

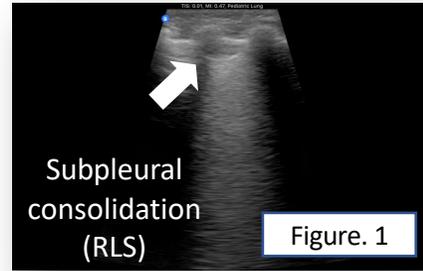
# CONCORDANCE BETWEEN CHEST X RAY (CXR) AND POINT OF CARE ULTRASOUND (POCUS) FINDINGS IN CHILDREN DIAGNOSED WITH RSV INFECTION BY NASOPHARYNGEAL RT-PCR: THE ZAMBIA EXPERIENCE

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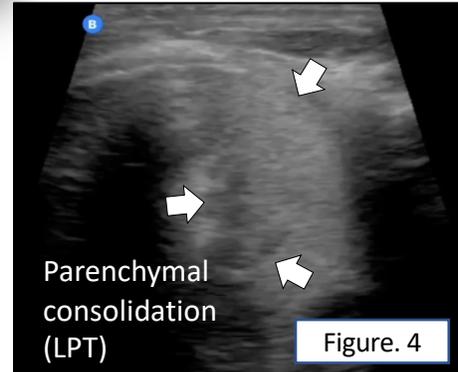
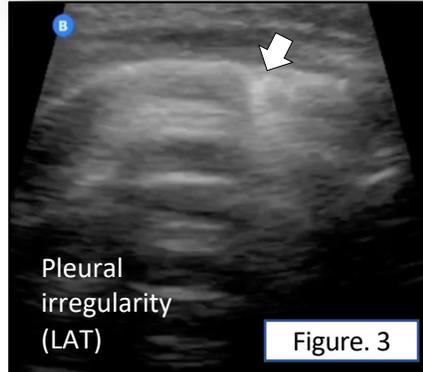
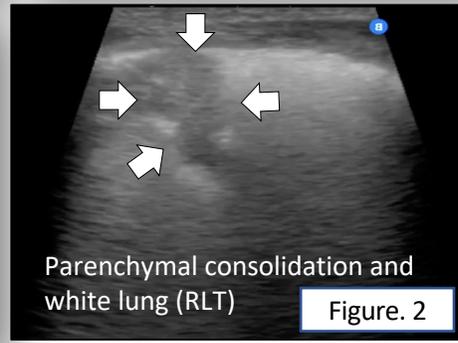
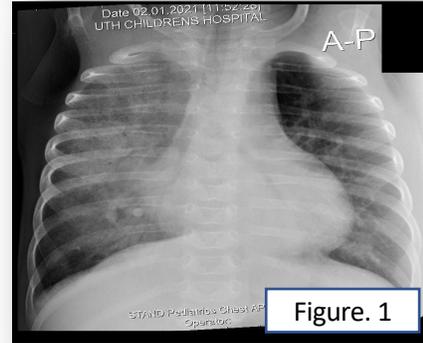
**Background:** Respiratory syncytial virus (RSV) pneumonia is a leading cause of infant mortality worldwide. RSV infection in resource-limited settings is usually diagnosed by CXR. POCUS is an alternative, non-radiating, easy to implement and interpret imaging modality in these settings. We aimed to compare CXR and POCUS imaging findings in children diagnosed with RSV using reverse transcriptase polymerase chain reaction (PCR) on nasopharyngeal (NP) samples.

**Methods:** 200 children ages 1-59 months with WHO-defined severe/very severe pneumonia were enrolled from the Emergency Department at University Teaching Hospital in Lusaka, Zambia. Demographic, clinical information, NP samples, a CXR and 12 lung POCUS images per patient were included. All CXR and POCUS images were adjudicated by two radiologists independently. They were masked to the correspondence between CXR, POCUS images and PCR status. Images were categorized as end point consolidation, no consolidation or normal on both, CXR and POCUS.

**Case 1.** Abnormal findings seen on POCUS (Fig. 1) with normal CXR (Fig. 2)



**Case 2.** CXR with hazy alveolar opacities in the right lung (bronchopneumonia) and LLL (retrocardiac) alveolar opacities (Fig. 1). POCUS shows abnormal findings corresponding to the abnormal interstitial patterns seen on CXR (Fig. 2,3,4)



**Results:** 20% of cases tested RSV+ by PCR (44/200; 22%). The median age of the RSV+ participants was 7 months (IQR: 2-12). 32 patients had abnormal findings on POCUS on the left side while only 26 demonstrated abnormal findings on CXR on the same side. On the right side, 42 patients had abnormal findings while only 31 showed abnormal findings on CXR.

**Table 1. Summary of imaging findings by modality & laterality**

Right Side	End Point Consolidation	Non-consolidation (interstitial &/or effusion)
POCUS N=44(%)	15/44 (34%)	44/44 (100%)
CXR N=44(%)	14/44 (32%)	36/44 (82%)

Left Side	End Point Consolidation	Non-consolidation (interstitial &/or effusion)
POCUS N=44(%)	8/44 (18%)	44/44 (100%)
CXR N=44(%)	11/44 (25%)	36/44 (82%)

**Conclusions:** POCUS proved to be a reliable imaging alternative compared to CXR to diagnose RSV in limited resource settings. Abnormal findings were more often seen on POCUS than on CXR for children diagnosed with RSV by RT-PCR. This raises doubt whether CXR is a valid gold standard.

## References:

- Jaszczolt S, Polewycz T, Dołęga-Kozierowska M, Woźniak M, Doniec Z. Comparison of lung ultrasound and chest X-ray findings in children with bronchiolitis. *J Ultrason*. 2018;18(74):193-197. doi:10.15557/JoU.2018.0029
- Basile V, Di Mauro A, Scalini E, Comes P, Lofù I, Mostert M. et al.: Lung ultrasound: A useful tool in diagnosis and management of bronchiolitis. *BMC Pediatr* 2015; 15: 63.
- Volpicelli G, Elbarbary M, Blaivas M, Lichtenstein D, Mathis G, Kirkpatrick AW. et al.: International evidence-based recommendations for point-of-care lung ultrasound. *Intensive Care Med* 2012; 38: 577-591.