Bronchiolitis Hospitalizations in Rural New England – 2010-2017

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Specific Aim. Investigate the epidemiology of bronchiolitis hospitalizations to inform public health strategies for mitigating the burden of hospitalization for bronchiolitis. .

Methods. A retrospective chart review was conducted of all initial bronchiolitis admissions (N=295) to the Children's Hospital at Dartmouth-Hitchcock between 1 Nov. 2010 to 31 October 2017 using the relevant ICD-9 and 10 codes for this illness. Abstracted data included documentation of respiratory syncytial virus infection (RSV) severity of illness, duration of hospitalization, age in days on admission, weight on admission, prematurity, day care attendance, older siblings, and relevant medical conditions.

Results. In addition to the well-described seasonality and clinical aspects of bronchiolitis, Using PICU admission (seen in 41%) as a surrogate for severity neither weight, chronologic age, nor prematurity influenced the risk of PICU admission to the PICU . By calculating days of life on hospitalization in the 295 infants, this study emphasizes the early onset of serious RSV disease, Figure 1, After sparing in the first two weeks of life (potentially attributable to the 5-7 day incubation period of the disease and cocooning of the youngest infant from the general environment), the most rapid acquisition is in the first 3 months of life with 37% of term and 47% of prematures hospitalized by that age.

We investigated whether the month of hospitalization in the peak months of Jan, Feb and March influenced age at hospitalization with the consideration being that we might find a curve that shifted to a younger age later in the epidemic as older cohorts became immune from contact with the virus.

Figure 1 Kaplan Myer Plot of Age of Hospitalization for RSV

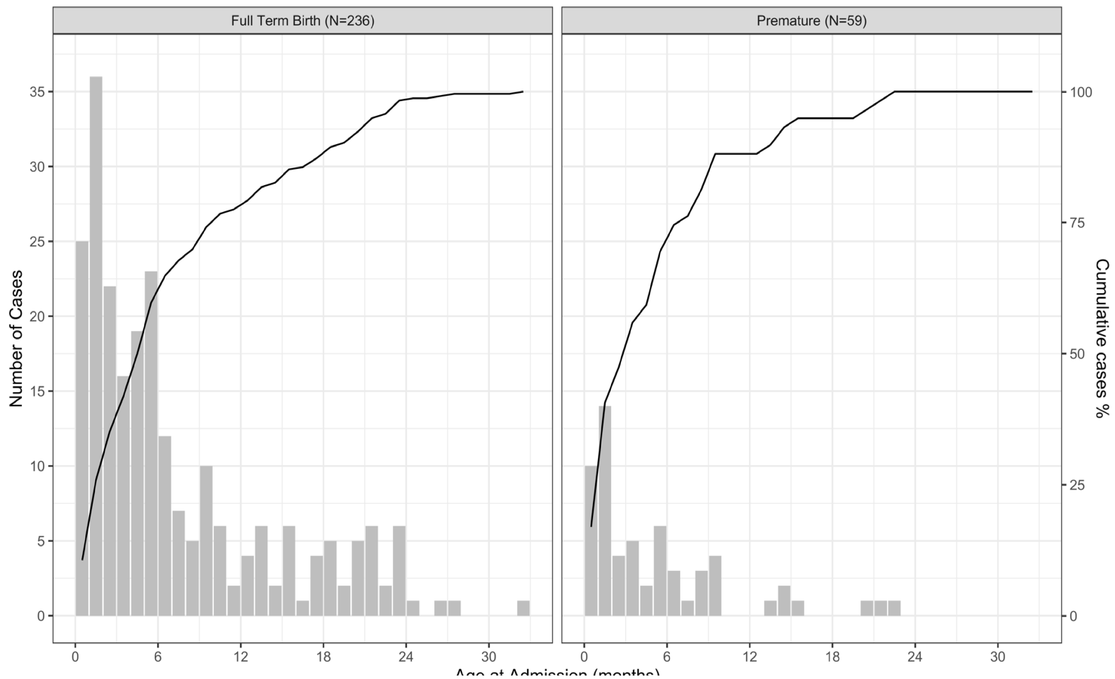
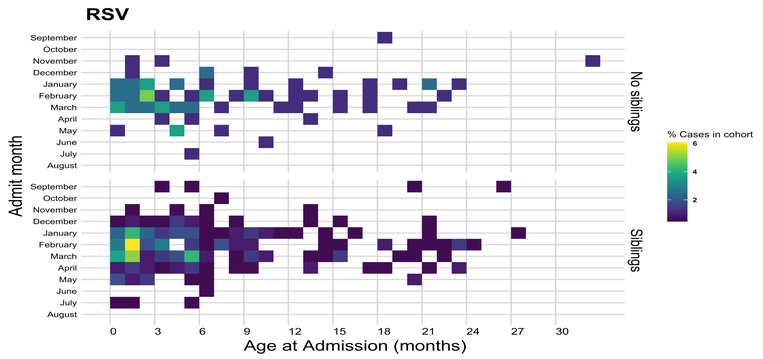


Figure 2 Heat Map of age at hospitalization by sibling status



Results, cont.

That theory of progressive immunity developing during the course of the epidemic did not appear to be the case.

In our cohort young age and the presence of an older sibling in the family were the primary drivers of hospitalization. A major factor in explaining age of hospitalization was having an older sibling in the household The presence of an older sibling, 84%, was strikingly more frequent than in the general population 58%. Having an older sibling led to hospitalization at an earlier age, This is shown in the heat map in Figure 2 .

Discussion. A dogma in the RSV literature is that maternally derived or passively administered serum antibody lowers the risk of hospitalization in a dose dependent fashion. However, this conclusion is not consistently supported by the available literature or by the precise data on age of hospitalization presented here.

We could find no supportive evidence that the anticipated higher level of maternal antibody in the youngest children prevented hospitalization. The curve of acquisition of serious disease is dramatically different than measles – a prototypic illustration of protection by maternal antibody.
The acquisition of RSV and resultant serious disease certainly has having an older sibling as a major risk factor.

In conclusion, we believe that vaccination of the infant in as young an age as possible and having a strategy to vaccinate older children who are vectors of disease may be the most effective strategy