IDWeek 2016 Meeting Highlights

IDWeek, the combined annual meeting of the Infectious Diseases Society of America (IDSA), the Society for Healthcare Epidemiology of America (SHEA), the HIV Medicine Association (HIVMA), and the Pediatric Infectious Diseases Society (PIDS), was held Oct 26 through 30 in New Orleans. With the theme "Advancing Science, Improving Care," IDWeek 2016 brought together more than 7,000 researchers and clinicians to present and discuss the latest in infectious disease prevention, diagnosis, treatment, and epidemiology.

Antimicrobial resistance (AMR) was one of the hot topics at IDWeek 2016. The meeting kicked off with a plenary session speech by Centers for Disease Control and Prevention (CDC) Director Tom Frieden, MD, MPH, who focused on the growing threat of AMR and the need for better surveillance, greater coordination between healthcare facilities, and better antimicrobial stewardship. "Truly we face a scary situation," Frieden said, warning that modern medicine could be undermined if we don't act quickly to reduce resistance.

Frieden's speech was one of several presentations and workshops addressing different aspects of resistance and stewardship, from the global perspective on AMR to controversies in antimicrobial dosing to the challenges of stewardship implementation. There were also hundreds of oral abstracts and poster sessions on resistance and stewardship, some of which are highlighted in this report.

For more on the full spectrum of presentations focused on resistance and stewardship, check out IDWeek's stewardship page.

-Chris Dall
Pre-Conference Workshop: Best Practices for Antimicrobial Stewardship Programs

A workshop on “Best Practices for Antimicrobial Stewardship Programs” sponsored by the IDSA was held on Oct 25, 2016, in New Orleans prior to IDWeek. This workshop was co-organized by SHEA and PIDS in collaboration with the CDC. The workshop was well attended by healthcare providers, including physicians, pharmacists, microbiologists, and other healthcare providers, who desire to create, implement, and improve antimicrobial stewardship programs (ASPs) at their institutions. This workshop was particularly timely, because healthcare providers are preparing for the Joint Commission’s new Medication Management standard for hospitals, critical access hospitals, and nursing care centers, which addresses antimicrobial stewardship and becomes effective Jan 1, 2017.

During the general IDWeek meeting, experts gave presentations on diverse topics, including social determinants of antibiotic prescribing, what outcomes to measure, legal issues in antibiotic stewardship, expanding stewardship into the community hospital setting, and challenges for implementing methods for rapid antimicrobial susceptibility. Clinical controversies discussed included managing methicillin-resistant Staphylococcus aureus (MRSA) bacteremia, when to use extended-infusion beta-lactam antibiotics, non-carbapenem beta-lactam options for treating extended-spectrum beta-lactam (ESBL) infections, and antibiotic prophylaxis. Implementation topics included the role of the stewardship team in managing Clostridium difficile infections, implementation of daily stewardship rounds, and effectively conducting stewardship in the intensive care unit (ICU). Finally, an update on national stewardship activities was presented.

-Marnie Peterson, PharmD, PhD

“The Social Determinants of Antibiotic Prescribing”

Julia Szymczak, PhD, University of Pennsylvania, delivered an intriguing presentation focused on the social and behavioral determinants that affect antibiotic prescribing and how knowledge of these factors can be used to inform the development of stewardship interventions. Social determinants of antibiotic prescribing include relationships between clinicians and patients. As to the former, she noted that senior colleagues and social networks are more influential than guidelines, and regarding the latter, she highlighted patient pressure to prescribe, especially in ambulatory and pediatric settings. Szymczak also mentioned that fear, anxiety, and risks affect antibiotic prescribing, as well, noting that broad-spectrum drugs “feel safe” for prevent “disaster” within 24 hour and underscoring patients’ common perception of a risk of “undertreating.” Finally, there are misperceptions of the problem, such as clinicians perceiving antibiotic overuse a problem generally but not locally or assuming that other specialties are responsible for overuse, as well as environmental factors like time pressures and decision fatigue that occurs later in the day.

Szymczak said ASPs need to incorporate sociological factors into stewardship to build trust. She suggested leveraging face-to-face, repeated interactions described as “handshake” stewardship,
which fosters more judicious prescribing (see also Dr. Amanda Hurst presentation below). Messaging and communication also matter; she said it is important to create a “we” versus “you” and “us.” Programs and antibiotic stewards need to develop a plan to deal with conflict and prescriber resistance. As more focus on these social factors occurs, it will create an opportunity to develop more qualitative research to identify novel sociobehavioral targets for interventions and social tools for stewardship that can address these challenges in perception, communication, and implementation.

“What to Tackle and What to Measure?”
Debbie Goff, PharmD, The Ohio State University Medical Center, presented a how-to for the development of an ASP that is based on the local needs and resources of the individual antimicrobial steward’s practice setting. As the antimicrobial steward, your team may be small and you need to lead change by promoting interdisciplinary engagement with other healthcare providers and administrators, she said. Local needs include alignment with the hospital’s goals and a prioritization of the goals and issues. Goff suggested asking for resources, including compensation and protected time to conduct stewardship activities. She suggested finding an advocate and mentor to support your efforts.

How to measure and report antimicrobial use depends on what you want to know, Goff said. Examples include: “how often” (percent of patients who received appropriate antibiotic for a particular infection, according to guidelines), “how long” (duration of antibiotic therapy for a particular infection), and total amount of antibiotics (defined daily doses or days of therapy/1,000 patient days). She reminded the audience that cost is a component of antimicrobial stewardship but is not the only metric because quality care is not free. High-resource hospitals may also combine the effectiveness of rapid diagnostic tests with antimicrobial stewardship support and interpretation, which can optimize the time to appropriate antibiotic selection for diseases, including MRSA and *C difficile* infections.

“Expanding Stewardship into the Community Hospital Setting”
Eddie Stenehjem, MD, medical director of the Intermountain Health System, gave an interesting presentation that described a novel delivery approach for antimicrobial stewardship through the development of an Infectious Diseases TeleHealth program in the community setting. In the United States (2012), 72.4% of registered non-federal hospitals had fewer than 200 beds. He identified through a research survey that small community hospitals within the Intermountain Health System had mean antibiotic use rates comparable to larger community hospitals (antibiotic days of therapy/1,000 patient days) and similar antibiotic use spectrums. Most small community hospitals, however, lacked stewardship programs and infectious disease (ID) clinicians. The New Antimicrobial Stewardship Standards will soon require these hospitals to have stewardship programs. Small hospitals have fewer staff and focus is on core syndromes, including community-associated pneumonia, urinary tract infections, and skin and other soft-tissue infections. Stenehjem led a study that used an ID clinician toll-free call line 24 hours a day, 7 days a week as a consultant to small community hospitals that received 50 to 80 calls per
month. He suggested that constructing a team in small community hospitals requires a local leader, multidisciplinary team, and engagement.

**Study examines types of stewardship at small community hospitals**

*News reporter Chris Dall's summary of the above presentation:*

A highlighted study found that higher-level ASPs resulted in greater reduction in antibiotic use in small community hospitals.

The purpose of the study, which SHEA's featured oral abstract, was to compare the impact of three different types of ASP in a network of small community hospitals operated by Utah-based Intermountain Healthcare. Small community hospitals account for nearly 75% of all US hospitals, but only about 22% have an ASP. And while the data on antibiotic use in small community hospitals are limited, stewardship experts believe improving antibiotic use in these settings should be a priority.

In the cluster-randomized controlled trial, investigators randomly assigned the 15 small community hospitals to one of the three ASP models: Five hospitals were assigned to program 1, a reference group that had a minimal ASP program; five hospitals were assigned to program 2, which featured stewardship education, a limited prospective audit and feedback program, and antibiotic restrictions that were controlled by local pharmacy staff; and five hospitals were in program 3, which featured an expanded prospective audit and feedback program, antibiotic restrictions overseen by both a pharmacist and an infectious disease (ID) physician, and ID physician review of all culture results.

The primary outcomes were total antibiotic use and broad-spectrum antibiotic use. Secondary outcomes included mortality rates, readmission rates, and incidence of *C difficile*. In the final analysis, the investigators found that the small community hospitals in program 3 reduced total antibiotic use by 17% compared with program 1, but the hospitals in program 2 showed no statistically significant reduction compared with those in program 1. Both program 2 and 3 hospitals reduced broad spectrum use by 31% and 27%, respectively, compared with hospitals in program 1. An analysis of secondary outcomes showed no difference in mortality or patient readmission rates among the different programs, but programs 2 and 3 saw 45% fewer cases of *C difficile* compared with program 1.

"Stewardship programs are now known to be feasible in small community hospitals, and they can reduce antibiotic use if the appropriate resources are out there," lead author Edward Stenehjem, MD, MSc, told the audience.

Oct 28 SHEA featured oral abstract

**“Tackling Legal Issues in Antimicrobial Stewardship”**

*Mary Ellen Nepps, JD,* provided a stimulating conversation related to the legal dilemmas that might arise in the implementation of an ASP. She asked, “Does antimicrobial stewardship create
a duty to the patient?” This is largely uncharted territory, she said, and the answer depends on the circumstances and the jurisdiction.

A duty arises if there is an expressed or implied provider-patient relationship, and state law dictates the requirements for establishing medical liability. Nepps outlined potential sources of legal risks using risk scenarios. These sources of risk can occur with “pre-authorization practices,” which is when approval for antibiotics is given or withheld and the patient has an adverse outcome. Such outcomes can occur due to automatic stop orders for antibiotics or delays in treatment.

Additionally, “prospective audit and feedback mechanisms” can lead to adverse outcomes when a recommendation is accepted or declined or a provider fails to make a recommendation. How do you manage the risk? Do you document or not document? Elements of suggested documentation include a clear designation that documentation is from the antimicrobial stewardship team (name and contact information) and that an ID consultation should be obtained if appropriate. Also, the care team should specify in the patient’s chart what data were reviewed before a recommendation was given, and what wording was used in the recommendation.

In addition, roles and protocols should be clarified to medical staff to avoid delay in administering antibiotics, Nepps said, and the stewardship team should consider developing an electronic antimicrobial stewardship team form.

What does the future hold? Nepps proposed that, as antimicrobial stewardship becomes more established, liability case law may develop. If this liability is imposed, she asked, “Will federal or state laws respond with limitations on immunity from liability, given the public health imperatives and mandates?”

“Practical Implementation of Daily Stewardship Rounds”

Amanda Hurst, PharmD, described her real-world experience in establishing daily antibiotic stewardship rounds at Children’s Hospital Colorado (CHCO), a 444-bed hospital in Aurora with 15,000 admissions per year. The CHCO ASP team consists of four staff: an MD medical director (0.7 FTE), two clinical pharmacists (shared 1.0 FTE), and a data analyst (0.2 FTE). Her team uses a rounding-based, supportive and collaborative antimicrobial optimization service, or “handshake” stewardship, approach. There were no restrictions or preauthorization on antibiotics, and the clinical pharmacists and MD reviewed all antimicrobials 24 hours and 72 hours after prescribing. In addition, the ASP team participated in daily microbiology rounds to review cultures and bring microbiology to the wards.

These implementation approaches resulted in significant decreases in antibiotic use, with antibacterial prescriptions dropping 10%) and antiviral use falling 16,. Costs also decreased from $54,753/1,000 patient days before implementing the program (October 2010 to September 2011) to $46,194 post-implementation (October 2014 to September 2015). The predominant interventions conducted by the ASP team were de-escalation of antibiotics and education. The implementation of handshake stewardship also resulted in a 30% increase in ID
consultations. Overall, handshake stewardship was an effective stewardship method but requires time commitment and financial support from administrators.

Study looks at impact of 'handshake stewardship'

_News reporter Chris Dall’s summary of the above session:_

What kind of impact can "handshake stewardship" have on antibiotic prescribing at pediatric hospital?

That's the question that researchers at Children's Hospital Colorado (CHCO) were looking to answer in a study that explored antibiotic interventions at the hospital after an ASP was implemented in 2013. For the study, they reviewed more than 3,000 interventions that occurred from April 2014 to October 2016 under the ASP, which used prospective audit and feedback of antibiotic prescribing as the core strategy of its approach.

Unlike typical prospective audit and feedback models, which focus on reviewing the use of broad-spectrum antibiotics and only reporting on a few intervention types, CHCO's program submits all antimicrobial prescriptions to review by a stewardship team consisting of a pharmacist and an ID physician. Another key element of the CHCO model is that the pharmacist and ID physician do rounds with every in-patient clinical team each day, and all antibiotic interventions are communicated directly to provider teams during clinical rounds. This is the "handshake" element—communicating a decision about antibiotic treatment through face-to-face interaction.

"We really wanted to be seen as a stewardship program," said Amanda Hurst, PharmD, an antimicrobial stewardship and clinical infectious disease pharmacist at CHCO. "We wanted to be up on the floor, to see where those challenges are, because it's really hard to understand a complete patient just by looking at their chart."

In their review of 3,078 interventions (roughly 170 per month), the researchers found an overall acceptance rate of 86%, with de-escalation of antibiotic therapy being the most common intervention (49%). Interventions were made most commonly on the medical, intensive care, surgical, and oncology units.

Vancomycin and anti-pseudomonal beta-lactams were most commonly involved in interventions (17% and 15%, respectively). But the investigators also found that the antimicrobials not commonly reviewed by ASPs, like amoxicillin, were involved in more than 10% of all interventions. Hurst and her colleagues say the finding suggests that a review of all antimicrobials may be warranted.

**Oct 29 IDWeek poster abstract session**

“Antibiotic Stewardship: An Update on National Activities”

_Capt. Arjun Srinivasan, MD_, from the CDC provided an update on the overall antimicrobial stewardship activities in the nation as well as the new collaborative efforts between
government agencies and private partners. First, he reviewed the “Core Elements” for antibiotic stewardship programs, including leadership commitment from administration, having a single leader responsible for outcomes, naming a pharmacy leader, antibiotic use tracking, regular reporting on antibiotic use and resistance, education of providers, and specific improvement interventions.

The 2015 National Healthcare Safety Network (NHSN) hospital survey determined that more hospitals—overall 48%—appear to be reporting implementation of all seven core elements. Smaller hospitals still lag behind larger hospitals, with 66% of those that have 200 beds or more meeting all seven requirements versus 31% of hospitals with 50 or fewer beds. To aid small hospitals, the CDC is partnering with the Pew Trusts and a group of external experts to connect directly with several critical-access hospitals that report implementation of the Core Elements. They are seeking lessons learned and tips that would be useful to smaller hospitals (such as those described in Dr. Stenehjem’s presentation).

Next, he described the Standardized Antibiotic Administration Ratio (SAAR), which is a measure that was developed to compare observed antibiotic use with expected use, whereby expected use is calculated based on facility level risk adjustment. The SAAR was endorsed by the National Quality Forum in January 2016, and benchmark values are now available to all hospitals enrolled in the NHSN Antibiotic Use Option. The CDC is starting to review SAAR data nationally and working with users to continually improve use of the data.

The agency plans to fund an effort to support optimal implementations of stewardship programs and monitor the impact of SAAR. The Agency for Healthcare Research and Quality is funding an effort to develop a Comprehensive Unit-based Safety Program (CUSP) for antibiotic stewardship across all healthcare settings. In addition, the CDC is partnering with the American Nurses Association in an effort to engage bedside nurses in stewardship and is also partnering with the Vermont Oxford Network on a national stewardship initiative in neonatal ICUs. Starting in 2016, all state health departments are receiving additional funding for addressing antibiotic resistance with a requirement they work on stewardship. The Centers for Medicare and Medicaid Services will also be providing funding through the new Hospital Improvement Innovation Networks to improve care in all hospitals.

-Marnie Peterson, PharmD, PhD
Other Presentation Highlights

from CIDRAP reporter Chris Dall

Dangerous bacteria can end up on nurses' scrubs

In a new study that researchers say highlights the complexity of bacterial transmission and the importance of hospital infection control practices, investigators from Duke University Hospital demonstrated that bacteria that can cause serious infections frequently spread from patients in ICUs to nurses' scrubs and the environment.

The study was a randomized controlled trial that included 167 ICU patients who received care from 40 nurses during three separate 12-hour shifts, for a total of 120 shifts. Before and after each shift, the investigators took cultures from the sleeves, pockets, and midriffs of the nurses' scrubs; the environment (bed rails, beds, and medical supply carts); and from the patients to determine if the nurses and room had acquired organisms during the shift, and where they had come from. The rooms were cleaned daily.

In the end, the investigators found 22 shifts (18%) in which there was a confirmed transmission of bacteria, with the pockets and sleeves of the nurses' scrubs showing contamination 10% of the time and the room—mainly the bed rails—showing contamination 8% of the time.

When the investigators looked to see where the bugs on the nurses' scrubs were coming from, they found that, in 5% of the cases, the bacteria were transmitted from the patient to the nurse, and in the other 5% the bacteria were passed from the room to the nurse. The investigators did not identify any bacteria that had spread from the nurses to the patients, or from the nurses to the room.

The seven types of bacteria transmitted included MRSA, *Acinetobacter baumannii*, and *Klebsiella pneumoniae*.

Lead author Deverick Anderson, MD, MPH, said these findings show that bacterial movement is a complicated process, and that bacteria move more freely than previously thought. But the biggest takeaway is that healthcare workers need to be cognizant of all the possible avenues of transmission.

"Healthcare workers really need to be aware that not only can they become contaminated from dealing with their patients, but simply going into the hospital room poses a risk as well," Anderson told reporters. "So we really have to emphasize the importance of our basic infection control practices, like hand hygiene."

Oct 28 oral abstract session
Oct 27 CIDRAP News story
ID consultations can save lives, single-center study finds

Consulting an ID specialist can reduce mortality in patients with multi-drug resistant gram-negative infections, according to a study by researchers with SUNY Downstate Medical Center in Brooklyn, N.Y.

The single-center, retrospective, case-cohort study included 205 patients who were being treated for bacteremias and urinary tract infections. Of the 205 patients, 40 received early ID consultation (within 48 hours), 25 received late ID consultation (after 48 hours), and 140 received no consultation. The two most common organisms isolated were extended-spectrum beta-lactamase producing *Escherichia coli* and *K pneumoniae*.

Overall, 60 patients died during the study. Forty-five of the deaths occurred in patients who received no ID consult, and 15 occurred among those patients who received late ID consultation. None of the patients who received early ID consultation died. In addition, the mean time to defervescence (fever reduction) was estimated at 1.8 days for early consult, 5.3 days for late consult, and 4.9 days for no consult.

The study adds to research showing that when an ID specialist is involved in healthcare, patients are correctly diagnosed more often, have fewer complications, and have better outcomes.

Oct 29 IDWeek oral abstract session

Increased risk of sepsis linked to antibiotic exposure

A study conducted by CDC researchers suggests that an increased risk of sepsis following infection-related hospitalization could be linked to antibiotics that disrupt the microbiome.

The study used patient records from a hospital drug database to determine how many patients had been re-admitted for sepsis within 90 days of discharge, and how many of those patients had received antibiotics during their initial stay. In particular, the researchers were looking for antibiotics with a high risk for microbiome disruption, such as third- and fourth-generation cephalosporins, fluoroquinolones, carbapenems, lincosamides, beta-lactam/beta-lactamase inhibitor combinations, and oral vancomycin.

Animal studies have shown that administering antibiotics that disrupt the balance of good and bad bacteria in the microbiome can be associated with an increased risk of sepsis.

Overall, the data showed that among more than 9 million patients who visited 473 hospitals from 2006 to 2010, 0.6% had sepsis during readmission within 90 days of discharge.

When the researchers compared patients who had received antibiotics during the index visit with those who had received no antibiotics, they found that the patients with antibiotic exposure were 50% more likely to be hospitalized with sepsis, and nearly 80% more likely if they had received high-risk antibiotics. Patients who received longer courses of treatment also had a higher risk of sepsis.
"The observed increased risk for subsequent sepsis following receipt of antibiotics that significantly disrupt the microbiome...supports the idea that microbiome disruption confers increased risk for subsequent severe infections," the study authors concluded.

"It's one more call to really focus our efforts on using antibiotics only when we need them, because the adverse effects are really big," Arjun Srinivasan, MD, told reporters. Srinivasan, who directs CDC programs aimed at preventing healthcare-associated infections, was not involved in the study but highlighted the findings in a pre-conference meeting with reporters.

Oct 27 IDWeek oral abstract session

**Drug-resistant gonorrhea emerges in southern Ohio**

In a "late breaker" oral abstract, researchers from Wright State University and Public Health – Dayton & Montgomery County (PHDMC) described the emergence of drug resistance among gonorrhea isolates in southern Ohio, a timely study given growing concerns about increasing resistance in the sexually transmitted pathogen.

For the study, the researchers performed susceptibility tests on *Neisseria gonorrhoeae* isolates that had been collected at PHDMC since 2011. The tests analyzed susceptibility to azithromycin, ceftriaxone, and ciprofloxacin.

The CDC currently recommends that gonorrhea be treated with azithromycin (taken orally) and ceftriaxone (injected) because of increasing resistance to ciprofloxacin. But in July, the CDC warned that gonorrhea in recent years has been growing increasingly resistant azithromycin and ceftriaxone. If that trend continues, treatment of the second most commonly transmitted STD in the United States could become substantially more difficult, agency officials said.

What the researchers found were steadily increasing rates of resistance to two of those antibiotics, with resistance to ciprofloxacin rising from 0.8% among isolates tested from 2011 to 2014 to 15.7% among isolates tested in 2016. In 2015, 1.9% of isolates showed reduced susceptibility to azithromycin. That number climbed to 5.9% in 2016. No isolates, however, from 2011 to 2016 showed reduced susceptibility to ceftriaxone.

Oct 29 IDWeek oral abstract session

**Emphasizing narrow-spectrum antibiotics in pediatric pneumonia**

In 2011, the PIDS and IDSA published guidelines recommending narrow-spectrum penicillin antibiotics for children hospitalized with uncomplicated pneumonia. Before the release of these guidelines, the use of broader-spectrum antibiotics, such as second- and third-generation cephalosporins, was common, despite the strength of evidence supporting narrow-spectrum therapy.

In a poster abstract session, Derek Williams, MD, MPH, explored the impact of those guidelines in a study of children treated for pneumonia at 28 children's hospitals from 2009 through 2015. The study, which included a survey regarding the local activities implemented at hospitals after
the guidelines were released, also assessed the impact of the guidelines by comparing the change in prescribing before and after the guidelines were issued.

Overall, 58,559 hospitalizations were included in the study. Prior to the national guidelines, penicillin use was uncommon (<10%), while cephalosporins accounted for about 60% of prescribing. After the guidelines were released, 19 hospitals (68%) implemented a new clinical practice guideline, and 20 (71%) implemented a new order set.

Although prescribing changes varied across hospitals, by the end of the study and compared with pre-guideline trends, the authors noted an absolute increase in penicillin use of 27.6%, with cephalosporin use declining by a similar magnitude. Among the 19 hospitals implementing a new clinical practice guideline or new order set after guideline release, the median difference was 29.5% for penicillins, while among hospitals without local activities, the median difference was 20.1%. These differences, however, were not statistically significant.

Conclusion: Antibiotic prescribing for pneumonia changed substantially after release of national guidelines. Local implementation efforts may enhance appropriate antibiotic selection, but room for improvement remains.

Oct 29 IDWeek poster abstract session