The objective of SENTINEL1, an observational study conducted during the 2014–2015 and 2015–2016 RSV seasons, was to characterize RSV-confirmed hospitalizations (RSVH) among US preterm infants born at 29–35 weeks' gestational age (wGA). Studies published from 2013 to 2015 have shown that preterm infants 32–35 wGA not receiving immunoprophylaxis in 2014–2016 were at increased risk for life-threatening RSV disease. From 2009 through mid-2014, the high-risk subset of infants born at 32–34 wGA was recommended to receive RSV immunoprophylaxis for the duration of the RSV season, which were previously reported. Exclusion criteria are as follows:

- Age <12 months at the time of the index RSVH
- Diagnosis of community-acquired RSV disease (index RSVH) during the index RSVH
- Presence of congenital heart disease
- Presence of disease of prematurity
- Mechanical ventilation (IMV), and survival

Studies published from 2013 to 2015 have shown that preterm infants 32–35 wGA not receiving RSV-PV in 2014-3 had increased rates of RSV disease and hospitalization compared with full-term infants. Despite advances in neonatal care, RSV disease is still one of the leading causes of death and illness in preterm infants. The current study aimed to describe the characteristics and outcomes of RSV-confirmed hospitalizations among preterm infants born at 29–35 wGA in the United States during the 2014–2015 and 2015–2016 seasons. The study eligibility period for both seasons was October 1 through April 30. Data analysis for the infants enrolled during the 2015-2016 season is ongoing. Infants <6 months of age accounted for 78% of RSVH observed, 81% of ICU admissions, and 90% of those requiring mechanical ventilation.

Intensive care unit (ICU) admission and invasive mechanical ventilation (IMV) were associated with younger chronologic age and lower gestational age. The relative risk of requiring ICU admission was 3.0 times higher for infants born at <32 wGA compared with infants born at 35 wGA. The relative risk of requiring IMV was 4.2 times higher for infants born at <32 wGA compared with infants born at 35 wGA. Infant mortality was 4.0 times higher for infants born at <32 wGA compared with infants born at 35 wGA.

In summary, the results of this study confirm the increased risk of RSV disease among preterm infants born at 29–35 wGA. The findings highlight the importance of continued surveillance and research to better understand the impact of RSV disease in this vulnerable population and to develop effective strategies to prevent and manage RSV disease in preterm infants.

Results

Table 1. Characteristics of Community-acquired RSV-confirmed Hospitalizations Among All Identified Infants by Gestational Age Group

<table>
<thead>
<tr>
<th>Gestational Age Group</th>
<th>Mean (SD)</th>
<th>Median (IQR)</th>
<th>Range 1–67</th>
<th>1–188</th>
<th>1–101</th>
<th>1–85</th>
<th>1–135</th>
<th>1–113</th>
</tr>
</thead>
<tbody>
<tr>
<td>32–35 wGA</td>
<td>10 (10)</td>
<td>9 (12)</td>
<td>1–67</td>
<td>1–188</td>
<td>1–101</td>
<td>1–85</td>
<td>1–135</td>
<td>1–113</td>
</tr>
<tr>
<td>33–34 wGA</td>
<td>10 (16)</td>
<td>6 (11)</td>
<td>1–188</td>
<td>1–101</td>
<td>1–85</td>
<td>1–135</td>
<td>1–113</td>
<td></td>
</tr>
<tr>
<td>35 wGA</td>
<td>8 (11)</td>
<td>5 (9)</td>
<td>1–101</td>
<td>1–85</td>
<td>1–135</td>
<td>1–113</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean (SD) = mean (standard deviation); Median (IQR) = median (interquartile range); Range 1–67 = range 1–67 days; 1–188 = range 1–188 days; 1–101 = range 1–101 days; 1–85 = range 1–85 days; 1–135 = range 1–135 days; 1–113 = range 1–113 days. ICU = intensive care unit; IMV = invasive mechanical ventilation; IQR = interquartile range; LOS = length of stay; SD = standard deviation.

Figure 1a. Distribution of Community-acquired RSV-confirmed hospitalizations, ICU admissions, and need for IMV Among Infants 29–35 wGA by Chronologic Age During the 2014-2015 Season

Figure 1b. Distribution of Community-acquired RSV-confirmed hospitalizations, ICU admissions, and need for IMV Among Infants 29–35 wGA by Gestational and Chronologic Age Groups During the 2014-2015 Season

Figure 2a. Proportion of Community-acquired RSV-confirmed ICU Admissions and Need for IMV Among Infants 29–35 wGA by Gestational and Chronologic Age Groups During the 2015-2016 Season

Figure 2b. Proportion of Community-acquired RSV-confirmed ICU Admissions and Need for IMV Among Infants 29–35 wGA by Gestational and Chronologic Age Groups During the 2016-2017 Season

Conclusions

- SENTINEL1 is the largest multicenter observational study to examine laboratory-confirmed RSV hospitalizations among US preterm infants 29–35 wGA.
- Consistent with previous studies, earlier gestational age and younger chronologic age was associated with a higher risk of RSV hospitalization.
- Younger chronologic age (<3 months) was associated with a higher risk of ICU admission and need for IMV which was consistent in both seasons.
- Despite advances in neonatal care, RSV disease often is life-threatening in this population. It is crucial to prevent severe RSV disease, particularly during the first months of life when its incidence and severity are highest, could substantially decrease morbidity in these prematurely born infants.