Disclosures. Brian L. Harry, MD PhD, Summit Bioslabs Inc. (Grant/Research Support, Shareholder) Mara Couto-Rodriguez, MS, Biotia (Employee) Dorottya Nagy-Szakal, MD PhD, Biotia Inc (Employee, Shareholder) Niam B. O’Hara, PhD, Biotia (Board Member, Employee, Shareholder) Shi-Long Lu, MD PhD, Summit Bioslabs Inc. (Grant/Research Support, Shareholder)

150. Updated Clinical Guidelines for Treatment and Prophylaxis of Plague

Cheryl A. Olson, MD MPH1; Katharine Cooly, MPH2; Shannon Fleck-Derderian, MPH1; Centers for Disease Control and Prevention, Fort Collins, CO; 1Centers for Disease Control and Prevention/Division of Vector-Borne Diseases/Alaka’ina Foundation of Companies, Fort Collins, CO Session: O-31. Respiratory Infections

Background. Plague still occurs naturally in the western United States, Latin America, Asia, and Africa. Yersinia pestis, the causative agent of plague, is a Tier 1 bioterrorism agent due to its potential for release and high fatality rates. Recommendations for treatment and post-exposure prophylaxis (PEP) of plague were published in 2000 and included limited first-line options for treating plague, namely streptomycin or gentamicin. Doxycycline or ciprofloxacin were recommended for PEP. However, since 2000 new human clinical data and animal data have become available, and the FDA has approved additional antimicrobials for plague.

Methods. CDC developed updated, evidence-based guidelines for treatment and prophylaxis of plague using a comprehensive process. To collect evidence on relative efficacy of various antimicrobials for treatment of plague, the guidelines team conducted systematic literature reviews and analyzed U.S. surveillance data. Results of these investigations were published in Clinical Infectious Diseases in 2020. We also hosted several meetings with subject matter experts and clinical organizations (IDSA, AAP, etc.), federal agencies, and others to review relevant data and gather individual input on treatment and prophylaxis of plague.

Results. The forthcoming plague guidelines will include several important updates. First-line treatment options have been expanded to include ciprofloxacin, levofloxacin, and moxifloxacin in addition to streptomycin and gentamicin. For PEP, levofloxacin and moxifloxacin are now first-line options in addition to doxycycline and ciprofloxacin. Trimethoprim-sulfamethoxazole is now one of several new alternative options for PEP. The updated guidelines also include recommendations for treatment of clinical forms of plague other than pneumonic. Additional special populations such as immunocompromised persons and neonates are also covered.

Conclusion. Plague remains a threat, both as a naturally occurring disease and as a potential bioterrorism weapon, and preparedness and early recognition are key to effective response. The updated clinical guidelines will be a useful tool for clinicians to manage antimicrobial treatment and PEP for plague.

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151. Simplifying Empirc Antimicrobial Therapy Selection for Lower Respiratory Tract Infections in Intensive Care Unit Patients: Using Resistance Frequency to Guide Decision Making

Kenneth Klinker, PharmD1; Levita K. Hidayat, PharmD BCIDP2; C. Andrew DeRyke, PharmD3; Mary Motyl, PhD4; Karri A. Bauer, PharmD5; ‘Merck & Co, Inc, Kenilworth, New Jersey; 2Merck & Co, Inc, Kenilworth, New Jersey; 3Merck & Co, Inc., Kenilworth, New Jersey

Session: O-31. Respiratory Infections

Background. In the US, the burden of multidrug resistant bacterial infections, including carbapenem-resistant P. aeruginosa (CRPA) and ESBL-producing Enterobacteriaceae (ESBL-E), is substantial. These resistant pathogens may affect the delivery of timely effective therapy. The aim of this study is to evaluate beta-lactam (BL) susceptibility trends based on the aggregate frequency of CRPA and a combined ESBL-E phenotype (K. pneumoniae (KPn) + E. coli (EC)) observed in critically ill patients with lower respiratory tract infections (LRTI).

Methods. In 2016-2019, ~20 US institutions per year submitted up to 250 gram-negative pathogens as part of the Study for Monitoring Antimicrobial Resistance Trends. A total of 471 PA, 380 KPn, and 336 EC isolates were collected from ICU patients with LRTI. MICs were determined using broth microdilution and interpreted using 2011 CLSI breakpoints. ESBL-E phenotype was defined as: ceftriaxone MIC ≥ 2 mcg/mL. Institutions were stratified into two groups based on frequency of CRPA and combined ESBL-E phenotype: Group 1: CRPA ≤ 15% and ESBL-E ≤ 15%; Group 2: CRPA > 15% and ESBL-E > 15%. Based on CLSI guidance, an empiric antibiotic susceptibility threshold of ≥80% was deemed optimal.

Results. Overall, CRPA and ESBL-E phenotypes were identified in 28.4% and 21.2% of isolates, respectively. Aggregate BL susceptibility in group 1 was above the breakpoint for ceftazidime (CEF), piperacillin/tazobactam (TZP), meropenem (MEM), ceftolozane/tazobactam (C/T), and imipenem/relebactam (I/R) (Table 1). However, as frequency of CRPA and ESBL-E exceeded 15%, aggregate BL susceptibility declined to 77.3%, 79.3%, and 86.2% for CEF, TZP, and MEM, respectively. In contrast, C/T and I/R maintain susceptibility above the empiric susceptibility threshold.

Table 1. Aggregate susceptibility of P. aeruginosa, E. coli, and K. pneumoniae ICU LRTI isolates stratified by resistance frequency: Best (Group 1) and worst-case (Group 2) scenarios

Organism | n | CEF | TZP | MEM | CRPA | ESBL-E | Group 1 | Group 2 | Group 1 | Group 2
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
P. aeruginosa | 203 | 97.5 | 98.5 | 88.2 | 85.3 | 94.1 | 92.4 | 54.8 | 62.9 | 54.8
E. coli | 123 | 97.6 | 100 | 98.4 | 92.7 | 100 | 98.4 | 100 | 98.4 | 100
K. pneumoniae | 127 | 97.6 | 99.2 | 96.0 | 94.5 | 99.2 | 98.4 | 94.5 | 99.2 | 99.2

Conclusion. In ICU patients, exceeding CRPA and combined ESBL-E phenotype frequency of 15% for both classifications, impacts susceptibility to 1st line BLs resulting in a failure to achieve empiric susceptibility thresholds. This stratification could serve as a decision point for triggering earlier susceptibility testing or modifying empiric therapy recommendations for LRTI to include newer agents pending microbiology results.

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152. Sharp Decline in Rates of Community Respiratory Viral Infections Among NIH Clinical Center Patients During the COVID-19 Pandemic

Michele Woolbert, MPH1; Sinet Sinai, PhD, MPH2; Christine Spalding, BSN3; David K. Henderson, M.D.1; Tara N. Palmore, MD4; National Institutes of Health, Bethesda, Maryland; 1NIH, Bethesda, MD; 2NIH Clinical Center, Maryland

Session: O-31. Respiratory Infections

Background. During the first year of the COVID-19 pandemic, nonpharmaceutical interventions had a broad impact on viral transmission apart from SARS-Cov-2. The NIH Clinical Center has used the BioFire FilmArray multiplex PCR respiratory pathogen panel (RPP) for evaluation of upper respiratory symptoms since 2014. Beginning in 3/20, respiratory samples from symptomatic patients were tested by SARS-Cov-2 PCR and the RPP. We performed a retrospective study comparing frequency and rates of community respiratory viruses detected by RPP from 1/14 through 3/21.

Methods. Results of RPPs from nasopharyngeal swabs/washes, bronchoalveolar lavages, and bronchial washes were included. Results from viral challenge studies were excluded. Charts were reviewed to determine whether repeat positives for the same virus within 12 months represented new infections; repeats from the same infection were excluded. A quantitative data analysis was completed using cross tabulations; comparisons were done using mixed models, applying Dunnett’s correction for multiple comparisons.

Results. A total of 3,329 patients underwent 8,122 RPPs from 1/14 through 3/21. Frequency of all respiratory pathogens declined from an annual range of 0.88%-1.97% from 1/14-3/20 to 0.29% in 4/20-3/21 (p < 0.001). Individual viral pathogens declined across this timeframe, with zero cases of influenza A/B, parainfluenza, or metapneumovirus detected from 4/20-3/21. One case each of adenovirus, RSV, CoV OC43, and CoV HKU1 were detected in 4/20-3/21. Rhino/enterovirus detection...
Frequency of detection of all respiratory pathogens tested using the Biofire FilmArray multiplex PCR respiratory pathogen panel from January 2014 through March 2021. The frequency of pathogen detection from April 2020 through March 2021 declined substantially in comparison with previous years.

Frequency of detection of influenza A, influenza B, rhinovirus/enterovirus, para-influenza (1, 2, 3, 4), and respiratory syncytial virus from January 2014 through March 2021. The frequency of detection of these pathogens declined sharply starting in April 2020.

**Conclusion.** During the pandemic, the burden of viral respiratory infections detected among patients at the NIH Clinical Center improved considerably. This relief was likely thanks to the layered COVID-19 prevention and mitigation measures implemented in the community and the hospital: masking, distancing, symptom screening, isolation and testing symptomatic persons. As COVID-19 vaccination allows relaxation of masking, community transmission of respiratory viruses will likely resume; continued mask-wearing in the hospital may provide an enduring benefit by preventing nosocomial transmission.

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153. Gone Are the Other Respiratory Viruses During COVID…but the Rhinovirus/Enterovirus “Cockroach” Persists! Jasjit Singh, MD, FAAP, FIDSA1; Beth Huff, RN, CPN2; Delma Nieves, M.D.2; Wendi Gornick, MS, CIC, FAPIC1; 1CHOC Children’s, Orange, CA; 2UC Irvine / Children’s Hospital Orange County, Orange, California

**Session:** O-31. Respiratory Infections

**Background.** In a typical winter respiratory season, Influenza A, Influenza B, Respiratory Syncytial Virus (RSV) and human Metapneumovirus (hMPV) infections are common in pediatrics. During the COVID-19 pandemic, we noted a marked decrease in all except for Rhinovirus/Enterovirus at our free-standing quaternary level children’s hospital.

**Methods.** We prospectively reviewed all patients with positive testing for viral respiratory pathogens from October 1, 2018 through May 29, 2021. Testing was done by polymerase chain reaction (PCR) (BioFire® FilmArray® Respiratory 2 Panel, UT) and by SARS-CoV-2 PCR testing (Cepheid®, CA). The latter may have been done for pre-procedure or admission screening. We submitted 74 specimens to the California Department Public Health (CDPH) for definitive identification and serotyping analysis.

**Results.** The number of Rhinovirus/Enterovirus (RV/EV) infections was compared with Influenza A & B, RSV, and hMPV over the past 3 years. There was a 152% increase in RV/EV from 2018-2019 to 2020-2021 with near absence of other respiratory viruses (Figure 1). In 2020-2021, RV/EV (N=877, 84%) made up a larger percentage of all viral etiologies compared to 2018-2019 (N=348, 11%) (Figure 2). Healthcare acquired infections (HAI) due to respiratory viruses decreased in 2020-2021 compared to both of the prior seasons, though all cases were due to RV/EV (Figure 3). There were no RV/EV associated deaths. Of 74 submitted, CDPH did typing on 24 samples; all were found to be rhinovirus (RV).

**Conclusion.** We experienced a marked increase in RV/EV during COVID precautions, despite a near absence of other common respiratory viruses. This was reflected in both our community data and HAI due to respiratory viruses. There was a marked increase in RV/EV starting with week 18 (Figure 4). We hypothesize this is due to schools’ re-opening. Understanding RV epidemiology and transmission is important, as it may inform return to school and work protocols for the upcoming respiratory viral season.

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**Figure 1. High-Risk Winter Viral Infections 2019-2021.**

**Figure 2. Distribution of Winter Viral Pathogens 2018-2019 Compared to 2020-2021 Season.**

**Figure 3. Winter Viral Healthcare Associated Infections 2019-2021.**

**Figure 4. Rhinovirus/Enterovirus by Week for the 2020-2021 Season.**

**Rhinovirus/Enterovirus Trends**
September 27, 2020 - May 29, 2021

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