Characterizing Respiratory Syncytial Virus-Related Pediatric Disease Severity in Canada.

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Introduction

- In 2019, respiratory syncytial virus (RSV) was associated with 33 million lower respiratory tract infection episodes, 8 million hospital admissions, 30,000 in-patient deaths and 100,000 deaths globally in children under 5 years of age.

- In Canada, RSV is a leading cause of hospitalization for children under 5 years of age. From 2005-2013, incidence of RSV associated hospitalization in Canadian children under 1 year was 10.2 per 1000. About 16.3% of those hospitalized had one or more risk factors for severe infections.

- RSV hospitalization in infancy is associated with 3-fold increased risk of asthma by the age of 5-12 years.

- RSV hospitalization in Canada is associated with substantial costs and the only current medical intervention to prevent severe RSV disease is monthly administration of palivizumab prophylaxis available for high-risk infants with chronic heart or lung conditions or those who are born premature.

- The RSV prevention landscape is radically changing with several vaccine candidates at different stages of regulatory review, including long-acting, monovalent antibody passive immunization for all infants and RSV vaccines for pregnant women.

Aim

To evaluate disease severity in laboratory confirmed RSV hospitalizations in Canadian children, particularly young infants.

Methodology

- This prospective study included patients aged 0-16 years residing in Canada admitted to 13 tertiary care IMPACT (Canadian Immunization Monitoring Program Active) hospitals with laboratory confirmed RSV infection in any of the five RSV seasons (November 2017- June 2022).

- Ethics approval was obtained from IMPACT hospitals. Consent was not required as this is secondary data.

- Nurse monitors actively collected and verified data at these tertiary care hospitals on admission date, discharge date, age, intensive care unit (ICU) admission, and mortality.

- Hospital length of stay (LOS) was estimated from admission and discharge date.

- A descriptive analysis is presented on disease severity by age group (Overall, 0-5 months, 6-11 months, 12-23 months, 2-4 years, 5-9 years, and 10-16 years).

Acknowledgements

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Results

Table 1. Cohort characteristics of laboratory confirmed RSV hospitalizations and outcomes from 2017/2018-2021/2022 seasons at IMPACT hospitals

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Total</th>
<th>Mean (SD)</th>
<th>Median (Q1-Q3)</th>
<th>Male, N (%)</th>
<th>Female, N (%)</th>
<th>ICU Admission, N (%)</th>
<th>LO5-7 Days (LOS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>21,587</td>
<td>16.6 (28.6)</td>
<td>16.1 (26.9)</td>
<td>6 (1 [19])</td>
<td>1,105 (45.5)</td>
<td>1,122 (54.5)</td>
<td>1,200 (49.8)</td>
</tr>
<tr>
<td>0-5 months</td>
<td>1,200 (50.4)</td>
<td>1,241 (40.6)</td>
<td>1,256 (40.4)</td>
<td>23 (9.9%)</td>
<td>313 (27.4)</td>
<td>244 (19.4)</td>
<td>201 (16.7)</td>
</tr>
<tr>
<td>6-11 months</td>
<td>6 (10.0%)</td>
<td>12 (20.7%)</td>
<td>546 (49.8)</td>
<td>11 (19.0%)</td>
<td>1,373 (54.9)</td>
<td>1,196 (45.3)</td>
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<tr>
<td>12-23 months</td>
<td>5,488 (25.0)</td>
<td>516 (17.1%)</td>
<td>451 (17.5%)</td>
<td>1,249 (21.3%)</td>
<td>336 (11.7%)</td>
<td>202 (6.1%)</td>
<td>1,200 (49.8)</td>
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<tr>
<td>2-4 years</td>
<td>1,126 (45.1)</td>
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<td>1,126 (45.1)</td>
<td>1,249 (21.3%)</td>
<td>1,126 (45.1)</td>
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<tr>
<td>5-9 years</td>
<td>416 (17.1%)</td>
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<td>1,126 (45.1%)</td>
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<tr>
<td>10-16 years</td>
<td>1,200 (49.8)</td>
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- Of 29 total RSV associated deaths, 21 (72.4%) were observed in children under 5 years of age.

Conclusion

- RSV hospitalizations in Canada are frequent and approximately half of those are among children under 6 months of age.

- Those aged 0-5 months are more likely to have severe disease from RSV requiring ICU admission or have longer than 7 days of hospital stay, although mortality is rare.

- Consequently, young infants needs to be prioritized for RSV prevention public health program.