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**977. An Innovative 3-Year Medical Student Spiral Curriculum in Antimicrobial Stewardship and Infectious Diseases**

Peter Chin-Hong, MD<sup>1</sup>, Arianne Teherani, PhD<sup>2</sup>, David Irby, PhD<sup>3</sup> and Brian Schwartz, MD<sup>1</sup>, <sup>1</sup>Internal Medicine, Division of Infectious Disease, UCSF, San Francisco, California, <sup>2</sup>Medicine, UCSF, San Francisco, California, <sup>3</sup>UCSF, San Francisco, California and <sup>4</sup>Division of Infectious Diseases, University of California, San Francisco, San Francisco, California

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**Background.** By 2050, infections due antimicrobial-resistant organisms are predicted to account for 10 million deaths/year worldwide. Physician antibiotic prescribing patterns are a significant factor in the development of antibiotic resistance organisms. Early, continual, and integrated medical student education may help students develop a framework for responsible antimicrobial use as they develop prescribing patterns.

**Methods.** We designed a spiral antimicrobial stewardship curriculum (defined as revisiting the same concept but with increasing complexity) for medical students in years 2-4. Data provided by the Graduation Questionnaire (GQ) administered by the US Association of American Colleges were used. We compared student responses during the curriculum rollout in 2013-2015 between students at our institution and other schools. We also surveyed graduating seniors in 2015 about antimicrobial stewardship training.

**Results.** Using GQ data for the class of 2013 (preintervention), a similar proportion of UCSF medical students compared with other US medical students rated microbiology clinical preparation as excellent (43.6% vs. 45.1%,  $P > 0.20$ ). For the 2014 class, we developed interactive case-based sessions at the beginning of years 3 and 4. After this first intervention, a higher proportion of UCSF students rated the microbiology clinical preparation as excellent (51.3%) compared with responses at all schools (39.8%, odds ratio [OR] 1.59, 95% confidence interval [CI] 1.1-2.3,  $P = 0.013$ ). For the class of 2015, we added content during the medicine clerkship and 1 week before graduation. For the 2015 class, an even higher proportion of UCSF students rated microbiology preparation as excellent (57.6%), compared with all schools (41.2%, OR 2.23, 95% CI 1.54-3.22,  $P < 0.0001$ ). From our survey, 88% were very or extremely satisfied with antimicrobial stewardship training.

**Conclusion.** A spiral curriculum focusing on antimicrobial stewardship and infectious diseases increases student perception of clinical preparation prior to graduation. As the curriculum was incrementally introduced, students' knowledge increased indicating a dose-response pattern. Based on these positive results, we plan to introduce more content throughout UME, and link to curriculum for GME and practicing clinicians.

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**978. Assessing the Impact of a Mobile Device-Based Clinical Decision Support Tool on Guideline Adherence and Mental Workload**

Katherine Richardson, MD<sup>1</sup>; Sarah Fouquet, PhD<sup>2</sup>; Ellen Kerns, MPH CPH<sup>2</sup> and Russell McCulloh, MD<sup>3</sup>, <sup>1</sup>Pediatric Infectious Diseases, Children's Mercy Hospital, Kansas City, Missouri, <sup>2</sup>Medical Informatics and Telemedicine, Children's Mercy Hospital, Kansas City, Missouri and <sup>3</sup>Hospital Medicine, Children's Hospital and Medical Center, Omaha, Nebraska

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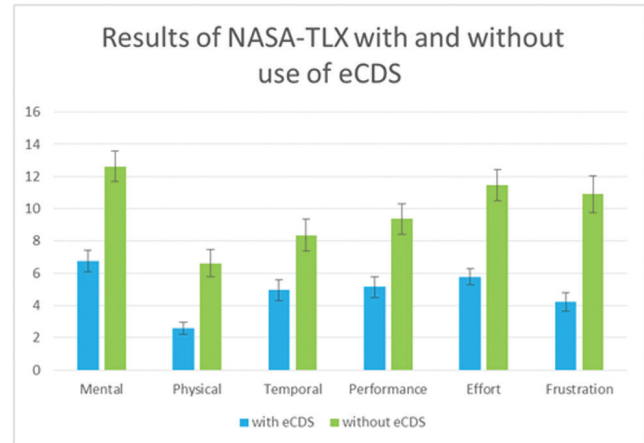
**Background.** Fever in infants <90 days old can indicate a serious bacterial infection (SBI) such as urinary tract infection, bacteremia, or meningitis. Clinical management of febrile infants varies widely. Implementing clinical practice guidelines (CPGs) can help standardize care, and electronic clinical decision support (eCDS) tools are a potential means of distributing CPGs. Little is known regarding the individual-level impact of eCDS tool use on medical decision-making. Children's Mercy Kansas City developed a mobile eCDS tool (CMPeDS: Pediatric Decision Support) that was used internationally in a practice standardization project focused on the management of febrile infants.

**Methods.** We conducted a prospective cross-over simulation study amongst pediatric healthcare providers. Attending and resident physicians performed simulated patient scenarios using either CMPeDS or a standard text reference (the Harriet Lane Handbook). Participants' responses in the simulation were evaluated based on adherence to evidence-based guidelines. Participants' mental workload was assessed using the NASA Task Load Index survey (NASA-TLX, in which lower scores are optimal) to assess mental, physical, and temporal demand, as well as performance, effort,

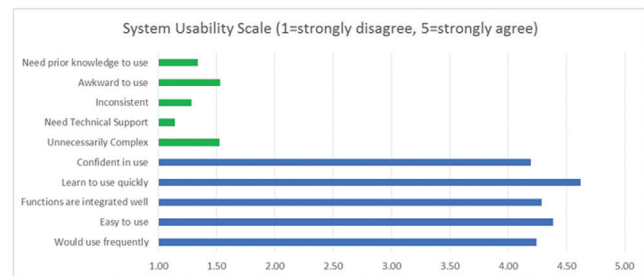
and frustration when completing a series of tasks. Paired *t*-test and ANOVA were used to determine significance for case performance scores and NASA-TLX scores, respectively. A System Usability Scale (SUS) was used to determine usability of the CMPeDS app.

**Results.** A total 28 of 32 planned participants have completed trial procedures to date. Mean performance scores on the cases were significantly higher with CMPeDS vs. standard reference, (87.7% vs. 72.4% [ $t(27) 3.22, P = 0.003$ ]). Participants reported lower scores on the NASA-TLX when using CMPeDS compared with standard reference tool (Figure 1). Mean score on SUS was 88.2 (scale 0-100) indicating excellent tool usability (Figure 2).

**Conclusion.** Using the eCDS tool CMPeDS was associated with significantly increased adherence to evidence-based guidelines for febrile infant management and decreased mental workload in simulation. Our findings highlight the potential value of eCDS deployment as part of CPG implementation projects.



**Figure 1**



**Figure 2**

**Disclosures.** All authors: No reported disclosures.

**979. Standardizing Medical Student Learning for Infectious Diseases Consult Electives: Prioritizing Content**

Emily Abdoler, MD<sup>1</sup>; Karen Hauer, MD, PhD<sup>2</sup> and Brian Schwartz, MD<sup>1</sup>, <sup>1</sup>Division of Infectious Diseases, University of California, San Francisco, San Francisco, California and <sup>2</sup>School of Medicine, University of California, San Francisco, San Francisco, California

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**Background.** The goals of 4th-year medical student electives vary, and students' learning during clinical electives may occur solely through the subspecialty cases that students encounter. We aim to standardize learning during electives by creating a toolkit to guide elective directors in the development of curricula that reinforce basic science principles, highlight areas for high-value care, and provide opportunities for further inquiry. The first step is to determine the core specialty topics applicable to students regardless of career choice. Here, we describe this content prioritization process within the context of an infectious diseases (ID) elective pilot curriculum.

**Methods.** We conducted a modified, 2-round Delphi process to develop consensus on ID topics that all graduating medical students should know. Through review of the literature for common diagnoses and high value care, and the medical school curriculum, the authors generated an initial list of 16 topics. An interdisciplinary group of 90 expert faculty educators from Internal Medicine, Family Medicine, Emergency Medicine, and Surgery rated these topics' importance using a 5-point Likert scale, from 0 (absolutely do not include) to 4 (very important). We considered items rated at least 3 (important) by at least 80% of participants to have reached consensus.

**Results.** Sixty of 90 (67%) educators responded to the initial survey, and 48/60 (80%) completed both surveys. Nine additional topics were proposed by first-round participants. After the second round, 14 topics met the consensus criterion. Many common conditions, several dangerous infections, and infectious issues overrepresented in the local population met consensus. However, while many of the topics failing to meet consensus addressed rare conditions or those typically managed by subspecialists, some were also common conditions.

**Conclusion.** Standardizing medical student learning during elective rotations begins with identifying key topics. Our process included a diverse group of educators to determine key topics. We will use this list to guide the content of a new asynchronous, online ID elective curriculum, and we will describe our process as part of a curriculum development toolkit for other elective directors.

**Table 1: List of Topics Meeting the Consensus Criterion for Inclusion**

| Topic  | Mean Rating | % Rating $\geq$ 3 |
|--|-------------|-------------------|
| Health-Care Associated Infections            | 3.92        | 98                |
| Pneumonia/Lower Respiratory Tract Infections | 3.92        | 98                |
| Skin & Soft Tissue Infections                | 3.90        | 100               |
| Sepsis - Initial Evaluation & Management     | 3.90        | 98                |
| Bacteremia/Endocarditis (IE)                 | 3.88        | 100               |
| Urinary Tract Infections                     | 3.75        | 100               |
| Meningitis/Encephalitis                      | 3.63        | 94                |
| Tuberculosis (TB)                            | 3.40        | 90                |
| HIV Prevention, Epidemiology, Diagnosis      | 3.33        | 90                |
| Upper Respiratory Tract Infections           | 3.31        | 81                |
| Infectious Diarrhea/Enteric Infections       | 3.19        | 85                |
| Post-Operative Fever/Infections              | 3.06        | 85                |
| Osteomyelitis                                | 2.96        | 81                |
| Opportunistic Infections in HIV/AIDs         | 2.96        | 83                |

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**980. Using Videoconferencing with the Clinical Microbiology Lab to Enhance Medical Student Learning During Clinical Rotations**

Peter Chin-Hong, MD and Brian Schwartz, MD, Division of Infectious Diseases, University of California, San Francisco, San Francisco, California

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**Background.** Preclinical medical student learning in the microbiology laboratory traditionally focuses on enhancing understanding of microbiology but less on understanding clinical workflow. During a novel course that revisited foundational sciences during clerkships, we designed a virtual microbiology laboratory session to enhance understanding and familiarity with clinical workflow on testing of patient samples.

**Methods.** The virtual microbiology laboratory sessions were conducted twice in 2018, each including 80 third-year medical students. Clinical cases were used to build upon foundational knowledge. We live-streamed video and audio content from the clinical microbiology laboratory to a remote classroom via the Zoom videoconferencing platform. We conducted the session as a tour and lively interview with microbiology staff who explained the processing as well as diagnostic testing Methods. Students were able to ask questions. To evaluate the sessions we (1) distributed a quantitative survey using a 5-point Likert scale (5 = strongly agree) and (2) conducted focus groups with learners. Qualitative data were analyzed using open and axial coding.

**Results.** In a questionnaire administered to 160 students, 74% of respondents agreed that the technical aspects and faculty in the session provided the feeling on a "hands-on" tour. Of the respondents, 58% reported that they would be more likely to contact the microbiology laboratory team for help in ordering or interpreting various laboratory tests. In focus groups, learner reflections reinforced the ability of this format to ensure standardization with each student getting to clearly see the demonstration and hear instructor perspectives. Students also appreciated the linear approach of following a specimen from arrival to the laboratory, a better understanding of the laboratory staff and their roles in performing and interpreting laboratory tests. The live feed could be enhanced further by better audio and video synchronization and by reducing ambient noise.

**Conclusion.** Videoconferencing with the clinical microbiology laboratory can be used to effectively teach microbiology and infectious diseases content to advanced medical students. Whether this exposure to the microbiology laboratory can enhance patient care outcomes requires further study.

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**981. A Comprehensive Survey of Infectious Diseases Curriculum Among US Pharmacy Schools**

Meghan Jeffres, PharmD<sup>1</sup>, Wesley Kufel, PharmD, BCPS, AAHIVP<sup>2</sup>, Lauren Biehle, PharmD, BCPS<sup>3</sup>, Jonathan Cho, PharmD, BCPS<sup>4</sup>, Navaneeth Narayanan, PharmD, BCPS, Epidemiology<sup>5</sup> and Conan Macdougall, PharmD, MAS, BCPS<sup>6</sup>, <sup>1</sup>Department of Clinical Pharmacy, University of Colorado Skaggs School of Pharmacy, Aurora, Colorado, <sup>2</sup>Pharmacy Practice, Binghamton University School of Pharmacy and

Pharmaceutical Sciences, Binghamton, New York, <sup>3</sup>University of Wyoming School of Pharmacy, Laramie, Wyoming, <sup>4</sup>The University of Texas at Tyler College of Pharmacy, Tyler, Texas, <sup>5</sup>Rutgers School of Public Health, Piscataway, New Jersey and <sup>6</sup>Department of Clinical Pharmacy, University of California San Francisco School of Pharmacy, San Francisco, California

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**Background.** Pharmacists are key partners in institutional antimicrobial stewardship and require adequate knowledge and skills in antimicrobial pharmacotherapy to fulfill this role, whether or not they have specialized postgraduate training in infectious diseases (ID). The objective of this study was to describe ID topics and teaching strategies across US schools of pharmacy.

**Methods.** A 23-question electronic survey was sent to ID faculty or curricular deans at all 137 US pharmacy schools.

**Results.** Surveys were collected from 106 schools (77% response rate). ID curriculum was allotted 60 (IQR 40–80) hours of classroom time and primarily taught in the third year. Respondents dedicated 33% of curriculum hours to ID fundamentals and 66% to disease states. Content was primarily delivered through traditional lectures compared with active learning (75% and 25%, respectively). Greater than 94% of schools taught all tier 1 ID topics from the 2016 American College of Clinical Pharmacy Pharmacotherapy Didactic Curriculum Toolkit. Utilization of active learning methods and time allocated to ID fundamentals differed across schools. Public schools dedicated more time to antimicrobial fundamentals than private schools (40 vs. 30 hours,  $P = 0.023$ ). Schools using a block schedule allotted more classroom hours to ID content than schools using semester or quarter schedules (77.5 vs. 60 vs. 50 hours,  $P = 0.001$ ). Schools established less than 5 years ago devoted more classroom hours to active learning than schools established 5 to 10, 11 to 20, and greater than 20 years ago (65 vs. 25 vs. 25 vs. 20,  $P = 0.012$ ). Private schools were more likely to consistently or frequently use audience response systems (86% vs. 68%,  $P = 0.037$ ) and concept maps (27% vs. 6%,  $P = 0.005$ ) compared with public schools. Public schools were more likely to use debates (18% vs. 2%,  $P = 0.006$ ). Schools established 10 or less years ago were more likely to use concept maps (28% vs. 12%,  $P = 0.050$ ), games (38% vs. 19%,  $P = 0.050$ ), and simulation (41% vs. 18%,  $P = 0.015$ ).

**Conclusion.** Increased communication and collaboration between ID pharmacotherapy educators is warranted to increase consistency of ID education and distribution of educational innovations.

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**982. Summer Outbreak of Severe RSV-B Disease, Minnesota, 2017**

Beth Thielen, MD, PhD<sup>1</sup>; Erica Bye, MPH<sup>2</sup>; Xiong Wang, DVM, PhD<sup>3</sup>; Hannah Friedlander, MPH<sup>4</sup>; Stacene Maroushek, MD, PhD<sup>5</sup>; Meghan Shilts, MHS<sup>5</sup>; Anna Strain, PhD<sup>6</sup>; Kathryn Como-Sabetti, MPH<sup>2</sup>; Patricia Ferrieri, MD, FIDSA<sup>6</sup> and Ruth Lynfield, MD, FIDSA<sup>7</sup>, <sup>1</sup>Adult and Pediatric Infectious Diseases, University of Minnesota, Minneapolis, Minnesota, <sup>2</sup>Minnesota Department of Health, St. Paul, Minnesota, <sup>3</sup>Minnesota Department of Health, Saint Paul, Minnesota, <sup>4</sup>Hennepin County Medical Center, Minneapolis, Minnesota, <sup>5</sup>Vanderbilt University, Nashville, Tennessee, <sup>6</sup>Department of Laboratory Medicine and Pathology, University of Minnesota Medical Center, MHealth, Minneapolis, Minnesota and <sup>7</sup>State Epidemiologist and Medical Director for Infectious Diseases, Epidemiology and Community Health, Minnesota Department of Health, St. Paul, Minnesota

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**Background.** Respiratory syncytial virus (RSV) causes seasonal outbreaks peaking from October to April in the United States. While symptoms are typically mild and limited to the upper respiratory tract in older children and adults, RSV can cause severe lower respiratory disease, hospitalization and death, particularly among younger children, the immunocompromised and the elderly. During summer 2017, the Minnesota Department of Health (MDH) received a report of a cluster of severe respiratory illness in children with RSV-B infection admitted at an urban county hospital.

**Methods.** MDH conducts surveillance for RSV in Minneapolis-St. Paul with collection of respiratory specimens and clinical and demographic data. We compared characteristics of cases reported in summer 2017 with the previous 4 summer seasons. To understand the genetic relatedness among viruses, we performed complete genome sequencing from primary specimens using an Illumina MiSeq platform employing both a sequence-independent sequencing method and an RSV-specific, overlapping PCR-based approach.

**Results.** From May to September 2017, 58 cases of RSV (48 RSV-B) were reported to MDH compared with 18 (7 RSV-B) during the same period in 2016, 27 in 2015, and 29 in 2014. The median age and frequency of co-morbidities were similar across years; however, 50% required ICU admission in 2017 compared with 12% in preceding 3 years. The RSV-B genome was sequenced from 10 specimens from March to May 2016, 20 specimens from May to September 2017 and 30 specimens from October 2017-January 2018. Phylogenetic analysis revealed that 15 cases from May to September 2017 formed a unique clade distinct from the lineage encompassing 2016 cases from Minnesota and 35 representative complete RSV genomes in GenBank isolated from 6 continents over 13 years. From October 2017 to January 2018, we detected co-circulation of viruses from both lineages among older adults and children.