**SUPPLEMENTARY MATERIAL**

**Appendix**

*Data collection for selection of prior distributions*

From 2005, blood culture results were available for a portion of the patients captured in pneumonia surveillance; cultures were obtained at clinician discretion. An ALRI case with a CXR performed was considered confirmed pneumonia if *Streptococcus pneumoniae, Klebsiella pneumoniae, Haemophilus influenzae, Staphylococcus aureus, Streptococcus pyogenes or Mycobacterium tuberculosis* complexwere isolated from the blood.

From 2012 to 2014, a study on the etiology of pneumonia in children <5 years, the Pneumonia Etiology Research for Child Health (PERCH) was conducted at the provincial hospitals in Sa Kaeo and Nakhon Phanom provinces. Children who met the PERCH definition for pneumonia [[1](#_ENREF_19), [2](#_ENREF_20)] were enrolled in this study and had CXRs read by a separate panel of radiologists trained in the WHO’s standardized interpretation of paediatric chest radiographs for the diagnosis of pneumonia [[3](#_ENREF_21)]. Children <5 years were diagnosed with radiographically-confirmed pneumonia if the CXR was interpreted as having primary endpoint pneumonia or other infiltrate or both. Each CXR was read by two readers (one radiologist, one paediatrician), and if there was disagreement between these readers it went to an arbitration panel; 10% of CXRs with agreement between readers were also reviewed by the arbitration panel.

*Method*

We incorporated data from four sources to estimate prior sensitivity and specificity for clinician readings and radiology panel readings:

1. Past literature: one radiologist sensitivity of 0.533-0.761 [[4](#_ENREF_6)], two radiologist sensitivity of 0.65 [[5](#_ENREF_22)] and specificity of 0.802-0.897 [[4](#_ENREF_6)]; a clinician sensitivity of 0.563-0.791 [[4](#_ENREF_6)] and specificity of 0.778-0.878 [[4](#_ENREF_6)].
2. Blood culture-confirmed cased were defined as true positives for radiographically-confirmed pneumonia, the sensitivity for radiology panels was 0.71 and 0.69 for clinicians.
3. Blood culture-confirmed cased were defined as true positives for radiographically-confirmed pneumonia, the sensitivity for radiology panels was 0.71 and 0.69 for clinicians.
4. Data from parallel study: we compared CXR interpretations from the separate PERCH radiology panel with our panel of radiologists’ readings for patients enrolled in the PERCH study to estimate our radiology panel’s sensitivity (0.73) and specificity (0.77).
5. Expert opinion: a possible lower specificity of CXR –confirmed pneumonia diagnosis from clinicians compared to a radiology panel

From these sources, we summarized the plausible ranges for sensitivities and specificities of radiology panel and clinicians (Table 1). Lastly we compared our range of prior estimates to the sensitivity and specificity estimated by Williams et al [[6](#_ENREF_9)] which used LCA to estimate sensitivity and specificity of radiologist readings of CXR to detect radiographic consolidation. Consolidation, the presence of dense opacity in a portion or whole of a lobe or of the entire lung, should be more obvious on chest radiograph than other radiographic indications of pneumonia. Our range of prior estimates was slightly lower than those calculated for consolidation by Williams et al (Supplementary Table S1), providing additional confidence in our selection of prior estimate parameters.

Supplementary Table S1: Prior selection source for sensitivities and specificities of radiology panel and clinician by chest radiograph (CXR)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Surveillance, Thailand** | **PERCH**§**, Thailand [**[**1**](#_ENREF_19)**]** | **Bettenay et al [**[**5**](#_ENREF_22)**], Australia** | **Kramer et al [**[**4**](#_ENREF_6)**], Canada** | **Williams et al [**[**6**](#_ENREF_9)**], Australia** |
| **Panel Radiologist sensitivity** | 0.71 | 0.73 | 0.65 | 0.533-0.761 | 0.76-0.86 |
| **Panel Radiologist specificity** |  | 0.77 |  | 0.802-0.897 | 0.90-0.92 |
| **Clinician sensitivity** | 0.69 |  |  | 0.563-0.791 | 0.66-0.81 |
| **Clinician specificity** |  |  |  | 0.778-0.878 | 0.97-0.99 |
| **Comparator** | Blood culture isolated pathogens\* | PERCH Panel radiologists | Laboratory confirmed pathology | ‘blinded’ paediatric radiologist | None |

\* *Streptococcus pneumoniae, Klebsiella pneumoniae, Haemophilus influenzae, Staphylococcus aureus, Streptococcus pyogenes or M. tuberculosis complex*

§ Pneumonia Etiology Research for Child Health (PERCH)

Supplementary table S2: Demographic, clinical characteristics and patient outcomes of chest radiograph (CXR) performed pneumonia hospitalization included and excluded in the analysis, Thailand, 2005-2010.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Age <5 years (n=14799)** | | **Age ≥5 (n=29570)** | |
|  | Included  (n=9639) | Excluded  (n=5160) | Included  (n=16597) | Excluded  (n=12973) |
| **Age:**  **Median (IQR)** | 1 (0-2) | 1 (0-2) | 58 (37-72) | 59 (39-72) |
| **Male gender:**  **%** | 60% | 61% | 53% | 56% |
| **Temperature:**  **Mean (sd)** | 38 (1) | 38 (1) | 38 (1) | 38 (1) |
| **Respiratory rate:**  **Mean (sd)** | 42 (11) | 40 (12) | 26 (7) | 26 (11) |
| **White blood cell count:**  **Median (IQR)** | 12260 (9000-16330) | 12500 (8940-16760) | 10230 (7200-14220) | 10200 (7170-14265) |
| **Intubation:**  **%** | 2.3% | 2.8% | 10.3% | 12.9% |
| **Blood culture positive with pathogens\*:**  **%** | 2.2% | 3% | 5.5% | 7.3% |
| **Death:**  **%** | 0.5% | 0.7% | 9.6% | 11.4% |

\*: *Streptococcus pneumoniae, Klebsiella pneumoniae, Haemophilus influenzae, Staphylococcus aureus, Streptococcus pyogenes or M. tuberculosis complex*

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