

Submission Type Breakout/Quick/Lightning/Poster
ID [7583](#)

Abstract Type Breakout

Abstract Title Enhancing Illinois' Extensively Drug-Resistant Organism (XDRO) Registry to Meet Emerging Public Health Needs
Abstract

BACKGROUND: Illinois' XDRO registry supports inter-facility communication and timely infection control action. Carbapenem-resistant Enterobacteriaceae (CRE) are reportable to the registry; an automated alerting system emails infection preventionists when CRE-positive patients are admitted to their hospital. Following a successful 2015 pilot, auto alerting is being expanded to hospitals across Illinois. Additionally, a method for sending text message or pager alerts was developed for more rapid notification, especially outside normal office hours. The XDRO registry's design allows for rapid scale-up to include emerging pathogens of concern. In 2016, CDC issued a clinical alert for multidrug-resistant *Candida auris*. After cases were identified in Illinois, the Illinois Department of Public Health (IDPH) decided to add *C. auris* to the registry.

METHODS: We prioritized hospitals for auto alert expansion based on social network connections among facilities. Highly connected hospitals were targeted, as were "bridge" hospitals in low-prevalence regions of Illinois that are connected to Illinois' high-prevalence region (Chicagoland) and serve as hubs for patient transfer within low-prevalence regions. Providers, by default, receive email alerts and must log into the registry to view patient information. Now, providers can add the option of SMS text and pager alerts, sent real-time from 8am–8pm, with off-hours alerts queued until 8am the next day. Illinois' communicable diseases administrative code allowed the addition of *C. auris* to the registry. The new report form and alerting method were based on infrastructure built for CRE.

RESULTS: In 2016, 4 Chicagoland and 2 bridge hospitals began receiving auto alerts, for a total of 16 hospitals. Text alerting began at one hospital, and pager alerting at another. From 1/7/2015 – 12/12/2016, the 16 hospitals received 475 alerts for 193 unique patients. Among the 182 correct patients for which there were data, the facility did not know CRE status for 78 (43%). Of those, 48 (62%) were not in contact precautions at the time of the alert. Even among 104 patients for whom facilities had prior CRE information, 24 (23%) were not in contact precautions. Reporting and alerting for *C. auris* is expected to start January 2017. Only IDPH personnel will report non-CRE pathogens to allow for rapid rollout of the new feature.

CONCLUSIONS: Although initially launched for CRE with manual reporting and querying, the XDRO registry has been enhanced to include *C. auris* and auto alerting. Recent developments have demonstrated the XDRO registry's ability to adapt to and address emerging public health needs.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Healthcare Associated Infections (HAI); Informatics; Antimicrobial Resistance

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7551](#)

Abstract Type Breakout

Abstract Title Implementation of the CDC's Core Elements of Antibiotic Stewardship in Tennessee Nursing Homes
Abstract

BACKGROUND: Over 4 million Americans are admitted to or reside in nursing homes each year. Up to 75% of antibiotics in this setting are prescribed incorrectly. In 2015, the Centers for Disease Control and Prevention (CDC) released The Core Elements of Antibiotic Stewardship for Nursing Homes. There are 7 Antibiotic Stewardship Core Elements (ASCE): Leadership, Accountability, Drug Expertise, Action, Tracking, Reporting and Education. The Tennessee Department of Health (TDH) sought to determine the status of Long-Term Care Facilities' (LTCFs) implementation of the Antibiotic Stewardship Core Elements.

METHODS: From January 2016–November 2016, 23 infection control assessments were performed in LTCFs in Tennessee. The assessments were performed by Infection Preventionists (IP) using the Infection Control Assessment Tool designed by the CDC. The tool contained ten questions on Antibiotic Stewardship; TDH matched specific questions/combination of questions to the corresponding ASCEs. Data were analyzed in SAS 9.4 (SAS Institute, Cary, NC).

RESULTS: A total of 9% of long-term care facilities reported having all 7 ASCEs. Forty-eight percent of facilities had implemented at least 5 ASCEs and 78% of facilities had implemented at least 3 ASCEs. Of facilities with less than 100 beds, 22% had implemented at least 5 ASCEs compared to 55% of facilities with more than 100 beds. A total of 79% of facilities reported Leadership, 61% reported Accountability, and 91% reported having Drug Expertise. A total of 39% of facilities reported having written policies on antibiotic prescribing. Seventy-eight percent of facilities reported Action, 26% of facilities reported Tracking, 43% of facilities implemented Reporting and 43% of facilities reported Education.

CONCLUSIONS: Our results show that the majority of long-term care facilities evaluated in Tennessee have not implemented all 7 Core Elements of Antibiotic Stewardship. In October 2016, the Centers for Medicare and Medicaid Services (CMS) passed a final rule which will revise the requirements that Long-Term Care facilities must meet to participate in CMS programs. The rule states that LTCFs must implement an antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use by November 2017. These data do highlight the areas where there are gaps in antibiotic stewardship programs in long-term care and where the TDH can provide guidance and recommendations to address these gaps. Specifically, Tracking, Reporting, and Education had the lowest implementation. The Tracking element had the lowest implementation among facilities and this is particularly important to address as the new CMS requirements include monitoring antibiotic use.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Healthcare Associated Infections (HAI); Antimicrobial Resistance

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8206](#)

Abstract Type Breakout

Abstract Title Abstract Sharing Is Caring: Hospital Readiness in Coordinating an Approach to Implement Antimicrobial Stewardship Activities

BACKGROUND: Antimicrobial stewardship programs (ASP) promote and support the judicious use of antibiotics within healthcare facilities in order to curb the evolution of antimicrobial resistant (AR) organisms. The Centers for Disease Control and Prevention found that coordinated prevention approaches have more potential to prevent the emergence and spread of AR organisms, within and between healthcare facilities, than when working alone. In January 2017, skilled nursing facilities (SNFs) were required by California law to implement specific ASP elements. However, many do not have the capacity and/or resources to comply. The Los Angeles County Department of Public Health (LACDPH) conducted a survey to assess the status of hospital ASPs, in part to better understand what level of support they can provide to SNFs with which they share patients (network SNFs).

METHODS: An online questionnaire was sent out to all 93 LAC acute care hospitals in November 2015. Student volunteers conducted follow-up calls to obtain responses. Results were collected via Google Docs, and summarized in Excel. ASP tiers were defined using the California Department of Public Health ASP Initiative.

RESULTS: Overall fifty-one hospitals responded (55%); twenty (39%) reported having an advanced ASP and thirty-one (61%) an intermediate or basic ASP. Of those with an intermediate or basic ASP, 11/18 (61%) and 10/13 (77%), respectively, cited 'insufficient protected time for ASP activities' as a major or moderate challenge in implementing more advanced strategies. Thirty-one (63%) hospitals reported knowing the facility had a network of SNFs, but only five (11%) knew whether these SNFs have any AS activities. Thirty hospitals (59%) reported they would be likely or extremely likely to provide educational materials and treatment guidelines for stewardship activities at their network SNFs; twenty (39%) to provide infectious disease consultation; and nineteen (37%) to provide pharmacy support. Facilities with advanced ASPs were more likely to offer assistance in one or more of these areas but differences were not statistically significant.

CONCLUSIONS: Results show that many hospitals are willing to support ASPs of networked SNFs. More advanced programs appear more likely to provide this support. For hospitals with basic or intermediate ASPs, having more dedicated time and resources to advance their own hospital's program may be needed before they can begin assisting others. As part of its ongoing efforts to combat the spread of AR in LAC, LACDPH is working with hospitals to develop a coordinated approach for AS activities with their network SNFs.

Submission Complete? Yes

Committee Infectious Disease
Topic Antimicrobial Resistance
Keywords Health Care; Antimicrobial Resistance

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8557](#)

Abstract Type Breakout

Abstract Title Surveillance for Antimicrobial-Resistant *Shigella* Infections in Pennsylvania, 2006-2014
Abstract

BACKGROUND: *Shigella* is a leading cause of enteric infections in the United States. The annual incidence of shigellosis is approximately 4.82 cases per 100,000 individuals. Recently, *Shigella* species resistant to broad-spectrum antibiotics have been associated with outbreaks in several jurisdictions including a cluster of ciprofloxacin-resistant *Shigella sonnei* in Pennsylvania. However, statewide surveillance for antimicrobial-resistant *Shigella* infections is limited.

METHODS: From a collection of *Shigella* isolates received during 2006-2014, we tested 204 samples equally categorized into overseas travel-associated and domestically acquired infections (n=102 for each category). We analyzed isolates for antimicrobial resistance profiles, geographic distributions, and pulsed-field gel electrophoresis (PFGE) patterns.

RESULTS: Eighty-one (79.4%) of the *Shigella* isolates associated with international travel were resistant to multiple antibiotics, compared to 53 (52.1%) of the infections transmitted in domestic settings. Eighty (78.4%) of isolates associated with international travel demonstrated resistance to aminoglycosides and tetracyclines, and 20 (19.6%) isolates were resistant to quinolones. Among 95 isolates from overseas-acquired infections that were caused by *S. flexneri* and *S. sonnei*, 27.3% had 6 PFGE patterns that were observed ≥ 3 times. Among isolates associated with domestic settings, 94 (92.2%) were resistant to aminoglycosides, and five isolates from adult male patients were resistant to azithromycin. Among 98 domestically acquired *S. flexneri* and *S. sonnei* infections, 39 (39.8%) were caused by 6 distinct PFGE patterns. Among 95 infections acquired during overseas travel, 22 (23.2%) were caused by *S. sonnei* isolates. *Shigella* isolates with shared PFGE patterns had different antimicrobial resistant profiles.

CONCLUSIONS: Widespread antimicrobial resistance to clinically important drugs was demonstrated among *Shigella* isolates associated with both travel and domestic settings. The variations in antimicrobial resistance profiles suggest limitations of PFGE in revealing underlying genetic differences among *Shigella* isolates. There is need for continued surveillance with precise genome sequence analysis to elucidate the spread of multi-drug resistant shigellosis.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Antimicrobial Resistance; Emerging Infections; Enteric Infectious Diseases

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7871](#)

Abstract Type Poster

Abstract Title Alaska State and Regional Antibigrams- 2016
Abstract

BACKGROUND: Antibigrams are an important component of antimicrobial stewardship, because they provide a tool for choosing appropriate empirical antibiotics and because they can be used to monitor trends in resistance. Hospitals in Alaska are geographically distant, with several hospitals in Anchorage serving as referral facilities for smaller hospitals. In light of these patterns, there was a request from the Alaska Antimicrobial Stewardship Collaborative to produce regional antibigrams for different areas of the state. The State Healthcare Associated Infections Program was also interested in antibiogram data as a source of information about the epidemiology of antibiotic resistance in Alaska.

METHODS: Antimicrobial stewardship contacts and hospital microbiologists were contacted to obtain their most recent facility antibigrams. Twenty- two hospitals were contacted and 18 were able to provide an antibiogram. Antibigrams were processed, and the cumulative proportion of isolates susceptible to each antibiotic was calculated. Regional antibigrams were then constructed to resemble hospital antibigrams in appearance and interpretation. Comparisons between regions were done for several antibiotic-organism combinations of interest to providers. Comparisons were done using Clopper-Pearson binomial confidence intervals.

RESULTS: Antibigrams for the state of Alaska and for five of six economic regions were constructed. Comparisons between regions were done for fluoroquinolone-resistant *Escherichia coli* , methicillin-resistant *Staphylococcus aureus* , and piperacillin-tazobactam-resistant *Pseudomonas aeruginosa* . Only the proportion of *S. aureus* resistant to methicillin differed between the regions, with a significantly greater proportion of isolates in the Southwest testing resistant compared to the state average. Antibigrams and results were presented in several webinars and posted on the State Healthcare-Associated Infections Program website. Feedback from users at hospitals was positive and indicated that the antibigrams were useful.

CONCLUSIONS: Regional and state antibigrams based on hospital antibigrams were constructed for the state of Alaska. Some regional differences in susceptibility patterns were noted, but the regions were similar overall. Hospitals indicated that the antibigrams were helpful, as they had larger sample sizes than individual facilities and contained information about species not included in every facility antibiogram. Collecting and analyzing hospital antibigrams was a simple and efficient way of collecting a large amount of information on antibiotic resistance in Alaska.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Antimicrobial Resistance; Healthcare Associated Infections (HAI)

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [7597](#)

Abstract Type Poster

Abstract Title Antibiotic Stewardship Programs in Arizona Long-Term Care Facilities
Abstract

BACKGROUND: The CDC estimates that antibiotic resistance is responsible for more than 2 million infections and 23,000 deaths each year in the United States. Studies have shown that 40 – 75% of antibiotics prescribed in nursing homes may be unnecessary or inappropriate. Recently, the Centers for Medicare & Medicaid Services (CMS) passed a rule requiring all long-term care facilities to establish an antibiotic stewardship program (ASP) by November 28, 2017. Despite the recent impetus for expanding ASPs in long-term care facilities (LTCF), there is little information available about the state of current programs in Arizona. The Arizona Department of Health Services' Healthcare-Associated Infection (HAI) Program identified survey information to provide baseline data and inform next steps in assisting LTCFs in establishing ASPs.

METHODS: In early 2016, Arizona LTCFs were surveyed to assess infection control practices, infrastructure and outbreak reporting as part of ELC Ebola Supplement Activity A. The survey consisted of 11 sections with 5-15 questions under each section. The antibiotic stewardship section included ten questions that addressed each of the seven core elements of ASPs. We used those questions as the focus for this analysis, and divided Arizona by the 4 Emergency Management System regions to provide a geographical representation while maintaining simplicity and anonymity.

RESULTS: 56 of 146 (38%) LTCFs completed the survey. Of those responding facilities, 18% met all seven core elements of ASPs based on responses to questions from the survey, 71% met at least three core elements, and 98% met at least one core element. Overall, the Northern Region had the highest scores, while the Western Region scored the lowest. Those elements that had the highest percentage of LTCF participation were tracking (77%), leadership commitment (73%), and drug expertise (71%). Those elements with the lowest percentage of LTCF participation were reporting (41%) and education (50%). The remaining two elements, accountability and action, had 62% and 63% compliance, respectively.

CONCLUSIONS: This survey provided the HAI Program with a first look at the ASPs in LTCFs in Arizona. While most LTCFs in Arizona demonstrate some elements of ASPs, very few met all seven core elements. The HAI Program has targeted ASPs as an area of high priority to improve patient outcomes and reduce adverse events due to multidrug resistant organisms and *Clostridium difficile* infections. Furthermore, as the CMS rule requiring antibiotic stewardship programs in LTCFs looms in the very near future, LTCFs in Arizona have major challenges in front of them.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Surveillance; Antimicrobial Resistance; Healthcare Associated Infections (HAI)

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8612](#)

Abstract Type Poster

Abstract Title Distribution and Trends of Carbapenem-Resistant Enterobacteriaceae (CRE) in Tennessee
Abstract

BACKGROUND: CRE has been reportable in Tennessee since 2011; isolates must be sent to the State Public Health Laboratory (SPHL) to confirm carbapenemase production and for resistance mechanism testing (blaKPC, and blaNDM). Regional situational awareness of CRE is an important component to improve regional response to this urgent threat.

METHODS: CRE are defined as *E.coli*, *Klebsiella*, and *Enterobacter* species isolated from any clinical specimen and resistant to doripenem, meropenem, imipenem (minimum inhibitory concentrations [MIC] of ≥ 4 $\mu\text{g/ml}$) or ertapenem (MIC ≥ 2 $\mu\text{g/ml}$, or demonstrated production of a carbapenemase. We compared reports from the first 8 months of 2015 and 2016. County of residency and county level aggregate data were analyzed using SAS V9.4 and displayed in iDashboard (a visual tool that allows interactive portrayal of data).

RESULTS: In the first eight months of 2015 240 cases of CRE were reported, 57 (24%) of which were carbapenemase-producing (CP-CRE) compared to 475 cases, 130 (27%) in 2016, an increase of 49% and 56%. In 2015, species included 82 (34%) *Enterobacter*, 98 (41%) *E. coli*, and 60 (25%) *Klebsiella*. Similar to that in 2016-- 185 (39%) *Enterobacter*, 149 (31%) *E. coli*, and 141 (30%) *Klebsiella*. The predominant CP-CRE in 2016 was *Klebsiella* (50%), whereas it was *Enterobacter* (49%) in 2015. The iDashboard highlights CP-CRE hotspots in Southwestern (SW) and Northeastern (NE) TN. In 2015 and 2016, Shelby County (Memphis), in SW TN, primarily harbored CP-CRE *Enterobacter*; n=20 (87%) and n=28 (76%). Over one year, NE TN evolved from few reported CP-CRE to become a hotspot of *Klebsiella* CP-CRE with some counties showing incidences as high as 15 cases/100,000 person-years (p-y). Davidson county (Nashville) reported no CP-CRE in 2015 and two CP-CRE cases in 2016. The mean annualized incidence rate of CRE was 2.80 and 5.02 cases/100,000 p-y for 2015 and 2016 respectively. An exact sign test was used to test the significance of the increase; a 2.23 cases/100,000 p-y mean increase was observed in annualized incidence rate in 2016 ($p < 0.0001$). Similarly, CP-CRE showed a mean increase of 1.61 cases/100,000 p-y from 2015 (0.84) to 2016 (2.45) ($p = 0.0009$).

CONCLUSIONS: CRE and CP-CRE incidence continues to rapidly increase across Tennessee with remarkable geographic variation. iDashboard is a visual tool used to interactively portray CRE data. The interactive maps within iDashboard can improve situational awareness of CRE and improve regional response to this urgent threat.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Surveillance; Antimicrobial Resistance; Epidemiology

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8335](#)

Abstract Type Poster

Abstract Title Initiating a Public Health Approach to Antimicrobial Stewardship in Colorado
Abstract

BACKGROUND: In response to antibiotic resistance threats in the United States, state public health departments are taking an active role in antimicrobial stewardship. However, the best way to promote and support antimicrobial stewardship at the state-level is undefined. In Colorado, approximately 30% of hospitals have a comprehensive antimicrobial stewardship program, defined by implementation of all of the Centers for Disease Control and Prevention's (CDC's) Core Elements of Hospital Antibiotic Stewardship. Therefore, the Colorado Department of Public Health and Environment (CDPHE) outlined an initial approach to antimicrobial stewardship in Colorado.

METHODS: We incorporated the priorities of CDC, interests of community partners, local antimicrobial resistance and stewardship data, and an analysis of the strengths, weaknesses, opportunities, and threats of our Healthcare-Associated Infections Program into a strategic plan.

RESULTS: Our mission is to support antimicrobial stewardship practices in Colorado across the spectrum of healthcare through 1) statewide leadership, priority setting, and regional data sharing, and 2) expert guidance to healthcare facilities and providers. We propose to offer a voluntary assessment and consultation service to hospitals designed to establish infrastructure and implement the CDC's Core Elements. The service will be provided by an infectious diseases physician and include education, assessment of antimicrobial stewardship practices, review of antimicrobial use and resistance data, and review of existing facility resources and stewardship goals. Each assessment will inform an action plan with facility-specific objectives and follow-up. In return, we will encourage administrative commitment to antimicrobial stewardship, data sharing, shared experiences among facilities, and feedback. Response metrics will include achievement of facility objectives, implementation of Core Elements, measures of antibiotic use, and *Clostridium difficile* and antimicrobial resistance data. We will add a more concise assessment to our ongoing Infection Control Assessment and Response in at-risk long-term care facilities. We will also develop a Colorado regional antibiogram and regional measures of antibiotic use.

CONCLUSIONS: Although CDPHE is early in the process, we hope to improve antimicrobial stewardship across Colorado. Our experiences implementing a statewide approach to antimicrobial stewardship, in the context of a variety of approaches in other states, will inform the growing number of public health agencies that are new to this field. While we choose to focus our initial efforts on hospitals and long-term care facilities, it is not clear whether antimicrobial stewardship in hospitals, long-term care facilities, outpatient settings, care networks, or in agriculture will have the greatest impact on antibiotic resistance in our state.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Health Care; Healthcare Associated Infections (HAI); Antimicrobial Resistance

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8670](#)

Abstract Type Poster

Abstract Title Maryland's Statewide Antibiotic Stewardship Collaborative
Abstract

BACKGROUND: Curbing antibiotic resistance (AR) is a national priority, as highlighted by the 2013 CDC Threat Report on AR and the 2015 National Action Plan for Combating Antibiotic-Resistant Bacteria. Improving antibiotic use and slowing the emergence of AR is a critical patient safety and public health issue. Antibiotic stewardship (AS) programs will soon become a required standard in all healthcare facilities. The Maryland Campaign for Appropriate Antibiotic Use (CAAUSE) is a statewide collaborative led by the state health department (DHMH) that aims to assist facilities across the healthcare continuum with meeting AS requirements while reducing the emergence of antibiotic resistance.

METHODS: Initial CAAUSE members were recruited from Maryland's HAI Advisory Committee, including those from public health and patient safety organizations, academic and community hospitals, long term care (LTC) facilities, represented by physicians, nurses, pharmacists, epidemiologists and healthcare administrators. Monthly meetings are held in person and via conference call. Additional recruiting was achieved through webinars, seminars, and joint letters from DHMH, the Maryland Hospital Association and the state Quality Improvement Organization (HQI) to CEOs and administrators at acute care and LTC facilities.

RESULTS: Maryland CAAUSE was launched in January 2016. Collectively, CAAUSE defined itself as a collaborative with a 3-year commitment consisting of 3 Phases: (1) facility commitment/baseline antibiotic use metrics, (2) stewardship intervention implementation, (3) program maintenance/outcomes. To date, 37 of 46 acute care hospitals have joined CAAUSE and LTC recruitment is underway. By the end of Phase 2, all facilities aim to meet the CDC's Seven Core Elements of Antibiotic Stewardship, which will align with both acute and long term care CMS regulations. Stewardship interventions currently under development by CAAUSE subcommittees include protocols for asymptomatic bacteriuria management, targeted 48-72 hour antibiotic hold and review, and vancomycin toxicity prevention.

CONCLUSIONS: The Maryland CAAUSE Collaborative has provided a forum to consolidate AS expertise and resources, as well as to stimulate innovation in AS across the healthcare continuum. Networking and relationship strengthening has occurred, resulting in enhanced connections between public health, patient quality and safety, acute and LTC, and academic and community hospitals. Additionally, the critically important perspectives of infectious disease pharmacists and LTC quality experts have contributed to this collaborative. As CMS and Joint Commission standards become mandated, Maryland aims to have its acute care and LTC facilities actively prepared for full participation.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Infectious Diseases; Antimicrobial Resistance; Collaboration

Consider for Different Presentation? Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 8561
Abstract Type	Poster
Abstract Title Abstract	Of Carbapenemases and Case Definitions: Impact of the 2016 CSTE Carbapenem-Resistant Enterobacteriaceae Definition Change in Two Minnesota Counties BACKGROUND: Carbapenem-resistant Enterobacteriaceae (CRE) are an emerging threat. Carbapenemase-producing CRE (CP-CRE) are associated with widespread antibiotic resistance and dissemination in health care facilities. To prevent spread of CP- and non-CP-CRE in facilities, hospitalized patients are placed in enhanced precautions. To better capture CP-CRE incidence, the Council of State and Territorial Epidemiologists (CSTE) CRE definition was changed in 2016 from “non-susceptible to a carbapenem (excluding ertapenem) and resistant to all third generation cephalosporins tested,” to “resistance to any carbapenem (including ertapenem)” using current Clinical and Laboratory Standards Institute interpretive criteria. Prior definitions excluded ertapenem based on elevated MICs to this antibiotic caused by non-carbapenemase-mediated resistance mechanisms (e.g. AmpC beta-lactamase, porin loss), often seen in <i>Enterobacter</i> spp. We describe the impact of this definition change on CRE case volume and CP-CRE case identification. METHODS: The Minnesota Department of Health (MDH) conducts active, laboratory-based surveillance for CRE in the two most populous counties, including isolate submission to the MDH-Public Health Laboratory (PHL) for carbapenemase testing. The 2015 and 2016 definitions were applied to <i>Enterobacter</i> spp., <i>Klebsiella</i> spp., and <i>E. coli</i> isolates submitted in 2016. The 2016 definition was also applied excluding ertapenem to determine the role of ertapenem alone in increase in CRE volume. Multiple isolates of the same organism from single patients were excluded. RESULTS: In 2016, 319 isolates of <i>Enterobacter</i> spp., <i>Klebsiella</i> spp., and <i>E. coli</i> were submitted to MDH-PHL; 201 (63%) of these were <i>Enterobacter</i> spp. Overall, this is a 126% increase over submissions in 2015. Of isolates submitted in 2016, 85 (27%) met the 2015 CRE definition; 18 (21%) of these were CP-CRE (9 <i>K. pneumoniae</i> , 2 <i>E. coli</i> , 7 <i>E. cloacae</i>). In contrast, 281 (88%) isolates met the 2016 CRE definition; 21 (7%) were CP-CRE (11 <i>K. pneumoniae</i> , 3 <i>E. coli</i> , 7 <i>E. cloacae</i>). 3 CP-CRE that met the 2016 definition would have been missed using the 2015 definition (2 <i>K. pneumoniae</i> , 1 <i>E. coli</i>). Of the 281 isolates that met the 2016 definition, 190 (68%) were based on resistance to ertapenem alone; 135 (71%) of these were <i>Enterobacter</i> spp. CONCLUSIONS: The 2016 definition change did identify additional CP-CRE in <i>Klebsiella</i> spp. and <i>E. coli</i> but resulted in submission of a high proportion of non-CP <i>Enterobacter</i> spp., the majority of which were resistant to ertapenem alone. A more specific definition for <i>Enterobacter</i> spp. could reduce CRE case volume without detriment to CP-CRE identification, reducing financial burden of implementing infection control measures.
Submission Complete?	Yes
Committee Topic Keywords	Infectious Disease Antimicrobial Resistance Antimicrobial Resistance; Surveillance; Infection Control
Consider for Different Presentation?	Yes
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Submission Type Breakout/Quick/Lightning/Poster
ID [8551](#)

Abstract Type Poster

Abstract Title Abstract
Seven Core Elements of Antibiotic Stewardship Program in Long-Term Care Facilities in Houston, Texas, 2016

BACKGROUND: Healthcare-associated infections are responsible for significant morbidity and mortality in patients. Most of these infections are the consequences of non-judicial use of antibiotics. Antibiotics are among the most frequently prescribed medications in nursing homes and other long-term care facilities (LTCF). Each year in the United States, up to 70% of LTCF residents received one or more courses of systemic antibiotics. Certain core elements have been outlined by the CDC as necessary for implementing a successful Antibiotic Stewardship Program (ASP). The objective of this study is to examine the current state of the core elements of ASP in LTCFs within the City of Houston.

METHODS: Data were collected via the infection control assessment tool (IC Tool) for LTCFs developed by CDC. The IC Tool is a fillable word document that collects information regarding infection prevention practices within a facility including, the seven core elements of ASP via yes/no questions. These core elements include Leadership Commitment, Accountability, Drug Expertise, Action, Tracking, Reporting and Education. The applied definition of these core elements is in accordance with the CDC's Core Elements of Antibiotic Stewardship for Nursing Homes. This study covers ten on-site infection control assessment of LTCFs conducted by the Houston Health Department (HHD) between March and December 2016 and focuses only on findings from the ASP domain of the assessments.

RESULTS: Seven out of a total of ten LTCFs lack leadership commitment. In addition, seven out of ten LTCFs do not provide reporting/feedback for antibiotic use and resistance to prescribing clinicians and other relevant staff. Half of the LTCFs have identified a person who is accountable for ASP activities. Five out of ten LTCFs have implemented at least one action on the policy or practice to improve antibiotic use. Six out of ten LTCF have access to drug expertise (infectious disease trained pharmacist and/or physician). In addition, six LTCFs track at least one process measure and outcome for antibiotic use within their facility. Only two LTCFs provided education pertaining to ASP to relevant staff or residents.

CONCLUSIONS: An ASP within Houston's LTCFs is still in its infancy. Although none of the visited LTCFs have all the core elements of ASP in place, most have implemented some activities around the core elements and are committed to improving antibiotic prescribing practices and reducing inappropriate use. In 2017, HHD will be conducting additional on-site visits to assess, follow-up, and guide quality improvement activities.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Antimicrobial Resistance; Healthcare Associated Infections (HAI); Infection Control

Consider for Different Presentation? Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 8431
Abstract Type	Quick
Abstract Title Abstract	Epidemiologic Investigation of an Outbreak of Extended-Spectrum Beta-Lactamase (ESBL)-Producing <i>Proteus Mirabilis</i> Among Northeast Colorado Healthcare Facilities—Colorado, 2015-2016

BACKGROUND: In December 2015, the Colorado Department of Public Health and Environment (CDPHE) received a report of high numbers of extended-spectrum beta-lactamase (ESBL)-producing organisms in a northeast Colorado community. A large proportion of these were *Proteus mirabilis*, a pathogen found in the environment and healthcare settings. CDPHE performed an investigation of a multi-facility outbreak of ESBL-producing *Proteus mirabilis*, not a reportable pathogen in Colorado, among nursing homes and hospitals in a widespread rural geographic region, northeast Colorado.

METHODS: Investigation methods included a review of microbiology records to find cases, site visits to 2 facilities to determine methods of transmission, and medical record reviews to understand patient transfer patterns. *Proteus mirabilis* ESBL data from 2015-2016 were requested from 9 northeast Colorado laboratories. Pulsed-field gel electrophoresis (PFGE) was performed on available isolates. A confirmed case was defined as the first identified culture from a patient positive for ESBL-producing *Proteus mirabilis* with a $\geq 75\%$ match to the predominant PFGE pattern between January 1, 2015 and December 31, 2016 in northeast Colorado. Probable and non-linked cases were similarly defined except lacking PFGE results and having a $< 75\%$ PFGE sequence homology, respectively. Using modified National Healthcare Safety Network (NHSN) definitions, confirmed cases were further classified by onset location. CDPHE provided infection control assessments in 2 nursing homes with the most cases.

RESULTS: Five (56%) of 9 laboratories provided *Proteus mirabilis* ESBL data from 2015-2016, 2 (22%) submitted partial data, and 2 (22%) did not respond to requests. Of 25 isolates that underwent PFGE, 23 (92%) were confirmed and 2 (8%) non-linked cases. Among confirmed cases, 12 (52%) were nursing home-onset, 4 (17%) community-onset, 1 (4%) community-onset nursing-home-associated, and 6 (26%) undetermined. Laboratory data identified an additional 101 probable cases. Infection prevention assessments in 2 nursing homes identified infection control breaches in hand hygiene, use of personal protective equipment, environmental decontamination, and surveillance. The 2 nursing homes continue to identify cases; however, the number of cases has decreased over time.

CONCLUSIONS: This investigation illustrates the challenges faced in multi-facility outbreaks of healthcare-associated infections, particularly in rural areas. Transmission among facilities was likely due to poor infection control practices regionally. Challenges obtaining data from laboratories and involved facilities prolonged the investigation. CDPHE continues to work with the community; social network analysis to diagram and quantify transmission patterns between colonized patients is planned.

Submission Complete? Yes

Committee	Infectious Disease
Topic	Antimicrobial Resistance
Keywords	Outbreaks; Healthcare Associated Infections (HAI); Antimicrobial Resistance
Consider for Different Presentation?	Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 7644
Abstract Type	Quick
Abstract Title Abstract	Evaluating the State of Antimicrobial Stewardship Programs in Long-Term Care Facilities in Hawaii BACKGROUND: Antimicrobial resistance (AR) is ever increasing, with over two million people in the United States acquiring antibiotic-resistant infections each year. Up to 75% of all antibiotics prescribed are unnecessary or inappropriately prescribed in long-term care facilities (LTCFs). An antibiotic stewardship program (ASP) is one method shown to curtail rising AR. ASP implementation in LTCFs has not been measured in Hawaii. Our objective was to evaluate the status of ASPs in LTCFs in Hawaii as a measure of efforts toward addressing AR. METHODS: A web-based survey was adapted from CDC's <i>Core Elements of Antibiotic Stewardship for Nursing Homes</i> and distributed to all 45 LTCFs in Hawaii. The assessment included questions on facility demographics, the seven Core Elements, and barriers to ASP implementation. The survey was intended for facilities to assess their existing ASP capacity and to help inform tool and training development. Survey analysis was done using SAS v 9.4. RESULTS: Completed surveys were received from 21 LTFCs (47% response rate). Among responding facilities, four (19%) reported implementing all core elements. Facilities with leadership support for antibiotic stewardship (63%) differed significantly from those lacking such in several areas, including: monitoring one or more measures of antibiotic use (100% vs 57%; p=.04; overall: 83%), implementing practices to improve antibiotic use (92% vs 29%; p=.01; overall: 72%), and provision of educational resources on AR and stewardship (82% vs 14%; p=.01; overall: 56%). Among all respondents, most (79%) could identify an ASP lead, but fewer (63%) reported having access to individuals with antibiotic stewardship experience. Over half (68%) reported having policies to improve antibiotic use, with 29% of those facilities implementing more than one policy. Seventy-one percent of facilities experienced at least one barrier to ASP implementation, with 20% reporting 3 or more. Staffing constraints (57%) and lack of a program proposal (38%) were identified most often as barriers to implementation. CONCLUSIONS: Among responding LTCFs, ASP implementation varies; greatest progress has been made by facilities with leadership support for antibiotic stewardship. Overall, a majority of respondents incorporated ASP practices, policies, and education; however, a substantial portion experienced barriers, with a majority citing a lack of staffing for ASP. Response rate was a limitation of our study; it is unclear how non-respondents may impact findings, and follow-up with these facilities is needed. Next steps will include collaboration with LTCFs to strategize ways to increase ASP leadership capacity and mitigate barriers to implementation in Hawaii.
Submission Complete?	Yes
Committee Topic Keywords	Infectious Disease Antimicrobial Resistance Infectious Diseases; Antimicrobial Resistance; Healthcare Associated Infections (HAI)
Consider for Different Presentation?	Yes
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Submission Type Breakout/Quick/Lightning/Poster
ID [8222](#)

Abstract Type Quick

Abstract Title Abstract
Hospital Prevalence of Carbapenem-Resistant Enterobacteriaceae in Arkansas

BACKGROUND: Multidrug-resistant organisms like carbapenem-resistant Enterobacteriaceae (CRE) are difficult to treat, have been associated with high mortality rates, and have the potential to spread extensively in healthcare facilities and in the community. The approach to controlling transmission of CRE in healthcare facilities includes understanding the prevalence in the region. Although 21 states and counting have already made CRE reportable, information about prevalence is limited since CRE infections are not reportable in Arkansas or nationally.

METHODS: A survey was developed in SurveyMonkey[®] and sent to Infection Preventionists at all acute care, long-term acute care, and critical access hospitals in the state of Arkansas. The survey asked facilities how many isolates of *E. coli*, *Klebsiella* spp., and *Enterobacter* spp. were identified and how many were classified as CRE in 2014, as defined by the current CSTE case definition. However, no specific laboratory criteria such as minimum inhibitory concentration (MIC) profiles were defined. Information on lab capabilities and processes of alerting staff of a CRE infection were also collected.

RESULTS: The survey response rate was 53% as 42/80 facilities completed the survey by fax, email, or SurveyMonkey[®]. Of the 42 facilities, 21 (50%) reported having at least one CRE-infected or -colonized patient present in their facility in 2014. These facilities were distributed across Arkansas, with the majority in the Northwest Region. Of the reported isolates, 72/18,583 (<1%) *E. coli*, 46/5,726 (<1%) *Klebsiella* spp., and 90/1,589 (5.7%) *Enterobacter* spp. were identified as carbapenem-resistant. Most facilities (79%) indicated having an on-site microbiology laboratory at their facility, and 88% report that they have or have access to a laboratory that has the capability to identify the production of a carbapenemase. Of the 208 reported carbapenem-resistant isolates, only 41 (20%) were confirmed as carbapenemase-producing. Among the 42 facilities, 36 (86%) stated that the microbiology laboratory that performs cultures for their facility has an established system for alerting infection prevention staff in a timely manner whenever a CRE isolate is identified. Only three facilities (7%) reported performing any form of CRE screening.

CONCLUSIONS: Although CRE were particularly rare in 2014 in those facilities that completed the survey (<1%), 50% of the respondents reported having at least one CRE in their facility. The results of this survey will allow the Arkansas Department of Health (ADH) to develop regional interventions and education to tackle CRE. To address limited availability of CRE mechanism testing, ADH is implementing polymerase chain reaction (PCR) capabilities.

Submission Complete? Yes

Committee Infectious Disease
Topic Antimicrobial Resistance
Keywords Healthcare Associated Infections (HAI); Antimicrobial Resistance

Consider for Different Presentation? Yes

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Submission Type Breakout/Quick/Lightning/Poster
ID [8270](#)

Abstract Type Quick

Abstract Title Investigation of First Identified *Mcr-1* Gene in an Isolate from a Patient in the United States—Pennsylvania, 2016
Abstract

BACKGROUND: In 2015, scientists reported the emergence of the plasmid-encoded *mcr-1* gene, which confers resistance to the antibiotic colistin. Its discovery signaled the potential emergence of pan-resistant bacteria. In May 2016, *mcr-1* positive *Escherichia coli* was first isolated from a specimen from a U.S. patient when a Pennsylvania woman was evaluated for a urinary tract infection. In collaboration with the Centers for Disease Control and Prevention, the Pennsylvania Department of Health launched an investigation.

METHODS: Highest-risk contacts in household and healthcare settings were identified for screening. Twenty persons at potentially higher risk included the patient's medical facility roommate, household contacts, home health personnel, friends who assisted with activities of daily living, and a patient who developed an *E. coli* infection after receiving direct care from a caregiver who also assisted the index patient. All 20 contacts completed screening. The index patient was also subsequently screened monthly to monitor colonization status. Four medical facilities that had admitted the patient in 2016 were also assessed for transmission risk. Two higher-risk facilities were identified, and 78 of 98 identified healthcare workers completed screening. One facility also conducted a point prevalence study to determine if transmission was occurring among patients; seven of 18 patients completed screening. Prospective laboratory surveillance was conducted for 30 days at all four medical facilities. In total, 51 extended-spectrum β -lactamase (ESBL)-producing isolates underwent colistin susceptibility testing.

RESULTS: The index patient had no international travel in nearly a year, no exposure to livestock, and a limited role in meal preparation with store-bought groceries. Among the 105 persons screened and 51 ESBL-producing isolates tested, no bacteria with the *mcr-1* gene were detected. The index patient's monthly screenings on May 31 and June 26 were positive for the *mcr-1* gene and negative on August 1 and 17.

CONCLUSIONS: No transmission was detected among the patient's highest-risk contacts, suggesting the risk for transmission to otherwise healthy individuals might be relatively small, even if these individuals had substantial exposure to a colonized patient. Therefore, focused screening of contacts at highest risk of transmission is recommended. It is not known how the patient became colonized, especially in the absence of an epidemiologic link to known persons or places with identified *mcr-1*. Nonetheless, as more surveillance systems with broader testing are established, it is anticipated that *mcr-1* will be identified with increasing frequency. This highlights the importance of comprehensive antimicrobial stewardship, especially given potential transmission of the *mcr-1* gene among bacteria.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Emerging Infections; Epidemiology; Antimicrobial Resistance

Consider for Different Presentation? Yes

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Submission Type ID	Breakout/Quick/Lightning/Poster 8459
Abstract Type	Quick
Abstract Title Abstract	Precious Drugs & Scary Bugs Campaign: A Commitment Poster's Impact on Provider-Patient Interactions and Antibiotic Prescribing BACKGROUND: Judicious use of antibiotics is essential to combatting drug-resistant infections. At least 30% of antibiotics prescribed in the outpatient setting are unnecessary. Illinois community pharmacies dispensed 853 antibiotic prescriptions per 1,000 people in 2013-2014 which is slightly higher than the national average. The Illinois Department of Public Health (IDPH) launched the statewide Precious Drugs & Scary Bugs Campaign in March 2015 to promote the appropriate use of antibiotics in the outpatient setting. Participating facilities displayed poster-sized letters to patients, personalized with provider photos and names, which stated providers' commitment to prescribe antibiotics appropriately for acute respiratory infections. IDPH assessed the commitment poster's impact on antibiotic prescribing and provider-patient interactions. METHODS: IDPH encouraged participating facilities to track changes in the avoidance of antibiotic treatment in adults with bronchitis and the appropriate treatment for children with an upper respiratory infection (URI) for one year before and after poster implementation. These two quality measures are part of the Healthcare Effectiveness Data and Information Set (HEDIS), a nationally standardized tool used by health plans to measure performance on important dimensions of care and service. Chi-square tests were performed to determine if there was an association between the use of the poster and appropriate antibiotic prescribing after campaign implementation (alpha=0.05). IDPH also administered an online provider survey to determine how the posters impacted provider-patient interactions. RESULTS: IDPH received summary antibiotic prescribing data from a medical group comprised of 19 practices. During poster implementation, the percent of adults with acute bronchitis who were not prescribed an antibiotic increased by three percent (p= 0.61) and appropriate treatment for children with URI increased by 24% (p = 0.0002) compared to baseline. Sixty-four providers completed the post-campaign survey. Most survey (64%) respondents noticed the posters displayed in their facility. Of these, 66% reported that the poster increased conversations about appropriate antibiotic use with patients and 43% reported that the poster reminded them to prescribe antibiotics only when needed. CONCLUSIONS: Displaying a personalized commitment poster is a low cost quality improvement intervention with potential to increase appropriate antibiotic prescribing for acute respiratory infections. Commitment posters can also promote provider-patient conversations about appropriate antibiotic use.
Submission Complete?	Yes
Committee Topic Keywords	Infectious Disease Antimicrobial Resistance Program Evaluation; Community Health; Antimicrobial Resistance
Consider for Different Presentation?	Yes
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Submission Type Breakout/Quick/Lightning/Poster
ID [7851](#)

Abstract Type Quick

Abstract Title Abstract
Virginia Hospitals Show Improvement Meeting Seven Core Elements of Antibiotic Stewardship Programs, 2014-2015

BACKGROUND: The promotion of antibiotic stewardship programs (ASPs) in healthcare facilities is a federal priority with the goal to have ASPs in 100 percent of hospitals by 2020. Guidelines have been published by the Centers for Disease Control and Prevention (CDC) outlining seven core elements of a successful hospital ASP. Elements include: leadership support, accountability, drug expertise, measurable actions, antibiotic tracking, reporting, and education. Facility capacity is evaluated through the Annual Hospital Survey completed within the National Healthcare Safety Network.

METHODS: A comparative analysis of 2014 and 2015 survey data was conducted to evaluate progress and identify remaining gaps in Virginia ASPs across two survey years. Hospitals were stratified based on Virginia region, bedsize (≤ 100 , 101-200, >200), and medical school affiliation. Statistical significance was analyzed using Fisher's exact test. Analyses were conducted using SAS 8.3.

RESULTS: A total of 81 and 82 Virginia hospitals responded to the 2014 and 2015 surveys, respectively. Forty hospitals (50%) met all seven core elements in 2014, and 50 hospitals (61%) reported meeting them in 2015 ($p < 0.01$). Statistically significant improvement was seen in 2015 in the leadership ($p < 0.001$), accountability ($p < 0.001$), and reporting ($p = 0.03$) core elements. Of the hospitals that met all 7 core elements in 2015, 48% were affiliated with a medical school, and 42% were in hospitals with >200 beds.

CONCLUSIONS: Improvement was seen in Virginia hospital ASPs in 2015 compared to 2014. Despite overall improvement, gaps remain within each individual core element, including implementing antibiotic time out, tracking days of antibiotic therapy and defined daily dose, and developing staff stewardship education programs. Virginia stakeholders plan to use these data to create targeted education and resources to strengthen hospital ASPs across the state. The Virginia Department of Health's recent receipt of federal funds to build capacity to enhance hospital ASPs will further augment these endeavors, with the aim to improve appropriate antibiotic prescribing and decrease antibiotic resistance.

Submission Complete? Yes

Committee Infectious Disease

Topic Antimicrobial Resistance

Keywords Hospital Data; Healthcare Associated Infections (HAI); Antimicrobial Resistance

Consider for Different Presentation? Yes

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