ASM Microbe 2016 Highlights

The ASM Microbe 2016 meeting organized by the American Society of Microbiology (ASM) convened in Boston from Jun 16 to 20, 2016. This event brought more than 10,000 multidisciplinary international scientists as the first combined conference of the former ASM General Meeting and Interscience Conference of Antimicrobial Agents and Chemotherapy (ICAAC). The meeting included numerous topics pertaining to emerging infections and antimicrobial resistance, antimicrobials, vaccines and rapid diagnostics in development, microbial pathophysiology, antibiotic resistance, antimicrobial stewardship, and infection prevention.

The opening keynote session featured Bill Gates, in which he highlighted the importance of global health equity. He stressed the key role of reducing child death rates by increasing vaccines against rotavirus, pneumococcus, and polio. He described working with local governments to source antibiotics to economically challenged countries and also increasing infectious disease surveillance networks to prevent the spread of diseases.

Award and Distinguished Lecturers provided lectures on topics ranging from antimicrobial resistance, a universal influenza virus vaccine, CRISPR biology and how clean hands are critical to infection prevention. Specifically, David C. Hooper, MD, of Harvard Medical School presented a thorough overview of the studies that determined the different fluoroquinolone resistance mechanisms and the contributing factors. Many of these insights have lead to next generation design of fluoroquinolone antibiotics in development as well as antimicrobial stewardship strategies to prevent fluoroquinolone resistance in targeted organisms.

Antimicrobial Stewardship continued to be an expansive topic as a strategy to reduce and prevent antimicrobial resistance, which has become a global concern. Hospital antimicrobial stewards presented their findings of antibiotic restriction strategies to reduce the use of respiratory fluoroquinolones or post-operative antibiotic prophylaxis to prevent antibiotic-associated *Clostridium difficile* infections. De-escalation strategies were discussed to reduce the over use of broad-spectrum antibiotics in the hospital setting guided by rapid diagnostic identification of microbes and antimicrobial susceptibility studies. De-escalation was a controversial topic owing to lack of consensual definitions across studies and randomized controlled trials to determine outcomes from implementing these strategies.

New therapeutic agents in the clinical trial development stage also were discussed. These new drugs target multidrug-resistant gram-negative and gram-positive organisms and are derivatives of several known antibiotic drug classes such as broad spectrum antibiotics (beta-lactams) combined with beta-lactamase and carbapenemase inhibitors, tetracyclines, fluoroquinolones, aminoglycoside, macrolides and fusidic acid. Additional compounds in earlier phases of development included novel drug classes of antimicrobials such as defensin mimetics and glycopeptides-cephalosporin heterodimers. However, none of the nine total novel compounds in development have activity against Gram-negative ESKAPE pathogens. Immunotherapeutic strategies were also presented including monoclonal antibodies that target multi-drug resistant gram-negative and gram-positive bacterial surface proteins or toxins (*C difficile*) as prevention and treatment strategies.

For more information on the more than 400 difference scientific sessions, visit [http://www.asmmicrobe.org/](http://www.asmmicrobe.org/).

Marnie L. Peterson, PharmD, PhD
Some Presentation Highlights

from CIDRAP reporters

MCR-1 gene detected in *E coli* from South African patients, Swiss traveler

The MCR-1 protein was detected in six *Escherichia coli* isolates from South African hospitals and in a Swiss traveler to India, according to studies presented in June at the American Society for Microbiology (ASM) Microbe conference in Boston.

Researchers from the University of Fribourg in Switzerland and the University of Johannesburg in South Africa used polymerase chain reaction (PCR) to search seven *E coli* isolates from different South African hospitals for MCR-1. The protein is associated with resistance to colistin, a last-line antibiotic for treating gram-negative bacterial infections.

MCR-1 was detected in all but one of the samples, and all six of those isolates had colistin minimum inhibitory concentrations (MIC) of 8 or 16 micrograms per milliliter (mcg/mL), the presenters said. MCR-1 was the only marker of resistance in all 6 isolates, and the protein was located at the same plasmid in five of the six positive samples.

*Jun 18 ASM Microbe* abstract on South African isolates

In a related presentation, a research team led by the University of Bern in Switzerland detected MCR-1 in a stool sample obtained from a 57-year-old Swiss woman with a history of travel to India.

Upon the woman's return to Switzerland after 15 days in India, her stool sample tested positive for *E coli* carrying the MCR-1 protein and demonstrated a colistin MIC of 8 mg/L. She also carried an *E coli* strain producing the CTX-M-15 enzyme, which can confer resistance to beta-lactam antibiotics. MCR-1 was not detected in the traveler's stool at 3 and 6 months after the initial sample was taken, the presenters said.

The presentation noted that many colistin-resistant strains of *Enterobacteriaceae* remain susceptible to cephalosporins and carbapenems.

*Jun 18 ASM Microbe* abstract on Swiss isolate

Restricting fluoroquinolone use lowered *C diff* cases in hospital study

Restricting the use of fluoroquinolones to treat respiratory illnesses led to a significant reduction in *Clostridium difficile* infections (CDIs) in five hospitals, according to a study reported at ASM Microbe.

Fluoroquinolone treatment poses a high risk of causing CDIs, and up to 80% of fluoroquinolone use has been deemed inappropriate, the authors said in the abstract of their oral presentation.
The researchers examined *C diff* infection rates at the hospitals before and after the implementation of a "respiratory fluoroquinolone restriction program," which included education and development of criteria for use of the drugs. The five hospitals, all part of one healthcare system, are in Austin, Houston, and Memphis.

Before the program's launch, overall fluoroquinolone use was 24.5 days of therapy (DOT) per 1,000 patient days, according to the report. After the education phase of the effort, the DOT dropped to 12.8 (*P* < .001), and after the restrictions were phased in, the rate dropped further, to 4.0 (*P* < .001).

The researchers reported a 35% reduction in CDIs per 1,000 patient days between the pre-intervention and post-restriction periods, with an absolute mean reduction of 0.1 case per 1,000 patient days (*P*=.036).

"Implementation of a respiratory fluoroquinolone restriction program can reduce utilization and hospital-acquired *C diff* infections," they concluded.  

**Jun 17 ASM Microbe abstract**

**Reduced MDR and *C diff* infection rates follow stewardship interventions**

Antimicrobial stewardship interventions were associated with reduced multidrug-resistant (MDR) organisms and *C diff* infection rates at a Singapore hospital, according to a study presented at ASM Microbe.

Researchers at Singapore General Hospital evaluated the effects of discontinuing, de-escalating, or using narrow-spectrum empirical therapy on 324 patients receiving parenteral ciprofloxacin, piperacillin-taxobactam, and carbapenem antibiotics, with discontinuation being the most commonly used intervention (215 patients, or 66%).

Following acceptance of interventions, the presenters observed a fivefold reduction in MDR infection rates, from 9% to 2% of patients. *C diff* rates also fell, from 3.2% to 0.4%. Interventions were associated with a drop in duration of therapy from an average of 6 to 3 days and a shorter hospital stay (15 days vs. 21 days pre-intervention).

**Jun 19 ASM Microbe abstract**

**MDR *Acinetobacter baumannii* clearance tied changes in carbapenem use**

Clearance of MDR *Acinetobacter baumannii* in youth receiving burn treatment was associated with lowered or discontinued use of carbapenem antibiotics and increased therapy with beta-lactams, according to researchers at Taiwan's Chang Gung Memorial Hospital.

The team evaluated changes to necessary carbapenem therapy in 42 youth hospitalized for burn treatment following a June 2015 dust explosion at a water park. Nine patients developed MDR *A baumannii* during the first month of hospitalization.

Clearance of *A baumannii* followed lower or discontinued carbapenem use, from 652 days of therapy (DOT) per 1,000 patient-days to 449 DOT, combined with an increase in beta-lactam therapy of 213 to 694 DOT.
The presenters noted that, given these results, early discontinuation of carbapenem use may be indicated in MDR *A baumannii* patients.

**Improved Staph testing associated with shorter time to treatment**

Use of improved testing to detect cases of bacteremia caused by *Staphylococcus aureus* were associated with quicker administration of appropriate antibiotics and higher engagement from infectious disease clinicians, according to another study.

The University of Virginia Health System implemented nucleic acid microarray (NAM) to detect *S aureus* bacteremia and trigger an infectious disease consult for every positive test, the presenters said. To assess clinical outcomes, they reviewed charts from 107 patients identified before implementation of the NAM system and quality improvement bundle and charts from 126 patients identified after the change.

Consults rose from 85% to 97% of infected patient after the intervention, and time to initiation of first-line or appropriate second-line antibiotic therapy fell by an average of 17.3 hours. The time to treatment with nafcillin or cefazolin for patients with methicillin-sensitive *S aureus* decreased by an average of 31.3 hours.

The presenters said that after observing the effect of the improved culturing system, the program will be extended to include other gram-negative bacterial infections.

**Microbiology rounds aid in optimizing antimicrobial therapy**

Daily microbiology rounds were associated with 85 antimicrobial stewardship intervention made during 1 month at an academic hospital, according to data presented at ASM Microbe in Boston.

A pharmacist charged with antimicrobial stewardship has attended microbiology rounds at the Medical University of South Carolina since 2012. In November 2015, daily rounds resulted in 85 stewardship interventions, including clarifying specimen source and testing restricted antibiotics (42% of interventions), managing MDR infections (22%), and interpreting culture reports and antimicrobial susceptibility results (18%).

Recommended interventions prompted by the rounds were accepted by clinicians 95% of the time, and involvement of the clinical microbiology lab was associated with de-escalation of antimicrobial use in 19% of patients. The presenters said that 31% of interventions optimized antimicrobial therapy, and 40% reduced time to clinical action.
Study identifies risk factors for MDR pneumonia
Authors who devised a treatment algorithm to identify patients with community acquired pneumonia (CAP) at risk for infection with MDR organisms identified several risk factors.

Their objective was to try to improve upon the predictability of the Infectious Diseases Society of America (IDSA) guidelines in identifying CAP patients infected with MDR pathogens. Treatment was stratified by quantity of risk factors and severity of illness.

A pre- and post-intervention analysis demonstrated that the institutional algorithm exhibited better specificity and predictive values for MDR detection than the IDSA guidelines and maintained identical sensitivity. The strongest risk factors for prediction of resistant organisms were a history of infection with a resistant pathogen and need for intensive care unit admission.

The authors concluded that "utilization of a CAP treatment algorithm based on quantity of risk factors and severity of illness reduced antipseudomonal antibiotic use without negatively impacting treatment outcomes."

Jun 19 ASM Microbe abstract

About 35% of surgical antibiotics inappropriately prescribed, researchers say
New Orleans scientists found that 35% of surgical prophylactic antibiotics are inappropriately described and that patients receiving them had a higher rate of adverse events, according to their single-center study.

The authors conducted a single-center, retrospective cohort study to determine the appropriateness of antibiotics for surgical prophylaxis among patients already receiving antibiotics for an active or suspected infection. Appropriate spectrum of coverage was based on the type of surgery and guideline recommendations. Appropriateness of overall antibiotic coverage was defined based on either gaps or redundancy in spectrum of coverage.

Patients receiving appropriate coverage vs. inappropriate coverage were compared with regard to the following outcomes: 30-day readmission, hospital length of stay, 14-day all-cause mortality, and antibiotic-related adverse events.

The authors found no difference between the two groups in 30-day readmission, hospital length of stay, or 14-day all-cause mortality. Those who received inappropriate antibiotics, however, had a higher rate of adverse events. The team reports that about 35% of prophylactic antibiotics were inappropriately prescribed.

Jun 19 ASM Microbe abstract