

**FRONTLOADING VERSUS STANDARD SPUTUM SMEARS FOR DIAGNOSIS OF  
PULMONARY TUBERCULOSIS IN MULAGO HOSPITAL, KAMPALA.**

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## ABSTRACT

**Introduction:** In Uganda, the prevalence of smear positive TB is 4.4 per 1000. Diagnosis of TB in resource limited settings depends on smear microscopy of 2 samples. Frontloading is the examination of two sputum sample smears collected 1 hour apart for acid alcohol fast bacilli all on the same day. The gold standard for diagnosis of TB is sputum culture that takes up to 3 to 6 weeks for growth.

**Aim:** This study aimed at comparing the performance (sensitivity, specificity, NPV, PPV and Likelihood ratios) of frontloading to the standard sputum diagnosis of *Mycobacterium tuberculosis* PTB in Mulago Hospital hence validating the front loading technique with the aim of reducing number of health encounters in a resource limited setting.

**Methods:** It was a cross-sectional study that was carried out at the Assessment centre and TB clinics of Mulago National Referral Hospital. Patients who met the inclusion criteria had a data collection tool administered to them by the research Assistant after obtaining written informed consent. Patients submitted sputum specimens as spot-morning (the standard approach), and an additional specimen was collected one hour after the first (the Xspot) on the first day of presentation to the hospital. HIV serologies were done on those whose serostatus was unknown and were willing to test. Auramine-O/ZN stained smears were read by blinded laboratory technicians and graded according to the WHO grading systems. Culture on LJ was used as the gold standard. Data were entered using epidata and analysed with STATA v10 statistical packages and reported in proportions of 95% confidence intervals.

**Results:** Analysis was done on results for 221 patients. The sensitivity of frontloading in this sample was 99.1% (CI 84.2%, 95.6%) and that of the standard scheme was 91.1% (CI 84.2%, 95.6%). The specificities of frontloading versus the standard approach were 86.2% (CI 78.3%, 92.1%) and 91.7% (CI 84.9, 96.2%) respectively. Kappa Statistic showed that these

methods of diagnosis had excellent agreement of 0.87 ( $p=0.0000$ ). The positive predictive value for the frontloaded approach was 87.2% and that for standard approach was 91.9% while the negative predictive values were 90.4% and 90.9% for the frontloaded and standard approaches respectively. The likelihood ratios for a positive test were 6.62 and 11.0 for frontloaded versus standard smear respectively and the likelihood ratios for a negative test were 0.10 and 0.09 respectively.

**Conclusions:** The study findings suggest that frontloading will perform as well as the standard approach for diagnosis of PTB in Mulago hospital. Further studies are recommended to validate these results.