

## Defining the Risk and Associated Morbidity and Mortality of Severe Respiratory Syncytial Virus Infection Among Infants with Chronic Lung Disease

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## Abbreviations

- BPD: Bronchopulmonary dysplasia
- CHD: Congenital heart disease
- CLD: Chronic lung disease
- ECMO: Extracorporeal membrane oxygenation
- ICU: Intensive care unit
- LOS: Length of stay
- MV: Mechanical ventilation
- NICU: Neonatal intensive care unit
- OR: Odds ratio
- RSV: Respiratory syncytial virus
- RSVH: Respiratory syncytial virus hospitalization
- SOE: Strength of evidence
- wGA: Weeks' gestational age

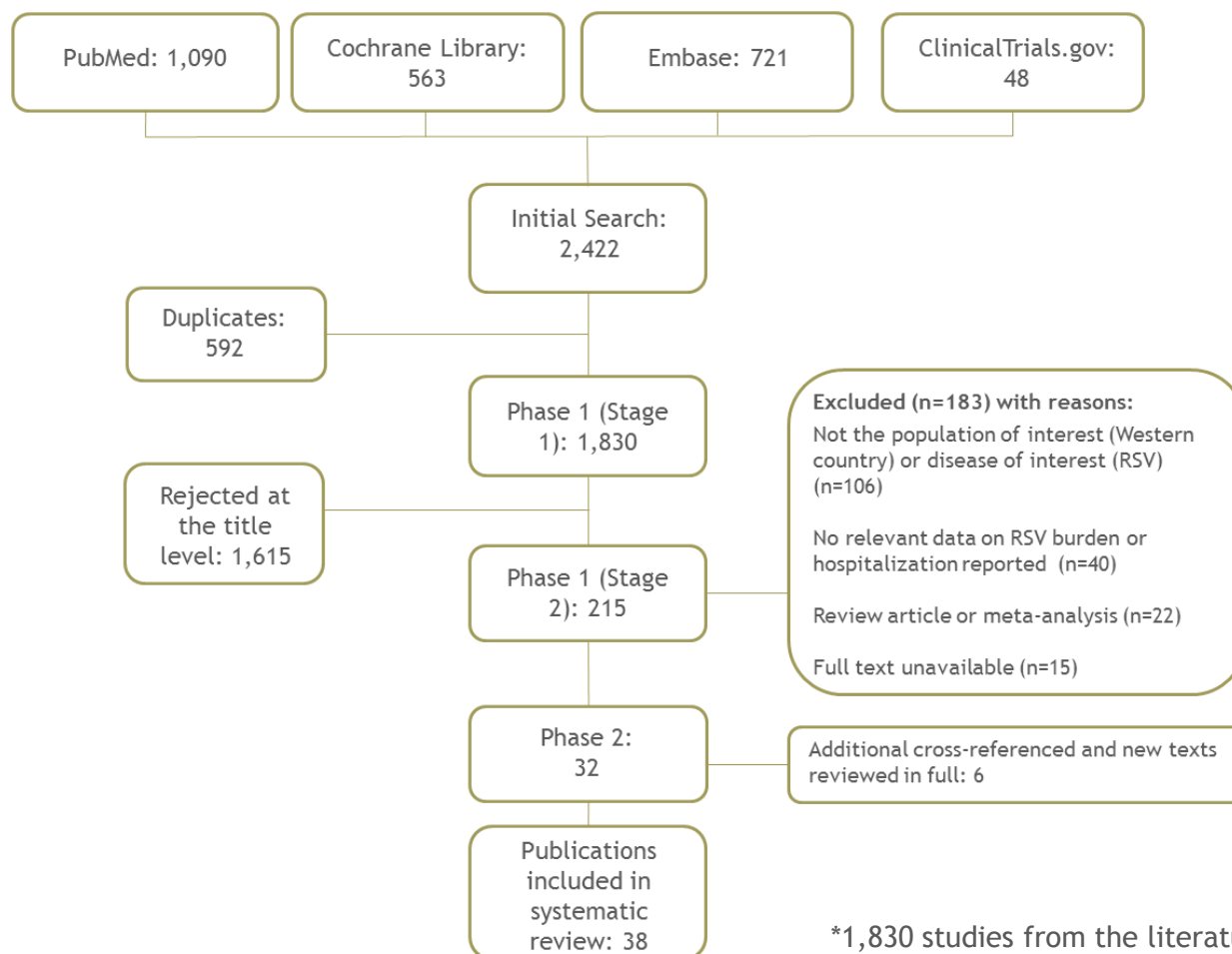
## REGAL 3: Associated morbidity and mortality of RSV in infants with CLD

- The methodology followed that of the predetermined protocol outlined in REGAL 1. The target population consisted of:
  - Infants and young children with BPD/CLD with ‘proven’ or ‘probable’ RSV
- Outcomes of interest for this review included:
  - Hospitalization rates due to severe RSV
  - Hospital LOS
  - ICU admission and LOS
  - Oxygen requirement
  - Need for and duration of MV and/or non-invasive ventilation
  - Case-fatality rates

‘What is the morbidity, long-term sequelae and mortality of infants and young children with BPD/CLD due to severe RSV infection?’

## Systematic review

- 1,836 studies\* were identified of which 38 were included



\*1,830 studies from the literature search (excluding duplicates) plus 6 additional cross-references

## Defining BPD/CLD

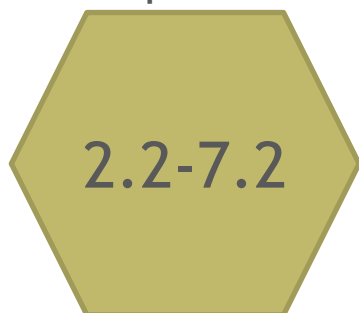
- “Original BPD” was based on the Northway classification
- “New BPD” definition targets extremely preterm infants with structurally immature lungs due to lung growth arrest
- Within this review, BPD was defined in infants born at <32 weeks post-menstrual age as follows:

Severity	Definition
Mild BPD	<ul style="list-style-type: none"><li>• Oxygen requirement for the first 28 days but room air at 36 weeks post-menstrual age</li></ul>
Moderate BPD	<ul style="list-style-type: none"><li>• Oxygen requirement for the first 28 days and fraction of inspired oxygen &lt;30% at 36 weeks post-menstrual age</li></ul>
Severe BPD	<ul style="list-style-type: none"><li>• Oxygen requirement for the first 28 days and fraction of inspired oxygen &gt;30% and/or continuous positive airway pressure/MV at 36 weeks post-menstrual age.</li></ul>

- For infants born >32 weeks' postmenstrual age, BPD/CLD was defined as 'continuous need for oxygen and/or respiratory support beyond 36 weeks post-menstrual age', adjusted to 56 days of life

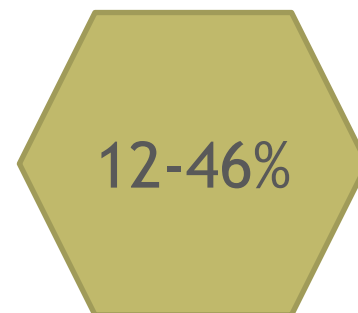
## BPD/CLD was identified as a significant risk factor for RSVH (high SOE)

Studies reported ORs of



for BPD/CLD as a risk factor for RSVH

Incidence of RSVH was



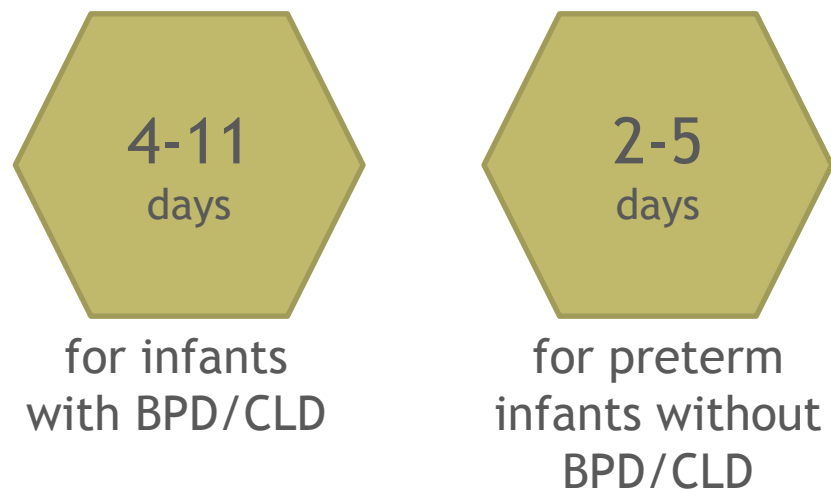
in infants with BPD/CLD who had not received RSV immunoprophylaxis

- During the first 2 years of life, **children with BPD/CLD** experienced RSVH at a **higher rate** than:
  - Children born at term ( $\geq 36$  wGA)
  - Children with CHD
  - Preterm infants without comorbidities

Infants with BPD/CLD had a significantly higher risk of RSVH compared to other high-risk groups

## RSV infection in infants with BPD/CLD led to significant morbidity and healthcare utilization (high SOE)

Typical hospital LOS for RSV infection was:



- Compared to term infants, RSVH among infants with BPD/CLD led to an **increase** in:
  - NICU admission
  - Oxygen supplementation
  - MV
- There were no data to indicate that case-fatality rates were higher in BPD/CLD than in healthy preterm or term infants

BPD/CLD was reported to be associated with a complicated course of disease and substantial healthcare costs

Key Statements/Findings	Level of Evidence
BPD/CLD is a highly significant independent risk factor for RSVH (OR 2.2-7.2)	1
BPD/CLD is associated with a higher rate of RSVH compared to other high-risk groups (e.g. CHD, preterms without comorbidities) and term infants	1
The reported incidence of RSVH in infants and young children with BPD/CLD who have not received RSV immunoprophylaxis varies between 12 and 21%	1
Median hospital LOS for RSV infection in children with BPD/CLD is 4-11 days	1-2
BPD/CLD is significantly and independently associated with a complicated course of disease, involving use of MV and/or requirement for ECMO support	1-3

Infants with BPD/CLD were more susceptible to developing RSV with a more severe course of illness versus healthy infants



## Further development

- Key areas of research
  - More up-to-date research and specific studies are needed to investigate the burden of severe RSV infection in infants and young children with BPD/CLD
  - Comparison of the morbidity and mortality incurred by infants with ‘old’ versus ‘new’ BPD/CLD
- Improved surveillance programs would provide insight into the burden of RSV, and may help to improve outcomes and plan allocation of healthcare resources

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