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## Supplementary appendix

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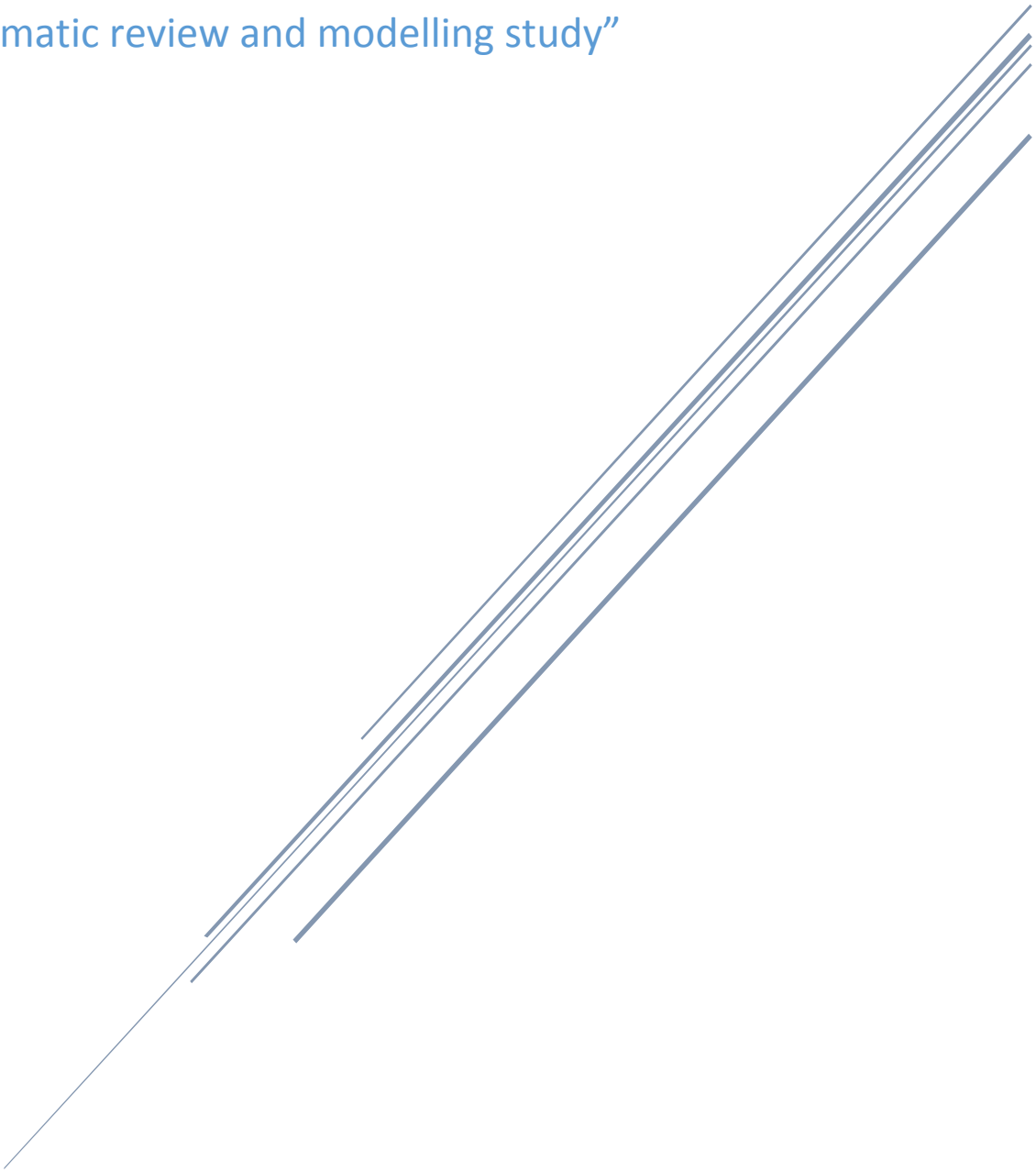
Supplement to: Shi T, McAllister D A, L O'Brien K. Global, regional, and national disease burden estimates of acute lower respiratory infections due to respiratory syncytial virus in young children in 2015: a systematic review and modelling study. *Lancet* 2017; published online July 6. http://dx.doi.org/10.1016/S0140-6736(17)30938-8.

# Supplementary material for “Global, regional and national disease burden estimates of acute lower respiratory infections due to respiratory syncytial virus in young children in 2015:

## A systematic review and modelling study”



## Glossary

1. RSV-associated ALRI: cough or difficulty breathing with increased respiratory rate for age (cut-offs same as in WHO Integrated Management of Childhood Illnesses [IMCI] case definition) and laboratory confirmed RSV.
2. RSV-associated severe ALRI: children aged 2-59 months- cough or difficulty in breathing with chest wall indrawing and laboratory confirmed RSV; children aged <2months- increased RR (>60 breaths/ min) OR chest wall indrawing and laboratory confirmed RSV
3. RSV-associated very severe ALRI: cough or difficulty in breathing with one danger sign (cyanosis, difficulty in breastfeeding or drinking, vomiting everything, convulsions, lethargy, or unconsciousness, head nodding) and
4. Hospitalised RSV-associated ALRI: all children with physician confirmed diagnosis of ALRI (pneumonia or bronchiolitis) that are hospitalised or recommended hospitalisation and laboratory confirmed RSV
5. Hospitalised RSV-associated severe ALRI: Hospitalised ALRI cases with hypoxemia (as defined below) and laboratory confirmed RSV
6. Hospitalised RSV-associated very severe ALRI: hospitalised ALRI with one danger sign (cyanosis, difficulty in breastfeeding or drinking, vomiting everything, convulsions, lethargy, or unconsciousness, head nodding) OR proxies for very severe disease – mechanical ventilation OR ICU admission.
7. Hypoxemia: $SpO_2$ <90% (at altitude ≤2500 m) in children aged 1-59 months and <88% for neonates (at sea level). At altitude above 2500m, $SpO_2$ <87% in children aged 1-59 months and <85% for neonates would classify as hypoxemia.
8. LMIC: low income countries, lower middle income countries and upper middle income countries as per World Bank Classification.
9. Neonates: children aged 0-27 days.
10. Inflation factor: the ratio between RSV-associated ALRI mortality in community and RSV-associated ALRI deaths in hospital.

## Search Strategy

**Medline**

1. exp Respiratory Syncytial Viruses/ or exp Respiratory Syncytial Virus, Human/ or exp Respiratory Syncytial Virus Infections/ or RSV.mp.

2. respiratory syncytial virus*.mp.

3. pneumonia.mp. or exp Pneumonia/ or exp Pneumonia, Viral/

4. bronchiolitis.mp. or exp Bronchiolitis/ or exp Bronchiolitis, Viral/

5. exp Respiratory Tract Infections/ or respiratory infection*.mp.

6. exp Respiratory Tract Diseases/ or respiratory disease*.mp.

7. incidence.mp. or exp Incidence/

8. prevalence.mp. or exp Prevalence/

9. exp Child Mortality/ or exp Infant Mortality/ or mortality.mp. or exp Hospital Mortality/ or exp Mortality/

10. death*.mp. or exp Death/ or exp "Cause of Death"/

11. morbidity.mp. or exp Morbidity/

12. burden.mp.

13. epidemiology.mp. or exp Epidemiology/

14. 1 or 2

15. 3 or 4 or 5 or 6

16. 7 or 8 or 9 or 10 or 11 or 12 or 13

17. 15 or 16

18. 14 and 17

19. limit 18 to (yr="1995 -Current" and ("all infant (birth to 23 months)" or "newborn infant (birth to 1 month)" or "infant (1 to 23 months)" or "preschool child (2 to 5 years)") and (female or humans or male))

**EMBASE**

1. RSV.mp. or exp Respiratory syncytial pneumovirus/ or exp respiratory syncytial virus infection/

2. respiratory syncytial virus*.mp.

3. exp community acquired pneumonia/ or exp pneumonia/ or exp virus pneumonia/ or exp infectious pneumonia/ or pneumonia.mp.

4. bronchiolitis.mp. or exp bronchiolitis/ or exp viral bronchiolitis/

5. exp respiratory tract infection/ or exp lower respiratory tract infection/ or respiratory infection*.mp.

6. exp respiratory tract disease/ or respiratory disease*.mp.

7. exp incidence/ or incidence.mp.

8. prevalence.mp. or exp prevalence/

9. exp newborn mortality/ or exp mortality/ or exp childhood mortality/ or mortality.mp. or exp infant mortality/

10. exp death/ or death*.mp. or exp "cause of death"/ or exp child death/

11. morbidity.mp. or exp morbidity/ or exp newborn morbidity/

12. burden.mp.

13. exp epidemiology/ or epidemiology.mp.

14. 1 or 2

15. 3 or 4 or 5 or 6

16. 7 or 8 or 9 or 10 or 11 or 12 or 13

17. 15 or 16

18. 14 and 17

19. limit 18 to (yr="1995 -Current" and (infant or preschool child <1 to 6 years>))

**Global Health**

1. RSV.mp.

2. exp human respiratory syncytial virus/

3. respiratory syncytial virus*.mp.

4. exp community acquired pneumonia/ or pneumonia*.mp. or exp pneumonia/

5. bronchiolitis.mp. or exp bronchiolitis/

6. respiratory infection*.mp.

7. exp respiratory diseases/

8. respiratory disease*.mp.

9. incidence.mp. or exp disease incidence/ or exp incidence/

10. prevalence*.mp. or exp disease prevalence/

11. mortality.mp. or exp infant mortality/ or exp neonatal mortality/ or exp mortality/

12. death*.mp. or exp death/ or exp "causes of death"/

13. morbidity.mp. or exp morbidity/

14. exp epidemiology/ or epidemiology.mp.

15. burden.mp.

16. 1 or 2 or 3

17. 4 or 5 or 6 or 7 or 8

18. 9 or 10 or 11 or 12 or 13 or 14 or 15

19. 17 or 18

20. 16 and 19

21. limit 20 to yr="1995 -Current"

**CINAHL**

S1= (MH “respiratory syncytial virus infections”) OR (MH “respiratory syncytial viruses”) OR “respiratory syncytial virus”

S2= “RSV”

S3= (MH “pneumonia+”) OR “pneumonia” OR (MH “pneumonia, viral”) OR (MH “community-acquired pneumonia”)

S4= (MH “bronchiolitis+”) OR “bronchiolitis”

S5= (MH “respiratory tract infections+”) OR “respiratory infection”

S6= (MH “respiratory tract diseases+”) OR “respiratory disease”

S7= (MH “incidence”) OR “incidence”

S8= (MH “prevalence”) OR “prevalence”

S9= (MH “mortality+”) OR “mortality” OR (MH “infant mortality”) OR (MH “child mortality”) OR (MH “hospital mortality”)

S10= (MH “death+”) OR “death” OR (MH “cause of death”) OR (MH “infant death+”)

S11= (MH “morbidity+”) OR “morbidity”

S12= “burden”

S13= (MH “epidemiology+”) OR “epidemiology”

S14= S1 OR S2

S15= S3 OR S4 OR S5 OR S6

S16= S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13

S17= S15 OR S16

S18= S14 AND S17

Limiters: Published date: 19950101 – 20150804; Age groups: infant, newborn: birth-1 month, infant: 1-23 months, child, preschool: 2-5 years

**Web of Science**

Topic= (respiratory syncytial virus) AND Topic= (epidemiology) AND Topic= (children)

From 1995 to 2015

**WHOLIS (KMS)**

Respiratory syncytial virus in All Indexes

**LILACS (AMRO/PAHO)**

Respiratory syncytial virus in All Indexes

**IndMed**

RSV in anywhere

**SIGLE**

Respiratory syncytial virus

**CNKI**

Topic: respiratory infection or pneumonia (vague)

Or Topic: bronchiolitis (vague)

And Topic: respiratory syncytial virus (vague)

And Topic: children (vague)

Publication time: 1st Jan 1995 – 30th Aug 2015

**Wanfang Data**

All (vague): respiratory infection or

All (vague): pneumonia or

All (vague): bronchiolitis and

All (vague): respiratory syncytial virus and

All (vague): children

Time: 1995 – 2015

**ChongQing VIP**

Title/key word: respiratory tract infection

Or Title/key word: pneumonia

Or Title/key word: bronchiolitis

And Title/key word: respiratory syncytial virus

And Title/key word: children

Time: 1995 – 2015

## Imputation for missing data

Only 40 studies (12 published[1-11] and 28 unpublished[U3-5, U8, U11, U15-24, U26-29, U32, U34-37, 39-40, U42, U45]) reported disease incidence / hospitalisation rate by age group for the full age range (0-59m group); we imputed data for the remaining studies (supplementary tables 2,3 and 5)

For community-based studies reporting incidence rate, relative to an incidence of 1.0 for RSV-associated ALRI in the 0-11 months age group, an incidence rate ratio of 1.01 was calculated for children aged 0-5 months (based on 9 studies), 0.90 for children aged 0-23 months (8 studies), 0.84 for children aged 0-35m (6 studies) and 0.57 for those aged 0-59 months (6 studies), by taking the median of the incidence rate ratios of studies reporting incidence for these age ranges[12-14]. For RSV-associated severe ALRI, an incidence rate ratio of 1.26 was calculated for children aged 0-5 months (based on 7 studies), whereas for those younger than 2 years, 3 years and 5 years, the ratios were 0.64 (7 studies), 0.56 (4 studies) and 0.34 (4 studies). For hospital-based studies reporting hospitalisation rate, relative to children younger than 1 year, the median hospitalisation rate ratio for children aged 0-5 months was 1.32 (based on 27 studies), for those younger than 2 years, 3 years and 5 years, the median rate ratios were estimated as 0.63 (38 studies), 0.44 (23 studies) and 0.27 (35 studies) respectively.

### Sensitivity analysis

We conducted several sensitivity analyses by excluding imputed data and found that in general the meta-estimates based on including the full dataset (including imputed data) had slightly lower or higher point estimates and narrower 95% CI. However, inclusion of imputed data increased the point estimates for the incidence rate in 0-59 month old children by over 40%. However, this increase is not statistically significant as the uncertainty range of both estimates overlap each other. Secondly, the large increase in the point estimate for incidence rate in this case is driven by data from two recent high quality studies (Drakenstein birth cohort study in South Africa [Zar, unpublished] and RESPIRA-PERU study in rural highlands of Peru [Wu et al, 2015]) as can be evinced by the incidence rate after excluding these 2 studies from the sensitivity analysis using imputed data - 40.4 (25.0 – 65.2) per 1000 children below 5 years per year. Both studies are of high quality but in children below 3 years and report a high(er) incidence rate in infants and in the second year of life.

**Comparison of incidence rate meta-estimates after excluding imputed data**

| Region | 0-11m | | | | 0-59m | | | |
|---|---|---|---|---|---|---|---|---|
| | Excluding imputed data | | Including imputed data | | Excluding imputed data | | Including imputed data | |
| | No. | Incidence rate | No. | Incidence rate | No. | Incidence rate | No. | Incidence rate |
| **Developing** | 11 | 99.3 (62.6-157.3) | 14 | 88.3 (58.6-133) | 6 | 35.5 (17.2-73.1) | 14 | 50.8 (32.4-79.7) |

**Comparison of hospitalisation rate meta-estimates after excluding imputed data**

| Region | 0-11m | | | | 0-59m | | | |
|---|---|---|---|---|---|---|---|---|
| | Excluding imputed data | | Including imputed data | | Excluding imputed data | | Including imputed data | |
| | No. | Hospitalisation rate | No. | Hospitalisation rate | No. | Hospitalisation rate | No. | Hospitalisation rate |
| **Low income** | 5 | 5.6 (1.7-18.1) | 5 | 5.6 (1.7-18.1) | 4 | 1.3 (0.3-5.1) | 5 | 1.7 (0.6-5.1) |
| **Lower middle income** | 15 | 18.4 (13.7-24.8) | 17 | 18.2 (13.9-23.8) | 12 | 4.9 (3.5-6.9) | 17 | 5.1 (3.7-6.9) |

| Region | 0-11m | | | | 0-59m | | | |
|---|---|---|---|---|---|---|---|---|
| | Excluding imputed data | | Including imputed data | | Excluding imputed data | | Including imputed data | |
| | No. | Hospitalisation rate | No. | Hospitalisation rate | No. | Hospitalisation rate | No. | Hospitalisation rate |
| **Upper middle income** | 12 | 19.2 (12.8-28.7) | 15 | 18.5 (13.3-25.8) | 12 | 5.3 (4.2-6.7) | 15 | 6.2 (5.0-7.8) |
| **High income** | 21 | 20.8 (17.4-24.9) | 31 | 19.6 (16.9-22.8) | 14 | 5.3 (4.0-7.0) | 31 | 5.5 (4.7-6.3) |
| **Developing** | 36 | 16.2 (13.0-20.1) | 43 | 16.0 (13.2-19.4) | 33 | 4.3 (3.5-5.1) | 43 | 4.9 (4.1-5.8) |
| **Industrialised** | 17 | 20.9 (17.1-25.4) | 25 | 20.2 (17.2-23.8) | 9 | 5.8 (4.1-8.2) | 25 | 5.5 (4.7-6.5) |

***Supplementary table 1: List of unpublished studies from RSV GEN collaborators contributing to the analysis***

| | Location (reference) | Published reference | Remarks |
|---|---|---|---|
| **U1** | Kilifi birth cohort, Kenya (Nokes and colleagues) | Clin Infect Dis 2008; 46:50-7 | report both community-based rate and hospital-based rate; data re-analysed using common case definitions |
| **U2** | San Marcos, Guatemala (Bruce and colleagues) | Lancet 2011; 378(9804): 1717-26 | data re-analysed using common case definitions |
| **U3** | Dhaka, Bangladesh (Brooks and colleagues) | Pediatr Infect Dis J 2010; 29(3): 216-21 | RSV was tested for the first 4 years of study; 15 ALRI deaths without information about virus |
| **U4** | Ballabhgarh, India (Krishnan and colleagues) | BMC Infect Dis 2015; 15: 462 | data re-analysed using common case definitions |
| **U5** | Bandung, Indonesia (Simoes and colleagues) | Pediatr Infect Dis J 2011; 30(9): 778-84 | data re-analysed using common case definitions |
| **U6** | Managua, Nicaragua (Gordon and colleagues) | Pediatr Infect Dis J 2016; 35(2): 152-6 | data re-analysed using common case definitions |
| **U7** | Matiari, Pakistan (Ali and colleagues) | PLoS One 2013; 8(9) | data re-analysed using common case definitions |
| **U8** | Gilgit, Pakistan (Rasmussen and colleagues) | no | data are not yet published |
| **U9** | Puerto Maldonado, Peru (Romero and colleagues) | no | only one very severe case in 12-23m |
| **U10** | Paarl, South Africa (Zar and colleagues) | i. Thorax 2015; 70(6): 592-4<br>ii. Lancet Glob Health 2015; 3(2): e95-e103 | report both community-based rate and hospital-based rate; data re-analysed using common case definitions |
| **U11** | Nashville, Tennessee, USA (Wright and colleagues) | no | data are not yet published; report rate in outpatients in industrialised countries |
| **U12** | CEMIC, Buenos Aires, Argentina (Echavarria and colleagues) | i. Arch Argent Pediatr 2011;109(4):296-304<br>ii. Pediatr Infect Dis J 2013; 32(3): e105-e110<br>iii. Medicina 2012; 72(1): 28-32 | another paper is in preparation; data re-analysed using common case definitions |
| **U13** | Buenos Aires, Argentina (Polack and colleagues) | Am J Respir Crit Care Med 2013; 187(9): 983-90 | data re-analysed using common case definitions |
| **U14** | Kishoregonj, Bogra, Comilla and Barisal, Bangladesh (Homaira and colleagues) | PLoS One 2016; 11(2): e0147982 | data re-analysed using common case definitions |
| **U15** | Belo Horizonte, Brazil (Oliveira and colleagues) | no | data are not yet published |
| **U16** | Concepcion, Chile (Fasce and colleagues) | no | data are not yet published |
| **U17** | Iquique, Chile (Fasce and colleagues) | no | data are not yet published |
| **U18** | Jingzhou, China (Yu and colleagues) | J Infect Dis 2013; 208 Suppl 3: S184-8 | data re-analysed using common case definitions |
| **U19** | Santa Ana, El Salvador (Clara and colleagues) | i. Bull World Health Organ 2012; 90(10): 756-63<br>ii. Influenza Other Respir Viruses 2016 | data re-analysed using common case definitions |

| | Location (reference) | Published reference | Remarks |
|---|---|---|---|
| **U20** | Gambia Western Region, Gambia (Howie and colleagues) | Clin Infect Dis 2014; 59(5): 682-5 | data re-analysed using common case definitions |
| **U21** | Santa Rosa, Guatemala (McCracken and colleagues) | i. Infect Dis 2013; 208 Suppl 3: S197-206<br>ii. Pediatr Infect Dis J 2013; 32(6): 629-35 | data re-analysed using common case definitions |
| **U22** | Quetzaltenango, Guatemala (McCracken and colleagues) | i. Infect Dis 2013; 208 Suppl 3: S197-206<br>ii. Pediatr Infect Dis J 2013; 32(6): 629-35 | data re-analysed using common case definitions |
| **U23** | Ballabhgarh, India (Broor and colleagues) | J Infect 2015; 70(2): 160-70 | data re-analysed using common case definitions |
| **U24** | Pune, India (Chadha and colleagues) | J Infect 2015; 70(2): 160-70 | data re-analysed using common case definitions |
| **U25** | Lombok, Indonesia (Gessner and colleagues) | Epidemiol Infect 2008; 136(10): 1319-27 | data re-analysed using common case definitions |
| **U26** | Kilifi hospital study, Kenya (Nokes and colleagues) | JAMA 2010; 303(20): 2051-7 | data re-analysed using common case definitions |
| **U27** | Bondo district, Kenya (Feikin and colleagues) | J Med Virol 2013; 85(5): 924-32 | data re-analysed using common case definitions |
| **U28** | Manhiça, Mozambique (Bassat and colleagues) | Pediatr Infect Dis J 2011; 30(1): 39-44 | data re-analysed using common case definitions |
| **U29** | Manhiça, Mozambique (Bassat and colleagues) | Pediatr Infect Dis J 2011; 30(12): 1032-6 | data re-analysed using common case definitions |
| **U30** | Utrecht, Netherlands (Bont and colleagues) | i. Pediatr Infect Dis J 2014; 33(1): 19-23<br>ii. Pediatrics 2011; 127(1): 35-41 | healthy term infants; data re-analysed using common case definitions |
| **U31** | 41 sites in Netherlands (Bont and colleagues) | N Engl J Med 2013; 368(19): 1791-9 | late preterm infants; data re-analysed using common case definitions |
| **U32** | David City, Panama (Jara and colleagues) | no | data are not yet published |
| **U33** | Tagbilaran and 6 rural sites, Philippines (Lucero and colleagues) | i. Pediatr Infect Dis J 2009; 28(6): 455-62<br>ii. J Clin Microbiol 2013; 51(3): 945-53 | data re-analysed using common case definitions |
| **U34** | Gauteng province, South Africa (Cohen and colleagues) | i. J Infect Dis 2013; 208 Suppl 3: S217-26<br>ii. J Infect Dis 2012; 206 Suppl 1: S159-65 | data re-analysed using common case definitions |
| **U35** | KwaZulu-Natal province, South Africa (Cohen and colleagues) | i. J Infect Dis 2013; 208 Suppl 3: S217-26<br>ii. J Infect Dis 2012; 206 Suppl 1: S159-65 | data re-analysed using common case definitions |
| **U36** | Klerksdorp site, South Africa (Cohen and colleagues) | i. J Infect Dis 2013; 208 Suppl 3: S217-26<br>ii. J Infect Dis 2012; 206 Suppl 1: S159-65 | data re-analysed using common case definitions |
| **U37** | Soweto, South Africa (Madhi and colleagues) | J Clin Virol 2006; 36(3): 215-21 | data re-analysed using common case definitions |
| **U38** | Maela Camp, Tak Province, Thailand (Turner and colleagues) | i. PLoS ONE 2012; 7(11): e50100<br>ii. BMC Infect Dis 2013; 13(1) | data re-analysed using common case definitions |
| **U39** | Sa Kaeo and Nakhon Phanom, Thailand (Thamthitiwat and colleagues) | i. Pediatr Infect Dis J 2014; 33(2): e45-e52<br>ii. J Infect Dis 2013; 208 Suppl 3: | data re-analysed using common case definitions |

| | Location (reference) | Published reference | Remarks |
|---|---|---|---|
| | | S238-45 | |
| **U40** | Tone district, Togo (Gessner and colleagues) | no | data are not yet published |
| **U41** | Alaska, USA (Singleton and colleagues) | i. Pediatr Infect Dis J 2007; 26(11(Supplement): S46-S50<br>ii. J Med Virol 2010; 82(7): 1282-90 | report very severe cases from 1994 to 2007; hypoxemia data from Oct 2005 to Sep 2007; data re-analysed using common case definitions |
| **U42** | Colorado, USA (Simoes and colleagues) | no | ICD-9 codes for hypoxemia |
| **U43** | Navajo and WMA, USA - MEDI (O'Brien and colleagues) | submitted to journal | data re-analysed using common case definitions |
| **U44** | Navajo and WMA, USA - EPI (O'Brien and colleagues) | Pediatrics 2002; 110(2 Pt 1): e20 | data re-analysed using common case definitions |
| **U45** | Nha Trang, Vietnam (Yoshida and colleagues) | i. Pediatr Infect Dis J 2010; 29(1): 75-7<br>ii. Eur Respir J 2013; 42(2): 461-9 | subtypes data from 2010 to 2012; another paper is in preparation; data re-analysed using common case definitions |
| **U46** | Buenos Aires, Argentina (Echavarria and colleagues) | i. Arch Argent Pediatr 2011;109(4):296-304<br>ii. Pediatr Infect Dis J 2013; 32(3): e105-e110<br>iii. Medicina 2012; 72(1): 28-32 | another paper is in preparation; data re-analysed using common case definitions |
| **U47** | Buenos Aires, Argentina (Gentile and colleagues) | Arch Argent Pediatr 2014; 112(5): 397-404 | data re-analysed using common case definitions |
| **U48** | Takeo and Kampong Cham, Cambodia (Goyet and colleagues) | Pediatr Infect Dis J 2013; 32(1): e8-13 | data re-analysed using common case definitions |
| **U49** | Chillan, Chile (Fasce and colleagues) | no | data are not yet published |
| **U50** | Osorno, Chile (Fasce and colleagues) | no | data are not yet published |
| **U51** | Punta Arenas, Chile (Fasce and colleagues) | no | data are not yet published |
| **U52** | Santiago, Chile (Fasce and colleagues) | no | data are not yet published |
| **U53** | Valparaiso, Chile (Fasce and colleagues) | no | data are not yet published |
| **U54** | China (Yu and colleagues) | PLoS One 2014; 9(6): e99419 | data re-analysed using common case definitions |
| **U55** | Beijing, China (GABRIEL) | no | data are not yet published |
| **U56** | Ulaanbaatar, Mongolia (GABRIEL) | no | data are not yet published |
| **U57** | Phnom Penh, Cambodia (GABRIEL) | no | data are not yet published |
| **U58** | Lucknow, India (GABRIEL) | no | data are not yet published |
| **U59** | Antananarivo, Madagascar (GABRIEL) | no | data are not yet published |
| **U60** | Asuncion, Paraguay (GABRIEL) | no | data are not yet published |
| **U61** | Bamako, Mali (GABRIEL) | no | data are not yet published |
| **U62** | Berlin, Germany (Rath and colleagues) | i. iagn Microbiol Infect Dis 2015; 81(3): 171-6<br>ii. J Clin Microbiol 2009; 47(6): | data re-analysed using common case definitions |

| | Location (reference) | Published reference | Remarks |
|---|---|---|---|
| | | 1800-10 | |
| **U63** | Amman, Jordan (Khuri and colleagues) | Vaccine 2015; 33(47): 6479-87 | data re-analysed using common case definitions |
| **U64** | Lwak, Kenya (Montgomery and colleagues) | J Infect Dis 2013; 208 Suppl 3: S207-16 | data re-analysed using common case definitions |
| **U65** | Rabat, Morocco (Bassat and colleagues) | i. J Trop Pediatr 2014; 60(4): 270-8<br>ii. Epidemiol Infect 2016; 144(3): 516-26 | data re-analysed using common case definitions |
| **U66** | Kathmandu, Nepal (Basnet and colleagues) | Pediatr Infect Dis J 2011; 30(12): 1032-6 | data re-analysed using common case definitions |
| **U67** | Karachi, Pakistan (Ali and colleagues) | PLoS One 2013; 8(9) | data re-analysed using common case definitions |
| **U68** | Basse, Gambia (PERCH) | no | data are not yet published |
| **U69** | Kilifi, Kenya (PERCH) | no | data are not yet published |
| **U70** | Bamako, Mali (PERCH) | no | data are not yet published |
| **U71** | Nakhon Phanom and Sa Kaeo, Thailand (PERCH) | no | data are not yet published |
| **U72** | Lusaka, Zambia (PERCH) | no | data are not yet published |
| **U73** | Dhaka, Bangladesh (PERCH) | no | data are not yet published |
| **U74** | Matlab, Bangladesh (PERCH) | no | data are not yet published |
| **U75** | Tacloban, Philippines (Lupisan and colleagues) | BMC Infect Dis 2012; 12: 267 | data re-analysed using common case definitions |
| **U76** | Mpumalanga, South Africa (Cohen and colleagues) | i. J Infect Dis 2013; 208 Suppl 3: S217-26<br>ii. J Infect Dis 2012; 206 Suppl 1: S159-65 | data re-analysed using common case definitions |

*Supplementary table 2: Description of all studies reporting incidence of RSV-associated ALRI in children younger than 5 years*

| Location (reference) | Case definition (codes)* | Denominator source | Specimen and diagnostic test* | Incidence of RSV associated ALRI (per 1000 children per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0-5m | 6-11m | 0-11m | 12-23m | 24-59m | 0-59m |
| San Marcos, Peru (rural, Mar 2009 - Sep 2011)[15] | I | Defined population base | nasal swab; RT-PCR | 343.8 | 338.1 | 340.8 | 304.3 | | (194.3) |
| Dhaka, Bangladesh (urban, Apr 2009 - Mar 2011)[16] | I | Defined population base | NPW; RT-PCR | 150.0 | 110.0 | (148.5)† | 120.0 | | (84.7) |
| Kilifi birth cohort, Kenya (rural, Jan 2002 - May 2005) (Nokes and colleagues) | I, O2+/- | Defined population base | NPA, nasal wash; DFA | 147.0 | 63.0 | 105.1 | 71.0 | | (59.9) |
| Mirzapur, Bangladesh (rural, Oct 1993 - Aug 1996)[17] | I | Defined population base | NPA; ELISA | (46.8) | | (46.3) | | | (26.4) |
| Ballabhgarh, India (rural, Oct 2001 - Mar 2005)[18] | I | Defined population base | NPA; DFA | 60.2 | 18.0 | 38.0 | 52.0 | | (21.7) |
| Ibadan, Nigeria (rural, Jun 1999 - May 2001)[1] | I | Defined population base | NPA, NPW; ELISA | (117.2) | | 116.0 | | | 94.0 |
| San Marcos, Guatemala (rural, Dec 2002 - Dec 2004) (Bruce and colleagues) | I, II, DS+/- | Defined population base | NPA; DFA | 107.7 | 172.4 | 147.5 | 124.5 | | (84.1) |
| Rio de Janeiro, Brazil (rural, Jan 1987 - Dec 1989)[19] | II, T+/-, W+/- | Defined population base | NPA; IFA, culture | (24.8) | | (24.6) | | | 14.0 |
| Dhaka, Bangladesh (urban, Jan 2005 - Feb 2008) (Brooks and colleagues) | I, W+/C+, DS+/- | Defined population base | NPW, serum; serology, RT-PCR | 28.3 | 36.7 | 32.2 | 21.8 | 9.5 | 17.5 |
| Ballabhgarh, India (rural, Aug 2012 - Aug 2013) (Krishnan and colleagues) | I, DS+/- | Defined population base | NPS; RT-PCR | 97.3 | 76.9 | 85.5 | 54.6 | 10.1 | 33.4 |
| Bandung, Indonesia (periurban and rural, 1st Feb 1999 - 26th Apr 2001) (Simoes and colleagues) | I, DS+/- | Defined population base | nasal wash; RT-PCR | 26.6 | 141.5 | 87.9 | 97.3 | 21.1 | 65.4 |
| Managua, Nicaragua (urban, Sep 2011 - Sep 2012) (Gordon and colleagues) | I, DS+/- | Defined population base | nasal and throat swab; RT-PCR | (61.4) | | 60.8 | | | (34.7) |

* NPA=nasopharyngeal aspirate. NPS=nasopharyngeal swab. NPW=nasopharyngeal wash. RT-PCR=reverse transcriptase polymerase chain reaction. IFA=indirect immunofluorescent antibody test. DFA=direct immunofluorescent antibody test. ELISA=enzyme-linked immunosorbent assay. I=WHO definition applied by a health worker. II=physician's assessment. T+/-=tachypnea part of case definition or not. W+/-=wheeze part of case definition or not. DS+/-=danger signs part of case definition or not. O2+/-=hypoxemia part of case definition or not. C+/-=crepitation part of case definition or not.

† Data in parentheses are imputed

| Location (reference) | Case definition (codes)* | Denominator source | Specimen and diagnostic test* | Incidence of RSV associated ALRI (per 1000 children per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0-5m | 6-11m | 0-11m | 12-23m | 24-59m | 0-59m |
| Gilgit, Pakistan (rural, 1st Apr 2012 - 31st Mar 2014) (Rasmussen and colleagues) | I, DS+/- | Defined population base | NPS; RT-PCR | 30.8 | 101.9 | 62.5 | 58.6 | 15.9 | 35.9 |
| Paarl, South Africa (periurban, Mar 2012 - Dec 2014) (Zar and colleagues) | I, DS+/- | Defined population base | NPS; RT-PCR | 506.7 | 141.8 | 331.0 | 78.6 | | (188.7) |
| Nashville, Tennessee, USA (urban, Jan 1973 - Dec 1993) (Wright and colleagues) ‡ | II | Defined population base | NPW; culture | (46.3) | | 45.8 | | | 24.0 |
| Multicentric, Germany (urban, Nov 1999 - Oct 2001) †[20] | II | Census-derived estimate | NPS; PCR | (92.6) | | (91.7) | | | (52.3) |

‡ Outpatient clinic based

*Supplementary table 3: Description of all studies reporting incidence of RSV-associated severe ALRI in children younger than 5 years*

| Location (reference) | Case definition (codes)* | Denominator source | Specimen and diagnostic test* | Incidence of RSV associated severe ALRI (per 1000 children per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0-5m | 6-11m | 0-11m | 12-23m | 24-59m | 0-59m |
| Kilifi birth cohort, Kenya (rural, Jan 2002 - May 2005) (Nokes and colleagues) | I, O2+/- | Defined population base | NPA, nasal wash; DFA | 86.0 | 47.0 | 68.5 | 17.0 | | (23.3)† |
| Ballabhgarh, India (rural, Oct 2001 - Mar 2005)[18] | I | Defined population base | NPA; DFA | 20.1 | 9.0 | 14.3 | 6.5 | | (4.8) |
| Dhaka, Bangladesh (urban, Jan 2005 - Feb 2008) (Brooks and colleagues) | I, W+/C+, DS+/- | Defined population base | NPW, serum; serology, RT-PCR | 5.1 | 1.4 | 3.4 | 0.5 | | 1.0 |
| Ballabhgarh, India (rural, Aug 2012 - Aug 2013) (Krishnan and colleagues) | I, DS+/- | Defined population base | NPS; RT-PCR | 53.1 | 51.3 | 52.0 | 32.1 | 2.3 | 17.7 |
| Bandung, Indonesia (periurban and rural, 1st Feb 1999 - 26th Apr 2001) (Simoes and colleagues) | I, DS+/- | Defined population base | nasal wash; RT-PCR | (24.1) | 35.8 | 19.1 | 13.0 | 3.1 | 11.2 |
| Managua, Nicaragua (urban, Sep 2011 - Sep 2012) (Gordon and colleagues) | I, DS+/- | Defined population base | nasal and throat swab; RT-PCR | (28.9) | | 22.9 | | | (7.8) |
| Matiari, Pakistan (rural, Oct 2011 - Jun 2014) (Ali and colleagues) | I, F+/- | Census-derived estimate | NPS; RT-PCR | 19.0 | 22.2 | 20.6 | 3.1 | | (7.0) |
| Paarl, South Africa (periurban, Mar 2012 - Dec 2014) (Zar and colleagues) | I, DS+/- | Defined population base | NPS; RT-PCR | 406.7 | 82.1 | 253.5 | 36.9 | | (86.2) |
| Nashville, Tennessee, USA (urban, Jan 1973 - Dec 1993) (Wright and colleagues)‡ | II | Defined population base | NPW; culture | (3.2) | | 9.5 | | | 3.0 |

* NPA=nasopharyngeal aspirate. NPS=nasopharyngeal swab. NPW=nasopharyngeal wash. RT-PCR=reverse transcriptase polymerase chain reaction. DFA=direct immunofluorescent antibody test. I=WHO definition applied by a health worker. II=physician's assessment. W+/-=wheeze part of case definition or not. DS+/-=danger signs part of case definition or not. F+/-=fever part of case definition or not. O2+/-=hypoxemia part of case definition or not. C+/-=crepitation part of case definition or not

† Data in parentheses are imputed

‡ Outpatient clinic based

*Supplementary table 4: Description of all studies reporting incidence of RSV-associated very severe ALRI in children younger than 5 years*

| Location (reference) | Case definition (codes)* | Denominator source | Specimen and diagnostic test* | Incidence rate of RSV associated very severe ALRI (per 1000 children per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0-5m | 6-11m | 0-11m | 12-23m | 24-59m | 0-59m |
| Puerto Maldonado, Peru (periurban, Jan - Dec 2013) (Romero and colleagues) | I, W+/C+, DS+/- | Defined population base | NPW, serum; serology, RT-PCR | | | | 18.2 | | 4.4 |
| Paarl, South Africa (periurban, Mar 2012 - Dec 2014) (Zar and colleagues) | I, DS+/- | Defined population base | NPS; RT-PCR | 26.7 | 14.9 | 21.1 | 2.5 | | |
| Dhaka, Bangladesh (urban, Jan 2005 - Feb 2008) (Brooks and colleagues) | I, DS+/- | Defined population base | OPS; RT-PCR | 1.1 | 0.5 | 0.8 | | | 0.2 |
| Ballabhgarh, India (rural, Aug 2012 - Aug 2013) (Krishnan and colleagues) | I, DS+/- | Defined population base | NPS; RT-PCR | 17.7 | 6.4 | 11.1 | 6.4 | | 3.4 |

* NPS=nasopharyngeal swab. NPW=nasopharyngeal wash. OPS=oropharyngeal swab. RT-PCR=reverse transcriptase polymerase chain reaction. I=WHO definition applied by a health worker. W+/-=wheeze part of case definition or not. DS+/-=danger signs part of case definition or not. C+/-=crepitation part of case definition or not

*Supplementary table 5: Description of all studies reporting hospitalisation rate of RSV-associated ALRI in children younger than 5 years*

| Location (reference) | Case definition (codes)* | Denominator source | Specimen and diagnostic test* | Hospitalisation rate of RSV associated ALRI (per 1000 children per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0-5m | 6-11m | 0-11m | 12-23m | 24-59m | 0-59m |
| Alice Springs, Australia (urban, 1st Jan 2000 - 31st Dec 2004)[21] | II | Census-derived estimate | NPA; DFA | (42.7)† | | (32.4) | | | (8.7) |
| Suzhou, China (urban, Jan 2007 - Dec 2008)[22] | II | Census-derived estimate | nasal aspirate; DFA | (14.1) | | (10.7) | | | 2.9 |
| Hong Kong, China (urban, 2003 - 2006)[3] | II, F+ | Census-derived estimate | NPA; DFA, culture | 26.8 | 10.4 | 18.7 | 10.1 | 4.4 | 13.0 |
| Sa Kaeo and Nakhom Phanom, Thailand (rural, 1st Jan 2004 - 31st Dec 2007)[4] | II, XR | Census-derived estimate | NPS, serum; RT-PCR, IFA | (14.3) | | 10.9 | | | 5.4 |
| Damanhour, Egypt (urban and rural, Jun 2009 - Jun 2012)[10] | II | Census-derived estimate | NPS, OPS; RT-PCR | (23.0) | | 17.5 | | | 2.4 |
| Lørenskog, Norway (periurban, 1993 - 2000)[23] | II | Census-derived estimate | NPA; ELISA | (28.6) | | 21.7 | 6.8 | | (5.9) |
| Valencia, Spain (urban, 2001 - 2002)[24] | II | Census-derived estimate | NA‡ | (37.2) | | (28.2) | 9.8 | | (7.6) |
| Gipuzkoa, Spain (urban, Jul 2004 - Jun 2007)[25] | II | Census-derived estimate | NPA; RT-PCR | 39.4 | 10.8 | 25.1 | 3.0 | | (6.8) |
| Bursa, Turkey (urban, 1st Mar 2010 - 28th Feb 2011)[26] | II | Census-derived estimate | nasal swab; IF | (16.1) | | (12.2) | | | (3.3) |
| USA (urban and rural, 1997 - 2006)[27] | II | Census-derived estimate | NA | (32.8) | 13.4 | (24.8) | 5.0 | 0.8 | 6.7 |
| Dadaab and Kakuma, Kenya (rural, Sep 2007 - Aug 2010)[2] | III, T+/-, CWI+/-, O2+/- | Census-derived estimate | NPS, OPS; RT-PCR | (38.3) | | 29.0 | | | 9.3 |

* NPA=nasopharyngeal aspirate. NPS=nasopharyngeal swab. NPW=nasopharyngeal wash. OPS=oropharyngeal swab. RT-PCR=reverse transcriptase polymerase chain reaction. IFA=indirect immunofluorescent antibody test. DFA=direct immunofluorescent antibody test. ELISA=enzyme-linked immunosorbent assay. IF=immunofluorescence. II=physician's assessment. III=SARI definition. F+/-=fever as part of case definition or not. T+/-=tachypnea part of case definition or not. W+/-=wheeze part of case definition or not. C+/-=crepitation part of case definition or not. XR=X-ray confirmed (radiologically confirmed pneumonia). CWI+/-=chest wall indrawing part of case definition or not. DS+/-=danger signs part of case definition or not. O2+/-=hypoxemia part of case definition or not. ICU=intensive care unit. MV=mechanical ventilation

† Data in parentheses are imputed

‡ NA=not available

| Location (reference) | Case definition (codes)* | Denominator source | Specimen and diagnostic test* | Hospitalisation rate of RSV associated ALRI (per 1000 children per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0-5m | 6-11m | 0-11m | 12-23m | 24-59m | 0-59m |
| Gipuzoka, Spain (urban, Jul 1996 - Jun 2000)[11] | II | Census-derived estimate | NPA; ELISA | 36.8 | 14.2 | 25.5 | 3.6 | 0.5 | 6.2 |
| Kiel, Germany (urban, 1996 - 97 to 2000 - 2001)[28] | II, XR, W+/- | Defined population base | NPA; RT-PCR | (21.5) | | 16.3 | | | (4.4) |
| Multicentric, Germany (urban, Nov 1999 - Oct 2001)[20] | II | Census-derived estimate | NPS; PCR | (33.5) | | (25.4) | | | (6.9) |
| Shropshire, United Kingdom (urban, 1996 - 1999)[29] | II | Census-derived estimate | NA; IF | (34.2) | | (25.9) | | | (7.0) |
| Stockholm, Sweden (urban, 1987 - 1998)[30] | II | Census-derived estimate | NPW; IFA | (18.5) | | 14.0 | | | (3.8) |
| Graz, Austria (urban, 1999 - 2000)[31] | II | Census-derived estimate | NPA; ELISA | (14.7) | | (11.1) | | | (3.0) |
| England, United Kingdom (urban, Apr 1995 - Mar 1998)[8] | II | Census-derived estimate | NA | (37.4) | | 28.3 | | | 10.1 |
| Netherlands (urban, 1997 - 2003)[32] | II | Census-derived estimate | NA; cell culture, IF | (12.5) | | 9.5 | | | (2.6) |
| Banjul, Fajara and Sibanor, Gambia (urban and rural, Jan 1994 - Dec 1996)[33] | II | Census-derived estimate | NPA; IF | (23.4) | | 17.7 | | | (4.8) |
| Mpumalanga, South Africa (rural, Apr 2000 - Mar 2001)[1] | II, CWI+/-, W+/-, T+/- | Census-derived estimate | NPA, NPW; ELISA | 17.1 | | 15.0 | | | 9.0 |
| Takhli, Thailand (rural, 1999 - 2000)[34] | II, T+, CWI+, XR | Defined population base | NPA; IF | (43.0) | | (32.6) | | | 8.8 |
| Hong Kong, China (urban, 1993 - 1997)[35] | II | Census-derived estimate | NPA, throat swab; DFA, virus isolation | (12.2) | | (9.3) | | | 2.5 |
| Townsville (Queensland), Australia (urban and rural, Jan 1997 - Oct 1999)§[36] | II | Census-derived estimate | NA; IF, culture | (23.8) | | 18.0 | | | (4.9) |
| Monroe and Davidson Counties in Tennessee, USA (urban and rural, Oct 2000 - Sep 2001)[7] | II | Census-derived estimate | nasal and throat swab; viral culture, RT-PCR | 18.5 | 7.4 | 12.9 | 3.3 | 0.4 | 3.5 |
| Milwaukee, USA (urban, Nov 1996 - Oct 1998)[37] | II | Census-derived estimate | NPS, throat swab; culture, ELISA | (28.4) | | (21.5) | | | 5.8 |
| Tennessee, USA (urban, Jul 1989 - Jun 1993)[38] | II | Census-derived estimate | NA | 88.2 | 30.1 | 63.0 | 7.3 | | (17.0) |

§ Reported hospitalisation rate of an aboriginal population in a high-income country

| Location (reference) | Case definition (codes)* | Denominator source | Specimen and diagnostic test* | Hospitalisation rate of RSV associated ALRI (per 1000 children per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0-5m | 6-11m | 0-11m | 12-23m | 24-59m | 0-59m |
| Alaska, USA (rural, Jan 2000 - Dec 2001) §[39] | II | Census-derived estimate | NA | (45.4) | | 34.4 | | | (9.3) |
| USA (urban and rural, Jan 2000 - Dec 2001)[39] | II | Census-derived estimate | NA | (36.2) | | 27.4 | | | (7.4) |
| Nashville, Rochester and Cincinnati, USA (urban, Oct 2000 - Sep 2004)[6] | II, F+/-, W+/- | Census-derived estimate | nasal and throat swab; RT-PCR, culture | 16.9 | 5.1 | 11.1 | 2.7 | 0.4 | 3.0 |
| Kilifi birth cohort, Kenya (rural, Jan 2002 - May 2005) (Nokes and colleagues) | II, T+, CWI+/DS+ /O2+ | Defined population base | NPA, nasal wash; DFA | 20.0 | 6.0 | 11.6 | 5.4 | | (3.1) |
| CEMIC, Buenos Aires, Argentina (urban, 1st Jun 2008 - 31st Dec 2010) (Echavarria and colleagues) | II, ICU+/-, MV+/- | Defined population base | NPA; IFA | 14.3 | | (16.8) | | 0.7 | 4.5 |
| Buenos Aires, Argentina (urban and rural, 2011 - 2013) (Polack and colleagues) | II, O2+, W+, F+/-, ICU+/-, MV+/- | Census-derived estimate | NPA; PCR | 64.5 | 33.4 | 48.9 | 9.1 | | (13.2) |
| Kishoregonj, Bogra, Comilla and Barisal, Bangladesh (urban and rural, 2010 - 2013) (Homaira and colleagues) | II, F+/- | Census-derived estimate | nasal and throat swab; RT-PCR | (18.7) | | (14.1) | | | 3.8 |
| Belo Horizonte, Brazil (urban, 2011 - 2013) (Oliveira and colleagues) | II, F+, O2+/-, ICU+/- | Census-derived estimate | nasal swab; RT-PCR | (10.4) | | 7.9 | 1.3 | 0.9 | 2.2 |
| Concepcion, Chile (urban and rural, Jan 2012 - Dec 2013) (Fasce and colleagues) | II, F+/-, ICU+/- | Census-derived estimate | NPA; IF | (11.0) | | 8.3 | 1.9 | 0.3 | 2.2 |
| Iquique, Chile (urban and rural, Jan 2012 - Dec 2013) (Fasce and colleagues) | II, F+/-, ICU+/- | Census-derived estimate | NPA; IF | (30.4) | | 23.0 | 3.2 | 0.5 | 4.9 |
| Jingzhou, China (urban and rural, Jan 2010 - Dec 2012) (Yu and colleagues) | III, T+/-, XR | Census-derived estimate | NPS; RT-PCR | 3.5 | 6.6 | 5.2 | 11.2 | 3.4 | 5.4 |
| Santa Ana, El Salvador (urban, 2008 - 2013) (Clara and colleagues) | III | Census-derived estimate | NPS; IFA | (52.5) | | 39.8 | 16.2 | 2.0 | 12.2 |
| Gambia Western Region, Gambia (urban and rural, Jul 2007 - Jun 2008) (Howie and colleagues) | II, CWI+/-, W-, O2+/- | Defined population base | NPA; PCR | (32.2) | 17.4 | 24.4 | 6.3 | 1.6 | 5.7 |
| Santa Rosa, Guatemala (urban and rural, 2008 - 2013) (McCracken and colleagues) | II, CWI+/-, DS+/- | Census-derived estimate | NPS, OPS; RT-PCR | (34.9) | | 26.4 | 5.6 | 0.8 | 7.1 |

| Location (reference) | Case definition (codes)* | Denominator source | Specimen and diagnostic test* | Hospitalisation rate of RSV associated ALRI (per 1000 children per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0-5m | 6-11m | 0-11m | 12-23m | 24-59m | 0-59m |
| Quetzaltenango, Guatemala (urban and rural, 2009 - 2013) (McCracken and colleagues) | II, CWI+/-, DS+/- | Census-derived estimate | NPS, OPS; RT-PCR | (19.1) | | 14.4 | 3.3 | 0.4 | 3.8 |
| Ballabhgarh, India (rural, Jan 2010 - Dec 2012) (Broor and colleagues) | II, DS+/- | Defined population base | NPS; RT-PCR | 6.3 | 2.0 | 3.8 | 1.0 | 0.1 | 1.0 |
| Pune, India (rural, May 2009 - Apr 2013) (Chadha and colleagues) | II | Census-derived estimate | NPS; RT-PCR | 12.2 | 22.1 | 18.5 | 11.1 | 2.2 | 5.3 |
| Lombok, Indonesia (urban and rural, 2000 - 2002) (Gessner and colleagues) | II, CWI+ | Defined population base | nasal wash; ELISA | 14.0 | 12.3 | 13.1 | 2.6 | | (3.5) |
| Kilifi hospital study, Kenya (urban and rural, Jan 2002 - Dec 2010) (Nokes and colleagues) | II, CWI+, O2+/DS+ | Census-derived estimate | OPS, NPS, nasal wash; DFA | 27.2 | 11.1 | 19.3 | 3.4 | 0.6 | 4.9 |
| Bondo district, Kenya (rural, Jan 2007 - Jun 2009) (Feikin and colleagues) | II, O2+/DS+ | Census-derived estimate | NPS, OPS; RT-PCR | 52.6 | 25.0 | 32.0 | 6.3 | 7.1 | 16.5 |
| Manhiça, Mozambique (rural, 20th Sep 2006 - 19th Sep 2007) (Bassat and colleagues) | II, T+ | Census-derived estimate | NPA; RT-PCR | 14.5 | 6.6 | 11.0 | 2.8 | 0.6 | 3.2 |
| Manhiça, Mozambique (rural, 1st Jan 2011 - 30th Jun 2014) (Bassat and colleagues) | II, T+, O2+/- | Defined population base | NPA; RT-PCR | 4.4 | 1.9 | 3.2 | 1.2 | 0.4 | 1.1 |
| Utrecht, Netherlands (urban, 2001 - 2010) (Bont and colleagues) | II | Defined population base | NPS, NPW; PCR, IF | (11.1) | | 8.4 | | | (2.3) |
| 41 sites in Netherlands (urban and rural, 2008 - 2013) (Bont and colleagues) | II, ICU+/- | Defined population base | NPS, NPW; PCR, IF | (53.5) | | 40.5 | | | (10.9) |
| David City, Panama (urban, Jan 2011 - Dec 2013) (Jara and colleagues) | II | Defined population base | NPS, OPS; IFA, RT-PCR | (24.3) | | 18.4 | | | 5.6 |
| Tagbilaran and 6 rural sites, Philippines (urban and rural, 5th Jul 2000 - 31st Dec 2004) (Lucero and colleagues) | II, CWI+, DS+/- | Defined population base | NPA, nasal swab; culture, PCR | 73.1 | 54.8 | 62.4 | 23.1 | | (16.8) |
| Gauteng province, South Africa (urban, 2009 - 2012) (Cohen and colleagues) | II | Defined population base | NPA; PCR | (38.9) | | 29.4 | 6.8 | 1.3 | 7.8 |
| KwaZulu-Natal province, South Africa (periurban, 2010 - 2014) (Cohen and colleagues) | II | Defined population base | NPA; PCR | (27.5) | | 20.8 | 2.6 | 0.7 | 5.1 |
| Klerksdorp site, South Africa (periurban, Jan 2011 - Dec 2014) (Cohen and colleagues) | II | Defined population base | NPA; PCR | (16.3) | | 12.3 | | | 3.3 |
| Soweto, South Africa (urban, Mar 1998 - Oct 2005) (Madhi and colleagues) | II, CWI+, O2+/- | Defined population base | NPA; IF | 33.1 | 10.2 | 20.0 | 4.0 | 0.5 | 4.7 |
| Paarl, South Africa (periurban, Mar 2012 - Dec 2014) (Zar and colleagues) | II, CWI+, T+, DS+/- | Defined population base | NPS; RT-PCR | 146.7 | 29.9 | 91.5 | 4.9 | | (24.7) |

| Location (reference) | Case definition (codes)* | Denominator source | Specimen and diagnostic test* | Hospitalisation rate of RSV associated ALRI (per 1000 children per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0-5m | 6-11m | 0-11m | 12-23m | 24-59m | 0-59m |
| Maela Camp, Tak Province, Thailand (rural, Nov 2007 - Oct 2010) (Turner and colleagues) | II, CWI+, T+ | Defined population base | NPA; RT-PCR | 135.7 | 73.1 | 105.0 | 61.9 | | (28.4) |
| Sa Kaeo and Nakhon Phanom, Thailand (rural, Jan 2008 - Dec 2011) (Thamthitiwat and colleagues) | II, F+/-, T+/-, CWI+, O2+/- | Census-derived estimate | NPS; PCR | 12.2 | 18.6 | 15.4 | 15.3 | 6.3 | 9.8 |
| Tone district, Togo (rural, Aug 2011 - Dec 2013) (Gessner and colleagues) | II, CWI+ | Census-derived estimate | nasal wash; RT-PCR | 0.4 | 0.3 | 0.4 | 0.2 | 0.0 | 0.1 |
| Alaska, USA (rural, Jul 1994 - Jun 2012) (Singleton and colleagues) § | II, MV+/- | Census-derived estimate | NPS; ELISA, DFA, culture | 202.0 | 121.1 | 161.6 | 39.8 | | (43.6) |
| Colorado, USA (urban and rural, Jan 2008 - Jun 2013) (Simoes and colleagues) | II | Census-derived estimate | nasal wash; PCR | (23.8) | | 18.1 | 5.8 | 1.6 | 5.7 |
| Navajo and WMA, USA - MEDI (rural, Oct 2004 - Dec 2010) (O'Brien and colleagues) § | II, O2+/- | Defined population base | NPS; RT-PCR | 314.4 | 236.3 | 292.3 | | | (78.9) |
| Navajo and WMA, USA - EPI (rural, Oct 1997 - Mar 2000) (O'Brien and colleagues) § | II, O2+/- | Defined population base | NPA; ELISA | 230.2 | 158.9 | 194.4 | 81.7 | | (52.5) |
| Nha Trang, Vietnam (urban and rural, Feb 2007 - Dec 2012) (Yoshida and colleagues) | II, CWI+/DS+ | Census-derived estimate | NPS; RT-PCR | 9.3 | 3.8 | 7.5 | 4.1 | 0.8 | 2.8 |
| Memphis, Nashville and Salt Lake City, USA (urban, Jul 2010 - Jun 2012)[40] | II, XR | Census-derived estimate | NPS, OPS; RT-PCR | (5.8) | | (4.4) | | 0.7 | (1.2) |
| Spain (urban, Jan 1997 - Dec 2011)[5] | II | Census-derived estimate | NA | (54.6) | | 41.4 | 8.0 | 2.2 | 10.7 |
| Karemo, Kenya (rural, Aug 2009 - Jul 2012)[41] | III | Census-derived estimate | NPS, OPS; RT-PCR | 13.4 | 14.0 | (19.3) | 8.1 | 2.0 | 5.2 |
| Ho Chi Minh, Vietnam (urban, Jul 2009 - Dec 2013)[42] | II | Defined population base | NPS; RT-PCR | (10.6) | | 8.0 | | | (2.2) |
| Dong Thap, Vietnam (urban and rural, Aug 2009 - Dec 2012)[42] | II | Defined population base | NPS; RT-PCR | (40.8) | | 30.9 | | | (8.3) |
| USA (urban, 1997 - 2000)[43] | II | Census-derived estimate | NA | (30.0) | | 22.7 | | | (6.1) |
| USA (urban, 2000)[9] | II | Census-derived estimate | NA | (22.9) | | 17.4 | | | 4.5 |
| **Valencia, Spain (urban, Jan 2009 - Dec 2012)[44]** | II | Defined population base | NA | 31.6 | 3.6 | 19.5 | 0.7 | | (5.3) |

| Location (reference) | Case definition (codes)* | Denominator source | Specimen and diagnostic test* | Hospitalisation rate of RSV associated ALRI (per 1000 children per year) | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 0-5m | 6-11m | 0-11m | 12-23m | 24-59m | 0-59m |
| **New SouthWales, Australia (urban, 2001 - 2010)[45]** | II | Defined population base | NA | (24.2) | | (18.3) | | | 4.9 |
| **Gothenburg, Sweden (urban, 2004 - 2011)[46]** | II | Census-derived estimate | NA; PCR, IF | (23.0) | | 17.4 | | | 4.2 |

*Supplementary table 6: Description of all studies reporting proportion of ALRI hospitalisations in children younger than 5 years positive for RSV*

| Location (reference) | Case definition (codes)* | Specimen and diagnostic test* | Proportion of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-11m | 0-23m | 0-35m | 0-59m |
| Subiaco, Australia (urban, Jan 2000 - Dec 2005)[47] | II | NPA; DFA, RT-PCR, viral culture | 54.4 | 51.4 | | |
| Hangzhou, China (urban, Jan 2001 - Dec 2006)[48] | II | NPA; DFA | 30.1 | | 27.1 | |
| Lanzhou, China (urban, 1st Jan - 31st Dec 2011)[49] | II, F+/-, W+/-, XR | throat swab; RT-PCR | 19.3 | | | |
| Lanzhou, China (urban, Oct 2004 - Oct 2005)[50] | II, F+/-, XR | NPA, serum; DFA, ELISA | 23.4 | | 20.3 | 19.2 |
| Shanghai, China (urban, May 2009 - Jul 2010)[51] | II, F+ | NPS; RT-PCR | | | 11.6 | |
| Hong Kong, China (urban, 1st Jan 2004 - 31st Dec 2004)[52] | II | NPA; DFA | | | 11.6 | |
| Hong Kong, China (urban, Nov 2005 - Oct 2006)[53] | II, W+/-, F+/- | NPA, nasal swab; DFA, RT-PCR, viral culture | | | | 8.4 |
| Taiwan, China (urban, Jan 2001 - Dec 2003)[54] | II | NPA; virus culture, IF | 26.1 | 24.3 | | 23.5 |
| Shizuoka, Japan (urban, 1st Jul 1997 - 30th Jun 2000)[55] | II, W+/-, XR | NPA; ELISA | | | 31.4 | |
| Tokyo, Japan (urban, Mar 2007 - Jul 2009)[56] | II, W+/-, F+/-, XR | NPS; RT-PCR | | 27.6 | | |
| Japan (urban, Apr 2008 - Apr 2009)[57] | II, F+, XR | NPS; RT-PCR | 26.9 | 28.7 | | 26.1 |
| Nagasaki, Japan (urban, Apr 2009 - Mar 2010)[58] | II, XR | NPS; IF, RT-PCR | | | | 55.9 |
| Seoul, Korea (urban, Jan - Dec 2004)[59] | II, W+, XR | NPA; RT-PCR | | | | 29.5 |
| Seoul, Korea (urban, Jul 2004 - Jan 2006)[60] | II, XR, W+ | NPA; DFA | | | | 20.6 |
| Seoul, Korea (urban, Jan 2007 - Feb 2011)[61] | II | NPA; RT-PCR | | | 67.7 | |
| Kuala Lumpur, Malaysia (urban, Jan 1982 - Dec 1997)[62] | II | NPA; IFA, culture | 19.2 | 18.4 | | |

* NPA=nasopharyngeal aspirate. NPS=nasopharyngeal swab. NPW=nasopharyngeal wash. OPS=oropharyngeal swab. RT-PCR=reverse transcriptase polymerase chain reaction. IFA=indirect immunofluorescent antibody test. DFA=direct immunofluorescent antibody test. ELISA=enzyme-linked immunosorbent assay. IF=immunofluorescence. II=physician's assessment. III=SARI definition. F+/-=fever as part of case definition or not. T+/-=tachypnea part of case definition or not. W+/-=wheeze part of case definition or not. C+/-=crepitation part of case definition or not. XR=X-ray confirmed (radiologically confirmed pneumonia). CWI+/-=chest wall indrawing part of case definition or not. DS+/-=danger signs part of case definition or not. O2+/-=hypoxemia part of case definition or not. ICU=intensive care unit. MV=mechanical ventilation.

| Location (reference) | Case definition (codes)* | Specimen and diagnostic test* | Proportion of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-11m | 0-23m | 0-35m | 0-59m |
| Ho Chi Minh City, Vietnam (urban, Nov 2004 - Jan 2008)[63] | II, T+, CWI+/-, ICU+/- | nasal swab, throat swab, NPA; RT-PCR | 21.4 | | | 24.4 |
| Ho Chi Minh City, Vietnam (urban, Apr 2010 - May 2011)[64] | II, XR | NPS; RT-PCR | | 24.7 | | |
| Pune, India (urban, Feb 2002 - Dec 2004)[65] | II | NPA; IF | 46.0 | | 42.5 | |
| Kolkata, India (urban, Apr 2010 - Mar 2011)[66] | III, CWI+, W+, C+, T+ | nasal and throat swabs; RT-PCR | 21.0 | | | 16.7 |
| Lucknow, India (urban, Jun 2011 - May 2012)[67] | II, CWI+ | NPA; RT-PCR | 34.3 | | | 25.2 |
| Khon Kaen, Thailand (urban, Aug 1992 - Nov 1994)[68] | II, CWI+, XR | NPA; virus culture, IF, ELISA | | | | 29.0 |
| Nakhon Sawan, Thailand (rural, Nov 1998 - Feb 2001)[69] | II, CWI+ | NPA; IFA | | | | 34.2 |
| Khon Kaen, Thailand (urban, Apr 2002 - Aug 2004)[70] | II, W+, T+ | NPA; RT-PCR | 67.6 | 64.7 | | |
| Tak Province, Thailand (rural, Apr 2009 - Sep 2011)[71] | II, CWI+/-, DS+/- | NPA; RT-PCR | 39.1 | | | |
| Seeb, Oman (urban, Dec 2007 - Dec 2008)[72] | II | NPA; IF, RT-PCR | | | | 21.6 |
| Zarqa, Jordan (urban, Jan 1997 - May 1999)[73] | II | NPW; DFA, RT-PCR | | 25.5 | | |
| Amman, Jordan (urban, Sep 2002 - Mar 2004)[74] | II | NPA; DFA | 15.6 | 12.5 | | |
| Riyadh, Saudi Arabia (urban, Apr 1993 - Mar 1996)[75] | II, F+, W+/-, XR | NPA; IFA | | | | 28.9 |
| Riyadh, Saudi Arabia (urban, Jan 2005 - Dec 2010)[76] | II | NPA; DFA | 48.8 | | 48.4 | 47.4 |
| Abha, Saudi Arabia (urban, Oct 1997 - Sep 2001)[77] | II | NPA; ELISA, IFA | | | | 35.3 |
| Zagreb County, Croatia (urban, 1994 - 2005)[78] | II | NPA; DFA, virus isolation | 50.9 | 47.4 | | 45.8 |
| Zagreb County, Croatia (urban, Aug 2006 - Aug 2007)[79] | II | NPA; DFA | 48.1 | 47.0 | | 46.5 |
| Turku, Finland (urban, Jan 1993 - Dec 1995)[80] | II, F+, XR | NPA; ELISA, culture | | 46.3 | | |
| Montpellier, France (urban, 1st Nov 2003 - 31st Oct 2004)[81] | II | NPA; DFA, virus culture | 33.8 | 30.5 | 29.4 | |
| Kiel, Germany (urban, Jul 1996 - Jun 2001)[82] | II | NPA; ELISA, RT-PCR | 28.2 | 23.6 | | 19.8 |
| Germany (urban, Nov 1999 - Oct 2001 and Oct 2002 - Jun 2005)[83] | II | NPA; RT-PCR, ELISA | 42.8 | 36.2 | 34.1 | |
| Athens, Greece (urban, 2008 - 2009)[84] | II | NPA; IF | | | | 28.5 |
| Be'er Sheva, Israel (urban, Nov 2001 - Oct 2002)[85] | II | nasal wash; DFA | | | | 19.6 |
| Be'er Sheva, Israel (urban, Nov 2001 - Oct 2005)[86] | II, XR | NPW; DFA, culture | | | | 28.0 |
| Pisa, Italy (urban, Jan 2000 - May 2006)[87] | II | nasal swab; DFA | | 31.1 | | |

| Location (reference) | Case definition (codes)* | Specimen and diagnostic test* | Proportion of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-11m | 0-23m | 0-35m | 0-59m |
| Milan, Italy (urban, Oct 2004 - Sep 2006)[88] | II, W+/- | NPA; RT-PCR | | 28.0 | | |
| Milan, Italy (urban, 1st Dec 2008 - 31st Dec 2009)[89] | II, W+/- | OPS; RT-PCR | 52.0 | 42.6 | | 37.0 |
| Enschede, Netherlands (urban, 2006 - 2007)[90] | II, W+/-, F+/- | NPW; RT-PCR | | 48.3 | | |
| Palma, Spain (urban, Jan 1995 - Dec 2006)[91] | II | NPA, NPW; ELISA, culture | | 62.7 | | |
| Madrid, Spain (urban, Oct 2000 - Jun 2005)[92] | II | NPA; IFA, RT-PCR | | 45.3 | | |
| Madrid, Spain (urban, Sep 2005 - Aug 2008)[93] | II, W-, ICU+/- | NPA; RT-PCR | | 61.3 | | |
| Malmo, Sweden (urban, 1998 - 1999)[94] | II | NPA; IF | 54.5 | | | |
| Lausanne and Geneva, Switzerland (urban, Mar 2003 - Dec 2005)[95] | II, CWI+, W- | NPA, serum; RT-PCR, IFA, ELISA, serology | | | | 13.1 |
| Turkey (urban, May 2008 - Sep 2010)[96] | II | NPA, NPS, nasal wash, nasal swab; IF | | 16.9 | | |
| Buenos Aires and Santa Fe, Argentina (urban, 1990 - 1996)[97] | II, T+/-, W+/-, XR | NPA; IFA | | 27.0 | | |
| Buenos Aires, Argentina (urban, 1999 - 2004)[98] | II | NPA; RT-PCR, DFA | | | | 31.6 |
| Pelotas, Brazil (urban, 1st Aug 1997 - 31st Jul 1998)[99] | II, CWI+ | NPA; DFA | 30.8 | | | |
| Bahia, Brazil (urban, Jan - Dec 1998)[100] | II | NPA; IFA | | | | 23.8 |
| Sao Paulo, Brazil (urban, Mar 1999 - Jun 2000)[101] | II, W+, XR | NPA, nasal swab; IFA, virus culture, RT-PCR | 60.9 | | | |
| Sao Paulo, Brazil (urban, Jan 2003 - Dec 2006)[102] | II | NPA, nasal swab; RT-PCR | 45.4 | | | 42.0 |
| Sao Paulo, Brazil (urban, Jan 2006 - Dec 2007)[103] | II, W- | NPA; IFA | 63.5 | | | |
| Bahia, Brazil (urban, Sep 2003 - May 2005)[104] | II, XR | NPA, serum; IF, ELISA | | | | 15.2 |
| Sao Paulo, Brazil (urban, May 2004 - Sep 2005)[105] | II, T+/-, W+/- | NPA; RT-PCR | 40.4 | 34.1 | | |
| Sao Paulo, Brazil (urban, Feb 2005 - Sep 2006)[106] | II, W+/- | NPA; IFA | 30.1 | | | 28.6 |
| Sao Paulo, Brazil (urban, Mar 2008 - Aug 2011)[107] | II, CWI+ | NPA; RT-PCR | | 27.3 | | |
| Belem, Brazil (urban, Nov 2006 - Oct 2007)[108] | II, F+/-, XR | NPA; DFA, RT-PCR | | | 23.1 | |
| Porto Alegre, Brazil (urban, Sep 2009 - Sep 2010)[109] | II, W- | NPA; DFA | 53.5 | | | |
| Iqaluit, Canada (urban, 28th Jan 2002 - 27th Mar 2003)[110] | II | NPA; ELISA | | 51.2 | | |

| Location (reference) | Case definition (codes)* | Specimen and diagnostic test* | Proportion of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-11m | 0-23m | 0-35m | 0-59m |
| British Columbia, Canada (urban, Apr 2008 - Mar 2010)[111] | II | NA† | 48.1 | | | |
| Medellin, Colombia (urban and rural, Apr 1994 - Apr 1995)[112] | II | NPW; DFA | 41.7 | | | |
| Colombia (urban, Apr 2005 - Apr 2006)[113] | II | NPA; IF | 30.1 | | | |
| San Luis Potosi, Mexico (urban, 1st May 2003 - 30th Apr 2005)[114] | II | NPW; DFA | 26.9 | 25.9 | 24.8 | |
| Alaska, USA (rural, 1st Oct 1991 - 30th Sep 1993)‡[115] | II | NA; ELISA, IF, culture | | 38.4 | | |
| California, USA (urban, 1996 - 2004)[116] | II | NA; DFA | | 56.2 | | |
| Dallas, Texas, USA (urban, Jan 2002 - Dec 2007)[117] | II | NPA; IF, DFA, virus culture | | 66.3 | | |
| New York, USA (urban, Oct 2007 - May 2010)[118] | II, F+ | NPS; RT-PCR, ELISA, virus culture | | 53.7 | | |
| Kumasi, Ghana (urban, Jan 2008 - Dec 2008)[119] | II, CWI+, DS+/- | NPS; RT-PCR | | 14.6 | | 14.1 |
| Rarieda, Kenya (rural, 1st Mar 2007 - 28th Feb 2010)[120] | III, DS+/CWI+ | NPS, OPS; RT-PCR | | | | 22.6 |
| Kilifi, Kenya (rural, Jan - Dec 2010)[121] | II, CWI+ | NPA, OPS, sputum; RT-PCR | | | | 26.5 |
| Bondo district, Kenya (rural, Aug 2008 - Dec 2010)[122] | II, CWI+/DS+/O2+ | NPS, OPS; RT-PCR | | | | 17.1 |
| Santiago, Chile (urban, Jan 1989 - Dec 2000)[123] | II, W- | NPA; IFA | | 29.0 | | |
| Cape Town, South Africa (urban, Jun 1995 - Aug 1996)[124] | II, W+/- | NPA; ELISA | | 15.8 | | |
| Manhica District, Mozambique (rural, Oct 1998 - May 2000)[125] | II, CWI+/-, W+/-, T+/- | NPA; ELISA | 10.7 | | | |
| Athens, Greece (urban, Feb 1997 - Jun 2000)[126] | II, XR, W+/-, T+/- | NPW; DFA | 61.5 | | | |
| Buenos Aires, Argentina (urban, May 1991 - Dec 1992)[127] | II, CWI+/-, XR, W+/-, T+/- | NPA; IFA | | 38.6 | | |
| Rio de Janeiro, Brazil (rural, Jan 1987 - Dec 1989)[19] | II, T+/-, W+/- | NPA; IFA, culture | | | | 40.5 |
| Beijing, China (urban, Feb 2001 - Mar 2003)[128] | II | NPA; virus culture, IFA | 44.9 | | 39.0 | 36.5 |
| Beijing, China (urban, Mar 2010 - Feb 2012)[129] | II | NPA, throat swab; RT-PCR | 56.3 | | 49.1 | 41.8 |

† NA= Not available

‡ Reported data from aboriginal population in a high-income country

| Location (reference) | Case definition (codes)* | Specimen and diagnostic test* | Proportion of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-11m | 0-23m | 0-35m | 0-59m |
| Changsha, China (urban, Sep 2007 - Aug 2008)[130] | II, F+, T+ | NPA; RT-PCR | 42.0 | | 37.1 | 37.0 |
| Changsha, China (urban, Sep 2007 - Aug 2008)[131] | II | NPA; RT-PCR | 30.1 | | 27.6 | 27.6 |
| Changsha, China (urban, Jun 2011 - Jun 2012)[132] | II | NPA; DFA | 55.1 | | 53.7 | 53.9 |
| Chaozhou, China (urban, Jun 2011 - Oct 2012)[133] | II | NPA; IFA | 9.3 | | 6.9 | |
| Chengdu, China (urban, Jan - Dec 2007)[134] | II | NPA; DFA | 29.8 | | 26.4 | |
| Chengdu, China (urban, Mar 2010 - Feb 2011)[135] | II | NPA; RT-PCR | | 30.6 | | |
| Chenzhou, China (urban, Jan - Dec 2010)[136] | II | NPA; PCR | 21.5 | | 18.2 | |
| Chongqing, China (urban, Apr 2003 - Oct 2007)[137] | II | NPA; DFA | 36.4 | | 29.6 | |
| Chongqing, China (urban, Apr 2008 - Mar 2009)[138] | II | NPA; RT-PCR | 31.7 | 29.3 | 28.7 | |
| Chongqing, China (urban, Feb 2009 - Mar 2011)[139] | II | NPA; DFA | | | | |
| Chongqing, China (urban, Jan 2009 - Dec 2011)[140] | II | NPA; DFA | 34.5 | | 31.9 | |
| Dongguan, China (urban, Mar 2011 - May 2012)[141] | II | NPA; DFA | 32.1 | | 23.2 | |
| Chengdu, China (urban, Jan 2007 - Dec 2009)[142] | II | NPA; IF | 25.5 | | 27.5 | |
| Fuyang, China (urban, Jan 2003 - Dec 2004)[143] | II | NPA; DFA | | | | |
| Guangzhou, China (urban, Oct 2009 - Sep 2010)[144] | II | NPS; RT-PCR | 10.7 | | 8.5 | 7.5 |
| Guiyang, China (urban, Jan 2010 - May 2011)[145] | II | NPA; IF | | | 21.0 | |
| Guiyang, China (urban, Jun 2006 - Apr 2011)[146] | II | NPA; DFA | 27.1 | | 24.1 | |
| Haikou, China (urban, Jan 2007 - Oct 2008)[147] | II | NPA; RT-PCR | 41.7 | | 39.7 | |
| Hangzhou, China (urban, 2000 - 2001)[148] | II | NPA; IF | 34.9 | | 29.5 | |
| Hangzhou, Chin (urban, 2001 - 2003)[149] | II | NPA; DFA | | | | |
| Jiaxing, China (urban, Dec 2008 - Dec 2009)[150] | II | NPA; RT-PCR, DFA | 16.8 | 15.8 | | |
| Jiaxing, China (urban, Aug 2010 - Aug 2012)[151] | II | NPA; DFA | 18.6 | | 14.6 | |
| Kunming, China (urban, Oct 2005 - Oct 2007)[152] | II | NPA; DFA | 28.5 | | 25.9 | |
| Kunming, China (urban, Sep 2009 - Sep 2010)[153] | II | NPA; RT-PCR | 46.2 | 42.9 | 40.8 | 40.2 |
| Yueqing, China (urban, Jan 2006 - Dec 2010)[154] | II | NPA; DFA | 32.0 | | 23.2 | 19.3 |
| Liaocheng, China (urban, Oct 2007 - Oct 2008)[155] | II | NPA; DFA | 43.1 | | 38.9 | |

| Location (reference) | Case definition (codes)* | Specimen and diagnostic test* | Proportion of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-11m | 0-23m | 0-35m | 0-59m |
| Linyi, China (urban, Dec 2010 - Dec 2011)[156] | II | NPA; RT-PCR | 33.2 | 31.5 | | |
| Nanjing, China (urban, Apri 2006 - Mar 2007)[157] | II | NPA; DFA | 28.3 | 20.9 | | 17.1 |
| Nanjing, China (urban, Sep 2008 - Aug 2009)[158] | II | NPA; DFA | 33.1 | | 29.0 | |
| Nanjing, China (urban, Jan 2009 - Dec 2011)[159] | II | NPA; DFA | 36.8 | | 34.1 | |
| Shanghai, China (urban, May 2001 - Apr 2002)[160] | II | NPA; IF | 25.3 | | 21.1 | |
| Shanghai, China (urban, Jan - Dec 2000)[161] | II | NPA; IF | 21.1 | | 19.1 | 18.6 |
| Shanghai, China (urban, Oct 2002 - Apr 2004 )[162] | II | NPA; DFA | 29.8 | | 20.4 | 19.0 |
| Shanghai, China (urban, 2003 - 2006)[163] | II | NPA; DFA | 21.4 | | 23.0 | 21.6 |
| Shanghai, China (urban, Jan 2009 - Mar 2010)[164] | II | NPA, throat swab; RT-PCR | 28.1 | | 25.6 | |
| Shanghai, China (urban, Mar 2011 - Feb 2012)[165] | II | NPA; DFA | | | 10.1 | |
| Shangluo, China (urban, May 2011 - May 2012)[166] | II | NPA; IF | 43.3 | | 40.6 | 39.7 |
| Shantou, China (urban, Jan 2007 - Dec 2007)[167] | II | NPA; RT-PCR | | | | 19.1 |
| Suzhou, China (urban, Sep 2005 - Oct 2011)[168] | II | NPA; DFA | 22.4 | | 18.9 | 17.1 |
| Tianjin, China (urban, Jan 2002 - Mar 2004)[169] | II | NPA; IFA | 9.8 | | 9.4 | |
| Tianjin, China (urban, Jan 2010 - Jun 2011)[170] | II | NPA; DFA | 7.5 | | 6.5 | |
| Weifang, China (urban, Nov 2007 - Nov 2008)[171] | II | NPA, NPS; DFA | 31.0 | | 25.8 | |
| Wenzhou, China (urban, Jan 2003 - Jan 2005)[172] | II | NPA; DFA | 42.8 | | 39.5 | |
| Wenzhou, China (urban, Nov 2003 - Feb 2005)[173] | II | NPS; IFA | | | 27.5 | |
| Wenzhou, China (urban, Nov 2004 - Nov 2006)[174] | II | NPA; DFA | 39.5 | | 39.6 | |
| Wenzhou, China (urban, Jan 2007 - Dec 2008)[175] | II | NPA; DFA | 38.1 | | 35.6 | |
| Wenzhou, China (urban, Feb 2009 - Jan 2010)[176] | II | NPA; DFA | 34.1 | | 30.4 | 28.2 |
| Wenzhou, China (urban, Jan - Dec 2010)[177] | II | NPA; IF | | | | |
| Xian, China (urban, 1994 - 1997)[178] | II | NPA; IF | 27.4 | | 25.8 | |
| Yancheng, China (urban, Jun 2011 - Jul 2012)[179] | II | NPA; DFA | 22.1 | | 20.0 | |
| Zhongshan, China (urban, Apr 2011 - Mar 2012)[180] | II | NPS; IF | 17.8 | | | |
| Zhuzhou, China (urban, Jan - Dec 2011)[181] | II | NPA; DFA | 26.7 | | 25.3 | 22.5 |

| Location (reference) | Case definition (codes)* | Specimen and diagnostic test* | Proportion of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-11m | 0-23m | 0-35m | 0-59m |
| Buenos Aires, Argentina (urban, 1st Jun 2008 - 31st Dec 2010) (Echavarria and colleagues) | II, ICU+/-, MV+/- | NPA; IFA | 43.0 | 36.8 | 34.8 | 33.3 |
| Buenos Aires, Argentina (urban, 2001 - 2013) (Gentile and colleagues) | II, MV+/- | NPA; IFA | 42.7 | 40.4 | 39.8 | 38.9 |
| Takeo and Kampong Cham, Cambodia (urban, Apr 2007 - Feb 2010) (Goyet and colleagues) | II, F+, T+ | NPS, throat swab; RT-PCR | 22.6 | 20.5 | 20.2 | 18.8 |
| Chillan, Chile (urban and rural, 2010 - 2013) (Fasce and colleagues) | II | NPA; IF | 27.2 | | | 23.7 |
| Osorno, Chile (urban and rural, 2010 - 2013) (Fasce and colleagues) | II | NPA; IF | 25.4 | | | 22.3 |
| Punta Arenas, Chile (urban and rural, 2010 - 2013) (Fasce and colleagues) | II | NPA; IF | 60.8 | | | 56.4 |
| Santiago, Chile (urban, 2010 - 2013) (Fasce and colleagues) | II | NPA; IF | 33.5 | | | 28.2 |
| Valparaiso, Chile (urban mostly, 2010 - 2013) (Fasce and colleagues) | II | NPA; IF | 20.1 | | | 16.0 |
| China (urban and rural, Jan 2009 - Sep 2013) (Yu and colleagues) | II, XR, W+/-, F+/- | NPA, NPS; PCR | 27.0 | 24.9 | 23.5 | 21.6 |
| Beijing, China (urban, Jan 2011 - Dec 2012) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 73.8 | 53.8 | 42.2 | 33.1 |
| Ulaanbaatar, Mongolia (urban, Sep 2011 - Oct 2012) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 21.4 | 21.5 | 24.7 | 22.8 |
| Phnom Penh, Cambodia (urban, Oct 2010 - Jan 2013) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 21.8 | 22.6 | 22.8 | 21.7 |
| Lucknow, India (urban and rural, Jun 2012 - Dec 2013) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 9.1 | 6.4 | 6.2 | 5.7 |
| Antananarivo, Madagascar (urban and rural, Dec 2010 - Feb 2013) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 10.9 | 15.9 | 15.0 | 13.2 |
| Asuncion, Paraguay (urban, Jul 2010 - May 2013) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 25.6 | 16.9 | 14.9 | 14.3 |
| Bamako, Mali (urban, Jul 2011 - Nov 2012) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 43.6 | 36.4 | 30.9 | 26.5 |
| Berlin, Germany (urban, 1st Apr 2010 - 31st Mar 2014) (Rath and colleagues) | II, F+, ICU+/- | NPS, NPA; RT-PCR | 38.8 | 31.2 | 29.5 | 27.7 |
| Tehran, Iran (urban, Mar 2008 - May 2009)[182] | II | throat swab and wash; PCR | 20.5 | 18.9 | 17.6 | 17.6 |
| Iran (urban, Nov 2007 - Apr 2013)[183] | II | throat swab; RT-PCR | 24.6 | 24.7 | | |
| Amman, Jordan (urban, Mar 2010 - Mar 2013) (Khuri and colleagues) | II, T+, O2+/ICU/MV | nasal and throat swab; PCR | 55.7 | 52.5 | | |
| Lwak, Kenya (rural, 2007 - 2011) (Montgomery and colleagues) | II, CWI+/DS+/O2+ | NPS, OPS; RT-PCR | 32.9 | 25.9 | 23.3 | 21.5 |
| Rabat, Morocco (urban, Nov 2010 - Dec 2011) (Bassat and colleagues) | II, CWI+, T+ | NPA; RT-PCR | 29.3 | 22.3 | 19.9 | 17.3 |
| Kathmandu, Nepal (urban, Jan 2006 - Jun 2008) (Basnet and colleagues) | II, CWI+ | NPA; RT-PCR | 15.2 | 14.1 | 13.8 | |

| Location (reference) | Case definition (codes)* | Specimen and diagnostic test* | Proportion of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-11m | 0-23m | 0-35m | 0-59m |
| Karachi, Pakistan (urban, Aug 2009 - Jul 2012) (Ali and colleagues) | II | throat swab; RT-PCR | 22.1 | 21.2 | 20.5 | 19.4 |
| Basse, Gambia (rural, 3rd Nov 2011 - 2nd Nov 2013) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 25.5 | 21.9 | 20.3 | 19.3 |
| Kilifi, Kenya (urban, 15th Aug 2011 - 15th Nov 2013) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 33.7 | 27.0 | 25.2 | 23.7 |
| Bamako, Mali (urban, 3rd Jan 2012 - 14th Jan 2014) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 32.0 | 27.5 | 26.4 | 25.4 |
| Nakhon Phanom and Sa Kaeo, Thailand (rural, 1st Jan 2012 - 31st Jan 2014) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 26.4 | 26.2 | 29.1 | 27.3 |
| Lusaka, Zambia (urban, 10th Oct 2011 - 31st Oct 2013) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 20.4 | 19.6 | 18.9 | 18.7 |
| Dhaka, Bangladesh (urban, 1st Jan 2012 - 31st Dec 2013) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 21.3 | 19.9 | 19.6 | 18.7 |
| Matlab, Bangladesh (rural, 1st Jan 2012 - 31st Dec 2013) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 53.6 | 39.0 | 35.8 | 33.3 |
| Tacloban, Philippines (rural, May 2008 - Jul 2012) (Lupisan and colleagues) | II, CWI+, DS+/- | NPS, serum; PCR, virus isolation, culture, serology | 21.6 | 18.9 | 17.9 | 17.0 |
| Mpumalanga, South Africa (rural, Jan 2010 - Dec 2014) (Cohen and colleagues) | II | NPA; PCR | 25.9 | 23.2 | 22.4 | 21.3 |
| Nanjing, China (urban, Jan 2013 - Dec 2013)[184] | II | NPA; DFA | 26.5 | | 11.5 | |
| Guangdong, China (urban, Jul 2010 - Jul 2012)[185] | II | NPA; RT-PCR | 6.1 | | 8.8 | 7.5 |
| Yanting, China (urban, Jan 2011 - Dec 2012)[186] | II | NPA; RT-PCR | 56.3 | | 49.0 | 41.7 |
| Guiyang, China (urban, Jan 2012 - Dec 2013)[187] | II | NPA; DFA | 40.6 | | 32.4 | |
| Qingyuan, China (urban, Aug 2012 - Apr 2014)[188] | II | NPA; RT-PCR | 7.9 | | 7.4 | |
| Guangzhou, China (urban, Jun 2012 - Jun 2013)[189] | II | NPA; RT-PCR | 7.2 | | 7.2 | 6.8 |
| Guangxi, China (urban, Jan 2013 - Dec 2013)[190] | II | NPA; DFA | 13.9 | | 13.0 | 12.5 |
| Huzhou, China (urban, Jan 2011 - Dec 2013)[191] | II | NPA; DFA | 18.4 | | 17.2 | 16.8 |
| Foshan, China (urban, Feb 2012 - Jan 2014)[192] | II | NPA; DFA | 16.6 | 15.4 | | 13.0 |
| Wuhan, China (urban, Jan 2011 - Dec 2012)[193] | II | NPA; DFA | 20.2 | | | |
| Wenzhou, China (urban, Jan 2013 - Dec 2013)[194] | II | NPA; RT-PCR | 42.6 | | | 42.4 |
| Wenzhou, China (urban, Dec 2012 - Nov 2013)[195] | II | NPA; DFA | 20.0 | | 16.3 | 13.0 |
| Chongqing, China (urban, Feb 2013 - Apr 2014)[196] | II | NPA; DFA | 11.7 | | 10.4 | 9.3 |
| Ningxia, China (urban, Jan 2010 - Dec 2013)[197] | II | NPA; DFA | 91.8 | 82.5 | 76.8 | |
| Lishui, China (urban, Jan 2010 - Mar 2013)[198] | II | NPA; DFA | 24.3 | | 21.7 | |

| Location (reference) | Case definition (codes)* | Specimen and diagnostic test* | Proportion of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-11m | 0-23m | 0-35m | 0-59m |
| Nantong, China (urban, Jan 2012 - Mar 2013)[199] | II | NPA; DFA | 39.7 | | 30.8 | 28.5 |
| Quanzhou, China (urban, Jan 2012 - Jan 2013)[200] | II | NPS; DFA | 37.7 | | 31.0 | 25.6 |
| Suzhou, China (urban, Jan 2009 - Dec 2013)[201] | II | NPS; DFA | 18.9 | 17.6 | 17.1 | 15.8 |
| Changsha, China (urban, Apr 2013 - Mar 2014)[202] | II | NPA; DFA | 50.7 | | 46.4 | 45.0 |
| Shenzhen, China (urban, Jul 2007 - Jun 2010)[203] | II, F+ | NPA; RT-PCR | 16.3 | 15.6 | | |
| Soma, Japan (urban, Feb 2008 - Aug 2009)[204] | II | NPA; RT-PCR | | | 34.2 | |
| Tokyo, Japan (urban, Apr 2007 - Mar 2012)[205] | II | nasal swab; RT-PCR | | 30.8 | | |
| Baguio, Philippines (urban, Apr 2009 - Dec 2011)[206] | III | NPS, OPS; RT-PCR | | 31.7 | | 28.4 |
| Riga, Latvia (urban, Jul 2009 - Jun 2012)[207] | II | NPA; RT-PCR | | 42.5 | | |
| Mirzapur, Bangladesh (both, Jun 2006 - Sep 2007)[208] | II | nasal wash; RT-PCR | | | | |
| Beirut, Lebanon (urban, Oct 2012 - Mar 2014)[209] | II | NPW; IF | | 25.8 | | |
| England, UK (urban, Apr 2007 - Mar 2008)[210] | II | NA | 28.0 | | | |
| Tehran, Iran (urban, Jan 2012 - Dec 2012)[211] | II | NPA; RT-PCR | | | | 17.2 |
| Taiwan, China (urban, Jan 2009 - Mar 2011)[212] | II | NPA; culture, IF | | 43.4 | | |
| Ouagadougou, Burkina Faso (urban, Jul 2010 - Jul 2011)[213] | II | NPA; DFA | | | 14.0 | |
| Rize, Turkey (urban, Jan 2014 - Jan 2015)[214] | II | NPS; RT-PCR | 51.2 | 52.1 | 49.2 | 47.3 |
| Aliasghar children's hospital, Iran (urban, Mar 2010 - Mar 2013)[215] | SARI | NPA; RT-PCR | 33.7 | 34.7 | | 31.0 |
| Riyadh, Saudi Arabia (urban, Feb 2008 - Feb 2009)[216] | II | NPA; RT-PCR | | | | 22.4 |
| Yaounde, Cameroon (urban, Sep 2011 - Sep 2013)[217] | II | NPS; RT-PCR | 67.2 | 67.5 | | 67.1 |
| Vila Real, Portugal (urban, Sep 2005 - Dec 2015)[218] | II | NPA; IF | | | 47.7 | |
| Nicosia, Cyprus (urban, Nov 2010 - Oct 2013)[219] | II | NPS; RT-PCR | 46.2 | | 36.9 | |
| Shenzhen Children's Hospital, China (urban, Jan 2012 - Dec 2015)[220] | II | NPS; DFA | 13.4 | | 11.7 | |
| Lima, Peru (urban, Jan 2009 - Sep 2010)[221] | II | NPS; RT-PCR | | | | 17.3 |
| Chonburi hospital, Thailand (urban, Jun 2013 - May 2014)[222] | II | NPA; RT-PCR | | | | 21.6 |
| Baiyin, China (urban, Apr 2012 - Mar 2015)[223] | II | NPA; RT-PCR | 37.6 | 36.2 | | 33.0 |
| Shijiazhuang, China (urban, Mar 2014 - Feb 2015)[224] | II | NPA; DFA | 47.0 | 32.2 | 33.3 | |

| Location (reference) | Case definition (codes)* | Specimen and diagnostic test* | Proportion of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-11m | 0-23m | 0-35m | 0-59m |
| Guangzhou, China (urban, 2011 - 2013)[225] | II | NPA; RT-PCR | 21.2 | 19.9 | | 17.6 |
| Wenzhou, China (urban, Mar 2013 - Feb 2014)[226] | II | NPA; DFA | 25.7 | | 19.0 | |
| Jinhua, China (urban, Feb 2013 - Jan 2014)[227] | II | NPA; DFA | 32.5 | | 27.0 | |
| Chongqing, China (urban, Jan 2014 - Dec 2014)[228] | II | NPA; IF | 32.5 | | 35.4 | |
| Suzhou, China (urban, Jan 2013 - Dec 2014)[229] | II | NPA; DFA | 24.9 | | 23.9 | |
| Shijiazhuang, China (urban, Mar 2014 - Feb 2015)[230] | II | NPA; DFA | 35.1 | | 29.9 | |
| Cangzhou, China (urban, May 2012 - Jul 2013)[231] | II | NPA; DFA | | | 26.3 | |
| Donguan, China (urban, Jan 2013 - Dec 2014)[232] | II | NPA; RT-PCR | | 27.7 | | |

*Supplementary table 7: Description of 103 studies reporting proportion of in-hospital CFR for RSV associated ALRI in children younger than 5 years positive for RSV*

| Location (reference) | Case definition (coding)* | Specimen and diagnostic test* | In-hospital CFR of RSV associated hospitalised ALRI (%) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 0-5m | 6-11m | 0-11m | 0-23m | 0-35m | 0-59m |
| Hong Kong, China (urban, 1st Jan 2004 - 31st Dec 2004)[52] | II | NPA; DFA | | | | | 0.0 | |
| Taiwan, China (urban, Jan 2001 - Dec 2003)[54] | II | NPA; virus culture, IF | | | | | | 0.0 |
| Ho Chi Minh, Vietnam (urban, Nov 2004 - Jan 2008)[63] | II, T+, CWI+/-, ICU+/- | nasal swab, throat swab, NPA; RT-PCR | | | | | | 0.0 |
| Palma, Spain (urban, Jan 1995 - Dec 2006)[91] | II | NPA, NPW; ELISA, culture | | | | 0.1 | | |
| San Luis Potosi, Mexico (urban, 1st May 2003 - 30th Apr 2005)[114] | II | NPW; DFA | | | | | 0.0 | |
| Alaska, USA (rural, 4th Oct 2005 - 30th Sep 2007) †[233] | II | NPS, NPW; RT-PCR | | | | | 0.0 | |
| Dallas, Texas, USA (urban, Jan 2002 - Dec 2007)[117] | II | NPA; IF, DFA, virus culture | | | | 0.1 | | |
| Jingzhou, China (urban, Jan - Dec 2011)[234] | III, W+/-, T+/-, XR | NPS, OPS; RT-PCR | | | | | | 0.0 |
| Taiwan, China (urban, 2004 - 2007)[235] | II | NA | | | | | | 0.1 |
| Sa Kaeo and Nakhom Phanom, Thailand (rural, 1st Jan 2004 - 31st Dec 2007)[4] | II, XR | NPS, serum; RT-PCR, IFA | | | | | | 0.1 |
| Damanhour, Egypt (urban and rural, Jun 2009 - Jun 2012)[10] | II | NPS, OPS; RT-PCR | | | | | | 0.0 |
| Lørenskog, Norway (periurban, Feb 1993 - Jan 2000)[23] | II | NPA; ELISA | | | | 0.2 | | |
| 272 institutions, Japan (urban, Aug 2006 - Jul 2008)[236] | II | NA | | | | | 1.4 | |
| Cairo, Egypt (urban, Feb 2010 - May 2011)[237] | III | NPS and OPS; RT-PCR | | | 5.0 | | | |

* NPA=nasopharyngeal aspirate. NPS=nasopharyngeal swab. NPW=nasopharyngeal wash. OPS=oropharyngeal swab. RT-PCR=reverse transcriptase polymerase chain reaction. IFA=indirect immunofluorescent antibody test. DFA=direct immunofluorescent antibody test. ELISA=enzyme-linked immunosorbent assay. IF=immunofluorescence. II=physician's assessment. III=SARI definition. F+/-=fever as part of case definition or not. T+/-=tachypnea part of case definition or not. W+/-=wheeze part of case definition or not. C+/-=crepitation part of case definition or not. XR=X-ray confirmed (radiologically confirmed pneumonia). CWI+/-=chest wall indrawing part of case definition or not. DS+/-=danger signs part of case definition or not. O2+/-=hypoxemia part of case definition or not. ICU=intensive care unit. MV=mechanical ventilation.

† Reported data from aboriginal population in high income country

| Location (reference) | Case definition (coding)* | Specimen and diagnostic test* | In-hospital CFR of RSV associated hospitalised ALRI (%) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 0-5m | 6-11m | 0-11m | 0-23m | 0-35m | 0-59m |
| Amman, Jordan (urban, 18th Jan - 29th Mar 2007)[238] | II, F+/- | nasal and throat swab; RT-PCR | | | | | | 0.9 |
| Croatia (urban, Sep 2003 - Oct 2009)[239] | II | NPA; DFA | | | | | | 0.2 |
| Beer-Sheva, Israel (urban, Nov to Mar, 2004 - 2011)[240] | II, CWI+, XR | NPW; DFA and culture | | | | 0.2 | | |
| Belgrade, Serbia (urban, Nov 2008 - Mar 2009)[241] | II | NPA; EIA | | | 2.2 | | | |
| Athens, Greece (urban, Feb 1997 - Jun 2000)[126] | II, XR, W+/-, T+/- | NPW; DFA | | | 0.7 | | | |
| Stockholm, Sweden (urban, 1987 - 1998)[30] | II | NPW; IFA | | | 0.3 | | | |
| Multicentric, Germany (urban, Nov 1999 - Oct 2001)[20] | II | NPS; PCR | | | | | 0.7 | |
| Shropshire, United Kingdom (urban, Apr 1996 - Mar 1999)[29] | II | NA‡; IF | | | | 0.2 | | |
| Berne, Switzerland (urban, Jul 1997 - Jun 2001)[242] | II | NPS; DFA | | | | | | 0.2 |
| Freiburg, Germany (urban and rural, Apr 1997 - Mar 1999)[243] | II | NPS; IF | | | | | | 0.7 |
| Germany (urban, 1999 - 2005)[244] | II | NPA; ELISA, culture, PCR | | | 0.5 | | | |
| Manhica, Mozambique (rural, Oct 1998 - May 2000)[125] | II, CWI+/-, W+/-, T+/- | NPA; ELISA | | | | | | 3.4 |
| Banjul, Fajara and Sibanor, Gambia (urban and rural, Oct 1993 - Dec 1996)[33] | II | NPA; IF | | | | 2.0 | | |
| Hong Kong, China (urban, Jan 1993 - Dec 1997)[35] | II | NPA, throat swab; DFA, virus isolation | | | | | | 0.1 |
| Sydney, Australia (urban, May 1997 - Oct 1999)[245] | II | NA | | | | 0.3 | | |
| Townsville, Australia (urban and rural, Jan 1997 - Oct 1999) †[36] | II | NA; IF, culture | | | 1.1 | | | |
| Navajo and WMA, USA (rural, Oct 1997 - Mar 2000) †[246] | II | NPA; ELISA | | | | 0.1 | | |
| Buenos Aires, Argentina (urban, Apr 1993 - Dec 1994)[247] | II | NPA; DFA | | | | | | 1.3 |
| Santiago, Chile (urban, Jan 1989 - Dec 2000)[123] | II, W- | NPA; IFA | | | | 0.1 | | |
| Graz, Austria (urban, Nov 1999 - Oct 2000)[31] | II | NPA; ELISA | | | 0.0 | | | |
| Cape Town, South Africa (urban, Jun 1995 - Aug 1996)[124] | II, W+/- | NPA; ELISA | | | | 2.1 | | |

‡ NA= not available

| Location (reference) | Case definition (coding)* | Specimen and diagnostic test* | In-hospital CFR of RSV associated hospitalised ALRI (%) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 0-5m | 6-11m | 0-11m | 0-23m | 0-35m | 0-59m |
| Buenos Aires, Argentina (urban, May 1991 - Dec 1992)[127] | II, CWI+/-, XR, W+/-, T+/- | NPA; IFA | | | | 0.0 | | |
| Sao Paulo, Brazil (urban and rural, Mar 1995 - Aug 1996)[248] | II | NPA, NPS; IFA | | | | | | 0.0 |
| Tlaxcala, Mexico (urban and rural, Oct 1994 - Jun 1995)[249] | II | NPS; IFA | | | | | | 0.0 |
| Alaska, USA (rural, Jul 2001 - Jun 2004) (Singleton and colleagues) † | II | NPS, NPW; RT-PCR | | | | | 0.4 | |
| Buenos Aires, Argentina (urban, 2001 - 2013) (Gentile and colleagues) § | II, MV+/- | NPA; IFA | 1.9 | 1.7 | 1.8 | 1.8 | 1.8 | 1.8 |
| Takeo ad Kampong Cham, Cambodia (urban, Apr 2007 - Feb 2010) (Goyet and colleagues) § | II, F+, T+ | NPS, throat swab; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Beijing, China (urban, Jan 2011 - Dec 2012) (GABRIEL) § | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Ulaanbaatar, Mongolia (urban, Sep 2011 - Oct 2012) (GABRIEL) § | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Phnom Penh, Cambodia (urban, Oct 2010 - Jan 2013) (GABRIEL) § | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lucknow, India (urban and rural, Jun 2012 - Dec 2013) (GABRIEL) § | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Antananarivo, Madagascar (urban and rural, Dec 2010 - Feb 2013) (GABRIEL) § | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Asuncion, Paraguay (urban, Jul 2010 - May 2013) (GABRIEL) § | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Bamako, Mali (urban, Jul 2011 - Nov 2012) (GABRIEL) § | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 14.3 | 4.2 | 3.6 | 3.3 | 3.2 |
| Berlin, Germany (urban, 1st Apr 2010 - 31st Mar 2014) (Rath and colleagues) § | II, F+, ICU+/- | NPS, NPA; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Amman, Jordan (urban, Mar 2010 - Mar 2013) (Khuri and colleagues) | II, T+, O2+/ICU/MV | nasal and throat swab; PCR | 0.4 | 0.4 | 0.4 | 0.4 | | |
| Lwak, Kenya (rural, 2007 - 2011) (Montgomery and colleagues) § | II, CWI+/DS+/O2+ | NPS, OPS; RT-PCR | 8.3 | 0.0 | 4.2 | 3.8 | 4.6 | 4.0 |
| Rabat, Morocco (urban, Nov 2010 - Dec 2011) (Bassat and colleagues) § | II, CWI+, T+ | NPA; RT-PCR | 4.5 | 6.1 | 5.2 | 3.8 | 3.2 | 2.9 |
| Karachi, Pakistan (urban, Aug 2009 - Jul 2012) (Ali and colleagues) § | II | throat swab; RT-PCR | 1.1 | 0.0 | 0.7 | 0.5 | 0.5 | 0.9 |
| Basse Santa Su, Gambia (rural, 3rd Nov 2011 - 2nd Nov 2013) (PERCH) § | II, CWI+, DS+/- | NPS, OPS; PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Kilifi, Kenya (urban, 15th Aug 2011 - 15th Nov 2013) (PERCH) § | II, CWI+, DS+/- | NPS, OPS; PCR | 3.4 | 3.7 | 3.5 | 3.6 | 3.5 | 4.0 |

§ Reported in-hospital CFR separately for each of the following age bands- 0-5m, 6-11m and 12-59m

| Location (reference) | Case definition (coding)* | Specimen and diagnostic test* | In-hospital CFR of RSV associated hospitalised ALRI (%) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 0-5m | 6-11m | 0-11m | 0-23m | 0-35m | 0-59m |
| Bamako, Mali (urban, 3rd Jan 2012 - 14th Jan 2014) (PERCH) § | II, CWI+, DS+/- | NPS, OPS; PCR | 1.7 | 5.6 | 2.2 | 2.7 | 2.6 | 2.6 |
| Nakhon Phanom and Sa Kaeo, Thailand (rural, 1st Jan 2012 - 31st Jan 2014) (PERCH) § | II, CWI+, DS+/- | NPS, OPS; PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lusaka, Zambia (urban, 10th Oct 2011 - 31st Oct 2013) (PERCH) § | II, CWI+, DS+/- | NPS, OPS; PCR | 4.8 | 8.0 | 5.7 | 6.1 | 5.9 | 5.8 |
| Dhaka, Bangladesh (urban, 1st Jan 2012 - 31st Dec 2013) (PERCH) § | II, CWI+, DS+/- | NPS, OPS; PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Matlab, Bangladesh (rural, 1st Jan 2012 - 31st Dec 2013) (PERCH) § | II, CWI+, DS+/- | NPS, OPS; PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Tacloban City, Philippines (rural, May 2008 - Jul 2012) (Lupisan and colleagues) § | II, CWI+, DS+/- | NPS, serum; PCR, virus isolation, culture, serology | 2.5 | 2.0 | 2.3 | 1.8 | 1.7 | 1.7 |
| Mpumalanga, South Africa (rural, Jan 2010 - Dec 2014) (Cohen and colleagues) § | II | NPA; PCR | 2.4 | 4.6 | 3.2 | 2.6 | 2.4 | 2.2 |
| CEMIC, Buenos Aires, Argentina (urban, 1st Jun 2008 - 31st Dec 2010) (Echavarria and colleagues) § | II, ICU+/-, MV+/- | NPA; IFA | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Buenos Aires, Argentina (urban and rural, 2011 - 2013) (Polack and colleagues) | II, O2+, W+, F+/-, ICU+/-, MV+/- | NPA; PCR | 1.4 | 1.1 | 1.3 | 1.1 | | |
| Belo Horizonte, Brazil (urban, 2011 - 2013) (Oliveira and colleagues) § | II, F+, O2+/-, ICU+/- | nasal swab; RT-PCR | 1.8 | 2.0 | 1.9 | 1.6 | 1.4 | 1.3 |
| Concepcion, Chile (urban and rural, Jan 2012 - Dec 2013) (Fasce and colleagues) § | II, F+/-, ICU+/- | NPA; IF | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.5 |
| Iquique, Chile (urban and rural, Jan 2012 - Dec 2013) (Fasce and colleagues) § | II, F+/-, ICU+/- | NPA; IF | 0.0 | 3.3 | 1.0 | 0.9 | 0.9 | 0.8 |
| Santa Ana, El Salvador (urban, 2008 - 2013) (Clara and colleagues) | III, T+/-, XR | NPS; IFA | | | 23.3 | 17.6 | | 15.9 |
| Western Gambia (urban and rural, Jul 2007 - Jun 2008) (Howie and colleagues) | II, CWI+/-, W-, O2+/- | NPA; PCR | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Santa Rosa, Guatemala (urban and rural, 2008 - 2013) (McCracken and colleagues) § | II, CWI+/-, DS+/- | NPS, OPS; RT-PCR | 3.7 | 1.7 | 3.1 | 2.8 | 2.6 | 3.0 |
| Quetzaltenango, Guatemala (urban and rural, 2009 - 2013) (McCracken and colleagues) § | II, CWI+/-, DS+/- | NPS, OPS; RT-PCR | 0.9 | 1.4 | 1.0 | 1.4 | 1.3 | 1.3 |
| Ballabhgarh, India (rural, 2010 - 2012) (Broor and colleagues) § | II, DS+/- | NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Pune, India (rural, May 2009 - Apr 2013) (Chadha and colleagues) § | II | NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Lombok, Indonesia (urban and rural, 2000 - 2002) (Gessner and | II, CWI+ | nasal wash; ELISA | 3.3 | 0.7 | 2.1 | 1.8 | | |

| Location (reference) | Case definition (coding)* | Specimen and diagnostic test* | In-hospital CFR of RSV associated hospitalised ALRI (%) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 0-5m | 6-11m | 0-11m | 0-23m | 0-35m | 0-59m |
| colleagues) | | | | | | | | |
| Kilifi hospital study, Kenya (urban and rural, Jan 2002 - Dec 2010) (Nokes and colleagues) § | II, CWI+, O2+/DS+ | OPS, NPS, nasal wash; DFA | 2.1 | 2.2 | 2.1 | 1.9 | 2.2 | 2.2 |
| Bondo district, Kenya (rural, Jan 2007 - Jun 2009) (Feikin and colleagues) § | II, O2+/DS+ | NPS, OPS; RT-PCR | 0.0 | 7.7 | 2.6 | 1.8 | 1.6 | 1.5 |
| Manhiça, Mozambique (rural, 20th Sep 2006 - 19th Sep 2007) (Bassat and colleagues) § | II, T+ | NPA; RT-PCR | 0.0 | 10.0 | 2.9 | 2.3 | 2.2 | 2.0 |
| Manhiça, Mozambique (rural, 1st Jan 2011 - 30th Jun 2014) (Bassat and colleagues) § | II, T+, O2+/- | NPA; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Utrecht, Netherlands (urban, 2001 - 2010) (Bont and colleagues) | II | NPS, NPW; PCR, IF | 0.0 | 0.0 | 0.0 | | | |
| 41 sites in Netherlands (urban and rural, 2008 - 2013) (Bont and colleagues) | II, ICU+/- | NPS, NPW; PCR, IF | 0.0 | 0.0 | 0.0 | | | |
| David City, Panama (urban, Jan 2011 - Dec 2013) (Jara and colleagues) § | II | NPS, OPS; IFA, RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Tagbilaran and 6 rural sites, Philippines (urban and rural, 5th Jul 2000 - 31st Dec 2004) (Lucero and colleagues) | II, CWI+, DS+/- | NPA, nasal swab; culture, PCR | 0.8 | 0.8 | 0.8 | 0.6 | | |
| Gauteng province, South Africa (urban, 2009 - 2012) (Cohen and colleagues) § | II | NPA; PCR | 0.9 | 0.0 | 0.6 | 0.5 | 0.5 | 0.5 |
| KwaZulu-Natal province, South Africa (periurban, 2010 - 2014) (Cohen and colleagues) § | II | NPA; PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Klerksdorp site, South Africa (periurban, Jan 2011 - Dec 2014) (Cohen and colleagues) § | II | NPA; PCR | 2.6 | 0.0 | 2.0 | 1.6 | 1.5 | 1.5 |
| Soweto, South Africa (urban, Mar 1998 - Oct 2005) (Madhi and colleagues) § | II, CWI+, O2+/- | NPA; IF | 2.4 | 1.0 | 2.0 | 1.7 | 1.7 | 1.6 |
| Paarl, South Africa (periurban, Mar 2012 - Dec 2014) (Zar and colleagues) | II, CWI+, T+, DS+/- | NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Sa Kaeo and Nakhon Phanom, Thailand (rural, Jan 2008 - Dec 2011) (Thamthitiwat and colleagues) § | II, F+/-, T+/-, CWI+, O2+/- | NPS; PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Tone District, Togo (rural, Aug 2011 - Dec 2013) (Gessner and colleagues) § | II, CWI+ | nasal wash; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Colorado, USA (urban and rural, Jan 2008 - Jun 2013) (Simoes and colleagues) § | II | nasal wash; PCR | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 |
| Navajo and WMA, USA - MEDI (rural, Oct 2004 - Dec 2010) (O'Brien and colleagues) † | II, O2+/- | NPS; RT-PCR | 0.0 | 0.0 | 0.0 | | | |

| Location (reference) | Case definition (coding)* | Specimen and diagnostic test* | In-hospital CFR of RSV associated hospitalised ALRI (%) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 0-5m | 6-11m | 0-11m | 0-23m | 0-35m | 0-59m |
| Navajo and WMA, USA - EPI (rural, Oct 1997 - Mar 2000) (O'Brien and colleagues) † | II, O2+/- | NPA; EIA | 0.3 | 0.0 | 0.2 | 0.1 | | |
| Nha Trang, Vietnam (urban and rural, Feb 2007 - Dec 2012) (Yoshida and colleagues) § | II, CWI+/DS+ | NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Spain (urban, Jan 1997 - Dec 2011)[5] | II | NA | | | 0.1 | 0.1 | 0.1 | 0.1 |
| Baguio, Philippines (urban, Apr 2009 - Dec 2011)[206] | III | NPS, OPS; RT-PCR | | | | 0.5 | | 0.4 |
| Tehran, Iran (urban, Jan 2012 - Dec 2012)[211] | II | NPA; RT-PCR | | | | | | 0.0 |
| USA (urban, 2000, 2003, 2006 and 2009)[250] | II | NA | | | | 0.1 | | |
| USA (urban, 2000 - 2011)[250] | II | NA | | | | 0.3 | | |
| USA (urban, 2000)[9] | II | NA | | | | | | 0.1 |
| San Luis Potosi, Mexico (urban, May 2003 - Dec 2014)[251] | II | NPA; NA | 1.5 | 0.7 | 1.3 | 1.2 | 1.1 | 1.0 |
| Seremban, Malaysia (urban, Jan 2008 - Dec 2013)[252] | II | NPA; DFA | | | 1.4 | | | 1.6 |
| Gothenburg, Sweden (urban, 2004 - 2011)[46] | II | NA; PCR, IF | | | | | | 0.0 |
| National database, USA (urban, 2004 - 2013)[253] | II | NA | | | | 0.3 | | |

*Supplementary table 8: Description of 43 studies reporting proportion of in-hospital CFR (by narrow age bands) for RSV associated ALRI in children younger than 5 years positive for RSV*

| Location (reference) | Case definition (coding)* | Specimen and diagnostic test* | In-hospital CFR of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-5m | 6-11m | 12-23m | 24-59m |
| Buenos Aires, Argentina (urban, 2001 - 2013) (Gentile and colleagues) | II, MV+/- | NPA; IFA | 1.9 | 1.7 | 1.6 | 2.3 |
| Takeo ad Kampong Cham, Cambodia (urban, Apr 2007 - Feb 2010) (Goyet and colleagues) | II, F+, T+ | NPS, throat swab; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Beijing, China (urban, Jan 2011 - Dec 2012) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Ulaanbaatar, Mongolia (urban, Sep 2011 - Oct 2012) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Phnom Penh, Cambodia (urban, Oct 2010 - Jan 2013) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Lucknow, India (urban and rural, Jun 2012 - Dec 2013) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | | 0.0 |
| Antananarivo, Madagascar (urban and rural, Dec 2010 - Feb 2013) (GABRIEL) | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Asuncion, Paraguay (urban, Jul 2010 - May 2013) (GABRIEL and colleagues) | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Bamako, Mali (urban, Jul 2011 - Nov 2012) (GABRIEL ) | II, T+, W-, XR | NPA, NPS; RT-PCR | 0.0 | 14.3 | 0.0 | 0.0 |
| Berlin, Germany (urban, 1st Apr 2010 - 31st Mar 2014) (Rath and colleagues) | II, F+, ICU+/- | NPS, NPA; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Lwak, Kenya (rural, 2007 - 2011) (Montgomery and colleagues) | II, CWI+/DS+/O2+ | NPS, OPS; RT-PCR | 8.3 | 0.0 | 3.3 | 4.3 |

* NPA=nasopharyngeal aspirate. NPS=nasopharyngeal swab. NPW=nasopharyngeal wash. OPS=oropharyngeal swab. RT-PCR=reverse transcriptase polymerase chain reaction. IFA=indirect immunofluorescent antibody test. DFA=direct immunofluorescent antibody test. ELISA=enzyme-linked immunosorbent assay. IF=immunofluorescence. II=physician's assessment. III=SARI definition. F+/-=fever as part of case definition or not. T+/-=tachypnea part of case definition or not. W+/-=wheeze part of case definition or not. C+/-=crepitation part of case definition or not. XR=X-ray confirmed (radiologically confirmed pneumonia). CWI+/-=chest wall indrawing part of case definition or not. DS+/-=danger signs part of case definition or not. O2+/-=hypoxemia part of case definition or not. ICU=intensive care unit. MV=mechanical ventilation.

| Location (reference) | Case definition (coding)* | Specimen and diagnostic test* | In-hospital CFR of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-5m | 6-11m | 12-23m | 24-59m |
| Rabat, Morocco (urban, Nov 2010 - Dec 2011) (Bassat and colleagues) | II, CWI+, T+ | NPA; RT-PCR | 4.5 | 6.1 | 0.0 | 0.0 |
| Karachi, Pakistan (urban, Aug 2009 - Jul 2012) (Ali and colleagues) | II | throat swab; RT-PCR | 1.1 | 0.0 | 0.0 | 3.7 |
| Basse Santa Su, Gambia (rural, 3rd Nov 2011 - 2nd Nov 2013) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Kilifi, Kenya (urban, 15th Aug 2011 - 15th Nov 2013) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 3.4 | 3.7 | 4.3 | 7.7 |
| Bamako, Mali (urban, 3rd Jan 2012 - 14th Jan 2014) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 1.7 | 5.6 | 6.7 | 0.0 |
| Nakhon Phanom and Sa Kaeo, Thailand (rural, 1st Jan 2012 - 31st Jan 2014) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Lusaka, Zambia (urban, 10th Oct 2011 - 31st Oct 2013) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 4.8 | 8.0 | 9.1 | 0.0 |
| Dhaka, Bangladesh (urban, 1st Jan 2012 - 31st Dec 2013) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Matlab, Bangladesh (rural, 1st Jan 2012 - 31st Dec 2013) (PERCH) | II, CWI+, DS+/- | NPS, OPS; PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Tacloban City, Philippines (rural, May 2008 - Jul 2012) (Lupisan and colleagues) | II, CWI+, DS+/- | NPS, serum; PCR, virus isolation, culture, serology | 2.5 | 2.0 | 0.0 | 0.0 |
| Mpumalanga, South Africa (rural, Jan 2010 - Dec 2014) (Cohen and colleagues) | II | NPA; PCR | 2.4 | 4.6 | 0.0 | 0.0 |
| CEMIC, Buenos Aires, Argentina (urban, 1st Jun 2008 - 31st Dec 2010) (Echavarria and colleagues) | II, ICU+/-, MV+/- | NPA; IFA | 0.0 | 0.0 | 0.0 | 0.0 |
| Belo Horizonte, Brazil (urban, 2011 - 2013) (Oliveira and colleagues) | II, F+, O2+/-, ICU+/- | nasal swab; RT-PCR | 1.8 | 2.0 | 0.0 | 0.0 |
| Concepcion, Chile (urban and rural, Jan 2012 - Dec 2013) (Fasce and colleagues) | II, F+/-, ICU+/- | NPA; IF | 0.0 | 0.0 | 0.0 | 6.2 |
| Iquique, Chile (urban and rural, Jan 2012 - Dec 2013) (Fasce and colleagues) | II, F+/-, ICU+/- | NPA; IF | 0.0 | 3.3 | 0.0 | 0.0 |
| Santa Rosa, Guatemala (urban and rural, 2008 - 2013) (McCracken and colleagues) | II, CWI+/-, DS+/- | NPS, OPS; RT-PCR | 3.7 | 1.7 | 1.2 | 5.7 |
| Quetzaltenango, Guatemala (urban and rural, 2009 - 2013) (McCracken and colleagues) | II, CWI+/-, DS+/- | NPS, OPS; RT-PCR | 0.9 | 1.4 | 2.8 | 0.0 |

| Location (reference) | Case definition (coding)* | Specimen and diagnostic test* | In-hospital CFR of RSV associated hospitalised ALRI (%) | | | |
|---|---|---|---|---|---|---|
| | | | 0-5m | 6-11m | 12-23m | 24-59m |
| Ballabhgarh, India (rural, 2010 - 2012) (Broor and colleagues) | II, DS+/- | NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Pune, India (rural, May 2009 - Apr 2013) (Chadha and colleagues) | II | NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Kilifi hospital study, Kenya (urban and rural, Jan 2002 - Dec 2010) (Nokes and colleagues) | II, CWI+, O2+/DS+ | OPS, NPS, nasal wash; DFA | 2.1 | 2.2 | 0.5 | 5.8 |
| Bondo district, Kenya (rural, Jan 2007 - Jun 2009) (Feikin and colleagues) | II, O2+/DS+ | NPS, OPS; RT-PCR | 0.0 | 7.7 | 0.0 | 0.0 |
| Manhiça, Mozambique (rural, 20th Sep 2006 - 19th Sep 2007) (Bassat and colleagues) | II, T+ | NPA; RT-PCR | 0.0 | 10.0 | 0.0 | 0.0 |
| Manhiça, Mozambique (rural, 1st Jan 2011 - 30th Jun 2014) (Bassat and colleagues) | II, T+, O2+/- | NPA; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| David City, Panama (urban, Jan 2011 - Dec 2013) (Jara and colleagues) | II | NPS, OPS; IFA, RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Gauteng province, South Africa (urban, 2009 - 2012) (Cohen and colleagues) | II | NPA; PCR | 0.9 | 0.0 | 0.0 | 0.0 |
| KwaZulu-Natal province, South Africa (periurban, 2010 - 2014) (Cohen and colleagues) | II | NPA; PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Klerksdorp site, South Africa (periurban, Jan 2011 - Dec 2014) (Cohen and colleagues) | II | NPA; PCR | 2.6 | 0.0 | 0.0 | 0.0 |
| Soweto, South Africa (urban, Mar 1998 - Oct 2005) (Madhi and colleagues) | II, CWI+, O2+/- | NPA; IF | 2.4 | 1.0 | 0.7 | 0.0 |
| Sa Kaeo and Nakhon Phanom, Thailand (rural, Jan 2008 - Dec 2011) (Thamthitiwat and colleagues) | II, F+/-, T+/-, CWI+, O2+/- | NPS; PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Tone District, Togo (rural, Aug 2011 - Dec 2013) (Gessner and colleagues) | II, CWI+ | nasal wash; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |
| Colorado, USA (urban and rural, Jan 2008 - Jun 2013) (Simoes and colleagues) | II | nasal wash; PCR | 0.0 | 0.1 | 0.0 | 0.2 |
| Nha Trang, Vietnam (urban and rural, Feb 2007 - Dec 2012) (Yoshida and colleagues) | II, CWI+/DS+ | NPS; RT-PCR | 0.0 | 0.0 | 0.0 | 0.0 |

*Supplementary table 9: Regional meta-estimates of incidence of RSV-associated ALRI (by narrow age bands) in children younger than 5 years*

| Region | 0-27days | | 28-<3m | | 3-5m | | 6-11m | | 12-23m | | 24-59m | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No.* | Incidence | No. | Incidence | No. | Incidence | No. | Incidence | No. | Incidence | No. | Incidence |
| **Low income** | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| **Lower middle income** | 2 | 14.4 (0.3-609.1) | 4 | 23.6 (7.6-72.9) | 6 | 72.2 (48.8-106.7) | 8 | 80.7 (48-135.6) | 8 | 66.5 (39.4-112.2) | 4 | 13.4 (8.5-20.9) |
| **Upper middle income** | 1 | 235.3 (88.3-626.9) | 1 | 471.4 (335.1-663.1) | 1 | 619 (452.3-847.3) | 2 | 223 (95.2-522.1) | 2 | 155.7 (41.3-586.7) | 0 | |
| **High income** | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| **Developing** | 3 | 40 (2.5-635.7) | 5 | 45.7 (5.9-356.1) | 7 | 99.6 (38.5-257.7) | 10 | 98.8 (58.8-166.1) | 10 | 79.1 (45.1-138.9) | 4 | 13.4 (8.5-20.9) |
| **Industrialised** | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |

* No. = Number of studies

*Supplementary table 10: Meta-estimates of incidence of RSV-associated severe and very severe ALRI (by narrow age bands) in children younger than 5 years residing in developing countries*

| | 0-27days | | 28-<3m | | 3-5m | | 6-11m | | 12-23m | | 24-59m | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No.* | Incidence | No. | Incidence | No. | Incidence | No. | Incidence | No. | Incidence | No. | Incidence |
| **RSV-associated severe ALRI** | 2 | 93.4 (11.2-778.3) | 3 | 28.5 (1.4-594.7) | 5 | 38.7 (5.7-265) | 7 | 24.7 (11.5-53.2) | 7 | 10.3 (4.6-23) | 2 | 2.8 (1.3-6.2) |
| **RSV-associated very severe ALRI** | 0 | .. | 2 | 5.7 (0.2-155.4) | 3 | 11.2 (1.7-75.2) | 3 | 3.8 (0.5-29.6) | 3 | 6.6 (2.5-17.5) | 0 | .. |

* No. = Number of studies

*Supplementary table 11: Regional meta-estimates of hospitalisation rate of RSV-associated ALRI (by narrow age bands) in children younger than 5 years*

| Region | 0-27 days | | 28-<3m | | 3-5m | | 6-8m | | 9-11m | | 12-23m | | 24-59m | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No.* | Hospitalisation rate | No. | Hospitalisation rate | No. | Hospitalisation rate | No. | Hospitalisation rate | No. | Hospitalisation rate | No. | Hospitalisation rate | No. | Hospitalisation rate |
| **Low income** | 2 | 5.0 (0.4-69.8) | 3 | 5.2 (1.4-19.5) | 2 | 6.8 (1.7-28.1) | 3 | 2.5 (0.5-12.9) | 2 | 1.8 (0.9-3.7) | 4 | 1.3 (0.4-5.0) | 4 | 0.4 (0.1-1.2) |
| **Lower middle income** | 5 | 9.3 (2.5-35.3) | 7 | 22.9 (13.3-39.5) | 7 | 20.5 (11.9-35.4) | 7 | 14.0 (7.8-25.4) | 7 | 9.4 (4.1-21.7) | 12 | 5.6 (3.3-9.7) | 9 | 1.1 (0.6-1.9) |
| **Upper middle income** | 3 | 46.4 (3.9-549.5) | 4 | 74.5 (28.2-197) | 5 | 25.7 (11.6-56.7) | 5 | 16.9 (9.1-31.5) | 5 | 18.8 (9.6-36.9) | 8 | 7.1 (4.6-10.7) | 6 | 1.4 (0.8-2.7) |
| **High income** | 2 | 31.9 (26.9-37.8) | 2 | 67.4 (45.3-100.5) | 3 | 36.7 (19.1-70.6) | 1 | 40.8 (36.9-45.1) | 1 | 25.9 (22.9-29.4) | 14 | 4.2 (3.4-5.4) | 11 | 0.9 (0.6-1.2) |
| **Developing** | 11 | 15.9 (8.8-28.9) | 15 | 26.1 (16.7-40.7) | 15 | 20.7 (12.9-33.0) | 16 | 12.0 (7.9-18.3) | 15 | 11.3 (7.3-17.4) | 28 | 5.0 (3.8-6.4) | 23 | 1.0 (0.7-1.4) |
| **Industrialised** | 1 | 31.0 (22.0-43.6) | 1 | 54.6 (45.5-65.5) | 2 | 27.5 (23.4-32.4) | 0 | | 0 | | 10 | 3.9 (3.0-5.3) | 7 | 0.8 (0.6-1.2) |

* No. = Number of studies

*Supplementary table 12: Regional meta-estimates of proportion of hospitalised RSV-associated ALRI cases with hypoxemia in children younger than 5 years*

| Region | 0-11m | | 12-23m | | 0-23m | | 24-59m | | 0-59m | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. of studies | Proportion (%) | No. of studies | Proportion (%) | No. of studies | Proportion (%) | No. of studies | Proportion (%) | No. of studies | Proportion (%) |
| **Low income** | 8 | 16.4 (9.1-29.6) | 8 | 18.9 (2.2-162.7) | 8 | 14.4 (7.8-26.5) | 8 | 10.7 (6.1-18.8) | 8 | 13.9 (7.7-24.9) |
| **Lower middle income** | 6 | 16.5 (9.1-30.0) | 6 | 17.7 (9.9-31.8) | 6 | 16.3 (9.2-29.1) | 4 | 14.7 (6.5-33.3) | 5 | 17.3 (7.8-38.6) |
| **Upper middle income** | 9 | 26.9 (18.3-39.5) | 9 | 23.0 (14.9-35.3) | 9 | 24.3 (16.7-35.5) | 5 | 36.6 (23.7-56.5) | 5 | 30.5 (20.1-46.1) |
| **High income** | 2 | 32.4 (8.3-127.3) | 2 | 53.8 (28.1-103.0) | 2 | 37.0 (11.7-117.4) | 2 | 53.2 (29.9-94.9) | 2 | 39.6 (14.2-110.5) |
| **Developing** | 23 | 20.2 (15.1-26.9) | 23 | 19.7 (12.8-30.4) | 23 | 18.6 (14.0-24.8) | 17 | 20.6 (13.3-31.9) | 18 | 18.4 (12.8-26.4) |
| **Industrialised** | 2 | 32.4 (8.3-127.3) | 2 | 53.8 (28.1-103.0) | 2 | 37.0 (11.7-117.4) | 2 | 53.2 (29.9-94.9) | 2 | 39.6 (14.2-110.5) |

*Supplementary table 13: Regional meta-estimates of proportion of hospitalised ALRI cases positive for RSV by World Bank income regions in children younger than 5 years*

| Region | 0-11m | | 0-59m | |
|---|---|---|---|---|
| | No. of studies | Proportion (%) | No. of studies | Proportion (%) |
| **Low income** | 8 | 21.1 (15.2-29.3) | 6 | 20.9 (17.9-24.5) |
| **Lower middle income** | 14 | 29.6 (23.4-37.4) | 18 | 21.9 (18.1-26.5) |
| **Upper middle income** | 103 | 28.7 (26.5-31.1) | 53 | 23.0 (20.5-25.7) |
| **High income** | 22 | 39.7 (34.7-45.4) | 27 | 28.3 (25.3-31.6) |
| **Developing** | 133 | 28.7 (26.7-30.8) | 93 | 23.2 (21.4-25.3) |
| **Industrialised** | 14 | 42.5 (35.7-50.6) | 11 | 29.9 (24.1-37.1) |

*Supplementary table 14: Regional meta-estimates of proportion of hospitalised ALRI cases positive for RSV, and estimated hospitalisations by WHO regions in children younger than 5 years*

| Region | 0-11m | | 0-59m | | |
|---|---|---|---|---|---|
| | No. of studies | Proportion (%) | No. of studies | Proportion (%) | Hospitalised cases (*$10^3$) |
| **Africa** | 10 | 27.3 (19.9-37.5) | 13 | 22.7 (17.9-28.8) | 1008 (795-1278) |
| **Americas** | 19 | 37.5 (32.6-43.3) | 15 | 27.6 (23.9-32.0) | 170 (147-197) |
| **Eastern Mediterranean** | 8 | 29.4 (21.1-41.1) | 10 | 24.4 (18.9-31.4) | 438 (340-564) |
| **Europe** | 12 | 43.1 (35.4-52.6) | 10 | 29.8 (23.8-37.4) | 557 (444-699) |
| **South-East Asia** | 10 | 30.8 (21.8-43.7) | 9 | 23.9 (19.2-29.8) | 629 (505-784) |
| **Western Pacific** | 88 | 27.0 (24.8-29.5) | 47 | 22.2 (19.8-24.9) | 109 (97-122) |
| **Global** | | | | | **2911 (2329-3644)** |

*Supplementary table 15: Meta-estimate of hospitalisation rate (per 1000 children per year) and in-hospital CFR (%) for RSV-associated ALRI in children younger than 5 years in developing countries by subtypes*

| | 0-5m | | 0-11m | | 0-59m | | | |
|---|---|---|---|---|---|---|---|---|
| | No. of studies | Hospitalisation rate | No. of studies | Hospitalisation rate | No. of studies | Hospitalisation rate | No. of studies | hCFR |
| RSV-A | 5 | 9.2 (4.9-17.3) | 5 | 9.0 (5.4-14.9) | 6 | 2.4 (1.6-3.6) | 9 | 2.3 (1.7-3.1) |
| RSV-B | 3 | 2.1 (0.3-15.3) | 4 | 2.5 (0.9-7.0) | 4 | 0.7 (0.3-1.6) | 7 | 1.5 (0.8-2.8) |

*Supplementary table 16: Proportion of eligible ALRI cases not tested for RSV (in the studies included in the analysis) with reasons thereof*

| Location (study period) (reference) | % of eligible cases not tested for RSV | Reasons for not testing |
|---|---|---|
| **Dhaka, Bangladesh (Jan 2005 - Feb 2008) (Brooks, unpublished)** | 19.3 (290/1500) | NA |
| **Bandung, Indonesia (1st Feb 1999 - 26th Apr 2001) (Simoes, unpublished)** | 65.6 (1535/2339) | subjects did not meet case definition (LRI) |
| **Gilgit, Pakistan (1st Apr 2012 - 31st Mar 2014) (Rasmussen, unpublished)** | 14.3 (34/238) | child absent when collecting samples, samples were not valid by the time it reached the testing center, mother refusal |
| **Paarl, South Africa (Mar 2012 - Dec 2014) (Zar, unpublished)** | 36.1 (116/321) | specimen not collected, PCR results not available |
| **Sa Kaeo and Nakhom Phanom, Thailand (1st Jan 2004 - 31st Dec 2007)[4]** | 51.5 (11760/22857) | NA |
| **Damanhour, Egypt (Jun 2009 - Jun 2012)[10]** | 12.4 (659/5324) | no informed consent or samples |
| **Multicentric, Germany (Nov 1999 - Oct 2001)[20]** | 36.9 (1078/2924) | no informed consent, unavailable clinical specimens or specimens were not tested |
| **Banjul, Fajara and Sibanor, Gambia (Jan 1994 - Dec 1996)[33]** | 59.5 (3305/5557) | no village of orgin documented, from outside the western region, no sex documented, samples not being taken because children admitted during weekends/holidays, absence of the patient from the ward for investigations and lack of documentation of an admission diagnosis on the patient's chart |
| **Nashville, Rochester and Cincinnati, USA (Oct 2000 - Sep 2004)[6]** | 18.6 (1158/6225) | a lack of parental consent or unavailability of parents |
| **CEMIC, Buenos Aires, Argentina (1st Jun 2008 - 31st Dec 2010) (Echavarria, unpublished)** | 5.3 (3/57) | insufficient sample |
| **Buenos Aires, Argentina (2011 - 2013) (Polack, unpublished)** | 0.9 (30/3371) | sample inadequate |
| **Belo Horizonte, Brazil (2011 - 2013) (Oliveira, unpublished)** | 59.4 (757/1275) | frozen samples at weekends; laboratory refused |
| **Concepcion, Chile (Jan 2012 - Dec 2013) (Fasce, unpublished)** | 3.3 (16/481) | cases were not notified in time so as to collect sample |
| **Iquique, Chile (Jan 2012 - Dec 2013) (Fasce, unpublished)** | 0.6 (4/683) | cases were not notified in time so as to collect sample |
| **Jingzhou, China (Jan 2010 - Dec 2012) (Yu, unpublished)** | 97.1 (19092/19660) | sample selection |
| **Santa Ana, El Salvador (2008 - 2013) (Clara, unpublished)** | 78.8 (4388/5570) | NA |

| Location (study period) (reference) | % of eligible cases not tested for RSV | Reasons for not testing |
|---|---|---|
| **Gambia Western Region, Gambia (Jul 2007 - Jun 2008) (Howie, unpublished)** | 4.2 (4/95) | technical problem with specimen |
| **Santa Rosa, Guatemala (2008 - 2013) (McCracken, unpublished)** | 5.7 (104/1810) | no consent or no specimen |
| **Quetzaltenango, Guatemala (2009 - 2013) (McCracken, unpublished)** | 10.9 (207/1893) | no consent or no specimen |
| **Pune, India (May 2009 - Apr 2013) (Chadha, unpublished)** | 12.7 (78/612) | poor quality swab; inadequate specimen; sample lost |
| **Lombok, Indonesia (2000 - 2002) (Gessner, unpublished)** | 28.9 (1500/5198) | primarily age <3 months and critical illness on presentation; specimens collected 4 days a week so if patients who had rapid admission, would not have been done |
| **Kilifi hospital study, Kenya (Jan 2002 - Dec 2010) (Nokes, unpublished)** | 24.4 (2817/11544) | died; discharged; refusal |
| **Bondo district, Kenya (Jan 2007 - Jun 2009) (Feikin, unpublished)** | 28.7 (208/726) | low swab quality |
| **Manhiça, Mozambique (20th Sep 2006 - 19th Sep 2007) (Bassat, unpublished)** | 3.4 (28/835) | NPA not collected or processed without results |
| **Manhiça, Mozambique (1st Jan 2011 - 30th Jun 2014) (Bassat, unpublished)** | 3.1 (15/491) | NPA not collected or processed without results |
| **41 sites in Netherlands (2008 - 2013) (Bont, unpublished)** | 10.0 (24/241) | reasons for not testing are unknown, as the decisions for testing are made by independent physicians at hospital of presentation |
| **David City, Panama (Jan 2011 - Dec 2013) (Jara, unpublished)** | 81.8 (2152/2631) | lack of resources at the lab to test |
| **Tagbilaran and 6 rural sites, Philippines (5th Jul 2000 - 31st Dec 2004) (Lucero, unpublished)** | 36.0 (537/1491) | no specimen collected for those cases not tested for RSV |
| **Gauteng province, South Africa (2009 - 2012) (Cohen, unpublished)** | 2.0 (122/6016) | child too ill to take sample from; specimens not reaching laboratory within 72 hours |
| **KwaZulu-Natal province, South Africa (2010 - 2014) (Cohen, unpublished)** | 4.5 (72/1607) | patient very ill; parents refuse consent, specimen not at lab within 72 hours |
| **Klerksdorp site, South Africa (Jan 2011 - Dec 2014) (Cohen, unpublished)** | 3.2 (30/932) | patient very ill; parents refuse consent, specimen not at lab within 72 hours |
| **Soweto, South Africa (Mar 1998 - Oct 2005) (Madhi, unpublished)** | 4.6 (240/5231) | missed as part of surveillance |
| **Maela Camp, Tak Province, Thailand (Nov 2007 - Oct 2010)** | 2.3 (8/354) | parents refused NPA taken |

| Location (study period) (reference) | % of eligible cases not tested for RSV | Reasons for not testing |
|---|---|---|
| **(Turner, unpublished)** | | |
| **Sa Kaeo and Nakhon Phanom, Thailand (Jan 2008 - Dec 2011) (Thamthitiwat, unpublished)** | 75.0 (14334/19103) | NA |
| **Tone district, Togo (Aug 2011 - Dec 2013) (Gessner, unpublished)** | 3.2 (4/124) | testing just started |
| **Alaska, USA (Jul 1994 - Jun 2012) (Singleton, unpublished)** | 20.5 (1222/5965) | at provider discretion |
| **Navajo and WMA, USA - MEDI (Oct 2004 - Dec 2010) (O'Brien, unpublished)** | 3.8 (5/132) | specimen not collected, most probably due to short hospitalization stay (<2 days) |
| **Nha Trang, Vietnam (Feb 2007 - Dec 2012) (Yoshida, unpublished)** | 3.1 (25/795) | some sample being lost |
| **Subiaco, Australia (Jan 2000 - Dec 2005)[47]** | 54.8 (10877/19849) | NA |
| **Lanzhou, China (Oct 2004 - Oct 2005)[50]** | 7.1 (63/884) | lack of consent and convalescent serum sample was not obtained |
| **Hong Kong, China (Nov 2005 - Oct 2006)[53]** | 80 | sampling |
| **Nagasaki, Japan (Apr 2009 - Mar 2010)[58]** | 3.0 (13/433) | NA |
| **Seoul, Korea (Jan - Dec 2004)[59]** | 71.8 (509/709) | excluded during sampling process and small quantities not enough for RNA extraction |
| **Khon Kaen, Thailand (Apr 2002 - Aug 2004)[70]** | 35.0 (91/260) | parents didn't give consent for collection of NPA from their children; inappropriately stored for viral detection |
| **Tak Province, Thailand (Apr 2009 - Sep 2011)[71]** | 14.0 (117/836) | failure to meet the case definition; presented twice within 14 days; inadequate specimens |
| **Turku, Finland (Jan 1993 - Dec 1995)[80]** | 14.2 (42/296) | a convalescent serum sample was not obtained, chest radiographs did not have infiltrates compatible with pneumonia at the reevaluation done by 3 pediatric radiologists, or the radiographs were not available for the reevaluation |
| **Kiel, Germany (Jul 1996 - Jun 2001)[82]** | 37.3 (1015/2721) | NA |
| **Pisa, Italy (Jan 2000 - May 2006)[87]** | 19.5 (39/200) | some specimens were frozen immediately after collection and unsuitable for virus detection by DFA or rapid culture in shell vials |
| **Milan, Italy (1st Dec 2008 - 31st Dec 2009)[89]** | 4.0 (24/600) | no guardian consent |
| **Palma, Spain (Jan 1995 - Dec 2006)[91]** | 17.5 (505/2889) | no info about RSV microbiology; erroneously codified; >2y; had a previous episode of obstructive lower airway infection |

| Location (study period) (reference) | % of eligible cases not tested for RSV | Reasons for not testing |
|---|---|---|
| **Madrid, Spain (Sep 2005 - Aug 2008)[93]** | 14.1 (52/370) | lack of NPA samples or they refused to participate |
| **Lausanne and Geneva, Switzerland (Mar 2003 - Dec 2005)[95]** | 10.8 (12/111) | impossibility to obtain samples or interrupt the study |
| **Pelotas, Brazil (1st Aug 1997 - 31st Jul 1998)[99]** | 30.4 (266/874) | refusals and losses; insufficient available data to generate adequate diagnostic by the judge or the judge did not give a diagnostic of ARD; readmission; not tested for RSV |
| **Sao Paulo, Brazil (Jan 2006 - Dec 2007)[103]** | 17.7 (53/299) | didn't meet criteria; incomplete data in their medical records |
| **Sao Paulo, Brazil (May 2004 - Sep 2005)[105]** | 4.3 (13/303) | loss of specimen |
| **Sao Paulo, Brazil (Mar 2008 - Aug 2011)[107]** | 27.5 (308/1121) | repeated or inadequate samples |
| **Belem, Brazil (Nov 2006 - Oct 2007)[108]** | 13.5 (164/1214) | no consent from parents or legal guardians |
| **Porto Alegre, Brazil (Sep 2009 - Sep 2010)[109]** | 3.0 (2/67) | no samples collected |
| **Iqaluit, Canada (28th Jan 2002 - 27th Mar 2003)[110]** | 7.3 (9/124) | NA |
| **San Luis Potosi, Mexico (1st May 2003 - 30th Apr 2005)[114]** | 16.1 (118/734) | no respiratory samples |
| **California, USA (1996 - 2004)[116]** | 15.0 (309/2060) | NA |
| **Dallas, Texas, USA (Jan 2002 - Dec 2007)[117]** | 4.4 (211/4800) | not tested |
| **Rarieda, Kenya (1st Mar 2007 - 28th Feb 2010)[120]** | 78.1 (1250/1600) | NA |
| **Kilifi, Kenya (Jan - Dec 2010)[121]** | 16.0 (154/963) | refused; died during the admission process; failure of the computerized flagging system; other reasons |
| **Bondo district, Kenya (Aug 2008 - Dec 2010)[122]** | 58.9 (974/1654) | not tested |
| **Santiago, Chile (Jan 1989 - Dec 2000)[123]** | NA | poor sample quality or quantity |
| **Cape Town, South Africa (Jun 1995 - Aug 1996)[124]** | 68.3 (2776/4064) | NA |
| **Manhica District, Mozambique (Oct 1998 - May 2000)[125]** | 44.2 (793/1794) | no NPA or complete information or valid NPA result |
| **Athens, Greece (Feb 1997 - Jun 2000)[126]** | 25.6 (163/636) | NA |
| **Buenos Aires, Argentina (2001 - 2013) (Gentile, unpublished)** | 12.9 (1361/10581) | NA |

| Location (study period) (reference) | % of eligible cases not tested for RSV | Reasons for not testing |
|---|---|---|
| **Lwak, Kenya (2007 - 2011) (Montgomery, unpublished)** | 72.4 (1231/1701) | refusal to consent; unavailability of transport from field site to lab; high patient volumes; inadequate staffing levels |
| **Kathmandu, Nepal (Jan 2006 - Jun 2008) (Basnet, unpublished)** | 71.8 (1630/2271) | other severe illness, history of documented TB, severe malnutrition, heart disease, diarrhoea with dehydration, disappearance of indrawing after salbutamol, recurrent wheezing, effusion/pneumothorax on chest X-ray, Hb% < 7 gm/dl, chronic cough, already enrolled in study once |
| **Basse, Gambia (3rd Nov 2011 - 2nd Nov 2013) (PERCH, unpublished)** | 7.2 (46/638) | quality control not yet complete |
| **Kilifi, Kenya (15th Aug 2011 - 15th Nov 2013) (PERCH, unpublished)** | 0.3 (2/634) | specimen not collected |
| **Bamako, Mali (3rd Jan 2012 - 14th Jan 2014) (PERCH, unpublished)** | 9.1 (61/674) | quality control not yet complete |
| **Nakhon Phanom and Sa Kaeo, Thailand (1st Jan 2012 - 31st Jan 2014) (PERCH, unpublished)** | 18.3 (41/224) | quality control not yet complete |
| **Lusaka, Zambia (10th Oct 2011 - 31st Oct 2013) (PERCH, unpublished)** | 10.5 (65/617) | quality control not yet complete |
| **Mpumalanga, South Africa (Jan 2010 - Dec 2014) (Cohen, unpublished)** | 4.0 (52/1310) | patient very ill; parents refuse consent; specimen not at lab within 72 hours |
| **Beirut, Lebanon (Oct 2012 - Mar 2014)[209]** | 18.3 (99/542) | no specimens collected or had onset of respiratory symptoms for more than 7 days |
| **Buenos Aires, Argentina (Apr 1993 - Dec 1994)[247]** | 3.4 (44/1278) | NA |
| **Beer-Sheva, Israel (Nov to Mar, 2004 - 2011)[240]** | 52.8 (1182/2240) | specimens were not obtained |
| **Jingzhou, China (Jan - Dec 2011)[234]** | 93.0 (6803/7314) | random samples |
| **Amman, Jordan (18th Jan - 29th Mar 2007)[238]** | 2.0 (15/743) | clinical or laboratory data were not available |

### *Supplementary table 17: Method for calculating country specific estimates for RSV-associated ALRI*

Step 1

We conducted a systematic literature review to identify the risk factors for RSV in children aged 0-4 years (Shi et al., 2015). We selected risk factors which in meta-analyses had strong statistically significant associations with RSV. These were:

- Prematurity (gestational age <37 weeks) - OR 1.96 (1.44-2.67)
- Low birth weight (<2500 gms) - OR 1.91 (1.45-2.53)
- Siblings - OR 1.6 (1.32-1.95)
- Maternal smoking - OR 1.36 (1.24-1.5)
- Paediatric HIV - OR 3.74 (2.47-5.66)
- Crowding - OR 1.94 (1.29-2.93)

Step 2

We obtained data on the prevalence of low birth weight, siblings and crowding from nationally representative household surveys with large sample sizes - the Demographic and Health surveys (DHS). DHS surveys are generally carried out every 2 to 5 years and provide data on demography and health indicators. The data for China were obtained from the Chinese National Bureau of Statistics. The HIV data were obtained from the United Nations programme on HIV/AIDS (UNAIDS) estimates for 2013 (http://www.unaids.org/en/media/unaids/contentassets/documents/epidemiology/2013/gr2013/20131118_Methodology.pdf). Maternal smoking data were obtained from previously published global estimates (Ng et al JAMA 2013) and prematurity data were obtained from WHO estimates (Blenclowe et al, Lancet 2012). We ensured that the definitions of risk factors were the same in the studies estimating the risk ratios as in the surveys that measured prevalence of exposure to these risk factors.

Specifically, we defined each risk factor using one or more DHS variables. Then, using individual patient data from the survey for each country, we calculated the proportion of participants with each combination of risk factors.

We chose the standard DHS survey (i.e. not special surveys) with these risk factors recorded closest to 2015 respectively.

Step 3

We categorised the developing countries into different subgroups based on the six WHO regions and child and adult mortality strata: A, very low child and very low adult mortality; B, low child and low adult mortality; C, low child and high adult mortality; D, high child and high adult mortality; E, high child and very high adult mortality. Where available, we decided to use the latest data for the prevalence of the six risk factors. If the prevalence data were not available for any risk factor in a particular country, we imputed the median

prevalence for the subgroup to which the country belonged.

Step 4 The total rates for RSV-associated ALRI in developing countries were obtained from meta-analyses described in the methods section of the paper. The estimates and standard errors for each meta-estimate was used to define log-normal distributions. In R, we obtained 10,000 from these distributions.

The rate of RSV-associated ALRI in a population is the sum of each stratum specific rate, weighted by the proportion in each stratum where there are *j* mutually exclusive strata: -

$$Total\ rate = \frac{\sum x_j}{\sum n_j} = \sum_j \left( \frac{x_j}{n_j} \cdot \frac{n_0}{x_0} \cdot \frac{x_0}{n_0} \cdot \frac{n_j}{\sum n_j} \right)$$

where x is the number of cases in a stratum, n is the total population in a stratum and where j = 0 indicates the stratum which has no exposures (i.e. the unexposed) and j = 1 to j = 127 indicate the strata for each unique combination of risk factors. This equation can be re-written as: -

$$Total\ rate = \frac{x_0}{n_0} \times \sum j \left( \frac{x_j}{n_j} \cdot \frac{n_0}{x_0} \cdot \frac{n_j}{\sum n_j} \right)$$

where $\frac{x_0}{n_0}$ is the rate in the unexposed, $\frac{x_j}{n_j} \cdot \frac{n_0}{x_0}$ is the rate ratio, and $\frac{n_j}{\sum n_j}$ is the proportion in each stratum.

Therefore, using the regional estimates (for developing countries) of the total rate, the combined rate ratio for each stratum, and the proportion in each stratum calculated the incidence in unexposed people for the region (all developing countries). This was estimated to be 26.6 (15.6-44.3) episodes per 1000 children aged below 5 years per year. If we then assume that the rate in the unexposed is consistent across the region (all developing countries) we can then calculate the incidence rate for each country: -

$$Country\ specific\ rate\ = \frac{\sum x_j^c}{\sum n_j^c} = \frac{\sum x_j^r}{\sum n_j^r} \cdot \frac{\sum_j \left( \frac{x_j}{n_j} \cdot \frac{n_0}{x_0} \cdot \frac{n_j^r}{\sum n_j^r} \right)}{\sum_j \left( \frac{x_j}{n_j} \cdot \frac{n_0}{x_0} \cdot \frac{n_j^c}{\sum n_j^c} \right)}$$

where c indicates a country specific value and r indicates a regional value.

Step 5 Assumptions:

- As with attributable fraction calculations, we assume that the pooled risk ratios obtained from a range of case-control/cohort studies in the developing region were applicable across all developing countries. As described in Step 6 we added additional uncertainty to our estimates to somewhat relax this assumption.
- As in our previous analysis (Theodoratou et al., 2014) we assumed that there was an n-way interaction between each risk factor (1.25 fold reduction) such that rate ratios combined sub-multiplicatively (e.g. for the group with malnutrition and low birth weight, $RR_A = 4.5$, and $RR_B = 3.6$, $RR_{A\&B} = 4.5 \times 3.6 / 1.25 = 12.96$ rather than $4.5 \times 3.6 = 16.2$). None of the primary studies included in the meta-analysis reported interaction/heterogeneity of effect measure estimates on a multiplicative scale. However, we noted that the majority of studies did not report testing for interaction and it seemed unlikely to us that all risks combined fully multiplicatively. Therefore, we added a weak interaction term to shrink the combined rate ratios towards the null. This would have the effect of causing the country specific estimates to be attenuated towards the overall estimate for the developing region.
- We also obtained individual-level patient data from two collaborating sites and estimated all two-way interactions for prematurity, siblings, overcrowding and low birth weight except low birth weight-siblings (as no patients had this combination). There were 92 cases with RSV of 311 patients. As expected the confidence intervals were very wide, offering little empirical guidance to the choice of a specified interaction odds ratio.

| Interaction term | Odds ratio | Lower CI | Upper CI |
|---|---|---|---|
| **prematurity:siblings** | 2.66 | 0.2 | 35.89 |
| **prematurity:crowding** | 0.67 | 0.04 | 10.15 |
| **prematurity:lbw** | 0.83 | 0.27 | 2.61 |
| **lbw:crowding** | 6.71 | 0.72 | 62.79 |
| **siblings:crowding** | 2.68 | 0.2 | 35.36 |

This justifies our choice of adding a weak interaction term (as described above).

- In order to calculate the proportion of the population in each country within each of the j strata we first aggregated the survey data to obtain a marginal (overall) estimate for each risk factor, then assumed independence to estimate the proportion of individuals with each combination of risk factors (i.e. the proportion in each of the j strata).

This assumption was made so that the uncertainty around the proportion for each combination of risk factors could be obtained by sampling from 6 beta distributions (with shape parameters determined by the number of participants in the survey with and without each of the 6 risk factors), then multiplying together each of the 6 sampling distributions. We could instead have used the actual number of participants with each combination of risk factors, and sampled instead from a Dirlecht distribution (a multivariate extension of the beta distribution). However, our chosen approach had a number of advantages. Firstly, it allowed us to use data from more than one source (only 3 of the 6 risk factors were well recorded in the DHS surveys). Secondly, data processing was more straightforward. Thirdly, it meant that we could make the data used in the analyses publicly available, which would not have been possible had we used the actual joint proportions, which are potentially disclosive.

- Finally we assumed that the rate among the unexposed (i.e. the risk in the absence of these SIX risk factors) came from the same distribution for all countries. This is the same as assuming that there was no residual confounding.

Step 6 Using a simulation based approach, we performed the calculation described in step 4 to estimate the country specific rates along with uncertainty ranges (UR).

This was done by performing this calculation for each of the 10,000 samples from the distributions representing the incidence rates, odds ratios and risk factor proportions (methods used to obtain each of these were obtained as described above) within R. Full analysis code and data are available from the authors on request.

*Supplementary table 18: Incidence and number of episodes of RSV-associated ALRI in 132 developing countries*

| Country | Incidence of RSV-associated ALRI (per 1000 children per year) | No. of episodes of RSV-associated ALRI (UR) |
|---|---|---|
| **Afghanistan** | 53.3 (33.6-83.8) | 263677 (166462-414858) |
| **Algeria** | 51.6 (32.7-80.9) | 236857 (150049-371261) |
| **Angola** | 53.7 (34-84.1) | 253440 (160269-397001) |
| **Antigua and Barbuda** | 46.8 (29.7-73.4) | 341 (216-534) |
| **Argentina** | 48.3 (30.7-75.8) | 179694 (114110-281976) |
| **Bahamas** | 48.2 (30.5-75.4) | 1402 (889-2195) |
| **Bahrain** | 57.2 (36-89.9) | 6217 (3918-9773) |
| **Bangladesh** | 51.9 (32.9-81.2) | 796123 (504325-1245371) |
| **Barbados** | 47.7 (30.2-74.8) | 829 (525-1299) |
| **Belize** | 53 (33.6-83) | 2092 (1324-3275) |
| **Benin** | 57.4 (36.1-90.5) | 98087 (61677-154467) |
| **Bhutan** | 39.6 (24.3-64.3) | 2611 (1600-4239) |
| **Bolivia** | 50.2 (31.7-78.7) | 59473 (37562-93249) |
| **Botswana** | 60 (37.6-94.2) | 15976 (10011-25088) |
| **Brazil** | 51.4 (32.5-80.3) | 773070 (488993-1207125) |
| **Burkina Faso** | 59.7 (37.5-93.9) | 187717 (117797-295328) |
| **Burundi** | 56 (35.4-88.1) | 115475 (72992-181572) |
| **Cambodia** | 51.1 (32.3-80) | 90538 (57236-141700) |
| **Cameroon** | 58.8 (36.8-92.4) | 219742 (137476-345249) |
| **Cape Verde** | 54.5 (34.3-85.5) | 2923 (1840-4581) |
| **Central African Republic** | 55 (34.7-86.2) | 38958 (24558-61043) |
| **Chad** | 57.7 (36.2-90.7) | 151768 (95236-238755) |
| **Chile** | 48.7 (30.9-76.4) | 57031 (36187-89448) |
| **China** | 31 (18.7-50.8) | 2581262 (1552250-4229873) |
| **Colombia** | 47.2 (29.9-73.9) | 176453 (111638-276234) |
| **Comoros** | 62.8 (39.3-99.1) | 7496 (4686-11820) |
| **Congo** | 56.7 (35.7-88.9) | 43059 (27084-67509) |
| **Cook Islands** | 50.3 (31.6-79) | 106 (66-166) |
| **Costa Rica** | 40.3 (24.5-65.6) | 14125 (8595-22989) |
| **Cote d'Ivoire** | 51.9 (32.8-81.5) | 190408 (120415-298876) |
| **Dem. Peoples's Rep. of Korea** | 51.1 (32.4-79.8) | 89280 (56599-139482) |
| **Dem. Rep. of the Congo** | 54.3 (34.3-85.1) | 753225 (475718-1180411) |
| **Djibouti** | 57.3 (36-90) | 5848 (3672-9182) |
| **Dominica** | 48.7 (30.8-76.2) | 297 (188-464) |
| **Dominican Republic** | 46.9 (29.6-73.8) | 49802 (31480-78430) |
| **Ecuador** | 46.6 (29.5-73.1) | 75053 (47574-117696) |
| **Egypt** | 50.4 (31.9-78.8) | 610777 (386798-955331) |
| **El Salvador** | 53.7 (34-84.1) | 27939 (17674-43719) |
| **Equatorial Guinea** | 55.3 (35-86.9) | 7093 (4488-11137) |

| Country | Incidence of RSV-associated ALRI (per 1000 children per year) | No. of episodes of RSV-associated ALRI (UR) |
|---|---|---|
| **Eritrea** | 57.6 (36.2-90.6) | 46916 (29459-73808) |
| **Ethiopia** | 58 (36.4-91.3) | 846851 (532193-1333188) |
| **Fiji** | 37.5 (22.8-61) | 3299 (2011-5369) |
| **Gabon** | 60.9 (38-95.7) | 14554 (9094-22881) |
| **Gambia** | 58.3 (36.5-91.7) | 21361 (13378-33601) |
| **Ghana** | 52.8 (33.4-82.9) | 214075 (135362-336105) |
| **Grenada** | 48.3 (30.6-75.6) | 480 (304-752) |
| **Guatemala** | 54.6 (34.5-86.1) | 114073 (72104-179935) |
| **Guinea** | 59.5 (37.1-93.9) | 121665 (75809-192047) |
| **Guinea-Bissau** | 58.2 (36.6-91.5) | 16822 (10566-26435) |
| **Guyana** | 56 (35.3-87.8) | 3758 (2372-5897) |
| **Haiti** | 52.6 (33.2-82.3) | 65088 (41121-101880) |
| **Honduras** | 52 (33-81.4) | 42428 (26902-66384) |
| **India** | 56.7 (35.7-89) | 7013468 (4420047-11010288) |
| **Indonesia** | 50.1 (31.6-78.5) | 1245185 (786572-1951996) |
| **Iran (Islamic Republic of)** | 56.6 (35.7-88.9) | 387906 (244677-609112) |
| **Iraq** | 54.8 (34.6-86.2) | 313987 (197944-493979) |
| **Jamaica** | 48.3 (30.6-75.7) | 9849 (6228-15419) |
| **Jordan** | 61.3 (38.6-96.8) | 60063 (37877-94943) |
| **Kenya** | 53.8 (34-84.4) | 385484 (243738-604648) |
| **Kiribati** | 38.2 (23.2-62) | 563 (342-916) |
| **Kuwait** | 55.9 (35.2-88.1) | 19450 (12261-30648) |
| **Lao People's Dem. Republic** | 41 (25-66.9) | 34428 (20929-56091) |
| **Lebanon** | 56.2 (35.5-88.3) | 25907 (16363-40710) |
| **Lesotho** | 58.1 (36.5-91.4) | 16167 (10164-25433) |
| **Liberia** | 54.9 (34.4-86) | 38516 (24112-60313) |
| **Libyan Arab Jamahiriya** | 55 (34.8-86.4) | 35686 (22581-56046) |
| **Madagascar** | 54.5 (34.4-85.5) | 205554 (129713-322426) |
| **Malawi** | 58.9 (37.2-92.6) | 174043 (109741-273602) |
| **Malaysia** | 38.1 (23.2-62.1) | 94332 (57527-153910) |
| **Maldives** | 44.4 (28.1-70.2) | 1660 (1049-2622) |
| **Mali** | 58.1 (36.5-91.8) | 190123 (119269-300448) |
| **Marshall Islands** | 39.9 (24.3-65.1) | 200 (122-327) |
| **Mauritania** | 55.9 (35.2-87.8) | 33617 (21171-52756) |
| **Mauritius** | 53.3 (33.7-83.6) | 3765 (2379-5905) |
| **Mexico** | 47.4 (30.1-74.3) | 550902 (349207-863101) |
| **Micronesia (Fed. States of)** | 40.1 (24.4-65.4) | 464 (282-757) |
| **Mongolia** | 37 (22.5-60.1) | 12501 (7617-20319) |
| **Morocco** | 54.8 (34.5-86.2) | 187360 (118086-294888) |
| **Mozambique** | 58.6 (36.9-91.8) | 282071 (177599-442050) |
| **Myanmar** | 40.2 (24.7-65.2) | 183560 (112580-297556) |

| Country | Incidence of RSV-associated ALRI (per 1000 children per year) | No. of episodes of RSV-associated ALRI (UR) |
|---|---|---|
| **Namibia** | 55.4 (34.9-87.1) | 18744 (11809-29458) |
| **Nauru** | 42.1 (25.4-69.1) | 40 (24-66) |
| **Nepal** | 54.6 (34.5-85.6) | 153176 (96943-240359) |
| **Nicaragua** | 52.7 (33.4-82.7) | 31940 (20210-50079) |
| **Niger** | 58.2 (36.3-92.1) | 241080 (150641-381852) |
| **Nigeria** | 55.6 (34.9-87.3) | 1728622 (1086317-2717239) |
| **Niue** | 41 (24.9-66.8) | 6 (3-9) |
| **Oman** | 57 (35.9-89.4) | 21954 (13841-34454) |
| **Pakistan** | 63.9 (39.4-101.7) | 1575051 (972854-2507724) |
| **Palau** | 37.5 (22.9-61.2) | 75 (46-122) |
| **Panama** | 47.6 (30.2-74.4) | 17533 (11114-27427) |
| **Papua New Guinea** | 37.9 (23.1-61.9) | 37763 (22994-61670) |
| **Paraguay** | 52.3 (33.1-81.7) | 35221 (22293-55074) |
| **Peru** | 48.3 (30.6-75.6) | 145886 (92275-228312) |
| **Philippines** | 59.8 (37.5-93.9) | 673244 (422425-1057080) |
| **Qatar** | 55.8 (35.2-87.6) | 7383 (4656-11593) |
| **Republic of Korea** | 35.9 (21.8-58.3) | 82022 (49895-133456) |
| **Rwanda** | 50.6 (31.9-79.6) | 85681 (54107-134839) |
| **Saint Kitts and Nevis** | 48.6 (30.7-76.1) | 223 (141-349) |
| **Saint Lucia** | 48.6 (30.7-76.1) | 669 (423-1048) |
| **Saint Vincent and Grenadines** | 48.6 (30.8-76.3) | 414 (262-649) |
| **Samoa** | 36.9 (22.5-60.3) | 892 (543-1457) |
| **Sao Tome and Principe** | 51.5 (32.5-81) | 1523 (962-2395) |
| **Saudi Arabia** | 54.3 (34.3-85.6) | 171639 (108456-270632) |
| **Senegal** | 65.6 (40.3-105.1) | 170579 (104861-273378) |
| **Seychelles** | 53.1 (33.5-83.4) | 445 (281-699) |
| **Sierra Leone** | 55.8 (34.9-87.8) | 56009 (35078-88184) |
| **Solomon Islands** | 39.7 (24.1-64.6) | 3242 (1969-5284) |
| **Somalia** | 48.7 (30.8-76.9) | 95964 (60642-151541) |
| **South Africa** | 52.7 (33.3-82.6) | 283103 (178994-443697) |
| **Sri Lanka** | 39.9 (24.1-65.5) | 65633 (39649-107543) |
| **Sudan** | 56.9 (35.7-89.4) | 338938 (212399-531922) |
| **Suriname** | 47.7 (30.2-74.8) | 2299 (1456-3603) |
| **Swaziland** | 59.3 (37.2-93.1) | 10277 (6448-16151) |
| **Syrian Arab Republic** | 57.5 (36.3-90.5) | 126112 (79599-198435) |
| **Thailand** | 39.4 (23.8-64.3) | 149676 (90537-244458) |
| **Timor-Leste** | 42.2 (26.5-66.9) | 8597 (5396-13629) |
| **Togo** | 58 (36.4-91.2) | 67291 (42204-105766) |
| **Tonga** | 36.6 (22.2-59.5) | 472 (287-768) |
| **Trinidad and Tobago** | 47.9 (30.3-75.2) | 4602 (2913-7231) |
| **Tunisia** | 51.6 (32.6-81.2) | 50711 (31977-79731) |

| Country | Incidence of RSV-associated ALRI (per 1000 children per year) | No. of episodes of RSV-associated ALRI (UR) |
|---|---|---|
| **Tuvalu** | 36.6 (22.3-59.4) | 37 (22-60) |
| **Uganda** | 58.5 (36.8-92) | 425686 (267700-669329) |
| **United Arab Emirates** | 54.8 (34.7-86.3) | 26947 (17053-42408) |
| **United Republic of Tanzania** | 56.8 (35.6-89) | 533967 (335007-836521) |
| **Uruguay** | 49.4 (31.3-77.4) | 11899 (7534-18643) |
| **Vanuatu** | 38.1 (23.2-62.2) | 1325 (807-2162) |
| **Venezuela** | 48.1 (30.5-75.5) | 142500 (90276-223432) |
| **Viet Nam** | 35.3 (21.4-57.6) | 273416 (166008-446120) |
| **Yemen** | 57.2 (35.9-89.9) | 224628 (140904-352670) |
| **Zambia** | 57.9 (36.4-90.9) | 165095 (103789-259193) |
| **Zimbabwe** | 52.3 (33.1-82) | 131042 (82878-205315) |

*Supplementary table 19: Comparison of the modelled national estimates of RSV-associated ALRI with those reported in the included studies*

| Country | Observed incidence rate of RSV-ALRI in 0-59m (per 1000 children per year) | | | RSV-ALRI incidence (modelled estimates) |
|---|---|---|---|---|
| | Study 1 | Study 2 | Study 3 | |
| **Bangladesh*** | *84.7 (56.4-129.8)* | *26.4 (17.3-40.5)* | 17.5 (15.7-19.5) | 51.9 (32.9-81.2) |
| **Brazil** | 14 (7.8-25.3) | | | 51.4 (32.5-80.3) |
| **Germany** | *52.3 (45.5-60.4)* | | | |
| **Guatemala** | *84.1 (69.7-115.6)* | | | 54.6 (34.5-86.1) |
| **India†** | *21.7 (10.8-43.3)* | 33.4 (25.2-44.2) | | 56.7 (35.7-89) |
| **Indonesia** | 65.4 (57.4-74.6) | | | 50.1 (31.6-78.5) |
| **Kenya** | *59.9 (44.1-81.4)* | | | 53.8 (34-84.4) |
| **Nicaragua** | *34.7 (17.3-69.3)* | | | 52.7 (33.4-82.7) |
| **Nigeria** | 94 (89.1-99.1) | | | 55.6 (34.9-87.3) |
| **Pakistan** | 35.9 (27.6-46.7) | | | 63.9 (39.4-101.7) |
| **Peru** | *194.3 (158.2-238.6)* | | | 48.3 (30.6-75.6) |
| **South Africa** | *188.7 (154.1-230.9)* | | | 52.7 (33.3-82.6) |

* There are 3 studies: Dhaka, Bangladesh (Apr 2009 - Mar 2011); Mirzapur, Bangladesh (Oct 1993 - Aug 1996); Dhaka, Bangladesh (Jan 2005 - Feb 2008)

† There are 2 studies: Ballabhgarh, India (Oct 2001 - Mar 2005); Ballabhgarh, India (Aug 2012 - Aug 2013)

Estimates in italics are imputed

*Supplementary table 20: In-hospital CFR (%) for RSV-associated ALRI in children younger than 5 years by narrow non-overlapping age bands by World Bank income regions (based on data from 43 studies reporting hCFR estimates by narrow age bands for full 0-59 month age range)*

| Region | No.* | 0-27 days | 28-<3m | 3-5m | 6-8m | 9-11m | 12-23m | 24-59m |
|---|---|---|---|---|---|---|---|---|
| **Low income** | 9 | 0 | 0 | 3.8 (0.9-15.1) | 16.1 (5.2-49.9) | 0 | 6.6 (0.9-47.1) | 0 |
| **Lower middle income** | 16 | 6.3 (3.3-12.1) | 2.7 (1.7-4.1) | 3.6 (2.2-6.00) | 2.6 (1.2-5.4) | 7.0 (4.0-12.4) | 2.5 (1.3-5.1) | 5.5 (3.1-10.0) |
| **Upper middle income** | 12 | 1.0 (0.1-7.2) | 1.9 (1.1-3.4) | 1.9 (1.1-3.3) | 3.0 (1.1-8.1) | 2.2 (0.5-8.6) | 0.7 (0.1-4.7) | 0 |
| **High income** | 6 | 0 | 2.1 (1.3-3.5) | 0.4 (0.0-5.5) | 1.2 (0.3-5.6) | 1.1 (0.5-2.5) | 0.3 (0.0-5.4) | 1.2 (0.2-8.2) |
| **Developing** | 41 | 5.3 (2.8-9.8) | 2.3 (1.7-3.0) | 2.4 (1.8-3.2) | 3.0 (2.1-4.4) | 3.6 (2.3-5.6) | 2.0 (1.3-3.0) | 4.2 (2.6-6.6) |
| **Industrialised** | 2 | 0 | 0 | 0.1 (0.0-0.4) | 0.1 (0.0-0.7) | 0 | 0.0 (0.0-0.3) | 0.2 (0.1-0.5) |

* No.= Number of studies

*Supplementary table 21: Method estimating overall RSV-associated ALRI mortality in children younger than 5 years*

| | |
|---|---|
| **Step 1** | Identify sites with community-based data on ALRI (pneumonia) mortality (based on verbal autopsy, mortality survey, or COD provided in vital registration of deaths) along with monthly data on RSV (and influenza) activity (where available) for at least three consecutive years |
| **Step 2** | Use comparative (excess mortality model) to estimate excess ALRI mortality during RSV season (Supplementary table 20). Ascertain that there is no overlap in peak RSV and influenza activity. |
| **Step 3** | Attribute all excess mortality during RSV season to RSV. Estimate the proportion of ALRI mortality that can be attributed to RSV (Supplementary table 21). |
| **Step 4** | Estimate RSV-associated ALRI mortality in the country providing community-based ALRI mortality data. |
| **Step 5** | Estimate RSV-associated ALRI hospitalisations in above country using hospitalisation rate for developing country. Apply in-hospital CFR to this estimate to calculate the estimated number of in-hospital deaths due to RSV-associated ALRI (Supplementary table 22). |
| **Step 6** | Compare overall RSV-associated ALRI deaths in given country (step 4) with RSV-associated ALRI in hospital in same country (step 5). This ratio provides the inflation factor. |
| **Step 7** | Estimate RSV-associated ALRI mortality in developing countries by applying mean inflation factor to the estimated RSV-associated ALRI deaths in hospital in developing countries (Supplementary table 22).<br><br>[59578 (47750-74325) *2.2 = 131072 (105050-163515)] |
| **Step 8** | Adjust for influenza activity during RSV season by estimating area under the curve for RSV. This ranges from 90-100% based on data from Bangladesh and Argentina. Assume that there is no difference in CFR for RSV and influenza in the community.<br><br>[131072 (105050-163515)*0.9= 117964 (94545-147164)] |
| **Step 9** | Estimate global RSV-associated ALRI mortality by summing the RSV-associated ALRI mortality in developing countries with RSV-associated ALRI deaths in hospital in industrialised countries.<br><br>[{117964 (94545-147164)} + {237 (78-2202)}] = 118201 (94623-149366) |

*Supplementary table 22: Estimated RSV-ALRI mortality in children younger than 5 years (using excess mortality models) in three LMICs using pneumonia mortality data in under-five children and concurrent RSV activity*

| Site | Study year | Months of RSV season (a) | Average ALRI deaths per month during RSV season (b) | Average ALRI deaths per month outside RSV season (c) | Total ALRI deaths per year (d) | Proportion of ALRI deaths due to RSV (%) (e)* | ALRI deaths overall in country (f)[254] | Estimated RSV deaths in country (g)# |
|---|---|---|---|---|---|---|---|---|
| **Urban slums, Buenos Aires, Argentina** | 2011 | 4 | 6.3 | 1.8 | 39 | 46.2 | 887 | 409 |
| | 2012 | 4 | 8.5 | 0.9 | 41 | 74.4 | 878 | 653 |
| | 2013 | 4 | 3.3 | 0.9 | 20 | 47.5 | 844 | 401 |
| | **Mean** | | | | | | | **488** |
| **Rural villages, Multicentre, Bangladesh** | 2010 | 9 | 3.0 | 2.7 | 35 | 8.6 | 21917 | 1879 |
| | 2011 | 4 | 8.8 | 5.4 | 78 | 17.3 | 20028 | 3466 |
| | 2012 | 6 | 9.5 | 6.3 | 95 | 20.0 | 18759 | 3752 |
| | **Mean** | | | | | | | **3032** |
| **Multiple rural hamlets, Lombok, Indonesia** | 2000 | 6 | 73.3 | 62.3 | 814 | 8.1 | 39257 | 3183 |
| | 2001 | 6 | 84.8 | 48.8 | 802 | 26.9 | 37584 | 10122 |
| | 2002 | 7 | 45.0 | 36.8 | 499 | 11.5 | 36020 | 4143 |
| | **Mean** | | | | | | | **5816** |

*RSV=respiratory syncytial virus. ALRI=acute lower respiratory infection. *e= [(b-c)*a]/d. #g=e*f*0.01*

*Supplementary table 23: Calculation of inflation factor to estimate overall RSV-ALRI mortality in developing countries*

| Country | Meta-estimate of hospitalised RSV-ALRI (per 1000 children per year) (h)§ | Meta-estimate of hCFR for RSV-ALRI (%) (i)§ | Population in mean study period (j) | Estimated in-hospital RSV-ALRI deaths in country (k)* | Estimated RSV deaths in country (g) | Inflation factor (l)# |
|---|---|---|---|---|---|---|
| **Argentina** | 4.9 | 1.9 | 3407649 | 320 | 488 | 1.5 |
| **Bangladesh** | 4.9 | 1.9 | 15197631 | 1426 | 3032 | 2.1 |
| **Indonesia** | 4.9 | 1.9 | 21639000 | 2030 | 5816 | 2.9 |
| **Mean** | | | | | | **2.2** |

*RSV=respiratory syncytial virus. hCFR=in-hospital case fatality ratio. §Meta-estimate in the developing region (where this country comes from) was used. *k=h*j*0.001*i*0.01. #l=g/k*

***Supplementary table 24: Sensitivity analysis for estimating RSV-ALRI mortality in children younger than 5 years (using excess mortality models) in three LMICs using pneumonia mortality data in under-five children and concurrent RSV activity (by extending RSV season by one month to capture pneumococcal deaths secondary to RSV infection)***

| Site | Study year | Months of RSV season (a) | Average ALRI deaths per month during RSV season (b) | Average ALRI deaths per month outside RSV season (c) | Total ALRI deaths in community per year (d) | Proportion of ALRI deaths due to RSV (%) (e)* | ALRI deaths overall in this country (f)[254] | RSV deaths overall in this country (g)# |
|---|---|---|---|---|---|---|---|---|
| **Buenos Aires, Argentina** | 2011 | 5 | 5.6 | 1.6 | 39 | 51.6 | 887 | 458 |
| | 2012 | 5 | 7.4 | 0.6 | 41 | 83.3 | 878 | 731 |
| | 2013 | 5 | 3.0 | 0.7 | 20 | 57.1 | 844 | 482 |
| | **Mean** | | | | | | | **557** |
| **Multicentre, Bangladesh** | 2010 | 11 | 3.0 | 2.0 | 35 | 31.4 | 21917 | 6888 |
| | 2011 | 4 | 8.8 | 5.4 | 78 | 17.3 | 20028 | 3466 |
| | 2012 | 8 | 9.5 | 4.8 | 95 | 40.0 | 18759 | 7504 |
| | **Mean** | | | | | | | **5953** |
| **Lombok, Indonesia** | 2000 | 7 | 78.7 | 52.6 | 814 | 22.5 | 39257 | 8816 |
| | 2001 | 7 | 86.3 | 39.6 | 802 | 40.7 | 37584 | 15315 |
| | 2002 | 9 | 43.2 | 36.7 | 499 | 11.8 | 36020 | 4259 |
| | **Mean** | | | | | | | **9463** |

*RSV=respiratory syncytial virus. ALRI=acute lower respiratory infection. *e=[(b-c)*a]/d. #g=e*f*0.01*

| Site | Meta-estimate of hospitalisation rate (per 1000 per year) (h)§ | Meta-estimate of in-hospital CFR (%) (i)§ | Population in mean study period (j) | RSV deaths in hospital overall (k)* | Mean of RSV deaths in community (g) | Adjustment factor (l)# |
|---|---|---|---|---|---|---|
| **Argentina** | 4.9 | 1.9 | 3407649 | 320 | 557 | 1.7 |
| **Bangladesh** | 4.9 | 1.9 | 15197631 | 1426 | 5953 | 4.2 |
| **Indonesia** | 4.9 | 1.9 | 21639000 | 2030 | 9463 | 4.7 |
| **Mean** | | | | | | **3.5** |

*RSV=respiratory syncytial virus. CFR=case fatality ratio. §Meta-estimate in the developing region (where this country comes from) was used. *k=h*j*0.001*i*0.01. #l=g/k.*

*Supplementary table 25: Proportion of eligible cases not tested for RSV and comparison of CFR among children who were tested for RSV (with those not tested)*

| Location (reference) | % of eligible cases not tested for RSV | Reasons for not testing | Proportion of in-hospital ALRI deaths not tested for RSV (%) | CFR among hospitalised ALRI tested for RSV (%) | CFR among hospitalised ALRI not tested for RSV (%) |
|---|---|---|---|---|---|
| **Kilifi, Kenya (PERCH, unpublished)** | 0.3 (2/634) | specimen not collected | 6.1 | 4.9 | 100.0 |
| **Iquique, Chile (Fasce, unpublished)** | 0.6 (4/683) | cases were not notified in time so as to collect sample | 0.0 | 0.4 | 0.0 |
| **Buenos Aires, Argentina (Polack, unpublished)** | 0.9 (30/3371) | sample inadequate | 23.6 | 1.3 | 43.3 |
| **Gauteng province, South Africa (Cohen, unpublished)** | 2.0 (122/6016) | child too ill to take sample from; specimens not reaching laboratory within 72 hours | 5.7 | 0.8 | 2.5 |
| **Manhiça, Mozambique (Bassat, unpublished)** | 3.1 (15/491) | NPA not collected or processed without results | 14.3 | 2.5 | 13.3 |
| **Klerksdorp site, South Africa (Cohen, unpublished)** | 3.2 (30/932) | patient very ill; parents refuse consent, specimen not at lab within 72 hours | 0.0 | 2.1 | 0.0 |
| **Tone District, Togo (Gessner, unpublished)** | 3.2 (4/124) | testing just started | 100.0 | 0.0 | 66.7 |
| **Concepcion, Chile (Fasce, unpublished)** | 3.3 (16/481) | cases were not notified in time so as to collect sample | 0.0 | 0.4 | 0.0 |
| **Manhiça, Mozambique (Bassat, unpublished)** | 3.4 (28/835) | NPA not collected or processed without results | 8.5 | 9.3 | 25.0 |
| **Mpumalanga, South Africa (Cohen, unpublished)** | 4.0 (52/1310) | patient very ill; parents refuse consent; specimen not at lab within 72 hours | 12.5 | 6.1 | 21.2 |
| **Western Gambia (Howie, unpublished)** | 4.2 (4/95) | technical problem with specimen | 0.0 | 3.3 | 0.0 |
| **KwaZulu-Natal province, South Africa (Cohen, unpublished)** | 4.5 (72/1607) | patient very ill; parents refuse consent, specimen not at lab within 72 hours | 9.1 | 0.7 | 1.4 |

| Location (reference) | % of eligible cases not tested for RSV | Reasons for not testing | Proportion of in-hospital ALRI deaths not tested for RSV (%) | CFR among hospitalised ALRI tested for RSV (%) | CFR among hospitalised ALRI not tested for RSV (%) |
|---|---|---|---|---|---|
| **Soweto, South Africa (Madhi, unpublished)** | 4.6 (240/5231) | missed as part of surveillance | 16.3 | 5.5 | 22.5 |
| **CEMIC, Buenos Aires, Argentina (Echavarria, unpublished)** | 5.3 (3/57) | insufficient sample | NA | 0.0 | 0.0 |
| **Santa Rosa, Guatemala (McCracken, unpublished)** | 5.8 (104/1810) | no consent or no specimen | 2.2 | 5.2 | 1.9 |
| **Basse Santa Su, Gambia (PERCH, unpublished)** | 7.2 (46/638) | quality control not yet complete | 22.7 | 2.9 | 10.9 |
| **Bamako, Mali (PERCH, unpublished)** | 9.1 (61/674) | quality control not yet complete | 12.7 | 14.5 | 21.3 |
| **41 sites in Netherlands (Bont, unpublished)** | 10.0 (24/241) | reasons for not testing are unknown, as the decisions for testing are made by independent physicians at hospital of presentation | NA | 0.0 | 0.0 |
| **Lusaka, Zambia (PERCH, unpublished)** | 10.5 (65/617) | quality control not yet complete | 14.5 | 18.1 | 26.2 |
| **Quetzaltenango, Guatemala (McCracken, unpublished)** | 10.9 (207/1893) | no consent or no specimen | 0.0 | 2.7 | 0.0 |
| **Buenos Aires, Argentina (Gentile, unpublished)** | 12.9 (1361/10581) | NA | 10.8 | 2.0 | 1.6 |
| **Paarl, South Africa (Zar, unpublished)** | 16.4 (21/128) | specimens were not obtained | 50.0 | 0.9 | 4.8 |
| **Nakhon Phanom and Sa Kaeo, Thailand (PERCH, unpublished)** | 18.3 (41/224) | quality control not yet complete | 33.3 | 1.1 | 2.4 |
| **Kilifi hospital study, Kenya (Nokes, unpublished)** | 24.4 (2817/11544) | died; discharged; refusal | 67.0 | 5.2 | 32.7 |
| **Bondo district, Kenya (Feikin,** | 28.7 (208/726) | NA | 43.8 | 5.2 | 10.1 |

| Location (reference) | % of eligible cases not tested for RSV | Reasons for not testing | Proportion of in-hospital ALRI deaths not tested for RSV (%) | CFR among hospitalised ALRI tested for RSV (%) | CFR among hospitalised ALRI not tested for RSV (%) |
|---|---|---|---|---|---|
| **unpublished)** | | | | | |
| **Lombok, Indonesia (Gessner, unpublished)** | 28.9 (1500/5198) | primarily age <3 months and critical illness on presentation; specimens collected 4 days a week so if patients who had rapid admission, would not have been done | 86.1 | 2.2 | 33.1 |
| **Tagbilaran and 6 rural sites, Philippines (Lucero, unpublished)** | 36.0 (537/1491) | no specimen collected for those cases not tested for RSV | 70.6 | 0.5 | 2.2 |
| **Belo Horizonte, Brazil (Oliveira, unpublished)** | 59.4 (757/1275) | frozen samples at weekends; laboratory refused | 62.5 | 1.2 | 1.3 |
| **Lwak, Kenya (Montgomery, unpublished)** | 72.4 (1231/1701) | refusal to consent; unavailability of transport from field site to lab; high patient volumes; inadequate staffing levels | 66.0 | 3.4 | 2.5 |
| **Sa Kaeo and Nakhon Phanom, Thailand (Thamthitiwat, unpublished)** | 75.0 (14334/19103) | patients refused to take part in it | NA | 0.0 | 0.0 |

*Supplementary table 26: hCFR sensitivity analysis assuming that the proportion of RSV in untested (deaths) is same as in those tested*

| Location (reference) | % of eligible cases not tested for RSV | CFR of tested ALRI (%) | CFR of untested ALRI (%) - a | No. of untested ALRI - b | Proportion of RSV-ALRI - c | No. of RSV+ from untested ALRI - d* | Excess RSV mortality from untested ALRI - e | Deaths of RSV-tested ALRI - f | Cases of RSV-tested ALRI - g | CFR of RSV-tested ALRI (%) - h | Adjusted CFR of RSV-ALRI (%) - i |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Kilifi, Kenya (PERCH, unpublished)** | 0.3 (2/634) | 4.9 | 100.0 | 2 | 0.24 | 0.47 | 0.47 | 6 | 150 | 4.00 | 4.30 |
| **Iquique, Chile (Fasce, unpublished)** | 0.6 (4/683) | 0.4 | 0.0 | 4 | 0.35 | 1.40 | 0.00 | 2 | 237 | 0.84 | 0.84 |
| **Buenos Aires, Argentina (Polack, unpublished)** | 0.9 (30/3371) | 1.3 | 43.3 | 30 | 0.65 | 19.46 | 8.43 | 24 | 2167 | 1.11 | 1.48 |
| **Gauteng province, South Africa (Cohen, unpublished)** | 2.0 (122/6016) | 0.8 | 2.5 | 122 | 0.29 | 35.04 | 0.86 | 8 | 1693 | 0.47 | 0.51 |
| **Manhiça, Mozambique (Bassat, unpublished)** | 3.1 (15/491) | 2.5 | 13.3 | 15 | 0.14 | 2.14 | 0.29 | 0 | 68 | 0.00 | 0.41 |
| **Klerksdorp site, South Africa (Cohen, unpublished)** | 3.2 (30/932) | 2.1 | 0.0 | 30 | 0.22 | 6.72 | 0.00 | 3 | 202 | 1.49 | 1.44 |
| **Tone District, Togo (Gessner, unpublished)** | 3.2 (4/124) | 0.0 | 66.7 | 3 | 0.12 | 0.37 | 0.25 | 0 | 15 | 0.00 | 1.61 |

* Assume the proportion is the same as in the tested ALRI; d=b*c; e=d*a*0.01; h=f/g*100; i=(f+e)/(g+d)*100

| Location (reference) | % of eligible cases not tested for RSV | CFR of tested ALRI (%) | CFR of untested ALRI (%) - a | No. of untested ALRI - b | Proportion of RSV-ALRI - c | No. of RSV+ from untested ALRI - d* | Excess RSV mortality from untested ALRI - e | Deaths of RSV-tested ALRI - f | Cases of RSV-tested ALRI - g | CFR of RSV-tested ALRI (%) - h | Adjusted CFR of RSV-ALRI (%) - i |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Concepcion, Chile (Fasce, unpublished)** | 3.3 (16/481) | 0.4 | 0.0 | 16 | 0.43 | 6.92 | 0.00 | 1 | 201 | 0.50 | 0.48 |
| **Manhiça, Mozambique (Bassat, unpublished)** | 3.4 (28/835) | 9.3 | 25.0 | 28 | 0.06 | 1.70 | 0.43 | 1 | 49 | 2.04 | 2.81 |
| **Mpumalanga, South Africa (Cohen, unpublished)** | 4.0 (52/1310) | 6.1 | 21.2 | 52 | 0.21 | 11.08 | 2.34 | 6 | 268 | 2.24 | 2.99 |
| **Western Gambia (Howie, unpublished)** | 4.2 (4/95) | 3.3 | 0.0 | 100 | 0.18 | 17.58 | 0.00 | 0 | 16 | 0.00 | 0.00 |
| **KwaZulu-Natal province, South Africa (Cohen, unpublished)** | 4.5 (72/1607) | 0.7 | 1.4 | 72 | 0.28 | 20.22 | 0.28 | 0 | 431 | 0.00 | 0.06 |
| **Soweto, South Africa (Madhi, unpublished)** | 4.6 (240/5231) | 5.5 | 22.5 | 240 | 0.17 | 41.50 | 9.34 | 14 | 863 | 1.62 | 2.58 |
| **CEMIC, Buenos Aires, Argentina (Echavarria, unpublished)** | 5.3 (3/57) | 0.0 | 0.0 | 3 | 0.39 | 1.17 | 0.00 | 0 | 21 | 0.00 | 0.00 |

| Location (reference) | % of eligible cases not tested for RSV | CFR of tested ALRI (%) | CFR of untested ALRI (%) - a | No. of untested ALRI - b | Proportion of RSV-ALRI - c | No. of RSV+ from untested ALRI - d* | Excess RSV mortality from untested ALRI - e | Deaths of RSV-tested ALRI - f | Cases of RSV-tested ALRI - g | CFR of RSV-tested ALRI (%) - h | Adjusted CFR of RSV-ALRI (%) - i |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Santa Rosa, Guatemala (McCracken, unpublished)** | 5.8 (104/1810) | 5.2 | 1.9 | 104 | 0.41 | 34.10 | 0.66 | 15 | 505 | 2.97 | 2.90 |
| **Basse Santa Su, Gambia (PERCH, unpublished)** | 7.2 (46/638) | 2.9 | 10.9 | 46 | 0.19 | 8.86 | 0.96 | 0 | 114 | 0.00 | 0.78 |
| **Bamako, Mali (PERCH, unpublished)** | 9.1 (61/674) | 14.5 | 21.3 | 61 | 0.25 | 15.52 | 3.31 | 4 | 156 | 2.56 | 4.26 |
| **41 sites in Netherlands (Bont, unpublished)** | 10 (24/241) | 0.0 | 0.0 | 24 | 0.72 | 17.25 | 0.00 | 0 | 156 | 0.00 | 0.00 |
| **Lusaka, Zambia (PERCH, unpublished)** | 10.5 (65/617) | 18.1 | 26.2 | 65 | 0.19 | 12.13 | 3.17 | 6 | 103 | 5.83 | 7.97 |
| **Quetzaltenango, Guatemala (McCracken, unpublished)** | 10.9 (207/1893) | 2.7 | 0.0 | 207 | 0.37 | 69.28 | 0.00 | 8 | 628 | 1.27 | 1.15 |
| **Buenos Aires, Argentina (Gentile, unpublished)** | 12.9 (1361/10581) | 2.0 | 1.6 | 1361 | 0.39 | 529.93 | 8.57 | 65 | 3590 | 1.81 | 1.79 |
| **Paarl, South Africa (Zar, unpublished)** | 16.4 (21/128) | 0.9 | 4.8 | 21 | 0.26 | 5.50 | 0.26 | 0 | 28 | 0.00 | 0.78 |

| Location (reference) | % of eligible cases not tested for RSV | CFR of tested ALRI (%) | CFR of untested ALRI (%) - a | No. of untested ALRI - b | Proportion of RSV-ALRI - c | No. of RSV+ from untested ALRI - d* | Excess RSV mortality from untested ALRI - e | Deaths of RSV-tested ALRI - f | Cases of RSV-tested ALRI - g | CFR of RSV-tested ALRI (%) - h | Adjusted CFR of RSV-ALRI (%) - i |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Nakhon Phanom and Sa Kaeo, Thailand (PERCH, unpublished)** | 18.3 (41/224) | 1.1 | 2.4 | 41 | 0.27 | 11.20 | 0.27 | 0 | 50 | 0.00 | 0.45 |
| **Kilifi hospital study, Kenya (Nokes, unpublished)** | 24.4 (2817/11544) | 5.2 | 32.7 | 2817 | 0.16 | 460.95 | 150.87 | 31 | 1428 | 2.17 | 9.63 |
| **Bondo district, Kenya (Feikin, unpublished)** | 28.7 (208/726) | 5.2 | 10.1 | 208 | 0.13 | 26.50 | 2.68 | 1 | 66 | 1.52 | 3.97 |
| **Lombok, Indonesia (Gessner, unpublished)** | 28.9 (1500/5198) | 2.2 | 33.1 | 1500 | 0.20 | 300.57 | 99.59 | 13 | 741 | 1.75 | 10.81 |
| **Tagbilaran and 6 rural sites, Philippines (Lucero, unpublished)** | 36 (537/1491) | 0.5 | 2.2 | 537 | 0.37 | 200.95 | 4.49 | 2 | 357 | 0.56 | 1.16 |
| **Belo Horizonte, Brazil (Oliveira, unpublished)** | 59.4 (757/1275) | 1.2 | 1.3 | 757 | 0.29 | 222.13 | 2.93 | 2 | 152 | 1.32 | 1.32 |
| **Lwak, Kenya (Montgomery, unpublished)** | 72.4 (1231/1701) | 3.4 | 2.5 | 1231 | 0.21 | 264.53 | 6.66 | 4 | 101 | 3.96 | 2.92 |

| Location (reference) | % of eligible cases not tested for RSV | CFR of tested ALRI (%) | CFR of untested ALRI (%) - a | No. of untested ALRI - b | Proportion of RSV-ALRI - c | No. of RSV+ from untested ALRI - d* | Excess RSV mortality from untested ALRI - e | Deaths of RSV-tested ALRI - f | Cases of RSV-tested ALRI - g | CFR of RSV-tested ALRI (%) - h | Adjusted CFR of RSV-ALRI (%) - i |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sa Kaeo and Nakhon Phanom, Thailand (Thamthitiwat, unpublished)** | 75 (14334/19103) | 0.0 | 0.0 | 14334 | 0.17 | 2389.50 | 0.00 | 0 | 795 | 0.00 | 0.00 |

hCFR meta-estimate in children aged 0-59m from developing countries using data from above 30 studies reporting deaths in hospitalised RSV positive cases – 1.5 (0.9 to 2.3) (A)

hCFR meta-estimate in children aged 0-59m from developing countries using data from above 30 studies reporting deaths in hospitalised RSV positive cases and assuming that proportion of RSV positive in those not tested is same as in those tested– 1.6 (1.0 to 2.5) (B)

Adjustment factor to account for this assumption = B/A = 1.07

*Supplementary table 27: hCFR sensitivity analysis assuming that all deaths in untested ALRI cases are RSV positive*

| Location (reference) | % of eligible cases not tested for RSV | CFR of tested ALRI (%) | CFR of untested ALRI (%) - a | No. of untested ALRI - b | Deaths in RSV-tested ALRI - f | Cases of RSV-tested ALRI - g | CFR in RSV-tested ALRI (%) - h | Deaths in RSV untested ALRI - j[†] | Adjusted CFR in RSV-ALRI (%) - i |
|---|---|---|---|---|---|---|---|---|---|
| **Kilifi, Kenya (PERCH, unpublished)** | 0.3 (2/634) | 4.9 | 100.0 | 2 | 6 | 150 | 4.00 | 2 | 5.26 |
| **Iquique, Chile (Fasce, unpublished)** | 0.6 (4/683) | 0.4 | 0.0 | 4 | 2 | 237 | 0.84 | 0 | 0.83 |
| **Buenos Aires, Argentina (Polack, unpublished)** | 0.9 (30/3371) | 1.3 | 43.3 | 30 | 24 | 2167 | 1.11 | 13 | 1.68 |
| **Gauteng province, South Africa (Cohen, unpublished)** | 2 (122/6016) | 0.8 | 2.5 | 122 | 8 | 1693 | 0.47 | 3 | 0.61 |
| **Manhiça, Mozambique (Bassat, unpublished)** | 3.1 (15/491) | 2.5 | 13.3 | 15 | 0 | 68 | 0.00 | 2 | 2.41 |
| **Klerksdorp site, South Africa (Cohen, unpublished)** | 3.2 (30/932) | 2.1 | 0.0 | 30 | 3 | 202 | 1.49 | 0 | 1.29 |
| **Tone District, Togo (Gessner, unpublished)** | 3.2 (4/124) | 0.0 | 66.7 | 3 | 0 | 15 | 0.00 | 2 | 11.11 |

[†] Assume all deaths in untested ALRI cases are RSV positive; h=f/g*100; i=(f+j)/(g+b)*100

| Location (reference) | % of eligible cases not tested for RSV | CFR of tested ALRI (%) | CFR of untested ALRI (%) - a | No. of untested ALRI - b | Deaths in RSV-tested ALRI - f | Cases of RSV-tested ALRI - g | CFR in RSV-tested ALRI (%) - h | Deaths in RSV untested ALRI - j[†] | Adjusted CFR in RSV-ALRI (%) - i |
|---|---|---|---|---|---|---|---|---|---|
| **Concepcion, Chile (Fasce, unpublished)** | 3.3 (16/481) | 0.4 | 0.0 | 16 | 1 | 201 | 0.50 | 0 | 0.46 |
| **Manhiça, Mozambique (Bassat, unpublished)** | 3.4 (28/835) | 9.3 | 25.0 | 28 | 1 | 49 | 2.04 | 7 | 10.39 |
| **Mpumalanga, South Africa (Cohen, unpublished)** | 4 (52/1310) | 6.1 | 21.2 | 52 | 6 | 268 | 2.24 | 11 | 5.31 |
| **Western Gambia (Howie, unpublished)** | 4.2 (4/95) | 3.3 | 0.0 | 100 | 0 | 16 | 0.00 | 0 | 0.00 |
| **KwaZulu-Natal province, South Africa (Cohen, unpublished)** | 4.5 (72/1607) | 0.7 | 1.4 | 72 | 0 | 431 | 0.00 | 1 | 0.20 |
| **Soweto, South Africa (Madhi, unpublished)** | 4.6 (240/5231) | 5.5 | 22.5 | 240 | 14 | 863 | 1.62 | 54 | 6.17 |
| **CEMIC, Buenos Aires, Argentina (Echavarria, unpublished)** | 5.3 (3/57) | 0.0 | 0.0 | 3 | 0 | 21 | 0.00 | 0 | 0.00 |
| **Santa Rosa, Guatemala (McCracken, unpublished)** | 5.8 (104/1810) | 5.2 | 1.9 | 104 | 15 | 505 | 2.97 | 2 | 2.79 |

| Location (reference) | % of eligible cases not tested for RSV | CFR of tested ALRI (%) | CFR of untested ALRI (%) - a | No. of untested ALRI - b | Deaths in RSV-tested ALRI - f | Cases of RSV-tested ALRI - g | CFR in RSV-tested ALRI (%) - h | Deaths in RSV untested ALRI - j[†] | Adjusted CFR in RSV-ALRI (%) - i |
|---|---|---|---|---|---|---|---|---|---|
| **Basse Santa Su, Gambia (PERCH, unpublished)** | 7.2 (46/638) | 2.9 | 10.9 | 46 | 0 | 114 | 0.00 | 5 | 3.13 |
| **Bamako, Mali (PERCH, unpublished)** | 9.1 (61/674) | 14.5 | 21.3 | 61 | 4 | 156 | 2.56 | 13 | 7.83 |
| **41 sites in Netherlands (Bont, unpublished)** | 10 (24/241) | 0.0 | 0.0 | 24 | 0 | 156 | 0.00 | 0 | 0.00 |
| **Lusaka, Zambia (PERCH, unpublished)** | 10.5 (65/617) | 18.1 | 26.2 | 65 | 6 | 103 | 5.83 | 17 | 13.69 |
| **Quetzaltenango, Guatemala (McCracken, unpublished)** | 10.9 (207/1893) | 2.7 | 0.0 | 207 | 8 | 628 | 1.27 | 0 | 0.96 |
| **Buenos Aires, Argentina (Gentile, unpublished)** | 12.9 (1361/10581) | 2.0 | 1.6 | 1361 | 65 | 3590 | 1.81 | 22 | 1.76 |
| **Paarl, South Africa (Zar, unpublished)** | 16.4 (21/128) | 0.9 | 4.8 | 21 | 0 | 28 | 0.00 | 1 | 2.04 |
| **Nakhon Phanom and Sa Kaeo, Thailand (PERCH,** | 18.3 (41/224) | 1.1 | 2.4 | 41 | 0 | 50 | 0.00 | 1 | 1.10 |

| Location (reference) | % of eligible cases not tested for RSV | CFR of tested ALRI (%) | CFR of untested ALRI (%) - a | No. of untested ALRI - b | Deaths in RSV-tested ALRI - f | Cases of RSV-tested ALRI - g | CFR in RSV-tested ALRI (%) - h | Deaths in RSV untested ALRI - j[†] | Adjusted CFR in RSV-ALRI (%) - i |
|---|---|---|---|---|---|---|---|---|---|
| **unpublished)** | | | | | | | | | |
| **Kilifi hospital study, Kenya (Nokes, unpublished)** | 24.4 (2817/11544) | 5.2 | 32.7 | 2817 | 31 | 1428 | 2.17 | 922 | 22.45 |
| **Bondo district, Kenya (Feikin, unpublished)** | 28.7 (208/726) | 5.2 | 10.1 | 208 | 1 | 66 | 1.52 | 21 | 8.03 |
| **Lombok, Indonesia (Gessner, unpublished)** | 28.9 (1500/5198) | 2.2 | 33.1 | 1500 | 13 | 741 | 1.75 | 497 | 22.76 |
| **Tagbilaran and 6 rural sites, Philippines (Lucero, unpublished)** | 36.0 (537/1491) | 0.5 | 2.2 | 537 | 2 | 357 | 0.56 | 12 | 1.57 |
| **Belo Horizonte, Brazil (Oliveira, unpublished)** | 59.4 (757/1275) | 1.2 | 1.3 | 757 | 2 | 152 | 1.32 | 10 | 1.32 |
| **Lwak, Kenya (Montgomery, unpublished)** | 72.4 (1231/1701) | 3.4 | 2.5 | 1231 | 4 | 101 | 3.96 | 31 | 2.63 |

| Location (reference) | % of eligible cases not tested for RSV | CFR of tested ALRI (%) | CFR of untested ALRI (%) - a | No. of untested ALRI - b | Deaths in RSV-tested ALRI - f | Cases of RSV-tested ALRI - g | CFR in RSV-tested ALRI (%) - h | Deaths in RSV untested ALRI - j[†] | Adjusted CFR in RSV-ALRI (%) - i |
|---|---|---|---|---|---|---|---|---|---|
| **Sa Kaeo and Nakhon Phanom, Thailand (Thamthitiwat, unpublished)** | 75.0 (14334/19103) | 0.0 | 0.0 | 14334 | 0 | 795 | 0.00 | 0 | 0.00 |

hCFR meta-estimate in children aged 0-59m from developing countries using data from above 30 studies reporting deaths in hospitalised RSV positive cases – 1.5 (0.9 to 2.3) (A)

hCFR meta-estimate in children aged 0-59m from developing countries using data from above 30 studies reporting deaths in hospitalised RSV positive cases and assuming that all deaths in untested ALRI are RSV positive – 2.1 (1.2 to 3.5) (B)

Adjustment factor to account for this assumption = B/A = 1.4

*Supplementary table 28: Sensitivity analysis of in-hospital mortality estimates in developing countries from a sub-set of 22 studies reporting data by narrow age bands through the first year of life*

| Age group | 0-27 days | 28 days - <3 months | 3-5 months | 6-8 months | 9-11 months | 12-23 months | 24-59 months | Overall |
|---|---|---|---|---|---|---|---|---|
| **CFR** | 5.3 (2.8-9.8) | 2.1 (1.6-2.9) | 2.2 (1.6-3.0) | 2.8 (1.9-4.1) | 3.0 (1.9-4.8) | 1.7 (1.0-2.7) | 4.0 (2.5-6.5) | -- |
| **No. of deaths** | 8600 (3700-20400) | 11400 (6500-19700) | 13700 (7800-24400) | 10200 (5800-18100) | 10200 (5300-19700) | 9900 (5800-17100) | 13900 (7500-25700) | 81200 (64200-103400) |

*Supplementary table 29: Sensitivity analysis for in-hospital CFR for RSV-ALRI after excluding studies with <50 RSV cases*

| | | 0-5m | 6-11 m | 12-59 m |
|---|---|---|---|---|
| | No. of studies | CFR | CFR | CFR |
| **Low income** | 4 | 1.7 (0.4-6.8) | 5.6 (0.8-39.4) | 4.8 (0.7-33.8) |
| **Lower middle income** | 13 | 2.7 (2.0-3.6) | 2.8 (1.8-4.4) | 2.7 (1.7-4.3) |
| **Upper middle income** | 9 | 1.8 (1.2-2.6) | 2.4 (1.1-5.4) | 0.5 (0.1-3.5) |
| **High income** | 5 | 0.2 (0.0-14.3) | 0.9 (0.2-4.3) | 0.7 (0.1-5.4) |
| | | | | |
| **Developing** | 29 | 2.2 (1.8-2.7) | 2.28 (1.7-3.0) | 2.2 (1.6-3.0) |
| **Industrialised** | 2 | 0.02 (0.0-0.1) | 0.05 (0.01-0.4) | 0.1 (0.03-0.3) |

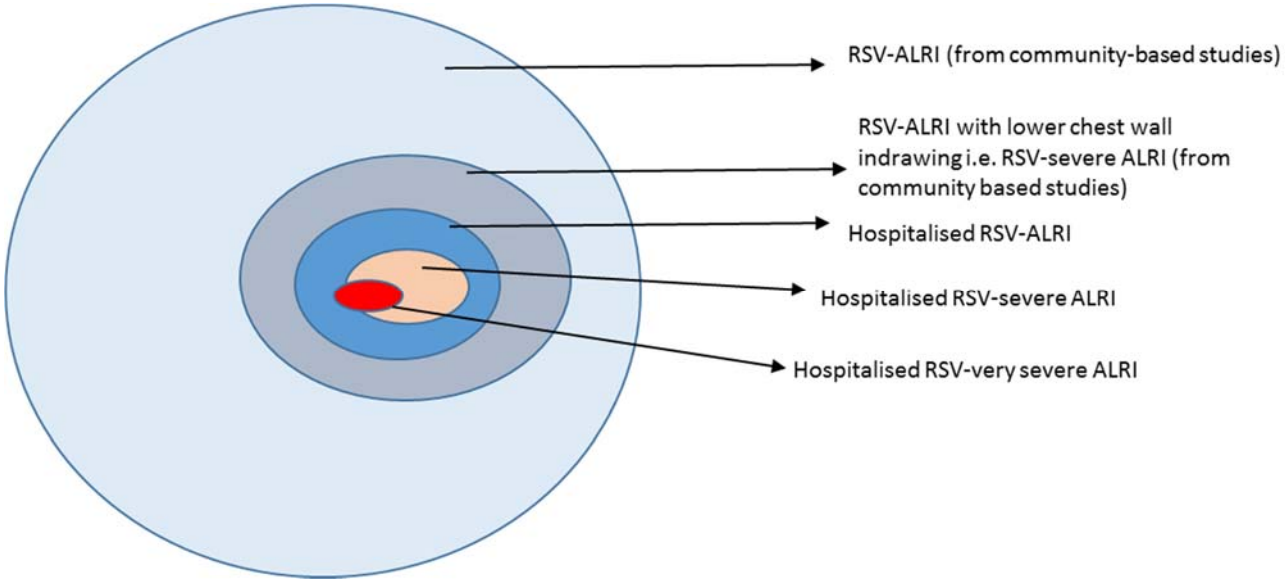
*Supplementary table 30: Sensitivity analysis for in-hospital CFR for RSV-ALRI after excluding studies with <100 RSV cases*

| | | 0-5m | 6-11 m | 12-59 m |
|---|---|---|---|---|
| | No. | CFR | CFR | CFR |
| **Low income** | 3 | 1.7 (0.4-6.8) | 5.6 (0.8-39.4) | 4.8 (0.7-33.8) |
| **Lower middle income** | 11 | 2.8 (2.0-3.8) | 2.7 (1.7-4.2) | 2.7 (1.7-4.3) |
| **Upper middle income** | 8 | 1.8 (1.2-2.6) | 2.4 (1.1-5.4) | 0.5 (0.1-3.5) |
| **High income** | 5 | 0.2 (0.0-14.3) | 0.9 (0.2-4.3) | 0.7 (0.1-5.4) |
| | | | | |
| **Developing** | 25 | 2.2 (1.8-2.7) | 2.2 (1.7-3.0) | 2.2 (1.6-3.0) |
| **Industrialised** | 2 | 0.02 (0.00-0.13) | 0.05 (0.01-0.38) | 0.1 (0.03-0.3) |

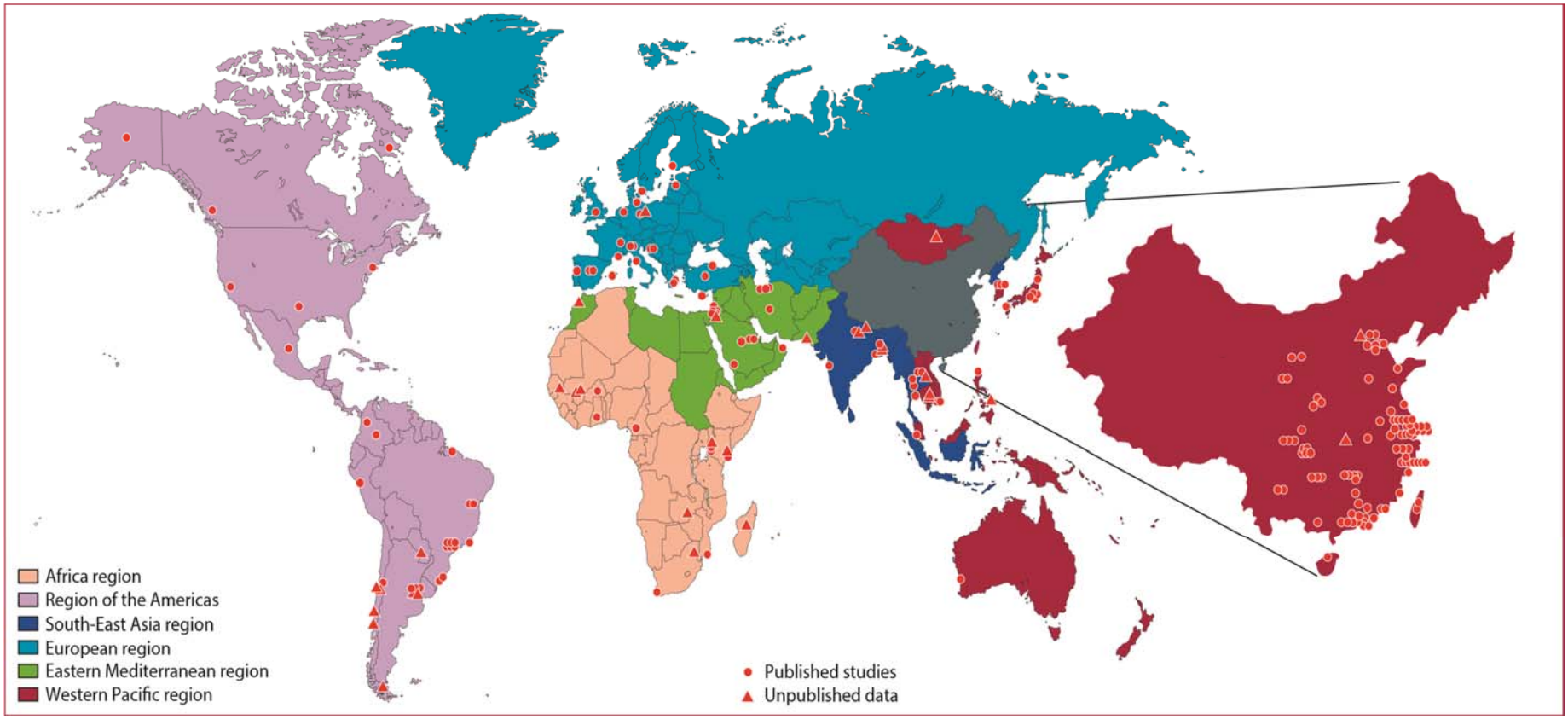
*Supplementary table 31: Definition of hypoxemia in included studies*

| Location (reference) | Prop of RSV cases with recorded SpO2 (%) | Definition of hypoxemia |
|---|---|---|
| Matlab, Bangladesh (PERCH) | 100.00 | SpO2 <90% or based on supplemental oxygen at altitude ≤2500 m |
| Basse, Gambia (PERCH) | 100.00 | SpO2 <90% or based on supplemental oxygen at altitude ≤2500 m |
| Santa Rosa, Guatemala (McCracken and colleagues) | 93.00 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m |
| Dhaka, Bangladesh (PERCH) | 100.00 | SpO2 <90% or based on supplemental oxygen at altitude ≤2500 m |
| Tacloban, Philippines (Lupisan and colleagues) | 100.00 | SpO2 <90% (at altitude ≤2500 m) in children aged 1-59 months and <88% for neonates |
| Kilifi hospital study, Kenya (Nokes and colleagues) | 99.93 | SpO2 <90% for all at altitude ≤2500 m |
| Bondo district, Kenya (Feikin and colleagues) | 100.00 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m (at sea level) |
| Rabat, Morocco (Bassat and colleagues) | 93.38 | SpO2 <90% for all at altitude ≤2500 m |
| Nakhon Phanom and Sa Kaeo, Thailand (PERCH) | 100.00 | SpO2 <90% or based on supplemental oxygen at altitude ≤2500 m |
| David City, Panama (Jara and colleagues) | 71.86 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m (at sea level) |
| Berlin, Germany (Rath and colleagues) | 78.11 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤0.942500 m |
| Soweto, South Africa (Madhi and colleagues) | 99.65 | SpO2 <90% for 1-59 months |
| Kilifi, Kenya (PERCH) | 100.00 | SpO2 <90% or based on supplemental oxygen at altitude ≤2500 m |
| Lusaka, Zambia (PERCH) | 97.09 | SpO2 <90% or based on supplemental oxygen at altitude ≤2500 m |
| Bamako, Mali (PERCH) | 100.00 | SpO2 <90% or based on supplemental oxygen at altitude ≤2500 m |
| Manhiça, Mozambique (Bassat and colleagues) | 100.00 | SpO2 <90% for all at altitude ≤2500 m |
| Damanhour, Egypt [10] | 27.41 | SpO2 <90% for all at altitude ≤2500 m |
| Sa Kaeo and Nakhon Phanom, Thailand (Thamthitiwat and colleagues) | 51.95 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m (at sea level) |
| Buenos Aires, Argentina (Gentile and colleagues) | 99.94 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m (at sea level) |
| Colorado, USA (Simoes and colleagues) | 100.00 | ICD-9 codes |
| Maela Camp, Tak Province, Thailand (Turner and colleagues) | 93.02 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m (at sea level) |

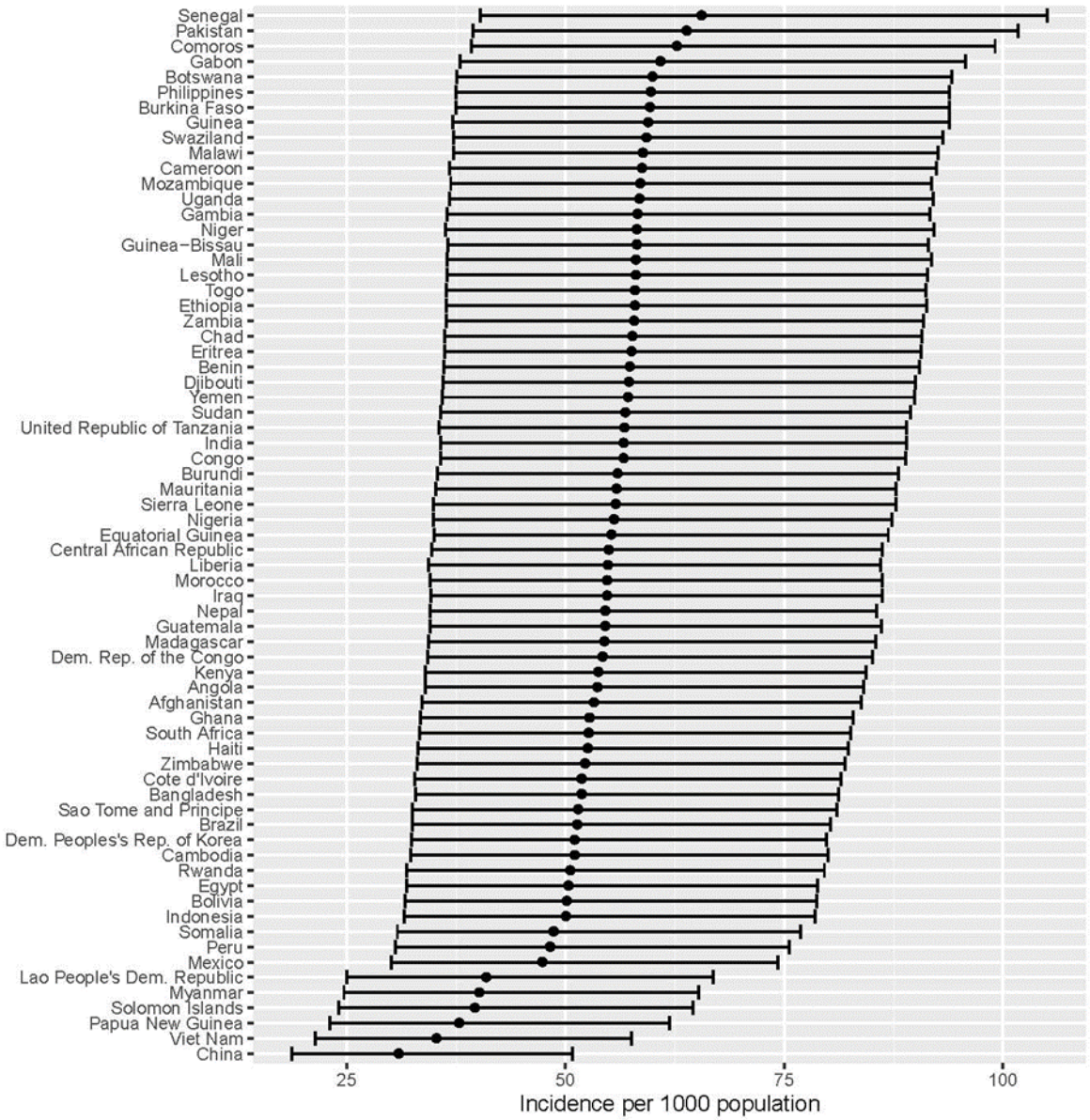
| | | |
|---|---|---|
| Tagbilaran and Dauis, Philippines (Lucero and colleagues) | NA | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m (at sea level) |
| Alaska, USA (Singleton and colleagues)# | 100.00 | SpO2 <90% for all at altitude ≤2500 m |
| Lombok, Indonesia (Gessner and colleagues) | 99.19 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m (at sea level) |
| Amman, Jordan (Khuri and colleagues) | 100.00 | SpO2 <90% for all at altitude ≤2500 m |
| Paarl, South Africa (Zar and colleagues) | 92.86 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m |
| Buenos Aires, Argentina (Polack and colleagues) | 98.71 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m |
| Navajo and WMA, USA - EPI (O'Brien and colleagues)# | 92.05 | SpO2 <90% for 1-59 months and <88% for neonates at altitude ≤2500 m (at sea level) |



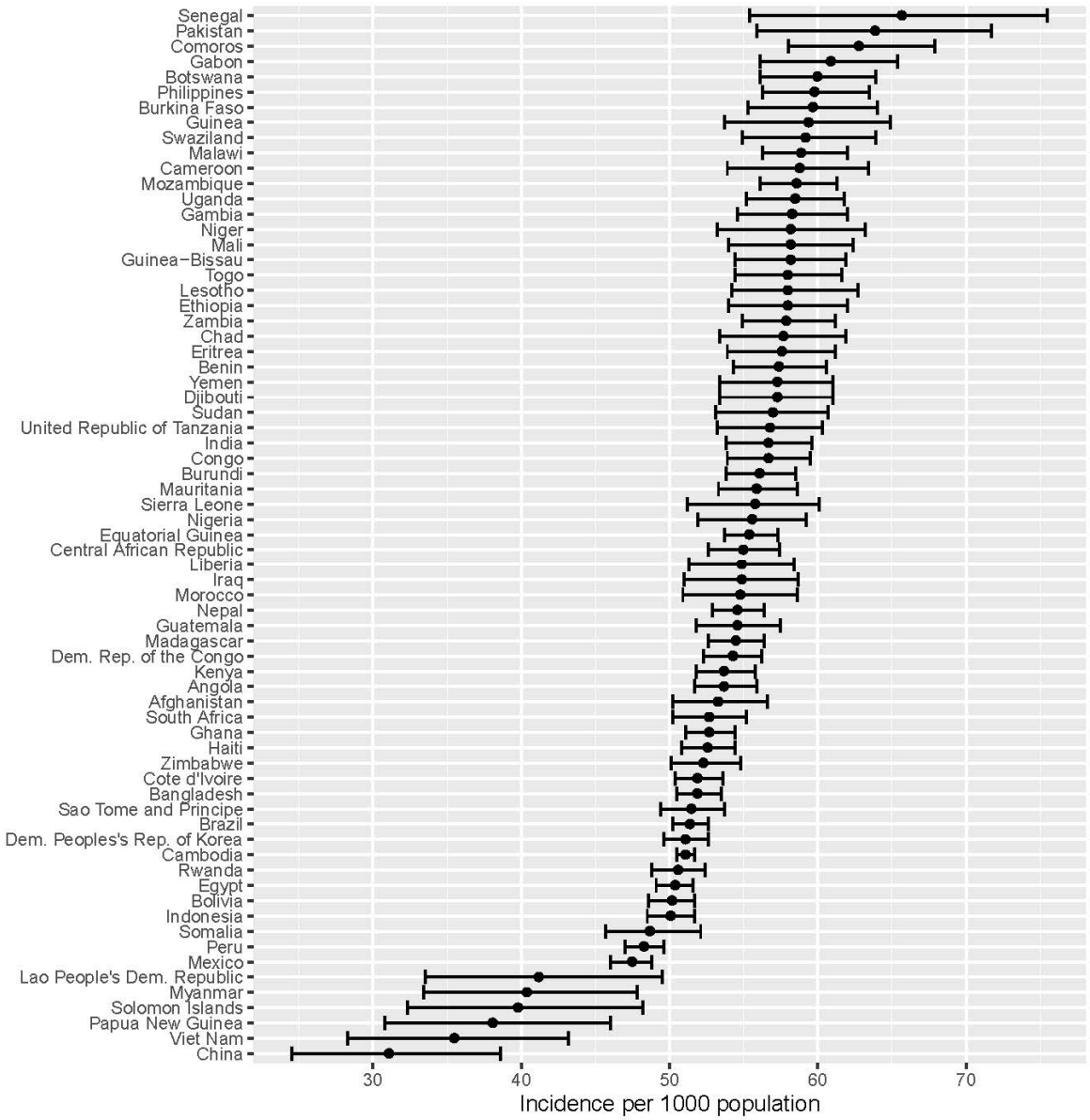

***Supplementary figure 1: Conceptual diagram showing how the various categories of disease severity relate to each other***




*Supplementary figure 2: Location of hospital-based studies reporting proportion of ALRI cases positive for RSV*

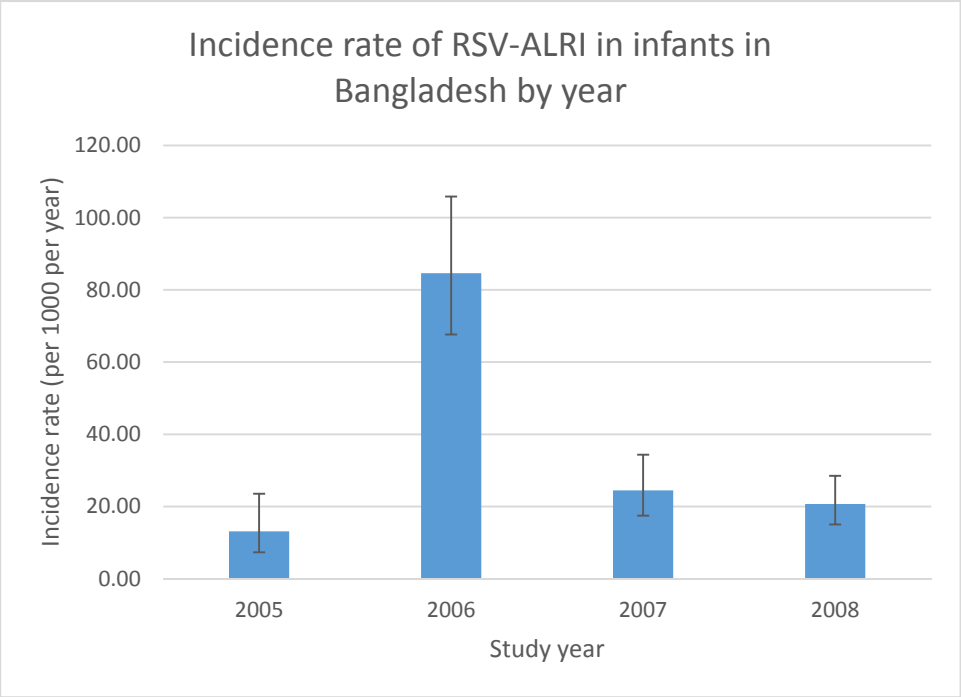


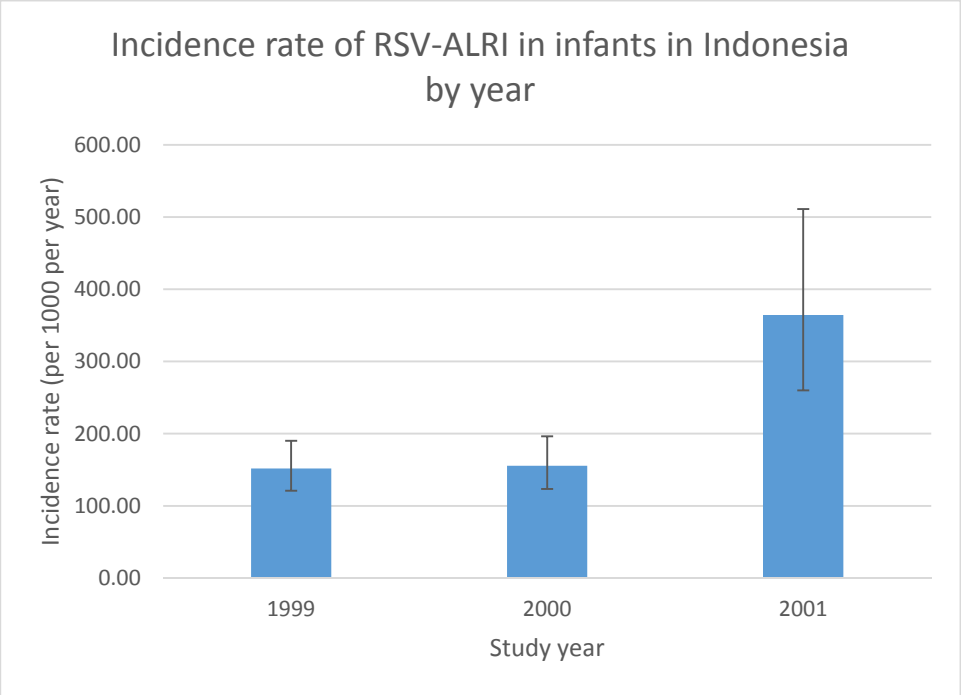

*Supplementary figure 3: Incidence of RSV-associated ALRI (per 1000 children aged under 5 years per year) in 69 countdown countries*

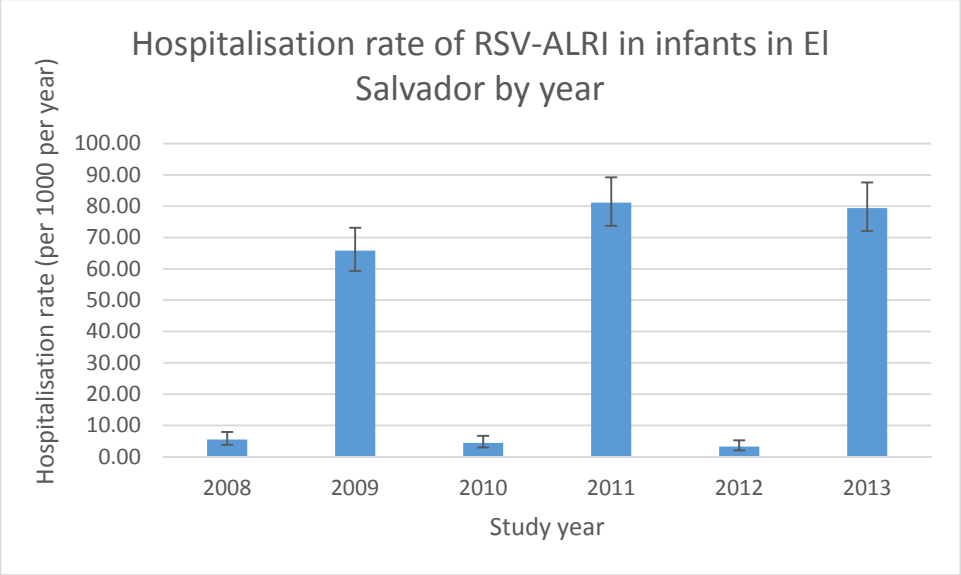


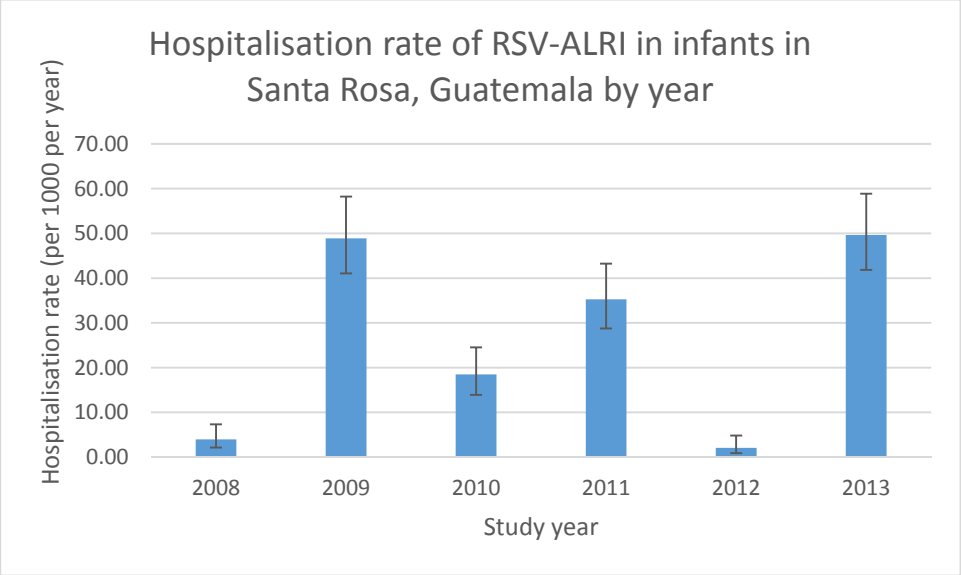

*Supplementary figure 4: Incidence of RSV-associated ALRI (per 1000 children younger than 5 years per year) in 69 countdown countries if there were no uncertainty in meta-estimates of incidence of RSV-associated ALRI in developing countries*

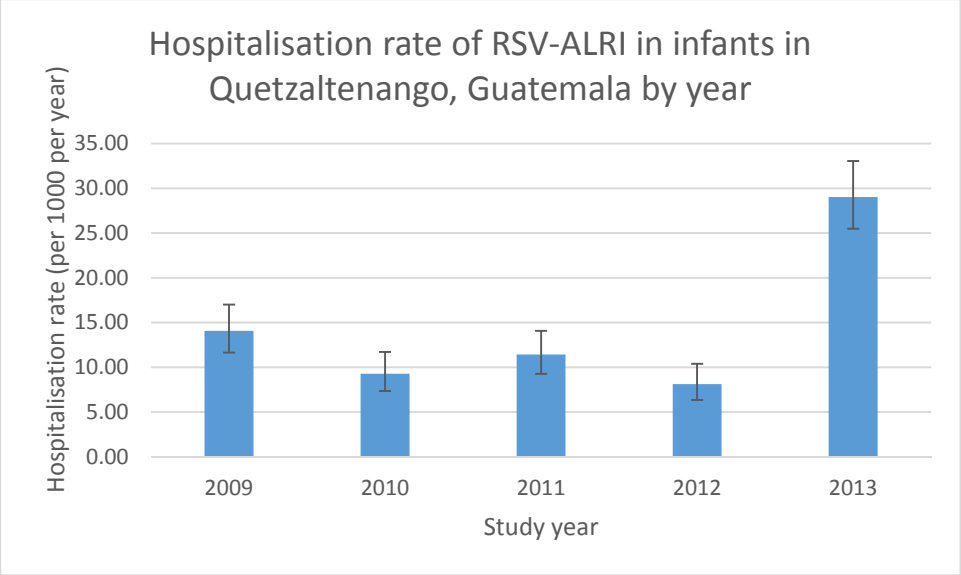
***Supplementary figure 5: Annual variation in the incidence and hospitalisation rates for RSV-associated ALRI among children aged below 5 years at various locations across the world***

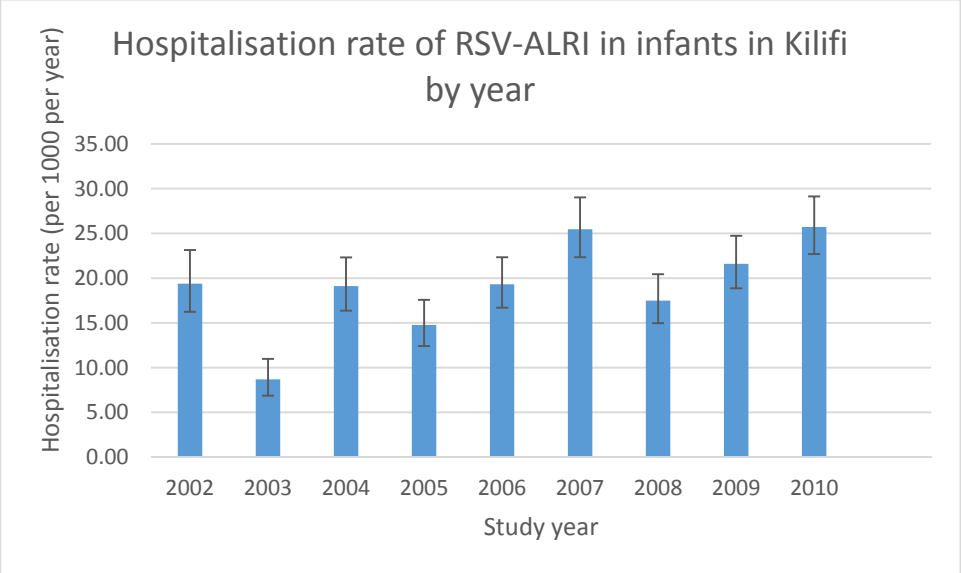


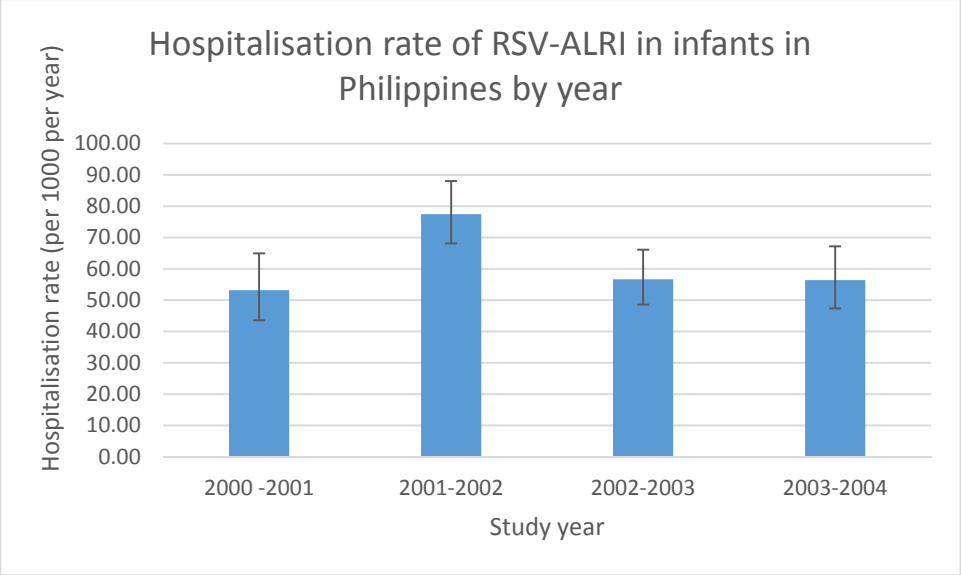



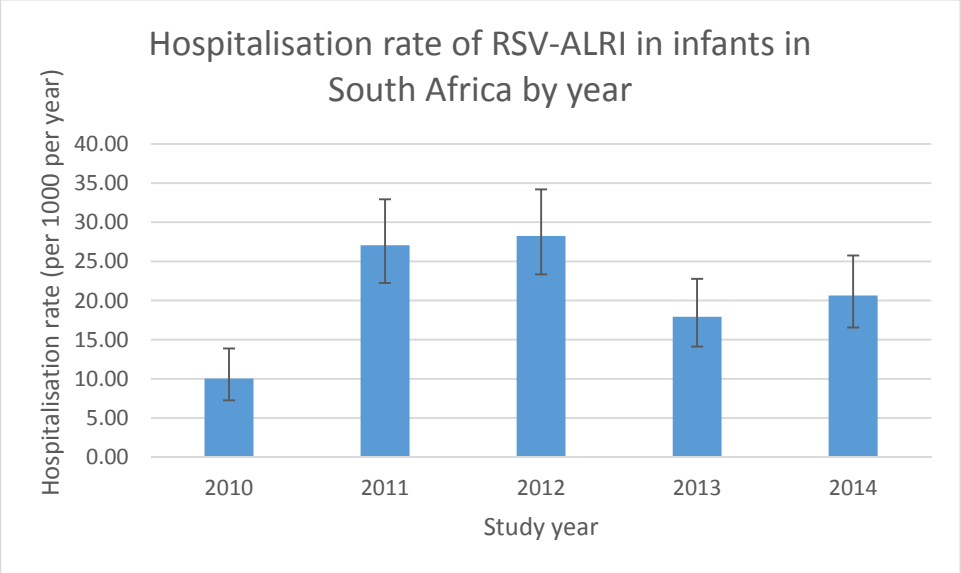

Hospitalisation rate of RSV-ALRI in infants in El Salvador by year
Hospitalisation rate (per 1000 per year)
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
2008
2009
2010
2011
2012
2013
Study year

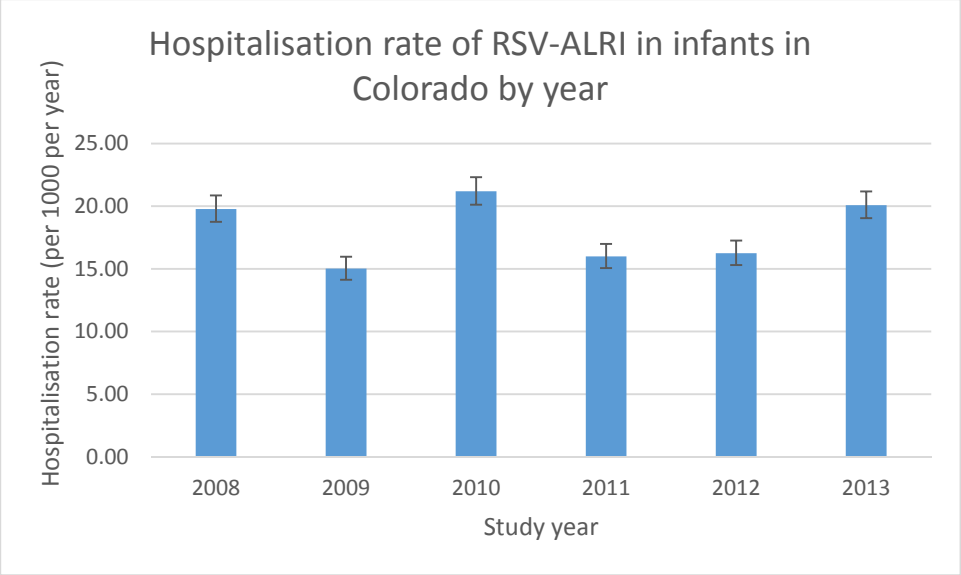

Hospitalisation rate of RSV-ALRI in infants in Santa Rosa, Guatemala by year
Hospitalisation rate (per 1000 per year)
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
2008
2009
2010
2011
2012
2013
Study year

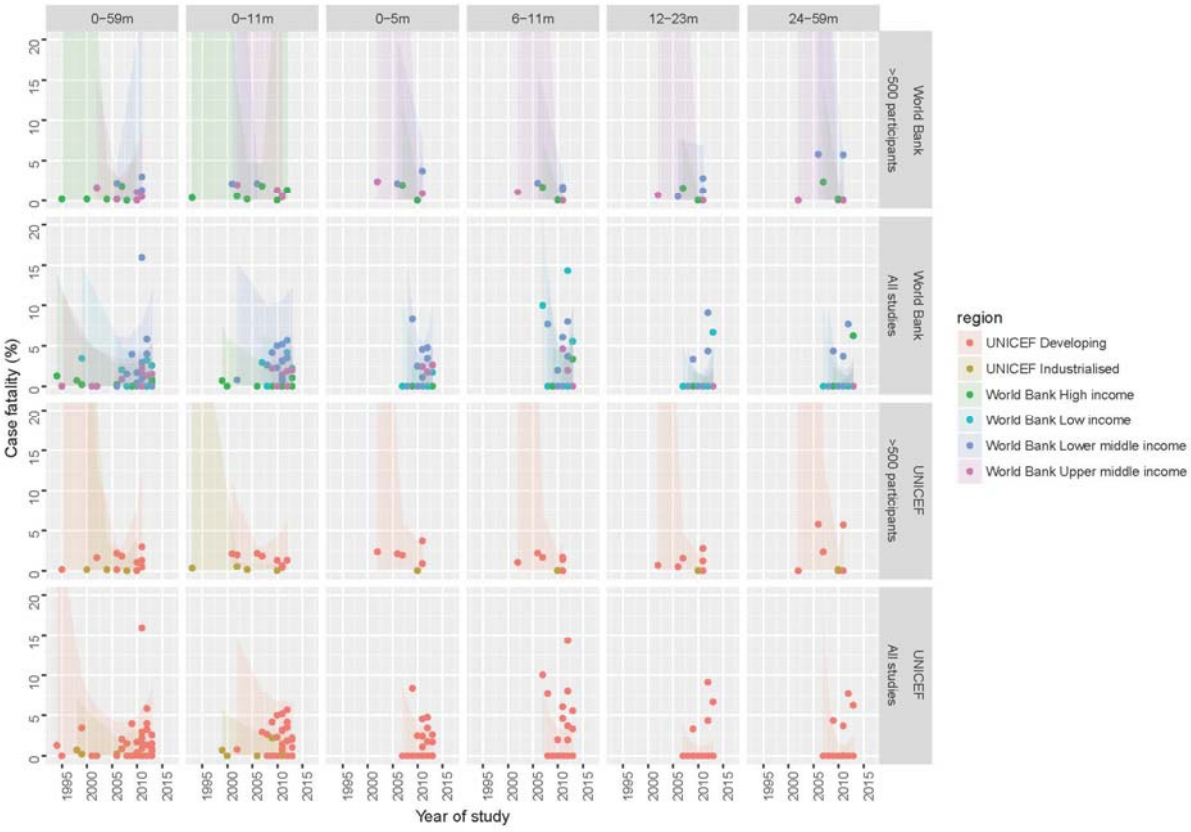

Hospitalisation rate of RSV-ALRI in infants in Quetzaltenango, Guatemala by year
Hospitalisation rate (per 1000 per year)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2009
2010
2011
2012
2013
Study year


Hospitalisation rate of RSV-ALRI in infants in Kilifi by year
Hospitalisation rate (per 1000 per year)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2002
2003
2004
2005
2006
2007
2008
2009
2010
Study year


Hospitalisation rate of RSV-ALRI in infants in Philippines by year
Hospitalisation rate (per 1000 per year)
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
2000 -2001
2001-2002
2002-2003
2003-2004
Study year


Hospitalisation rate of RSV-ALRI in infants in South Africa by year
Hospitalisation rate (per 1000 per year)
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
2010
2011
2012
2013
2014
Study year


Hospitalisation rate of RSV-ALRI in infants in Colorado by year
Hospitalisation rate (per 1000 per year)
25.00
20.00
15.00
10.00
5.00
0.00
2008
2009
2010
2011
2012
2013
Study year




*Supplementary figure 6: Trends in in-hospital case fatality ratio for RSV-associated ALRI in children younger than 5 years, by age group and by region*

**Checklist of information that should be included in new reports of global health estimates**

| Item # | Checklist item | Reported on page # |
|---|---|---|
| **Objectives and funding** | | |
| **1** | Define the indicator(s), populations (including age, sex, and geographic entities), and time period(s) for which estimates were made. | 2 |
| **2** | List the funding sources for the work. | 12 |
| **Data Inputs** | | |
| *For all data inputs from multiple sources that are synthesized as part of the study:* | | |
| **3** | Describe how the data were identified and how the data were accessed. | 2 |
| **4** | Specify the inclusion and exclusion criteria. Identify all ad-hoc exclusions. | 2 |
| **5** | Provide information on all included data sources and their main characteristics. For each data source used, report reference information or contact name/institution, population represented, data collection method, year(s) of data collection, sex and age range, diagnostic criteria or measurement method, and sample size, as relevant. | 13-38 in supplementary material |
| **6** | Identify and describe any categories of input data that have potentially important biases (e.g., based on characteristics listed in item 5). | 3 |
| *For data inputs that contribute to the analysis but were not synthesized as part of the study:* | | |
| **7** | Describe and give sources for any other data inputs. | 2 |
| *For all data inputs:* | | |
| **8** | Provide all data inputs in a file format from which data can be efficiently extracted (e.g., a spreadsheet rather than a PDF), including all relevant meta-data listed in item 5. For any data inputs that cannot be shared because of ethical or legal reasons, such as third-party ownership, provide a contact name or the name of the institution that retains the right to the data. | Can be accessed from the web link- is http://datashare.is.ed.ac.uk/handle/10283/2115 |
| **Data analysis** | | |
| **9** | Provide a conceptual overview of the data analysis method. A diagram may be helpful. | 4 |
| **10** | Provide a detailed description of all steps of the analysis, including mathematical formulae. This description should cover, as relevant, data cleaning, data pre-processing, data adjustments and weighting of data sources, and mathematical or statistical model(s). | 3-4 |
| **11** | Describe how candidate models were evaluated and how the final model(s) were selected. | 3-4 |
| **12** | Provide the results of an evaluation of model performance, if done, as well as the results of any relevant sensitivity analysis. | 9 |
| **13** | Describe methods for calculating uncertainty of the estimates. State which sources of uncertainty were, and were not, accounted for in the uncertainty analysis. | 3, 9-11 |
| **14** | State how analytic or statistical source code used to generate estimates can be accessed. | 3 |
| **Results and Discussion** | | |
| **15** | Provide published estimates in a file format from which data can be efficiently extracted. | Page 7-9 in published article and pages 41-48, 58-61 in supplementa |

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