Can Analysis of Routine Viral Testing Provide Accurate Estimates of Respiratory Syncytial Virus (RSV) Disease Burden in Adults?

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**BACKGROUND**

Respiratory Syncytial Virus (RSV) is a RNA virus first identified in 1956. RSV is being recognized more often as a significant cause of respiratory illness in older adults. Disease usually averages over two weeks, and symptoms are consistent with an upper respiratory tract infection but some high-risk adults, such as those with chronic illnesses or immunosuppression, may have more severe symptoms consistent with a lower respiratory tract infection, such as pneumonia. There is growing evidence that rates of health care utilization, hospitalization, morbidity and mortality among adults with RSV infection may be similar to those observed with influenza infection. Most studies to date which focus on disease burden in adults utilize data derived from RSV testing done as part of research. Notably, many commercial influenza PCR assays are multiplexed with RSV and Rochester General Hospital (RGH) uses such a test (Simplexa®). Thus, adult RSV cases are incidentally detected as a result of influenza testing. If such data are used to confirm adult RSV disease burden it will be necessary to examine such data bases for bias.

**METHOD**

- Results of the Simplexa® Influenza/RSV Polymerase Chain Reaction (PCR) assay ordered for routine rapid diagnosis of viral infection in adults seen in the emergency room (ER) or admitted to Rochester General Hospital (Monroe County, NY) from October 2015 to April 2016 were reviewed.
- Charts of adults testing positive for influenza or RSV were reviewed for discharge diagnosis (ICD-10).
- Total number of Respiratory illnesses at Rochester General Hospital during the same period (ER visits and inpatient) were compared to test conducted.
- Common respiratory illnesses - ICD-10 codes for Viral illness, URI, Bronchitis, COPD exacerbation, Asthma exacerbation, Pneumonia, Acute respiratory Failure.

**RESULTS**

- 3956 Total PCR assays
- 536 Positive
- 133 RSV 103 Hospitalized
- 403 Influenza 188 Hospitalized

<table>
<thead>
<tr>
<th>ICD 10 Diagnosis</th>
<th>RSV (n=103)</th>
<th>Influenza (n=188)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Discharge Diagnosis</td>
<td>5 (5%)</td>
<td>56 (30%)</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>Other Discharge Diagnosis</td>
<td>51 (50%)</td>
<td>149 (79%)</td>
<td>&lt;0.005</td>
</tr>
<tr>
<td>No Mention of Respiratory Disease</td>
<td>52 (50.5%)</td>
<td>39 (21%)</td>
<td>&lt;0.005</td>
</tr>
</tbody>
</table>

**CONCLUSIONS**

- Routine viral testing to estimate RSV disease burden in adults may be useful but certain limitations should be kept in mind.
- The role of RSV as a cause of hospitalization among internists and hospitalist is not well appreciated so that mining ICD-10 databases for RSV discharge diagnoses is problematic.
- Testing bias remains a concern. Viral testing was nearly twice as common during periods of high influenza activity compared to periods of RSV activity. Estimates of RSV disease burden using routine viral testing will likely underestimate RSV cases.