

# How new imaging techniques help diagnosing TB? Ultrasound compared to chest X-ray to diagnose TB in PNG

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## Background

Papua New Guinea (PNG) is a high tuberculosis (TB) burden country. Early diagnosis is crucial for TB control and access to chest X-ray is lacking in many peripheral settings. Médecins Sans Frontières (MSF) provides diagnosis and treatment to TB patients in Port Moresby, the capital city in collaboration with the Ministry of Health.

## Objectives

The primary objective of this study is to assess the performance of lung ultrasound for TB diagnosis in patients with presumptive pulmonary TB. We compared lung ultrasound findings associated with TB to radiological findings on chest X-ray.

## Methods

Prospective diagnostic study which included patients above 10 years attending MSF TB clinic between May 2022 to May 2023. Those reporting cough for at least two weeks were considered as presumptive pulmonary TB. All patients enrolled underwent a clinical consultation, GeneXpert in sputum, chest X-ray and lung ultrasound. Patients were categorised as confirmed TB, unconfirmed TB or not TB. For the estimation of the sensitivity and specificity of the imaging tools, confirmed TB and not TB were used as reference standard.

## Results

Among 496 patients included, 55% were male, median age was 30 [Interquartile range 23-42] years, 42% were initiated on TB treatment, in total, 152 (31%) had confirmed TB, 55 (11%) unconfirmed TB and 289 (58%) not TB. Among 208 patients with both chest X-ray and lung ultrasound, reviewed by an expert, the ultrasound had a sensitivity of 92% (95%CI: 87-96), and a specificity of 40% (95%CI: 34-47). The sensitivity and specificity of the chest x ray were 92% (95%CI: 88- 96) and 67% (95%CI: 60-73), respectively. The kappa coefficient for the agreement between the two imaging methods was 0.37 (95%CI: 0.25-0.49). Of 112 patients with suggestive TB by chest X-ray, 100 (89%) had findings of TB in the ultrasound.

## Conclusion

Lung ultrasound for pulmonary TB diagnosis had a comparable sensitivity to chest X-ray, however specificity was very limited and lower than chest X-ray. Agreement between the two imaging tools was low. However, lung ultrasound detected TB in most of the chest X-rays suggestive of TB.

Lung ultrasound can be a potential tool for TB diagnosis when chest X-ray is not available. Next steps in the study are to look at possible combination of findings with better specificity and maintained sensitivity.

