharmacists, antimicrobial stewardship program members, and nephrologists from the Children's Hospital met to identify ways to prevent this complication in pediatric patients. The pediatric pharmacists educated their teams about the increased risk of AKI when vancomycin is combined with piperacillin-tazobactam. A pediatric infectious diseases fellow and pediatric pharmacist updated the vancomycin guidelines to allow teams to target lower vancomycin troughs for several types of infection. In the following months, the use of vancomycin and piperacillin-tazobactam in combination dropped significantly. There was also a decrease in vancomycin-related AKI over time. With this multidisciplinary effort, we were able to reduce the risk of AKI complication in our children's hospital.





Take an “Antibiotic Time-Out”

Many patients who come into the hospital with signs of infection receive empiric antibiotics, although the medical team might not be sure exactly the source of infection. The initial antibiotic regimen is designed to cover all suspect pathogens (i.e., MRSA or Pseudomonas). By 48 hours, results of most tests for infection, such as blood and urine cultures, will be completed. In this time, the team has also had time to monitor the patient’s response to therapy and perform additional studies, such as imaging, to make a diagnosis. In many cases, the team is able to tailor antibiotics that specifically target the patient’s infection, discontinuing

redundant or unnecessary antibiotics. Often, the team might determine that the patient does not need antibiotics at all and can stop them completely. This not only reduces a patient’s risk of antibiotic-resistant infections, *C. difficile* infections, and antibiotic-related side effects, but may also allow them to be discharged home sooner.

Studies have shown that this optimization process is successful if teams take a dedicated “antibiotic time-out,” in which they conduct a focused discussion about the suspected infection and the antibiotic regimen. This approach encourages all members of the team, including clinicians, pharmacists, and nurses, to engage in optimizing each patient’s antibiotic plan. The antimicrobial stewardship program, with support from UNC’s Institute for Healthcare Quality Improvement, is leading an initiative to implement the antibiotic time-out process at UNC Hospitals. The stewardship program is building upon a successful pilot conducted in 2017, in which antibiotic time-outs were shown to lead to appropriate de-escalation of antibiotics. For this project, the stewardship program is implementing this approach in medicine services at the Hillsborough campus. This initiative allows the medical teams to experiment with different approaches, optimizing efficiency and efficacy of this intervention before bringing it to the main campus.

The AHRQ Safety Program for Improving Antibiotic Use: A National Program for Antimicrobial Stewardship

The Agency for Healthcare Research and Quality (AHRQ), in conjunction with the Johns Hopkins Medicine Armstrong Institute for Patient Safety and Quality and NORC at The University of Chicago, created the AHRQ Safety Program for



Improving Antibiotic Use to develop and implement a bundle of interventions designed to improve antibiotic stewardship and antibiotic prescribing practices across acute care, long-term care, and ambulatory care facilities across the United States. CASP has been participating in this program since March 2018, working with seven services interested in improving antibiotic use. The goal of the program is to develop or enhance antibiotic stewardship priorities and commitments in the participating institutions. Using evidence-based, scientific literature and practical implementation strategies, we are trying to help understand the drivers of antibiotic prescribing, improve knowledge of antibiotic use, and identify approaches to optimizing antibiotic therapy.

The program involves conducting antibiotic reviews (team timeouts) with participating teams each month in order to assess key action items for improving antimicrobial use. These include assessing the appropriateness of culture data, IV to oral medication switches, and de-escalation of broad-spectrum antibiotics. We also work with services to develop tools that can potentially sustain best practices for the long term, providing them access to webinars for training on stewardship through the AHRQ program. To date, CASP members and collaborating services have completed more than 380 team timeouts.

In addition, we monitor and report on antimicrobial use and adverse outcomes, such as *Clostridium difficile* infection rates, for each of the participating services. Each quarter, these seven services have had over 14,000 patient days of antibiotic use. This data will be used by the program to allow for better benchmarking of antimicrobial use that will allow us to set goals for improvements. In the end, the data from this project will provide essential information for improving antimicrobial use at UNC Medical Center, as well as nationally.

Introducing: Rapid Staphylococcal Testing for Positive Blood Cultures

On November 26th, the microbiology lab will be adding rapid staphylococcal testing for positive blood cultures with a Gram stain of Gram-positive cocci. Rapid testing using the Nanosphere Verigene® BC-GP assay can identify bloodstream isolates to the genus and species level among enterococci, staphylococci, and streptococci, as well as determine the presence of certain resistance markers (*mecA*, *vanA/B* genes) in approximately 3 hours. Conventional laboratory methods for identification and susceptibility of these Gram-positive isolates can take up to three days. The physician who ordered the initial culture will be alerted by the microbiology lab immediately when the gram stain is positive. Of note, any Gram stains with mixed morphologies will not undergo rapid testing and will be worked up through conventional methods. Once the rapid test is completed, the results will be paged to the pharmacy clinical on call pager, which is covered by a pharmacist 24 hours a day, 7 days a week. A member of the treatment team will be contacted by the pharmacist if a change to therapy is warranted. The antimicrobial stewardship pager (216-2398) is available from 9 am – 5 pm on weekdays if additional assistance is needed.



Optimizing Beta-Lactams: Extended Infusion Piperacillin/Tazobactam

Beta-lactam antibiotics like piperacillin/tazobactam work best when we optimize the time when concentrations stay above the minimum inhibitory concentration (MIC) of bacterial pathogens. Extended infusions (administering standard doses over 4 hours) and continuous infusion are two methods to achieve prolonged time above the MIC. This year, the UNC Medical Center implemented extended infusions of piperacillin/tazobactam protocols in adult and pediatric areas. The extended infusion strategy is the recommended standard administration method for adult patients, while the extended infusion strategy will be considered for selected pediatric patients with CrCL > 40mL/min and indications such as cystic

fibrosis patients and those with documented multidrug resistant organisms. Clinical data have demonstrated noninferior or superior mortality outcomes using prolonged infusions of piperacillin/tazobactam, and during critical drug shortages, use of prolonged infusion dosing strategies conserve total doses of antibiotics needed to provide effective therapy.

All patients should receive a one-time piperacillin/tazobactam bolus over 30 minutes before starting the prolonged infusion strategy. This is to ensure that patients rapidly achieve therapeutic levels. Decision support for bolus dosing, renal function, and antipseudomonal or non-pseudomonal dosing is built into the piperacillin/tazobactam extended infusion order panel (screen shot below). Please use this order panel to provide optimized regimens for your patients. Traditional dosing regimens using standard 30 min infusions remain available for patients who have limited IV-line availability. Nursing staff can direct compatibility questions to their service pharmacist.

The screenshot shows two sections of a medical order entry system. The top section, 'Order Sets & Panels', has a table with columns for 'Name' and 'User Version Name'. A red arrow points to a row where the name is 'piperacillin-tazobactam (ZOSYN) IV extended infusion or...' and the word 'Preferred' is written in red above it. The bottom section, 'During visit Medications', has a table with columns for 'Name', 'Dose', 'Route', and 'Frequency'. It lists two medication orders: 'PIPERACILLIN-TAZOBACTAM (ZOSYN) DESENSITIZATION' and 'piperacillin-tazobactam (ZOSYN) IV (intermittent)' with a dose of 3.375 g, intravenous route, and every 6 hours frequency.

UPDATED! UNCH Medical Center Antibiogram

The antibiogram displays the cumulative susceptibility of isolates tested by the UNC Clinical Microbiology Laboratory between 4/22/16 and 12/31/17, and results are expressed as the percent of isolates susceptible by in vitro susceptibility testing per CLSI standards.

The data are primarily categorized by age (adult or pediatric), appearance on Gram stain (Gram-positive or Gram-negative), type of specimen (urine vs non-urine), and location (community vs ED vs inpatient non-ICU vs inpatient ICU). Data for Cystic fibrosis cultures, mycobacterial isolates, yeast, and aerobic streptococci are reported separately.



Color coding is now included and should be interpreted as follows:

Green: Greater than 90% of isolates tested were susceptible

Yellow: 60-90% of isolates tested were susceptible

Red: Less than 60% of isolates tested were susceptible

Note that organisms intrinsically resistant to an antimicrobial are not shaded as red but are indicated by the “#” symbol.

Updated antibiograms are now available. The newest version can be found on the McLendon Labs website:

<https://uncmedicalcenter.intranet.unchealthcare.org/dept/MCL/Documents/Antibiogram%20UNCHCS.pdf>

THANK YOU!



We would like to extend a huge “thank you!” to all of our Antimicrobial Stewardship Program partners, including (in no particular order):

Department of Pharmacy

Hospital Epidemiology

Infection Control Liaisons

Division of Allergy and Immunology

Division of Pediatric Infectious Diseases

Division of Infectious Diseases and Global Health

AHRQ Project Collaborators: Med J, SICU, Med E3, FAM, Peds Heme/Onc, PICU, PMH