

# Building a Prediction Model for Radiographically-Confirmed Pneumonia in Peruvian children: From Symptoms to Imaging

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## Objective

- We sought to assess the diagnostic value of clinical prediction models based on lung auscultation, pulse oximetry, and lung ultrasound to identify radiographically-confirmed clinical pneumonia in Peruvian children <5 years.

## Background

- Community-acquired pneumonia remains the leading cause of death in children worldwide<sup>1</sup>.
- Current diagnostic guidelines in resource-poor settings are neither sensitive nor specific<sup>2,3,4</sup>.

## Methods

- Children aged < 5 years with an acute respiratory illness presenting to a tertiary hospital in Lima, Peru were consecutively enrolled.
- The ability to predict radiographically-confirmed clinical pneumonia was assessed using logistic regression under four additive scenarios: reported symptoms and clinical signs only, addition of lung auscultation, addition of oxyhemoglobin saturation (SpO<sub>2</sub>), and addition of lung ultrasound.

## Results

- Of 832 children (mean age 21.3 months, 59% boys), 453 (54.6%) had clinical pneumonia and 221 (26%) were radiographically-confirmed.

### Classification of Radiographically-Confirmed Pneumonia

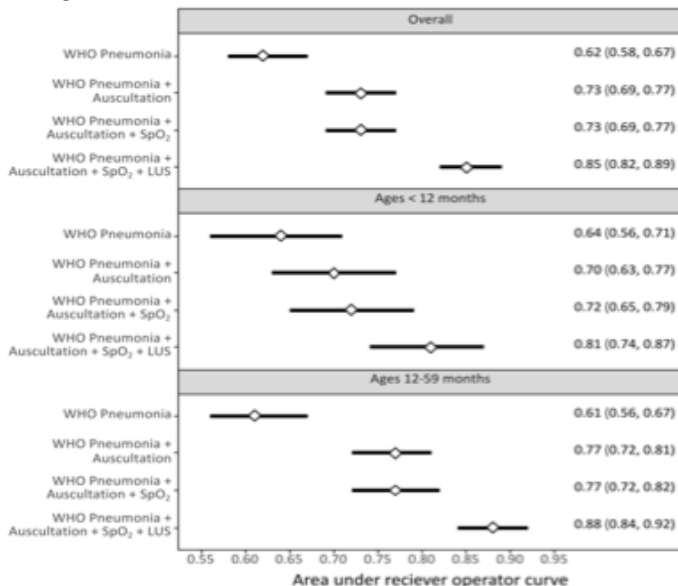
- The ability to correctly identify radiographically-confirmed clinical pneumonia using reported symptoms and clinical signs was limited (Area Under the Curve [AUC]= 0.62, 95% CI 0.58-0.66)(Figure 1).
- The addition of lung auscultation improved classification (0.73, 0.69-0.77), whereas the addition of SpO<sub>2</sub> did not (0.73, 0.69-0.77)(Figure 1).
- Adding lung ultrasound was associated with the largest improvement in classification (0.85, 0.81-0.88)(Figure 1).

## Acknowledgements

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## Results

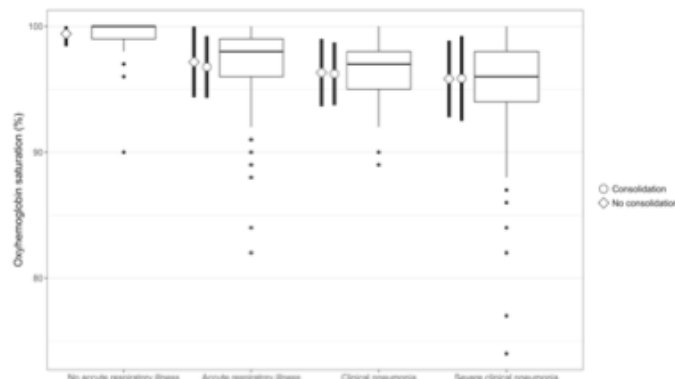
Figure 1. Area Under Curve for Each Additive Clinical Scenario



### Distribution of Oxyhemoglobin Saturation by Acute Respiratory Illness Status

- Children with radiographically-confirmed clinical pneumonia had a lower average SpO<sub>2</sub> than those without (95.9% vs. 96.6%; p<0.01)(Figure 2).

Figure 2. Oxyhemoglobin Saturation by Acute Respiratory Illness Status



## Conclusions

- WHO definition of pneumonia based on clinical symptoms and signs alone had poor discrimination for radiographically-confirmed clinical pneumonia among Peruvian children who presented with an acute respiratory illness
- The addition of lung ultrasound and auscultation to clinical signs and symptoms improved the ability to correctly classify radiographically-confirmed clinical pneumonia.
- While SpO<sub>2</sub> was significantly lower in children with pneumonia when compared to those who did not have pneumonia, it did not add value to other diagnostic tools to identify radiographically-confirmed clinical pneumonia

## References

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