

Defining the Risk and Associated Morbidity and Mortality of Severe Respiratory Syncytial Virus Infection Among Infants with Congenital Heart Disease

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Abbreviations

- CHD: Congenital heart disease
- HS-CHD: Hemodynamically significant congenital heart disease
- ICU: Intensive care unit
- LOS: Length of stay
- MV: Mechanical ventilation
- RSV: Respiratory syncytial virus
- RSVH: Respiratory syncytial virus hospitalization
- SOE: Strength of evidence

REGAL 4: Associated morbidity and mortality of RSV in infants with CHD

- The methodology followed that of the predetermined protocol outlined in REGAL 1. The target population consisted of:
 - infants and young children with CHD/HS-CHD
- Short-term outcomes of interest for this review included:
 - RSVH
 - 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 predisposition and associated morbidity, long-term sequelae and mortality of infants and young children with CHD following severe RSV infection?’

Defining CHD

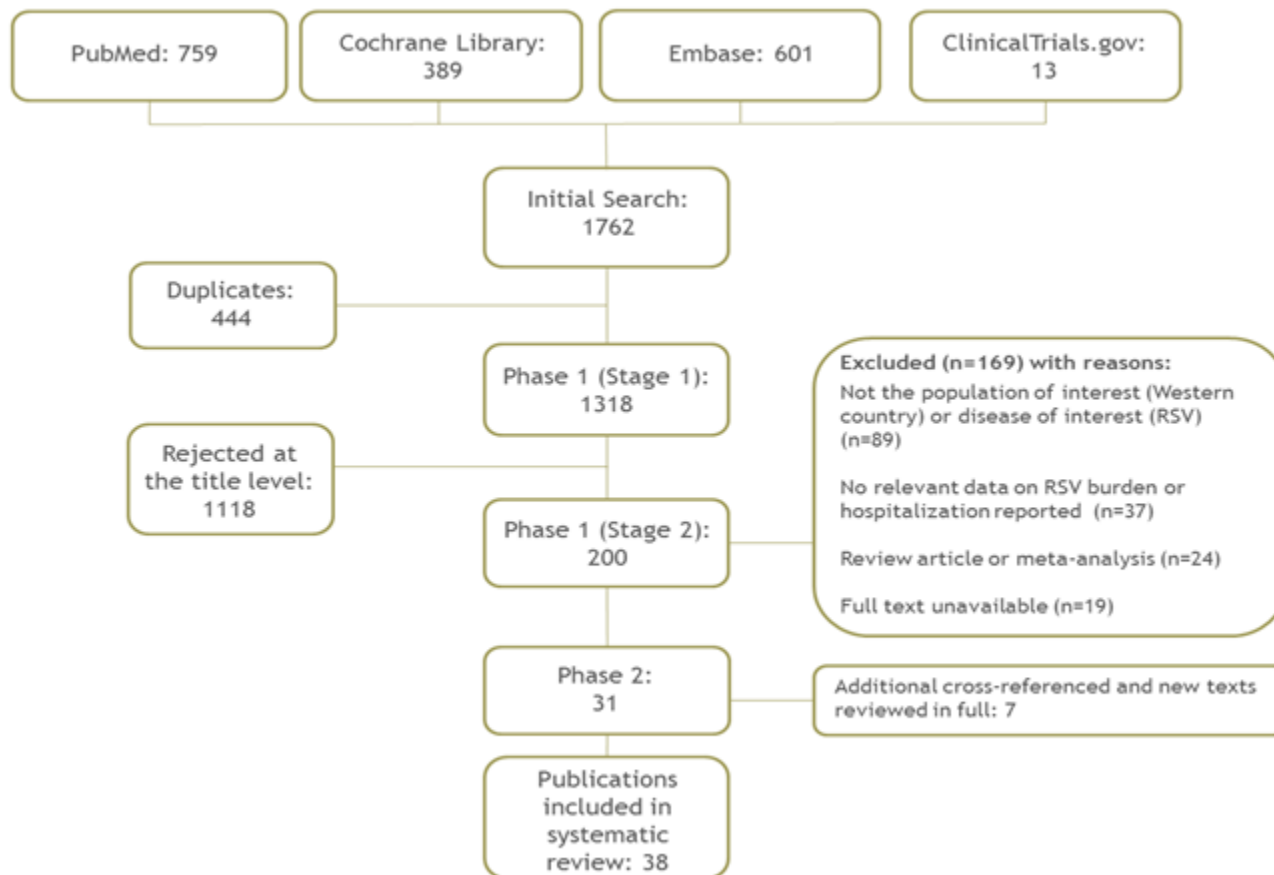
- The following definition was proposed as a useful classification for future studies of CHD in relation to RSV

HS-CHD in relation to RSV was defined as:

- Uncorrected or palliated cyanotic or acyanotic CHD with pulmonary hypertension
- Systolic pulmonary arterial pressure ≥ 40 mmHg or mean pulmonary arterial pressure ≥ 25 mmHg, and/or
- Need for medication to manage congestive heart failure

Systematic review

- 1,325 studies* were identified of which 38 were included



*1,318 studies from the literature search (excluding duplicates) plus 7 additional cross-references

Infants with CHD were at greater risk of RSVH than term infants (high SOE)

RSVH rates ranged from

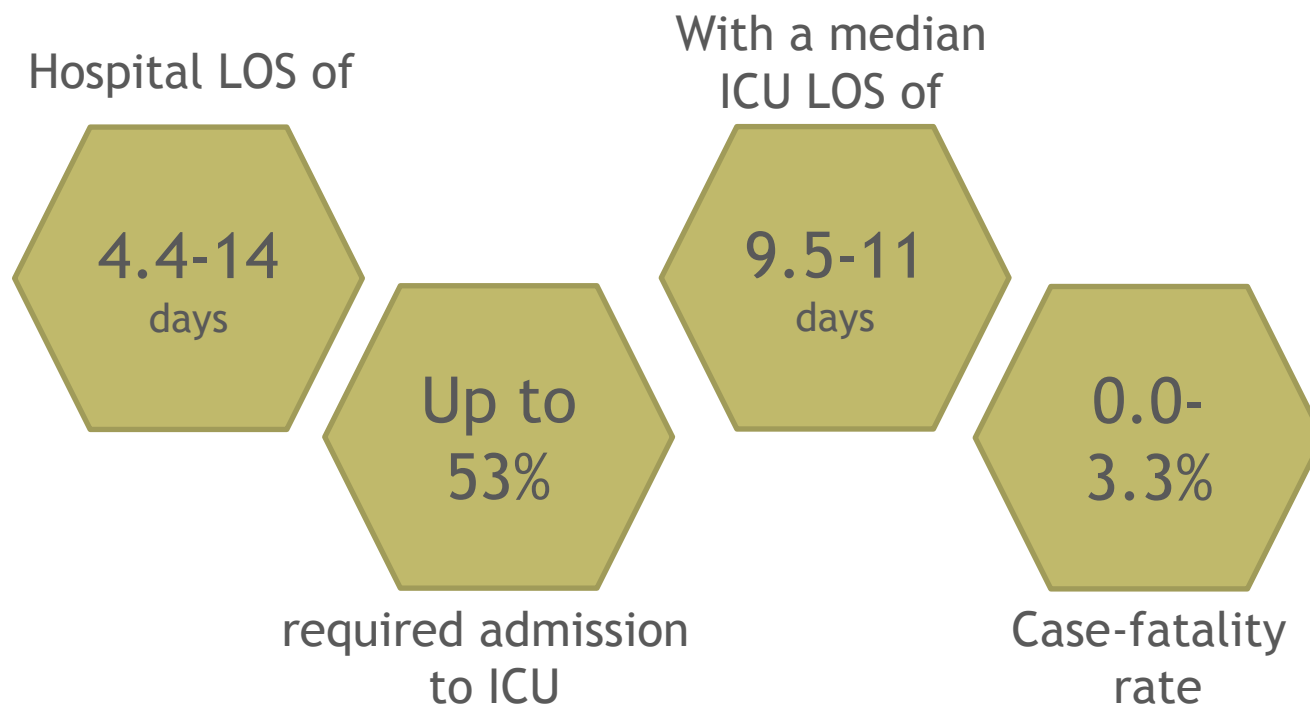


for infants with CHD

- Several studies reported a **higher RSVH rate** in infants with CHD aged **<12 months**
- Multivariate analyses reported **CHD** as an **independent risk factor** for RSVH
- Verification of **non-HS-CHD** as an independently significant **risk factor** for RSVH in **non-premature populations** is required

CHD, in particular HS-CHD, was a significant risk factor for severe RSV infection

RSVH in children with CHD was associated with considerable morbidity (high SOE)



Children with CHD had a more severe course of RSV infection than children without CHD

RSV infection may impact significantly on cardiac surgery for CHD (moderate SOE)

- Surgical outcomes in children with CHD have improved over the past two decades. However, RSV resulted in substantial morbidity and mortality in children with CHD undergoing cardiac surgery
- Nosocomial RSV infection in the ICU was also an important cause of morbidity in this population
- RSV infection resulted in:
 - Delayed cardiac surgery and postoperative complications
 - Longer duration of heart failure medication
 - Prolonged hospital LOS and increased time spent in ICU

RSV infection was identified as an important consideration for the timing of surgery for CHD

Concluding statements

Key Findings	Level of Evidence
CHD, in particular HS-CHD, is a significant risk factor for severe RSV infection with RSVH rates ranging from 14-357 per 1000	1
Children with CHD spend an average of 4.4-14 days in hospital for RSV infection, with up to 53% requiring admission to the ICU	1
Children with CHD have a more severe disease course (increased ICU admission and ventilation) than children without CHD	1
RSV infection can delay and impact surgery for CHD and increase post-operative complications, such that the timing of surgery is an important consideration	2
Case fatality rates associated with RSVH in children with CHD are reported to range from 0-3.3%	1

Infants and children with CHD are at high risk for severe RSV infection, particularly in the first year of life

Further development

- Key areas for research:
 - Studies to determine the longer-term effects of severe RSV infection in infants and young children with CHD or HS-CHD
 - Assessment of RSV outcomes related to CHD and HS-CHD in children, independent of chromosomal/non-chromosomal anomalies and other serious pre-existing medical disorders
- An understanding of the relationship between RSV and CHD will help reduce the burden and improve outcomes in this patient population

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