There was a higher frequency of detection of rhinovirus, but not other viral and bacterial pathogens among adults who were active smokers. (Table 1)

- Detection of S. aureus was more common among those with influenza (OR: 1.68, 95% CI:1.12, 2.51) and CVEV (OR: 1.55, 95% CI: 1.35, 1.80), followed by Pseudomonas aeruginosa, Moraxella catarrhalis, and Haemophilus influenzae, which were similarly higher among children (OR: 2.33, and OR: 2.48, respectively). Increased detection of S. aureus was also observed only for children with RSV (OR: 2.06, 95% CI: 1.13, 3.73).
- Increased detection of H. influenzae was not observed for any viral pathogen nor either age group. (Table 2)

There was an overall higher detection of rhinovirus, but not other viral and bacterial pathogens among adults who were active smokers. (Table 1)

**Results**

- There was a higher frequency of detection of rhinovirus, but not other viral and bacterial pathogens among adults who were active smokers. (Table 1)

- Detection of S. aureus was more common among those with influenza (OR: 1.68; 95% CI:1.12, 2.51) and CVEV (OR: 1.55; 95% CI: 1.35, 1.80). Moraxella catarrhalis and Haemophilus influenzae, which were similarly higher among children (OR: 2.33, and OR: 2.48, respectively). Increased detection of S. aureus was also observed only for children with RSV (OR: 2.06; 95% CI: 1.13, 3.73).

- Increased detection of H. influenzae was not observed for any viral pathogen nor either age group. (Table 2)

**Conclusions**

- Young age and day care attendance was associated with more frequent detection of viral and bacterial respiratory pathogens among children with ILI.

- Smoking was not associated with more frequent detection of bacterial pathogens among adult ILI cases.

- Increased detection of Staphylococcus aureus was found for several viral pathogens, whereas increases in S. pneumoniae were only observed among patients with influenza. Further evaluations of viral-bacterial co-detections are warranted, particularly as related to etiology and symptom severity.

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**Patterns of Viral and Bacterial Co-detection among Otherwise Healthy Adults with Influenza-like Illness: Utilization of a Multiplex Respiratory Pathogen Panel**

Michelande Ridore MS2,2, Wei-Ju Chen PhD2,2, Mary P. Fairchok MD3,3, Christina Schofield MD1, Kristina St. Clair DO MTM&H1, Patrick J. Danaher MD6, Michael Rajnik MD1, Erin McDonough BS1, Leslie Malone MS, MBA(SCP)C2, Elena Grogorenko PhD1, Donald Stalons PhD3, Deepika Mor MS2,3, Timothy H. Burgess MD MPH1, John C. Arnold MD1, Eugene V. Millar PhD1,2

1 Infectious Disease Clinical Research Program, Bethesda, MD; 2 Naval Medical Center San Diego CA; 3 Madigan Army Medical Center, Fort Lewis WA; 4 Naval Medical Center Portsmouth VA; 5 San Antonio Military Health System, San Antonio TX; 6 Walter Reed National Military Medical Center, Washington DC; 7 Naval Health Research Center, San Diego; 8 Diatherix Laboratories, Huntsville AL; 9Henry M. Jackson Foundation for the Advancement of Military Medicine, Bethesda MD

**Introduction**

- Bacteria such as Strepptococcus pneumoniae, Neumaphilus influenzae, and Staphylococcus aureus frequently colonize the nasopharynx of healthy individuals. During acute respiratory infection (ARI), the majority of which are viral in origin, these and other bacteria may worsen the severity of disease.

- To examine these associations, we used a multiplex assay to evaluate patterns of viral-bacterial co-detection among otherwise healthy individuals with influenza-like ILI.

**Methods**

- Since 2009, we enrolled otherwise healthy medical personnel and beneficiaries into an observational longitudinal study of influenza-like illness (ILI) at five military treatment facilities across the continental United States (Figure 1).

- Eligibility. Patients presenting for care <72h after the onset of ILI, defined as fever (temperature of 100.4°F or greater at the time of evaluation, or by self-report) and sore throat or one of the following respiratory symptoms: cough, sputum production, shortness of breath, or chest pain. Patients with underlying medical conditions were excluded.

- Clinical and demographic information, and a nasopharyngeal swab was collected at baseline (day 0). 594 participants returned on days 1-5; 726 on days 1-7; and 1,164 patients completed the daily symptom diary for the seven days following ILI onset. Symptom presence and severity was recorded either by self-report (diary) or interview as: 0 (none); 1 (mild; not changing activity or requiring treatment); 2 (moderate; requiring some modification in activity or medication); and 3 (severe; unable to perform usual activities or requiring medical treatment and/or medication). Participants were trained by research personnel on the definitions of each score. Swabs were tested for influenza by real time reverse transcription polymerase chain reaction (rRT-PCR) at the Naval Health Research Center (San Diego, CA).

- A target-enriched multiplex PCR (TEM-PCR) panel for 13 bacterial and 10 viral respiratory pathogens was developed by Diatherix Laboratories, LLC, Huntsville, AL. The platform relies upon nested multiplex PCR to provide the initial target enrichment and sequence information to correctly label the PCR products. The viral respiratory pathogens on the panel include: adenovirus, coxackievirus/A/Echovirus, bovavirus, coronaviruses, human metapneumovirus, rhinovirus, influenza A/B, parainfluenza and respiratory syncytial virus. The bacterial respiratory panel on the pathogen include: Strepptococcus pneumoniae, Neumaphilus influenzae, Moraxella catarrhalis, Staphylococcus aureus, Strepptococcus pyogenes, Klebsiella pneumoniae, Pseudomonas aeruginosa, Staphylococcus aureus, and Neisseria meningitidis.

- Statistical analyses were performed using SAS (Version 9.3; SAS Institute, Cary, NC). The study was approved by the Infectious Disease Institutional Review Board of the Uniformed Services University of the Health Sciences (ICDRP-045).