Modeled impact of nirsevimab against respiratory syncytial virus (RSV) among UK infants experiencing their first RSV season

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INTRODUCTION

- Respiratory syncytial virus (RSV) is a leading cause of acute lower respiratory infection (ALRI) in young children[1], such as bronchiolitis, and is associated with significant morbidity, especially among infants.
- Nirsevimab is a monoclonal antibody being developed (Ph3 recently completed) for the prevention of RSV-LRTIs. Understanding its health and economic impact under different scenarios is important to determine the optimal implementation strategy to protect all infants entering their first RSV season.

Objective:

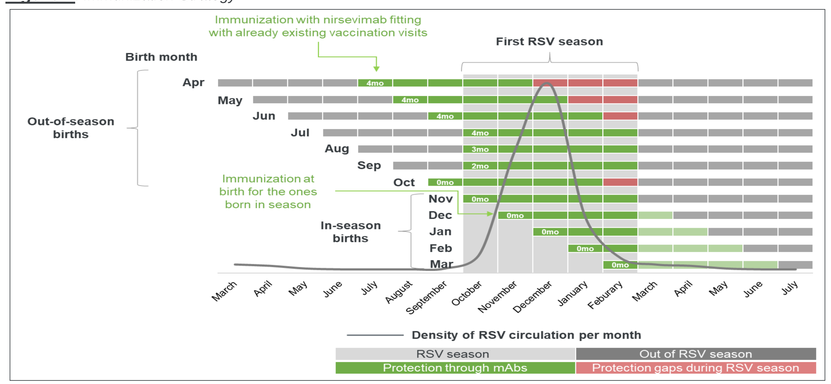
To estimate the potential impact of nirsevimab in a full UK birth cohort compared to current standard of practice (palivizumab for a restricted subset of the birth cohort, and no intervention for others).

METHODS

A static Markov model was developed to estimate RSV-related events and costs in a UK birth cohort over their first RSV season:

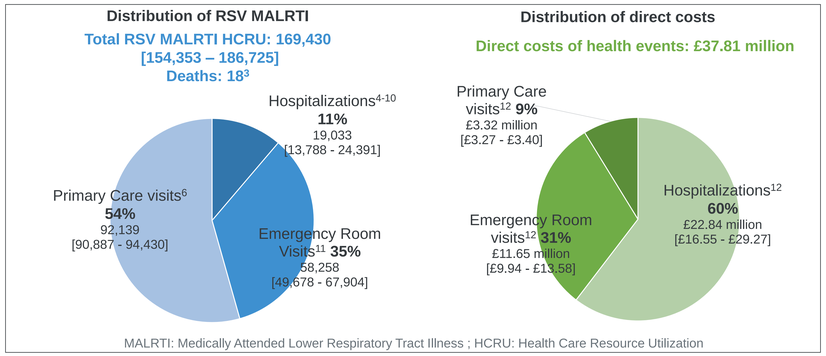
- Monthly cycles to expose the cohort to differential risk of RSV according to age in months at start of the season and circulating seasonal RSV density.
- UK birth cohort stratification to correspond to nirsevimab randomized clinical trial populations (palivizumab eligible infants, as per recommendations, non-eligible to palivizumab preterm and term infants).
- One administration of nirsevimab.
- Five-month duration of protection with constant efficacy.[2]
- Seasonal immunization during pre-existing routine vaccination visits (the closest to the start of the season for infants born outside of the season (OoS) and at birth for those born within the season (WiS) (***Figure 1***).

Figure 1. *Immunization Strategy*



RESULTS

Figure 2. *Current RSV MALRTI burden and related costs over the first season of infants' life – modelled estimates*



MALRTI: Medically Attended Lower Respiratory Tract Illness ; HCRU: Health Care Resource Utilization

Figure 3. *RSV related hospitalization per month of birth over the first season of infants' life – modelled estimates*

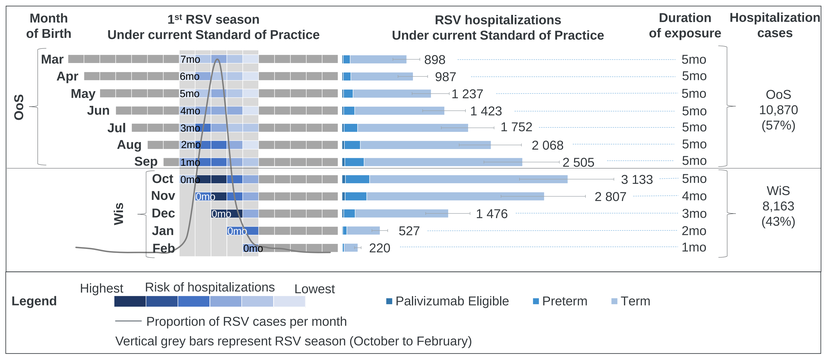
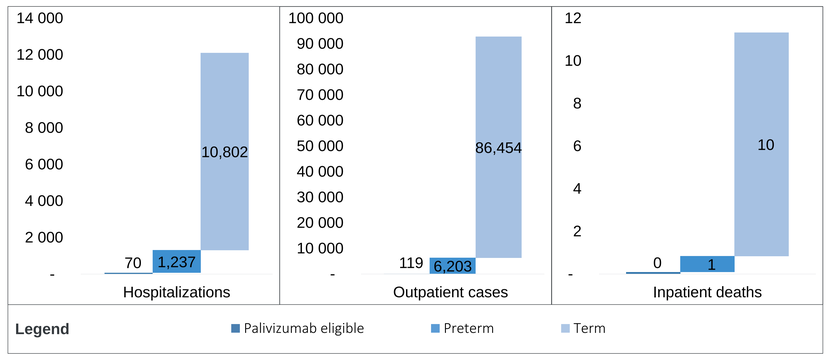


Figure 4. *Prevented RSV MALRTI with nirsevimab – modelled estimates*



RESULTS

Current RSV burden over the first RSV season – *modelled estimates*

- In the overall population, while hospitalizations represent about 10% of the RSV Medically Attended LRTIs (RSV MALRTIs), the associated direct costs represent 60% of the economic burden (***Figure 2***).
- More than 95% of RSV related hospitalizations and inpatient deaths occur in infants not eligible for palivizumab.
- The model shows that 43% of the RSV related hospitalizations occur in infants born WiS and 57% in those born OoS (***Figure 3***). Similarly, 66% of all RSV MALRTI occur in infants born OoS.

Nirsevimab impact vs. Standard of Practice – *modelled estimates*

Considering a theoretical 70%[2] reduction of RSV MALRTIs in non-eligible to palivizumab preterm and term infants) and non-inferiority to palivizumab in the eligible population:

- Nirsevimab would prevent 104,885 [95,552 – 115,591] RSV MALRTIs and about £25M [£20M - £29M] associated costs.
- All infant immunization would prevent more cases in term infants, being the largest subgroup of the birth cohort (***Figure 4***).

DISCUSSION & CONCLUSION

- Currently, most of the RSV related hospitalizations and inpatient deaths occur in infants for whom no prevention is recommended today.
  - Protection of the whole annual birth cohort with nirsevimab for their first RSV season is critical to achieving optimal levels of protection.
- Considering the age at start of the season, the burden of RSV MALRTI is almost equally distributed between infants born WiS and those born OoS.
  - Likely due to the duration of exposure to RSV.
- Additional significant benefits from a broad protection can be expected.
  - Opportunity cost benefit of reduction in hospitalization during the winter season in a resource constrained health service.
  - Impact on quality of life at population level.
  - All infant protection is likely to be a cost-effective strategy.

RSV is a leading cause of hospitalizations in all infants.
All infants need protection from RSV MALRTI.
Nirsevimab is designed to provide protection for all infants.

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