Epidemiology, Seasonality and Coinfections of Community Respiratory Viral Infections at UMASS Memorial Medical Center between 2010 and 2013.

Aline Azar1 MD; Melissa McGuirt2; Shannon Stock2; Julien Fahed2 MD; Apurva Akkad2; Shu Yang3; Tara Bouton3 MD; Dung Nguyen1; Richard T. Ellison III1 MD
1. Division of Infectious Diseases and Immunology, University of Massachusetts Medical School; 2. Department of Internal Medicine, University of Massachusetts Medical School; 3. University of Massachusetts Medical School
4. Department of Mathematics and Computer Science, College of the Holy Cross

**Corrected Abstract**

**Background**: Community Respiratory viruses (CRV) infections have a significant clinical impact and have been increasingly studied and proven in immunocompromised patients, children, and elderly. There is a difference in epidemiology and seasonality among different viruses and coinfections are well reported. We have sought to further define the epidemiology of these pathogens through a review of CRV infections at a tertiary care center in Massachusetts over a span of 4 years. A retrospective cohort study was conducted in all patients who were tested for respiratory viruses by rapid influenza and respiratory syncytial virus (RSV) antigen testing as well as multiplex nucleic acid amplification (RVP) testing for 12 community respiratory pathogens at UMass Memorial Medical Center (UMMMC) between 2010 and 2013. Results: 8108 specimens were tested between January 2010 and December 2013, with 51.6% specimens identifying at least one respiratory virus. Among the tested patients, 60.4% were adults (≥18) vs 39.6% pediatric patients and 52% men vs 47% women. Among the positive specimens, 43% were adults vs 57% pediatric patients, 53% men vs 47% women, 73.5% inpatient vs 24.7% outpatient, and 86% immunocompetent vs 14% immunocompromised (HIV or malignancies). Pronounced seasonal variation was found with influenza viruses, RSV, and human metapneumovirus, and with the other CRVs. Rhinovirus was the most frequent virus isolated followed by RSV and influenza A. Influenza A was more common in adults, while Rhinovirus and RSV more in children. Rhinovirus was the most common virus in immunocompromised patients. We identified significant differences in the frequency of infection by gender for several of the CRVs. Influenza A was more common in women (p=0.01) and parainfluenza 1, rhinovirus and adenovirus in men (p <0.05). 377 patients were infected with more than one virus; most prevalent coinfections were seen with PIV, MPV, Rho, RSV and adenovirus and the least with Flu A and B. The most common 5 combinations were Rhino/RSV followed by Rhino/Adv and RSV/Adv and MPV/Rhino. Most of the coinfections were seen in Peds (statistically significant with Rhino and Adv) and Men (not statistically significant).

**Methods**

**Molecular detection of viruses and Data collection**

**Rapid influenza and respiratory syncytial virus (RSV) antigen testing as well as multiplex nucleic acid amplification (RVP) testing were performed. Medical records of the patients were reviewed, demographic and clinical characteristics were collected. The results were stratified according to age, gender, location and immune status. Virus and month**

**Results**

**Basic demographics**

- **Distribution by Age**
  - **Distribution by Gender**
  - **Distribution by Location**
  - **Distribution by Immune Status**

**Epicurpe of CRVs at UMASS Memorial Medical Center**

**Coinfections**

**Primary objective: 1. Report the epidemiology, the seasonality and coinfections of different respiratory viruses. 2. Assess for any difference based on age, gender or immune status**

**Statistical analysis**

- Data are expressed as mean ± SD, median (interquartile range), or number (%).
- Baseline measures were compared with T-test for variables meeting assumptions of normality and Chi-squared test for categorical variables.
- P <0.05 was considered as the level of significance.
- The program used was STATA.
- Data were stratified according to age, gender, location and immune status . Incidence of co-infections was also assessed according to these groups

**Discussion**

Epidemiology and seasonality was similar to prior studies

- Pronounced seasonal variation was found with influenza viruses, RSV, and human metapneumovirus, and with the other CRVs.

- Most prevalent coinfections were seen with PIV, MPV, Rho, RSV and adenovirus and the least with Flu A and B.

- The most common isolates in IS were Rhino followed by FLU A and RSV.

- 377 patients (8%) were infected with more than one virus.

- Most prevalent coinfections were seen with PIV, MPV, Rho, RSV and adenovirus and the least with Flu A and B.

- The most common 5 combinations were Rhino/RSV followed by Rhino/Adv, PIV/Rhino, RSV/Adv and MPV/Rhino.

- Most of the coinfections were seen in Peds (statistically significant with RSV and rhino) and Men (not statistically significant).

- There was a statistical difference in gender where Flu A was more common in women (p<0.001) and PIW 1, rhinovirus and adenovirus in men (p<0.05).

**Conclusion**

It has been known that, in general, males are more susceptible to infectious diseases than females.

Multiple studies have documented this sex bias in susceptibility to certain bacterial, parasitic, and viral infections. Multiple studies have addressed the differences in men and women in their innate, humoral, and cell-mediated immune responses to viral vaccines as well as being more prone to some diseases over others with sex being the plausible explanation.

It has been reported that men were more affected with most of the type of RTI and more vulnerable to the clinical courses [11,13]. Few have reported women being more affected (11,13)

One study so far analyzed different viruses and found statistical difference with men being affected (14)

**References**