European Congress of Clinical Microbiology and Infectious Diseases — ECCMID 2017

The 27th ECCMID meeting, organized by the European Society of Clinical Microbiology and Infectious Diseases, convened in Vienna, Austria, from Apr 22 through 25, 2017. This event attracted more than 12,000 multidisciplinary international scientists, clinicians, and public health experts eager to learn about contemporary research, therapeutic approaches, and strategies in the battle against infectious diseases.

Attendees of this year’s conference had access to 150 presentations and symposia and more than 2,000 poster presentations, some of which are outlined in this report, at their fingertips. Highlights of this year’s conference included keynote speeches on HIV, innovative approaches to vaccines, the microbiome, tuberculosis therapies, antimicrobial stewardship, as well as ecological and economic aspects of antimicrobial resistance.

Antimicrobial resistance and strategies to combat this phenomenon through stewardship were highlighted throughout the conference. In a keynote speech by Dilip Nathwani, OBE, he emphasized, "Stewardship is saving lives, and now is the time for global action."

The microbiome was featured in a keynote speech on the intestinal microbiota’s role in combating antimicrobial-resistant bacteria given by Eric G. Pamer, MD, of Memorial Sloan-Kettering Cancer Center. In the address, he outlined how crucial of a role gut flora play in both initial resistance to infection and how reintroduction of healthy intestinal microbiota could provide an avenue to reduce antimicrobial resistant infections and their transmission.

New therapies for multidrug-resistant gram-negative infections, including vaccine and antibody therapies, were also spotlighted. New perspectives on therapeutic antibody-based therapies to combat Staphylococcus aureus and Pseudomonas aeruginosa infections attracted considerable interest.

Excitement around advances in rapid diagnostic bacteriology and virology filled both the lecture and the exhibition halls. Solutions to the challenges of providing good quality diagnostics in both major hospitals and low-resource settings were presented. Development of these innovations will be a part of future conferences and will greatly influence antibiotic stewardship initiatives.

Next year’s conference, the 28th ECCMID, will be held in Madrid on Apr 21 through 24, 2018.

-Marnie Peterson, PharmD, PhD
A Global Approach to Antibiotic Stewardship

Dilip Nathwani, OBE, president of the British Society for Antimicrobial Chemotherapy, gave an inspiring and dynamic keynote lecture titled, "Antibiotic Stewardship Around the Globe." He introduced the impact of antimicrobial resistance by describing it as "the quintessential One Health issue."

Nathwani noted that, while the 2016 United Nations Special Assembly pertaining to antibiotic resistance raised this issue as a global threat, it failed to set specific targets and goals. Globally, antibiotics are overused in high-income countries, yet access is limited in low-income countries. More children under 5 years of age die from lack of access to antibiotics in low-income countries than die from antibiotic-resistant microbes in high income countries, he said. However, as access increases, so can misuse, which leads to the spread of antimicrobial resistance.

The allocation of resources for the research and development of new therapies must be accompanied by equitable transfer of knowledge with open and free access to information across borders, Nathwani said. A balance between prevention of resistance and preservation of antibiotics through appropriate antibiotic dosing and prescribing is crucial to the future of stewardship. Antibiotic resistance needs to be established as a global issue to patients, clinicians, healthcare organizations and governments if we want to make progress, he added.

The implementation of antimicrobial stewardship, Nathwani spelled out, requires adoption leading to adaptation and finally transformation. If we can change the cultural perspective surrounding antibiotics as a resource worth preserving, we can succeed. This process varies greatly depending on geographical, economic, and cultural factors and should be tailored accordingly.

Leadership of antibiotic stewardship must broaden to include not only physicians but also nurses and pharmacists, who are already playing important and critical roles in the administration of antimicrobials, Nathwani said. Stewardship requires a locally designed structure and process to deliver good outcomes. Successes need to be shared across countries for learning to continue. The evidence that antibiotic stewardship works to decrease total antibiotic use already exists, he says; now we need to act.

-Marnie Peterson, PharmD, PhD
Some ECCMID Abstract Highlights

from Chris Dall, CIDRAP News reporter

Rapid molecular tests may aid in antibiotic stewardship
New rapid molecular diagnostic tests used to identify viral sources of respiratory infection could aid stewardship by decreasing the unnecessary use of antibiotics, according to a study by Turkish researchers.

In the study, researchers from Koc University School of Medicine analyzed 1,368 patients (both inpatients and outpatients) who had influenza-like illness from June 2013 through May 2016 and had been given a rapid, point-of-care molecular test that can detect 15 respiratory pathogens. In 741 of the patients (54%), at least one virus was detected, with rhinovirus (32%), adenovirus (15%), influenza A (15%), and influenza B (13%) the most common.

Although antibiotic treatment was continued in 46.4% of inpatients despite detection of the virus, there was an overall decrease in antibiotic use during the study period (from 55.0% to 38.7%), along with a reduction in mean duration of antibiotic treatment after detection of virus (from 3.1 days in 2013 to 2.4 days in 2016). Elderly patients and those with malignant disease were more likely to receive antibiotics even with diagnosis of a viral infection.

"The use of rapid molecular diagnostic tests is promising in antimicrobial stewardship, but the antibiotic prescribers should be trained," the authors write.

Abstract

Study finds e-prescribing fails to cut antibiotic errors
A study by researchers from the United Kingdom found that when it comes to antimicrobial stewardship, technology can have its downsides.

In the study, investigators with the Imperial College Healthcare NHS Trust wanted to assess whether the implementation of an electronic prescribing system (EPA), which replaced paper drug charts, had any unintended consequences on the healthcare system's antimicrobial stewardship program. To do so, they reviewed a 3-month period before implementation of the EPA (June through August 2015) and compared it with a post-implementation period (August through October 2016). Prescribing errors identified from regular prescription review were included, and errors were reviewed and analyzed.

In the 3-month period prior to implementation of the EPA, there were 28 incidents related to prescribing or administering antibiotics to adult inpatients, compared with 39 in the post-roll out period. After implementation, "omitted dose" incidents fell from 50% to 30%, but there was in increase in delayed doses, prescription of the wrong antibiotic, incorrect prescription frequency, and incorrect drug monitoring. In addition, the EPA's method of selecting dosing frequency resulted in sub-optimal dosing schedules in patients receiving flucloxacillin and amoxicillin for endocarditis and bacteremia.
"All errors noted within this study have been corrected and processes changed but this data demonstrates the need for continual review of new systems to ensure patient safety is maintained," the authors write.

**Abstract**

**Prospective audit and feedback shown effective in internal medicine**
Prospective audit and feedback intervention has been shown to improve antibiotic utilization in critical care settings but has produced mixed results in patients who are not critically ill. But new research out of Canada suggests it can safely and effectively optimize antibiotic use and reduce antibiotic expenditure in patients on a general internal medicine ward.

The Scarborough Hospital, an acute care community hospital in Toronto, introduced a prospective audit and feedback program in its 36-bed general internal medicine ward in 2014. Under this program, all identified opportunities for antibiotic optimization are reviewed twice weekly by a pharmacist and infectious disease physician and discussed with a treating physician. To evaluate the impact of the program, the researchers compared antibiotic use, antibiotic expenditure, and clinical outcomes in the first 2 years of the program with the year before the intervention began.

The acceptance rate of antibiotic stewardship recommendation was 94% in year 1 and 92% in year 2. Compared with the pre-intervention period, broad-spectrum antibiotic use in days of therapy (DOT) per 1,000 patient-days was reduced by 38% in year 1 and 48% in year 2, driven mostly by a 58% reduction in fluoroquinolone use in year 1. In year 2, the decrease in fluoroquinolone use was sustained and the use of piperacillin-tazobactam and vancomycin dropped by 51%. In addition, antibiotic expenditures dropped from $2.80 Canadian dollars (CAD) per patient-day in the pre-intervention period to $2.34 (CAD) in year 1 and $1.83 CAD in year 2.

Incidence of *Clostridium difficile* infection among patients in year 1 and year 2 was comparable to the ward's historic rates, although it rose slightly in year 1. There were no significant changes in length of stay, hospital readmission, or mortality rates.

**Abstract**

**Annual review found to improve antibiotic prescribing**
New data presented by Dutch researchers suggests the use of annual consumption analyses can guide improvement of antibiotic prescribing in the intensive care unit (ICU).

In the Leiden University Medical Center ICU, diagnostics and antimicrobial drug regimens are reviewed daily by a multidisciplinary team that includes microbiologists. Since 2014, the hospital's antibiotics committee has been analyzing data on antibiotic consumption annually—including the type of antibiotics used, defined daily dose per 1,000 patient-days, and the number of patients treated. The idea is that if an uptick in consumption is detected, it will spur a review of individual prescriptions to determine whether they are adhering to hospital guidelines.
As an example, data from 2015 showed an increase in the prescription of amoxicillin/clavulanic acid and meropenem compared with previous years. Although the researchers detected increased usage of both drugs, further review showed that none of the prescriptions for amoxicillin/clavulanic acid complied with hospital guidelines, while meropenem use was accurate in 90% of the cases. They also found that assignment of prescriptions without consultation of a medical microbiologist was associated with less appropriate use of antibiotics.

"The use of annual consumption analyses within an antibiotic stewardship programme made it possible to identify structural administration inaccuracies which make initiation of improvement programs possible," the authors write.

**Abstract**

**Health worker survey shows gaps in antibiotic resistance knowledge**

A survey of healthcare workers in Hungary found that more education on infectious diseases and antibiotic resistance may be necessary.

The self-administered questionnaire-based study, conducted by researchers at the University of Szeged, included 210 community pharmacists and general practitioners with an average age of 43.6 years. Of this group, 92.9% said antibiotics are medicines of special importance and 96.7% said misuse of antibiotics is a critical issue.

But while 85.6% said their knowledge of antimicrobial therapy was appropriate, only 72.2% said their knowledge of the mechanisms of infectious diseases and their prevention was appropriate, and only 58.9% said their knowledge of antibiotic resistance was appropriate. Just over 81% of respondents said medical education should focus more on infectious diseases and antibiotic resistance.

In other interesting results, one third of the respondents said patient temperament influences their prescribing/dispensing practices, and 77.6% said they believe the use of antibiotics in animal husbandry plays an equally important role in the spread of resistance.

The authors of the study argue that the findings suggest that continuous professional development of pharmacists and general practitioners, the first line of defense against inappropriate use of antibiotics, will be essential for preserving antibiotic efficacy.

**Abstract**

**Combining hand hygiene, antimicrobial stewardship found effective**

Research out of Germany indicates that combining antimicrobial stewardship (AMS) and hand hygiene (HH) measures can have a significant impact on incidence of antimicrobial-resistant bacteria and *C difficile* in hospital patients.

In the study, researchers from the University of Tubingen searched PubMed databases to identify studies reporting the effect of combined AMS interventions on the rate of antimicrobial-resistant pathogens (including methicillin-resistant *Staphylococcus aureus*, vancomycin-resistant Enterobacteriaceae, carbapenem-resistant Enterobacteriaceae, and extended-spectrum beta-
lactamase–producing Enterobacteriaceae) and *C difficile* in hospitalized patients. The primary outcome was to define the effect of the combined measures on incidence rate (IR) of infection and/or colonization.

Of the 1,113 studies retrieved by the search, 31 were included for review. AMS measures included antibiotic cycling, audits, restrictive policies, single antibiotic interventions, therapy duration interventions, and guideline implementation. Five of the studies reported on AMS in association with active implementation and audits of HH measures. A pooled meta-analysis showed that implementation of AMS and HH was associated with a 70% reduction in IR of studied pathogens, while the 26 studies on AMS alone showed a 20% reduction.

"Our analysis underlines the importance of including AMS in a multifaceted approach to optimize effectiveness in reducing the rate of [multidrug-resistant] bacteria in hospitalized patients," the authors write.

**Abstract**

**Patient needs top list of antimicrobial stewardship key elements**

What are the key elements needed to implement an antimicrobial stewardship program? That was the question at the heart of a survey that participants in a 6-week Massive Online Open Course on antimicrobial stewardship were invited to complete, and patient needs and local policies topped the list of answers.

The survey, created by UK researchers, included specific questions on antimicrobial stewardship activities in the respondents’ organizations and a range of questions on the perceived determinants of antibiotic decision-making.

Overall, 505 participants from 53 countries completed the survey, a group that included 182 doctors, 130 pharmacists, 89 nurses, and 104 researchers, students, and members of the public. Among the healthcare professionals, 56% of doctors, 43% of nurses, and 35% of pharmacists reported receiving post-graduate training in antimicrobial stewardship. Of the 337 respondents from hospitals, 81% had institutional antibiotic prescribing policies, 75% had a dedicated antimicrobial stewardship committee, and 60% had a reporting structure for antibiotic consumption.

When asked to rank the perceived determinants of antibiotic decision-making using a 10-point Likert scale, the doctors, nurses, and pharmacists listed patient needs, local policies, and antibiotic resistance as the most influential factors, with personal experience, specialty-level culture and practices, and senior doctor recommendations also seen as important factors.

The authors of the study note that post-graduate training in antimicrobial stewardship remains low, and surveillance of antibiotic use is not universal. They conclude that better resources are needed for staff tasked with implementing stewardship programs, and that the cultural determinants of antibiotic prescribing need to be addressed.

**Abstract**
IT-based support system improves antimicrobial prescribing

Researchers in Israel say the implementation of an IT-based decision support system (DSS) was associated with a significant improvement in the rate of appropriate empirical antimicrobial treatment.

The study, conducted at a primary and tertiary care facility in Israel, involved a before and after analysis of six wards that implemented the TREAT Steward DSS, a program that provides diagnosis and antimicrobial recommendations based on all available patient- and infection-related information. The intervention associated with the DSS was the recommendation of empirical antibiotic treatment.

The researchers conducted the analysis using retrospective data from the "before" period (January 2010 to December 2011) and the "after" period (January 2015 through May 2016). The rate of empirical antimicrobial treatment for patients with a microbiologically documented infection (MDI) was the primary outcome, and usage of broad-spectrum antimicrobials was the secondary outcome. The outcomes were analyzed by intention to treat and per protocol, as determined by compliance with DSS advice.

Overall, 1,342 and 3,223 infectious episodes were included in the before and after studies, respectively, and the researchers found that 48.5% of MDI cases received empirical antimicrobial treatment in the before study compared with 57.9% in the after study. Empirical treatment was prescribed in 69.1% of MDIs treated per protocol. In addition, the results showed a marked reduction in the use of third-generation cephalosporins and increase in the use of penicillins without beta-lactamase inhibitors after implementation of the DSS.

Abstract

Carbapenem de-escalation beneficial for patients with UTIs

New research out of Spain suggests that de-escalation of carbapenem therapy can reduce mortality and shorten hospital stays in patients with complicated urinary tract infection (UTI).

The prospective observation study, conducted in a third-level hospital in Spain from August 2013 through July 2014, involved patients with complicated UTI who had received carbapenems—a broad-spectrum antibiotic used in difficult-to-treat drug-resistant infections—before or during their stay. The aim of the study was to assess the impact of de-escalation on outcomes—including in-hospital mortality, length of stay, and duration of antibiotic therapy—and determine the impact of pharmacist interventions in this practice.

De-escalation, which was ordered only for patients with positive cultures, was conducted in 49.5% of the 382 patients with complicated UTI. Of the recommendations for de-escalation, 34 came from pharmacists, and 23 of those recommendations were accepted. While the duration of antibiotic treatment per episode was longer in the de-escalation group compared with the non-de-escalation group (13 vs. 9 days), crude in-hospital mortality was much lower (7.8% vs. 24.7%), and de-escalation reduced the median hospital stay by 72 hours.
Factors associated with de-escalation included being an internal medicine patient (odds ratio [OR], 3.41), culture request (OR, 2.39), pharmacist recommendation of de-escalation (OR, 2.34), and meropenem prescription (OR, 1.92).

Abstract

Antimicrobial stewardship reduces *C difficile* infections
A study by Italian researchers has found that implementation of an antimicrobial stewardship program reduced *C difficile* infections in the geriatric ward of a hospital in Rome.

The program, instituted in June 2016, included direct and daily involvement by two infectious disease (ID) specialists in antimicrobial therapy decisions made at bedside. The main objectives were to avoid antibiotic treatment of asymptomatic bacteriuria, avoid the use of carbapenems in empirical therapy, and—in patients with pressure ulcers without signs of systemic infection—avoid the use of fluoroquinolones for treatment of non-severe urinary tract infection. Appropriate choice of antimicrobials and duration of therapy were given particular attention.

To assess the impact of the program, the researchers compared the pre-implementation period (January through May 2016) and the post-implementation period (June through October 2016). They found that incidence of *C difficile* infection fell from 14.4% to 2.85% among patients diagnosed as having other bacterial infections, while the rate of pneumonia did not change significantly (46% vs 40%). There was also a significant reduction in fluoroquinolone use (15.7% vs 5.7%) and in length of antimicrobial therapy (16.9 days vs 9.2 days). Overall length of hospitalization and mortality did not differ between the two periods.

"The presence of dedicated ID Specialists conferred an advantage in terms of a more appropriate therapeutic approach towards HAI [healthcare-associated infection], targeting not only ICU patients but also subjects with more comorbidities and frailty such as elderly," the authors write.

Abstract

ASP improves outcomes with carbapenem-resistant *Klebsiella*
A study conducted by researchers at the University of Pittsburgh found that implementing a formal antimicrobial stewardship program (ASP) targeting carbapenem-resistant *Klebsiella pneumoniae* (CRKP) improved patient outcomes, shortened hospital stays, and reduced costs over a 3-year period.

In the study, researchers compared outcomes for the 83 CRKP bacteremic patients identified in the 7 years priors to the ASP (June 2007 through May 2013) with the 44 patients diagnosed during the 3 years after implementation (June 2013 through April 2016).

The ASP employed decision-support software that uses an algorithm to make recommendations for CRKP infection, which has limited treatment options and poor clinical outcomes. The end points of the study included 30-day mortality rate, hospital stay after positive blood culture, mean hospital length-of-stay (LOS), and 90-day readmission rate.
In-hospital mortality rates dropped from 45% in the pre-intervention period to 19% in the post-intervention period, hospitalization after positive blood culture decreased from 34 days to 14.5 days, median LOS fell from 60 days to 25.5 days, and the 90-day readmission rate decreased from 39% to 36%. In addition, the estimated average cost saved per CRKP bacteremic patient was $704,684.

**Abstract**

**Infection prevention plus hand hygiene did not cut HAI, antibiotics**

A study by German researchers indicates that an ongoing campaign to improve hand hygiene and infection prevention and control (IPC) in German hospitals has not reduced HAI or antibiotic usage (AU).

The researchers compared data from the 2016 national point prevalence survey of HAI and AU in German acute care hospitals to data from a similar survey conducted in 2011. The surveys, which followed the methodology established by the European Centre for Disease Prevention and Control, documented all AU and HAI that were active or under treatment on the day of the survey. Data from 218 hospitals and 64,412 patients were included in the 2016 survey.

From 2011 to 2016, there was a significant increase in the mean number of infection control nurses and doctors per 100 patients, along with an increase in consumption of alcoholic hand rub. But while statistical analysis revealed a reduction in HAI prevalence, AU remained at a constant level. Furthermore, comparison of the representative sample and a core group of 46 hospitals that participated in both surveys showed no significant difference in HAI prevalence and AU.

"Despite ongoing efforts to improve IPC analyses of the core group and the representative sample revealed no significant decrease in HAI prevalence," the authors wrote. "AU remains at a high level, which illustrates the need for intensifying efforts in antibiotic stewardship."

**Abstract**