2ND CONFERENCE ON

INNOVATIONS IN TUBERCULOSIS

2025

ABSTRACT BOOK

2nd Conference on Innovations in Tuberculosis 2025

Windhoek, Namibia | 12 May

ame
academic
medical education

All meeting materials such as abstracts, presentations, etc will be posted on **www.AcademicMedicalEducation.com**

ORAL ABSTRACTS

Paper # - Paper Title **Page #**

POSTER ABSTRACTS

Paper # - Paper Title **Page #**

ORAL

ABSTRACT

PRESENTATIONS

2nd Conference on Innovations

in Tuberculosis 2025

12 May 2025

Windhoek, Namibia

1

Development and Internal Evaluation of an AI-Enabled Cough Sound Analysis Model for Tuberculosis Screening in a High-Burden Setting: A Prospective Cross-Sectional Study

Kagujje M[1], Mirheidari B[2], Maimbolwa M[1], Sanjase N[1], Muzazu S[1], Muyoyeta M[1], Brown G[2], Ma N[2]

[1]Centre for Infectious Disease Research in Zambia, Lusaka, Zambia, [2]School of Computer Science, University of Sheffield, Sheffield, United Kingdom

Background: Cough characteristics and accompanying symptoms are routinely used to inform diagnostic decisions on respiratory conditions. Emerging evidence suggests that Tuberculosis (TB) coughs exhibit distinct acoustic markers, allowing differentiation from other causes. Artificial intelligence (AI)-based cough sound analysis can detect subtle acoustic variations imperceptible to human listeners and reduce challenges such as intra- and inter-clinician variability. In this study we developed and evaluated an AI-enabled cough sound analysis tool for TB screening, specifically designed to address limitations of prior studies, and to provide a practical screening solution.

Methods: Data was collected from two second-level hospitals in Lusaka between April 2023 and September 2024. Three participant groups were recruited: bacteriologically confirmed TB cases (TB+, n=201), individuals with other respiratory diseases (OR, n=150), and healthy controls (HC, n=149), totalling 500 participants. TB+ participants were enrolled from TB clinics, OR participants from outpatient departments, and HC participants from patient caretakers and healthcare workers. Cough sounds were recorded using RØDE M5 microphones and Samsung Galaxy smartphones in an outdoor Keter shed. Age and sex distribution were matched across groups to minimize confounding. AI development involved three key steps: data pre-processing, model fine-tuning, and inference. Silence and background noise were removed, and audio recordings were annotated with demographic and diagnostic data.

Pre-trained speech foundation models (Wav2Vec2, HuBERT) were fine-tuned using cough sound for TB screening, alongside a baseline logistic regression classifier. Xpert MTB/Rif served as the ground truth.

The trained acoustic classifier was evaluated for performance, with sensitivity and specificity compared against the World Health Organization's target product profile for TB screening and triage tools.

Findings: The best-performing model, Wav2Vec2, achieved an AUC of 0.85 for distinguishing TB+ coughs from all other participants (TB+ vs. Rest) and 0.80 for differentiating TB+ from symptomatic OR participants (TB+ vs. OR), using 3-second audio clips. For TB+ vs. HC classification, the HuBERT model slightly outperformed Wav2Vec2, with an AUC of 0.91 compared to 0.90 using the same input length. The logistic regression classifier showed lower performance, with its best results, using 2-second audio files, reaching an AUC of 0.80 for TB+ vs. Rest, 0.75 for TB+ vs. OR, and 0.84 for TB+ vs. HC. Incorporating individual demographic and clinical parameters into the Wav2Vec2 model led to slight improvements, but adding all supplementary data resulted in significant performance gains, with the final AUC reaching 0.91 for TB+ vs. Rest and 0.83 for TB+ vs. OR. The sensitivity and specificity of the sound model with supplementary data was 0.87 and 0.81 for TB+ vs. Rest, and 0.81 and 0.71 for TB+ vs. OR. Positive and negative predictive values were 0.75 and 0.90 for TB+ vs. Rest, and 0.79 and 0.74 for TB+ vs. OR, while F1-scores were 0.0.81 and 0.0.80, respectively.

Interpretation: These findings suggest that AI-based cough sound analysis has strong potential for TB screening. External evaluations of the tool are needed.

2

A Before-and-After Study Evaluating a Male-Specific Tuberculosis Screening and Diagnosis Intervention in Uganda

Nidoi J[1,2], Wingfield T[2,3,4], Thomson R[2], Pulford J[2], Muttamba W[1], Henrion M[5], Ranga S[1], Akera E[1], Kirenga B[1,6]

[1]Makerere University Lung Institute, Kampala, Uganda, [2]Liverpool School of Tropical Medicine, Liverpool, United Kingdom of Great Britain and Northern Ireland, [3]Karolinska Institutet, WHO Collaborating Centre in TB and Social Medicine, Stockholm, Sweden, [4]Liverpool University Hospitals NHS Foundation Trust, Liverpool, United Kingdom of Great Britain and Northern Ireland, [5]Malawi Liverpool Wellcome Research Programme, Blantyre, Malawi, [6]Makerere University, Kampala, Uganda

Background: Despite men having a higher burden of tuberculosis (TB), they are frequently missed by TB services due to social, behavioural, and health system factors that limit healthcare access. In Uganda, there are no gender-specific guidelines for TB. Working with healthcare workers, TB survivors, policymakers and researchers, we co-designed, implemented, and evaluated a gender-specific intervention to find men with TB.

Design/Methods: We conducted a quasi-experimental study, comparing TB notification data before (January – June 2023) and after (July – December 2023) the intervention at both intervention (Gombe and Mityana hospitals) and control (Luwero and Kiboga hospitals) sites. The intervention package enhanced TB screening documentation using checklist stamps on patients' records, distributed TB educational materials, and introduced male-friendly TB clinics with evening opening hours, health education delivered by male champions, and integrated TB screening with HIV, diabetes, and hypertension. We extracted data from TB registers and fitted a quasi-Poisson regression model, adjusting for catchment population dynamics by gender, to assess the intervention's effects on TB case notification rates.

Results: Overall, 6,415 people in the participating hospitals were presumed to have TB, and 53.3% of these were females. Post-intervention, TB notifications increased by 46.3% (Female 0%, Male 88.4%) in Gombe and 36.4% (Female 26.3%, Male 45.1%) in Mityana; while they reduced by 26.7% (Female 28.8%, Male 25.5%) in Luwero and by 15.4% (Female +23.9%, Male -31.8%) in Kiboga. The regression analysis's baseline case notification rate was 246/100,000 population. The intervention significantly increased TB case notification rates (RR: 1.51, 95% CI: 1.03-2.22) and males had a higher notification rate than females (RR: 1.5, 95% CI: 1.23-1.83). In intervention sites, the treatment initiation rate was higher among women pre- and post-intervention (97.4%-100%) than men (91.4%- 97.7%).

Conclusions: Gender-specific interventions for screening and diagnosing people with TB and linking them to care can significantly improve notifications among men without decreasing notifications among women.

3

Enhancing TB Case Notification and Screening in Katsina, Northwestern Nigeria: The Impact of CommTb Mobile App Integration

Batur S[1]

[1]*Kncv Nigeria, Abuja, Nigeria*

Background: Tuberculosis (TB) remains a major public health challenge in Katsina State, Nigeria, with suboptimal case notification and screening coverage, particularly in hard-to-reach areas. The integration of digital tools like the CommTB mobile app has been proposed to strengthen community-based TB interventions, improve case finding, and enhance data reporting. This study evaluates the impact of CommTB integration on TB case notification and screening outcomes in Katsina.

Methods: A quasi-experimental study was conducted from december 2023 to December2024 across selected Local Government Areas (LGAs) in Katsina. Community-based organizations (CBOs) and linkage coordinators were trained to use the CommTB app for real-time documentation of TB screening, referrals, and treatment initiation. Data were collected on the number of individuals screened, presumptive TB cases identified, and confirmed TB cases notified. Comparative analysis was performed between pre-implementation (January–December 2022) and post-implementation periods using descriptive and inferential statistics.

Results:

- Screening Coverage: The number of individuals screened increased significantly from 10,500 in 2022 to 18,700 post-implementation ($p < 0.01$).
- Presumptive TB Cases: Identified presumptive cases rose from 2,450 to 4,100, reflecting a 67% increase.
- Case Notification: TB case notification improved by 58%, from 1,200 cases pre-implementation to 1,890 cases post-implementation.
- Treatment Linkage: 95% of confirmed cases were successfully linked to treatment centers, compared to 85% pre-implementation.
- Data Reporting Efficiency: Data submission timelines improved by 45%, with reduced errors in reporting..

Conclusion: The CommTB mobile app demonstrates the potential to bridge gaps in TB case finding and reporting in resource-limited settings. Scaling up this innovation across other LGAs in Katsina and beyond could further strengthen Nigeria's TB control efforts and contribute to achieving global TB elimination targets.

4

Diagnostic Accuracy of Xpert MTB/RIF Ultra on Nasopharyngeal Swabs in Adults With Presumptive TB in a High-Burden Setting

Nakawunde R[1], Achar J[1,2], Naidoo C[1], Theron G[1]

[1]DSI-NRF Centre of Excellence for Biomedical Tuberculosis Research, South African Medical Research Council Centre for Tuberculosis Research, Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University, Capetown, South Africa, [2]Department of Global Public Health, Karolinska Institute, Stockholm, Sweden

Background: Tuberculosis (TB) remains the leading infectious cause of morbidity and mortality, with 10.8 million incident cases and 1.25 million deaths globally in 2023. Despite advances in diagnostics, 25% of TB cases went undiagnosed or unreported, and only 60% of reported cases were bacteriologically confirmed. This diagnostic gap hinders progress towards meeting TB targets. As the most frequently used TB diagnostic specimen, sputum has many limitations including difficulty in processing and standardization. Nasopharyngeal (NP) swabs offer a promising alternative with reduced infection risk, greater acceptability, potential for self-sampling, ease of transport and scalability, and, in the event of new respiratory virus pandemics, the potential to also be used for TB diagnosis. However, NP swabs have limited data to support their use to diagnose TB.

Methods: We thus assessed the accuracy of Xpert MTB/RIF Ultra on 273 bio-banked NP swabs from adults presenting with presumptive TB at clinics in Cape Town. Swabs and sputum were collected (sputum induction done in participants unable to expectorate). Biobanked swabs were randomly allocated at 1:1 ratios into TB-positive and TB-negative groups based on a sputum culture microbiological reference standard (MRS) and further by HIV status. Analyses were also done using an extended reference standard (eMRS; sputum culture and sputum Ultra). Subgroup analyses were conducted by HIV status, smear status, and previous TB.

Results: Among 273 participants, 149 (55%) were TB-positive (MRS), and 131 (48%) were PLHIV. Ultra on NP swabs demonstrated a sensitivity of 34% (26, 42) and specificity of 88% (80, 93) compared to MRS. Sensitivity was lower in PLHIV [23% (14, 36) vs. people without HIV [44% (32, 56), p=0.0186] and in smear-negative [31% (22, 42) vs. positive individuals 39% (26, 53), p=0.104]. Specificity did not differ based on previous TB. Most of the 66% (90/137) false negatives occurred in PLHIV, smear-negative individuals, or sputum Ultra-negative. Diagnostic performance was comparable between MRS and eMRS.

Conclusion: While NP swab-based Ultra did not meet WHO Target Product Profile requirements, it demonstrated proof-of-concept for using NP swabs as a non-sputum-based alternative in TB diagnostics. However, these findings warrant further investigation and optimization, particularly in vulnerable subgroups like PLHIV and smear-negative individuals, and other scenarios where NP swabs are already routinely collected.

5

Assessing the Effectiveness of Community-Based TB/HIV Testing in Improving TB/HIV Case Finding: Case Study in North-West Nigeria.

Agbo A[1], Msheliza S[1], Ogbu P[1], Udo S[1], Mulungi M[1], Ugwoke U[2], Adetiba T[2], Olupitan O[2], Aimu R[2], Adebayo O[2], Zamzu M[3], Tsujii K[3], Workneh N[3]

[1]The Leprosy Mission Nigeria, Abuja, Nigeria, [2]Global Fund N-THRIP, Institute of Human Virology, Nigeria (IHVN), Abuja, Abuja, Nigeria, [3]The Global Fund to Fight AIDS, Tuberculosis and Malaria, Global Health Campus, Geneva, Switzerland, Geneva, Switzerland

Background: Tuberculosis (TB) and HIV co-infections are significant contributors to maternal and neonatal morbidity in Sub-Saharan Africa, with over 50% of global TB/HIV co-infections occurring in the region. Approximately 30-40% of TB patients in Africa are co-infected with HIV, and pregnant women living with HIV face a heightened risk of developing TB, increasing maternal mortality (UNAIDS, 2023). In Nigeria, which has the second-largest HIV epidemic globally, an estimated 1.8 million people live with HIV, with 3-4% prevalence among pregnant women. Despite efforts, Nigeria still accounts for 12-15% of global mother-to-child transmission (MTCT) cases. Poor ANC attendance—affecting 20-30% of pregnant women in Sub-Saharan Africa—limits early detection and treatment (UNAIDS/NACA, 2023). This study aims to evaluate the impact of community-based TB/HIV testing in North-West Nigeria in addressing these challenges.

Methodology: A mixed-methods study conducted in Kebbi, Sokoto, and Zamfara States (January–October 2024) involved testing 5,768 pregnant women using rapid diagnostic tools by trained community TB/HIV workers. Quantitative data on diagnostic yield and treatment initiation were analyzed using Microsoft excel, while qualitative insights were obtained through interviews with patients and healthcare workers. Data were benchmarked against the 2024 WHO TB/HIV Africa report and Nigeria-specific health indicators.

Results: Among the 5,768 pregnant women screened, (634)11% were diagnosed with HIV, and (260)4.5% tested positive for active TB. Co-infections were observed in (63)10% of women Living with HIV. Early detection facilitated treatment initiation for 95% of HIV-positive and 90% of TB-positive women within two weeks of diagnosis. Community engagement led to a 35% increase in ANC attendance, while qualitative findings emphasized reduced stigma and increased trust in healthcare services as critical drivers of success.

Conclusion: Community-based TB/HIV testing is an effective strategy for improving TB/HIV case finding among pregnant women in high-burden areas. Early diagnosis and treatment will reduce adverse outcomes, aligning with WHO's integrated TB/HIV care recommendations. Scaling up similar programs nationally, supported by capacity building and robust monitoring systems, can further reduce TB/HIV-related maternal deaths and advance Nigeria's goal of eliminating MTCT by 2030.

6

Prevalence of Tuberculosis and Rifampicin-Resistant Tuberculosis Among Clients With Advanced HIV Disease in Akwa Ibom State, Nigeria: A Retrospective Analysis

Ibitham O[1], Elechi I[2], Igwe B[1], Abbah F[1], Anika O[1], Nwangeneh C[1], Ukpong K[2], Gana B[3], Ezieke E[3], Otu P[3], Usang S[3], Nwanja E[3], Onwah O[3], Akpan U[3], Toyo O[3], Carpenter D[4], Persaud N[4], Idemudia A[5], Eneogu R[5], Omo-Emmanuel U[5], Ogundehin D[5], Adebobola B[6], James E[5], Pius J[5], Oyelaran O[5], Ezema N[1], Onyedinachi O[3], Adegboye A[3], Eyo A[3]

[1]FHI 360, , Nigeria, [2]Achieving Health Nigeria Initiative, FCT, Nigeria, [3]Excellence Community Education Welfare Scheme (ECEWS), Uyo, Nigeria, [4]FHI 360, Washington, DC, United States, [5]Office of HIV/AIDS and TB, United States Agency for International Development, , Nigeria, [6]National AIDS, STI and Viral Hepatitis Control Program , , Nigeria

Introduction: Tuberculosis (TB) is the leading cause of morbidity and mortality among people living with HIV (PLHIV), accounting for one-third of all deaths. Advanced HIV disease (AHD) presents a heightened risk for opportunistic infections, including TB. This PEPFAR- and USAID-funded Excellence Community Education Welfare Scheme (ECEWS)-led study aimed to analyze the prevalence of TB and rifampicin-resistant TB (RR-TB) among clients with AHD.

Methods: A retrospective analysis was conducted using program data from the electronic medical record in Akwa Ibom State, Nigeria, focusing on all newly diagnosed HIV-positive clients (TX_NEW) with AHD from January 2023 to August 2024. AHD was defined as HIV clients <5 years and HIV clients ≥5 years with World Health Organization (WHO) clinical stage 3 or 4 or a CD4 count of <200 cells/mm³. Client-level data included demographic information (age and sex), geographic data (rural and urban), WHO clinical staging, CD4 counts, and lateral flow lipoarabinomannan (LF-LAM) and GeneXpert test results. The prevalence of TB and RR-TB and their association with CD4 counts were analyzed using chi-square tests to assess statistical significance.

Results: In total, 3,287 individuals were diagnosed with AHD out of 14,762 TX_NEW clients, with a mean age of 32 years (±15.9 years); 64.8% (2,129/3,287) were female. Of these individuals, 11.7% (383/3,287) were children <5 years, 12.5% (412/3,287) were diagnosed with AHD based on WHO clinical staging, and 85.2% (2,802/3,287) were diagnosed using CD4 counts, of which 306/2,802 (10.9%) were children <15 years. TB diagnostic tests were conducted on 77.9% (2,561/3,287) of individuals, and 30.4% (778/2,561) were diagnosed with TB. Urine LF-LAM identified 85.5% (665/778) of TB cases, while GeneXpert detected 14.5% (113/778), including 4.4% (34/778) with RR-TB. RR-TB was evenly distributed between males and females (50%, 17/34 each), predominantly found in individuals ages 35–49 (44.1%, 15/34, p <0.001), and rural facilities accounted for 94.1% (32/34, p <0.001) of cases. Among RR-TB cases, 91.2% (31/34) had CD4 counts <200 cells/mm³.

Conclusions: These findings highlight the burden of TB infection and RR-TB among clients with CD4 counts <200 cells/mm³ and emphasize the importance of integrating AHD screening and TB diagnostics for PLHIV.

7

Testicular Safety of a Pretomanid Regimen (BPaMZ) in Men With Pulmonary Drug-Resistant Tuberculosis

Howell P[1,2], Conradie F[1,2], Brumskine W[3,4], Mikiashvili L[5], Moreira J[6], Lombardi A[6], Holsta A[6], Betteridge M[6], Thompson L[7], Crook A[7], Bruinenberg P[6], Beumont M[6], Sun E[6], Boekelheide K[8]

[1]Clinical HIV Research Unit, Wits Health Consortium, University of the Witwatersrand, Johannesburg, South Africa, [2]Isango Lethemba TB Research Unit, Wits Health Consortium, University of the Witwatersrand, Gqeberha, South Africa, [3]The Aurum Institute, Rustenburg, South Africa, [4]Vanderbilt University, Nashville, United States, [5]National Center for Tuberculosis and Lung Disease, Tbilisi, Georgia, [6]TB Alliance, New York, USA, [7]University College London, London, UK, [8]Brown University, Providence, United States

Background: Pretomanid is part of the WHO recommended BPaL/M treatment regimen in patients with drug-resistant tuberculosis (DR-TB). Preclinical studies reported testicular toxicity in rodents exposed to high doses of pretomanid, but not in nonhuman primates. Hormone profiles in clinical studies were not indicative of human testicular toxicity. Findings from a paternity survey across four prior TB trials showed that birth rates among pretomanid-exposed participants were comparable to those receiving standard HRZE therapy. In light of the rodent findings, this Phase 2 clinical trial was conducted to assess the reproductive safety of pretomanid-containing BPaMZ (bedaquiline, pretomanid, moxifloxacin, pyrazinamide) therapy in adult males with DR-TB.

Methods: The study was conducted at four sites in South Africa and Georgia and enrolled 26 adult males with DR-TB. Participants received BPaMZ for 26 weeks, followed by a 52-week safety monitoring period. The primary outcome was the change in total sperm count at Week 26. Secondary endpoints included change from baseline in total sperm count at Week 12 and 44; change from baseline over time in sperm concentration, sperm volume, and male reproductive hormones (testosterone, inhibin B, FSH, LH).

Results: 22 participants completed treatment and 18 completed follow-up through 78 weeks. Among treatment completers, mean age was 37 years, 68% were Black and 36% living with HIV. At Week 26, the mean total sperm count increased from 48.8 to 68.8 million/ejaculate. Seventeen participants (77.3%) experienced an increase in sperm count and sperm concentration, with 13 (59.1%) showing a ≥50% improvement in both. Five participants (22.7%) exhibited a decrease, but only two (9.1%) had a ≥50% reduction in sperm count, likely due to low volumes, while none had a >50% decrease in sperm concentration. The greatest increases were observed in those with lower baseline sperm counts. Improvements in gonadal hormones were noted, with median testosterone rising from 547.0 ng/dL at baseline to 600.0 ng/dL at Week 26, peaking at 646.0 ng/dL at Week 44. Median Inhibin B increased from 122.0 pg/mL to 137.0 pg/mL at Week 26 and reached 172.0 pg/mL by Week 78, with no notablereductions in median FSH or LH, indicating an absence of testicular toxicity. Sputum culture conversion was achieved in all microbiologically assessable participants by Week 12 and remained negative through Week 78.

Treatment-emergent adverse events (TEAEs) were reported in 81% of participants, with the most common being pleuritic pain (19.2%), upper respiratory tract infections (15.4%), and hyperuricemia (15.4%). Two serious TEAEs occurred during treatment (hepatic enzyme elevation, possibly treatment-related, and infectious exacerbation of bronchiectasis, unrelated), and two during follow up (lung abscess and cystic lung disease, both unrelated). One fatal bacterial meningitis was reported during follow-up, deemed unrelated to BPaMZ. Pharmacokinetic analysis revealed no correlation between pretomanid concentrations and sperm count changes.

Conclusion: This study provides the first targeted evaluation of male reproductive safety in patients receiving the BPaMZ regimen for DR-TB. Improvements in sperm count and reproductive hormones suggest that pretomanid does not impair spermatogenesis or reproductive hormone function in humans.

8

Population Structure and Transmission Analysis of Drug-Resistant Mycobacterium tuberculosis Strains From Namibia Using Whole Genome Sequencing

Shavuka O[1], Mhuulu L[1], Dreyer V[2,6], Ekandjo H[1], Absai P[3], Ipinge C[3], Ruswa N[4], Niemann T[1,2,6], Nepolo E[1], Claassens M[1], Günther G[1,5], Niemann S[1,2,6]

[1]University of Namibia School of medicine., Windhoek, Namibia, [2]Research Center Borstel - Leibniz Lung Center., Borstel, Germany, [3]Namibia Institute of Pathology, Windhoek, Namibia, [4]National Tuberculosis and Leprosy Program, Ministry of Health and Social Services., Windhoek, Namibia, [5]Department of Pulmonology and Allergology, Inselspital, Bern University Hospital, University of Bern., Bern, Switzerland, [6]German Center for Infection Research, Borstel, Germany

Drug-resistant tuberculosis (DR-TB) poses a major public health challenge to TB control efforts in Namibia, a country with a high TB burden as classified by the World Health Organization (WHO). Knowledge on factors driving the DR-TB epidemic and epidemiological surveillance are crucial for DR-TB elimination in Namibia. Determining whether transmission plays a role will directly influence the strategies needed to control DR-TB effectively. This study aimed to investigate the transmission dynamics and the population structure of DR-TB in Namibia.

Whole Genome Sequencing (WGS) was performed to characterize 476 Mycobacterium tuberculosis complex (Mtbc) clinical strains collected between 2016 to 2023 from patients who had documented rifampicin resistance on Xpert MTB/RIF in all regions of Namibia. Phylogenetic strain classifications, genomic resistance predictions, and core-genome multi-locus sequence typing analysis using SeqSphere (Ridom GmbH, Münster, Germany). Cluster analysis was done using a threshold of 05 alleles.

Most Mtbc strains were classified as belonging to the lineage 4 (L4; n=463), 12 belonged to the lineage 2 (L2, Beijing) and the remaining one belonged to L1. Following the new WHO definitions, of the 476 Mtbc strains analyzed, 416 (87.4%) were identified to be multi-drug resistant (MDR). Twenty-eight samples (5.9%) were identified as pre-extensively drug-resistant (pre-XDR), nine samples (1.9%) were identified as XDR, and twenty-three (4.8%) were identified as non-MDR. The cluster rates were high, at 76.4% among MDR, 82.1% among pre-XDR, 88.9% among XDR, and 60.9% among non-MDR Mtbc strains. All strains of the two largest clusters, with 34 and 24 isolates belonged to the LAM lineage (L4).

These findings highlight the significant role of transmission in the DR-TB burden in Namibia. Further investigations are needed to better understand the factors driving DR-TB transmission. Strengthening molecular epidemiological surveillance and addressing transmission drivers are key to controlling the spread of DR-TB in Namibia.

9

Prevalence and Characterization of rpoB Mutations Across Nine Different Countries in Sub-Saharan Africa

Comfort V[1], Faridath M[2,3,4], Kindy S[5], Fatimata D[6], Awa Ba D[7], Adekola A[8], Shadrac C. A[9], Bolaji O[8], Mariette S[10], Jean Claude Semuto N[3,11,12], Gemeda A[13], Corinne M[14], Dissou A[2], Leen R[3,4], Melissa S[1], Bouke C[3,4]

[1]Center For Health Promotion And Research, Bamenda, Cameroon, [2]Supranational Reference Laboratory of Tuberculosis, Cotonou, Benin, [3]Mycobacteriology unit, Institute of Tropical Medicine, Antwerp, Belgium, [4]Department of Biomedical Sciences, University of Antwerp, Antwerp, Belgium, [5]Service de Pneumo-phtisiologie, Hopital National Ignace,, , Guinee, [6]University Clinical Research Center (UCRC), University of Sciences, Techniques and Technologies of Bamako (USTTB), Bamako, Mali, [7]Department of Biological and applied Pharmaceutical Sciences, Laboratory of Bacteriology and Virology, Cheikh Anta Diop Dakar University, Dakar, Senegal, [8]South West Zonal TB Ref Laboratory, University College hospital, Ibadan, Nigeria, [9]Department of Health Data Science, University of Liverpool, , UK, [10]Laboratoire National de Référence des Mycobactéries, PNLT, Kinshasa, DRC, [11]Research Innovation and Data Science Division, Rwanda Biomedical Centre, Kigali, Rwanda, [12]Department of Clinical Biology, University of Rwanda, Kigali, Rwanda, [13]Mycobacteriology Research Center, Jimma University, , Jimma, Ethiopia, [14]Special Programme for Research and Training in Tropical Diseases (TDR), World Health Organization, Geneva, Switzerland

Background: Rifampicin is the main first-line drug used to treat tuberculosis (TB) and is important in achieving a relapse-free cure. The World Health Organisation recommends performing universal drug-susceptibility testing for rifampicin resistance (RR) for all people diagnosed with TB. In many settings, RR testing is done using the rapid molecular Xpert MTB/Rif assay, which is highly sensitive for the detection of mutations within the RR determining region (RRDR) of the rpoB gene but misses some clinically important mutations outside the RRDR. On the other hand, low-level RR associated with specific mutations in the rpoB gene can be missed by phenotypic drug-susceptibility testing. These mutations are referred to as borderline mutations and include the following: Leu430Pro, Asp435Tyr, His445Asn, His445Leu, His445Ser, Leu452Pro, and Ile491Phe.

Additionally, 170Val and Ile491Phe mutations- outside the RRDR- are missed in rapid genotypic tests such as Xpert. Here, we describe the proportion and characteristics of rpoB mutations in a large population of people diagnosed with TB using an initial Xpert MTB/RIF test across nine Sub-Saharan African countries.

Methods: In this multi-country, cross sectional study, clinical samples were collected from people with TB aged ≥ 15 years who were diagnosed by Xpert MTB/RIF or Xpert MTB/RIF Ultra, including consecutive people with rifampicin-resistant TB and equal numbers of people with rifampicin-sensitive TB who had a history of TB treatment. We performed Deeplex Myc-TB, a targeted next-generation sequencing (tNGS) assay, directly on sputum, and whole genome sequencing (WGS) on isolates obtained after TB culture. The full rpoB sequence from tNGS/ WGS was considered the reference test. We determined the proportion of borderline mutations by country. We also evaluated whether isolates with borderline mutations were more likely to fail to grow on primary isolation, to be found in combination with other mutations, or as heteroresistant bacillary populations.

Results: We performed Deeplex Myc-TB on clinical specimens from 1,094 people with TB. Overall, borderline rpoB mutations were identified in 15% of specimens, with country specific proportions ranging from 3% to 23%. Only 0.4% of rpoB mutations were located outside the RRDR. There was no significant difference in primary culture positivity between rpoB mutants belonging to the borderline group vs the non-borderline group (94.9% vs 91.9%, p=0.17). From our data, borderline mutations were 4.4 (95% CI, 3.1-6.4; p<0.001) times more likely to occur in combination with other mutations than non-borderline mutations. The proportion of borderline mutations classified as heteroresistant was similar to non-borderline mutations (19.3% vs. 15.3%, p=0.2).

Conclusion: In this preliminary analysis, we found that across multiple African countries, most rpoB mutations tend to fall within the Xpert target and that borderline rpoB mutations are prevalent, and commonly occur in combination with other rpoB mutations. While they do not significantly impact primary culture positivity or heteroresistance, their co-occurrence with non-borderline mutations suggests that there is continued rifampicin drug pressure in the presence of borderline mutations.

10

Comprehensive Phylogenomic Analysis of Mycobacterium tuberculosis in Ethiopia

Ayano B[1], Godana A[2], Nigussie H[2], Chala F[1]

[1]Ethiopian Public Health Institute, Addis Ababa, Ethiopia, [2]Addis Ababa University , Addis Ababa, Ethiopia

Background: Tuberculosis (TB) remains a major public health challenge in Ethiopia, with complicating treatment. This study utilizes bioinformatics approaches to analyze Ethiopian Mycobacterium tuberculosis sequencing datasets, characterizing lineage diversity and resistance mutations.

Methods: Publicly available sequencing data (580 datasets) from Ethiopia were retrieved using the SRA Toolkit. Quality assessment was conducted with FastQC, and trimming performed using Trimmomatic and Fastp. Reads were aligned to the M. tuberculosis H37Rv genome with BWA-MEM, and variants were called by Snippy. Lineage classification and drug resistance prediction were performed with TB-Profiler, while phylogenetic analysis was conducted using IQ-TREE and visualized in iTOL. Statistical analyses, including chi-square tests and correlation coefficients, were carried out in Python.

Results: Genomic analysis showed high alignment quality (98.4% median) and >99% genome coverage at 30X depth, with stable GC content (65.3%). Among cases, 70.34% were drug-sensitive, while MDR-TB (15.52%), Pre-XDR-TB (5.69%), XDR-TB (0.34%), and RR-TB (0.52%) were detected. Resistance was highest for isoniazid (25.0%) among first-line drugs, and ethionamide (14.31%) among second-line drugs. Two resistance were found for bedaquiline, clofazimine, delamanid, and pretomanid, while none were detected for linezolid. Lineage4 (53.0%) was most prevalent, followed by lineage3 (30.6%). Sub-lineage 4.2.2.2 (47.65%) dominated lineage4. MDR-TB was highest in lineage4 (23.1%) and lineage3 (13.8%), whereas lineage7 remained largely drug-sensitive (98.0%), showing a significant association between lineage and drug resistance. Mixed-species cases were observed such as M. bovis–M. tuberculosis and M. orygis–M. tuberculosis, while mixed M. tuberculosis lineages were mostly drug-sensitive, except for La3-lineage3, associated with MDR-TB. Frequent resistance mutations were identified in rpoB (Rifampicin, 64.84%), katG (Isoniazid, 81.38%), and pncA (Pyrazinamide, 17.95%). katG mutations dominated MDR-TB (55.78%), while inhA and katG co-mutations were linked to Pre-XDR-TB (6.12%). Fluoroquinolone resistance correlated with gyrA mutations, and cross-resistance was identified for inhA, rrs, fbiC/mmpR5, and gyrA. Phylogenetic analysis confirmed lineage 4 dominance and clustering of MDR-TB and Pre-XDR-TB, suggesting active transmission. Lineage3 had localized MDR-TB and XDR-TB clusters.

Conclusions: This study highlights the dominance of Mycobacterium tuberculosis Lineage 4, particularly sub-lineage 4.2.2.2, in Ethiopia, with significant associations between lineage and drug resistance. Phylogenetic clustering of resistant strains suggests ongoing transmission, emphasizing the necessity of strengthened infection control. Integrating genome sequencing into TB surveillance and diagnosis can improve resistance tracking for effective TB management in Ethiopia.

Keyword: Drug resistance; Ethiopia; Lineages; MDR-TB; Mycobacterium tuberculosis; Phylogenomics; Pre-XDR-TB

11

The Continued Rise of Bedaquiline-Resistant Tuberculosis in Mozambique

Fernando T[2], Utpatel C[1], Chumane S[2], Abujate C[2], Barilar I[1], Madeira C[2], José B[3], Mutaquiha C[3], Niemann T[1], Gundane I[2], Manhique A[2], Ismael N[2], de Araujo L[1], Viegas S[2], Niemann S[1]

[1]Research Center Borstel, Molecular and Experimental Mycobacteriology, Borstel, Germany, [2]Instituto Nacional de Saúde , , Mozambique, [3]National Tuberculosis Control Program, Directorate of Public Health, Maputo, Mozambique

Introduction: Bedaquiline (BDQ) is a key component of the World Health Organization endorsed 6-month BPaLM regimen (BDQ, pretomanid, linezolid and moxifloxacin) and new combinations of BDQ, Pyrazinamide (Z), Delamanide (D), Levofloxacyn (Lfx) and Clofazimine (C) (BDLLfxC, BLMZ, BCLLfxZ) for treatment of patients including children, pregnant woman with rifampicin resistant (RR) or multi-drug-resistant (MDR, isoniazid resistance [INHr] + RR) tuberculosis (TB). Recent data from Mozambique indicated an increase of BDQ resistance (BDQr) from 3% to 14% from 2016-2021, suggesting that current RR/MDR-TB treatment regimens are not effectively preventing BDQr development at the population level.

Methods: Here, targeted Next-Generation-Sequencing based on the Deeplex®-Myc-TB was performed on GenoLyse® DNA extracted from over 200 INHr and/or RR samples (classified by Bruker-Hain GenoTypeMTBDRplus) submitted to the National Tuberculosis Reference Laboratory in Maputo between January/2021 and June/2024 to predict drug resistance to 15 anti-TB drugs.

Results: Overall, 28% of the samples analysed were classified as BDQr (28%)and 13% as XDR, (MDR+FQr+BDQr). A total of 65% BDQr harboring frameshift mutation causing cross resistance to BDQ and C. We also found a high rate of FQr (24%) among samples classified as RR. Nine samples (4%) had the rpoB I491F mutation as sole RR marker, notably, these samples were classified as rifampicin susceptible by GenoTypeMTBDRplus.

Conclusions: High BDQr and FQr rates compromise all combinations of full oral treatment regimens and potentially jeopardize MDR-TB control in the country. “Diagnostic escape” Mycobacterium tuberculosis strains with rpoB I491F RR mutation, not detected by commercial molecular drug resistance assays such as Xpert® MTB/RIF and GenoTypeMTBDRplus, cause an additional challenge for the current Drug-Resistant TB testing algorithms, and underline the urgent need for expanding the use of rapid comprehensive resistance testing to the whole country.

Keywords: Bedaquiline, MDR-TB, Drug resistance, Tuberculosis

12

Impact of Mycobacterium tuberculosis Strains With rpoB I491F Mutation on Uptake and Outcomes of BPaLM Regimen in Eswatini

Vambe D[1,2], Ziyane M[1,3], Mamba B[4], Mdigo T[1,3], Nkomo T[4], Masina S[4], de Araujo L[5,6], Thi S[4], Ruswa N, Mazuruse T[8], Dlamini L[9], Dube-Regional M[1], Maphalala G[3], Mandalakas A[2], Kay A[1,2], Ngqenya S[4], Dlamini S[3], Niemann S

[1]1. Baylor College of Medicine Children's Foundation Eswatini, Mbabane, Eswatini, [2]2. Department of Pediatrics, Global TB Program, Baylor College of Medicine,, Houston, United States, [3]3. Eswatini Health Laboratory Services, Ministry of Health, Mbabane,, Eswatini, [4]4. National TB Control Program, Manzini, Eswatini, [5]5. Respiratory Medicine & International Health, University of Lübeck, Lubeck, Germany, [6]6. Clinical Infectious Diseases, Research Center Borstel, Leibniz Lung Center, Borstel, Germany, [7]7. National TB and Leprosy Program, Windhoek, Namibia, [8]8. Good Shepherd Hospital, Siteki, Eswatini, [9]9. Nhlangano TB Reference Hospital, Nhlangano, Eswatini, [10]10. Research Center Borstel, Leibniz Lung Center, Borstel, Germany

Background: The National Tuberculosis Control Program (NTCP) of Eswatini has adopted BPaLM (bedaquiline, pretomanid, linezolid and moxifloxacin) and BPaL as primary regimens for patients with drug resistant tuberculosis (DR-TB) with or without fluoroquinolone resistance (FQ-R). The country also implemented targeted next generation sequencing for rapid drug resistance diagnostics including the detection of multidrug resistant (MDR) Mycobacterium tuberculosis strains with rpoB I491F mutation which are not detected by Xpert® MTB/RIF, line probe assays or conventional diagnostics. Further, more than 50% of I491F strains have the Rv0678 M146T mutation that correlates with elevated minimum inhibitory concentrations to bedaquiline and clofazimine. Still, there is limited evidence on the clinical significance of this mutation and how it impacts the uptake and outcomes of patients initiated on BPaLM regimen. This retrospective study aimed to assess whether infection with I491F strains affected uptake or outcomes of patients enrolled on the BPaL/M regimen.

Materials and Methods: Eswatini's nationwide rollout of a new six-month all-oral drug BPaLM regimen for DR-TB started in March 2023 following WHO recommendations. Patients with isoniazid monoresistance, polydrug resistance or rifampicin resistant (RR)-TB detected through Xpert MTB/RIF, LPA or MGIT culture underwent tNGS to determine the presence of other resistance-conferring mutations using Genoscreen Deeplex® Myc-TB kits running on the Ilumina iSeq 100. Those with presumed or confirmed RR were considered for either the BPaL or BPaLM regimen depending on FQ-R. Data were collected through routine monitoring and evaluation systems, to assess BPaLM uptake within the existing DR-TB regimens and their respective final outcomes. The prevalence of the rpoB I491F mutation among patients enrolled on BPaLM was assessed to determine the association with bedaquiline resistance as well as its influence on treatment outcome.

Results: Out of the 184 patients enrolled on DR-TB treatment from January 2023-December 2024, 132 were eligible for BPaLM, and only 96 were enrolled on BPaL/M regimen. 59 out of the 184 patients had documented tNGS results, of which 33 had the I491F mutation and 29 had the Rv0678 mutation (28 had both). The prevalence of rpoB I491F mutation among patients with documented tNGS results was 56.9% (95%CI; 43.7-69.2), out of which 84.8% (95%CI; 67.6-93.8) had additional resistance to bedaquiline. The treatment success rate for patients with the rpoB I491F mutation who were initiated on the BPaL/M regimen is 80%, while for those without the mutation, it is 100%, with no statistically significant difference (p = 0.263, Fisher's exact test). Among patients initiated on BPaLM without tNGS results, the success rate is 81%.

Conclusion: The prevalence of infections with MDR strains with rpoB I491F mutation is very high in this cohort, underlining the need for advanced molecular diagnostics. Further, they are highly associated with additional bedaquiline and clofazimine resistance. While this small study did not show a significant impact of rpoB I491F strains with bedaquiline/clofazimine resistance on BPaLM treatment outcomes, future studies are needed to fully elucidate the impact of pre-existing bedaquiline resistance on BPaL/M treatment outcomes and the selection of additional resistance.

13

Leveraging eCBSS Data for Geospatial Mapping of Tuberculosis Hotspots and Optimizing the Integrated TB Case Finding (CAST+) Intervention in Eastern Uganda

Brianwong C[1,2], Cherotin D[1,2], Ssekiswa Z L[1,2], Bakyawa J[1,2], Okwir E[1,2], Nghania F[1,2], Jjuuko R[2], Nahirya P[2], Akobye W[1,2], Mugume A[1,2], Kiragga D[2]

[1]USAID Local Partner Health Services-Eastern Activity/ Baylor Foundation Uganda, Mbale, Uganda, [2]Baylor Foundation Uganda, Kampala, Uganda

Background: The Ugandan Ministry of Health developed the CAST+ strategy to find missing TB patients through 5-day biannual door to door community screening for TB, leprosy, HIV, malaria, malnutrition, antenatal care and immunization status. The first nationwide campaign was conducted September 2022, covering all villages. However, this intervention has proven costly with variable results. In 2020, Uganda adopted the electronic case-based surveillance system (eCBSS) for TB surveillance and program reporting that provides patient level data and place of residence. We describe how eCBSS data was used to develop geospatial maps to define TB hotspots for targeted CAST+Campaigns.

Methods: Prior to the CAST+ campaign in March 2024, USAID LPHS-E scaled up eCBSS to 93% (166 out of 178) of the Diagnostic and Treatment Units (DTUs) in the Bukedi and Bugisu regions and supported entry to 103% (6992 out of 6860) of the patient backlog. This data was then used to map TB hotspots using Geographic Information System technology, which were prioritized and actively screened during the CAST+ campaign in March 2024. A hotspot was defined as any village with more than two TB patients in the past year (March 2023 to February 2024).

Results:

- There was a 41% drop in unit cost of identifying a TB patient from $66 in September 2022 to $37 in March 2024.
- The March 2024 campaign cost $5,783, a significant reduction from the $50,678 spent in the September 2022 campaign.
- During the March 2024 CAST+ campaign, 155 TB patient from the 109 mapped hotspots were diagnosed and started on treatment, compared to 764 TB patients identified in all villages in Sept 2022 with similar yield of 2.0% and 1.9% respectively

Conclusions: Utilizing eCBSS data for geospatial mapping enables TB programs to accurately identify hotspots, pinpoint high-burden areas, and effectively guide resource allocation for targeted community TB interventions.

14

Genome-Wide Analyses of Mycobacterium tuberculosis Complex Isolates Reveal Insights Into Circulating Lineages and Drug Resistance Mutations in The Gambia

Faal F[1], Top N[1], Jobe O[1], Colley S[1], Li H[4], Pandurangan A[4], Clark T[2,3], Phelan J[2], Tientcheu L[1,2]

[1]Medical Research council Unit The Gambia at London School of Hygiene and Tropical Medicine, Banjul, The Gambia, [2]Department of Infection Biology, Faculty of Infectious and Tropical Diseases, London School of Hygiene and Tropical Medicine, UK , London , UK, [3]Faculty of Epidemiology and Population Health, London School of Hygiene and Tropical Medicine, London , UK, [4]VPD Heart and Lung Research Institute, University of Cambridge, Cambridge, UK

Introduction: Tuberculosis (TB), caused by the Mycobacterium tuberculosis complex (MTBC), remains a pressing global health challenge, with the West African region, including The Gambia, experiencing a substantial burden.

Objective: This study explores the genetic diversity of MTBC strains circulating in The Gambia for nearly two decades (2002–2021) to enhance understanding of drug resistance dynamics and inform targeted diagnostic and treatment strategies.

Method: Whole genome sequencing of ~2000 MTBC isolates identified drug resistance mutations compared across The Gambia, West Africa, and globally. Mutations were classified as resistant or susceptible, with effects predicted using Site-Directed Mutator, FoldX, and PyRosetta. Findings were grouped by first-line drugs and MTBC lineages, revealing lineage-specific resistance patterns.

Results: From 1,803 isolates, we identified predominance of lineage4 (67.2%) and lineage6 (26.6%) strains, with ineage4 showing more significant genetic variability over time. Drug susceptibility analysis of these isolates revealed that 78% (1421 isolates) were drug-susceptible, while 6.5% (119 isolates) exhibited resistance, primarily to isoniazid, rifampicin, and their combination. Additionally, 15.5% (282 isolates) were classified as Other, having potential drug-resistance mutations of uncertain significance by the WHO catalogue. Interestingly, our resistance-associated analysis showed lineage6 specific ethambutol uncertain significance (WHO catalogue) mutation (embC Ala307Thr) more prevalent in The Gambia than in West Africa and globally. Structural analysis showed that resistance mutations frequently occur in solvent-inaccessible and conserved regions of proteins, often impacting protein stability and reflecting a balance between resistance, fitness, and evolutionary adaptation.

Conclusion: This study highlights the coexistence of globally prevalent and regionally restricted MTBC lineages, underscoring the importance of region-specific TB control measures. Integrating bioinformatic and structural analyses revealed highly uncertain significant mutations by the WHO catalogue in The Gambian isolates compared to West Africa and globally. These findings reinforce the necessity of continuous genomic surveillance to address the evolving challenges of TB in high-burden settings like West Africa.

15

Harnessing Artificial Intelligence to Predict TB Treatment Outcomes in Hiv-co-infected Patients: A Machine Learning Approach

Chitila M[1], Luzende N[1]

[1]*Levy Mwanawasa Medical University, Lusaka, Zambia*

Background: Tuberculosis (TB) treatment outcomes in HIV-co-infected patients remain suboptimal, with high rates of treatment failure and mortality. Accurate prediction of treatment outcomes is crucial for optimizing patient care.

Methods: We developed and validated a machine learning (ML) model using a dataset of 1,500 HIV-co-infected patients with TB. The model integrated clinical, laboratory, and demographic variables to predict treatment outcomes (cured, treatment completed, treatment failed, or died).

Results: Our ML model demonstrated high accuracy (92%) and area under the receiver operating characteristic curve (AUC-ROC) (0.95) in predicting TB treatment outcomes. The model identified key predictors of poor treatment outcomes, including low CD4 count, high viral load, and presence of drug-resistant TB.

Conclusion: This study showcases the potential of AI-driven predictive modeling to improve TB treatment outcomes in HIV-co-infected patients. Our findings inform the development of personalized treatment strategies and targeted interventions to optimize patient care.

Keywords: Artificial intelligence, machine learning, TB treatment outcomes, HIV co-infection, predictive modeling.

16

Leveraging Big Microdata to Optimize Social Determinants of Health to End Tuberculosis in Sub-Saharan Africa: Evidence from Lesotho

Ogbuabor D[1]

[1]University Of Nigeria, Enugu, Nigeria

Background: Studies on social determinants of TB using big microdata in sub-Saharan Africa (SSA) are scarce. The study identified the social determinants of TB and TB-related outcomes in Lesotho.

Methods: We conducted a secondary analysis of data from the 2023 Lesotho Demographic and Health Survey (DHS). The outcome variables were 'had TB,' 'TB-related stigma,' 'depression and anxiety,' 'cigarette smoking,' and 'health insurance ownership' among TB patients. The explanatory variables were individual, household, and health characteristics. We used Pearson's chi-squared test and complex sample logistic regression to identify the predictors of the outcome variables at a p-value of less than 0.05.

Results: TB prevalence significantly decreased with increasing age: 15-19 years (AOR=0.12, 95%CI:0.06-0.28, p<0.001), 20-29 years (AOR=0.16, 95%CI:0.08-0.31, p<0.001), and 30-39 years (AOR=0.40, 95%CI:0.24-0.64, p<0.001). Nevertheless, secondary education (AOR=2.85, 95%CI:1.04-7.83, p=0.042), clerical/sales/service occupation (AOR=2.55, 95%CI:1.18-5.49, p=0.017), HIV (AOR=3.20, 95%CI:1.30-7.85, p=0.011), and no stigma (AOR=3.45, 95%CI:1.83-6.50, p<0.001) increased the likelihood of having TB. Not having TB (AOR=2.41, 95%CI:1.42-4.11, p=0.001), being male (AOR=2.02, 95%CI:1.47-2.77, p<0.001), 15-19 years (AOR=4.40, 95%CI:2.51-7.70, p<0.001), 20-29 years (AOR=2.21, 95%CI:1.41-3.47, p=0.001), primary education (AOR=3.53, 95%CI:1.83-6.79, p<0.001), secondary education (AOR=2.73, 95%CI:1.49-5.01, p=0.001), and not working (AOR=1.52, 95%CI:1.02-2.27, p=0.039) increased the likelihood of TB-related stigma. Being male (AOR=35.80, 95%CI:11.82-108.44, p<0.001), no media exposure (AOR=9.22, 95%CI:2.88-29.45, p<0.001), low media exposure (AOR=4.06, 95%CI:1.37-11.98, p=0.012) and alcohol use (AOR=7.03, 95%CI:2.31-21.40, p=0.001) increased the odds of smoking among TB patients. Residing in urban areas (AOR=10.23, 95%CI:1.38-77.15, p=0.024), large households (AOR=11.15, 95%CI:2.27-54.68, p=0.003), and lack of a mobile phone (AOR=4.45, 95%CI:1.97-10.04, p<0.001) increased the odds of depression among TB patients. Being male (AOR=18.36, 95%CI:4.21-80.16, p<0.001), poorer (AOR=1.18, 95%CI:0.15-9.24, p<0.001), middle (AOR=3.05, 95%CI:0.47-19.57, p=0.002), richer (AOR=4.82, 95%CI:0.77-30.01, p=0.011), and richest (AOR=22.57, 95%CI:4.13-123.30, p<0.001) increased the odds of health insurance coverage among TB patients.

Conclusions: Evidence from Lesotho DHS highlights how microdata can enhance our understanding of the social determinants of TB in SSA. To effectively reduce vulnerability to TB and disparities in access to TB care, it is essential to integrate this evidence into Lesotho's TB control program and its multisectoral accountability framework for TB. We recommend that SSA countries include TB in future DHS surveys.

17

Economic Recovery Among Patients Following Drug-Susceptible Tuberculosis Treatment in Johannesburg, South Africa

Hirasen K[1,2], Rassool M[3], Charalambous S[4,5], Evans D[1]

[1]Health Economics and Epidemiology Research Office, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg , South Africa, [2]Health Economics Division, Faculty of Health Sciences, School of Public Health, University of Cape Town, Cape Town, South Africa, [3]Clinical HIV Research Unit (CHRU), Wits Health Consortium (WHC), Health Science Research Office (HSRO), Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa, [4]University of Witwatersrand, School of Public Health, Johannesburg, South Africa, [5]The Aurum Institute, Aurum House, Parktown, Johannesburg, South Africa

Introduction: The period following tuberculosis (TB) treatment completion, namely the 'post-TB' phase, is increasingly recognised as an important, under-researched aspect of the care cascade. We describe changes in economic indicators from treatment initiation to 18-months after TB treatment completion.

Methods: Socioeconomic sub-study nested within TB Sequel, a prospective cohort study designed to understand risk factors affecting long-term pulmonary function in people with drug-susceptible (DS) pulmonary tuberculosis (PTB). Adults (≥18 years) initiating DS-PTB treatment in the City of Johannesburg, South Africa were surveyed using the World Health Organization (WHO) patient cost instrument, at treatment initiation (month 0), completion (month 6), and 6- and 18-months post-treatment completion (months 12 and 24). We present economic data for patients completing surveys at respective time points, and a complete case analysis for a subset of patients completing surveys at all time points.

Results: 324 people initiating DS-PTB treatment were included. At initiation, 208 (64%) were male, with a median age of 37 years (IQR: 31-45). Majority were smear-positive (267; 82%), HIV-positive (221; 68%), and classified themselves as their household's main income earner (185; 59%). In complete case analysis (n=130), employed declined between months 0 (52.3%), 6 (45.4%), and 12 (23.9%), before returning to baseline-levels 18-months post-treatment completion (48.5%). The proportion of households that used savings, borrowed money, and sold assets to finance care were highest at month 0 (4.6%, 3.8%, and 0.8%), declining by 18-months post-treatment completion (2.3%, 0.8%, and 0.8%). Serious/very serious self-perceived financial impact of TB was highest at month 0 (10%), and by 18-months post-treatment completion, declined to 0.7%. Trends in economic recovery were similar among people completing surveys at respective time points, with marginal differences in absolute values (Table 1).

Conclusions: By 18-months post-treatment completion, most economic indicators returned to baseline-levels. However, employment levels never reached or surpassed baseline, potentially due to reduced work capacity/disability.

ORAL

ABSTRACT

PRESENTATIONS

2nd Conference on Innovations

in Tuberculosis 2025

12 May 2025

Windhoek, Namibia

18

The Impact of HIV-1 on the Phenotype and Function of Mycobacterium tuberculosis-Infected Human Alveolar Macrophages

Kajanga C[1,2], Mhango D[1,3], Chirambo A[1,3], Mandalasi C[1,3], Chimbayo E[1,5], Mitini-Nkhoma S[1,3], Kamkwatira A[1], Malamba R[1], Manduwa M[1], Tembo D[1], Mwandumba H[1,3,4]

[1]Malawi-Liverpool Wellcome Trust Clinical Research Programme, Blantyre, Malawi, [2]School of Science and Technology, Nottingham Trent University, Nottingham, United Kingdom, [3]Department of Clinical Sciences, Liverpool School of Tropical Medicine, Liverpool, United Kingdom, [4]Department of Medicine, Kamuzu University of Health Sciences, Blantyre, Malawi, [5]School of Infection, Immunity, and Inflammation, University of Glasgow, Glasgow, United Kingdom

Introduction: People with HIV-1 (PWH) face a heightened risk of developing tuberculosis (TB) compared to HIV-1-uninfected individuals. Pulmonary TB is the most prevalent form of TB in this population. Despite advancements like antiretroviral therapy (ART), which has reduced HIV-associated pulmonary TB rates, PWH still faces a threefold greater risk of TB compared to HIV-infected individuals, indicating persistent deficiencies in Mycobacterium tuberculosis (Mtb)-specific immune responses in the lungs. We postulated that PWH have impaired early innate immune responses, making them more susceptible to TB disease.

Methodology: We conducted a study at the Malawi Liverpool Wellcome Research Programme (MLW) and the Queen Elizabeth Central Hospital in Blantyre, Malawi. Participants, including healthy HIV individuals and asymptomatic PWH aged between 18 and 60 years, underwent bronchoscopy to collect bronchoalveolar lavage (BAL) samples. We used a CDC1551 fluorescent reporter Mtb strain expressing mCherry for flow cytometry analysis to evaluate Mtb uptake by AMs. Surface immunophenotyping determined CD206 and HLA-DR expression, while intracellular cytokine staining assessed IL-6 and TNF-α production in Mtb-infected AMs.

Results: Among 34 participants (17 HIV-negative, 17 PWH, including 4 ART-naive) (28 females and 6 males), PWH had a median CD4 count of [511.0 cells/µl range (113-841 cells/µl). PWH-derived AMs showed reduced CD206 expression (MFI 943) compared to HIV-negative individuals [(MFI 3878) (p = 0.0001)] and diminished Mtb-specific IL-6 [(MFI 632.0 vs. 1664) (p = 0.081)] and TNF-α [(MFI 3017 vs. 10386) (p = 0.0104)] responses. Despite ART, PWH AMs exhibited increased HLA-DR expression [(MFI 7049 vs. 3543) (p = 0.0402)], indicating ongoing immune activation.

Discussion: Our findings highlight HIV-related downregulation of CD206, crucial for Mtb phagocytosis by AMs, alongside elevated HLA-DR expression, suggesting persistent immune activation despite ART. Moreover, reduced IL-6 and TNF-α production in PWH indicates compromised early Mtb infection control. Persistent dysregulation of early AM responses to Mtb in the lungs likely contributes to the heightened TB risk in PWH, even with effective ART. These observations highlight the critical role of alveolar macrophage dysregulation in TB risk among PWH, emphasising the need for targeted strategies to augment lung immunity in this vulnerable population.

Developing more effective TB prevention tools, such as vaccines tailored to PWH, is a vital step forward. This work contributes to our understanding of TB pathogenesis in the context of HIV and could guide the design of interventions aimed at reducing TB incidence in PWH.

19

Antimicrobial Activity of Hop (Humulus lupulus) Extracts Against Drug-Susceptible and Resistant Mycobacterium tuberculosis Strains: Drug Rediscovery

du Plessis W[2], de Smidt O[1]

[1]Central University of Technology, Free State (CUT), Bloemfontein, South Africa, [2]Preserve Botanica, George, South Africa

Drug-sensitive tuberculosis can be cured, using a combination of 4 or more anti-TB drugs (rifampicin, isoniazid, pyrazinamide and ethambutol) for a six month period. However, this protracted treatment often leads to patient non-compliance resulting in the development of drug resistance. There is a dire need for more effective novel drugs with shorter treatment times and low toxicity. The use of hop (Humulus lupulus) for medicinal applications is not a new practice. Archaeological findings place hop seeds in the Neolithic period when hops were used solely for medicinal purposes.

The FDA considers hops essential oils and natural extractives to be generally recognized as safe (GRAS) for daily doses up to 300 mg for up to 3 months. The aim of this study was to test the efficacy of hop compounds to inhibit the growth of Mycobacterium tuberculosis. Minimal inhibitory concentrations (MIC) of 7 different hop preparations in middlebrook 7H9 medium as diluent, were determined using the broth micro-dilution assay and viability determined with resazurin. Inhibition was quantified against drug sensitive strain H37Rv as well as drug resistant strain MDR 11 by recording different levels of senescence after 7 and 14 days incubation. All compounds except Xanthohumol (>85% pure) and 20% hops glycerol/beta acid extract display potency against drug sensitive MTB and eliminated all bacteria at the specified MIC concentration.

All compounds had capacity to kill drug susceptible MTB and eliminated any persisters, as the MTB strain was incapable of regrowth after prolonged incubation. None of the compounds had the same killing power as rifampicin against susceptible strain H37Rv.

Compared to streptomycin (100 µg/ml), a hop beta acid in oil/water emulsion (100 µg/ml) had the same efficacy (MIC = 0.4 ug/ml). While H37Rv was 10-fold more susceptible to an ethanolic CO_2 hop extract (0.04 ug/ml), and 5-fold more to 45% hop beta acid in a propylene glycol solution (0.08 ug/ml). Interestingly, drug resistant strain MDR11 was more susceptible to all compounds tested than either rifampicin (>3.2 µg/ml) and streptomycin (6.25 µg/ml). The ethanolic CO_2 hop extract (10 µg/ml) showed the highest inhibition for both H37Rv and MDR11 at 0.02 µg/ml and 0.16 µg/ml, respectively.

In general, compounds with MICs of 1-5 µg/ml are considered useful for further investigation as potential drugs against MTB. Compounds with MIC within this range for MDR11 include hop beta acids in oil/water emulsion (0.8 µg/ml), ethanolic CO_2 hop extract (0.16 µg/ml) and 45% hop beta acids in propylene glycol solution (0.4 µg/ml) and will be further explored starting with minimum bactericidal concentration (MBC) testing against a wider spectrum of MBT isolates of clinical importance.

20

Resistance Patterns Among Treatment-Naive Drug-Resistant TB Patients in Nigeria

Awotoye J[1], Adetiba T[1], Bello Raji H[1], Chime C[1], Panwal T[1], Nwaduke P[1], Ogwu J[1], Ugwoke U[1], Adebayo O[1], Okpokoro E[2], Olupitan O[1], Agbaje A[3], Mensah C[4], Dakum P[3], Ssekitooleko J[5], Kimeu J[5], Reilly A[5], Zamzu M[5]

[1]Institute of Human Virology Nigeria (IHVN)), Abuja, Nigeria, [2]International Research Centre of Excellence (IRCE), Institute of Human Virology Nigeria , Abuja, Nigeria, [3]Institute of Human Virology Nigeria, Office of the CEO, Abuja, Nigeria. , Abuja, Nigeria, [4]Institute of Human Virology Nigeria, Office of the COO, Abuja, Nigeria. , Abuja, Nigeria, [5]The Global Fund to Fight AIDS,TB and Malaria, , Switzerland

Introduction: Nigeria is a high-tuberculosis (TB)-burden country with high rates of multidrug and extensively drug resistance to TB (M/XDRTB). Rapid molecular assays like Line-Probe-Assay (LPA) are crucial for diagnosing resistance, guiding treatment, and preventing MDR TB transmission. The Nigerian TB treatment guideline stipulates that all MTB/Rif resistance cases detected by a Xpert MTB/Rif be subjected to drug-sensitivity-testing (DST) with LPA before treatment commencement. This study analyzed the resistance pattern among TB treatment-naive patients (persons who have never taken anti-TB drugs) retested over the last 12months at Seven (7) National TB reference Laboratories in Nigeria.

Materials and Methods: This is a retrospective secondary analysis of data reported over one-year (1st January-31st December 2023) from Seven National TB reference laboratories (UCH Ibadan, NIMR Lagos, NTBLTC Zaria, JUTH Jos, Zankli Nasarawa, SH Amachara, FMC Yola) on Genexpert rifampicin-resistant samples. All sputum samples were subjected to first- and second-line genotypic DST using LPA GenoType® MTBDRplus assay for first line DST and GenoType® MTBDRsl® assay for 2nd-line DST respectively. Only samples with a definite and conclusive result were considered in these analyses. Simple frequencies and percentages were used to analyze the data using Microsoft Excel.

Results: A total of 628 GeneXpert rifampicin-resistant samples with clear and conclusive LPA results were analysed. Following first-line LPA, 21.5% (135/628) of samples were susceptible to first-line drugs (i.e., discordant to baseline Xpert) while 42.7% (268/628) were rifampicin mono resistant, 8.4% (53/628) had Isoniazid mono-resistance, and 27.4% (172/628) had Rifampicin and Isoniazid resistance. Following 2nd-line LPA, majority of the samples, 94.6% (594/628) were susceptible to second-line drugs (fluoroquinolones and aminoglycosides), 3.2% (20/628) had fluoroquinolones mono-resistance, 1.9% (12/628) had aminoglycosides mono-resistance (injectables), while 0.2 % (2/628) were resistant to both second-line anti-TB drugs.

Conclusion: The significant resistance to first line TB regimen among treatment-naive TB patients highlights the importance of access to rapid DST for all TB patients in alignment with pillar 1 of Global End TB strategy of integrated patient-centred TB care and prevention. It also highlights the urgent need to conduct another national Drug Resistance Survey following the one conducted in 2010 which put resistance among new TB cases at 2.9%.

21

Transforming Drug-Resistant TB Care: Eswatini's Journey to Enabling Nationwide Access to BPaLM Treatment Regimen for Drug-Resistant TB Patients

Vambe D[1,2], Mamba B[3], Nkomo T[3], Masina S[3], Mazuruse T[4], Dlamini L[5], Mandalakas A[3], Kay A[2,3], Ngwenya S[1], Thi S[1]

[1]Baylor College of Medicine Children's Foundation Eswatini, Mbabane, Eswatini, [2]Department of Pediatrics, Global TB Program, Baylor College of Medicine, Houston, United States, [3]National TB Control Program, Manzini, Eswatini, [4]Good Shepherd Hospital, Siteki, Eswatini, [5]Nhlangano TB Referral Hospital, Nhlangano, Eswatini

Background: The BPaLM (bedaquiline-pretomanid-linezolid-moxifloxacin) regimen is a 6-month, all-oral treatment for multidrug-resistant tuberculosis (MDR-TB) that has shown high efficacy in clinical trials, bringing the potential to improve treatment outcomes over the longer regimen. The World Health Organization (WHO) endorsed this regimen in May 2022.Despite the WHO's endorsement, adoption and implementation of the BPaLM regimen by national programs has been slow. We present how Eswatini rapidly achieved nationwide access to BPaLM, which may serve as a model for other countries.

Materials and Methods: Following the WHO's endorsement, The Eswatini National Tuberculosis Control Program (NTCP) sensitized stakeholders and developed a structured roll-out plan. Pretomanid was procured through the Global Drug Facility in December 2022. A transition plan was developed in February 2023 involving DR-TB clinicians, recipients of care, laboratory teams, pharmacy personnel, regional TB teams, and the National TB and HIV Program officers. The plan included developing interim guidelines, procurement plan, a structured training schedule, and a communication strategy for healthcare workers and affected communities. Additional considerations included strengthening laboratory capacity, monitoring and evaluation, active drug safety monitoring, patient support , supportive supervision and clinical management support. A readiness assessment was conducted to identify strategies for equitable access.
A standard operating procedure and training curriculum on clinical management using BPaLM regimen was developed and disseminated through serials of training to health care workers from all 14 DR-TB treatment sites. The first patients were enrolled on BPaLM regimen in February 2023. Data of DR-TB patients from performed in Stata version 18 to determine the proportion of DR-TB patients initiated on BPaLM regimen and their end of treatment outcomes.

Results: A total of 184 patients were enrolled on DR-TB treatment between January 2023-December 2024. with the characteristics of male (60%), HIV coinfected (60%) of which 94% on ART, pulmonary-TB (94%), non-severe extra-pulmonary TB (6%) and new cases (62.5%). Ninety-six (72.7%) out of 132 eligible were enrolled on BPaL/M regimen. Others were enrolled on the alternative standard treatment regimens including Isoniazid-mono resistant TB (Hr-TB) regimen (27), longer regimen (13), individualized regimen (7) and 9–12-month shorter regimen (38). Most patients who were initiated on BPaLM were registered as having rifampicin-resistance TB (44.8%), followed by Hr-TB (16.7%) and MDR-TB (11.5%). Outcomes were available for 67 out of the 96 treated with BPaLM. Overall treatment success rates (TSR) for the BPaL/M regimen were 84% (56/67). The TSR for BPaLM was 84.2% (48/57) and that of BPaL was 80% (8/10).

Conclusion: The TSR of BPaLM regimen was high and benefited patients with shorter time-spent on treatment. The success of this rapid rollout was due to a well-coordinated process that involved multidisciplinary transition planning, a readiness assessment, standard operating procedures, and clinical management training for health care workers. The Eswatini experience can inform nationwide introducing BPaLM regimen in other TB/HIV high-burden countries.

22

A Game-Changer for Multi-Drug Resistant TB? Patient Experiences With the BPaL-M Regimen in Zambia

Bhebhe A[1,2], Mputu M[2], Chirwa U[2], Banda F[1,2], Simukonda F[1,2], Mulenga L[1,2]

[1]*University Teaching Hospitals-Adult Hospital, Lusaka, Zambia,* [2]*Ministry of Health , Lusaka, Zambia*

Background: Zambia is among the 30 high tuberculosis (TB) burden countries globally, with TB posing a significant public health threat, particularly among vulnerable populations such as people living with HIV. The management of TB in Zambia is further complicated by a rising incidence of multidrug-resistant TB (MDR-TB), which remains a major challenge due to lengthy treatment durations, high pill burden, significant toxicity, and a historically low treatment success rate. The conventional MDR-TB regimens, which can extend up to 18–24 months, have been associated with high rates of loss to follow-up, poor adherence, and increased mortality. In response to these challenges, the BPaL-M regimen-a novel, all oral, 6-month treatment for MDR-TB-was introduced in Zambia in June 2024 and piloted in two provinces initially.

This regimen, which consists of bedaquiline, pretomanid, linezolid, and moxifloxacin, offers a shorter and potentially more effective alternative to traditional MDR-TB therapies. However, successful implementation requires a deep understanding of patient experiences, including treatment tolerability, adherence patterns, and the management of adverse events. Capturing these insights is critical to inform national policy, enhance patient-centered care, and ensure a smooth scale-up of the regimen across the country.

Methods: The pilot enrolled 80 MDR-TB patients across Lusaka and Copperbelt provinces, the country's high-burden regions. A subset of participants was selected for in-depth analysis. Data collection included structured patient interviews and routine clinical monitoring. The first patient initiated treatment on June 29, 2024, and the last on December 28, 2024.

Results: Preliminary findings suggest that the 6-month regimen was generally well-tolerated. However, fluoroquinolone resistance status remained unconfirmed for most patients, necessitating stringent active drug safety monitoring (aDSM). Key adverse events included QTc prolongation, peripheral neuropathy, and optic neuritis, all managed through close clinical oversight. Despite these challenges, patients reported a significant reduction in treatment burden compared to traditional regimens. The inability to systematically confirm fluoroquinolone resistance posed a major programmatic challenge, raising concerns about treatment effectiveness. Strengthening diagnostic capacity is essential to maximize the regimen's impact.

Conclusion: The BPaL-M regimen presents a promising option for MDR-TB treatment in Zambia, offering a shorter, potentially more manageable alternative for patients. However, successful scale-up will require enhanced diagnostics, robust pharmacovigilance, and continuous adaptation to patient needs. These insights will guide national policy decisions on expanding access to BPaL-M.

Keywords: MDR-TB, BPaL-M regimen, active drug safety monitoring, fluoroquinolone resistance

23

Leveraging AI-Enabled X-Ray Technology for Integrated TB and NCD Screening in Remote Rural Communities: Insights From the INTEGRATE TB Project in Nigeria

Okoye C[1], Ilozumba J[1], Creswell J[2]

[1]Catholic Caritas Foundation Of Nigeria, Enugu, Nigeria, [2]StopTB partnership Geneva, Geneva, Switzerland

Background: Tuberculosis (TB) and non-communicable diseases (NCDs), particularly cardiovascular diseases (CVDs) and chronic respiratory diseases (CRDs), pose significant health challenges in Nigeria, especially in remote rural communities with limited healthcare access. The INTEGRATE TB project leverages AI-enabled chest X-ray technology to facilitate integrated screening for TB, CVDs, and CRDs, aiming to enhance access, promote early detection, and strengthen linkage to care. Here, we present our experiences and key insights from the project's implementation.

Methods: A community-based screening approach was implemented across rural communities in Ebonyi and Nasarawa state in Nigeria, the Ai-enabled X-ray was used for screening for both TB, CVD and CRDs, a clear referral pathway was developed for each disease entity and the presumptive identified were referred accordingly. For TB presumptive that could produce sputum, samples were sent for Gene Xpert testing and those who couldn't produce sputum, their X-ray images were sent to radiologist with their clinical history for review. the CVDs and CRDs presumptive were referred to an already identified specialist care for further investigation and treatment.

Results: From January 2023 to December 2024, a total of 12,337 individuals were screened using AI-enabled X-ray technology. The AI report indicated an abnormality rate of 35% (4,318 cases). Among these, 1,216 (26%) were presumptive TB cases, 1,030 (24%) were presumptive CVD cases, and 2,072 (48%) were presumptive CRD cases. A total of 403 TB cases were confirmed and linked to treatment. While all individuals with presumptive CVD and CRD were referred for further evaluation, only 8% successfully reached a treatment center.

Conclusion: The INTEGRATE TB project has shown the potential of AI-enabled X-ray technology as a transformative tool for integrated TB and NCD screening especially in remote rural settings. Strengthening community-based interventions and leveraging digital innovations can enhance disease detection, promote early treatment initiation, and improve health outcomes in underserved populations. However, there is need to Empower PHCS to provide basic NCD care, because majority of the NCD presumptive identified could not access care due to inability to reach the treatment center which is usually in the town.

24

Optimizing the Implementation and Scale-Up of the WHO Treatment-Decision Algorithms for Children with Pulmonary Tuberculosis in Sub-Saharan Africa

Said Msafiri F[1], mfinanga s[2], Ngadaya E[2]

[1]*Kampala International University of Tanzania, Dar Es Salaam, Tanzania, United Republic of,* [2]*national institute of Medical research, Dar Es Salaam, Tanzania*

Background/Purpose: Pediatric tuberculosis (TB) remains underdiagnosed and undertreated in sub-Saharan Africa, with only 32% of children under five receiving timely care. This results in over 200,000 child deaths annually. The World Health Organization (WHO) recommends Treatment Decision Algorithms (TDAs) to improve TB diagnosis and treatment initiation in children under 10 years old. The OPTIC-TB study aims to evaluate the effectiveness, cost-effectiveness, feasibility, and acceptability of WHO-recommended TDAs in Tanzania, Uganda, and the Democratic Republic of Congo.

Methods: This four-year cluster-randomized, stepped-wedge trial includes 120 health facilities across three countries, stratified by resources and healthcare system characteristics. The study targets 60,000 children under 10 with presumptive TB, comparing TDA-based diagnosis with standard of care (SOC). Primary outcomes include TB detection rates, treatment initiation, and outcomes. Mixed-methods data collection captures implementation fidelity, barriers, and contextual adaptations. Cost-effectiveness analyses using a Markov model assess incremental costs and population-level impact.

Results: Preliminary data suggest TDAs improve pediatric TB detection by at least 20% compared to SOC. TDAs' integration of clinical features and molecular diagnostics enhances diagnostic accuracy while reducing delays in treatment initiation. Implementation challenges, such as limited resources and training, were mitigated through adaptive strategies, increasing acceptance among healthcare workers and policymakers.

Conclusion: OPTIC-TB demonstrates the potential of WHO-recommended TDAs to address diagnostic gaps, improve TB outcomes, and guide health policy in high-burden regions. The study underscores the importance of scalable, evidence-based interventions for achieving Sustainable Development Goal 3.3 to end TB by 2030.

25

Evaluating Targeted Next-Generation Sequencing for Diagnosing Drug-Resistant Tuberculosis in Namibia

Mhuulu L[1], Ekandjo H[1], Dreyer V[2], Günther G[1,5], Niemann T[1,2], Claassens M[1], Mokomele Q[3], Ruswa N[4], de Araujo L[2], Niemann S[1,2], Nepolo E[1]

[1]University Of Namibia, School of medicine, Windhoek, Namibia, [2]Research Center Borstel , Borstel, Germany, [3]Namibia Inistitute of Pathology, Windhoek, Namibia, [4]National Tuberculosis and Leprosy Program, Ministry of Health and Social Services , Windhoek, Namibia, [5]Department of Pulmonology and Allergology, Inselspital, Bern University Hospital, University of Bern, Bern, Switzerland

Rapid and accurate detection of Mycobacterium tuberculosis (MTB) resistance to anti-TB drugs is critical for effective treatment and control of tuberculosis (TB). Sequencing-based approaches such as Targeted next-generation sequencing (tNGS) is increasingly being adopted for the detection of drug resistance in MTB, due to its ability to predict drug resistance (DR) with comprehensive drug resistance profile. This study sought to assesses the diagnostic performance of tNGS on clinical isolates in predicting DR and address mutations missed by available commercial molecular diagnostics. A total of 119 clinical Mtb isolates were analyzed using a targeted sequencing deeplex assay covering key resistance-associated genes, including rpoB, katG, inhA, embB, pncA, gyrA and rv0678. Sensitivity and specificity were evaluated against whole-genome sequencing (WGS).

The results demonstrated a high concordance between tNGS and WGS (≥90%) for detecting mutations associated with resistance to first line and second line drugs. Both workflows had sensitivities and specificities of more than 95% for rifampicin and isoniazid, and high accuracy for fluoroquinolones (sensitivity approximately ≥94%) and second line-injectables (sensitivity 80%) compared with the composite reference standard. Importantly, these assays also detected mutations associated with resistance to critical new and repurposed drugs (bedaquiline, linezolid) not currently detectable by any other WHO-recommended rapid diagnostics on the market.

We note that the current format of assays has low sensitivity (≤50%) for linezolid and more work on mutations associated with drug resistance is needed. The finding underlines the potential of tNGS in guiding personalized TB treatment and can serve as a scalable alternative to traditional DST, particularly in resource-limited settings.

26

Bridging the Gap in TB Screening Among Men: A Community-Based, Gender-Sensitive CQI Approach in Wakiso District Uganda.

Joseph S[1], Shamira 2[1], Samuel K[1], Sarah [1], Andrew [1], Nyanzi [2], Kalema N[2], PRISCILLAR A[2], IPOLITO M[3], RICHARD L[1], CAREN M[1], RACHEAL A[1], ESTHER N[1]

[1]THE AIDS SUPPORT ORGANISATION , Kampala, Uganda, [2]INFECTIOUS DISEASE INSTITUTE , KAMPALA , UGANDA , [3]AFRICAN DIVERSITY AND INCLUSION CENTRE , DIV A, UGANDA

Background: Tuberculosis (TB) remains a leading cause of mortality globally, with low-income countries like Uganda disproportionately affected. Men in Uganda experience a TB prevalence rate four times higher than women, driven by societal norms, economic priorities, and stigma that discourage health-seeking behaviors. This disparity is particularly acute in high-risk regions served by TASO Entebbe, including the overcrowded islands of Lake Victoria and densely populated areas of Wakiso District, where limited healthcare access and poor living conditions exacerbate TB transmission.

Despite their elevated vulnerability, men are underrepresented in the TB care cascade; in January 2022, TASO Entebbe achieved only 66% (10/15) of its monthly TB case detection target, with men comprising 67% of cases insufficient relative to their higher burden. Root-cause analysis identified the lack of targeted, community-based screening as a key barrier to effective TB detection, underscoring the need for a Continuous Quality Improvement (CQI) initiative incorporating gender-sensitive, community-focused approaches to address healthcare barriers impeding TB detection and care among men.

Intervention: The TB clinic team at TASO Entebbe, in collaboration with the African Diversity and Inclusion Centre, implemented a community-based Continuous Quality Improvement (CQI) initiative in Wakiso District, Uganda, to address gaps in tuberculosis (TB) screening among men. Launched in January 2022 and guided by the Pareto Principle, the intervention began with hotspot mapping to identify high-risk zones, including fishing villages, construction sites, and areas with concentrated populations of men who use drugs, men who have sex with men, partners of sex workers, and tobacco users. Tailored screening activities were integrated into social events, market days, and flexible schedules to maximize accessibility. Community empowerment involved training 150 resource persons, including 80 post-TB survivors and influential peers, using participatory approaches aligned with Ministry of Health protocols. A 24/7 referral hotline and a sputum transportation network streamlined diagnosis and treatment. At the same time, real-time data reporting through DHIS2, integrated with WhatsApp and SMS platforms, enabled timely follow-up and data-driven decision-making. This comprehensive approach significantly improved TB case detection and health outcomes among underserved, high-risk male populations.

Results: quantitative analysis the intervention achieved a 100% TB diagnosis rate, surpassing the 95% target, with 29,880 men screened and 3,777 presumptive TB cases referred for diagnosis. Flexible screening schedules contributed to an 85% participation rate, driven by post-TB survivors and community influencers. Qualitative insights emphasized strong community engagement and the pivotal role of influencers in initiating referrals.

In conclusion, this initiative highlights the effectiveness of digitally enhanced, gender-sensitive strategies in improving TB screening among men. By utilizing community resource persons, offering flexible service delivery, and incorporating real-time digital tools, the intervention successfully addressed gaps in TB screening, promoted health equity, and reduced transmission. It provides a scalable model that can be adapted to similar contexts to tackle health disparities and enhance TB care in underserved communities.

27

Community-Based TB Screening: Malawi's Innovative Approach in Finding People With Tuberculosis

Mmanga M[1], Mbendera K[1], Shigut B[1]

[1]National TB And Leprosy Elimination Program, Lilongwe, Malawi

Background and implementation challenges: Malawi still has a 29% gap in TB case notification (Global TB Report, 2022) and is categorized as one of the highest TB/HIV burden countries in Africa. The National TB Program is closing the gap by implementing creative active TB case-finding (ACF) interventions. To aid in early TB diagnosis, the World Health Organization advises utilizing chest X-ray (CXR) screening on TB patients who are asymptomatic. In light of this, Malawi tested the use of artificial intelligence-powered mobile digital X-rays for tuberculosis ACF in four major cities in 2018. The program targeted high-risk groups. The intervention was scaled up nationwide based on the lessons discovered during the first phase of implementation

Implementation Design: The intervention used CXR and TB symptom screening questionnaires for all clients targeted under this intervention. Individuals aged 15 years and above with either fever, weight loss, cough, and night sweats of any duration or with a CAD4TB score of >60 were considered TB presumptive. An Xpert MTB rif Ultra was used to assess each sample onsite. All diagnosed with TB were linked to treatment facilities.

Results/Impact: From year 2019 to 2024, routine program quantitative data was examined (Figure 1); 628,822 (M = 338,557; F = 290,265) clients had TB screenings; 69,458 (M = 41,805; F = 27,653) Presumptive TB cases were found; presumptive categories included 29,880 with symptom positive only, 21,756 with abnormal CXR only, and 17,822 with both abnormal CXR and symptom positive. Of the cases reported, 6,381 (M = 4,507; F = 1,874) had a tuberculosis diagnosis and 96% of them started treatment.

Conclusions: The intervention is ideal and feasible for implementation at the community level, which includes hard-to-reach places, and is very efficient in identifying missing TB cases among high-risk populations, including men.

28

Strengthening Diagnostic Approaches: Utilizing X-Ray for Improved28 - Childhood TB Notification in Stool-Negative GeneXpert Cases in Akwa Ibom

Batur S[1]

[1]Kncv Nigeria, Abuja, Nigeria

Background: Tuberculosis (TB) remains a significant health challenge, particularly among children in high-burden regions. GeneXpert, while effective, often yields negative results in pediatric stool samples, leading to missed diagnoses. This study evaluates the use of chest X-ray (CXR) as an adjunct diagnostic tool to improve childhood TB notification in cases where GeneXpert results are negative.

Methods: The study was conducted in Akwa Ibom, Nigeria, from January to December 2023. Pediatric patients (ages 0-14) presenting with symptoms suggestive of TB and who tested stool-negative on GeneXpert were subjected to CXR. The CXRs were evaluated by trained radiologists for signs consistent with TB. Patients with suggestive CXR findings were further assessed clinically and through contact tracing. Data on TB notification rates before and after the implementation of CXR were compared.

Results: A total of 300 children with stool-negative GeneXpert results underwent CXR. Out of these, 85 (28.3%) had CXR findings indicative of TB. Subsequent clinical evaluation and contact tracing confirmed TB in 72 (24%) of these cases. The introduction of CXR led to a significant increase in childhood TB notifications in Akwa Ibom, from 120 cases per 100,000 children (pre-implementation) to 175 cases per 100,000 children (post-implementation), representing a 45.8% increase. The use of X-ray as a supplementary diagnostic tool resulted in a 22.5% increase in childhood TB notifications compared to relying solely on GeneXpert stool results.

Conclusion: The integration of chest X-ray as a supplementary diagnostic tool significantly improves the detection and notification of childhood TB in cases where GeneXpert results are negative. This approach has the potential to enhance TB control efforts, ensuring timely diagnosis and treatment of TB in children, thereby reducing TB-related morbidity and mortality in high-burden settings

29

The Impact of Clinical Contact Tracing on Tuberculosis Case Finding and Preventive Treatment in Lagos State, Nigeria: A Pilot Study

ALU P[1], DANIEL O[1], MENSAH [2], PEDRO M[1], AGBAJE A[2], TORIOLA [1], ENEOGU R[3]

[1]*INSTITUTE OF HUMAN VIROLOGY NIGERIA, LAGOS, NIGERIA ,* [2]*INSTITUTE OF HUMAN VIROLOGY NIGERIA, ABUJA, NIGERIA,* [3]*USAID , ABUJA, NIGERIA*

Background: Nigeria with a population of over 220 million has one of the highest burdens of TB in the world and 6th highest contributor to the global TB incidence. The Nigerian National TB management and Control Guideline recommends all household and close contacts of bacteriologically diagnosed TB patients be evaluated for TB. However, contact tracing of bacteriologically positive cases has not produced the expected yield as part of the broader efforts to meet the 2030 TB target to eliminate TB epidemic as outlined in UN SDGs. We piloted the contact tracing of clinical TB Case to see its impact on TB cases finding and preventive treatment.

Intervention: The TB LON 3 project implemented by Institute of Human Virology Nigeria (IHVN) with the support from USAID piloted Contact Tracing of clinically diagnosed TB case in public facilities from June to August 2024 in Lagos State Southwestern Nigeria. Based on these all-positive cases (bacteriological and clinical) in the facilities supported by IHVN where contact traced and reported using the Standard national data reporting tool and the District Health Information system (DHIS).

Results: During the study period, a total of 973 index TB cases were contact traced, of which 249 (26%) were clinically diagnosed patients, 3,493 contacts were identified among the index cases, out of which 955 (26%) were contacts of the clinically diagnosed index cases and were all screened for TB, 196 presumptive cases were identified and evaluated. After evaluation, 21 TB cases were reported and started on treatment, contributing 24% of the total TB cases.

In terms of contribution to tuberculosis preventive treatment (TPT), of the total 2470 contacts placed on TPT, 203 (8%) were contact of clinically diagnosed index cases.

Results show that contact tracing clinically diagnosed index case increased case finding by 24%, contributed over 23% to contact tracing cascade efficiency with an NNS of 45 and NNT of 9 to get a positive TB case.

Conclusions: The findings from this study highlight the potential of clinical contact tracing in bridging gaps in TB case finding, treatment and preventive treatment, particularly in high-burden areas. Scaling this approach will help accelerate progress toward achieving the 2030 TB elimination targets, reducing TB morbidity and mortality in Nigeria.

30

Impacts of Psychosocial Support Systems on Treatment Outcomes of Drug Resistance TB: A Case Study of Population Services Kenya

Mahihu A[1]

[1]PS Kenya, Nairobi, Kenya

Background: Drug-resistant TB remains a major public health concern in many countries. In Kenya, research indicates 2,500 people acquire DRTB annually, one of the main obstacles in the success of achieving the 2030 targets set in the End TB Strategy. The country adopted the WHO injection-free DRTB regimen and utilizes three models of care delivery: facility, community, and isolation to control the epidemic of DRTB. Despite great progress in drug-resistant TB management, the treatment success rate Is still at 77% , against a target of 85%. The low TSR has been affected by complex treatment challenges; psychosocial challenges paused by the disease and a long treatment journey. PS Kenya explored a psychosocial support systems strategy in a bid to enhance treatment outcomes of DRTB and control the epidemic in Kenya. Activities were implemented between August 2021- December 2023

Intervention: Population Services Kenya in partnership with the Ministry of Health, deployed roving counselors to offer psychosocial counseling, home visits, and regular mental assessment on the patients enrolled in DRTB treatment. For every newly enrolled DRTB case, the psychosocial counselor used the PHQ9 tool to assess the mental state of the DRTB cases. This informed on the severity of depression and monitoring the progress. Home visits were also conducted to understand the patient's Demographics, socioeconomic status, identification of treatment barriers, and importantly, to cascade information on DRTB infection prevention and the weightiness of Tender Love and Care from the family members in the improvement of treatment outcomes.

Results: A great decline, by 8% for severe and moderate depression cases was reported, after subsequent psychosocial counseling sessions at the end of the program. Home visits curbed stigma from the family members and 90% turned up to be treatment supporters. The treatment success rate rose from 77% to 93% at the end of the program, a 16% spike.

Conclusion: DRTB patients undergo a lot of social problems. A psychosocial support system has proved to be one of the best patient-centered approach strategies that enhance treatment outcomes. More insights are required on how to improve treatment outcomes of drug-resistant tuberculosis in Kenya.

31

Whole Genome Sequencing-Based Drug Resistant Genes Mutation Markers of Multi-Drug Resistant Mycobacterium tuberculosis in Ethiopia

Tiruye A[1], Wang S[2], Gelaw B[3], Tessema B[4]

[1]Wollo University, Dessie, Ethiopia, [2]The Ohio State University, Columbus , USA, [3]University of Gondar, Gondar, Ethiopia, [4]University of Gondar, Gondar, Ethiopia

Background: Tuberculosis (TB), caused by Mycobacterium tuberculosis (MTB) bacteria, is a leading infectious diseases worldwide that results morbidity and mortality, including in Ethiopia. Drug resistant M. tuberculosis is an emerging threat for TB control, making it important to detect the underlying genetic mutations, and thereby inform treatment decision making and prevent further transmission. There is no any study done on drug resistant mutation markers of drug resistant M. tuberculosis in Ethiopia. Therefore, the aim of this study is to identify the drug resistant gene mutation markers of multi-drug resistant (MDR) TB strains using whole genome sequencing (WGS) in the Amhara region.

Methods: Forty-five multi-drug resistant MTB isolates were collected between 2016 and 2018 from patients admitted at nine MDR-TB treatment center hospitals in Amhara region. Sputum samples were collected from each patient. Detection of drug resistance-conferring genes was subsequently performed using WGS with Illumina NextSeq 550 platform. Drug resistances gene markers for each strain was analyzed using TBprofiler and PhyReSE software.

Results: Majority of the M. tuberculosis isolates were TUR strain-type. According to WGS based drug resistance analysis of 41 isolates, 34 isolates were MDR-TB, 4 isolates were pre-XDR-TB and 3 isolates were susceptible for all first-line and second-line drugs. The most common drug resistant gene mutation markers among MDR-TB isolates were S315T in KatG (isoniazid), S450L in rpoB (rifampicin), G406S in embB (ethambutol), L88T in rpsL (streptomycin), T76P in pncA (pyrazinamide), A90V in gyrA (fluoroquinolones) and 1401 A→G in rrs (aminoglycosides/peptide). Forty five percent of TUR lineage was resistant to all first line drugs.

Conclusions: The most frequent resistant mutations were detected in the katG and rpoB genes, conferring resistance to isoniazid and rifampicin respectively. This study strongly highlights the importance of combating drug resistance (DR)-TB in Ethiopia through implementing next generation sequencing that can test resistance to all anti-TB drugs with a faster turnaround time. This can facilitate timely clinical decisions in managing MDR-TB patients with non-adherence or lost to follow-up.

32

Tobacco Use in Newly Diagnosed People With Pulmonary TB in Johannesburg, South Africa

Jinga N[1], Ngolele L[1], Madlala S[1], Ramushu C[1], Musina M[1], Tau H[1], Mokhesi N[1], Ballif M[2], Fenner L[2], Evans D[1]

[1]Health Economics and Epidemiology Research Office, University of the Witwatersrand, Johannesburg, South Africa, [2]Institute of Social and Preventive Medicine, University of Bern, , Bern, Switzerland

Background: Smoking increases the risk of contracting tuberculosis (TB) and the likelihood of recurrent TB and impairs the response to treatment. In 2023, the WHO introduced the MPOWER measures. This guidance provides a foundation for countries to implement and manage tobacco control.

Objectives: We aim to describe tobacco use among newly diagnosed people with pulmonary TB and explore factors associated with self-reported smoking status.

Methodology: Participants (≥15 years) initiating treatment for drug-susceptible pulmonary TB in Johannesburg between 10/2022 and 03/2024 were recruited as part of an ongoing TB cohort study in IeDEA-SA. Socio-economic and demographic factors and smoking status were collected using a structured questionnaire. The WHO Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST) questionnaire, which screens for substance use, was also included. We applied descriptive data analysis and used log-binomial regression to identify factors associated with self-reported smoking status.

Results: We analyzed data for 218 individuals with PTB; median age 39 years (IQR 33-49), 62% (136/218) male, 62% (136/218) HIV positive, and 22% (47/218) with previous TB.

Nearly a quarter of participants (24%, 53/218) reported currently smoking, while 41% (91/218) reported using tobacco products, including cigarettes, chewing tobacco, and cigars. Among current smokers, 85% (45/53) were male, and approximately 40% smoked 5 to 10 cigarettes per day. Of those who used tobacco, 54% (49/91) used it daily, and 38% (35/91) had attempted to quit.

Among current smokers, the median duration of smoking was 20 years (IQR 11–25), with males reporting a longer duration (20 years, IQR 15–25) compared to females (15.5 years, IQR 6.5–41.5) (p=0.81). For past smokers, the median duration of smoking was 10 years (IQR 4.5-15). Once again, males reported a longer smoking duration (10.5 years, IQR 5–20) than females (6.5 years, IQR 3–11.5) (p=0.17

From the adjusted analysis, males (aRR=3.10 CI 1.53-6.25) and those who reported alcohol use were more likely to be current smokers (aRR=1.89 CI 1.11-3.22).

Conclusions: Smoking is prevalent among male TB patients and alcohol users in Johannesburg despite the potential adverse effects of smoking on TB treatment outcomes. Smoking habits were long-standing, with a median duration of 20 years for current smokers. Additionally, nearly 40% of smokers consumed 5-10 cigarettes per day, and those who used alcohol were almost twice as likely to smoke. The findings highlight the need to implement the WHO recommendations on smoking cessation which state that brief advice from health professionals can increase quitting success rates by up to 30%, while intensive advice increases the chance of quitting by 84%.

33

Prevalence and Correlates of Hyperglycaemia Among People Living With HIV and TB on Dolutegravir-Based Antiretroviral Therapy in Zimbabwe: A Cross-Sectional Study

Zireva T[1], Musarurwa C[2], Mazhandu A[1], Nherera B[1], Munyati S[3], Manasa J[1,3], Zhou D[1], Vhanda D[1,3]

[1]University Of Zimbabwe, Harare, Zimbabwe, [2]University of Rwanda, Kigali, Rwanda, [3]Biomedical Research and Training Institute, Harare, Zimbabwe

Introduction: In low- and middle-income countries (LMICs), dolutegravir (DTG)-based antiretroviral therapy (ART) regimens are the preferred first-line treatment for adults, adolescents, and children infected with the human immunodeficiency virus (HIV). Dolutegravir, a second-generation integrase strand transfer inhibitor (INSTI), exhibits a higher genetic barrier to resistance, improved tolerability, and reduced potential for drug-drug interactions. However, emerging reports suggest a possible association between DTG usage and hyperglycaemia. Therefore, this study aims to investigate the hyperglycaemia risk in DTG-based ART among people living with HIV and TB in Zimbabwe.

Methods and Methods: An analytical cross-sectional study was conducted at the Parirenyatwa Group of Hospitals (PGH) Opportunistic Infections Clinic (OIC) and Beatrice Road Infectious Diseases Hospital (BRIDH) on adults aged 18 and over in Harare, Zimbabwe. Data collection was done from April 2024 to July 2024. Consenting and eligible participants presenting at the PGH OIC and BRIDH were stratified into three groups based on their HIV and TB status and associated DTG dosages as follows: group 1; 45 HIV-negative, TB-positive and DTG-naive patients, group 2; 62 HIV-positive, TB-negative and on 50mg DTG patients, group 3; 55 HIV-positive, TB-positive and on 100mg DTG patients. Patients' glycated haemoglobin (HBA1c) levels were analysed to determine the hyperglycaemic risk. A questionnaire was also administered to assess the risk factors associated with hyperglycaemia in people living with HIV and TB. The R statistical software (version 4.3.2 Vienna, Austria) was used for data analysis.

Results: The median (IQR) ages for these sub-groups were 44 (36-56), 44 (29.3-54.8), and 45 (35-56) years respectively and the age range was 20-80 years. The overall prevalence of impaired glucose regulation (IGR) was 40%, and hyperglycaemia was 31% in the group taking 100mg of dolutegravir. In the multivariable logistic regression analysis with variable elimination, taking 100mg of DTG was associated with a 5.17 (95%CI: 1.21-27.82) fold risk of developing hyperglycaemia.

Conclusion: The study findings indicate that the prevalence of hyperglycaemia and IGR is high in patients taking DTG-based ART in Zimbabwe. People living with both HIV and TB taking a double dose of DTG are at a higher risk of hyperglycaemia and IGR than those taking lower doses. This emphasizes the necessity for clinical and public health interventions to mitigate this emerging hyperglycaemic risk.

34

Comparative Pharmacokinetics of Dolutegravir in Children With HIV With and Without TB Co-Infection

Martyn-Dickens C[1], Yang H, Enimil A, Dompreh A, Sly-Moore E, Bosomtwe D, Amissah K, Ojewale O, Asiedu P, Appiah A, Maranchick N, Peloquin C, Antwi S, Kwara A

[1]*Komfo Anokye Teaching Hospital, Kumasi, Ghana*

Background: Current World Health Organization (WHO) guidelines recommend dolutegravir (DTG) 50 mg once-daily for children with HIV (CWH) weighing at least 20 kg and 50 mg twice daily for those with TB/HIV coinfection while on rifampin-containing TB treatment. Some experts have questioned the need for the added dose in the setting of TB treatment given the challenges and costs in programmatic settings. We therefore examined the pharmacokinetics (PK) of DTG in CWH with and without TB co-infection treated according to current guidelines.

Methods: Children weighing ≥20 kg with HIV with and without TB coinfection on DTG-based therapy were enrolled. After at least 4 weeks (PK1) and 7–8 months on ART (PK2), blood samples were collected at 0, 1, 4, 8, 12 and 24 hours post-dose. DTG concentrations were measured using validated LCMS/MS and PK parameters calculated by noncompartmental analysis. Geometric mean ratios were used to compare PK parameters between the two groups as well as on and off TB treatment in those with TB/HIV co-infection.

Results: Of 25 participants, 13 (52%) had TB coinfection, 68% were males and 60% were younger than 14 years old. There was no significant difference in demographic characteristics between children with and without TB coinfection. Dolutegravir area under the concentration-time curve (AUC0-24h) and 24-hour post-dose concentration (C24h) were 93% and 69% higher in children with TB/HIV coinfection on twice-daily compared to those with HIV on once-daily dosing, but the differences were not statistically significant. Among the children with TB/HIV, TB treatment increased DTG clearance by 86%. However, DTG C24h and AUC0-24h were not significantly different between the two periods. Overall, 2/12 and 1/11 CWH at PK1 and PK2 (respectively), and none of those with TB/HIV had DTG C24h <0.32mg/L (the EC90). At 6 months of ART, 11/13 (84.7%) children with TB/HIV and 8/11 (72.3%) with HIV only had HIV RNA <200 copies/mL. There were no treatment discontinuations due to medication side effects.

Conclusions: The plasma exposure and trough concentrations of dolutegravir were similar in CWH weighing ≥20 kg with or without TB coinfection treated according to current WHO dosing guidelines.

35

Improving TB Yield Among Household TB Contacts Through Additional 6-Months Follow-Up Contact Investigation: Lessons From Malawi

Matewere S[1]

[1]Partners In Hope Malawi, Lilongwe, Malawi

Background: World Health Organization recommends household TB contact investigation as one of the strategies for active TB case-finding. The Malawi National TB and Leprosy Elimination Program adopted the strategy and recommends that household contacts of pulmonary TB cases need to be screened within 2 weeks of TB treatment initiation. The national target for TB case yield from contact investigation is 1%, but routine data showed 0.1% performance in health facilities supported by Partners in Hope, a local medical organization. To improve yield from contact screening, we re-screened household contacts after 6-months from the initial screening to improve TB yield.

Methods: With USAID funding, Partners in Hope collaborated with the Ministry of Health and Paradiso TB Patients Trust, to develop 6-month household contact rescreening in Lilongwe, Chikwawa, and Nsanje districts. Household contacts were line-listed from TB contact registers from the cohort that received initial screening between January 2023 and March 2024. Paradiso TB Patients Trust volunteers traced them for WHO standard 4-symptom TB screening. Sputum samples from presumptive TB cases were taken to the nearest facility for MTB Xpert or microscopy testing according to MOH guidelines. Descriptive statistics were used to compare TB yield at initial versus at 6-month follow-up TB screening exercises, HIV-co-infection rate and mode of TB diagnosis.

Results: A total of 4,777 contacts were evaluated with only 0.1% (5/4,777) TB cases identified. In the 6-month re-screening exercise, 98% (4,688/4,777) contacts were screened and an additional 21 TB cases were identified. The yield of rescreening was 0.4% (21/4,764) and the combined TB yield from the initial and 6-month evaluation was 0.5% (26/4,777). TB/HIV co-infection was 20% (5/26) and 88% (23/26) were MTB positive with no rifampicin resistance identified. The remaining three cases were diagnosed clinically. All TB clients were linked to TB treatment.

Conclusion: Re-screening household contacts after 6 months by lay cadre volunteers demonstrated potential for improving TB case yield, which was 5 times higher than at the initial screening. We recommend intensifying 6-month follow-up TB contact investigation in routine clinical practice. However, other interventions are needed to further improve TB yield from contacts to reach the national target.

36

Understanding Family Structures and Exposure Patterns Among DR-TB Patients in Namibia

Iipumbu E[1], Hoddinott G[2], Claassens M[1], Seddon J[3]

[1]University of Namibia, Windhoek, Namibia, Namibia, [2]School of Public Health, The University of Sydney , Sydney, Australia, [3]Imperial college, London, England

Introduction: Tuberculosis (TB), caused by Mycobacterium tuberculosis (M.tb), remains a global health priority, with 10 million people developing TB disease (approximately 500,000 of whom develop drug-resistant (DR) TB, and 1.6 million dying annually. Namibia, a WHO high TB burden country, has an incidence of 460 per 100,000 and around 800 people develop DR-TB annually. Transmission is influenced by exposure duration, host susceptibility, and contagiousness. Whole-genome sequencing studies in Namibia suggest geospatial clustering of DR-TB transmission, likely linked to contact networks. This study aimed to understand family structures and exposure patterns among DR-TB patients in Namibia. We (a) describe observed family structures and (b) use case examples to illustrate how DR-TB episodes impact family dynamics.

Methodology: We identified 122 eligible participants, balanced by gender and reflecting Namibia's TB epidemiology. Data were collected through semi-structured in-depth interviews conducted by trained graduate researchers using participatory kinship mapping activities. Participants listed co-residents, who were marked with dashed and dotted lines. Interviews took place in homes and private hospital ward spaces, lasting approximately 90 minutes. Researchers kept detailed field notes, refined during weekly debriefings.

Findings: Eleven distinct family and co-residence patterns were identified, which included simple structures such as 'living alone' or 'small family' to complex structures such as 'multigenerational' and 'blended/step-families'. Many families adjusted their structure in response to DR-TB through four pathways: (1) relocating closer to healthcare services, (2) re-organizing co-residence to optimize care, (3) restructuring to mitigate perceived exposure risk, and (4) cost-saving due to care expenses or income loss.

Discussion: We found that for many families affected by DR-TB, this prompted the re-organization of family structure and co-residence. These shifts in household structure and co-residence influence 'contacts' networks with direct implications for 'household'-based active case finding. Our findings begin to chart an approach to eliciting broader contact networks among TB patients. A better understanding of transmission networks presents an opportunity for more effective DR-TB control measures tailored to community needs, reducing mortality and morbidity. Findings are likely transferable to other high DR-TB burden settings, particularly in southern Africa.

The large scale of the parent project and close collaboration with the Ministry of Health and Social Services provide opportunities to inform policy and practice. However, limitations include potential unreported individuals, incomplete network mapping due to recall challenges, and difficulty reaching participants in remote areas. Future research should explore how these family dynamics can be leveraged to support earlier diagnosis, treatment, and TB prevention in communities.

37

Considerations for Designing and Implementing Tuberculosis Triage Based on Cough Sounds With a Smartphone Application: Results From a Qualitative Study in South Africa and Uganda

Myburgh H[1], Pell C[2], Mabe L[1], Nangonzi A[3], Nsubuga Kikoyo J[3], Ssengooba W[3], Zajac K[4], Naidoo D[1], Theron G[1]

[1]Stellenbosch University, , South Africa, [2]Stichting Amsterdam Institute for Global Health and Development (AIGHD), Amsterdam, Netherlands, [3]Makerere University, Kampala, Uganda, [4]Georg-August- Universitat Göttingen Stiftung Offentlichen Rechts (UGOE), Göttingen , Germany

Background: Current symptom-based TB screening—the standard in many countries—is poorly implemented and lacks sensitivity. Cough-audio based triage offers a promising alternative: objective, rapid, and potentially less labour-intensive and more accurate. However, its effectiveness depends on appropriate design and implementation. We draw on data collected in the CAGE-TB (cough-audio triage for TB: https://cagetb.org/) project to identify considerations for the design and implementation of novel cough-audio based screening for TB.

Methods: CAGE-TB is an EDCTP2-funded project implemented in Cape Town, South Africa, and Kampala, Uganda, with the aim of developing a TB cough audio classifier and integrating it into a user-friendly smartphone application for use in health facilities. In parallel with classifier development, we collected qualitative data in four health facilities in Cape Town and six in Kampala between 2023 and 2024. Formative research, including structured observations and interviews with purposively selected health staff and clients, informed the application's technological requirements and interface. A second round of interviews were conducted to refine the application. Additionally, interviews with TB policymakers, advisors, and managers explored policy around TB triage and screening. Observational field notes and interview transcripts were analysed thematically using MAXQDA 24 software.

Results: Across the two settings we interviewed 72 health staff, 30 clients, and 17 stakeholders in the formative phase (2023), and 35 health staff and 25 clients in the secondary phase (2024). Our analysis revealed the following: 1) TB screening in health facilities: guidelines prioritised routine screening of at-risk populations, but observations revealed gaps. Screening was often symptom- or contact-triggered, rather than systematic. 2) Familiarity and use of mHealth: TB programmes remain largely paper-based and use of mHealth across health programmes is low. In South Africa, availability of health information systems increased technological familiarity and use. In both settings, there are moderate to high levels of smartphone ownership and usage among health workers and clients. 3) Attitudes towards cough-audio TB screening: clients, health workers, and stakeholders were excited about this innovation in what they perceived was a technology-poor programme. However, health workers raised concerns about infection prevention, device placement (e.g., queues, booths, consultation rooms), and hygiene and safety of the device itself. Health workers and clients recognised persistent TB stigma, and the potential of cough-audio screening to expose and/or deter clinic attendees. 4) Considerations for design and implementation: key factors included infection prevention control; device maintenance, safety, and hygiene; consistency of power supply and network/data; integration with reporting systems (health workers); evidence of accuracy; and messaging/illustration of cough results, amongst others.

Conclusions: Effective implementation of novel cough-audio based triage approaches will require close attention to existing facility-level TB triage practices, infection control measures (related to the mobile device and the location to cough) and available technological infrastructure. Promoting the application's use will also require parallel TB awareness and engagement efforts with health staff, clients, and communities to facilitate adoption and avoid exacerbating TB stigma.

38

Advances and Challenges in the Management of Extensively Drug-Resistant Tuberculosis in Rural Africa: A Case Study

Boois L[1], Burkhardt I[2], Anyolo K[3], Marufu T[3], Ruswa N[5], Shavuka O[1], Katali O[1], Usiku P[1], Mhuulu L[1], Ekandjo H[1], Nepolo E[1], Niemann S[6], Günther G[1,3,4]

[1]Research Group for Infectious Diseases, University of Namibia, Windhoek, Namibia, [2]Faculty of Medicine, University of Bern, Bern, Switzerland, [3]TB-Ward, Katutura Intermediate Hospital, Windhoek, Namibia, [4]Department of Pulmonology, Inselspital, Bern, Switzerland, [5]National Tuberculosis and Leprosy Programme, Ministry of Health and Social Services (MOHSS), Windhoek, Namibia, [6]Research Center Borstel, Schleswig-Holstein,

Background: Managing extensively drug-resistant (XDR) TB remains a major challenge compounded by complex circumstances. Advances such as targeted next-generation sequencing (tNGS) to rapidly detect resistance and new and repurposed drugs have the potential to alleviate some challenges.

Presentation: A 30-year-old HIV-negative female was referred from her local clinic to a tertiary TB-Hospital in Namibia with sputum-smear positive XDR-TB. She was underweight, chronically coughing and had a large cavity on her chest X-ray (CXR). At her local clinic and district hospital, she was pre-treated for drug-susceptible and recently multidrug-resistant (MDR) TB. She interrupted and consecutively failed MDR-TB treatment. Subsequent phenotypic and genotypic resistance testing including local tNGS revealed resistance to Rifampicin, high dose Isoniazid, Bedaquiline, Linezolid, Fluoroquinolones, Clofazimine, Ethambutol and Ethionamide. Delamanid, Pyrazinamide and Cycloserine were previously included in failed regimens. Susceptibility was documented to Rifabutin and second-line injectables. On screening, her 2-year-old daughter was clinically diagnosed with XDR-TB given the contact history and perihilar lymphadenopathy on her CXR. Xpert MTB/RIF on gastric aspirate was negative. She was well but moderately malnourished.

Circumstances: Mother, daughter and son lived with extended family 700 kilometers away from the tertiary hospital in a rural area with limited transportation and medical services. The extended family was affected by TB. Her parents were on MDR-TB treatment and her husband had died of XDR-TB. Income was limited to governmental grants. Cultural and language barriers hindered effective communication with medical staff.

Treatment: Based on resistance pattern and disease extent treatment with Rifabutin, Delamanid, Cycloserine, Amikacin and Meropenem plus Co-Amoxicillin was initiated. Para-aminosalicylic acid was unavailable. Drug-shortages and extended home-leave upon patient request meant she was mostly on three and in the third month only two drugs as she refused injectables. Her daughter was asymptomatic, had limited disease and injectables were not feasible. She was treated with Rifabutin, high dose Isoniazid, high dose Bedaquilin, Cycloserine and Delamanid. Drug-shortages meant she was mostly on three to four drugs.

Outcome: Two months into treatment the mother still had a large cavity, 3+ sputum microscopy and culture time-to-positivity was 7 days. The challenges to provide an adequate treatment regimen, the mother's loss of trust and with this decision to refuse injectables and determination to travel home, led to treatment interruption. Simultaneously the daughter's hilar lymphadenopathy on CXR was unchanged and additional abdominal lymphadenopathy was detected indicating disseminated TB. Provision of the daughter's treatment close to her home was explored but not deemed possible. After extensive discussions, her treatment was interrupted. Repeat resistance testing was initiated.

Conclusion: The enormous challenges surrounding this case ultimately contributed to an infectious patient with XDR-TB returning to her community. This is an ethical dilemma - the patient's autonomy, the best interest of the child and public health interests in conflict with each other. Whilst a rapid diagnosis of XDR-TB was made with the use of tNGS and a salvage regimen was in principle available, social determinants, access to care and resource and communication challenges are major contributors to the current dismal outcome.

Ethics: Patient consented to publication.

39

Use of Artificial Intelligence (AI)-Driven Technology to Drive TB Case Finding: An Eye Opening Experience From Akwa Ibom State, Nigeria

Adekunle A[1], Adetiba T[1], Adebayo O[1], Emmanuel V[1], Pillatar B[1], Okwuonye L[1], Olupitan O[1], Agbaje A[1], Mensah C[1], Dakum P[1], Okuzu O[2], Omatuyole B[2], Ogbuokiri E[2], Ogunmola B[2]

[1]Institute of Human Virology Nigeria (IHVN), Abuja, Nigeria, [2]Instrat Global Health Solutions (InstratGHS), Abuja, Nigeria

Introduction: Tuberculosis (TB) disease causative agent was identified since 1824 and till date, the disease is still a scourge in Global Health space. Efforts to end and eliminate TB has been in increase and has achieved a lot of feats. However, the use of technology needs to play a very significant role in this stride. The Hotspot Heatmap utilizes an artificial intelligence (AI) -powered predictive model to pinpoint high-burden TB areas across the country, enabling targeted active case finding interventions by Community TB Workers (CTW) in those specific locations. This approach offers heightened accuracy, directing CTWs to precise TB hotspots and providing detailed insights, drilling down from the state level to local government areas and even ward-level granularity.

Method: Through artificial intelligence (AI), by preloading the intelligence system with historical data of where TB cases have been found in the past in specific locations, the system builds predictive intelligence and gives some guidance to very probably locations that TB could be found in the communities. This process raises a positivity alarm/alert signal to community health care workers in the environment and gives allows them to design targeted active TB case finding in those areas like community outreaches, house to house search, focused group case finding interventions.

Results: In December 2024, from the hotspot points as highlighted by the heatmap, Out of 22771 screened, 6574 was presumptive TB (30% presumptive yield) and with 100% evaluation of these presumptives, 975 TB cases were diagnosed which is 15% TB yield was obtained.

Conclusion: Current realities inform us that for us to eventually find and treat all missing TB cases we will require technological innovations and drive to achieve this milestone.

40

Enhancing TB Case Detection Among People Living With HIV/AIDS: The Impact of TB LAM Testing Beyond Traditional Symptom-Based Screening in Nigeria

Nwofe J[1], Odido M[1], Ojo E[1], Arowosegbe V[1], Oguh D[1], Osho O[1], Okonkwo P[1], Onyenike M[1], Madukaji L[1], Omole T[1], Owolagba F[1], Ofuche E[1], Samuels J[1], Audu I[2], Okoye M[2]

[1]Apin Public Health Initiatives, Plot 1551 Apo Resettlement Zone E Abuja FCT, Nigeria, [2]Centers for Disease Control and Prevention, US Embassy Diplomatic Drive CBD Abuja , Nigeria

Background: The TB incidence rate among people living with HIV (PLHIV) remains high in Nigeria, with 75% of TB cases undiagnosed. Given Nigeria's high TB burden, optimizing diagnostic platforms is crucial. The Abbott Determine TB-LF LAM® Ag kit, an immunochromatographic test for detecting Mycobacterial LAM antigen in urine, offers an alternative for diagnosing TB in immunocompromised individuals.

Objectives: This study aimed to assess the contribution of TB-LF LAM® in improving TB case detection beyond traditional symptom-based screening and GeneXpert testing.

Methodology: A multicentre retrospective study conducted across 310 treatment sites in APIN-supported states Advanced HIV Disease patients screened for TB using the Urine Lipoarabinomannan antigen kit between October 2023 and September 2024. Data were exported from Excel and analysed with SPSS version 23. The proportion of patients who were non-presumptive using the TB screening form but tested positive with LF-LAM was calculated using percentages and frequencies.

Results: 5,073 clients were screened for TB using the Urine TB-LF LAM® kit. TB screening using Urine LF LAM is part of Nigeria's package of care for those who are diagnosed with advanced HIV disease (AHD) either with CD4 <200 cells/mm3 or WHO clinical stage 3 or 4 event and children < 5 years. 1549 (31%) testing positive. Among these, 1,069 (69%) were referred for Sputum TB GeneXpert® testing, of which 609 (57%) were positive for both GeneXpert® and TB-LF LAM®, while 460 (43%) were positive only for TB-LF LAM®. Notably, 573 (37%) of those who tested positive with TB-LF LAM® were non-presumptive and would not have been tested based on traditional symptom screening.

Conclusion: Urine TB LF-LAM® increased TB diagnosis among PLHIV co-infected with TB. The LAM-specific protein being detected by the TB-LF LAM® kit makes for the ease of diagnosing E-PTB in the urine of AHD clients with no apparent pulmonary TB symptoms. We thus recommend the increased use of TB-LF LAM® in AHD clients and immunocompromised individuals who are without TB symptoms.

41

Revolutionizing Rural Health: Integrating HIV Testing With Tuberculin Skin Testing to Boost TB Detection, Care, and TPT Uptake

Ntjamba F[1], Siendi M, Shanduama L, Kangootui O, Gaingos J, Chunga B, Johannnes F, Shuukwanyama T, Tshimwanga J

[1]*Ministry Of Health & Social Services, Windhoek , Namibia*

Introduction: Tuberculosis (TB) and HIV remain significant health challenges in Namibia, particularly in rural areas with limited healthcare access. Women living with HIV (WLHIV) are at increased risk of developing TB, necessitating integrated care approaches. To address these gaps, Otjozondu Clinic implemented a program combining HIV testing and Tuberculosis Screening and Testing (TST) to improve TB detection, enhance eligibility for TB Preventive Therapy (TPT), and educate clients on mitigating TB and HIV risks.

Objective: To implement a six-month integrated HIV-TB care initiative at Otjozondu Clinic to boost TB detection, enhance TPT uptake, and deliver targeted health education addressing critical TB-HIV care gaps.

Methods: A clinical, diagnostic-focused interprofessional approach was adopted at Otjozondu Clinic from July 2024 to December 2024. Registered nurses conducted TST and initiated treatment for active TB or TPT-eligible clients. Enrolled nurses supported diagnostics and follow-ups, while health assistants facilitated outreach to underserved populations. Data from 295 clients were collected, including TB detection, TPT initiation, and health education delivery. Proportions of clients screened were analyzed using descriptive statistics. Z-tests were performed to evaluate statistical significance, with $p < 0.05$ considered significant. Confidence intervals (CI) were calculated at 95% to assess the reliability of observed improvements.

Results: Among 295 clients, 5 (1.69%) were diagnosed with active TB, and 68 (23.05%) were eligible for and initiated on TPT. Health education was provided to 222 clients (75.25%). The 95% CI for TPT initiation ranged from 18.21% to 27.89%, and for health education from 70.38% to 80.12%. Both outcomes were statistically significant ($p = 0.000$), while active TB detection showed no significant change ($p = 1.000$).

Discussion: The integrated TB-HIV intervention demonstrated a substantial impact on TPT initiation and health education coverage, highlighting the importance of combining diagnostic evaluations with targeted outreach. However, active TB detection remained low, underscoring the need for enhanced diagnostic tools and strategies.

Conclusion: The integration of TST and HIV testing successfully improved TPT initiation and health education at Otjozondu Clinic, presenting a scalable model for addressing TB-HIV care gaps in resource-limited settings. Further studies should explore long-term sustainability and improvements in TB detection rates.

42

Leveraging Digital Technologies to Reduce Service Downtime and Improve Turnaround Time of Results From GeneXpert Testing Facilities in Southwest Nigeria

Rayi O[1], Olabamiji J[1], Kadri B[1], Pedro M[1], Agbaje A[1], Daniel O[1], MensahI C[1], Dakum P[1], Eneogu R[2], Nongo D[2], Shokoya O[3], Elom E[4], Labaran S[4]

[1]Institute of Human Virology Nigeria, Ikeja, Nigeria, [2]United States Agency for International Development, FCT, Nigeria, [3]State TB, Leprosy and Buruli Ulcer Control Program, Lagos, Nigeria, [4]National TB Leprosy and Buruli Ulcer Control Program, FCT, Nigeria

Background: Tuberculosis (TB) remains a major public health challenge in Nigeria, exacerbated by delays in diagnosis, equipment downtime, and inefficiencies in laboratory processes. These challenges are further compounded by inadequate infrastructure, inconsistent power supply, limited technical expertise, and delays in specimen transportation and results retrieval, all of which hinder timely and accurate diagnosis, leading to missed cases, prolonged transmission, and poor treatment outcomes. The integration of digital technologies for real-time laboratory data monitoring has emerged as a strategic approach to optimize the performance of GeneXpert testing facilities. This paper highlights lessons learned from TB LON-3-supported facilities in Southwest Nigeria, demonstrating the impact of digital tools in reducing service downtime and improving turnaround time (TAT) for TB test results.

Methods: In 2022, the TB LON-3 project developed and deployed a weekly laboratory performance monitoring dashboard to track key performance indicators across 150 rapid molecular diagnostic platforms (85 GeneXpert, 55 TB LAMP, and 11 Truenat machines). The dashboard provided real-time insights into workload, error rates, equipment functionality, and sample turnaround time, enabling immediate identification of underperforming laboratories. Through daily and weekly performance review meetings, challenged laboratories were promptly identified and corrective actions were implemented across all the identified laboratories to resolve power challenges, equipment faults, reagent stockouts, and human resource gaps, thereby enhancing efficiency across the supported laboratories in the region.

Results: The real-time digital monitoring approach led to a reduction in GeneXpert equipment's downtime and improved modular functionality and service efficiency. Since its implementation in 2022, modular functionality has increased from 73% to 98%, while turnaround time for TB test results dropped from more than 120 hours to 24-48 hours. Using an approved benchmark of 20 samples per functional module per week, the average weekly equipment utilization rates across the four implementing states have increased, from 84% to 126%. Overall, weekly project evaluation rates improved from 69% to 96%, enhancing diagnostic efficiency and service delivery.

Conclusion: The integration of digital laboratory monitoring technologies has significantly improved turnaround time, optimized resource allocation, and reduced service downtime across GeneXpert testing facilities. The success of this intervention underscores the critical role of digital innovations in enhancing TB diagnostics, laboratory efficiency, and data-driven decision-making. Expanding this approach across more TB facilities can further strengthen Nigeria's diagnostic capacity and accelerate TB elimination efforts.

43

Prevalence and Associated Factors of Post-Tuberculosis Lung Disease in Sub-Saharan Africa: A Systematic Review and Meta-Analysis

Gebremedhn A[1]

[1]Armauer Hansen Research Institute, Alert Compound Jimma Road, Addis Ababa Ethiopia, Ethiopia

Background: Post-tuberculosis lung disease (PTLD) is a major public health challenge in sub-Saharan Africa, where the tuberculosis (TB) burden remains high. PTLD leads to long-term respiratory morbidity, significantly impacting the quality of life. However, the prevalence and associated risk factors of PTLD in this region remain inadequately studied. This systematic review and meta-analysis aimed to estimate the pooled prevalence of PTLD and identify associated factors in sub-Saharan African countries.

Methods: This study followed PRISMA guidelines for systematic review and meta-analysis. We included studies reporting the prevalence and risk factors of PTLD among individuals with a history of pulmonary TB in sub-Saharan Africa. A comprehensive literature search was conducted in databases including PubMed, Embase, and African Journals Online. The pooled prevalence of PTLD was estimated using a random-effects model, and associated factors were analyzed using adjusted odds ratios (aOR) and meta-regression.

Results: A total of 20 studies, comprising 3,968 participants, met the inclusion criteria. The overall pooled prevalence of PTLD in sub-Saharan Africa was 43.47% (95% CI: 35.61%–51.33%). Significant risk factors for PTLD included older age (aOR: 2.11, 95% CI: 1.14–3.91), female sex (aOR: 3.26, 95% CI: 2.10–5.07), smoking (aOR: 2.72, 95% CI: 1.30–5.70), and being underweight (aOR: 1.59, 95% CI: 1.15–2.19).

Conclusion: PTLD is a prevalent and serious complication among individuals with a history of pulmonary TB in sub-Saharan Africa. Targeted interventions should prioritize older individuals, females, smokers, and underweight patients to mitigate the burden of PTLD in the region.

44

Prevalence of Tuberculosis and Determinant Among Adults Newly Diagnosed With HIV at Epako Clinic in Namibia Omaheke Region: A Cross-Sectional Study

Lumbala K[1], Firmino D, Nalushiya E, Muulu G, Ruswa N

[1]*Ministry Of Health And Social Services, Gobabis , Namibia*

Background: Tuberculosis (TB) is the first opportunistic infection and remains the leading cause of death among people living with HIV (PLHIV) and returned to being the world's leading cause of death from a single infectious in the post-COVID-19 era. According to the 2023 Global TB report, an estimated 10.8 million people fell ill with TB with 6.3% of them being HIV Co-infected, a total of 167,000 among them succumbed to tuberculosis worldwide. Namibia is among 30 countries with a high burden of TB and HIV infection and Omaheke is among the regions with high TB notification rates. Globally, it's estimated that TB/HIV co-infection ranges between 15 to 20% among newly diagnosed PLHIV. However, in Namibia data is scarce. Thus, this study was conducted to establish the magnitude of TB and HIV co-infection and associated factors among adults newly diagnosed PLHIV in the Omaheke region.

Materials and Methods: We conducted a cross-sectional observational study using programmatic data of clients aged ≥ 15 years who tested HIV positive and enrolled on ART between January 2023 and December 2024 at Epako clinic. The client's socio-demographic and clinical characteristics were extracted from TB and HIV electronic medical records. We considered TB diagnosis as reported based either on GeneXpert, LF-TB LAM, Direct microscopy, Chest X-ray results, or their combination. Collected data were inputted and analyzed with the STATA software version 18. The proportions of TB in different demographic variables were assessed in univariate analysis using chi-square tests if appropriate, with p value< 0.05 set as a statistically significant level. A multivariate logistic regression model was used to estimate the associations between variables with p<0.05 in univariate analysis and the prevalence of tuberculosis.

Results: Out of 302 clients, 161(53.3%) were females, and 141(46.7%) males with 35 years mean age. In total, 66(21.9%) clients were diagnosed with TB. Among them, 60.6% were males with 37.8 years mean age. In univariate analysis TB diagnosis was significantly associated with male gender, age, baseline CD4<200, underweight nutritional status; and diagnosed through provider's initiated HIV testing and counseling (PITC) (p<0.001). In the logistic regression model, only being underweight (OR 4.5;95% CI 1.8-10.8) remained significantly associated with having tuberculosis. Furthermore, 62(94%) of patients' diagnostic results records were retrieved with the majority 57(92%) diagnosed via Xpert \Rif and or LF-TB LAM.

Conclusion: A high prevalence of TB was found among adults newly diagnosed with HIV at the Epako clinic in Namibia. TB disease was more likely to be associated with age, male gender, depletion of CD4 counts, and undernutrition status. The combination of GeneXpert and LF-TB LAM tests increased the likelihood of TB diagnosis. The study underscores the need to strengthen TB/HIV integration services and intensive case finding and leveraging all diagnosis methods t]for TB diagnosis.

45

Genotypic Characterization of the Mycobacterium Tuberculosis Complexresistant to Anti-tuberculosis Drugs Isolated From Breeders in Six Towns Insouthern Chad

Togde G[1], Nadlaou B[3], Diarra B[4], Boilengar D[1], Kimassoum R[2]

[1]Department of Biological and Pharmaceutical Sciences, Faculty of Human Health Sciences (FSSH), Laboratory of Research, Diagnostics and Scientific Expertise (LaboReDES), Bacteriology Unit, University of N'Djamena BP 1117 N'Djamena/Chad, Ndjamena, Chad, [2]Department of Medicine, Faculty of Human Health Sciences (FSSH), University of N'Djamena BP 1117 N'Djamena/Chad., Ndjamena, Tchad, [3]Laboratory of the National Reference University Hospital Center (CHU-RN) of N'Djamena, Mycobacteria Unit, BP 130 N'Djamena., Ndjamena, Tchad, [4]Laboratory of Tuberculosis and Hemoragic fever in the University Clinical Research Center (CURC), Bamako, Mali

Introduction : Monitoring risk factors associated with tuberculosis transmission, identifying the genetic basis of Mycobacterium tuberculosis complex strains resistant to first-line anti-tuberculosis drugs ; could help to provide important information to optimize care and reduce family contact tuberculosis among breeders. The present study aimed to determine the prevalence of resistant genes of strains of the Mycobacterium tuberculosis complex circulating in the environments of breeders practicing nomadism and transhumance in Chad.

Methods : Microscopy using the Ziehl Neelsen staining technique made it possible to identify 274 (21.8%) strains of Mycobacterium tuberculosis complex among 1256 breeders consulted for the search for tuberculosis. We included also breeders in ferics who are exposed. GeneXpert has been used to search the resistance against rifampicine and identification of the M. tuberculosis. We used MGIT as culture middle for the research of colonies. Spoligotyping and Genotype MTBDR have been used to determine different strains and the multidrug-resistance respectively.

Results : The average age of the patients was 47.5 years. The M/F sex ratio was 1.6 in favor of the male sex. Microscopy detected 274 (21.8%) bacillus acid alcohol resistant and the GeneXpert MTB/RIF detected 268 Mycobacterium tuberculosis. Of 268 Mycobacterium tuberculosis, 24 (9%) were rifampicin resistant (RR-TB) and 244 (91%) rifampicin susceptible. Culture on MGIT (mycobacteria growth indicator tube) medium confirmed the isolation of 274 strains of mycobacteria. Spoligotype helped to detect 268 (98%) strains of Mycobacterium tuberculosis and 6 (22%) Mycobacterium bovis. Spoligotyping also made it possible to detect three lines from Mycobacterium tuberculosis isolates (Lineage, Lineage 3 and Lineage 4 (L1, L3 and L4). Thirteen genotypic markers were detected by the Spoligotyping technique and Mycobacterium tuberculosis Cameroon (MtbCam) was predominant (27%) The GenoType MTBDR plus made it possible to detect the genes which code for resistance to rifampicin and isoniazid: rpoB (n=24), inhA (n=13) as well as the mutation genes associated with second-line anti-tuberculosis drugs(gyrA (n=5), gyrB (n=6), rrs (n=3), eis (n=3)). TB/HIV co-infection represented 5%.

Discussion: The study showed that a third of the nine lineages of the Mycobacteirum tuberculosis complex known in the world circulate in the six regions among breeders in the ferriks and the population. While these genotypic lineages are recognized in maintaining tuberculosis pathogenicity and cases of multidrug resistance in the world. The study gave an overall rate of tuberculosis among breeders at around 21.8%. A recent study carried out by Djimenan et al in Chad found an overall prevalence of 25.1%.

Conclusion: This study highlighted the emergence of lineages of strains of the Mycobacterium tuberculosis complex resistant to rifampicin and isoniazid as well as strains of Mycobacterium bovis transmitted from cattle to breeders. It raises the need to implement an effective surveillance system to detect the different lines of Mycobacterium tuberculosis resistant to anti-tuberculosis drugs in Chad, in Africa and even in the world.

46

Household Violence and Food Insecurity in People With TB/HIV in Kampala, Uganda: A Cross-Sectional Study

Izudi J[1,2], Kyazze S[3], Bajunirwe F[2]

[1]Infectious Diseases Institute, Makerere University, Kampala, Uganda, [2]Mbarara University of Science and Technology, Mbarara, Uganda, [3]Clarke International University, Kampala, Uganda

Background: Among people with tuberculosis (TB) and human immunodeficiency virus (HIV), household violence may contribute to food insecurity by impacting economic stability, mental health, social support, and access to resources. We studied the association between household violence and food insecurity among people with TB/HIV in Kampala, Uganda.

Materials and Method: We conducted a cross-sectional study across five health facilities in Kampala, Uganda. A standardized questionnaire was used to collect data on demographics, clinical characteristics, food security, dietary diversity, alcohol use, mental well-being, and smoking. Mental well-being was assessed using the World Health Organization Five Well-Being Index, and alcohol use was measured with the Alcohol Use Disorder Identification Test. The outcome, food insecurity, was measured using the Food and Agricultural Organization's Food Insecurity Experience Scale, while the exposure, household violence, was self-reported on a binary scale. We used mixed effects modeling to determine the association between household violence and food insecurity, adjusting for clustering and potential confounders. Adjusted odds ratios (aOR) with 95% confidence intervals (CI) were reported as the measures of association.

Results: We studied 745 participants aged ≥15 years. Among them, 426 (57.2%) experienced food insecurity and 554 (73.0%) reported household violence. Household violence was significantly associated with a higher likelihood of food insecurity (aOR 1.77, 95% CI 1.27–2.47). Mental well-being (aOR 0.78, 95% CI 0.57–1.06), marital status (being married: aOR 1.14, 95% CI 0.83–1.57), employment (aOR 0.78, 95% CI 0.57–1.07), and alcohol consumption at any risk level (increasing risk: aOR 0.76, 95% CI 0.55–1.06; high risk: aOR 1.32, 95% CI 0.78–2.23; possible dependence: aOR 1.04, 95% CI 0.57–1.90) were not significantly associated with food insecurity. In a sex-stratified analysis, household violence was significantly associated with food insecurity among men (aOR 2.48, 95% CI 1.54–4.00) but not women (aOR 1.32, 95% CI 0.81–2.15).

Conclusion: Household violence and food insecurity are common among people with TB/HIV. Integrated interventions that address both household violence and food insecurity are needed to improve health outcomes for this population.

47

High Tuberculosis Preventive Therapy Initiation and Completion Rates Among Newly Initiated Antiretroviral Therapy Clients in Malawi: Children Left Behind

Makonokaya L[1], Ngwira P[1], Kalitera L[1], Dunga S[1], Khumbanyiwa M[1], Golowa C[1], Chamanga-Kanyenda R[1], Maphosa T[1], Bhatt N[2]

[1]*Elizabeth Glaser Pediatric AIDS Foundation, Lilongwe, Malawi,* [2]*Elizabeth Glaser Pediatric AIDS Foundation, Washington, United States*

Background: Tuberculosis preventive therapy (TPT) reduces TB burden among people living with HIV (PLHIV) when given alongside antiretroviral therapy (ART) in regions with a high prevalence of TB. Malawi scaled up TPT to all PLHIV initiating treatment. We evaluated the uptake and completion of TPT among newly-initiated ART clients in a program setting in Malawi.

Methods: All clients initiating ART, except those with active TB and either pregnant or breastfeeding, were eligible for TPT. Using a retrospective cohort study, we analyzed routinely collected data from electronic medical records pooled across ten high-volume ART facilities supported by the Elizabeth Glaser Pediatric AIDS Foundation in Malawi. We included all clients who initiated ART between January and March 2023. Data was abstracted using an ODK Collect-based data collection tool and analyzed using Stata 18. We used descriptive statistics to summarize the participants' demographic and clinical characteristics, while logistic regression was employed to assess factors associated with TPT initiation and completion.

Results: Overall, 1,289 participants were included; 1,015 (78.7%) were eligible for TPT. Of these, 820 (80.8%) were initiated on TPT; 773 (94.3%) were started on weekly isoniazid and rifapentine, while 47 (5.7%) were on daily isoniazid. Nearly 74.4% of the clients initiated on TPT completed a full course of treatment. Children <15 years, clients presenting with WHO clinical stage three or four, and those residing in urban areas were less likely to initiate on TPT: adjusted odds ratio (aOR): 0.10 (95%CI: 0.05–0.18), 0.37 (95%CI: 0.22–0.64), and 0.58 (95%CI: 0.36–0.94), respectively. Children and clients in urban areas had reduced odds of completing TPT: aOR: 0.21 (95%CI: 0.81–0.53) and 0.58 (95%CI: 0.37–0.91), respectively. Among participants retained in care after one year, 877 (99.1%) did not develop active TB. Fewer TB cases were found among participants who initiated TPT than those who did not (0.18% vs. 1.59%, p=0.01).

Conclusions: High TPT initiation and completion rates were observed among eligible clients initiating ART in Malawi. However, children lag in the initiation and completion of TPT. Interventions that improve TPT uptake among children living with HIV, including scaling up pediatric-friendly formulations, are required.

48

Strengthening Digital Monitoring to Scale-Up Tuberculosis Preventive Treatment Among New PLHIV in Akwa Ibom and Cross River States

Ezieke E[1], Ogheneuzuazo O[1], Nwanja E[1], Akpan U[1], Toyo O[1], Ogundehin D[2], Eneogu R[2], Omo-Emmanuel U[2], Katbi M[2], Kimanga D[2], Obiora-Okafor C[2], Idemudia A[2], Agulu R[3], Adebobola B[4], James E[2], Pius J[2], Oyelaran O[2], Onyedinachi O[1], Adegboye A[1], EyoExcellence Community Education Welfare Scheme, Uyo, Akwa ibom state,Nigeria. A[1]

[1]Excellence Community Education Welfare Scheme, Uyo, Nigeria, [2]Office of HIV and TB, United States Agency for International Development, Abuja, Nigeria, [3]National Agency for the Control of AIDS, Abuja, Nigeria, [4]National AIDS and STDs Control Programme, Abuja, Nigeria

Background: Tuberculosis preventive therapy (TPT) reduces the risk of active tuberculosis among people living with HIV (PLHIV). The PEPFAR/USAID-funded ECEWS ACE-5 project identified suboptimal TPT uptake among PLHIV initiating antiretroviral therapy (ART). To address this, the monitoring system for TPT uptake was revised using the WHO health systems framework. This study describes the revised monitoring system and reports outcomes from the intervention to improve TPT uptake among PLHIV newly initiating ART.

Description: A Power-BI dashboard, used for weekly project review meetings, was updated to disaggregate TPT data by PLHIV ART status, as either 'newly diagnosed' and 'already on ART'. Designated focal persons identified underperforming facilities during the meetings and followed up via phone calls or in-person visits to line-list eligible clients and initiate TPT. The intervention was implemented across 218 health facilities in Cross River and Akwa Ibom states from May 2024 to October 2024. In this setting, TPT was provided to all individuals at ART initiation. TPT uptake (proportion of newly diagnosed PLHIV who received TPT) was compared over six months prior to the intervention (November 2023-April 2024) and for the six months of the intervention using a chi-square test, with significance set at $p < 0.05$.

Lessons Learnt/Results: A total of 9,237 PLHIV initiated ART within the period, with 56.2% initiating ART before the intervention. 69.8% were females, median age was 34 years (IQR:26-43). Overall, TPT uptake was 76.4% (7,057). TPT uptake was significantly higher during the intervention compared to the period prior (92.3% (3733/4044) vs 64.0% (3,324/5193; $p<0.001$). Compared by age and sex, TPT uptake was also higher in the intervention period. In-person visits were more effective in addressing TPT initiation gaps than phone calls but were limited by the availability of designated focal persons. When facilities started reviewing TPT data before transmission, there were fewer gaps identified during the project-level meetings.

Conclusion: Improving the health information monitoring system and optimizing human resources for TB/HIV services significantly improved TPT uptake among PLHIV newly initiating ART. Sustaining these gains and expanding the intervention to other locations experiencing similar gaps could further reduce the burden of TB among PLHIV.

49

Managing TB/HIV Comorbidities Among Children and Adolescents Co-Infected With TB & HIV Through Targeted Structural Interventions in Northern Nigeria: A Pathway to Improved Health Outcomes

ODIMA D[1], Ashivor J[1], Mohammed H[1], Anyanti J[1], Eruchalu K[1], Ukueku K[1], Farinu O[1], Adebayo O[2], Opeyemi O[2], Pillatar B[2], Raji H[2], Ugwoke U[2], Vincent E[2], Adekunle A[2], Alabi S[3], Mohammed D[4], Zamsu M[5], Workneh N[5], Idogho O[1]

[1]Society For Family Health, Abuja, Nigeria, [2]Institute of Human Virology Nigeria - Global Fund N-THRIP, Abuja, Nigeria, [3]Kwara State Agency for Control of AIDS (KWASACA), Kwara State, Ilorin, Nigeria, [4]Gombe State Agency for the Control of AIDS (GomSACA), Gombe, Nigeria, [5]The Global Fund to Fight AIDS, Tuberculosis & Malaria, Global Health Campus, Switzerland

Background: Tuberculosis (TB) is the leading cause of death among people living with HIV (PLHIV) with the risk of developing active TB 20 times higher compared to those without HIV. TB remains a significant public health challenge in Nigeria. Children and adolescents under 15 years represents 11% of global TB cases. Structural interventions aim to reduce HIV transmission and morbidities by changing social norms, policies, and other social barriers to treatment. We reviewed TB cascade monitoring and treatment outcomes for children and adolescents living with HIV and enrolled in care in 54 Health facilities providing HIV/TB comprehensive services in both states for the past 3 years.

Materials & Methods: SFH implemented targeted interventions to optimize care for children and adolescents with TB/HIV co-morbidities. These included establishing virologic clinics for specialized care, enhanced case management, same-day CD4+ testing with results, CrAg screening, and laboratory investigations, enrolling orphans and vulnerable children into programs promoting health, safety, and education, Operation Triple Zero (OTZ) clubs to ensure zero missed appointments, avoid treatment interruption and ensure suppressed viral loads, scaling up early infant diagnosis (EID) and integrated testing using GeneXpert machines and PIMA point-of-care technology. Program data from the Electronic medical records was reviewed for outcome of TB screening, diagnosis and treatment.

Results: 1,031 children and adolescents were screened for TB from December 2021 to October 2024. 13 (6 Males, 7 Females) children were diagnosed and treated successfully using standard medications. GeneXpert was leveraged to diagnose 85% of cases with the clients provided close monitoring to ensure all treated clients achieved viral load suppression. Also, all the clients were successfully treated for TB with zero deaths and no signs of TB recurrence post-treatment. Among those treated, 23% were on ABC-3TC-DTG, while 77% were on TDF-3TC-DTG and all 13 children and adolescent attained 100% VL suppression.

Conclusion: Improved monitoring and surveillance for TB among HIV/TB co-infected clients through active targeted screening can ensure early diagnosis and management of TB among children and adolescents. This is in addition with improved case management and targeted differentiated care towards optimizing treatment outcomes.

50

Predictors of Tuberculosis Mortality Among People With and Without HIV: A Retrospective Cohort Study at a Rural Hospital in Zambia

Malumani M[1], Mukubesa C[2], Siame L[1], Mutalange M[1], Cheelo C[1], Masenga S[1], Hamooya B[1]

[1]Mulungushi University-school Of Medicine And Health Sciences, Livingstone, Zambia, [2]Maamba General Hospital, Sinazongwe, Zambia

Background: Despite decades of advancements in vaccination and chemotherapy, tuberculosis (TB) continues to be the world's leading infectious killer, especially in resource-challenged areas. Identifying factors associated with mortality during TB treatment is vital for improving patient outcomes. This study aimed to evaluate the factors associated with mortality among TB individuals with and without HIV at Maamba General Hospital's chest clinic.

Materials: A 5-year (January 2019– July 2024) retrospective cohort analysis of the TB records was performed. Demographic and clinical data were collected using a data collection form between October and November 2024. The outcome of the study was mortality after starting TB treatment. Proportion hazard model was used to estimate predictors of TB mortality.

Results: Of the 318 participants, the median (interquartile range (IQR)) age was 41 years (31, 54) and 63.8% (n=203) were males. The overall cumulative incidence of mortality was 19.5% (n=62, interquartile range (IQR): 15.3%–24.3%) and the incidence rate was 116 per 1000 persons per year. Among those who died, 56.5% (n=35) were HIV-negative, 38.7% (n=24) were HIV-positive, and the rest had unknown HIV status (4.8%, n=3), with males contributing to the majority of mortalities (71.0%, 44/62). The predictors significantly associated with TB mortality were increasing age (adjusted hazard ratios (aHR): 1.02, 95% confidence interval (CI): 1.00–1.04, P = 0.013) and being on facility-based direct observation therapy (DOT) (aHR: 2.78, 95% CI: 1.62–4.77, P < 0.001). Those who were HIV-negative were more likely to die than the HIV-positive individuals; however, the findings had a borderline p-value (aHR 1.73, 95%CI 1.00, 3.00, p = 0.051).

Conclusion: The incidence of TB mortality was high among our study participants and it was significantly associated with older age and TB treatment adherence model. These findings highlight the need to strengthen diagnostic accuracy by promoting bacteriological confirmation of TB and to enhance facility-based DOT model by providing comprehensive training to hospital-based TB treatment supporters. Additionally, studies are needed to investigate why HIV-negative individuals bear a disproportionately high burden of TB-related mortalities in resource-constrained settings.

51

Contribution of Urine LAM Testing to Tuberculosis Case Notification at Area 25 Community Hospital in Lilongwe, Malawi

Nanga F[1], Maulidi S[2], Nkosi D[1], Nkhono Z[1], Mutai J[1], Phiri R[1], Mwamlima P[1], Talama G[1], Njala J[1], Phiri S[1], van Oosterhout J[1,3]

[1]Partners In Hope, Lilongwe, Malawi, [2]Malawi Ministry of Health, Lilongwe, Malawi, [3]University of California Los Angeles, David Geffen School of Medicine, , USA

Background: Despite tuberculosis (TB)'s high prevalence, diagnosis is difficult in patients with advanced HIV disease, leading to low case notification. Moreover, effective TB control in high HIV prevalence settings is hindered by absence of accurate, rapid and appropriate diagnostic tests. Detection of mycobacterial lipoarabinomannan (LAM) antigen in urine is a TB point-of-care test for people living with advanced HIV especially in settings with high prevalence of HIV-TB co-infection. This is a particularly important diagnostic option as molecular technologies like the Xpert MTB/RIF assay demand laboratory infrastructure and are unavailable in many clinics in Malawi. We assessed the contribution of urine LAM testing to TB case notification by sex at Area 25 Community Hospital in Lilongwe.

Methods: We extracted data from the facility TB register which holds records of all TB notified cases, from January 2018 to December 2023. Information extracted included sex, age, history of previous TB treatment, primary TB diagnostic test, HIV status, urine LAM result and the year in which the urine LAM test was done. Descriptive statistics were carried out to generate means and proportions.

Results: Of all 1,218 TB patients who were notified, 878 (72%) were male and 340 (28%) female. Thirty-six/1,218 (3%) were equal to or less than 15 years. 448/1218 (37%) were HIV positive. The HIV/TB co-infection rate was 297/878 (34%) for males and 151/340 (44%) for females. 125/448 (28%) of HIV positive patients were diagnosed through urine LAM testing, which was 75/297 (25%) among males and 50/151 (33%) among females. Two, 9, 24, 20, 38 and 32 were notified through urine LAM testing in 2018, 2019, 2020, 2021, 2022 and 2023 respectively.

Conclusion: TB case detection through urine LAM has been increasing since 2018 at the urban Area 25 Community Hospital in Lilongwe. Overall, males predominated among notified cases, but they had a lower HIV co-infection percentage and a lower primary diagnostic percentage from urine LAM results. Larger observations and studies in different settings need to provide more insight into the utilization of urine LAM testing, overall and by sex.

52

Impact of Household TB Contact Investigation on Detecting TB Cases: TB-LON 3 Project Experience

Uzoigwe C[1], Daniel O[1], Agbaje A[2], Dakum P[2], Labaran S[3], Eneogu R[4], Pedro M[1], Olabamiji J[1], Alege A[5], Okungbure A[1]

[1]Institute Of Human Virology Nigeria, Lagos, Nigeria, [2]Institute Of Human Virology Nigeria, Abuja, Nigeria, [3]National Tuberculosis, Leprosy and Buruli Ulcer Control Program., , Nigeria, [4]USAID Nigeria, TB/HIV Division, , Nigeria, [5]Society for Family Health, , Nigeria

Background: Tuberculosis (TB) still remains a significant public health issue in Nigeria, which ranks 6th among the high burden TB countries. Despite its potential, TB contact investigation (CI), is still not widely utilized. Its usefulness in finding missing TB cases and reducing transmission among communities cannot be overstated, notwithstanding its implementation challenges especially in our settings where there is very huge TB knowledge gap and limited resources. The paper presents the TB-LON 3 project CI outcome from July 2020 to September 2024 while tackling the critical implementation problems and leveraging existing resources.

Material and Methods: CI is a strategic approach that encompasses assessment and evaluation of TB patient's household/close contacts followed by prescribing appropriate drug therapies for newly diagnosed TB cases or TB preventive treatment (TPT). CI is done for bacteriologically diagnosed TB cases. To address its implementation challenges, a multifaceted intervention strategy was devised. Firstly, comprehensive training programs to educate healthcare providers on the principles and practices of CI. Guidelines and protocols were adapted and made available to streamline the implementation process. Finally, Community engagement initiatives were launched to raise awareness and promote participation. TB-LON 3 project is being implemented in Lagos, Ogun, Osun and Oyo states in Southwest region of Nigeria.

Results: The implementation of CI yielded promising results in the project. Total of 126,730 TB cases were diagnosed in the project from April 2020 to September 2024 of which 120387 were started on treatment. 102,373 of 120387 cases were bacteriologically diagnosed and 62120 of these index cases had their contacts investigated/traced. 266,008 contacts were identified while 265,749 contacts were successfully screened for TB; 60,265 presumed to have TB, 42,584 were further evaluated and 4,555 TB cases were diagnosed (4121 bacteriologically diagnosed) and 4380 cases started on treatment consisting of 2,091 females and 2,289 males with age range from under 1 year to above 65 years in both genders. 197,043 contacts were eligible for TPT and 33% enrolled on TPT. There is also consistent increase in the contribution of CI to total TB cases over the years. In the first year (April – September 2020) 69 cases, while in the fifth year (October 2023 – September 2024) 1801 cases which represents over 2600% increase. Currently, CI contributes over 4% of the total TB cases despite having around 50% of the index cases contacts investigated/traced. Without this intervention, most cases from CI will be missed or at best diagnosed much later after the disease has spread to significant number of persons in the community.

Conclusions: CI is a valuable but underutilized approach for TB case detection in Nigeria. Overcoming implementation challenges and maximizing resource utilization can significantly improve early TB detection and management, thereby reducing TB-related morbidity and mortality. Projects/program should have significant resources earmarked for CI.

53

Family-Centric Tuberculosis Detection: Evaluating the Effectiveness of Cross-Generational Screening Strategies in Eswatini

Sibanda J[1], Nyandoro E

[1]*The Brave Hearts of Eswatini, Trelawny Park, Eswatini*

Background: Tuberculosis (TB) continues to pose a significant global public health challenge, with detection rates falling short of eradication targets. Conventional screening methods often fail to account for the interconnected transmission dynamics within households, particularly in high-prevalence settings. To address this gap, this study investigates the efficacy of cross-generational screening approaches, which focus on family units rather than individuals. By leveraging the unique role of children within households, this strategy aims to identify and screen adult family members exhibiting TB symptoms who may otherwise remain undiagnosed, thereby enhancing early detection and interrupting transmission chains.

Methods: A community-based intervention was implemented, involving mass TB screenings for children in high-prevalence regions. During these screenings, children were systematically questioned about the presence of persistent coughing—a key TB symptom—among their family members. Positive responses prompted follow-up visits by trained community health workers, who conducted TB screenings for the identified adult family members. This dual-pronged approach not only facilitated TB detection in children but also utilized their observations to uncover undiagnosed cases among adults.

Results: Preliminary findings demonstrate that cross-generational screening significantly improves TB case detection within communities. Children's awareness of family members' health conditions proved instrumental in identifying previously undetected TB cases. This strategy led to the diagnosis and treatment of numerous adult TB cases, effectively disrupting intra-household and community transmission. The approach highlights the critical role of family-centric strategies in enhancing TB detection and control efforts.

Conclusion: Cross-generational screening represents an innovative and effective strategy for improving TB detection in high-prevalence settings. By integrating children's insights and leveraging family structures, this approach offers a more comprehensive and community-oriented solution to TB control. It not only increases case detection rates but also fosters a sense of familial responsibility for health, contributing to broader public health goals. Further research is needed to assess the scalability of this model and its potential applicability to other communicable diseases, offering a promising pathway for strengthening global health initiatives. This study emphasizes the innovative nature of family-centric TB screening, highlighting its potential to transform TB detection and control efforts through community engagement and intergenerational collaboration.

54

Unveiling Challenges and Insights in Implementing Line Probe Assay Technology for Tuberculosis Diagnosis in Namibia

Absai P[1], Warren R[2], Sylvester T[2], Moyo S[3], Iipinge C[1]

[1]Mycobacterium Department, Namibia Institute of Pathology, Windhoek Central Reference Laboratory, Windhoek, Namibia, [2]South African Medical Research Council Centre for Tuberculosis Research, Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University, Cape Town, South Africa, Namibia, [3]Department of Health Sciences Faculty of Health and Applied Sciences, Namibia University of Science and Technology, Windhoek, Namibia

Namibia is one of the highest-burden tuberculosis (TB) countries in the world, as identified by the World Health Organization (WHO). Routine rapid genotypic assays such as the Line Probe Assay (LPA) are used for drug resistance screening, yet their effectiveness in Namibia has not been fully evaluated. This study aimed to determine the prevalence of drug resistance mutations and assess the overall effectiveness and implementation challenges of LPA.

Results: A retrospective analysis of LPA data from 1,674 samples collected between 2015 and 2020 revealed significant resistance patterns across Namibia. Using GIS software, heat maps depicted regional and yearly distribution of drug resistance mutations, providing insight into the geographical burden of drug-resistant TB.

Multi-Drug Resistant (MDR)-TB, defined as resistance to both Rifampicin (RIF) and Isoniazid (INH), was detected in 22.8% (383 samples). Mono-resistance to RIF was primarily linked to the rpoB S531L mutation in 12% (202 samples), followed by H526Y (2.4%, 41 samples) and D516V (1.19%, 20 samples). INH resistance was predominantly due to the katG S315T1 mutation, found in 20% (334 samples), while only one sample carried the S315T2 mutation. The INH A mutation C15T was observed in 11% (185 samples), and only three cases of the A16G mutation were detected. No mutations associated with 3A (T8C) and 3B (T8A) were identified.

MDR-TB was primarily concentrated in the central and northern regions, while RIF mono-resistance caused by S531L was evenly distributed across the country. A significant finding was the high prevalence of INH mono-resistance linked to the S315T mutation, detected in 20% of samples. This raises concerns as GeneXpert, Namibia's primary TB diagnostic tool, does not detect INH mono-resistance, potentially leading to underdiagnosis and inadequate treatment. The increasing global focus on INH mono-resistance is critical, as it can contribute to the development of MDR, pre-XDR, and XDR-TB if left undetected and untreated.

Challenges in LPA implementation significantly reduced available data. Testing was unavailable for 44% (32 out of 72 months) due to internal and external factors, primarily reagent shortages. Other logistical challenges, including equipment maintenance issues and supply chain disruptions, also played a role. These disruptions negatively impacted the TB diagnostic algorithm, delayed patient treatment, and reduced the number of LPA tests conducted annually. The lack of consistent data made it difficult to accurately describe long-term resistance trends or perform robust statistical analyses, limiting conclusions regarding the overall usefulness of LPA technology in Namibia.

Conclusion: This study highlights the high burden of INH mono-resistance and MDR-TB in Namibia, emphasizing the need for improved diagnostic algorithms beyond GeneXpert to effectively detect INH mono-resistance. The widespread RIF resistance due to S531L and INH resistance from katG S315T1 mutations indicate an urgent need for enhanced TB surveillance and targeted interventions. Additionally, addressing logistical challenges, particularly reagent shortages and equipment failures, is critical to improving TB diagnosis, treatment initiation, and overall patient outcomes. Strengthening Namibia's TB diagnostic capacity will be essential in combating drug-resistant TB and achieving better public health outcomes in this high-burden, resource-limited setting.

55

Tuberculosis Treatment Outcomes and the Role of Community-Based Support Groups Among Persons Who Inject Drugs (PWIDs) Living With HIV in Lagos State, Nigeria: A Case Study

Eghaghe J[1,2], Adebayo M[2], Oladepo E[2], Eghaghe O[2,3], Nathaniel T[2], Owolabi S[2]

[1]Nigeria Network Of People Who Use Drugs NNPUD, Alimosho, , Nigeria, [2]Equal Health and Rights Access Advocacy Initiative - EHRAAI, Alimosho, Nigeria, [3]Josan Consult Nigeria , Yaba, Nigeria

Background: Tuberculosis (TB) remains a significant public health challenge in Nigeria, ranking first in Africa and sixth globally in prevalence, as reported by the 2022 WHO Global TB Report. Nigeria is among the high-burden global categories for TB, HIV-associated TB, and multidrug-resistant TB (MDR-/RR-TB), Persons who inject drugs (PWIDs) face heightened vulnerabilities to TB and HIV. This study evaluates the effectiveness of community-based support structures in improving TB treatment outcomes among PWIDs living with HIV in Lagos State, Nigeria.

Description: Between January and August 2024, 45 PWIDs (25 females, 20 males; aged 18–35 years) undergoing TB treatment were monitored across four selected districts in Lagos State. Monthly community-based support group meetings were conducted targeting clients in urban slum areas at high risk for adverse outcomes. Attendance at these meetings was tracked, and treatment outcomes were obtained from the Lagos Infectious Diseases Treatment Centre database. Outcomes were compared between support group participants and non-participants.

Lesson Learned: Among the 45 clients, 37 (82.2%) attended all support group meetings. Of the 41 clients who attended at least one meeting, 94.1% achieved successful treatment outcomes. Conversely, the four clients who did not participate in meetings had significantly lower success rates. Participation in support groups was strongly correlated with improved treatment outcomes, particularly among individuals aged ≥35 years.

Conclusion/Next steps: Active participation in community-based TB support groups significantly enhances treatment outcomes for PWIDs affected by TB. These findings highlight the need to scale up access to such support groups nationally to improve adherence and health outcomes for vulnerable populations, aligning with global goals to end TB by 2030. Future efforts should focus on integrating support groups into broader TB and HIV programs to optimize treatment success.

56

Performance of Chest X-Ray in Detecting Subclinical TB Among People Living With HIV

Ndayisenga J[1], Mutembayire G[1], Uwizeye P[1], Ngabonziza J[1], Migambi P[1]

[1]*Rwanda Biomedical Centre, Kigali, Rwanda*

Background: Tuberculosis (TB) remains the leading cause of death among people living with HIV (PLHIV). TB detection through Symptom screening is widely used, especially in low- and middle-income countries (; however, it fails to detect subclinical TB infections, which are more prevalent in PLHIV. In this study, we assessed the added value of chest X-ray alongside symptom screening followed by GeneXpert Mycobacterium Tuberculosis/Resistance to Rifampicin (MTB/RIF) for the early detection of TB among PLHIV.

Methods: A cross-sectional section was conducted in 2015. PLHIV were screened for TB symptoms, which are cough, night sweats, weight loss, fever and known contact with a TB patient. After symptom screening, the participants were screened with mobile digital X-ray machines. Abnormal chest X-rays suggestive of TB and all PLHIV who were detected to have at least one of the five TB symptoms were registered as presumptive TB and provided sputum for the GeneXpert MTB/RIF test. A positive result by Xpert MTB/RIF was considered a TB case. The sensitivity and specificity of symptom screening and chest X-ray were calculated, and the significance of differences in the positivity rate was calculated via McNemar's chi-square test, with a p-value <0.05.

Results: A total of 11901 PLHIV were recruited from six health facilities in Kigali with 94 (0.8%) being TB positive. Among all the PLHIV, 639 (5.4%) had TB symptoms, including 52 (8.1%) who were confirmed on Xpert. Chest X-ray revealed that 1671 (14.4%) individuals had abnormal results predicting TB, including 42 asymptomatic TB patients. Chest X-ray revealed a higher sensitivity (100%) than symptoms screening (55.5%), but lower specificity (88.9%) compared to 95.5% of symptoms screening. The TB positivity rate significantly differed between chest X-ray and symptom screening (X2 = 40.024, p-value <0.001).

Conclusion: Our study revealed that chest X-ray detect subclinical TB patients among PLHIV with a high sensitivity, a good quality for a screening method. TB screening should not be based on symptom screening in this high-risk group, as a proportion of affected individuals can be missed. Promoting accessibility to chest X-ray for TB screening among PLHIV will improve early case detection and subsequent successful treatment outcomes.

57

Screening for Symptomatic and Asymptomatic Tuberculosis Among People Who Use and Inject Drugs in Githurai, Nairobi, Kenya

Kamau J[1]

[1]Kenya Network Of People Who Use Drugs (kenpud), Nairobi, Kenya

Tuberculosis (TB) remains a significant public health challenge, particularly in vulnerable populations such as people who use and inject drugs (PWUDs). These individuals face increased risks due to compromised immunity, high rates of HIV co-infection, and limited access to healthcare services. This study aimed to evaluate the prevalence of symptomatic and asymptomatic TB among PWUDs in Githurai, Nairobi, Kenya, and explore the effectiveness of targeted screening interventions in this population.

A cross-sectional study design was employed, involving 300 participants recruited through harm reduction centers and outreach programs in Githurai. Data collection included structured interviews to assess socio-demographic characteristics, substance use patterns, and TB-related symptoms. Symptomatic screening was conducted using the World Health Organization (WHO) symptom checklist, while asymptomatic cases were identified through chest radiography and GeneXpert MTB/RIF testing. Participants also underwent HIV testing to examine co-infection rates.

Preliminary findings indicate that 15% of participants reported symptoms consistent with TB, including persistent cough, fever, and weight loss. Among these, 60% were confirmed to have active TB using GeneXpert testing. Additionally, 10% of asymptomatic individuals were diagnosed with subclinical TB through radiographic and microbiological assessments. The study also found a high prevalence of HIV co-infection (30%) among participants, significantly correlating with TB occurrence. Despite these risks, over 40% of participants reported never having undergone TB screening prior to the study, highlighting critical gaps in healthcare access.

The findings underscore the urgent need for targeted TB screening and intervention programs for PWUDs in Githurai. Integrating TB screening into harm reduction services and addressing barriers such as stigma, lack of awareness, and limited healthcare infrastructure can enhance early diagnosis and treatment outcomes. Additionally, promoting HIV-TB co-management and strengthening community outreach programs can significantly reduce the dual burden of these diseases in vulnerable populations.

This study emphasizes the importance of comprehensive health approaches for marginalized groups, advocating for policy changes and resource allocation to bridge existing gaps in TB and HIV care. By addressing these challenges, Kenya can make strides toward achieving its national and global TB elimination goals.

58

Dietary Gap of Macro and Micronutrients and Associated Risk Factors Among Pulmonary TB Patients in Raipur District of Chhattisgarh

Sinha A[1]

[1]Pt JNM Medical College Raipur, RAIPUR, India

Introduction: Tuberculosis (TB) is a global public health problem. Under-nutrition is most potent risk factor for Tuberculosis. TB makes under-nutrition worse and under-nutrition weakens immunity and increases the chances of conversion of latent TB to an active TB disease. Low circulating concentration of micronutrients such as B 12, D3, and minerals Iron, Zinc and selenium have been reported biological plausibility for active TB. This study intended to Malnutrition assessment by BMI, Nutritional Biomarkers and associated risk factors among Pulmonary TB patient.

Material & Methods: Community Based Cross Sectional study was conducted in 160 newly diagnosed adult Pulmonary TB Patients of Raipur district during June 2023 – Nov 2024. After obtaining consent patients were recruited randomly and blood sample were collected for nutritional biomarkers and Information was obtained by Predesign Pretested Questionnaire.

Results: Out of total 160 study subjects studied mean age was 38.01 (SD+-15.69),Majority (68.1%) were female 88.8%. Dietary gap was observed as 79.4% Calorie & Protein deficient respectively while Mean calorie deficit 444.73Kcal (SD+-572.98) & Mean Protein Deficient -26.94gm (SD+-36). Among all 60% study subject were undernourished out of which 11.3% were Severely Malnourished. Micronutrient deficiency was observed as 83.4% vit D3 Deficient, 80.6%, 50.6% low Cholesterol, 20.6% B12 deficient, low serum iron 14.4% and serum ferritin low among 22.5% study subjects. Overall micronutrient deficiency found in 10 % of Pulmonary TB patients. Low level of Vit D, serum ferritin, serum iron was significantly more among undernourished TB patients as compared to normal nutrition.

Conclusion: High proportion of study subjects were Undernourished with significant Calorie and protein gap found in their recommended daily intake. This Dietary gap was also associated with various micronutrient Deficiencies. Therefore identified nutrient can be incorporated in the diet thogh locally available food through better treatment outcome among Pulmonary TB patients.

59

Prevalence and Trends of Unsuccessful Tuberculosis Treatment Outcomes Among HIV/TB Co-Infected Patients at Komfo Anokye Teaching Hospital, Ghana: A 10-Year Retrospective Study

Martyn-Dickens C[1], Cobinnah A, Idan J, Boakye K, Mensah N, Adanagbe E, Abdulai S, Enimil A, Mohammed A

[1]*Komfo Anokye Teaching Hospital, Kumasi, Ghana*

Introduction: Unsuccessful treatment outcomes significantly impact tuberculosis (TB) control efforts globally, especially amongst persons with HIV. This study aimed to assess the prevalence, trends, and associated factors of unsuccessful TB treatment outcomes among TB/HIV co-infected patients in Ghana.

Methods: A cross-sectional study was conducted using data from the Komfo Anokye Teaching Hospital (KATH) recorded from !st January 2012 to 31st December 2022. A total of 1,242 TB/HIV co-infected patients were included in the study. At 95% confidence interval and 5% alpha level, a modified Poisson regression with robust standard errors analysis was performed using Stata version 16.0 to identify predictors of unsuccessful treatment outcomes.

Results: The prevalence of unsuccessful treatment outcomes for the period (2012 – 2022) was 24.6% (95% CI: 22.3–27.1). There was a decreasing trend of unsuccessful TB treatment outcomes, from 47.62% in 2012 to 7.79 in 2022. Additionally, age (≥65 years) (ARR: 5.552, 95% CI: 2.782–11.079) had an increased risk of unsuccessful TB treatment outcomes. Patients with pretreatment weights of 40–54 kg (ARR: 0.522, 95% CI: 0.384–0.707), patients weighing 55–69 kg (ARR: 0.404, 95% CI: 0.272–0.600) and over 74 kg (ARR: 0.156, 95% CI: 0.107–0.702), and having a treatment supporter (ARR: 0.804, 95% CI: 0.649–0.996) reduced the risk of unsuccessful outcomes.

Conclusion: The high prevalence of unsuccessful TB treatment outcomes among TB/HIV co-infected patients within the 10 years highlights the need for targeted interventions. Prioritizing care for older patients, improving nutritional support, and promoting treatment support involvement will enhance treatment success in Ghana.

60

A Systematic TB Screening Campaign Improves TB Case Detection, Contact Tracing Yield, and TB Preventive Treatment (TPT) Initiation: Evaluating a Strategic Initiative at a National Mental Referral Hospital in Kampala, Uganda

Aryatuha I[1], Kazooba P[1], Namale G[1], Achayo H[1], Kaleebi J[1]

[1]*Reach Out Mbuya Community Health Initiative, Kampala, Uganda*

Background: Tuberculosis (TB) remains a critical global health priority, killing over 4,300 people daily and affecting nearly 11 million people annually, causing 1.3 million deaths. In Uganda, significant gaps in TB case detection, contact tracing, and TPT initiation hinder control efforts, particularly in vulnerable communities. We describe the effectiveness of Reach Out Mbuya Community Health Initiative's (ROM's) implementation of a systematic TB screening campaign to address gaps in TB diagnosis, contact tracing, and TPT initiation at Butabika National Mental Referral Hospital.

Description: From August 2023 to December 2024, ROM implemented a systematic TB screening campaign (a WHO recommendation) to address gaps in TB diagnosis, contact tracing, and TPT initiation in Butabika National Mental Referral Hospital. TB hotspots were mapped using data from an electronic Case Based Surveillance System (eCBSS). Active case finding included TB screening at facility entry points, admission wards, and in the community through collaboration with local leaders, village health teams, peer leaders, and TB champions in door-to-door visits, HIV outreach integration, and extended contact tracing. Populations that were unavailable during work hours were accessed using flexible outreach models during evenings and weekends. Community-based sputum collection was conducted to enhance the linkage of presumptive patients to diagnostic services.

Lessons Learned: TB case detection increased significantly by 53% from 145 cases in January 2023 to 216 cases in December 2024. Over the same period, the yield from contact tracing improved by 57% from 0 to 57 diagnosed contacts. Additionally, TPT for eligible contacts increased from 9 contacts to 447 contacts.

Conclusions/Next Steps: Systematic TB screening effectively enhances TB case detection, contact tracing yield, and TPT initiation among high-risk groups. Success relies on data-driven hotspot mapping, community engagement, flexible service delivery models, and integrating TB screening into other activities.

61

Prevalence of Tuberculosis Disease Among People Living With HIV Who Had Antiretroviral Therapy Interruption and Returned to Treatment in General Hospital, Wannune, Tarka LGA

Agugo C[1], Onyenike A[1], Agena B[2], Odoh V[2], Agaba G[2], Akase P[1], Ushie F[1], Udo R[1], Ikwueze D[1], Idoko J[3], Inya S[1], Ngwoke K[1], Ejimkaraonye E[1], Kaior A[4], Obatomi J[3], Enenche E[1], Omole T[1], Jwanle P[1], Onwuatuelo I[1], Samuels J[1], Okonkwo P[1]

[1]APIN Public Health Initiatives, Jos, Nigeria, [2]General Hospital, Wannune, Nigeria, [3]Benue State Ministry of Health, Makurdi, Nigeria, [4]Benue State Tuberculosis, Leprosy and Buruli Ulcer Control Program, Makurdi, Nigeria

Background: Tuberculosis (TB) is the leading opportunistic infection among people living with HIV (PLHIV). With adherence to antiretroviral therapy (ART), sustained virologic suppression is achieved. This is crucial to prevent the emergence of drug resistance, reduce morbidity from opportunistic infections, and improve the quality of life of these clients. However, with an interruption in treatment (IIT) of ART, the resultant immunosuppression predisposes them to opportunistic infections.

Materials and Methods: A cross-sectional study was carried out among clients who previously had interrupted treatment with ART for 1 year or more but re-initiated care from January 2023 to August 2024. Among other care plans based on their clinical presentation, their blood samples were collected for the CD4 test result. Those with <200 cells/mm3 further received urine lateral flow lipoarabinomannan (LF-LAM) assay for tuberculosis diagnosis. Those screened presumptive for TB (using the WHO-recommended four-symptom screen) were offered other TB evaluation methods (Sputum Genexpert testing and clinical diagnosis).

Results: Of 80 IIT clients who returned to care, 44 (55%) had >200 CD4 cells/mm3 while 36 (45%) had CD4 cells <200. Of those with <200 cells/mm3, 13 (36.1%) had positive urine LF-LAM results. Of the 32 who were TB presumptive, 4 (26.7%) out of the 15 who did the Sputum Genexpert test had Mycobacterium tuberculosis (MTB) detected (2 of them had <200 CD4 cells). Based on clinical signs and symptoms (clinical diagnosis), 2 clients were commenced on anti-TB drugs.

Conclusions: TB Screening and management remains a core component of care for PLHIV who had ART treatment interruption before they are re-initiated into care. TB was diagnosed and treated in more than one-fifth of them.

62

Transforming Drug Resistance Tuberculosis Care: Success of a Fully Ambulatory Model During a Tuberculosis Outbreak in Namisindwa District, Uganda

Brianwong C[1,3], Waisswa D[2], Ssekiswa L[1,3], Akobye W[1,3], Mugume A[1,3], Kiragga D[3]

[1]USAID Local Partner Health Services-Eastern Activity, Mbale, Uganda, [2]Mbale Regional referral Hospital, , Uganda, [3]Baylor Foundation Uganda, , Uganda

Introduction: In Uganda, the management of drug-resistant tuberculosis (DR-TB) typically follows a mixed model that combines hospital-based care with ambulatory services. Patients begin their treatment in tertiary hospitals, and once stabilized, they transition to daily directly observed therapy (DOT) at nearby health centers, with month visits to tertiary hospitals for monitoring and management of adverse events. We present outcomes of DR-TB patients who initiated treatment using a fully ambulatory care model at Bumbo Health Center III in Namisindwa during an outbreak from October 2022 to March 2023, compared with the traditional mixed model.

Methods: In November 2022, after 21 cases of rifampicin-resistant (RR) TB were diagnosed, the Ugandan Ministry of Health (MOH) declared a DR-TB outbreak in Bumbo, Namisindwa District. Due to space limitations at the tertiary hospital, the response team recommended ambulatory treatment for all 21 patients. The USAID LPHS-E and Mbale regional Hospital teams trained healthcare workers (HCWs) at the satellite health facility to manage the patients and ensure 100% DOT. Monthly follow-up clinics were held for treatment monitoring, adverse events screening, and contact tracing. Patient data was obtained from the DR-TB treatment register for the cohort October 2022 to March 2024.

Results: Of the 21 DR-TB patients treated at the satellite site, 62% were female, with a median age of 43.5 years (IQR: 34-54). All patients received health worker-led DOT. 90% (19/21) were newly diagnosed with TB; one had previously been treated with second-line drugs, and another with first-line drugs. Four patients (19%) were HIV positive, with three newly diagnosed, all of whom started antiretroviral therapy. The majority (86%) received modified shorter treatment regimens (mSTR). The treatment success rate at the satellite site was 95%, with one patient lost to follow-up. In comparison, the success rate was 88% for patients initiated at the tertiary hospital, with two deaths and two patients lost to follow-up. All baseline culture-positive patients were cured in both settings.

Conclusion: The 95% treatment success rate at the satellite site demonstrates that a fully ambulatory model is highly effective for DR-TB management in resource-limited settings. The training of healthcare workers played a crucial role, highlighting the potential for decentralizing complex care through capacity building. Further research is needed to assess long-term sustainability and scalability.

63

Addressing Diagnostics and Testing Barriers in TB Treatment Through Market and Patent Intelligence Study Research

Otieno D[1]

[1]KELIN, Nairobi, Kenya

Tuberculosis continues to be one of the leading public health threats in Kenya and Africa in general yet the issue on access to treatment is hindered by delays in diagnosis. The Market and Patent Intelligence (MPI) study conducted in Kenya highlighted key barriers related to diagnostics and testing that negatively impacted on TB treatment outcomes. Despite the efforts and advancements in TB treatment, a great number of individuals remain undiagnosed due to issues such as high diagnostic costs, limited access to modern testing technologies all because of intellectual property (IP) restrictions on essential diagnostic tools.

The Kenya MPI study found out that while Kenya has adopted WHO endorsed molecular diagnostic tools such as GeneXpert, their availability and affordability remains limited due to the high cost of acquisition, supply chain inefficiencies and over reliance on donor funded programs. Patent protections and evergreening of the diagnostic tools leads to monopolistic and exaggerated pricing further restricting the availability of rapid and high-quality TB diagnostics, making early detection difficult. Despite global recommendations for decentralized TB testing, most diagnostic services in Kenya remain centralized, leading to delays in diagnosis and treatment initiation especially in rural and marginalized areas. Patent monopolies on newer and more efficient TB testing technologies limit local production and competition hence keeping prices high and out of reach for many public health programs. The study also revealed that limited investment in research and local production of diagnostics increases reliance on expensive imports further straining Kenya's healthcare system.

The MPI study recommends several interventions like leveraging TRIPS flexibilities to allow for parallel importation and compulsory licensing of key TB diagnostics that can help reduce costs and improve accessibility. There is also the need to advocate for local production and technology transfer to enable Kenyan manufacturers to produce affordable diagnostic tools. The Kenya government must also prioritize the integration of TB testing within the universal health care program and within primary healthcare facilities to ensure timely detection and treatment initiation.

Moreover, the need for strategic partnerships between the public, NGOs and private sectors to expand access to innovative diagnostics is a cornerstone in the efforts to eradicate TB. By working with local, international and regional stakeholders, Kenya can strengthen its capacity to implement modern and efficient community-based testing models and mobile diagnostic units to reach marginalized populations. Strengthening the regulatory framework to fast-track the approval of generic diagnostic tools can also enhance competition and drive down prices.

Addressing these Intellectual Property barriers is important to achieving TB elimination targets and ensuring that no patient is left behind due to diagnostic delays. The MPI study serves as a crucial evidence base for policymakers and civil society organizations to advocate for policy reforms that prioritize equity in access to TB testing and treatment. By removing IP-related barriers, leveraging TRIPs flexibilities and investing in local diagnostic capacity, Africa can solidify its TB response and move closer to eradicating TB.

64

Tuberculosis Drug-Resistant Trends Within Patients Suspected of Having Drug Resistant TB in Western Kenya

Nyongesa L[1], SITATI R[1], OKUMU A[1], ODHIAMBO B[1], OTIENO K[1]

[1]*Kenya Medical Research Institute, Kisumu, Kenya*

Background: Tuberculosis remains public health concern in Kenya, with the country ranking among 30 TB high-burden countries globally. Drug-resistant tuberculosis (DR-TB) represents a threat to the control of tuberculosis. We sought to estimate the trends of DR-TB to first-line TB drugs in Western Kenya in patients suspected of having drug resistant TB in western Kenya.

Methodology: This was a cross sectional study where samples received between January 2020 and October 2024 as part of TB multidrug surveillance were used. Well-labelled samples in 50ml falcon tubes were received at KEMRI TB lab accompanied by their request forms. Sputum quality and volume was captured in electronic database. 2% N-acetyl-l-cysteine-sodium hydroxide was used to decontaminate the samples in the ratio of 1:1. Concentrated sediment was re-suspended in 2.0 ml sterile phosphate-buffered saline (pH 6.8) and used for MGIT culture Smear microscopy using ZN, brain heart infusion agar plate and TBc (BD) identification were performed on instrument positive MGIT tubes, to check for contamination and to confirm the presence of mycobacterium tuberculosis, followed by drug susceptibility testing for first line (DST) for isoniazid rifampicin and ethambutol using MGIT 960 instrument.

Result: This was a cross sectional study where total of 3219 Mycobacterium tuberculosis complex (MTBC) cultures between 2020 and November 2024 were used, out of which 183 (5.7%) were resistant and 1901 (59.1%) sensitive to isoniazid, 99 (3.1%) resistant, 1985 (61.7%) sensitive to rifampicin, 23 (0.7%) resistant, 2057 (63.9%) sensitive to ethambutol, 18(0.6%) had error while 1117 DST were not performed.

On Patient types, most patients were new at 78 (2.4%) followed by Relapse at 63(2.0%) median age was 33.0 (0, 101) and HIV negative were majority at 1794 (55.7%).

Conclusion/Recommendation: There has been a reduction in resistance to isoniazid, ethambutol and rifampicin from 2020 to 2024, apart from 2023 where there was an increase in rifampicin resistance. The TB program should continue strengthening diagnostic laboratories to achieve elimination of drug resistant TB.

65

Effect of a Tailored Capacity-Building Intervention on Administration of ART by Healthcare Workers in Managing TB/HIV Co-Infection in Ghana: A Quasi-Experimental Trial

Ogyiri L[1], Kenu E[1], Danso-Appiah A[1], Lartey M[2], Kwara A[3], Torpey K[1]

[1]School of Public Health, University Of Ghana, Accra, Ghana, [2]School of Medicine and Dentistry, University of Ghana, Accra, Ghana, [3]Emerging Pathogens Institute, University of Florida, Gainesville, USA

Background: There is strong evidence supporting the survival benefit of co-administration of ART and TB therapy in people with TB/HIV co-infection. Ghana consistently reported ART coverage below 50% (2015 to 2019) among co-infected people. The study aimed to assess the effectiveness of a tailored intervention on ART administration by healthcare workers in managing TB/HIV co-infection.

Methods: We conducted a quasi-experimental trial in 17 hospitals across Greater Accra and Ashanti regions in Ghana. There was a formative phase where we determined the barriers and facilitators to ART administration by healthcare workers and assessed ART uptake and data quality of medical records. We designed a one-day capacity-building program consisting of training on clinical management of TB/HIV co-infection and documentation of medical records, introduction of linkage forms to enhance communication between TB and HIV units, and supportive follow-up visits. Participants included healthcare workers managing TB and/or HIV. The intervention was guided by the Theoretical Domains Framework and informed by barriers and facilitators identified in the formative stage of the study. In assessing the effectiveness of the intervention, we measured and compared ART uptake and medical record completeness before and after the intervention. The pre-intervention period spanned 2019 to 2021, with the post-intervention in 2022. We compared the completeness of medical records in the pre-and post-intervention periods using random effects linear regression by the maximum likelihood estimation method. We used chi-squared test of proportions to compare the proportion of patients on ART pre- vs. post-intervention.

Results: The pre-intervention median scores on completeness in the TB register, TB folder, and ART folder among the participating facilities were 71%, 60%, and 77%, respectively. Completeness increased significantly by 5 percentage points (p= 0.046) and 10 percentage points (p<0.001) in the TB and ART folders, respectively. In the TB register, completeness scores decreased significantly by 4 percentage points (p = 0.034). ART uptake post-intervention was 63.7% compared to 55% at pre-intervention (p<0.001). Clients with unknown ART status post-intervention was 23.7% compared to 43.2% pre-intervention (p<0.001).

Conclusion: Training healthcare workers on TB/HIV management and enhancing medical record documentation may increase ART uptake and improve medical record completeness.

66

Integrating Agent-Based Modeling and Mobile Digital Chest X-Ray Screening to Transform TB Hotspots Into Cold Spots in High-Burden Settings

Mujuni D[1,2], Doran J[3], Yates C[3], Bowness R[3]

[1]Makerere University College of Health Sciences, Kampala, Uganda, [2]Alpha Biomedical Research and Innovation Network, Kampala, Uganda, [3]University of Bath, Bath, England

Background: Tuberculosis (TB) transmission remains a significant challenge, particularly in high-burden, densely populated areas. Early case detection is critical for interrupting transmission, yet delays in diagnosis allow TB to spread, sustaining hotspots of infection. To address this, we have developed an integrated approach that makes it possible to combine agent-based TB transmission modeling with mobile digital chest X-ray (DCXR) screening units deployed in high-risk areas to systematically turn TB hotspots into cold spots. The model was used to assess the impact of strategic deployment of mobile DCXR systems on TB incidence reduction.

Methods: In collaboration with the University of Bath, we developed an agent-based model (ABM) that simulates TB transmission at an individual level, incorporating factors such as population mobility, healthcare access, TB preventive therapy, as well as diagnostic and treatment delay influences. The model has been developed to enable dynamic updates using surveillance data from DCXRs equipped with AI-driven CAD4TB software, allowing for hotspot detection and predictive analytics.

Results: Preliminary simulations indicate that targeted deployment of DCXRs based on model predictions leads to a significant reduction in TB incidence compared to random screening. The model suggests that earlier detection and treatment initiation shorten the infectious period, thereby disrupting TB transmission chains. In hotspot areas, the guided DCXR-based screening showed a potential 20-fold reduction in unnecessary GeneXpert tests, optimizing resource utilization.

Conclusions: Our findings demonstrate that combining agent-based modeling with mobile DCXR deployment enables proactive, data-driven TB control strategies. Through the prediction and disruption of hotspots using individual data, we can accelerate TB elimination efforts in high-burden settings. Further research will refine model parameters, incorporate airborne TB biosensing, and evaluate long-term epidemiological outcomes.

67

Leaving No Enrolment Gaps Among Diagnosed Drug-Resistant Tuberculosis (DR-TB) Patients in Osun State Nigeria: A Strategic Approach Using Healthcare Providers and Social Media Platforms

Adekunle A[1], Adetiba T[1], Olupitan O[1], Agbaje A[1], Mensah C[1], Dakum P[1], Oladele R[2], Olaosun O[2], Dimang S[3], Ubochioma E[3], Adesigbin C[3], Bello Raji H[1]

[1]Institute of Human Virology Nigeria (IHVN), Abuja, Nigeria, [2]Osun State Tuberculosis Leprosy and Buruli Ulcer Control Programme , Osogbo, Nigeria, [3]National Tuberculosis Leprosy and Buruli Ulcer Control Programme, Abuja, Nigeria

Introduction: Drug Resistant tuberculosis (DR-TB) is undoubtedly a monster in the control of tuberculosis worldwide. DR-TB raises a big concern due to the various challenges with prevention, diagnosis, treatment, and follow-up in care of those affected by the disease. Nigeria is one of the countries with triple burden of TB, DR-TB and TB/HIV. Oftentimes, diagnosed DR-TB patients are not enrolled because of some factors like delayed sample processing due to sample overload at diagnostic sites, delayed result retrieval and communication of results, mind-set of denial in diagnosed patient, catastrophic cost for patients, access to care due to long distances and hard-to-reach areas. Osun state in Nigeria is one of the states that houses high DR-TB burden in the country.

Method: The state programme took up concerted efforts to close enrolment gaps in the state from 2022 to 2024:

- Generated a linelist of all diagnosed DR-TB patients in the state across all the local government areas (LGAs).
- Created a WhatsApp platform which involves all DR-TB care givers of the diagnosed patients like the laboratory/diagnostic technical staff; DOT officers where these patients were identified or presumed and sent for diagnosis; the state logistic officers who supply the anti-TB; the state DR-TB focal person who monitors the processes/proceedings closely. This improved result transmission and promptness to identify diagnosed DR-TB patients.
- All diagnosed DR-TB patients' details are sent to the WhatsApp group and from there all concerned care givers are alerted and mandated to trace, track and bring all the diagnosed DR-TB clients in their purview to care.
- Some incentives are provided by the programme to the caregivers to make calls and or visit patients' houses.
- Some incentives are provided for patients transport themselves to care centres to access care and commence treatment.
- Enhanced counselling is done to diagnosed DR-TB clients to improve treatment adherence.

Results: The enrolment gaps reduced from 49% in 2022 to 16% in 2024.

Conclusion: It is very dangerous to diagnose a TB/DR-TB patient and not place them on treatment. This increases morbidity and mortality in them, it increases danger of infection spread in the society. Concerted efforts need to be put in place to close enrolment gaps of DR-TB using several strategies including use of communication strategies, very close follow-up and incentive to enable early enrolment and access to care.

68

Accelerating TB and HIV Diagnosis Among Children: Outcome of Integrating Community-Based Interventions During a National Childhood TB Testing Week

Ezieke E[1], Nwanja E[1], Ogheneuzuazo O[1], Akpan U[1], Toyo O[1], Ogundehin D[2], Eneogu R[2], Omo-Emmanuel U[2], Katbi M[2], Kimanga D[2], Obiora-Okafor C[2], Idemudia A[2], Nsongurua J[1], Agulu R[3], James E[2], Pius J[2], Oyelaran O[2], Onyedinachi O[1], Adegboye A[1], Eyo A[1]

[1]Excellence Community Education Welfare Scheme, Uyo, Nigeria, [2]Office of HIV and TB, United States Agency for International Development, Abuja, Nigeria, Abuja, Nigeria, [3]National Agency for the Control of AIDS, Abuja, Nigeria

Background: Significant gaps remain in tuberculosis (TB) and HIV diagnosis among children in Nigeria. ECEWS, with funding from PEPFAR/USAID, supported the Cross River State Government to integrate TB/HIV screening into the Nigeria National Childhood TB Testing Week (May 27th – June 2nd, 2024). This paper describes the intervention and reports the outcomes of this integrated approach to TB/HIV diagnosis among children in Southern Nigeria.

Description: This initiative began with collaborative planning, dissemination of the Childhood TB guidelines, and stakeholder engagement including TB and HIV programs in Nigeria. Community mapping identified high-TB-prevalence locations such as slums, primary schools and orphanages. Resources including consumables and personnel were deployed from health facilities. Children <15 years identified in these settings were screened for TB using a symptom checklist, and HIV testing was offered to those with presumptive TB. Sputum or stool samples were collected for GeneXpert testing from children with presumptive TB and those diagnosed with TB and/or HIV were referred to the health facility. Regression analysis was used to assess factors associated with TB and HIV testing, with significance set at $p<0.05$.

Lessons Learnt: A total of 7,460 children were screened for TB, 75.5% (5,634) were aged 5 to 14 years and 54.5% (4,064) were females. Of these 20.7% (1,543) were presumptive for TB, 97.3% (1,501/1,543) were evaluated for TB and 3.3% (49/1,501) were diagnosed with TB. Of the 1,543 children presumed to have TB, 39.2% (605) were tested for HIV and seven (0.1%) children were diagnosed with HIV. Two children had TB/HIV co-infection. 100% of those diagnosed with HIV and TB were linked to treatment. Children aged 0-4 years were less likely to be tested for TB (OR: 0.2, 95% CI: 0.01–0.05, $p<0.01$) and children aged 5-14 years were less likely to be tested for HIV (OR: 0.36, 95% CI: 0.27–0.49, $p<0.01$).

Conclusion: The integrated TB/HIV screening during the National Childhood TB Testing Week successfully identified and linked children previously unaware of their TB and HIV status to treatment. However, more targeted strategies are needed to improve TB and HIV testing among children.

69

Improving Integration of Communicable and Non-Communicable Diseases: Using Tuberculosis and Diabetes Mellitus as Case Study in Tanzania

Cleophace Byashalira K[1]

[1]Kibong'oto Infectious Diseases Hospital, Kilimanjaro, Tanzania, United Republic of

Background: Tuberculosis (TB) control is threatened by a progressive increase of diabetes mellitus (DM), particularly in TB-endemic settings. Screening for DM is not routinely implemented due to limited access. We implemented five strategic areas for improving DM detection in patients with TB from low-resource-limited settings including Tanzania.

Methods: The study was implemented in three levels of health care facilities in three regions of Tanzania. Five strategic areas assessed for improving integration of TB and DM epidemics include; 1) baseline-line assessment to determine level within health system suitable for integrating dual TB/DM epidemics, 2) evidence on pathways for patients with dual TB/DM, 3) Step-wise training and clinical audit to support integration while improving quality of care delivery, 4) clinical-demographic markers for triaging DM screening for further DM confirmation at time of TB diagnosis and 5) assessed the application of a point-of-care HbA1c test in guiding DM treatment options in patients with TB/DM. Health facilities at Hospitals and lower The study was implemented while observing implementation outcomes between October 2019 and September 2020.

Results: The baseline assessment survey identified the integration of dual TB/DM care services being established well at hospitals compared to lower levels, with patients suffering from dual TB/DM epidemics attending various health facilities for each condition. Step-wise training increased rapid dissemination of knowledge with an additional 519 front-line healthcare providers being trained (371 nurses and 148 clinicians), clinical audit identified potential gaps in managing patients with dual TB/DM epidemics.

The study found age of 35 years as an independent marker for high blood glucose in the DM range at the time of TB diagnosis (p=0.018). Importantly, the HbA1c test was a potential biomarker for triaging DM treatment options during TB treatments.

Conclusion: Integration of communicable and non-communicable diseases using the TB and DM model was assessed as feasible based on various metrics in a low-resource setting. It was largely accepted and feasible, indicating its potential for broader scale-up across regions in Tanzania.

Keywords: Implementation, DM screening; TB patients; clinical-demographic; Tanzania

70

Outcomes of Tuberculosis Preventive Therapy in Selected Greater Gaborone District Clinics in Botswana

Gare K[1,2], Rankgoane-Pono G[1], Molefi T[2]

[1]Department of Family Medicine & Public Health, University of Botswana, Gaborone, Botswana, [2]Department of Health Services Management, Ministry of Health, Gaborone, Botswana

Background: Tuberculosis (TB) remains the biggest contributor to morbidity and mortality in persons living with the human immunodeficiency virus (PLHIV) in countries where TB is endemic. Treatment of TB infection is referred to as TB preventive therapy (TPT) and is one of the most powerful ways to prevent TB. The purpose of this study was to assess the outcomes of TPT and factors associated with favourable and unfavourable outcomes in selected Greater Gaborone district clinics in Botswana.

Methods: This was a cross-sectional study involving retrospective review of data of patients enrolled in TPT in Greater Gaborone clinics. The study utilized secondary data available from TPT registers and Integrated Patient Management System (IPMS). It was then determined which outcomes (favourable or unfavourable) were associated with which factors through logistic regression analysis using Stata 13.1 software.

Results: A total of 398 participants were enrolled into the study through secondary data capturing amongst 11 clinics. The regimen which majority (99.0%) of the participants was on was 3HP. Most (86.7%) participants took between 2-3 months to complete the therapy. All 398 (100.0%) were enrolled on ART and 378 (95.0%) had a TPT outcome of completed (TC) which is a favourable outcome. The association between TPT outcomes and various factors showed no statistical significance ($p>0.05$ and odd ratio 1.00) for both unadjusted and adjusted logistic regression models.

Conclusion: Overall, participants in Greater Gaborone Health District displayed favourable TPT outcomes and a high completion rate. Most socio-demographic and clinical characteristics of participants were attributable to favourable outcomes even though the model showed that some didn't have a predilection to favourable nor unfavourable outcomes because of collinearity.

Keywords: Tuberculosis Preventive Therapy, TPT Outcomes, Botswana, Greater Gaborone District, Clinics

71

The Invisible Threat: Investigating TB Transmission From Detention Centers to Prisons in Oyo State, Southwestern Nigeria

Odey L[1], Akingbesote S[1], Agbaje A[1], Olugbenga D[1], Olabamiji J[1], Ricketts A[1], Adedayo O[1], Samuel O[1], Mensah C[1], Eneogu R[2], Ihesie A[2], Ajayi O[5], Pedro M[1], Babalola J[3], Shehu L[4]

[1]Institute of Human Virology, Nigeria, , Nigeria, [2]USAID, , Nigeria, [3] Oyo State Ministry of Health, Ibadan, Nigeria, [4]Federal Ministry of Health, NTBLCP, , Nigeria, [5]Society for Family Health, , Nigeria

Background: Prisons in developing nations are hotspots for Tuberculosis, a highly contagious infectious disease caused by Mycobacterium tuberculosis bacteria and of significant public health importance. People in congregate settings like prisons and detention centers have a 10-times higher risk of developing TB, MDR-TB and related co-morbidities, with poorer treatment outcomes. Nigeria contributed 4.6% to the global TB burden in 2022 and prioritizes TB case-finding strategies especially in congregate settings like prisons and detention centers known to find more TB cases and its comorbidities. This study aims to investigate the transmission transit of TB from detainees in detention centers to correctional facilities.

Methods: To investigate active TB cases in prison facilities in Oyo state, we employed the use of technology and innovative strategy using Ultra-Portable digital Chest X-ray machines with artificial intelligence and World Health Organization-recommended TB symptomatic screening approach to screen officers and inmates in the Agodi correctional facility. The screening was done on a weekday, every week for 12 months between November 2023 and November 2024. Persons identified as presumptive with TB produced sputum samples for GeneXpert testing and a follow-up radiologist review for diagnosis confirmation.

Results: A total of 2817 persons were screened with 1036 (36.8%) having stayed and worked for more than 4 weeks while 1781 (63.2%) have stayed for about 2 weeks in the facility. A total of 276 presumptive TB was identified and investigated for TB of which 115 (41.6%) were inmates who had stayed for about 2 weeks in the facility. Overall, 112 TB cases were detected representing 40.5% TB yield. TB among participants that had spent less than 2 weeks in the prison facility were 53 cases (47.3% of the total).

Conclusions: This study reveals a significant TB burden among newly admitted inmates, suggesting that detention centers are a critical source of TB transmission, with a high risk of spreading to correctional facilities. Therefore, targeted interventions in detention centers are crucial to controlling the spread of TB.

72

Impact of HIV Among People With TB on Household Mtb Transmission in High TB Incidence

Marambire E[1], Calderwood C[1,3], Larsson L[4], Malhotra A[1,5], Madziva K[1], Mbiba F[1], Banze D[2,6], Nhamuave C[6], Minja L[7], Mfinanga A[2,7], Khosa C[5,7], Kallenius G[8], Sundling C[8], Kavenga F[9], Held K[4,10,11,12], Mutsvangwa J[13], Heinrich N[4,10,11], Khan P[3], Kranzer K[1,3,4]

[1]The Health Research Unit, Biomedical Research and Training Institute, Harare, Zimbabwe, [2] CIHLMU Center for International Health, University Hospital, LMU Munich, Munich, Germany, [3]Faculty of Infectious and Tropical Diseases, London School of Hygiene & Tropical Medicine, London, UK, [4] Institute of Infectious Diseases and Tropical Medicine, LMU University Hospital, LMU Munich, Munich, Germany, [5]Department of Clinical Sciences, Liverpool School of Tropical Medicine, Liverpool, UK, [6]Instituto Nacional de Saúde, Marracuene, Mozambique, [7]National Institute for Medical Research - Mbeya Medical Research Centre, Mbeya, Tanzania, [8]Division of Infectious Diseases, Department of Medicine Solna, Center for Molecular Medicine, Karolinska Institutet, Stockholm, Sweden, [9]National TB programme, AIDs and TB unit, Ministry of Health and Child Care, Harare, Zimbabwe, [10]German Center for Infection Research (DZIF), Partner Site Munich, Munich, Germany, [11]Fraunhofer Institute for Translational Medicine and Pharmacology ITMP, Immunology, Infection and Pandemic Research, Munich, Germany, [12]Unit Global Health, Helmholtz Zentrum München, German Research Centre for Environmental Health (HMGU), , Neuherberg, Germany, [13]Biomedical Research and Training Institute, Harare, Zimbabwe

Background: Lower transmission of Mycobacterium tuberculosis (Mtb) from people with concurrent tuberculosis (TB) and HIV had been described prior to wide-spread roll-out of antiretroviral therapy (ART). Lower Mtb transmission was thought to be due to the pauci-bacillary nature of the disease among individuals with severe immunosuppression. However, little is known about the impact of HIV in an era of universal ART among people with TB (PWTB) on Mtb transmission dynamics. We investigated Mtb transmission from people with infectious TB to household contacts (HHC).

Methods: A cohort of 2,109 TB HHC (≥10 years) of confirmed (medium/high Xpert MTB/RIF) PWTB was enrolled across sites in Mozambique, Tanzania, and Zimbabwe. Baseline Mtb infection status was determined with interferon-gamma release assays (IGRA). Multivariable mixed effects logistic regression modelling assessed the effect of HIV status of PWTB on risk of intrahousehold Mtb transmission.

Results: 1,923 household contacts of 822 PWTB were included in the analysis. PWTB were categorized as HIV-negative (N=568,69%), HIV-positive not on ART (N=94,11%; (diagnosed with HIV at time of TB diagnosis), HIV-positive on ART (N=181,22%), and unknown HIV status (N=64,8%). HHC were predominantly female (n=1198, 62%), and one third (n=626) adolescents aged 10–19 years. Odds of IGRA positivity among HHC were significantly lower when the PWTB was HIV-positive and not on ART compared to HIV-negative PWTB (odds ratio [OR] 0.45; 95%CI: 0.30–0.69). Adjusting for confounders or mediators (bacillary burden and symptom duration) did not change the effect size. There was no significant difference in IGRA positivity among HHC when the PWTB was HIV-positive and taking ART compared to HIV-negative patients (OR 0.85, 95%CI: 0.64–1.14).

Conclusion: Despite the enrolled PWTB having medium/high bacillary burden, people living with HIV not on ART exhibited reduced Mtb transmission. This may reflect differences in infectiousness duration and health-seeking behaviours.

73

Finding the Missing Tuberculosis (TB) Cases in the Communities: An Artificial Intelligence (AI)-Driven Model to Improve TB Case Finding In Nigeria; The CommTB Experience

Adekunle A[1], Bello-Raji H[1], Vincent E[1], Adetiba T[1], Adebayo O[1], Olupitan O[1], Agbaje A[1], Mensah C[1], Dakum P[1], Okuzu O[2], Omatuyole B[2], Ogbuokiri E[2], Ogunmola B[2]

[1]*Institute of Human Virology Nigeria (IHVN), Abuja, Nigeria,* [2]*Instrat Global Health Solutions (InstratGHS), Abuja, Nigeria*

Background: Tuberculosis (TB) disease poses a huge health burden globally, in Africa and in Nigeria particularly. Over 1.3 million people die of TB worldwide. About 2.5 million people are infected with TB in Africa. In Nigeria, the incidence rate of TB is 219/100000 population, and this makes about 5% of the world's TB burden. Despite various efforts to find missing TB cases in Nigeria, treatment coverage still stands at about 72%.

Method: The use of CommTB innovation which works with artificial intelligence (AI) in finding the TB cases in the country was engaged to improve TB case finding in the communities in Nigeria. The innovation involves the use of an application on a device (usually handheld like phones, tablets). The application has some screening questions as aligned with standard clinical practices to screen an individual for TB. Following screening with the application, the application denotes if the individual screened is a presumptive TB. Any presumptive TB is then evaluated using standard molecular diagnostic means and can be diagnosed with TB if the disease is present in the person. The method clearly improves TB presumption and improves surveillance in TB case finding in the communities.

Results: In a year with the use of this CommTB app, 913094 persons were screened, 656325 were evaluated using the standard molecular evaluation methods like the GeneXpert, 432643 persons were identified as presumptive TB which is a 58% presumptive TB yield and 60372 TB cases were diagnosed which gives 13% TB yield. The efficiency in screening and TB yield is clearly above the conventional screening methods.

Conclusion: The use of innovative technology especially AI driven systems has proven to produce results which are clearly above conventional screening methods. Also, some of these cases could have been missed if this innovation was not utilised in these instances. The CommTB proffers a very high screening efficiency for TB in the communities. There is need to scale up this innovation to find the missing TB cases in the communities in Nigeria and also other African Countries.

74

Integrating Community-Based TB, HIV, Syphilis, and Hepatitis B Testing in Nigeria: Insights From the Global Fund GC7 Program

Bello Raji H[1], Aimu R[1], Adebayo O[1], Vincent E[1], Daniel J[1], Ugwoke U[1], Adetiba T[1], Adekunle A[1], Ochigbo C[1], Pillatar B[1], Gurumnan R[1], Aderounmu [1], Nwadukwe A[1], Attah S[1], Bathnna M[2], Murtala-Ibrahim F[1], Okpokoro E[2], Olupitan O[1], Agbaje A[3], Mensah C[4], Dakum P[3], Ssekitooleko J[5], Kimeu J[5], Reilly A[5], Zamzu M[5]

[1]Institute of Human Virology Nigeria (IHVN)), Abuja, Nigeria, [2]International Research Centre of Excellence, Institute of Human Virology, Nigeria (IHVN) , Abuja, Nigeria, [3]3Institute of Human Virology Nigeria (IHVN), Office of the CEO, Abuja, Nigeria, [4]Institute of Human Virology Nigeria (IHVN), Office of the COO, Abuja, Nigeria, [5]The Global Fund to Fight AIDS, Tuberculosis and Malaria, Global Health Campus, , Switzerland

Background: Nigeria continues to grapple with a high burden of pediatric HIV, contributing 14% of global pediatric infections and reporting a 23.4% vertical transmission rate in 2023. This challenge is exacerbated by low antenatal care (ANC) coverage and poor uptake of prevention of mother-to-child transmission (PMTCT) services. Additionally, the 2023–2024 Nigeria Demographic Health Survey reports antenatal care (ANC) coverage at 63% and 62% of deliveries occurring outside formal health facilities, limiting access to skilled care and diagnostic services. To address these gaps, the Global Fund Grant Cycle 7 (GC7), through the Institute of Human Virology Nigeria, implemented a community-based intervention integrating HIV, syphilis, and hepatitis B testing into routine Tuberculosis community active case-finding activities. The initiative seeks to optimize resources, improve TB/HIV integration, and enhance community-level identification, testing, and linkage to care. This study evaluates the outcomes of this integrated approach.

Materials and Methods: This retrospective analysis utilized program data collected between January and December 2024 across Nigeria's 36 states and the Federal Capital Territory. Two primary approaches were employed. The first involved community-based outreach in homes, internally displaced persons (IDP) camps, and slums, where trained community TB teams offered pregnant women symptomatic TB screening and administered an eligibility checklist for HIV, syphilis, and hepatitis B testing. These teams included community TB volunteers, mentor mothers from the Network of People Living with HIV, and local government health personnel. Pregnant women who tested HIV-positive were linked to treatment and follow-up care through mentor mothers, while HIV-negative women were referred for ANC services. The second approach targeted unconventional care settings, such as traditional birth attendants' homes, religious centers, and traditional healers' Centres. Service providers were trained to incorporate TB and HIV testing into their routine services, with tools provided for proper documentation and reporting. Data analysis involved calculating frequencies and percentages using MS Excel.

Results: During the study period, 296,609 pregnant women were screened for TB, with 302 (0.1%) diagnosed with drug-susceptible tuberculosis. Of the eligible pregnant women, 271,356 (91.5%) were tested for HIV, yielding 1,056 positive cases (0.4%). All identified HIV-positive women were linked to treatment and support services, and all participants were referred to ANC. Additionally, 553 cases of syphilis, 53 cases of hepatitis B, and 13 cases of HIV-HBV co-infection were identified.

Conclusions: The integration of HIV, syphilis, and hepatitis B testing into community-based TB case-finding activities demonstrated substantial success in identifying previously undiagnosed infections, linking affected individuals to care, and promoting increased ANC attendance. The collaborative approach, leveraging TB case-finding structures and engaging unconventional service providers, significantly expanded diagnostic coverage in underserved populations. This initiative offers a scalable and adaptable model for improving maternal and child health outcomes while contributing to Nigeria's efforts in reducing pediatric HIV infections.

75

A Health Workers' Perspective on TB Preventive Therapy for Contacts of TB Patients: A Cross-Sectional Study From South Western Uganda

Dan M[1], Owino A[2], Suleiman M[2], Ogei A[1], Musiime F[1], Alima H[1], Muhumuza A[1], Masiko J[1]

[1]Uganda Protestant Medical Bureau, Kampala, Uganda, [2]School of Public Health, Department of Community Health, Epidemiology & Biostatistics, Mount Kenya University , , Kenya

A health workers' perspective on TB Preventive Therapy for contacts of TB Patients: A cross-sectional study from South Western Uganda

Background: Tuberculosis Preventive Therapy (TPT) is a key, cost-effective Tuberculosis (TB) prevention strategy but its coverage remains sub-optimal, globally. The objective of the study was to establish factors associated with TPT prescription for contacts of Pulmonary Bacteriologically Confirmed (PBC) TB patients.

Methods: A cross-sectional study was conducted between August and September 2023. Data was collected using a data abstraction tool and a self-administered, semi-structured questionnaire from the 17 TB diagnostic and treatment health facilities in Bushenyi district, South Western Uganda. Abstracted data for a complete year, July 2022 to June 2023 was analyzed in excel for descriptive statistics. Factor analysis was done using R Core Team, 2023, on the data collected using the questionnaire. Factors associated with TPT prescription were analyzed using logistic regression.

Results: Of the 781 contacts line-listed for contact tracing, only 442 (77.1%) were prescribed TPT, which is below the 90% target. Factor analysis revealed six factors affecting TPT prescription and these are: Latent TB testing, TPT service delivery, TPT financing, human resources for TPT, Monitoring and evaluation for TPT, and health workers attitude towards TPT. In multivariate logistic regression, perception of patient being uncomfortable with TPT (aOR 5.58 95% CI: 2.18-16.0; p = <0.001) and gaps in knowledge among healthcare worker about TB and TPT (aOR 5.97 95% CI: 2.08-19.6; p=0.002) were significantly associated with less likelihood of TPT prescription by a healthcare worker.

Conclusions: Whereas TPT is an efficient intervention for prevention of TB, health system factors remain impediments to its implementation. We recommend continuous targeted capacity building for health workers using a specially designed curriculum that addresses both knowledge and perceptions of health workers regarding TPT.

76

Targeting the Vulnerable: Patterns of TB, HIV and TB/HIV Co-infection Among Pregnant Women in Unconventional Settings in Katsina, Northwestern Nigeria

Lawrence I[1], Galadima A[1], Abi R[1], Batur P[1], Sheshi M[2], Okoh A[2], Odume B[2], Adebayo O[3], Adetiba T[3], Olupitan O[3], Vincent E[3], Ssekitooleko J[4], Reilly A[4]

[1]KNCV Nigeria, Katsina , Nigeria, [2]KNCV Nigeria, Abuja, Nigeria , [3]3Global Fund N-THRIP, Institute of Human Virology, Nigeria (IHVN), Abuja, Nigeria , [4]The Global Fund to Fight AIDS, Tuberculosis and Malaria, Global Health Campus, Geneva, Switzerland

Background: Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) are significant global public health challenges, particularly in resource-limited settings. Pregnant women represent a vulnerable population due to the dual burden of TB and HIV, with coinfections posing serious risks to maternal and neonatal health. This study aimed to explore the patterns of TB, HIV, and TB/HIV case finding among pregnant women in unconventional settings in Katsina, Northwestern Nigeria.

Method: A retrospective study of data of TB screening and HIV testing of pregnant women in unconventional settings was done. Data was obtained from outreaches, house-to-house visits, and Traditional Birth Attendant (TBA) registers. Screening for TB was conducted using the World Health Organization (WHO) four-symptom screening tool. HIV testing was offered to women with unknown HIV status and who did not access antenatal care (ANC) services. Data were analyzed to determine the prevalence of TB, HIV, and TB/HIV coinfection.

Results: A total of 33,765 pregnant women were reached in the communities. Of these, 30,564 (90.5%) were screened for TB. Among the screened women, 28,448 (84.5%) were eligible and consented for HIV testing. HIV testing identified 225 HIV-positive women (0.8% yield) while TB cases were diagnosed in 181 women (0.6% yield), with 73 (0.2% yield) of these being TB/HIV coinfections.

Conclusion: The findings underscore the need for integrated TB and HIV screening in unconventional settings to enhance case finding among pregnant women. The high number of TB and HIV cases detected highlights the importance of targeted interventions in resource-limited settings to improve maternal and child health outcomes. Strengthening outreach and leveraging TBA sites could significantly reduce the burden of TB and HIV in this vulnerable population.

77

Dietary Diversity and Its Effects on Underweight and Overweight or Obesity Among People With TB and HIV in Uganda: A Quasi-Experimental Study

Izudi J[1,2], Kyazze S[3], Bajunirwe F[2]

[1]*Infectious Diseases Institute, Makerere University, Kampala, Uganda,* [2]*Mbarara University of Science and Technology, Mbarara, Uganda,* [3]*Clarke International University, Kampala, Uganda*

Background: Dietary diversity indicates nutritional adequacy but its effect on the nutritional status among people with tuberculosis (TB) and human immunodeficiency virus (HIV) remains unclear. This study examines the effect of dietary diversity on nutritional status among people with TB/HIV in Kampala, Uganda.

Material and Methods: We conducted a quasi-experimental study using observational data from five primary healthcare facilities in Kampala, Uganda. Participants included people with TB/HIV attending TB clinics. Dietary diversity was assessed using the Food and Agriculture Organization's Dietary Diversity Score, classified as low (poor or borderline) or high (acceptable). Participants with high dietary diversity were assigned to the intervention group, while those with low dietary diversity formed the comparison group. Nutritional status was measured by body mass index (BMI), categorized as normal (18.5–24.9 kg/m²), underweight (<18.5 kg/m²), or overweight/obese (≥25.0 kg/m²). We balanced all demographic, clinical, and socio-behavioral factors across the intervention and comparison groups using propensity score weighting. Multinomial logistic regression was used to estimate the effect of dietary diversity on underweight and overweight/obesity relative to normal weight. Relative risk ratios (RRR) with 95% confidence intervals (CI) were reported.

Results: We included 745 participants (53.7% male and age ≥15 years). Of these, 30.7% had high dietary diversity, 50.9% had normal weight, 36.8% were underweight, and 12.3% were overweight/obese. High dietary diversity tended to increase the likelihood of being underweight (RRR 1.41, 95% CI: 0.87–2.32) and overweight/obese (RRR 1.16, 95% CI: 0.57–2.35). In the sex-stratified analysis, high dietary diversity in men tended to increase underweight (RRR 1.12, 95% CI: 0.24–2.23) but trended toward lowering overweight/obesity (RRR 0.69, 95% CI: 0.24–2.00). In women, high dietary diversity tended to increase both underweight (RRR 1.92, 95% CI: 0.94–3.91) and overweight/obesity (RRR 1.87, 95% CI: 0.69–5.04).

Conclusion: Dietary diversity may increase the risk of being underweight among people with TB/HIV, without significantly affecting overweight or obesity. These findings suggest that other factors may play a more significant role in nutritional outcomes and highlight the need for interventions addressing both dietary quality and quantity to tackle undernutrition in this population.

78

Improving TB Screening Efficiency Through Physician-Led Screening Approaches in Akwa Ibom State, Nigeria: A Retrospective Analysis

Otu P[1], Odoh C[2], Ugbechie E[2], Elechi I[2], Arthur S[1], Ezieke E[1], Ukpong K[2], Gana B[1], Akpan B[3], Ogheneuzuazo O[1], Akpan U[1], Nwanja E[1], Toyo O[1], Ogundehin D[4], Eneogu R[4], James E[4], Pius J[4], Oyelaran O[4], Onyedinachi O[1], Adegboye A[1], Eyo A[1]

[1]Excellence Community Education Welfare Scheme (ecews), Nigeria, Uyo, Nigeria, [2]Achieving Health Nigeria Initiative (AHNi), Uyo, Nigeria, Uyo, Nigeria, [3]State Ministry of Health (SMoH), Akwa Ibom, Nigeria, Uyo, Nigeria, [4]Office of HIV and TB, United States Agency for International Development, Abuja, Nigeria, Abuja, Nigeria

Background: Tuberculosis (TB) diagnosis remains a major public health challenge, especially in settings with high HIV prevalence. To improve this, In October 2023, the PEPFAR/USAID-funded Accelerating Control of the HIV Epidemic (ACE-5) project revised the clinical processes for people living with HIV (PLHIV) initiating antiretroviral therapy in Akwa Ibom. This study compares TB screening outcomes among PLHIV initiating ART before and after the intervention in Akwa Ibom, Nigeria.

Methods: This retrospective cross-sectional study analysed data of PLHIV initiated on ART across 162 PEPFAR-supported health facilities in Akwa Ibom State, Nigeria. Before the intervention (Oct 2022-Sep 2023), TB screening was conducted by lay workers prior to ART initiation. The intervention which was implemented between Oct 2023 and Sept 2024 involved integrating TB screening into the ART initiation services provided by physicians. We extracted data from the electronic medical records for the period October 2022 to September 2024 for analysis. Chi's square tests assessed TB-screening uptake (proportion screened for TB); TB-presumptive yield (proportion presumed to have TB); TB evaluation (proportion of presumed cases evaluated); and TB-diagnostic yield (proportion diagnosed with TB) before and after the intervention. A significant p-value was set at 0.05.

Results: Among the 14,549 PLHIV initiated on ART, 68.4% (9,949) were female and the median age was 33 years (IQR:25-41). Of these 54.6% (7.939) were initiated prior to the intervention. TB screening rates significantly increased during the intervention (98.9% [6536/6610] vs. 82.3% [6530/7939], p<0.001). The TB-presumptive yield decreased from 19.8% (1,290/6,530) pre-intervention to 17.1% (1,117/6,536) post-intervention (p < 0.001). However, the proportion of presumptive TB cases evaluated increased significantly from 59.5% (768/1,290) to 89.6% (1,001/1,117), p < 0.001 and TB diagnostic yield increased from 7.4% (57/768) to 25.0% (249/996) p=<0.001.

Conclusion: Physician-led TB screening significantly improved TB screening uptake, evaluation rates, and diagnostic yield among PLHIV in Akwa Ibom. More research is needed to unravel the factors responsible for this improvement.

79

Advancing Towards Tuberculosis Elimination in Malawi: A Five-Year Cross-Sectional Analysis of Key Performance Indicators for TB Control Using Nationwide Routine Surveillance Data

Twabi H[1,2], Msosa T[1,3,4], Mukoka M[1,5], Mwaluka I[6], Girmah B[6], Sikwese T[1], Mpunga J[6], Mbendera K[6], Simbeye J[7], Nliwasa M[1]

[1]Kamuzu University of Health Sciences, Blantyre, Malawi, [2]Institute of Life Course and Medical Sciences, University of Liverpool, Liverpool, United Kingdom, [3]Amsterdam UMC, location University of Amsterdam, Department of Global Health, Amsterdam, Netherlands, [4]Amsterdam Institute for Global Health and Development, Amsterdam, Netherlands, [5]Department of Infectious Disease Epidemiology and International Health, London School of Hygiene and Tropical Medicine, London, United Kingdom, [6]National Tuberculosis and Leprosy Elimination Programme, Ministry of Health, Lilongwe, Malawi, [7]University of Malawi, Zomba, Malawi

Background: Tuberculosis (TB) remains the leading cause of infectious mortality globally, despite progress in reducing its incidence over the past two decades. Sub-Saharan Africa, including Malawi, disproportionately bears this burden due to poverty and the HIV/AIDS pandemic. Despite declining trends in TB case notifications following antiretroviral therapy (ART) expansion, gaps in disease surveillance and case detection persist. Malawi's National Tuberculosis & Leprosy Control Strategic Plan (2021–2025) emphasizes data-driven approaches for monitoring TB control efforts, but national programmatic indicators have not been systematically evaluated since the plan's implementation. This study evaluates the performance of Malawi's National TB Program (NTP) using routine DHIS2 data, providing insights into national trends, geographical distributions, and programmatic gaps in TB care.

Methods: This cross-sectional study used aggregated TB data collected through Malawi's District Health Information System (DHIS2) from 2018 to 2022. Trends in TB incidence, case notification rate (CNRs), and case notification-to-target ratios (NTTR) were analysed nationally and sub-nationally by district, age, gender, and HIV status. Programmatic indicators, including the availability of TB diagnostic and treatment services and treatment success rates (TSR), were also assessed. We analysed trends in TB incidence and notification rates, calculated performance indicators, and assessed district-level variations using time-series plots and statistical comparisons. Population estimates were derived from the 2018 census and adjusted for annual growth.

Findings: Malawi reported 18,025 new TB cases in 2022, representing a 17.2% increase from 2018. From 2005 to 2018, TB incidence and CNRs declined by 68.6% and 54.5%, respectively, but the trends in CNRs plateaued population after 2017. The highest CNRs were recorded among males aged 35–64 years. Geographically, Lilongwe and Blantyre districts accounted for the largest number of cases but exhibited significant case detection gaps (NTTR of 0.78 and 0.79 for Lilongwe and Blantyre districts respectively). Access to TB diagnostic and treatment services improved nationally, with facilities increasing from 356 in 2018 to 523 in 2022. TSRs improved overall, reaching 89.2% in 2022, though disparities persisted for HIV-positive patients and those treated at tertiary facilities.

Interpretation: Despite progress in reducing TB burden and improving TSRs, critical challenges remain in Malawi's TB control efforts, particularly in addressing case detection gaps in high-burden districts and improving outcomes for vulnerable populations. Strengthening active case finding, enhancing diagnostic capacity, and addressing socioeconomic determinants of health are essential for sustaining progress and achieving End TB Strategy goals. These findings underscore the need for tailored interventions to bridge gaps in TB care and control.

80

Improving Pediatric Tuberculosis Case Identification Among Children Aged Below 15 Years Through Tuberculosis Screening in Schools in Kapelebyong District, Northeastern Uganda

Ninsiima C[1], Ssentongo S[1], Ochieng G[1], Oryokot B[1], Sekiranda P[1], Bakashaba B[1]

[1]*Aids Information Centre, KAMPALA, Uganda*

Background: In Uganda, only 60% of the estimated children and adolescents with tuberculosis (TB) were diagnosed in 2022. Similarly in April-June 2024, only 7% of children 0-15 years and below were identified in Teso Region, this is below the expected MoH/NTLP benchmark of 13% to 15%. To improve pediatric Tuberculosis case identification among children ages below 15 years, the AIDS Information Center (AIC) conducted Tuberculosis Screening in Schools in the Kapelebyong district, Northeastern Uganda.

Methods: In September 2024, the AIDS Information Center (AIC) with support from the US Centre for Disease Control and Prevention sought permission to conduct TB screening using WHO four-symptom screen (W4SS) tool in primary schools from the District Education Officer (DEO), through the Office of the District Health Officer for Kapelebyong district. A list of schools to be visited was generated and given to the DTLS. Seven primary schools were line-listed, including six (6) Universal Primary Education schools and one (1) privately funded school. Headteachers of the targeted schools were notified about the activity and requested to mobilize pupils for TB screening on designated days of the week. Health workers from Kapelebyong HCIV conducted TB screening integrating it with nutritional assessment of each of the pupils in lower primary classes.

Results: A total of 1,863 pupils attending seven (7) primary schools aged 5 to 15 years were screened for TB, of these 11% (n=210) were presumed, and on-spot sputum samples were collected. All the samples were referred for GeneXpert testing. Of these 10% (n=21) were diagnosed with pulmonary bacteriological TB, and 2.9% ((n=6) were diagnosed with extrapulmonary TB thus a yield of % 12.9% (n=27). Overall, the proportion (pediatric cases identified/Total number of TB cases identified) of pediatric TB cases identified improved from 0% in April-June 2024 to 34% in July-September 2024 in the district and 13% in the region in the same period.

Conclusions: Children in schools had a high prevalence of TB. Regular Screening for TB in lower primary schools, and integrated reverse contact tracing to their families could support finding the missing TB cases among children.

81

A Study of Loss to Follow-Up Among Tuberculosis Patients During COVID-19 Pandemic Restrictive Period at the Chest Clinic, Livingstone Central Hospital, Zambia

Kashitala C[1,2,3], Shaikh V[3], Mutengo H[2,3,4], Dzoro A[1,3]

[1]University Teaching Hospital (UTH), Lusaka, Zambia, [2]Young Emerging Scientists Zambia(YES Zambia), Lusaka, Zambia, [3]Mulungushi University School of Medicine and Health Sciences, Livingstone, Zambia, [4]Ministry of Health, Monze Hospital, Zambia

Background: The COVID-19 pandemic posed a significant global health threat and disrupted healthcare systems worldwide, including Zambia. As hospitals prioritized critical care for COVID-19 patients, routine care for diseases like tuberculosis (TB) was affected. This study aimed to determine the impact of COVID-19 restrictions on TB patient attendance, treatment, and follow-up at Livingstone Central Hospital's Chest Clinic in Zambia.

Methods: The study analyzed health records of TB patients who attended the Chest Clinic between March 2019 to September 2019 (pre-pandemic) and March 2020 to September 2020 (pandemic period). A data collection form was used to gather socio-demographic and clinical information, including whether the patient was lost to follow-up. Logistic regression was employed to calculate odds ratios (OR) and 95% confidence intervals (CI) to assess the association between COVID-19 restrictions and patient follow-up.

Results: The study reviewed 115 TB patient records from the two periods: 67 patients (58.3%) initiated treatment before COVID-19 restrictions, and 48 patients (41.7%) began treatment during the pandemic. The median age of patients was 34 years. Of the 115 patients, 59 (50%) were male, and 56 (48.7%) were female. The results revealed that new TB patients were more likely to be lost to follow-up during the COVID-19 period compared to the pre-pandemic period (69.7% vs. 30.4%, respectively). The odds ratio for loss to follow-up was 5.8 (95% CI: 2.3-14.3, p<0.001), indicating a significantly higher risk of loss to follow-up during the pandemic. Additionally, 75 (65.2%) of the TB patients had HIV co-morbidity, and 40 (34.8%) did not. The study found that TB patients with HIV were more likely to be lost to follow-up during the pandemic period compared to before (65% vs. 35%, respectively), with an odds ratio of 4.95 (95% CI: 1.66-14.7, p=0.004). No significant association was found between gender and loss to follow-up during the pandemic.

Conclusions: The study concluded that there was a significant increase in loss to follow-up among TB patients during the COVID-19 restrictive period. This was particularly evident among new TB patients and those with HIV comorbidity. These findings highlight the need for targeted interventions and a differentiated service delivery model to ensure continuity of TB care, even during health crises like the COVID-19 pandemic, to mitigate disruptions in essential healthcare services.

82

Assessment of Associated Factors for Tuberculosis Among Newly Diagnosed Human Immunodeficiency Virus-Infected Adult Patients in Oyo State, Nigeria

Olajide O[1], Adetoye D[1], Olafare A[1], Jwanle P[2], Onwuatuelo I[2], Osi Samuels J[2], Okonkwo P[2]

[1]APIN Public Health Initiatives, Ibadan, Nigeria, [2]APIN Public Health Initiatives, Abuja, Nigeria

Background: Tuberculosis (TB) is adjudged as the first opportunistic infection and leading cause of death among human immunodeficiency virus (HIV) infected patients. People living with HIV (PLHIV) are 14–18 times more likely to fall ill with TB disease than people without HIV. In 2014, an estimated 41% of African TB cases were HIV co-infected (WHO, 2014). The prevalence of TB in people with HIV in Nigeria is between 10.5% and 40%. According to (Daniel et al, 2015), TB/HIV co-infection in Lagos state was (23%) while national average was (19%) (NTBLCP, 2014). Improving the burden of TB among HIV-negative people would require comprehensive and up-to-date data to inform targeted policy actions in Nigeria.

Objectives: This study was conducted to determine the prevalence and associated factors for TB infection among newly diagnosed HIV-infected adult patients in Oyo State.

Methods: Cross-sectional study was carried out among newly diagnosed HIV-infected adult persons attending Antiretroviral therapy (ART) clinics between October 2023 and September 2024. While frequency tables were generated at the univariate level, an association was examined using a chi-square test. A binary logistic regression model was fitted using the categorical variables that were significant at the bivariate level to determine predictors of being diagnosed of TB among PLHIVs.

Results: Out of 3,415 newly diagnosed adult PLHIVs, 68.7% were females while 77.5% of the PLHIV were less than 50 years of age. Approximately two-third of the patients had World Health Organization (WHO) clinical stage 1 as at the time of diagnosis while 59% of them had CD4 count > 200 cells/mm3. However, the prevalence of TB was found to be 3.3%. Age and sex of the patients were sociodemographic factors associated with TB infection ($p<0.001$ and $p<0.003$ respectively). Likewise, facility level, weight of the patients, clinical stage, and the CD4 counts were clinical factors associated with TB infection ($p<0.001$). Clients within 50 -59 years and 60-69 years age category had a higher likelihood of being diagnosed of TB compared with those within 20 - 29 years age category (OR=3.2, 95% CI=1.1-9.6, P=0.036 and OR=14.5, 95% CI=4.6-45.1, P<0.001 respectively). Similarly, patients with WHO clinical stage 3 also had a higher likelihood of TB infection compared with patients with HIV Stage 1(OR=4.4, 95% CI=2.7-7.2, P<0.001)

Conclusion: There was a low prevalence of TB infection among newly diagnosed PLHIVs in the study location. However, patient's age, WHO clinical stage, CD4 count were factors associated with TB infection. Efforts should continue to diagnose HIV at an early stage so as to prevent Advanced HIV Disease.

Keywords: Tuberculosis, HIV/AIDS, PLHIVs, WHO Clinical Stage

83

Optimizing Molecular Testing for Tuberculosis Diagnosis Through Leadership Engagement and Continuous Quality Improvement Interventions in Eastern Uganda

Zimwanguyiza S[1], Akobye W[1], Okwir E[1], Jjuuko Kyakuwa R[1], Clark J[1], Birungi D[1], Mugume A[1], Kiragga D[1]

[1]USAID LPHS-E, Kampala, Uganda

Introduction: World Health Organisation (WHO) recommends molecular testing as a preferred diagnostic test for tuberculosis (TB) to increase surveillance for multi-drug resistant TB (MDR-TB). The Eastern region has 27 mWRDT sites serving 200 TB diagnostic and treatment units (DTUs) through a hub and spoke model. In the October - December 2022 quarter, molecular testing for notified TB cases in the region was at 64% compared to the expected 100%. This sub-optimal performance was associated with knowledge gaps among health workers on molecular testing eligibility, limited engagement of the District Health officers (DHOs) in tracking TB performance, and documentation gaps within primary TB data sources. Baylor Uganda set out to use a continuous quality improvement (CQI) approach to increase the percentage of presumptive TB cases accessing TB molecular testing at 161 facilities.

Methodology: Baylor Uganda supported targeted coaching to 161 (DTUs) to build health worker competencies to request for molecular TB testing, engaged facility CQI teams to monitor weekly TB indicators, site-specific TB data review, and reporting through the weekly National surveillance platform. DHOs were supported to monitor TB performance in their respective districts. Quarterly district data validation meetings were conducted to reconcile TB data primary tools, and district-based TB WhatsApp platforms were created to openly share daily updates.

Results: Access to molecular testing improved from 64% to 96% in six quarters while MDR-TB case notification improved from five to 15 cases as of April-June 2024. Oct/Dec 22 64% (812/1265), Jan/March 23 75% (914/1217), April/June 23 78% (882/1124), July/Sept 23 85% (965/1135), Oct/Dec 23 88% (985/1118), Jan/March 24 96% (1177/1229), and April/June 24 96% (1114/1160).

Discussion: This improvement was attributed to weekly data review and sharing of results through the WhatsApp platform, engagement of DHOs in the accountability and tracking of TB performance, and coordination meetings that guided triangulation of results.

Learning: Meaningful stakeholder engagement with prompt feedback is key in improving TB program performance. Limitations to this approach were inconsistent reporting for some facilities', and lack of sputum samples from children.

84

Adhesion to Tuberculosis Preventive Measures by Health Workers in Diagnostic and Treatment Centers in Douala, Cameroon

Ndjip Ndjock A[4], Djuikoue C[1,2,3], Djonkou Yamdeu W[1], Wanda Yimga G[3,8], Tchokonte-Nana V[2], Thumamo Pokam B[5], Longo-Mbenza B[6,7], Ndebia E[7]

[1]Department of Microbiology, Faculty of Health Science, Montagnes University, Bangangte, Cameroon , Bangangte, Cameroun, [2]Department of Public Health, Faculty of Health Science, Montagnes University, Bangangte, Cameroon , Bangangte, Cameroun, [3]Prevention and Control Foundation, Yaounde, Cameroon , Yaounde, Cameroun, [4]Department of Public Health, University of Douala, Douala, Cameroon , Douala, Cameroun, [5]Departement of Microbiology and Parasitology, Faculty of Science, University of Buea, Buea, Cameroon , Buea, Cameroun, [6]Faculty of Public Health, LOMO University of Research, Kinshasa, Democratic Republic of Congo , Kinshasa, Democratic Republic of Congo , [7]Faculty of Health Sciences, Walter Sisulu University, Mthatha, South of Africa , Mthatha, South of Africa , [8]Institute of Medical Research and Studies of Medicinal Plants (IMPM), Yaoundé, Cameroon , Yaoundé, Cameroun

Tuberculosis remains a major health problem in Africa. In Cameroon, it has impacted mortality as well as morbidity. Its socio-economic effects have been particularly hard on the population of big cities such as Douala, where it has increased mortality and morbidity rates. In 2018, the Littoral region of Cameroon saw more than 5,000 cases of tuberculosis. This accounted for 25% of the total number of TB patients in the country that year. In order to control the spread of tuberculosis, health workers must use protective measures and maintain a high level of surveillance for TB infection. This study assessed the level of adherence to TB prevention measures by health workers in the diagnostic and treatment centers in Douala.

A descriptive cross-sectional study was conducted by researchers from 20 July 2020 to 15 August 2020. The researchers surveyed health workers from 12 TB screening and treatment centers in the city of Douala. The data were collected using an observation grid designed on the basis of the WHO health professionals' technical guidelines 4th Edition. The guidelines were contextualized in Cameroon through the technical guidelines for health professionals in Cameroon 2020. The data collected was analyzed using the statistical software Epi Info 7.2.3.1. In the city of Douala, health workers in diagnostic and treatment centers implemented preventive measures against TB, but were insufficient. The adherence average for management measures was 79.16%, environmental measures 71.80% and individual protection measures 54.76%. Poor infection control measures in TB diagnostic and treatment centers in the city of Douala can spread tuberculosis. To solve this, an institutional effort is required to strengthen TB prevention activities.

85

Effect of Pyrazinamide and/or Ethambutol Resistance Determined on Whole Genome Sequencing on Treatment Outcomes, South Africa 2020-2022

Dlamini S[1], Moultrie H[1], Tshabane C[1], Zwane T[1], Ismail F[1]

[1]*National Institute for Communicable Diseases, Sandringhan, South Africa*

Introduction: Despite the high resistance rates to pyrazinamide (PZA) and/or ethambutol (EMB) reported among MDR-TB cases, their effects on treatment outcomes are poorly understood. In South Africa, both drugs are included in the all-oral short-course regimen. This study evaluated the effects of PZA and/or EMB resistance on treatment outcomes among MDR-TB cases in South Africa from 2020 to 2022.

Methods: We conducted a retrospective cohort study of people with MDR-TB who had drug resistance profiles characterised using whole genome sequencing (WGS) and treated with the all-oral short-course regimen. Resistance patterns to PZA and/or EMB were classified into four categories: susceptibility to both drugs (EMB-S & PZA-S), resistance to PZA only (EMB-S & PZA-R), resistance to EMB only (EMB-R & PZA-S), and resistance to both drugs (EMB-R & PZA-R). Treatment outcomes were categorized as either successful patient outcomes (SPO) or unsuccessful patient outcomes (USPO). A directed acyclic graph (DAG) guided the selection of variables for the generalized linear model. Incident rate ratios (IRRs) were calculated with 95% confidence intervals using modified Poisson regression with robust error variances.

Results: Among the 598 MDR-TB cases included in the analysis, 60% (356/598) were resistant to one or both drugs. Province and previous unsuccessful TB treatment were identified through the DAG as a minimally sufficient set. There was little evidence that resistance to PZA and/or EMB increased USPO: resistance to PZA (IRR = 1.18, 95% CI: 0.86–1.63), resistance to EMB alone (IRR = 0.94, 95% CI: 0.67–1.32), and resistance to both drugs (IRR = 0.97, 95% CI: 0.73–1.27). Residing in the Western Cape was associated with a higher IRR of USPO compared to Gauteng (IRR = 1.78, 95% CI: 1.16–2.74).

Conclusion: We found little evidence that PZA and/or EMB resistance determined using WGS altered patient outcomes amongst this cohort of people with MDR-TB. The addition of pyrazinamide and/or ethambutol to the all-oral short-course regimen was unnecessary, as it had no effect on the treatment outcome. Investigation of potential circulating MDR strains in provinces is needed.

86

Indeterminate Mycobacterium tuberculosis Resistance Profile in Kano, Nigeria

Aliyu Ahmad U[1]

[1]Institute Of Human Virology, Nigeria, Kano, Nigeria, [2]Department of Medical Microbiology and Parasitology, Faculty of Clinical Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [3]Department of Microbiology, Faculty of Life Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [4]Department of Microbiology, Faculty of Life Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [5]Department of Community Medicine, Faculty of Clinical Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [6]North-West TB Reference Laboratory, Aminu Kano Teaching Hospital, PMB 3142, Kano, KANO, Nigeria, [7]Department of Medical Microbiology and Parasitology, Faculty of Clinical Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [8]Department of Medical Microbiology and Parasitology, Faculty of Clinical Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [9]Department of Medical Microbiology and Parasitology, Faculty of Clinical Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [10]Department of Medical Microbiology and Parasitology, Faculty of Clinical Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [11]Department of Medical Microbiology and Parasitology, Faculty of Clinical Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [12]Department of Medical Microbiology and Parasitology, Faculty of Clinical Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [13]Department of Medical Microbiology and Parasitology, Faculty of Clinical Sciences, PMB 3011, BUK, Kano, KANO, Nigeria, [14]Department of Medical Microbiology and Parasitology, Faculty of Clinical Sciences, PMB 3011, BUK, Kano, Kano, Nigeria

Background: Drug resistant tuberculosis that include multidrug-resistant (MDR) and extensively drug-resistant (XDR) tuberculosis are global challenges due to the limited number of effective drugs for treatment. Treatment with less than 4-5 effective drugs might lead to the further emergence of drug resistance and poor clinical outcomes. The aim was to study the proportion of indeterminate drug-resistance and the incidence of drug resistant genes among Mycobacterium tuberculosis complex (MTBC) isolates in Kano.

Methods: Strains of MTBC were analysed in Kano, Nigeria between 2017 and 2018. Detection of resistance-associated genes in their genome was done using Genotype MTBDRplus® and Genotype MTBDRsl® line probe assays (LPA) that detect the presence of first-line (RIF and INH) and second line (FLQ and AMG) anti TB drugs. The DNA samples were extracted from the MTBC isolates by Genolyse® method.

Results: Out of 136 sputum samples processed DR-TB mutations conferring resistance to Rifampicin (rpoB), Isoniazid (katG and/or inhA), Flouroquinolones (gyr) and Amikacin (rrs) were detected in 101(74.3%), 64(47.1%), 23(16.9%) and 22(16.2%) respectively. Indeterminate results that could have been labeled resistant against RIF, INH, FLQ and AMG were 2(1.5%), 2(1.5%), 17(12.5%) and 20(14.7%) respectively.

Conclusion: Indeterminate results were determined against RIF, INH, FLQ and AMG which pose threats to TB control strategies especially in low and medium income countries like Nigeria. A number of the strains resistant to RIF and INH come from follow-up/relapse person meaning that there were issues regarding adherence to the DOTS protocol among person living with TB. This indirectly evaluated the performance of the assays assessing both interpretable and non-interpretable results from PTB samples.Advanced molecular tests such as pyrosequencing could be used to evaluate resistance to rifampicin, isoniazid, fluoroquinolones, and second-line injectable drugs for these MTBC strains to initiate individualize therapy.

Key words: Drug-resistant Tuberculosis, Indeterminate, Kano

87

Defining a Patient-Centered Treatment Support Package for MDR-TB: A Discrete Choice Experiment in Lusaka, Zambia

Kagujje M[1], Sikandagwa M[1], Mitumbi G[1], Shatilini J[1], Muyoyeta M[1], Kerkhoff A[2]

[1]Centre for Infectious Disease Research in Zambia, Lusaka, Zambia, [2]Division of HIV, Infectious Diseases, and Global Medicine - Department of Medicine, Zuckerberg, San Francisco General Hospital | University of California, San Francisco , , United States

Background: The prolonged duration, complexity, and toxicity of multidrug-resistant tuberculosis (MDR-TB) treatment undermines adherence and cure rates. These challenges underscore the need for support packages to improve outcomes; however, the features most valued and useful to persons with MDR-TB are unknown.

Methods/Design: We undertook a discrete choice experiment (DCE) among adults receiving treatment for MDR-TB in Lusaka, Zambia. The DCE featured five attributes with 3-4 levels each, comprising a support package: frequency of visits/refills and type of treatment observation, visit reminders, emotional and social support, and physical support. Participants completed 12 random choice tasks where they selected their preferred option from two hypothetical packages, each varying by attribute levels. Mean preference weights (PW) for each attribute level and the relative importance (RI) of each attribute were estimated using hierarchical Bayes. Latent class analysis was used to identify groups with distinct preferences.

Results: 99 participants with complete, high-quality data were included (median age 36 years, 70% male, 42% HIV positive, median daily income≈$1.5USD). Physical support was the most valued attribute (RI=45.7), being 1.7- to 9.7-times more important than other attributes with very strong preferences for receiving food supplements plus transport reimbursement (PW=110.1). Visit frequency was also highly valued (RI=26.7), with similar preferences for less frequent monthly (preference weight=39.9) and bimonthly visits (PW=42.4). Participants also preferred phone calls (PW=21.5) for visit reminders (RI=11.8), healthcare workers (HCWs) (PW=25.2) for emotional support (RI=11.2), and HCWs (PW=3.8) or loved ones (PW=3.2) for treatment observation (RI=4.7). Two distinct preference groups were identified, both highly valuing physical support; however, there was heterogeneity in preferences for the different delivery options for other support attributes.

Conclusions: Among economically vulnerable MDR-TB patients, physical support mechanisms and less frequent clinic visits were highly valued. Incorporating patient preferences into treatment programs could optimize MDR-TB care and improve treatment adherence and outcomes.

88

Outcomes of Scale-Up Efforts of Tuberculosis Preventive Therapy in Facilities, Supported by Zimbabwe Association of Church-Related Hospitals: 2020-2023

Makoto O[1], Malaba R[2], Ingwani A[1], Ngwenya M[1], Nyandoro P[1], Rushwaya W[1], Cham H[2], Maphosa T[2], Nzou C[1], Chitimbire V[1], Gwanzura C[3]

[1]Zimbabwe Association Of Church-related Hospitals, Harare, Zimbabwe, [2]Division of Global HIV and TB (DGHT) U.S Centers for Disease Control and Prevention , Harare, Zimbabwe, [3]Ministry of Health and Child Care, Harare, Zimbabwe

Background: According to the World Health Organization (WHO), tuberculosis (TB) is a major cause of death among PLHIV. WHO recommends TPT for those at higher risk of TB disease, including PLHIV. Zimbabwe faces a high TB burden, particularly among PLHIV, with TB/HIV co-infection rate at 49% (WHO Global TB Report 2023). Due to limited capacity and shortage of medicine, TPT access in Zimbabwe has been at 11% in 2017. In 2020, ZACH started TPT scale-up among PLHIV through improving community education and outreach, strengthening screening for eligibility, and ensuring a stable supply chain of TPT medicines.

Methods: Interventions implemented between 2020-2023 included intensified literacy sessions for both clients and health care workers (HCW), intensified TPT screening and initiation outreaches, improved documentation, capacity development sessions on updated TB guidelines, quality improvement initiatives, and improved stock of TPT medicines. Routinely collected 2020-2023 TPT program data for PLHIV receiving ART was analyzed using descriptive statistics to characterize trends in TPT initiations and completion.

Results: Proportion of TPT initiations among PLHIV receiving ART showed a significant increase, from 5% in March 2020 to 84% by September 2023, as depicted by the dotted trend. This improvement followed capacity development, increased screening, quality improvement, and improved stock of TPT medicines. The proportion of clients who completed TPT effectively increased from 63% in 2020 to 97% in 2023 due to comprehensive set of strategies aimed at enhancing both uptake and completion of the TPT course.

Conclusion: The remarkable progress highlights effectiveness of capacity enhancement, availability of TPT medicines, improved documentation, and quality improvement initiatives in promoting TPT initiations and completion among PLHIV. The achievements in TPT completion indicate the effectiveness of initiatives and strategies designed to increase patient involvement and support during the TPT course. Accelerating and sustaining the TPT program is important for preventing TB among PLHIV in Zimbabwe.

89

Improving Tuberculosis Screening Positivity Rates by Routine Quality TB Screening for People Living With HIV at Omuthiya Hospital, Namibia Between March 2023 and May 2024

Iiyambo M[1], Forster N[1], Said M[1], Haoses S[2], Uushona S[2], Mpingana S[2], Sithole E[3]

[1]Itech-namibia, Windhoek, Namibia, [2]Ministry of Health and Social Services (MOHSS), Windhoek, Namibia, [3]Division of Global HIV and Tuberculosis, Global Health Center , U.S. Centers for Disease Control and Prevention, Namibia, Windhoek, Namibia

Background: Namibia has one of the highest burdens of HIV-associated tuberculosis (TB). In 2023, the Namibian Ministry of Health and Social Services implemented routine TB symptom screening at all anti-retroviral treatment (ART) clinics to address missed TB cases amongst people living with HIV (PLHIV). From March 2023 through May 2024, we implemented a quality improvement (QI) initiative to support the implementation of TB symptom screening during ART consultations and improve TB symptom screen yield, targeting a 5% yield, at Omuthiya Hospital in Namibia's Oshikoto Region.

Materials & Methods: A facility-based QI team utilized QI methods to identify gaps and select change ideas for implementation and adaptation using Plan-Do-Study-Act (PDSA) cycles. Change ideas implemented included healthcare worker (HCW) training on effective TB symptom screening, use of visual aids, and patient education on TB symptoms. Routine data from the electronic patient monitoring system was used to calculate the TB symptom screen yield, defined as the proportion of ART clients screened positive for TB symptoms among those screened, was analyzed and monitored monthly to assess improvement. Monthly QI reports were reviewed to identify facilitators and challenges to improvement.

Results: Over the 14-month period, TB symptom screen yields increased from 2% (21/884) in March 2023 to 8% (62/760) in May 2024. A substantial increase in yield followed implementation of HCW training in April 2023 leading to an 8% (64/785) yield by June 2023. However, HCW rotations out of the hospital resulted in a decline in yield as trained staff were reassigned. In November 2023, a strategy to delay HCW rotations for six months was introduced. By March 2024, yields improved to 5% (50/957) and remained above 5% through May 2024.

Conclusion: The QI initiative improved TB symptom screen yield amongst PLHIV by addressing knowledge gaps and HCW rotations, key barriers to quality screening. To ensure improvement is sustained over time, facility leadership can consider additional methods to address training needs for a staff that routinely turns over. Patient involvement in understanding TB symptoms may further enhance outcomes. Implementation of tailored, collaborative, and complementary strategies could contribute to the achievement of TB screening goals.

90

Abstract 90 has been withdrawn.

91

Gender-Transformative HIV-TB Approaches and Community-Led Monitoring in Africa: Programme Innovation for Equitable Comprehensive Responses Within Global Fund Structures

León Cáceres Á[2], Amimi A[1]

[1]W4GF, Quito, Ecuador, [2]W4GF, Marrakech, Morocco

Background: TB remains a global health crisis, with gender disparities hindering access to prevention, diagnosis, and treatment. Africa is the region with the highest rates of HIV/TB co-infection; South Africa contributing to 50% of the cases. The intersection of HIV-TB presents health challenges for women and girls in Africa as in 2020 AGYW accounted for 25% of new HIV cases in the region, despite representing only 10% of the population. The COVID-19 pandemic exacerbated these challenges, leading to a surge in TB-related deaths not seen in over a decade. W4GF has been at the forefront of advocating for gender-transformative HIV-TB responses, calling for increased political will, innovative financing, and the active engagement of women in all of their diversity.

Objectives: Through its evidence-based advocacy actions, W4GF has better understood the comorbidities and coinfections related to HIV-TB among women and girls, bringing those outcomes to key decision-making spaces, influencing technical and financial processes within Global Fund structures. We have analyzed the gender-specific challenges in HIV-TB responses, and structural barriers women face in accessing prevention, screening, and access to affordable treatments. Through CLM, we demonstrated the potential of women-led and evidence-based actions for TB programming, drawing from W4GF's experience with CLM in Tanzania and Cameroon, as transferable models, connected to the monitoring of HIV-cervical cancer and HIV-GBV services, respectively. Through policy briefs, technical notes and social campaigning, we have proposed concrete gender-transformative HIV-TB integration and the inclusion of other comorbidities in Global Fund programmes that need increased investment in women-led TB initiatives, such as mental health, drug use, and cancer.

Methods: W4GF has successfully leveraged CLM ensuring that women-led organizations can collect real-time, disaggregated data to address service gaps in healthcare systems. The W4GF Accountability Toolkit provides a methodology for women and girls to track healthcare service delivery and assess accessibility. This gender-focused approach prioritizes lived experiences, capturing healthcare barriers and integration of HIV- TB services. W4GF advocates for a people-centered approach considering social determinants of health, gender inequalities, stigma, discrimination, and economic barriers. Our CLM Academy, peer training, and mentorship programs equip advocates with skills to gather and analyze health data to better understand and respond to comorbidities and co-infections.

Results & Impact: Our focus on gender-transformative advocacy has influenced international policy discussions on investing in women-led health initiatives. Integrating CLM into Global Fund HIV-TB programming enhances data-driven decision-making, funding accountability, and service delivery. Disease-focused approaches fail to address co-infections and comorbidities, limiting access to timely diagnosis and care.

Conclusion: To end TB by 2030 and achieve global HIV goals, gender inequalities must be addressed through community-driven, evidence-based strategies. W4GF advocates for the full integration of CLM in HIV-TB programs, ensuring women shape TB policies and monitor progress. GBV, stigma and discrimination remain significant barriers to accessing TB and HIV services and are exacerbating vulnerabilities. This methodology fosters holistic sustainable solutions to addressing the root causes of poor health outcomes for HIV and Tuberculosis such as poverty, gender-based violence, and legal barriers.

92

Effectiveness of Active Tuberculosis Case Detection Initiatives in Congregate Settings: Case Series Report Among Almajiri School Children in Taraba State, Nigeria

Salau O[1], Odume B, Haziel B, Bot T

[1]KNCV Nigeria, FCT Abuja, Nigeria

Background: Almajiri schools serve as semi-formal learning centers for children from underserved backgrounds, creating high-risk environments for TB transmission. Despite the vulnerability of these populations, active TB case detection efforts in such settings remain limited. Through USAID funding under the TBLON 1&2 project, KNCV Nigeria implemented a targeted active TB case detection initiative among Almajiri school attendees in Taraba State. This study evaluates the effectiveness of the intervention in identifying and linking TB cases to treatment.

Materials and Methods: An engagement meeting was held with Islamic teachers from selected Almajiri schools to obtain consent and raise awareness about TB transmission, consequences of untreated TB, and the availability of free testing and treatment. Following their approval, a community TB screening team conducted a sensitization campaign, screening students for TB symptoms. Sputum and stool samples from presumptive cases were collected and tested using GeneXpert. Individuals diagnosed with TB were initiated on treatment, while those without symptoms were offered Tuberculosis Preventive Therapy (TPT). The effectiveness of this initiative was assessed based on TB yield from two Almajiri schools.

Results: Between October and November 2023, 319 individuals were screened using the WHO symptomatic TB screening tool. Among them, 109 (34%) were identified as presumptive TB cases. Of these, 24 (22%) were confirmed bacteriologically positive through GeneXpert testing and promptly initiated on treatment.

Conclusions: This study highlights the effectiveness of active TB case detection initiatives in congregate settings, demonstrating a significant TB yield among Almajiri school children. The findings underscore the need for sustained, targeted TB interventions in similar high-risk populations to enhance early detection, reduce transmission, and improve treatment outcomes.

Expanding such community-driven screening approaches can strengthen TB control efforts, particularly among vulnerable groups in Nigeria.

93

Lung Function Outcomes in Adults Diagnosed With Pulmonary Tuberculosis During and After Treatment Completion in Windhoek, Namibia

Nelongo J[1], Günther G[2]

[1]Department of Human, Biological & Translational Medical Sciences, School of Medicine, University of Namibia, Windhoek, Namibia, [2]Inselspital Bern, Bern, Switzerland

Background: Patients undergoing pulmonary tuberculosis (PTB) treatment frequently have ventilation abnormalities. Lung damage and a decreased quality of life persist for TB survivors despite being microbiologically cured. The study aimed to assess pulmonary impairment and quality of life. Findings are essential for patients' care and improving lung health.

Materials and methods: 99 adult patients with PTB who were 18 years of age or older and receiving treatment for TB between September 2021 and July 2023 were enrolled in a prospective longitudinal study at the outpatient department of Katutura Intermediate Hospital in Windhoek. Data on St George's Respiratory Questionnaires (SGRQ), self-reported symptoms, and demographic information were collected at enrollment. At 8 and 52 weeks following TB treatment initiation, spirometry defined by z-scores and a 6-minute walk test were assessed. The SGRQ was administered again at 52 weeks. The IBM SPSS Statistics software was used for data analysis. Descriptive analysis was performed on the data, and a chi-square test was employed to ascertain the relationships between the categorical variables.

Results: The median age for participants was 36 years old (range 19-71), where 67/99 (67.7%) were males. At 8 and 52 weeks, 60/99 and 29/99 returned for follow-up, respectively. Not every patient who visited at 52 weeks was evaluated at the 8-week time point; many patients were lost to follow-up. 56/99 (56.6%) of the patients had completed secondary school, and 58/99 (58.6%) were unemployed. A median pack-year smoking history was 3.0 (range 0.05-30), 23/99 (23.2%) were ex-smokers, and 15/99 (15.2%) were recent cigarette smokers. 90/99 (90.9%) reported having a cough, while 75/99 (75.8%) produced sputum. 82/99 (82.8%) of the patients received TB treatment for the first time, and the median duration of symptoms before diagnosis was six weeks. The comorbidities included heart disease 2/99 (2%), diabetes 3/99 (3%), hypertension 6/99 (6.1%), asthma 5/99 (5.1%), and HIV-positive 31/99 (31.3%). Asthma and recent cigarette smoking were statistically significant characteristics that were linked to lung impairment, with p-values 0.006 and 0.002, respectively. Based on spirometry, the prevalence of lung impairment was 48.3% at 8 weeks, with 9/60 (15%) showing an obstructive pattern and 20/60 (33.3%) suggesting a restrictive pattern as a major condition. 7/60 (11.7%) spirometry efforts could not be interpreted, and 24/60 (40%) had normal spirometry. The quality of life scores for symptoms, activities, impact, and total SGRQ were 24.39, 24.88, 20.93, and 22.97, respectively. A six-minute walk test at 8 weeks covered an average of 437.5 meters. Findings on the patients' lung health approximately three years following TB treatment initiation will be completed.

Conclusion: A change in lung function after TB treatment completion could not be determined using the available data; more patients were lost to follow-up at 52 weeks. A funded study is recommended to enable reimbursement of participants and involve a community health worker to locate missing patients. A strategy to evaluate patients' lung health on a long-term basis following TB treatment is underway.

Keywords: Pulmonary tuberculosis, post-pulmonary tuberculosis, treatment, lung function impairment, spirometry, quality of life

94

Enhancing Efficiency in Tuberculosis Detection: The Synergistic Impact of Clinician Training and Strengthened Referral Pathways on Chest X-Ray Utilization in Lagos State, Nigeria

Rayi O[1], Olabamiji J[1], Kadri B[1], Agbaje A[1], Ukaegbu I[1], Daniel O[1], Mensah C[1], Dakum P[1], Eneogu R[2], Nongo D[2], Shokoya O[3], Elom E[4], Labaran S[4]

[1]Institute of Human Virology Nigeria, Ikeja, Nigeria, [2]United States Agency for International Development, FCT, Nigeria, [3]Lagos State TB leprosy control program, Ikeja, Nigeria, [4]National TB and leprosy control Program , FCT, Nigeria

Background: Tuberculosis remains a major infectious disease burden in Nigeria, with Lagos State being one of the highest TB-burden states. Despite advances in molecular diagnostics, chest x-ray (CXR) remains an essential tool for early TB detection, particularly among high-risk populations. Some of the key strategies of the TB LON 3 project were to strengthen TB case detection through intensified and efficient use of CXR through clinician training in CXR interpretation and the strengthening of referral and triage pathways to enhance screening efficiency and TB yield. This paper highlights the quarterly trends in CXR utilization and TB yield to assess the efficiency of this intervention.

Methods: A retrospective analysis evaluated quarterly trends in CXR utilization and TB yield from Q1 2022 through Q3 2024. Data was extracted from program records on the number of chest X-rays performed on patients who met the eligibility criteria for using Chest X-rays (children, adults who could not produce sputum samples, and patients who are still having symptoms of TB after bacteriological evaluation) the total TB cases detected, and the TB yield (%) for each quarter.

Results: Over the study period, 16,580 chest X-rays were conducted, with 5,859 suggestive of TB, yielding an average detection rate of 35%. TB yield fluctuated between 23% and 49%, with the lowest in Q1 2022 (23%) and the highest in Q3 2024 (49%). In 2022, yield remained relatively low (23–28%) despite increasing X-ray numbers. Following the Q3 2022 intervention including clinician training and strengthened referral pathways, yield initially dipped to 24% but later rose to 44% in Q1 2023 and peaked at 49% in Q2 2023. A temporary decline to 28% was noted in Q4 2023 which may have resulted from increased screening without proper risk stratification and increased use of CXR as the only accessible mode of evaluation due to challenges with the first line of diagnosis as highlighted in the national algorithm. However, yield rebounded in 2024, stabilizing at 46–49%, demonstrating the intervention's sustained impact. The improvement is linked to enhanced referral pathways, better patient triage, and increased clinician expertise in X-ray interpretation. These findings highlight the importance of continuous capacity-building, optimized screening strategies, and integrating CXR with other diagnostics to maximize TB detection.

Conclusion: This analysis shows that the synergistic implementation of clinician training and strengthened referral pathways has demonstrably enhanced CXR screening efficiency for TB detection among eligible patients in Lagos State. Although initial fluctuations were observed, sustained improvements in TB yield underscore the value of integrated capacity-building and streamlined operational processes. Scaling up these interventions could further optimize TB screening strategies in similar high-burden settings.

95

A Population-Based Study of Pharmacogenetics and Pharmacokinetics in Southern African Patients With Tuberculosis (PoPG): A Protocol for the Namibian Cohort

Boois L[1], Ekandjo H[1], Sima C[2], Oelofse C[2], Uren C[2,3,4,5], Petersen D[2,5], Möller M[2,3,4,5], Wijk M[6], Kellermann T[7], Decloedt E[7], McIlleron H[6], Denti P[6], Claassens M[1,8]

[1]Department of Human, Biological and Translational Medical Sciences, School of Medicine, Faculty of Health Sciences and Veterinary Medicine, University of Namibia, Windhoek, Namibia, [2]South African Medical Research Council Centre for Tuberculosis Research, Division of Molecular Biology and Human Genetics, Faculty of Medicine and Health Sciences, Stellenbosch University, , Cape Town, South Africa, [3]Centre of Bioinformatics and Computational Biology, Stellenbosch University, Stellenbosch, South Africa, [4]National Institute for Theoretical and Computational Sciences (NITheCS) South Africa, , South Africa, [5]5.Genomics for Health in Africa (GHA), Africa-Europe Cluster of Research Excellence (CoRE), , , [6]Division of Clinical Pharmacology, Department of Medicine, University of Cape Town, Cape Town, South Africa, [7]Division of Clinical Pharmacology, Department of Medicine, Stellenbosch University, Cape Town, South Africa, [8]8.Desmond Tutu TB Centre, Department of Pediatrics and Child Health, Faculty of Medicine and Health Sciences, Stellenbosch University, , South Africa

Background: Tuberculosis (TB) is an important healthcare problem in Namibia with far-reaching socio-economic impacts, justifying research to improve current treatment options. Precision medicine aims to use specific patient-related information such as genetic or molecular profiling for a tailored approach to healthcare. Successful implementation of precision medicine relies on the availability of population-specific data, such as genome-wide association studies (GWAS) and an understanding of the pharmacokinetics (PK) and pharmacogenetics (PG) of anti-tuberculosis (TB) drugs. To our knowledge, neither PK (or drug concentration established over time), nor PG data of anti-TB drugs is available for Namibian populations in the literature to date. We aim to generate PG and PK data in the country.

Methods: This cross-sectional study will consist of 100 Namibian participants with matched human DNA and PK data (on isoniazid (INH), clofazimine (CFZ), bedaquiline (BDQ) and the fluoroquinolones (levofloxacin (LFX) and moxifloxacin (MOX)) of active multi-drug resistant tuberculosis (MDR-TB) cases. PK sampling will be divided as follows: 30 individuals will undergo intensive PK sampling while 70 will be recruited and undergo sparse PK sampling. DNA will then be extracted and samples will be genotyped using the H3Africa microarray. Moreover, sequences will be aligned to the human reference genome, hg38 (GRCh38p13) using the freely available Burrows-Wheeler Aligner. A subset of the samples (n=20) will undergo whole genome sequencing (WGS).

Data Analysis: Quality control and variant call format (VCF) file generation will be performed using the Genome Analysis Toolkit best practices (version 3.5). Non-compartmental analysis will be used to analyse the intensive PK data. This will be followed by a nonlinear mixed-effects modelling approach where a population PK (popPK) model will be developed to characterise the relationship between dose and exposure including quantifying covariates, including genetic variation, explaining PK variability.

Ethics and Dissemination: Ethics approval has been obtained from the University of Namibia (UNAM) Human Research Ethics Committee for Health (HREC-H) and the Ministry of Health and Social Sciences (MoHSS). Participants will give informed consent. The PG and PK data to be collected will be integrated with existing PG and PK data from collaborators to generate the largest genetic data set in Southern Africa. Data obtained from analysis will give critical insights into future anti-TB treatment and it will serve as a role model for similar studies in other high-incidence settings. The study results will be submitted to a peer-reviewed journal.

96

The Diagnostic Gap: Investigating Xpert-Positive Tuberculosis Cases Later Identified as Nontuberculous Mycobacteria by Line Probe Assay

Eliya T[1,3], Aneke C[1], Bassey E[1], Kurshim1 J[1], Bimba J[1,2]

[1]Zankli Research Center, Bingham University Karu, Nigeria, ABUJA, Nigeria, [2]Department of Community Medicine & Primary Health Care, Bingham University Karu, Nigeria, KARU, NIGERIA, [3]Stephakim Life Foundation, Abuja., ABUJA, Nigeria

Tuberculosis (TB) remains one of the leading infectious diseases globally, mainly caused by Mycobacterium tuberculosis Complex (MTBC). However, the situation is complicated by Nontuberculous Mycobacteria (NTM), which can cause severe infections that often mimic TB. The co-infection of MTBC and NTM presents significant clinical challenges, as their diagnostic requirements and treatment regimens are different. This study aimed to explore the prevalence, diagnostic, and peculiarity of MTBC and NTM co-infections among samples confirmed positive for TB using Xpert MTB/RIF Ultra. A cross-sectional design was used to analyze 135 Xpert-confirmed TB-positive cases. Samples were processed using the NALC/NaOH method and inoculated on solid media for 8 weeks with weekly observation.

Positive culture follow-up was performed using smear and TB MPT64 Ag. Molecular species identification was performed using Line Probe Assay (LPA) GenoType Mycobacterium CM Kit. The prevalence of NTM among the samples tested was 22.9%. Of the 135 samples, 85 (63.0%) were confirmed as MTBC, while 31 (22.9%) were NTM. Among the NTM cases, M. abscessus (22 cases, 16.3%) and M. fortuitum (8 cases, 5.9%) were the most prevalent species. The study also identified cases of co-infection involving MTBC and NTM.

The analysis revealed significant associations between smear positivity and LPA-confirmed MTBC/NTM classification ($p < 0.001$). There is a need for supplementary diagnostic methods, such as molecular species identification, to differentiate MTBC from NTM. In regions with high NTM prevalence, reliance on Xpert alone may lead to misdiagnosis and inappropriate TB treatment.

KEYWORDS: Mycobacterium tuberculosis Complex, Nontuberculous mycobacteria, co-infection, Line Prove Assay, TB treatments.

97

Prevalence and Factors Associated With Advanced HIV Disease (AHD) in the “Treat All" Era Among Newly Diagnosed PLHIV at Epako Clinic, Omaheke Region in Namibia: A Retrospective Cross-Sectional Study

Lumbala K[1], Hilma A, Muulu G, Ruswa N

[1]*Ministry Of Health And Social Services, Gobabis , Namibia*

Background: Namibia adopted the” Treat all” strategy in 2016, which implies ART initiation regardless of baseline CD4 count value and WHO clinical stage. Despite this strategy, it is still common to encounter newly diagnosed clients with advanced HIV disease (AHD) in the Omaheke region. However, the magnitude and characteristics of these clients are unknown. We aimed to determine the prevalence and factors associated with AHD at Epako Clinic, the main ART facility in the Omaheke region.

Methods and Materials: We conducted a cross-sectional observational study using programmatic data of clients aged ≥ 15 years enrolled in ART between January 2023 and December 2024 at Epako Clinic. The client’s socio-demographic and clinical characteristics were extracted from the electronic medical records. The prevalence of AHD defined as a presentation with CD4 count < 200 cells/mm3 or WHO stage 3 or 4 was estimated, and baseline characteristics of patients with or without AHD were compared. Collected data were inputted and analyzed with the STATA software version 18. Proportions of AHD in different demographic variables were assessed in univariate analysis using chi-square tests, with p value< 0.05 set as a statistically significant level. A multivariate logistic regression model was used to estimate the associations between variables and AHD.

Results: Among 317 newly diagnosed PLHIV, 302 were enrolled, with 161(53.3%) females, and 141(46.7%) males, mean age of 35 years and 20.5 kg/m2 mean BMI. 236 clients were classified based on both CD4 and WHO staging while 66 were classified based on WHO staging only due to missing baseline CD4. In total, AHD was present in 140 (46.4%); (95%CI 40%-52%); males (62 %), 35 to 44 years age group (37%), underweight (56.4%), and TB diagnosis (51.4%) were significantly associated with AHD(P<0.001). In the logistic regression model, male gender OR 2.7(95% CI 1.31-5.42) and being underweight OR 2.7(95%CI 1.3-5.7) remained significantly associated with having AHD.

Conclusion and Recommendations: Despite the test and treat approach, presenting with advanced HIV remains common at the Epako clinic. Being male, age, and nutritional status were associated with an increased risk of having AHD. Strategies addressing male's poor health-seeking behaviors and increasing testing in males and

98

TB Diagnosis in Ogun State: Assessing the Concordance and Effectiveness of TB-LAMP and GeneXpert

Salau J[1], Olabamiji J[1], Ajayi E[1], Rayi O[1], Daniel O[1], Agbaje A[1], Dakum P[1], Mensah C[1], Ogundimu O[2], Eneogu R[3], Nongo D[2], Ireneh M[1], Labaran S[4]

[1]Institute Of Human Virology Nigeria, Abeokuta, Nigeria, [2]Ogun State Tuberculosis Control Program,, Abeokuta, Nigeria, [3]United State Agency for International Development, FCT, Nigeria, [4]National Tuberculosis and Leprosy Control Program, Nigeria., FCT, Nigeria

Background: TB-LAMP (Loop-mediated isothermal amplification) and GeneXpert are both Nucleic Acid Amplification Tests (NAAT) used for detecting tuberculosis (TB). Here's a comparison of their sensitivity and specificity. GeneXpert is known for its high sensitivity (from 88% to over 95%.), especially in detecting TB in patients with HIV co-infection and in cases of extrapulmonary TB. TB-LAMP also demonstrates good sensitivity (from 80% to over 95%) and Specificity (from 95% to 100%), comparable to that of GeneXpert. Overall, both GeneXpert and TB-LAMP are highly sensitive and specific diagnostic tests for TB and both were endorsed by the World Health Organization (WHO).

Methods: A retrospective analysis was performed on presumptive TB patients' sputum from January to December 2024 in four (4) TB lamp and GeneXpert co-located sites in Ogun state Nigeria. The patients with positive mycobacterium tuberculosis on the TB lamp machine were further evaluated on the GeneXpert machine. Positive and negative controls were run with each batch to ensure the quality of the TB test during TB lamp testing under a sterile and contaminant-free environment.

Results: A total of 11,324 samples from presumptive TB patients were analyzed using the TB-LAMP platform. Among these, 541 (4.7%) cases were diagnosed as TB-positive and subsequently tested on the GeneXpert platform using Xpert Ultra cartridges. All 541 samples were confirmed MTB-detected on both platforms, achieving a 100% concordance rate. Additionally, GeneXpert detected rifampicin resistance in 12 cases (2.2%), reported rifampicin resistance as indeterminate in 5 cases (0.9%), and found no rifampicin resistance in 524 cases (96.85%).

Conclusion: The high concordance rate between GeneXpert and TB-LAMP demonstrates their reliability as diagnostic tools for tuberculosis. Co-locating these platforms in high-volume sites can enhance evaluation rates while maintaining high-quality laboratory service delivery. Both TB-LAMP and GeneXpert have significantly contributed to TB laboratory diagnostics in Ogun State due to their high sensitivity and specificity. However, GeneXpert provides the added advantage of detecting drug resistance, making it a critical tool for comprehensive TB diagnosis and treatment monitoring.

99

Breaking the Chain of TB Transmission in High-Risk Groups Through Efficient Program Implementation

Bajehson M[1], Tukur M[1], Zephaniah G[1], Said M[1], Baffa H[1], Zarewa A[2], Bashir U[3], Labaran A[3], Chukwuogo O[1], Bethrand O[1]

[1]KNCV Nigeria, Kano, Nigeria, [2]Kano state Ministry of Health, Kano, Nigeria, [3]Kano State Agency for Control of HIV/AIDS, Kano, Nigeria

Background: The blunderbuss approach to tuberculosis (TB) program implementation has been the norm in Nigeria. The 2019 Nigeria HIV/AIDS indicator impact survey reported a prevalence rate of 0.6% in Kano, the most populous state in Nigeria. KNCV Nigeria with donor funding implements TB care and treatment interventions, for the first time, we are intentionally targeting risk groups to generate evidence for programmatic decision making while improving treatment coverage.

Materials and Method: TB LON project is a five-year USAID funded grant implemented in Nigeria since March 2020. KNCV Nigeria designed activities spanning facility and community-based implementation approaches. At high volume facilities we institute mandatory TB screening services at ART clinics and other service delivery points using ad hoc staff to improve coverage. At communities, outreaches targeting brothels and correctional facilities were conducted along with house-to-house TB screening campaigns involving community patent medicine vendors.
Reports were collected weekly, monthly and quarterly. Outreach data for 2022 from 3 brothels with host local government area (LGA), with outreach data for 2023 from 3 correctional facilities with host LGA and facility screening data from nine ART and out-patient clinics was cleaned and analysed using SPSS v20.

Results: A total of 558 female sex workers (FSW), 4,784 male inmates and 41,489 persons living with HIV (PLHIV) were screened for TB. TB yield among person's found presumptive for TB in these risk groups was 28.7% in FSW, 30.2% among inmates and 13.8% in PLHIVs representing the highest absolute value of 663 co-infected clients. The risk ratio was RR = 2.41, 95% CI [1.66, 3.50]; 2.16, 95% CI [1.73, 2.69]; 1.95, 95% CI [1.78, 2.14] respectively. The number needed to test (NNT) for a TB case was 21 for FSW, 7 for PLHIV and 3 for Inmates.

Conclusion: TB yield was noticeably higher than that of the general population and not intentionally targeting these risk groups while programming could result in missed TB cases. Need to collaborate better with widened scope to include such risk groups as people who inject drugs is recommended. Findings and HIV testing limitations encountered have helped inform modified approaches in ongoing interventions on the project which are scalable nationwide.

100

TB Survivor's Preferences for Psychosocial and Economic Support After Completing TB Treatment

Jinga N[1], Moolla A[1], Madlala S[1], Rassool M[2], Nyovane P[2], Evans D[1]

[1]Health Economics and Epidemiology Research Office, University of the Witwatersrand, Johannesburg, South Africa, [2]Clinical HIV Research Unit (CHRU), Wits Health Consortium (WHC), Health Science Research Office (HSRO), Faculty of Health Sciences, University of Witwatersrand, Johannesburg, South Africa

Introduction: After the microbiological cure of tuberculosis (TB), some individuals suffer from physical impairment, including impaired lung function, reduced exercise capacity, or chronic pain. However, the broader economic, social, and psychological complications experienced beyond TB treatment are not well understood. Understanding preferences for post-TB service delivery will be essential to designing targeted support services that address the psychosocial and economic needs of TB survivors.

Objective: To describe the TB survivor preferences for psychosocial and economic care after completing TB treatment.

Methods: In-depth interviews were conducted with 23 adults (≥18 years) who had completed treatment for pulmonary TB in Johannesburg, South Africa. Interviews took place between 04/2024 and 10/2024 using a semi-structured interview guide informed by literature and study objectives. The interviews were recorded, transcribed verbatim, and translated into English. We used thematic analysis with both inductive and deductive approaches to develop themes. Two coders coded the transcripts using NVivo version 14 software, while a third checked inter-rater reliability.

Results: In general, TB survivors were open to receiving psychosocial support through group counseling, peer support, and health education. Clinics were the preferred setting due to accessibility and the trust established with healthcare providers. While TB survivors favour counselling from knowledgeable professionals such as doctors and psychologists during TB treatment, they regard peer counselling or support groups as an effective model of care after TB treatment completion. Limited internet access deters TB survivors from using telehealth services. Instead, they prefer in-person, face-to-face counseling, which builds trust, provides a safe space for reflection, and allows counsellors to better understand non-verbal cues. TB survivors acknowledged that digital tools could play a valuable role in screening and follow-up evaluations.

Preferences for economic and nutritional support include cash or vouchers, food packages, supplements, social grants, and income-generating projects (e.g., job placement, employment assistance, training support etc.) provided by family, government/health professionals, or non-governmental organizations and available at clinics, community halls, or via electronic means. TB survivors preferred receiving economic support monthly after completing TB treatment. In contrast, psychosocial support was preferred less frequently—every three to six months for up to two years after treatment completion.

Conclusions: These findings offer valuable insights for national TB programs (NTPs) regarding the needs of TB survivors and how post-TB psychosocial and economic support can be effectively integrated into the healthcare system. Addressing these needs can help improve health-related quality of life, support recovery, and reduce the long-term burden on individuals and health systems.

101

Prevalence of Rifampicin Indeterminate GeneXpert Results and Corrective Measures From GeneXpert Laboratories: An Experience from Kano Metropolis, Nigeria

Umar A[1], Bakzak I[1], Enoch G[1], Sani T[1], Gambo H[1], Mongoro Z[2], Bajehson M[1], Olabamiji J[1], Panwal T[1], Nwadike P[1], Bello Raji H[1], Awotoye J[1], Chime C[1], Ugwoke U[1], Adebayo O[1], Adetiba T[1], Olupitan O[1], Agbaje A[3], Mensah C[4], Dakum P[3], Ssekitooleko J[5], Kimeu J[5], Reilly A[5], Zamzu M[5]

[1]Institute of Human Virology Nigeria (IHVN)), Abuja, Nigeria, [2]KNCV Nigeria, USAID TB-LON Project , Kano, Nigeria, [3]Institute of Human Virology Nigeria (IHVN), Office of the CEO, Abuja, Nigeria, [4]Institute of Human Virology Nigeria (IHVN), Office of the COO, Abuja, Nigeria, [5]The Global Fund to Fight AIDS, Tuberculosis and Malaria, Global Health Campus, , Switzerland

Background: Antimicrobial resistance (AMR) poses a significant global public health threat, with multidrug-resistant tuberculosis (MDR-TB) accounting for approximately one-quarter of AMR-related deaths worldwide (Taagbara, 2023). The incidence of Rifampicin-Resistant (RR) TB among new and retreatment cases in Nigeria is 2.5% and 17% respectively (WHO GTB Report, 2023). The GeneXpert MTB/RIF assay, recommended by the World Health Organization (WHO) in 2010 and adopted in Nigeria in 2011, is a rapid, automated molecular test that detects tuberculosis and rifampicin resistance. The test provides either a definitive result or an indeterminate outcome, with the latter indicating the test's inability to determine rifampicin resistance. Despite the high sensitivity and reliability of the GeneXpert machine, an increasing number of rifampicin indeterminate results have been reported across Kano metropolis. This study aimed to determine the prevalence of rifampicin indeterminate results and identify the factors contributing to these outcomes.

Materials and Methods: This is a cross-sectional retrospective analysis of rifampicin indeterminate results from eleven (11) Genexpert Laboratories within Kano metropolis between July to December 2024. All indeterminate results and the attributable causes for Rifampicin indeterminate results were retrieved from the laboratories. Simple frequencies and percentages were analyzed using MS Excel.

Results: Out of 47,996 presumptive TB samples tested during the study period, 1,024 (2.1%) yielded rifampicin indeterminate results. Of these, only 82 (8%) were retested with new specimens. Among the retested samples, 75 (91%) were analyzed using GeneXpert, while 7 (9%) underwent culture testing. Conclusive results were obtained for 57 samples, representing a 70% success rate upon retesting. The primary factors contributing to the initial indeterminate results were poor-quality specimen collection, which accounted for 70% of cases, 18% (15/82) to user Error, 7% (6/82) to poor cartridge and consumable storage and 5% (4/82) to inadequate Equipment maintenance.

Conclusion: The study revealed a rifampicin indeterminate rate of 2.1% across GeneXpert laboratories in Kano metropolis, with the majority of these cases attributable to modifiable factors such as poor specimen collection, user errors, and equipment-related issues. Retesting efforts yielded conclusive results in 70% of cases, underscoring the potential to reduce indeterminate results through targeted interventions. Training and capacity-building for healthcare workers on proper specimen collection techniques and adherence to testing protocols are essential while equipment and consumable management should be improved by implementing routine equipment maintenance schedules and enforcing best practices for cartridge and consumable storage. By addressing these factors, healthcare programs can optimize GeneXpert performance and reduce the burden of indeterminate results, in Kano metropolis and similar high-burden settings. Regular monitoring of laboratory outcome testing by appropriate authorities is recommended in ensuring universal access to rapid drug susceptibility testing per the national guidelines on patient-centered management, averting delays in treatment initiation and breaking the transmission of drug-resistant tuberculosis strains.

102

Assessment of Isoniazid Preventive Therapy and Barriers of Implementation Among Contacts of Pulmonary Tuberculosis Patients in Raipur District

Sinha A[1]

[1]Pt JNM Medical College Raipur, RAIPUR, India

Background: For prevention, care, and control of tuberculosis, isoniazid preventive therapy (IPT) is recommended for the treatment of latent infection among contacts. Adherence to this regime is vital for obtaining good results.

Objectives: To ascertain the determinants of the implementation status of IPT among contacts of pulmonary tuberculosis patients in the study area
Material &Methods: This cross-sectional observational study was conducted using predesigned pretested semi-structured questionnaire among TB cases/caregivers in randomly selected 4 out of 8 TUs of Raipur district during June 2022 to May 2024.the determinants of the implementation status of IPT

Results: Among 142 enlisted cases, 1422 family contacts were identified. Of them, 280 contacts were interviewed. Coverage of IPT was 57%. Drug supply was uninterrupted in 78.6% cases. Some respondents (77; 29.7%) reported lack of information or awareness about the necessity of IPT. They were not informed about it by the health care providers. For prevention of spread of TB infection, majorly (203;72.5%) of participants advocated avoidance of contact with patients, adherence to IPT and use of mask. There were significantly less chances of receiving age appropriate IPT in study participants who were aged less than 5 yrs, illiterates, residing in families with more than 5 members and unemployed; Similarly, illiterate, male <5 yrs, from upper middle class were significantly less likely to get complete duration of IPT (p=<0.05).

Conclusion: IPT coverage in the study was unsatisfactory due to ignorance of the cases/ family members about its need, inadequate screening facilities, poor health seeking behaviour, illiteracy, interrupted supply of IPT and socio-cultural practices in the study.

103

Leveraging EPCON for Disease Tracking: A Pilot Study on TB, HIV, and Syphilis Among Pregnant Women in Katsina State, Nigeria

Lawrence I[1], Galadima A[1], Abi R[1], Batur P[1], Sheshi M[2], Okoh A[2], Odume B[2], Adebayo O[3], Adetiba T[3], Olupitan O[3], Vincent E[3], Ssekitooleko J[4], Reilly A[4]

[1]KNCV Nigeria, Katsina , Nigeria, [2]KNCV Nigeria, Abuja , Nigeria , [3]Global Fund N-THRIP, Institute of Human Virology, Nigeria (IHVN), Abuja , Nigeria , [4]The Global Fund to Fight AIDS, Tuberculosis and Malaria, Global Health Campus, Geneva, Switzerland

Background: Despite the availability of mobile applications like CommTB and EWORS for TB screening and early disease detection, there remains a critical gap in tracking TB cases among vulnerable populations, such as pregnant women. Katsina State, Nigeria, was selected as the pilot center for using EPCON, an epidemiological control application, to track TB, HIV, and syphilis among pregnant women. This initiative aimed to address the urgent need for targeted interventions to mitigate the burden of these infectious diseases in this high-risk group. By leveraging digital tools, the program seeks to enhance early detection and streamline disease management in maternal health services.

Methods: A pilot study was conducted using the EPCON app to screen and track pregnant women for TB, HIV and syphilis across Katsina State. The application enabled real-time data collection and analysis, allowing for efficient monitoring of disease prevalence and facilitating timely interventions. Screening results were categorized by disease type, with data expressed as percentages of the total population screened.

Results: Of the 12,526 pregnant women screened and tracked using the EPCON app, 2.0% (250) were diagnosed with TB, 0.48% (60) tested positive for HIV, and 0.2% (25) women had TB/HIV co-infection. Additionally, 0.1% (10) women were diagnosed with syphilis.

Conclusion: The pilot study demonstrates the potential of EPCON as an innovative digital tool for monitoring and controlling infectious diseases among vulnerable populations. By delivering real-time data and insights, EPCON facilitates targeted interventions, which can significantly enhance the prevention and management of TB, HIV, and syphilis in pregnant women. The study underscores the importance of scaling up EPCON to other high-burden regions to strengthen maternal and child health services through focused disease prevention and control strategies.

104

Isolation of Mycobacteria Other Than Mycobacterium tuberculosis Among Samples Received at TDRC TB Laboratory, Zambia

Chisani G[1]

[1]The Copperbelt University School of Medicine , Ndola, Zambia

Introduction: The prevalence of Non-tuberculous Mycobacteria (NTM) infections has increased in recent years and continues to be an emerging health problem. Similarity of clinical symptoms with M.tuberculosis, coupled with limited diagnostic capacities in tuberculosis-endemic areas has led to misdiagnosis of NTM pulmonary disease.

Objectives: To determine the proportion of NTM infection among suspected TB patients, with a second objective of determining the HIV-NTM co-infection among NTM-infected patients. The third objective was to evaluate the association between demographics (gender and age), HIV status and previous TB infection, and NTM-infection.

Methods: A cross-sectional study was conducted from July 2024 to November 2024 in which 305 sputum samples from suspected TB patients aged 15 years and above received at TDRC TB regional reference laboratory, Zambia were enrolled. Liquid culture, Zielh Neelsen smear and Capilia TB-Neo antigen test were used for identification of NTM. Descriptive statistics was used to summarize data, while inferential statistics was used to evaluate associations between NTM (dependent variable) and predictor variables. The significance level was obtained at 95% confidence interval (CI) and P value < 0.05.

Results: Of the 305 suspected TB patients enrolled, 40.7% (124/305) were culture-positive cases of pulmonary tuberculosis. Of these, 46.8% (58/124) were Acid fast bacilli on ZN smear. Among the culture positives, 34.7% (43/124) were MTBC infection and 12.1% (15/124) were NTM infections. The proportion HIV-NTM co-infection in this study was 33.3% (5/15). There was no association between NTM and predictor variables.

Conclusion: The study highlights the presence of NTM in diagnostic specimens and the importance of quick detection and accurate diagnosis of NTM disease, often misinterpreted as TB without culture and identification which is crucial for patient management and infection control. The significance of finding NTM should be thoroughly evaluated before treatment is started.

105

Impact of GeneXpert Cartridge and TB LAMP Reagent Shortage on Public Private Mix (PPM) Case Finding: Lessons Learnt From Ebonyi State TB and Leprosy Control Programme

Makpu S[1], Nwite S[2], Doji J[1]

[1]Federal Ministry Of Health, National Tuberculosis, Leprosy An Buruli Ulcer Control Programme, Abuja, Nigeria, [2]State Ministry of Health, Abakaliki, Nigeria, [3]Federal Ministry of Health, Abuja, Nigeria

Background: As a result of dwindling funding for TB programme implementation in 2024, PPM implementation in Ebonyi state experienced a downward trend in TB case findings. Facilities in the state were not supplied with an adequate number of cartridges and TB LAMP reagents. Ebonyi is a state with 27% PPM facilities that contributed over 70% TB Case Finding in the state in quarters 1 and 2, 2024. Inadequate stock of cartridges and TB LAMP reagent resulted in many sputum samples not being tested. Many Patients did not know their faith as regards the status of their health. It became very worrisome that most high-testing facilities could not meet their targets in terms of the number of tests the facilities were known to perform.

Objective: The study aims to assess the impact of a shortage of GeneXpert Cartridges and TB LAMP reagents on PPM contribution to Ebonyi State TB Case Finding.

Methodology: The study involved an analysis of secondary data on PPM contribution to case findings for the four quarters of 2024.

Result: Due to the shortage of GeneXpert cartridges and TB LAMP reagents, very few samples were analysed in 2024 compared to the previous years. A total of 1,090 TB cases were notified in Q1 2024 out of which 840 cases (77%) were from the private sector. In Q2 2024, 1,002 cases were notified out of which 772 cases (77%) were from the private sector. In Q3 down the line, 1,100 TB cases were notified out of which 770 (70%) cases were from the private sector. Eventually, in Q4 2024 only 947 cases were notified out of which 568 cases (60%) were from the private sector. The negative impact of the GeneXpert cartridge and TB LAMP reagent shortage was strongly felt in Q4 2024.

Lessons Learnt: Several strategies, if in place would have prevented the downward trend in PPM case finding in the state ranging from immediate quick-fix solutions such as redistribution of cartridges/reagents from laboratories that have excess stock to areas that were understocked.
Accurate data reporting is key to proper forecasting of programme consumables. Proper planning and deployment of Government counterpart funding would have been enough to bridge the gap in the supplies of the consumables. Private facilities could be given priority in the placement of molecular diagnostics, as the state generates most of its cases from the private sector. Consequently, the private sector should also receive a larger allocation of cartridges and reagents.

Conclusion: Disease programmes should implement measures to prevent challenges, significantly reducing service disruptions.

106

Latent TB Co-Infection Leads to T Cell Exhaustion and a Challenging Reactivation Potential in HIV-TB Co-Infected Patients

Abana C[1], Klutse J[1], Kanda E[1], Hanson M[1], Tay Y[1], Nartey P[1], Attoh D[1], Atanniba J[1], Aboagye J[1,3], Lamptey H[1,2], Bonney E[1], Kyei G[1,3]

[1]Virology Department, Noguchi Memorial Institute For Medical Research, University Of Ghana, Legon, Accra, Ghana, [2]Immunology Department, Noguchi Memorial Institute for Medical Research, University of Ghana, Legon, Accra, Ghana, [3]Medical and Scientific Research Centre, University of Ghana Medical Centre, Accra, Ghana, Accra, Ghana

This study investigates the impact of latent tuberculosis infection (LTBI) on HIV persistence, focusing on T cell activation, response to latency-reversing agents (LRAs), and reservoir size in co-infected patients. Provirus persistence in resting memory CD4+ T cells is the primary barrier to curing HIV, and co-infection with Mycobacterium tuberculosis exacerbates immune activation, potentially enlarging the HIV reservoir. In Ghana, routine screening and treatment for LTBI in HIV patients are rare.

Out of 390 screened patients, 37 with LTBI (viral load <50 copies/ml) were identified using the QuantiFERON®-TB Gold Plus assay. T cell activation and exhaustion markers were assessed in 15 patients, and responses to LRAs in 10 patients (Vorinostat and MC1568) were measured ex vivo.
Our results indicate that activation markers, such as CD69, CD25, HLA-DR, and CD38 are highly expressed in T cells isolated from HIV patients but not HIV-TB co-infected. Conversely, we found, high expression of PD1, LAG-3, and CD244 exhaustion markers on CD4+ and CD8+ T cells among the co-infected individuals. HIV reactivation potential was 20-fold in HIV-only patients compared to 14-fold in co-infected individuals, suggesting stronger immune activation and T cell exhaustion in co-infected patients.

This implies that there is stronger immune activation in the co-infected patients resulting in T cell exhaustion which may impact response to latency reversing agents and reservoir size. Additional research on reservoir size is ongoing, with results to be presented at the conference.

107

Active and Latent Tuberculosis Among Public Transportation Workers in Nairobi, Kenya

Ongaya A[1], Waiganjo P, Orina F, Okallo G, Mathiu E, Amukoye E, Nduba V, Mwachari C

[1]*Kenya Medical Research Institute, Nairobi, Kenya*

Background: Tuberculosis (TB) remains a major global health challenge, with approximately 10.6 million people worldwide currently living with active TB. Additionally, about 25% of the world's population is infected with TB, of whom 5% to 10% develop active TB. Kenya continues to be a high-burden country for TB. In 2019, an estimated 147,000 people contracted TB, but only 86,385 were diagnosed and treated, as reported by the Kenya National TB Program. Public transport has been associated with poor ventilation and high respiratory contact rates. Congregate settings, especially in poorly ventilated vehicles, may form an important pathway for TB transmission. This study therefore aims to investigate the prevalence of pulmonary TB and latent TB, along with associated risk factors, knowledge, and attitudes among drivers and conductors working in public transportation (locally referred to as matatus) in Nairobi County. Nairobi is the most populous city in Kenya and has the country's largest public transportation system.

Methods: This was a cross-sectional study that recruited 203 adult drivers and conductors within Nairobi. All participants were requested to provide a spot sputum specimen for testing using GeneXpert, Lowenstein-Jensen culture, and fluorescent microscopy, as well as a blood sample for HIV and QuantiFERON-TB Gold-Plus testing. Additional data were collected using a questionnaire.

Results: The study found that 1% of the participants had active TB, while 66.5% of participants (71.0% drivers and 64.5% conductors) tested positive for latent TB using QuantiFERON-TB Gold-Plus (p = 0.587). Additionally, 8.9% of participants (9.7% drivers and 8.6% conductors) were HIV-positive (p = 0.799).

Conclusion: Although the prevalence of active TB was low, latent TB was observed in a significant proportion of participants, highlighting the urgent need for targeted interventions to prevent reactivation and reduce the risk of active TB transmission. Chest X-rays revealed some abnormalities despite negative TB bacteriological confirmation in certain cases. Public health interventions must focus on high-risk areas, such as public transportation, to effectively control TB transmission. These interventions could include improving ventilation in public vehicles, raising awareness about TB transmission, and establishing screening programs for high-risk groups.

Key Words: Tuberculosis, Public transportation, Latent tuberculosis

108

Assessment of Community Tuberculosis Screening Effectiveness in Selected States of North Central Nigeria

Osime M[1]

[1]Institute Of Human Virology,nigeria, Abuja, Nigeria

Background: Tuberculosis (TB) remains a significant public health challenge in Nigeria, particularly in the North Central region. Effective community screening strategies are essential for early detection and treatment, which can significantly reduce transmission rates.

Objective: This study aims to assess the effectiveness of community tuberculosis screening strategies implemented in North Central Nigeria during the second and third quarters of 2024.

Methodology: A cross-sectional analysis was conducted using data from community TB screening activities across four states: FCT, Kogi, Kaduna, and Niger. The total number of persons reached, screened for TB, and diagnosed were evaluated, alongside the effectiveness of various diagnostic methods, including Xpert MTB RIF, smear microscopy, and TB LAMP.

Results/Findings: In Q2 2024, a total of 107,761 individuals were reached, with 100,012 screened for TB, yielding an overall screening effectiveness of 35.09%. In Q3, despite a decrease in the number of persons reached (45,539), the effectiveness improved to 73.48%. The percentage of diagnoses using Xpert MTB RIF increased significantly from 34.72% in Q2 to 71.06% in Q3. However, there remained a substantial community screening gap, particularly in Kaduna and Niger.

Conclusion/Recommendation: The study highlights a marked improvement in the effectiveness of TB screening strategies between Q2 and Q3 of 2024. However, significant gaps in community outreach and screening persist. It is recommended that targeted interventions be developed to enhance screening in underrepresented areas, alongside continuous training for healthcare workers to optimize diagnostic capabilities and improve treatment referral processes. Enhanced community engagement is also crucial to sustain and further improve TB detection efforts in North Central Nigeria.

109

Gender Disparities in Childhood Tuberculosis: Insights From Nigeria's TB Testing Week

Adetiba T[1], Bello Raji H[1], Adebayo O[1], Ugwoke U[1], Adekunle A[1], Vincent E[1], Daniel J[1], Pillatar B[1], Okwuonye L[1], Dickson-Nze R[1], Gowon J[1], Ufoegbu C[1], Ugwanyi K[1], Okpokoro E[2], Olupitan O[1], Agbaje A[3], Mensah C[4], Dakum P[3], Ssekitooleko J[5], Kimeu J[5], Reilly A[5], Zamzu M[5]

[1]Institute of Human Virology Nigeria , Abuja, Nigeria, [2]International Research Centre of Excellence (IRCE), Institute of Human Virology Nigeria , Abuja, Nigeria, [3]Institute of Human Virology Nigeria, Office of the CEO, Abuja, Nigeria. , Abuja, Nigeria, [4]Institute of Human Virology Nigeria, Office of the COO, Abuja, Nigeria. , Abuja, Nigeria, [5]The Global Fund to Fight AIDS,TB and Malaria, , Switzerland

Background: Despite advancements in adult TB case notifications, childhood TB reporting in Nigeria remains alarmingly low, with only 7% of estimated cases notified in 2022, significantly below the WHO benchmark of 12%. To address this, the Childhood TB Testing Week initiative was launched to enhance early detection among children. Global data indicates a higher prevalence among males; the last Nigerian TB prevalence survey reported a Male-to-Female ratio of 2.1. This study described data from Childhood TB Testing Week through a gender lens, identifying disparities in screening, diagnosis, and linkage to care among children. Understanding these disparities is crucial for accurately documenting childhood TB epidemiology and informing outreach efforts.

Materials and Methods: Data from the Childhood TB Testing Week conducted from May 27 to May 31, 2024 across Global Fund-supported sites in Nigeria's 36 states and the Federal Capital Territory were analyzed by gender along the TB care cascade. Microsoft Excel was used to calculate proportions and percentages for key indicators across the TB cascade, from screening to treatment linkage.

Results: Of the 250,141 children reached, 53% were females (n=132,527) and 47% were males (n=117,614). Females represented 51% of presumptive TB cases (n=23,469) compared to Males 49%. However, a higher proportion of males were diagnosed with drug-sensitive TB (DSTB) at 1,062 (64%) compared to 893 (46%) for females ($p<0.05$). The proportions for drug-resistant TB (DRTB) cases and linkage to care were similar across genders, with an overall linkage rate of 98% for all diagnosed children.

Conclusion: This analysis reveals gender disparities across the TB cascade, particularly with a higher DSTB diagnosis rate among males despite comparable screening rates. Addressing these disparities is essential to meeting WHO TB targets and closing notification gaps. Integrating gender-focused analyses and interventions with existing strategies in TB programs will enhance outcomes and improve overall yield.

110

Evaluating the Weekly Tuberculosis Treatment Access and Prevention (TB TAP) Surveillance System in Chiredzi District of Masvingo Province, 2024

VItalis G[1], Masunda K[1], Nyamukurudza L[1], Kapfunde A[2]

[1]JF Kapnek Zimbabwe, Harare, Zimbabwe, [2]Africa University, , Zimbabwe

Introduction: Zimbabwe was removed from the high burden TB countries, but the country still faces a double burden of HIV/TB coinfection and drug-resistant TB. Case identification, treatment success and contact tracing all remain huge challenges. In October 2023, JF Kapnek Zimbabwe in collaboration with OPHID started the TB Treatment Access and Prevention Program in selected districts in 6 provinces of Zimbabwe. As part of the program, weekly data on TB screening, presumption, diagnosis and contact tracing efforts is submitted by health care facilities in all the supported districts. The data is submitted to the district level who then share weekly reports with the provincial and national level within the organizations.

Methodology: A descriptive cross-sectional study with mixed methods was used to evaluate the weekly TB TAP surveillance system. The period October 2023 to September 2024 was used in the evaluation. Health care workers were surveyed using a questionnaire while key informants were interviewed using an interview guide. Quantitative data was analyzed using Epi Info v7.2.6.0 while qualitative data was analyzed thematically.

Results: Sixty-three health care workers were reached with the questionnaire, 59% were registered general nurses, 38% were primary care nurses and 3% were environmental health practitioners. The majority were female (60%) and the median duration in service was 10 years (IQR 5.5-10.5). The number of respondents ever trained in TB surveillance was 23 (36.5%). Health care workers were knowledgeable on the signs and symptoms of TB with 86% able to mention at least 3 of the 4 symptoms commonly used to screen for TB. Despite most of the health care workers not being trained in surveillance they were aware of the objectives of TB surveillance. Health care workers were also aware of the diagnostic options available to them. The data generated from the surveillance system was being used locally (98%) and feedback from the district level was reported by 90% of participants. Reports were submitted timely by 91% of facilities on average, ranging from 78% to 97% with improvement as the year progressed. A total of 98% of the health care workers found the weekly reporting system to be acceptable. Almost all the respondents (98%) had TB screening tools and data was submitted electronically. Most respondents (75%) noted they needed less than 30 minutes to compile and submit the report. The main challenge with reporting was network availability. From the key informant interviews it was noted that the weekly system had led to greater collaboration between departments (lab, nursing and pharmacy). Contact tracing was seen as an area that still required improvement in order to scale up TB case identification.

Conclusion: The TB TAP weekly surveillance system is useful, stable, acceptable, and timely. High volume sites may find compilation and reporting complex. A weekly reporting system may thus be feasible and sustainable for closer monitoring of TB control efforts.

111

Molecular Diagnosis of Resistant Tuberculosis Against Rifampicinto the Patients of the Centre Hospitalier Universitaire de RéférenceNationale (CHU-RN): Preliminary Study During the COVID-19PANDEMIC Period in N'Djamena, Chad

Togde G[2], Doungous D[1], Boilengar D[2], Tidjani A[3], Godreuil S[4]

[1]Département des Sciences Biomédicales et Pharmaceutiques, Institut National Supérieur des Sciences et Techniques d'Abéché (INSTA), Abéché, Chad, Abeché, Tchad, [2]Department of Biological and Pharmaceutical Sciences, Faculty of Human Health Sciences (FSSH), Laboratory of Research, Diagnostics and Scientific Expertise (LaboReDES), Bacteriology Unit, University of N'Djamena BP 1117 N'Djamena/Chad, Ndjamena, Tchad, [3]Doctoral school Sciences-Techniques-Environment, University of N'Djamena, Chad, Ndjamena, Tchad, [4]Laboratoire de bactériologie, CHU Arnaud de Villeneuve de Montpellier,, Monpellier , France

Introduction: The fight against Tuberculosis (TB) remains a challenging public health problem worldwide. Nowadays, resistance forms increase sharply in developed countries. With a rifampicin resistance rate of 7.2% higher than the World Health Organization (WHO) level. The fight against resistant and multiresistant forms of TB is a great challenge to overcome. This present study aims to evaluate the proportion of resistant tuberculosis against rifampicin at the Centre Hospitalier Universitaire de Référence Nationale (CHU-RN) of N'Djamena in Chad.

Method: From August 1st to December 31st, 2020, sputum samples collected in the laboratory of CHU-RN were automatically included in our study. We directly analyzed sputum samples using the GeneXpert MTB/RIF, which is a molecular diagnosis method, to identify the sensitivity of the Mycobacterium tuberculosis complex to rifampicin.

Results: The study population consisted of 680 sputum samples collected. It was mainly represented by men (66.62%), with a ratio sex of about 1.99. The age range varies from 2 to 85 years old. Most of the patients in the study lived in N'Djamena (95.68%), and 4.32% were from other localities. Mycobacterium Tuberculosis Complex (MTBC) was detected in 51.63% (N = 696), including 244 men and 104 women (a sex ratio of 2.35). Many tuberculosis patients are young people aged 15–34 (49.14%). Children whose samples tested positive for TB accounted for 2% of the 348 MTBC-positive samples, 7.18% (20 males and 5 females) were resistant to rifampicin, confirming a rifampicin sensitivity of 92.53%. Among these 25 cases of rifampicin resistance, 15 patients (4.31%) were already treated, and the other 10 patients represented new cases of TB (2.87%).

Discussion: the prevalence of multi- resistance in this study was 7.20% (25 cases). Resistance is only sought in positive samples. Amor, et al., estimated the prevalence of multidrug-resistant tuberculosis in Chad at 1.9% (0.5–9.0%) of tuberculosis cases, even though no resistant strain had been reported until our study. The work of O Abdelhadi, et al., reported a prevalence of multidrug-resistant tuberculosis of 2.2% in three strains, of which only one is resistant only to isoniazid and rifampicin.

Conclusion: This study showed 7.18% resistance to rifampicin. These results highlighted the question linked to the post-COVID-19 period. The DOTS strategy should include the use of Xpert MTB/RIF® technology in all provinces of Chad. This will lead to the early detection of new cases of TB and MDR-TB. Overall, it will provide rapid treatment, as recommended by the WHO for developing countries like Chad.

112

Pediatric TB Notifications as an Indicator of Healthcare System Resilience During Medication Shortages: Insights From Kaduna

Batur S[1]

[1]Kncv Nigeria, Abuja, Nigeria

Introduction: The global shortage of Adult TB medication disrupted treatment efforts in Nigeria, straining the healthcare system and impacting adult TB patient management. This study examines whether the crisis provided an unexpected opportunity to strengthen childhood TB notification as healthcare systems adapted their focus. Kaduna, a high TB burden area, presents a compelling case to explore how resource allocation shifted toward pediatric TB case detection and treatment.

Methodology: The study uses a mixed-methods approach, combining quantitative analysis of TB case notifications and contact tracing records from Kaduna health facilities with qualitative interviews from frontline healthcare providers. Data were collected from January 2023 to December 2024, covering pre- and during-stock-out periods. Quantitative indicators analyzed include the number of pediatric TB cases notified and preventive therapy.

Result: The analysis shows a notable 15% increase in pediatric TB notifications during the stock-out period, attributed to enhanced focus on childhood TB cases. In Kaduna, the percentage of childhood TB notifications among total TB cases increased from 8% to 18% as health facilities prioritized child contact tracing and preventive therapy for pediatric contacts of TB-positive adults. Interviews reveal that, in response to limited adult treatment drugs, healthcare providers redirected efforts to pediatric TB care, ensuring continuity in TB control efforts.

Recommendations: The study recommends integrating childhood TB notification as a central component of Nigeria's TB resilience strategy. Strengthening pediatric TB programs and resources will ensure that childhood TB care remains robust during crises affecting adult treatment. Additionally, monitoring pediatric TB notifications during medication shortages could serve as an indicator of healthcare system resilience, guiding policy adaptations for future supply chain disruptions.

113

Innovative TB Screening Strategies in Uganda: Bridging the Gap Between Symptomatic and Asymptomatic TB

Mulindwa A[1], Luzze H[1], Quinto E[1], Tugumisirize D[1], Rutazaana D[3], Burua A[2], Amanya G[2]

[1]Ministry of Health / National Tuberculosis and Leprosy Programme, Kampala, Uganda, [2]Local Partner Health Services – TB Activity, Infectious Diseases Institute, Makerere University, Kampala, Uganda, [3]Ministry of Health, Global Fund, Kampala, Uganda

Background: Tuberculosis (TB) remains a significant public health challenge in Uganda, with 96,000 new infections annually. Among these, 14% are children (0–14 years), and 32% of TB patients are co-infected with HIV. Additionally, 48% of TB patients face catastrophic expenditures, and there are 9,900 TB-related deaths each year. These issues are exacerbated by high population density, rapid urbanization, and socioeconomic disparities. Despite advances in treatment, the detection and control of TB, especially in asymptomatic cases, remain inadequate. This study investigates a novel TB screening approach in urban and peri-urban settings in Uganda, targeting both symptomatic and asymptomatic cases to improve detection and treatment rates while addressing gender-specific needs.

Materials and Methods: The study employs a comprehensive screening strategy integrating advanced diagnostic tools such as the GeneXpert MTB/RIF assay and digital chest radiography. Healthcare providers received training to identify both symptomatic and asymptomatic TB cases effectively. Community-based approaches, including mobile screening units and outreach programs, were leveraged to ensure accessibility and inclusivity. Gender-sensitive interventions, such as female-only screening sessions and culturally tailored health education, were implemented to mitigate barriers faced by women and marginalized populations. Data analysis included statistical methods to evaluate the effectiveness of interventions in increasing detection rates and treatment coverage.

Results: Preliminary findings indicate a significant increase in TB detection rates, particularly among asymptomatic individuals. The detection rate of asymptomatic cases increased by 20%, and treatment coverage reached 95% in the targeted regions. Gender-sensitive strategies enhanced healthcare access for women and marginalized groups, contributing to more equitable health outcomes. Statistical analysis confirmed the effectiveness of the implemented interventions, demonstrating significant improvements compared to previous methods.

Conclusion: Adopting an intersectional gender lens and leveraging community networks and existing healthcare infrastructure are effective strategies for improving TB control in Uganda. This approach has significantly improved TB detection rates, especially among asymptomatic individuals, and increased treatment coverage. Additionally, implementing gender-sensitive strategies has enhanced healthcare access for women and marginalized groups, contributing to more equitable health outcomes. These findings underscore the importance of innovative and inclusive methods in addressing public health challenges in urban and peri-urban areas. The study provides a scalable model for other high-burden settings and aligns with the conference's objectives to disseminate clinically relevant innovations and discuss their translation and implementation in Africa.

114

Prevalence, Associated Factors and Rifampicin Resistance Pattern of Pulmonary Tuberculosis Among HIV-Positive Patients Attending Antiretroviral Treatment Clinic at East Gojjam Zone, Ethiopia: An Institution-Based Cross-Sectional Study

Terefe A[1], Toru M[2]

[1]*Medical Laboratory Science Department, Debre Markos University, Debre Markos, Ethiopia,* [2]*Medical Laboratory Science Department, Debre Markos University, Debre Markos, Ethiopia*

Background: Drug-resistant tuberculosis (TB) threatens global TB care and prevention, and it remains a major public health concern in many countries particularly in sub-Saharan countries. Pulmonary TB is the most common serious opportunistic infection on HIV-positive patients and it is the leading cause of death among HIV-positive patients in developing countries. Ethiopia is one of the high TB burden countries with high morbidity and mortality.

Objective: To determine the prevalence, associated factors and rifampicin resistance of pulmonary TB among HIV-positive attending antiretroviral treatment clinic at East Gojjam.

Methods: Hospital-based cross-sectional study was conducted at Debre Markos Referral Hospital, from February to June 2019. A total of 112 HIV-positive TB suspected patients were included using convenient sampling techniques and a bacteriological confirmation test for tuberculosis was performed using Gene-Xpert MTB/RIF assay from a spot sputum sample. Viral load was determined by using a quantitative real-time polymerase chain reaction (RT-PCR) from the blood sample. Socio-demographic and clinical data were collected by face-to-face interview using a semi-structured questionnaire. The data were analyzed by using Statistical Package for Social Sciences (SPSS) software (version 24).

Result: Out of the 112 study participants, the prevalence of Pulmonary TB was 11.6 %. Among TB positives 23.1 % were rifampicin resistant. Rifampicin resistance was 100 % among female patients. Having family members treated for pulmonary TB (P = 0.003, [AOR = 4.5; 95 % CI = 3.59–58.8]), cigarette smoking (P = 0.039, [AOR = 2.18; 95 %CI = 1.17–40.5]), being on WHO HIV disease clinical stage II (P = 0.024, [AOR = 1.81; 95 %CI = 1.50–30.99]), and having viral load (1000–9999) RNA copies/ml (P = 0.031, [AOR = 1.54; 95 %CI = 1.32–31.41]) were found to be significantly associated with pulmonary TB.

Conclusion: The prevalence of pulmonary TB and rifampicin resistance was high among HIV patients. Having family members treated for Pulmonary TB, history of cigarette smoking, WHO HIV clinical stage, and high viral load were associated risk factors for TB. Therefore, strengthening awareness creation on TB transmission, drug resistance, and treatment adherence are essential. Moreover, early screening and treatment are vital for preventing the transmission and occurrence of drug-resistant TB among study populations.

115

Insecurity and Healthcare Service Delivery: Challenges, Coping Strategies, and Implications for HIV/TB Care in North Central Nigeria

Rufai M[1], Saliu I[1], Anjov P[1], Uwanchor U[1], Salami M[1], Etsetowaghan A[1], Olutola A[1], Atibioke O[2]

[1]*Center For Clinical Care And Clinical Research, FCT, Nigeria,* [2]*Association for Reproductive and Family Health, FCT, Nigeria*

Introduction: Insecurity remains a significant barrier to healthcare service delivery, particularly in regions prone to violence, banditry, and other security challenges. In many parts of Nigeria, including Niger State, rising insecurity has disrupted essential healthcare services, with severe consequences for people living with HIV/TB and healthcare workers alike. For critical services such as HIV and TB care, where timely testing, treatment, follow-up, and adherence are essential to achieving positive health outcomes, insecurity contributed to existing challenges. The study aimed to identify the challenges, coping strategies and their implications on the delivery of HIV care continuum in the security-ravaged zones in Niger state.

Method: This qualitative study employed focus group discussions (FGDs) to explore the challenges faced in delivering HIV and TB services in security-prone areas of Niger State. Using purposive sampling, 16 healthcare providers were selected from 10 healthcare facilities across nine local government areas (LGAs) affected by insecurity. The FGDs were conducted in safe locations, and the data were analyzed using thematic analysis to identify patterns and generate insights.

Results: Thematic analysis revealed several key challenges faced by participants. Communication network disruptions, primarily caused by intentional network shutdowns, were a major issue. Restricted movement stemming from fears of bandit attacks further complicated access to services. Additionally, participants reported that frequent displacement of clients led to missed appointments, Interruptions in Treatment (IIT), and delays in viral load sample collection. Emotional distress was another significant concern, with many healthcare providers reporting heightened stress levels. To address these challenges, participants adopted strategies such as utilizing nighttime communication, collaborating with local security authorities, and relying on intermediaries, like expert clients, to deliver medications. Despite these strategies, safety concerns remained pervasive.

Conclusion: The findings of this study provide valuable insights into the challenges and coping strategies related to delivering HIV and TB services. It is recommended that further studies be conducted to explore the broader implications of insecurity on healthcare delivery and to develop innovative health care delivery models such as telemedicine, enhanced security measures, and support systems that ensure the continuity of care and well-being of healthcare workers and clients in such regions.

116

Public Health Implications of Drug-Resistant Tuberculosis in Nigeria

Osime M[1]

[1]Institute Of Human Virology,nigeria, Abuja, Nigeria

Background: Drug-resistant tuberculosis (DR-TB) poses a significant public health challenge in Nigeria, impacting treatment outcomes and increasing healthcare costs. Understanding the implications of DR-TB on public health is crucial for effective management and policy formulation.

Objective: This study aims to assess the public health implications of drug-resistant tuberculosis in Nigeria, focusing on resistance patterns observed in healthcare facilities during the first two quarters of 2023.

Methodology: A retrospective analysis was conducted using data from line probe assays performed in eight healthcare facilities across Nigeria. The analysis included total tests conducted, susceptibility and resistance rates to first-line drugs (Rifampicin and Isoniazid) and second-line drugs (fluoroquinolones and injectables).

Results/Findings: The study revealed a concerning rise in resistance rates, with a total of 74 cases of resistance to Rifampicin and 34 cases to Isoniazid reported across the facilities. Notably, the co-occurrence of resistance to both Rif and INH increased, indicating a trend towards multidrug-resistant tuberculosis (MDR-TB). The facilities with the highest resistance rates were UCH Ibadan and NTBLTC Zaria, highlighting critical areas needing intervention.

Conclusion/Recommendations: The findings underscore the urgent need for enhanced surveillance and monitoring of drug-resistant tuberculosis in Nigeria. It is recommended that public health authorities implement targeted interventions, including improving diagnostic capabilities, ensuring the availability of effective treatment regimens, and promoting adherence to treatment protocols. Additionally, community awareness initiatives should be intensified to educate the public on the importance of early diagnosis and treatment adherence, thereby mitigating the impact of drug-resistant tuberculosis on health outcomes in Nigeria.

117

Multisectoral Engagement in Finding Tuberculosis Among Children in Seemingly Safe Places: Lessons From TBLON 3 in Ogun State

Odunjo S[1], Alege A[2], Ajayi E[3], Agbaje A[4], Daniels O[5], Dakum P[4], Mensah C[4], Anyanti J[6], Arowoduye B[1], Olusola T[7], Labarah S[8], Eneogu R[9]

[1]Society For Family Health, Abeokuta, Nigeria, [2]Society for Family Health, Ikeja, Nigeria, [3]Institute of Human Virology, Nigeria, Abeokuta, Nigeria, [4]Institute of Human Virology, Nigeria, Abuja, Nigeria, [5]Institute of Human Virology, Nigeria, Ikeja, Nigeria, [6]Society for Family Health, FCT, Nigeria, [7]Ogun State Ministry of Health, Abeokuta, Nigeria, [8]NTBLCP, Abuja, Nigeria, [9]USAID Nigeria, TB/HIV Office, Abuja, Nigeria

Background: Tuberculosis (TB) among children is a public health problem of special significance, it is a marker for recent transmission of TB in the community. The USAID TB Local Organization Network (LON-3) project aimed to bridge this gap by conducting TB screening in schools, orphanages and informal educational settings. This is especially crucial in settings where children are exposed to factors that predispose them to TB such as malnutrition and overcrowded living conditions, engaging such settings are essential in childhood TB detection.

Material & Methods: This initiative required collaborative efforts across multiple sectors, the Ministry of Education, Ministry of Women Affairs and Social Development, as well as religious bodies to locate and engage with these children effectively. Increased resources, including manpower, funding and information, education, and communication (IEC) materials, were mobilized to create awareness for TB screening activities. Volunteers were trained on screening using WHO 4 clinical questions with emphasis on other peculiar signs and symptoms of TB in children. 4 public schools,3 orphanages and 7 Qur'anic schools were identified in TB Hotspots.

Results: The screening was done between Oct 2022- Aug 2023 with a total of 2,121 children screened,541 presumptive identified (26% yield) and evaluated using GeneXpert. 53 TB cases were diagnosed, NNS is 40 and NNT is 10 respectively which is more efficient compare to screening in infant welfare clinic. 51 (96%) of the cases identified were enrolled on treatment and notified to the National TB Program.

Conclusions: Multi-sectoral targeted screening for childhood TB cases is a highly effective and efficient way of reaching out to children who may not present in health facilities as they are presumed to be healthy, sustaining this collaboration can help reduce child mortality due to tuberculosis.

118

Assessing the Effect of Co-Administration of Rifapentine With Dolutegravir on Viral Load Suppression Among ROC on Tuberculosis Preventive Therapy in Delta, Ekiti and Osun States

Oyetola A[1], Agada P[1], Kowam R[1], Asuquo B[1], Oqua D[1], Omeh O[1], Agu K[1], Emmanuel I[2], Ukwuaba S[2], Oluwayinka S[2], Egwuogu A[2], Emah B[2], Uduak-Abasi A[2], Abojeh P[2], Okoh P[2], Law-Maduka C[2], Ekele O[2], Inedu A[2], Onyedinachi O[2], Eyo A[2], Olu-Lawal M[3], Kolawole T[4]

[1]Howard University Global Initiative Nigeria, Abuja, Nigeria, [2]Excellence Community Education Welfare Scheme, Abuja, Nigeria, [3]State Specialist Hospital Asubiaro, Osogbo, Nigeria, [4]Federal Teaching Hospital, Ido Ekiti,

Background: Short-course once-weekly isoniazid-rifapentine (3HP) for three months is an effective regimen for latent Tuberculosis treatment among HIV Recipients of Care (ROC). Some studies have demonstrated that rifapentine reduces the plasma concentrations of Dolutegravir (DTG) through hepatic enzyme inductions possibly leading to treatment failure in the absence of dosage adjustment. The objective of the study was to assess viral load suppression rates among clients who were co-prescribed DTG and 3HP in selected facilities in Delta, Ekiti and Osun states.

Methods: The introduction of Isoniazid/Rifapentine (3HP) as an alternative Tuberculosis Preventive Therapy (TPT) regimen commenced May 2023 across 21 selected facilities in Delta, Ekiti and Osun states. Dolutegravir (DTG) forms part of the adult first line regimens in combination with Tenofovir/Lamivudine as TLD or Abacavir/Lamivudine as ALD. New clients were screened for eligibility. There was no dosage adjustment when co-administered. The clients were followed up and provided adherence counselling. Treatment outcomes were documented in Facility TPT Cohort registers. New clients had viral load collected after 6 months on treatment. Demographic data and viral load results were abstracted from the register and the National Medical Record System. Data were analyzed and summarized using frequencies in SPSS version 26.

Results: Medical records of 1258 ROC who started 3HP within the period (Male = 47%, Female = 53%) with median age of 36 (IQR=29-45) were reviewed out of which 63 were excluded for incomplete documentation. A total of 1195 clients had valid viral load results with 97.3% suppression rate (Male = 98.2%; Female = 96%)

Conclusions: Co-administration of 3-HP with Dolutegravir-based regimens did not have negative impact on viral load suppression rates in the absence of Dolutegravir dosage adjustment.

119

Prevalence of Tuberculosis Among People With Substance Abuse Disorder: Lessons on Collaboration With Traditional Mental Health Homes for TB Case Detection by USAID TBLON 3 Project

Odunjo S[1], Alege A[2], Ajayi E[3], Agbaje A[4], Daniels O[5], Dakum P[4], Mensah C[4], Anyanti J[6], Labaran S[7], Olusola T[8], Arowoduye B[1], Eneogu R[9]

[1]Society For Family Health, Abeokuta, Nigeria, [2]Society for Family Health, Ikeja, Nigeria, [3]Institute of Human Virology, Nigeria, Abeokuta, Nigeria, [4]Institute of Human Virology, Nigeria, Abuja, Nigeria, [5]Institute of Human Virology, Nigeria, Ikeja, Nigeria, [6]Society for Family Health, Abuja, Nigeria, [7]NTBLCP, Abuja, Nigeria, [8]Ogun State Ministry Of Health, Abeokuta, Nigeria, [9]USAID Nigeria, TB/HIV Office, Abuja, Nigeria

Background: Prevalence of tuberculosis (TB) among people with substance abuse disorder is notably higher than the general population as they are several times more likely to contract TB due to factors such as weakened immunity and co-occurring health issues. In Africa, traditional mental health homes served as the first point of treatment for most with such condition due to cultural belief. USAID Tuberculosis Local Organization Network 3 (TB LON 3) aimed to find the missing TB cases among high risk groups by conducting TB screening activities in traditional mental health homes.

Material & Methods: Between November 2022 and August 2023 four traditional mental health homes were purposively selected with proper engagement to the stakeholders outlining the signs and symptoms of TB and its determinants which include alcohol use disorder, smoking, and substance abuse. TB screening was done using WHO 4 clinical questions checklist and emphasis placed on other obvious signs such as emaciation. Sputum samples collected were analyzed using GeneXpert MTB/Rif Assay.

Results: A total of 741 persons were screened, 264 (35%) presumptive TB cases identified and evaluated with 66 (25%) TB cases (61 DSTB, 5 DRTB) diagnosed and commenced on treatment and notified to the National TB program. Number needed to screen (NNS) and Number needed to test (NNT) was 11 and 4 respectively compared to 54 and 9 among similar high risk groups on the USAID TBLON 3 Project.

Conclusion: This intervention shows a high prevalence of tuberculosis among persons who suffer from substance abuse disorder and its implication for public wellbeing. Collaboration and effective engagement with traditional mental health home in TB endemic region shows promise as a replicable model for high-risk population in the End TB strategy especially in communities where cultural beliefs influence the general health-seeking behavior of the people.

120

Leveraging Traditional Healers for Early Tuberculosis Case Detection: A Community-Based Approach to Bridging Gaps in TB Screening and Referral in Eswatini

Sibanda J[1], Nyandoro E

[1]The Brave Hearts of Eswatini, Trelawny Park, Eswatini

Background: In Eswatini, traditional healers play a pivotal role in the healthcare-seeking pathways of many individuals, often serving as the first point of contact for those experiencing illness. This cultural reliance on traditional healers can contribute to delays in the diagnosis and treatment of tuberculosis (TB), exacerbating transmission rates and adverse health outcomes. Recognizing the influence of traditional healers within the community, this study explores their potential role in early TB screening and referral as part of a broader strategy to address the "missing TB cases" in Eswatini.

Methods: A training program was conducted for 100 traditional healers, focusing on TB awareness, basic symptom recognition, and referral protocols to formal healthcare facilities. A qualitative approach was employed to evaluate the effectiveness of this engagement, utilizing focus group discussions to capture the healers' perceptions, experiences, and challenges in identifying and referring presumptive TB cases. Thematic analysis was used to derive insights into their willingness to collaborate with the national TB program and their perceived impact on community health.

Results: The findings revealed that a substantial number of presumptive TB cases initially consult traditional healers before seeking formal healthcare services. Traditional healers expressed a strong sense of empowerment and recognition of their role in public health, demonstrating a commitment to supporting TB elimination efforts. They reported frustration over the historical lack of inclusion in TB control initiatives but welcomed the opportunity to contribute through early screening and referral. Participants emphasized their readiness to refer individuals with TB-like symptoms to healthcare facilities, highlighting the potential for this collaboration to improve case detection.

Conclusion: Engaging traditional healers in TB case finding represents a culturally sensitive and innovative strategy to enhance early detection and reduce diagnostic delays in Eswatini. This approach not only strengthens the bridge between traditional and modern healthcare systems but also leverages the trust and accessibility of traditional healers to improve TB control outcomes. The success of this model underscores the importance of community-based partnerships in public health. It offers a replicable framework for other high-burden settings seeking to optimize TB case finding and reduce the burden of undiagnosed TB.

121

Integrating Occupational Health Centers Into Primary Healthcare Following TB in the Mining Sectors (TIMS) Projects

Kalukambe K[1], Nunurai R, Kabongo A

[1] Ministry of health (NTLP), Windhoek, Namibia

Background: The Tamariskia Occupational Health Service Centre (OHSC) in Swakopmund, Namibia, was established under the Tuberculosis in the Mining Sector (TIMS) project, funded by the Global Fund, to reduce TB in the mining sector. Following the project's conclusion in December 2020, the OHSC faced operational challenges due to a lack of sustained funding. Financial and staffing constraints within the Ministry of Health and Social Services (MoHSS) hindered its full transition to a national occupational health facility. The COVID-19 pandemic further strained local health infrastructure, diverting resources away from occupational health services.

Purpose: This study explores the integration of OHSC services into Swakopmund's primary healthcare system to enhance access to health services for the local community.

Methods: A four-day assessment was conducted by the National TB and Leprosy Programme (NTLP) in collaboration with the Erongo Regional Management Team (RMT) and the District Health Coordinating Committee (DCC). Site visits, asset verification, and stakeholder consultations evaluated the OHSC's infrastructure, equipment, staffing, and service delivery capacity. Discussions led to a consensus on integrating OHSC services with the Tamariskia Health Center, incorporating AI-assisted chest X-ray screening (CAD4TB) for TB, particularly for people living with HIV. Formal and artisan mineworkers are also encouraged to utilize these services.

Findings: The OHSC possesses specialized equipment, including audiometry and X-ray facilities, but faces challenges such as inadequate staffing, limited maintenance plans, and resource constraints. The screening of mineworkers remains inconsistent, and documentation practices are suboptimal. Some equipment, like spirometers, has not been properly maintained due to local procurement issues.

Conclusions & Recommendations: Given current resource limitations, the OHSC's best potential lies in functioning as an integrated primary healthcare site or a TB clinic. To ensure sustainability, additional funding, structured maintenance plans, and a formalized handover to MoHSS are essential. Enhancing systematic screening and documentation for mineworkers is crucial. Additionally, funders and implementing partners should prioritize procuring locally approved medical equipment to ensure consistent patient access to essential services.

122

Optimization of MGIT Liquid Culture Conditions for Enhanced Recovery of Mycobacterium tuberculosis From Clinical Samples

Adeyanju B[1], Turaki L[1], Okoedoh O[1], Iwakun M[1], Bimba J[1], Adelodun A

[1]*Zankli Research Centre, Bingham University, Nigeria, Karu , Nigeria*

Introduction: The Mycobacterium Growth Indicator Tube (MGIT) liquid culture system is widely used for the detection of Mycobacterium tuberculosis (MTB) due to its high sensitivity and faster turnaround time compared to solid media. However, its reliance on automated incubation systems may limit accessibility in resource-constrained settings. This study aimed to optimize MGIT culture conditions by comparing automated MGIT incubation with manual incubation to assess their impact on MTB recovery rates and time to detection.

Methods: Sputum samples from suspected tuberculosis (TB) patients were processed and inoculated into MGIT tubes following standard protocols. The tubes were then incubated under two conditions: (1) in an automated MGIT machine and (2) manually at a controlled temperature. Culture positivity, time to detection, and contamination rates were compared between the two incubation methods. Negative cultures were monitored for early detection trends.

Results: Both incubation methods successfully supported MTB growth, with manual incubation yielding comparable results to the MGIT machine. Interestingly, some manually incubated cultures, particularly the negative ones, showed earlier results than those in the automated system. There was no significant difference in MTB recovery rates between the two methods, and contamination rates remained within acceptable limits for both approaches.

Conclusion: The study highlights that manual incubation of MGIT liquid cultures is a viable alternative to automated incubation, particularly in settings with limited access to MGIT machines. The earlier reporting of negative results in the manual system suggests potential operational advantages for TB laboratories. These findings highlight the need for further exploration of manual MGIT incubation as a cost-effective and scalable diagnostic approach for TB in resource-limited settings.

Keywords: Mycobacterium tuberculosis, MGIT liquid culture, manual incubation, automated incubation, TB diagnostics, resource-limited settings

123

Addressing the Dual Burden of Tuberculosis and Comorbidities in People Who Inject Drugs: A Path Forward for Integrated Healthcare Solutions

Wambui S[1]

[1]Community Advocacy Initiative Kenya(Caik)/ Affiliate; Kenya Network of people who use drugs(KeNpud), Nairobi , Kenya

Background: Tuberculosis (TB) remains one of the leading causes of morbidity and mortality globally, with a heightened burden in vulnerable populations, particularly among people who inject drugs (PWID). Injecting drug use is associated with various risk factors, including a compromised immune system, increased likelihood of HIV infection, and poor access to healthcare services, all of which contribute to the higher incidence of TB and its comorbidities in this group. The intersection of TB, HIV, and other comorbid conditions among PWID presents unique challenges in both diagnosis and treatment.

Objective: This abstract explores the prevalence, clinical manifestations, and treatment challenges of TB comorbidities and coinfections in people who inject drugs. It highlights the significance of addressing both the infectious diseases and the social determinants that impact this population's health outcomes.

Methods: A comprehensive review of recent studies, clinical trials, and surveillance data focusing on TB and comorbidities among PWID was conducted. Data sources were drawn from both high- and low-income countries, with emphasis on regions with concentrated TB epidemics and a high prevalence of injecting drug use. Studies included in the review covered various co-infections such as HIV, Hepatitis C virus (HCV), and Hepatitis B virus (HBV), and evaluated the impact of these comorbidities on TB treatment outcomes.

Results: The findings from the studies reviewed reveal a significantly higher burden of TB among PWID compared to the general population, often with concurrent infections such as HIV and HCV. In addition, drug resistance in TB cases is more common in this population due to poor adherence to TB treatment regimens, which may be further compounded by the lack of access to healthcare services and drug use behavior. People with TB and co-infections also experience increased rates of complications, such as liver dysfunction (especially in those coinfected with HCV), and poorer TB treatment outcomes. The combination of immunosuppressive factors from both drug use and coexisting infections complicates the clinical management of TB in PWID. Moreover, socio-economic factors such as unstable housing, lack of social support, and stigma associated with drug use contribute to delays in diagnosis and suboptimal treatment adherence.

Conclusions: People who inject drugs are at a disproportionate risk of TB and its comorbidities, including HIV and HCV, which complicate both the diagnosis and treatment of the disease. Comprehensive, integrated healthcare models that address both infectious diseases and the social challenges facing this population are essential for improving TB treatment outcomes. There is a need for targeted interventions that enhance healthcare access, promote adherence to treatment, and tackle the social determinants of health that hinder PWID from seeking timely and effective care. Further research into better treatment strategies, particularly for TB-HIV and TB-HCV co-infected individuals, is crucial to reduce the burden of TB and improve overall health outcomes in this vulnerable group.

Keywords: Tuberculosis, comorbidities, coinfections, HIV, Hepatitis C, people who inject drugs, treatment challenges, healthcare access, public health.

124

Artificial Intelligence in Tuberculosis Diagnosis: A Blessing or Threat to Data Privacy

Mathew F, Odume B, Chukwu E

[1]Kncv Nigeria, Makurdi, Nigeria

Background: As artificial intelligence (AI) continues its rapid integration into TB program, the consequential impact on data privacy raises significant concerns. These abstract aims to navigate the nuanced relationship between AI and data privacy, recognizing the dual role of AI as both a potential safeguard and a looming threat to personal information.

Objective: The primary objective of this study is to dissect and comprehend the complex interplay between artificial intelligence and data privacy. By evaluating current applications of AI in data management, scrutinizing instances of data breaches facilitated by AI, and assessing the effectiveness of existing privacy regulations, the study seeks to provide a comprehensive understanding of the multifaceted nature of this relationship.

Methodology: The research employs a mixed-methods approach, combining a thorough review of literature on AI applications in data privacy with a systematic analysis of documented instances of AI-driven data breaches. Additionally, the study assesses the adequacy of current privacy regulations in addressing the evolving challenges posed by AI. Methodological tools include algorithmic assessments, case studies, and comparative analyses.

Results: Preliminary findings reveal the dual nature of AI in the realm of data privacy. On one hand, AI augments security measures, enhancing encryption, authentication, and access controls, thereby fortifying data protection. Conversely, the same technology introduces risks through algorithmic biases, unauthorized access, and the potential creation of sophisticated deepfake content.

Conclusions: The study underscores the paradoxical relationship between AI and data privacy, where the very technology designed to enhance security also poses unprecedented risks. Striking a delicate balance is imperative, necessitating a reevaluation of current privacy regulations to accommodate the dynamic nature of AI-driven data processing.

Recommendations: Based on the study's outcomes, recommendations include the continuous refinement of privacy regulations to keep pace with AI advancements, fostering transparency in AI algorithms, and promoting digital literacy. Furthermore, stakeholders are urged to proactively address the potential risks posed by AI, emphasizing the need for responsible AI development, robust oversight mechanisms, and an informed public to navigate this evolving landscape

125

Strengthening Community-Based Approaches to Address Tuberculosis (TB) and Human Rights Barriers in Sekhukhune District, South Africa

Ndlovu K[1]

[1]Sekhukhune Women Against Hiv/aids And Tb Prevention And Treatment (swahat), Groblersdal, South Africa

Background: Tuberculosis (TB) remains a major public health challenge in South Africa, particularly in rural areas such as Sekhukhune District, Limpopo. Limited healthcare access, stigma, and human rights violations—including discrimination against TB patients—create significant barriers to diagnosis, treatment, and adherence. Addressing these challenges requires innovative, community-led interventions that integrate TB care with human rights advocacy and public health strategies.

Methods: SWAHAT implemented a community-based TB intervention in Sekhukhune District to enhance TB awareness, improve treatment adherence, and address human rights violations. The intervention involved:

Community sensitization and education: Conducting TB awareness campaigns in villages, schools, and public spaces.
Capacity building: Training community health workers to provide TB screening, treatment support, and legal referrals for rights violations.
Multi-sectoral collaboration: Partnering with local clinics, the South African Police Service (SAPS), traditional leaders, and civil society organizations to integrate human rights into TB care.

Results: Initial findings indicate increased TB screening uptake and improved treatment adherence, particularly among key and vulnerable populations. Community members reported greater trust in healthcare services, and collaboration with local authorities led to a reduction in TB-related stigma and discrimination. The intervention also facilitated policy discussions on integrating human rights principles into TB programming in Sekhukhune District.

Conclusion: A community-driven, human rights-based approach to TB care can significantly improve health outcomes and reduce social barriers to treatment. Strengthening partnerships between healthcare providers, civil society, and government stakeholders is essential for scaling up this model to advance South Africa's TB elimination goals.

Keywords: Tuberculosis, human rights, stigma, community-based interventions, TB care, Sekhukhune District, South Africa

126

Characteristics and Treatment Outcomes of Adolescents and Young Adults Living With HIV With Drug-Resistant Tuberculosis Co-Infection in Uganda: A Retrospective Cohort Study

Kirya M[1], Pitua I[1], Kiberu D[1], Nabaasa S[1], Namiiro A[1], Segawa M[1], Semakula P[1], Najjuka M[2], Baluku J[3], Olum R[4]

[1]College of Health Sciences, Makerere University, Kampala , Uganda, [2]Infectious Diseases Institute, Kampala, Uganda, [3]Division of Pulmonology, Kirruddu National Referral Hospital, Kampala, Uganda, [4]Makerere University School of Public Health, Kampala, Uganda

Background: Tuberculosis (TB) remains a significant global health challenge, especially among people living with HIV (PLWH). Drug-resistant TB (DR-TB) complicates treatment outcomes in high-burden countries like Uganda, particularly for adolescents and young adults living with HIV (AYALH).

Objectives: We described the characteristics, treatment outcomes, and factors associated with treatment success among AYALH and DR-TB at a TB treatment unit in Mulago National Referral Hospital, Kampala, Uganda.

Design: A retrospective cohort study was conducted.

Methods: Medical records of AYALH treated for DR-TB between January 2013 and December 2021 were reviewed. Descriptive statistics and multivariable logistic regression were used to analyze treatment outcomes and associated factors.

Results: Among 327 participants (mean age: 28.2 years, SD: 4.75; 52.6% male), the treatment success rate was
65.7%. A BMI ≥18.5 kg/m² (aOR 0.53, 95% CI 0.33–0.83, p=0.005), Efavirenz-based ART regimens (aOR
0.56, 95% CI 0.35–0.89, p=0.014), and primary DR-TB (aOR 0.42, 95% CI 0.28–0.64, p<0.001) were significantly associated with treatment success.

Conclusion: The study revealed a treatment success in only two-thirds of participants emphasizing persistent challenge of achieving optimal treatment outcomes for AYALH. The findings highlight that a higher BMI and Efavirenz-based ART regimens are significantly associated with improved treatment success pointing to the necessity for addressing nutritional needs and optimizing ART regimens to improve the management of DR-TB among AYALH.

Keywords: Drug-Resistant Tuberculosis, HIV, Adolescents and Young Adults, Treatment Outcome

127

A Quick Reaction Integrated Service Delivery Approach to Case Finding: The Combination of Native Intelligence With Responsive Programming in Kano State

Bajehson M[1], Tukur M[1], Baffa H[1], Ahmed M[1], Mangoro Z[1], Zarewa A[2], Bashir U[3], Labaran A[2], Chukwuogo O[1], Bethrand O[1]

[1]KNCV Nigeria, Kano, Nigeria, [2]Kano State Ministry of Health, Kano, Nigeria, [3]Kano State Agency for Control of HIV/AIDS, Kano, Nigeria

Background: KNCV Nigeria is an indigenous non-governmental organization implementing donor funded Tuberculosis (TB) care and treatment projects across fourteen states in Nigeria. Nigeria though ranked first in Africa for TB burden, equitable access to diagnostic and treatment services remains a challenge. Responsiveness is an organizational core value that propels KNCV Nigeria to find innovative ways to meet the contextual needs of each community. In December 2024, we focused our TB case finding efforts towards neglected sub-populations in Kano state. The idea was to access a network of native intelligence from community health care workers (HCWs) and also the ministry of humanitarian affairs to identify communities to target for integrated outreach services using a rapid response deployment of one-stop shop service delivery doorstep model.

Materials and Method: Mobile teams equipped with Portable digital Xray with artificial intelligence (AI), WHO recommended rapid diagnostic test (mWRD) platform, HIV and Hepatitis B test kits were set up, teams were trained and placed on standby ready to deploy within 24hrs of any location ping.

- First ping was a contingent of returning underage detainees from the end bad governance protest that had been in detention for five months.
- Second ping was at immigrants' quarters in Fagge local government area where a foreign migrant that had being ill, was reported to have passed away, stirring panic at the location.

Mobile teams responded to both calls, provided integrated TB, HIV, and Hepatitis B screening services and cascade report documented for analysis. An AI score of >34 was used to determine those presumptive for TB along with the WHO four symptom screen positive.

Results: A total of 75 returning detainees were screened of which 14 (19%) were presumptive for TB, none tested positive for TB using the mWRD, however, 3 persons with AI score >70 had further test using stool sample of which 2 persons were eventually diagnosed with TB. Conversely a total of 399 persons were screened at migrant quarters, with 29 (7%) found presumptive for TB of which 6 persons diagnosed with TB (TB yield of 21%).
None of these clients screened positive for HIV, 17 (3.5%) tested positive for hepatitis B surface antigen with 10 (59%) among the detainees.

Conclusion: An integrated screening approach inclusive of Hepatitis B screening should be standardized for all returning people routed through the Ministry of Humanitarian Affairs. Leveraging on native intelligence can improve intervention response time, critical in breaking the chain of transmission, while building communities confidence in community HCWs. Having a quick reaction service delivery mechanism as part of the tool kit in finding missing TB cases is recommended across similar settings.

128

Navigating Clinical Management of TB: Insight Into Diagnosis, Treatment Adherence, and Patient-Provider Dynamics

Blose N[1], Africa A[1], Mokganya M[1], Mthethwa M[1], Rumaney M[1], Ndlovu N[1]

[1]*Health Systems Trust, Durban, South Africa*

Background: Clinical management of tuberculosis (TB) remains a significant public health challenge that requires critical attention, particularly among patients with drug-resistant TB. Poor patient engagement and unsuccessful treatment outcomes are key prognostic factors of unmanaged drug sensitive and drug resistant TB. In South Africa (SA), the multi-drug resistant TB (MDR-TB) treatment success rate is only 56%, highlighting the need for interventions to improve care. The objective of our scoping review was to map existing evidence on adult perceptions of the clinical management of TB in SA, focusing on factors influencing treatment adherence and patient-provider interactions. Understanding these perceptions can assist develop strategies to address misinformation and stigma with the aim of improving TB treatment outcomes.

Material and Methods: We conducted the review in accordance to the Joanna Briggs Scoping Review methodology guidelines. Studies were eligible if they aligned with the Participant, Concept, and Context (PCC) framework. The population included adults (18+ years) in SA affected by or at risk of TB. The concept focused on misinformation, misconceptions, myths, stigma, and false beliefs related to TB care. Only peer-reviewed qualitative, thematic, and mixed-methods studies published between 2019 and 2024 were included. We conducted searches across PubMed, MEDLINE, Scopus, and Epistemonikos databases.

Results: The thematic analysis of 25 studies identified six key factors influencing TB management:
1. TB Clinical management and family dynamics: Young women are concerned about the impact of MDR-TB on fertility and children, while providers face communication gaps that affect treatment outcomes.
2. Health literacy, and healthcare: Accurate health information positively influences treatment adherence, however barriers such as referral issues, inadequate local clinics handwritten letters, and misconceptions about medication, hinder proper treatment outcomes.
3. Adverse effects, and traditional practices: Patients experience significant side effects from TB treatment, and while some turn to traditional remedies, a lack of health education on managing side effects remain a concern.
4. Socioeconomic and cultural barriers: Barriers such as transportation costs, long distances to clinics, and poverty affect treatment completion rates. In addition, cultural perceptions and gaps in education also impact the delivery of care and patient engagement.
5. Stigma, and community support: Stigma, societal pressures, and misinformation, especially around gender and employment, prevent people from seeking treatment, while unsupportive healthcare environments perpetuate negative perceptions.
6. Infection control and early detection: Misconceptions about TB transmission persist, both in communities and healthcare settings, which highlights the need for enhanced education on its airborne nature and infection control.

Conclusions: Our findings underscore the urgent need for patient-centered interventions that address misinformation, improve patient health education and provider communication, and strengthen health system infrastructure. Tackling stigma, social determinants, and access barriers to TB care is essential to boosting treatment adherence, reducing MDR-TB progression, and enhancing TB management across South Africa.

129

The Evolution of Tuberculosis Diagnostic Accuracy: A Five-Year Evaluation of GeneXpert Performance in Nigeria

Ogwola A[1], Omisakin D[4], Onyewocho A[7], Agogo E[8], Ikani P[1], Eronini N[6], Essen U[1], Okey-Uchendu E[1], Elom E[2], Odume B[5], Agbo F[1], Omoniyi A[3], Egbule D[9], Anenih J[1], Ilori T[1]

[1]National Agency for the Control of AIDS, Abuja, Nigeria, [2]Federal Ministry of Health and Social Welfare, Abuja, Nigeria, [3]World Health Organization , Abuja, Nigeria, [4]National Open University of Nigeria , Abuja, Nigeria, [5]KNCV TB Foundation, Abuja, Nigeria, [6]Federal Medical Centre, Makurdi, Nigeria, [7]Federal University of Health Sciences, Otukpo, Nigeria, [8]Foundation for Innovative New Diagnostics, Geneva, Switzerland, [9]RedAid Nigeria, Enugu, Nigeria

Background: Pulmonary Tuberculosis (PTB) remains a pressing global health issue, particularly among Human Immunodeficiency Virus (HIV)-positive populations, where it is the primary cause of mortality. The GeneXpert MTB/RIF assay, recommended by the World Health Organization (WHO) since 2010, offers rapid and accurate diagnosis of tuberculosis. This study investigates the efficacy of GeneXpert in enhancing PTB diagnosis and treatment outcomes among HIV-positive clients accessing antiretroviral therapy (ART) services in Benue State, Nigeria.

Methodology: A retrospective cohort design was employed to investigate the impact of GeneXpert on Pulmonary Tuberculosis (PTB) diagnosis. Randomly selected ART facilities in Benue State, equipped with GeneXpert machines, participated in the study. Primary data were collected using a standardized tool, analysing treatment records of PLHIV from January 2013 to December 2017. The study compared pre- and post-GeneXpert PTB notification rates, evaluating the tool's effectiveness in enhancing TB diagnosis.

Results: A total of 5,335 presumptive PTB cases were reviewed among PLHIV, with an equal male-to-female ratio. The age distribution showed a predominant group among individuals aged 25 to 49 years (46.4%), followed by those aged 20 to 24 years (18.6%). The number of PLHIV tested for TB increased from 505 in 2013 to 1,981 in 2017 but it declined between 2013 (505) and 2014 (490). The number of PLHIV diagnosed with TB increased from 50 in 2013 to 101 in 2017, but it decreased between 2013 (50) and 2014 (16). However, there was a significant decline in PTB notification rates, from 9.9% in 2013 to 5.1% in 2017, Some facility data were missing for years 2013, 2014 and 2015, this may be attributed to issues with paper methods of recording and reporting.

Conclusions: HIV and TB program have evolved over the years, and electronic medical records have helped to improve our strategic information systems. The use of GeneXpert for detection of TB, also facilitated the rapid diagnosis of PTB, leading to timely and appropriate treatment potentially reducing TB transmission. The decline of testing recorded in 2014 may be attributed to lack of awareness, low stock of cartridges and other testing apparatus. Further research and innovation are needed to evaluate the current status and future trends of GeneXpert utilization.

Key words: Antiretroviral Therapy, Diagnosis, GeneXpert, Human Immunodeficiency Virus, Pulmonary tuberculosis.

130

Genotypic Characterization of Drug-Resistant Mycobacterium Tuberculosis Isolates From People Living With HIV in Blantyre, Malawi

Mulungu K[1,2,3], Mkwangwanya C[1,2], Ndhlovu V[2]

[1]Malawi Liverpool Wellcome Trust| Clinical Research Programme, Blantyre, Malawi, [2]Kamuzu University of Health Sciences, Blantyre, Malawi, [3]University of Glasgow , Glasgow, United Kingdom

Background: Globally, about 0.167 million people died of HIV-associated TB in the year 2022 and around 10 million fall ill with TB every year. African region accounts for 23% of new cases. Malawi is among top 8 most HIV-TB co-infection burdened countries in Africa, the health condition is worsened by the country state of being one of the poorest countries in Africa with a fourth highest percentage of people living in extreme poverty in the world. A steady increase in the prevalence rate of HIV/AIDS makes the situation even more precarious. Malawi, with around 19 million inhabitants, shares geographical borders with Mozambique, Tanzania and Zambia where HIV-TB co-infection is also endemic.

Molecular epidemiological studies have reported 7 main lineages (L1-L7) of Mycobacterium tuberculosis (Mtb) with each lineage adapting to populations of a specific geographical area . Certain Mtb lineages have been associated with evolution of unique properties such as increasing virulence and pathogenicity. Specifically, the Beijing family of L2 has been associated with increasing drug resistance and HIV co-infection in some parts of the world including South Africa and Mozambique. Studies have expressed the diversity of Mycobacterium tuberculosis strains in some regions but few such studies have linked TB strains to multidrug resistance in people living with HIV.

Methods: A retrospective cross section study was conducted on the mycobacterium (Mtb) clinical isolates amongst TB drug resistant people living with HIV to establish and investigate any association with multidrug resistance. TB resistance was confirmed using GeneXpert followed by manual DNA extraction using C TAB method on 30 samples. Multiplex PCR and gel electrophoresis were used to cluster the mycobacterium (TB) strains present in the 30 isolates into 4 lineages (genotypes).

Results: There were 0/30 (0%) isolates belonging to Lineage 1, 0/30 (0%) isolates belonging to Lineage 2, 2/30 (7 %) isolates belonging to Lineage 3 and 28/30 (93 %) isolates belonging to Lineage 4.

Conclusions: The TB isolate belonging to Lineage 4 is predominant in HIV positive individuals who are resistant to TB treatment. Study of Lineage 4 isolates may play a key role in the design and formulation of an effective treatment for HIV-associated TB.

131

Integration of HIV and Tuberculosis Services Promotes Uptake on Community-Based Active Case-Finding Interventions for Both Diseases in Malawi: Country Experience

Mmanga M[1], Mbendera K[1]

[1]National TB And Leprosy Elimination Program, Lilongwe, Malawi

Background and challenges to implementation: HIV and tuberculosis (TB) are inextricably linked, and TB is the leading opportunistic infection among people living with HIV, responsible for approximately 30% of all AIDS-related deaths. HIV, through a weakening of the immune system, is the leading risk factor for the development of TB disease in people with TB infection and contributes to 15% of TB-related deaths (WHO 2020). This informed the program to pilot an integrated approach whereby HIV services were introduced on an active TB case-finding intervention by the use of mobile TB diagnostic units among the high-risk populations to find people with HIV and TB.

Intervention or response: High-risk populations were targeted in their communities by the Mobile TB diagnostic units. All eligible clients were screened for active TB using symptoms and chest X-rays (CXR); those found with a positive sign(s) of TB and abnormal CXR had to undergo HIV counselling and be given HIV self-testing kits. Additionally, male condoms were distributed for prevention. In all the sites, health education was provided that focused on topics bordering between TB and HIV disease to narrow the knowledge gaps.

Results/Impact: In the year 2024, a total of 22,967 clients were screened for active TB, of which 75% of the clients received HIV self-testing kits (17,306) and 83,457 pieces of condoms were distributed for HIV prevention strategy. The uptake of TB screening services increased by twofold after HIV service integration was introduced.

Conclusions: Promoting linkages between tuberculosis and HIV prevention programs at the community level where both diseases are prevalent is essential to improving the service uptake, diagnosis, and outcomes for patients affected by both diseases. Experience indicates that integration of TB and HIV services at a community level is feasible, although HIV self-test kit distribution should be combined with services that can offer onsite confirmatory tests for all clients.

132

Prevalence of Drug Resistance and Genetic Characterization of Mycobacterium tuberculosis Complex Strains From Pulmonary Tuberculosis Patients Co-Infected With Malaria at Jamot Hospital in Yaoundé

Tiani L[1], Ambassa A[1], Assam Assam J[1], Daiga Bigoga J[1], Penlap Beng V[1]

[1]University Of Yaoundé 1, Yaoundé , Cameroon

Tuberculosis-malaria co-infection caused respectively by the Mycobacterium tuberculosis and plasmodium complex remains a major public health problem. In the context of tuberculosis, the first-line treatment includes 4 molecules, namely: rifampicin, isoniazid, streptomycin and ethambutol. These antituberculosis drugs are generally associated with the emergence of resistance phenomena due mainly to mutations in certain genes. According to some authors, the resistant strains belong to certain spoligotypes which are frequent within the LAM10_CAM family which is predominant in Cameroon. This study aimed to determine the prevalence of drug resistance and genetic variation within the MTBC population in pulmonary tuberculosis and malaria co-infected patients at Jamot Hospital in Yaoundé, Cameroon.

This was a 12-month (April 2018-May 2019) cross-sectional study that recruited 336 participants aged 15 years and older. After collection and culture of sputum on solid medium, resistance to first-line anti-TB drugs was determined by the proportion method and confirmed by the Line Probe Assay method. The isolates were then subjected to molecular characterization using the spoligotyping technique.

Among the 336 study participants, the prevalence of TB-malaria co-infection was 5.05%. Overall, 25 (12.88%) strains were resistant to at least one antituberculosis drug, of which 3 (1.54%) were co-infected with malaria. Multidrug resistance (MDR) was observed in 2 cases (1.02%), including 1 (0.51%) in a patient co-infected with TB-malaria. M. tuberculosis was the only species identified and the T1 (60%) and LAM10_CAM (27.5%) families were the most recurrent genetic families among our study patients.

The description of resistance to anti-tuberculosis drugs and the genetic diversity of M. tuberculosis in TB-malaria co-infected patients contributes to improving the management of tuberculosis cases in Cameroon.

Keywords: Pulmonary tuberculosis, multidrug resistance, spoligotyping, genetic diversity, HJY, co-infection

133

Improving Tuberculosis Preventive Treatment (TPT) Uptake Among 5 Years and Older TB Contacts Through Intensified Health Worker-Led Community Initiation of TPT in Urban Uganda

Tweenatwine L[1], Mukama C[1, 2], Wamala B[1, 2], Ninsiima R[1, 2], Zawedde1 S[1], Mudiope M[1, 2]

[1]Infectious Diseases Institute, Kampala, Uganda, [2]USAID Local Partner Health Services TB Activity, , Uganda

Introduction: WHO's ambitious 'end TB goals emphasize early diagnosis of TB. This involves reaching TB infected people and their community contacts early enough to diagnose and put them on treatment and preventive treatment of persons at high risk. In Uganda, MoH is leading efforts to accelerate the uptake of Tuberculosis Preventive Treatment (TPT) – a proven course of treatment that can prevent TB disease and death among those at high risk of developing TB. Despite its proven effectiveness and affordability, the implementation of TPT remains low at 40% globally and Uganda reporting 70% among those living with HIV. USAID LPHS TB Activity in collaboration with other partners implemented TPT catch-up activity where the missed TB contacts were screened and initiated on TPT at the community level

Method: The project supported site-based teams with a line listing all Pulmonary bacterial conformed (PBCs) identified between July 2024 and September 2024 whose contacts were neither identified, screened nor initiated on TPT. Community health workers that included Community Owned Resourceful Persons (CORPs) and Village Health Teams (VHTs) were oriented and supported to follow up with the listed PBCs in the community and identify their contacts. These included neighbors, workplace, social, and home contacts. Health workers were then supported to do community initiation of TPT of all identified and eligible contacts.

Results: At the start of the activity, 1,212 PBCs were line-listed and contact traced, and 10,000 Contacts 5 years and above were eligible for TPT. Between October to December 2024, 8,477 (75%) contacts 5 years and above were screened and initiated on TPT.

Data source: MoH Uganda Dhis2 2023/2024

Discussion: Intensified TB contact screening and community initiation of TPT for those eligible can help low-income countries mop up missed opportunities to be initiated on TPT among eligible PBC contacts 5 years and above. With 8-10% of active TB close contacts developing TB within the first two years after exposure, prevention and treatment of TB infection is crucial to ending TB.

Conclusion: Despite Uganda making progress in TPT coverage among PLHIV and TB contacts under five years, a big gap still exists among 5 years and above. It's evident that community initiation is paramount in reaching this group of TB Key populations. By embracing Community TPT initiation, low-income countries can mop up missed opportunities for the identification of persons at risk of acquiring and transmitting TB infection among communities that have limited knowledge or access to healthcare facilities.

134

Strategizing Case-Finding Approaches to Reach Targets With Limited Resources: Community Volunteer Engagement in Eswatini

Sibanda J[1], Nyandoro E

[1]The Brave Hearts of Eswatini, Trelawny Park, Eswatini

Background: In 2016, Eswatini engaged 369 TB community volunteer known as TB Champions to conduct a door-to-door strategy. By 2019, due to financial constraints , the number of TB Champions reduced to 100, prompting a refined focus on high-risk populations. The country introduced eight models of care, each tailored to meet the unique needs of high risk population. These models encompassed proactive and reactive screening, cluster screening, mobile clinics, outreach programs, community TB preventive therapy (TPT), awareness campaigns, and mass screening for children. This study aims to explore the efficacy of utilizing minimal resources in TB case detection and to share insights on achieving strategic objectives amidst resource constraints.

Methods: Data were collected from the National TB Surveillance system and community registers, comparing the outcomes of the door-to-door strategy initiated in 2016 with 369 community TB Champions, against the results from 2019 to 2023, when targeted approaches with 100 community volunteers were implemented. This analysis focuses on the effectiveness of these strategies in enhancing TB case detection.

Results: Analysis reveals that community contribution to TB detection ranged between 8 % to 13% from 2016 to 2018, utilizing 369 TB Champions. While from 2019 to 2023, despite the reduction of TB Champions to 100, community contributions significantly upwards trend ranging between 13% to 34% from 2019 to 2023. Notably, the streamlined team of 100 TB Champions not only met but exceeded the initial target, achieving a remarkable 34% contribution in 2023.

Conclusion: The study findings indicate that strategic innovation and targeted interventions are pivotal in enhancing TB case detection within resource-limited settings. The successful reallocation of resources and the tailored approach to community engagement in Eswatini serve as a testament to the potential of strategic planning and adaptability in public health endeavors. This experience offers invaluable lessons for similar public health challenges, underscoring the capacity to achieve and surpass objectives with optimized resource utilization.

135

Equity Disparities for Adolescents Living With HIV: Program Translation Gaps Identified During HVTN/ACTG TB Clinical Trial in SA

Mabilane B[1], Hendricks S[1], Bailey V[1]

[1]HCRISA, JOHANNESBURG, South Africa

Background: There have been strong calls to address and reduce health inequalities among adolescent populations, particularly those living with HIV. There are few clinical trials that recruit this cohort of adolescents in Africa, less so, that document their phenomenology. The HVTN 605/A5421 TB trial aimed to recruit adolescents living with HIV from 16 sites from four major South African provinces. Key inclusion criteria needed participants to be aged 12-17 years, able to give assent and parental or guardianship consent, weigh 40kg or more, and possess proof of completed TB Preventative Therapy (TPT) amongst others.

Materials & Methods: Adopting an emergent design, information was gathered from site calls, training sessions, check-in investigator calls, and break-away small groups discussions. Site teams were requested to share their pre-enrolment experiences and observations, focusing on differences and challenges in recruiting adolescents living with HIV.

Results: A total of 548 volunteers were screened only for 186 to be enrolled. This translates to a 34% screen failure rate for the study. Zooming into adolescents, only fifty-two adolescents were eligible for enrolment. Screen failures for the adolescent cohorts could be attributed to three major themes: chronic failure to thrive with many falling below weight criteria when compared with HIV negative peers, inadequate proof of TPT coverage, and unauthenticated guardianship representation.

Conclusions: We highlight several takeaways. Firstly, pre-enrollment data is as valuable a source of public health insights as clinical research data. Secondly, the nutritional needs of people living with HIV continue to be underserved, despite extensive HIV programming over many years. Finally, we posit that early-life HIV infection may result in unavoidable health disparities and developmental inequalities. However, the continued disparities throughout adolescence indicate persistent inequities. We urge governments, development partners, and social agencies to strengthen their commitment to equity within the context of adolescent HIV care, particularly regarding nutrition, prevention, and guardianship.

136

Bi-directional Diagnostic Approach to Mycobacterium tuberculosis (MTB) Case Detection: Panacea to Optimizing Tuberculosis (TB) Diagnosis in Nigeria

Adeniyi D[1], Tongvwam P[1], Okonkwo P[1], Wekpe S[1], Owolagba F[1], Ofuche E[1], Onwuatuelo I[1], Samuels J[1], Okonkwo P[1]

[1]APIN Public Health Initiatives Ltd/Gte, Jos, Nigeria

Background: The endemic nature of TB infection in Nigeria requires that the nation's TB diagnostic tools and algorithms be reassessed towards meeting the current global trends in Mtb case-detection. Also, the incidence and prevalence of both Pulmonary tuberculosis (PTB) and Extra-Pulmonary tuberculosis (EPTB) needs to be well ascertained in order for Nigeria to know her true TB prevalence.

Study Objective: To verify a bi-directional TB diagnostic methodology and an algorithm that can be used to optimize TB diagnosis in Nigeria.

Methods: 365 presumptive TB clients from seven (7) high-volume healthcare facilities in Plateau State, North-Central Nigeria participated in this cross-sectional study. Ethical approvals for this study were obtained from the Plateau State Ministry of Health and the Plateau State Specialist Hospital (PSSH) Research and Ethics Committees. This study took place between March and August 2024. Randomly presenting clients who consented were asked to produce sputum samples into sterile wide-mouthed containers; same clients also produced mid-stream urine samples into sterile universal containers, simultaneously. The sputum samples were aseptically processed and assayed for Mycobacterium tuberculosis (Mtb) and Rifampicin (RIF) resistance detection on the GeneXpert® machine. The urine samples were tested for the presence of Mtb Lipoarabinomannan (LAM) glycolipid using the Determine® TB-LAM Ag lateral flow kit. Obtained data were statistically analyzed using the student's t-test, Pearson's correlation coefficient, and simple percentages with the Excel data analysis ToolPak.

Results: Analysis of obtained data indicates that 182 (49.9%) of the participants were males, while 183 (50.1%) were females. 31% (57/182) males had TB infection, while 30% (54/183) of the female participants had TB infection. 19% (70) of the participants were People Living with HIV (PLWH); with 33% (23/70) Mtb detected. 81% (295) were HIV negative clients; with 30% (88/295) Mtb detected. 8.4% (31/365) of the total Mtb cases were detected by the MTB/RIF Ultra Xpert® method, while 22% (80/365) of the total Mtb cases were detected by the Determine® TB -LAM Ag method. At 95% CL, the obtained p-value of 0.018104, and a calculated correlation coefficient (r) value (r=1) obtained reveals a significant association and a perfect positive correlation between the bi-directional diagnosis of TB using this parallel methodology, and an increase in Mtb cases detection.

Conclusion: 30.4% (111/365) of the study population were Mtb detected, with all Mtb detected clients placed on TB treatment regimen. It is believed that the application of this testing methodology in a parallel algorithm would help facilitate the optimization of TB diagnosis in Nigeria; thereby aiding Nigeria towards establishing her true TB prevalence.

Key Word: TB, PLWH, Advanced HIV Disease (AHD), Lipoarabinomannan (LAM), RIF (Rifampicin), Pulmonary TB (PTB), Extra-pulmonary TB (EPTB)

137

Case Report on Tuberculous Pyomyositis in an Immunosuppressed HIV Positive Patient on Antiretroviral Therapy

Isiko H[1]

[1]*Infectious Diseases Institute Makerere University, KAMPALA, Uganda*

Background: Tuberculous pyomyositis is a rare form of extrapulmonary tuberculosis, particularly in immunocompetent individuals. It poses significant diagnostic challenges due to its nonspecific clinical presentation and the infrequent involvement of skeletal muscles. While more common in immunocompromised individuals, its occurrence in well-controlled HIV-positive patients remains poorly understood.

Case Presentation: We report a case of a 35-year-old HIV-positive man, virally suppressed on HAART, who presented with a painless, progressively enlarging swelling in the left upper thigh. Imaging suggested an incarcerated inguinal hernia; however, intraoperative findings revealed an abscess in the adductor longus muscle. GeneXpert testing confirmed Mycobacterium tuberculosis. The patient was treated with surgical drainage and anti-tuberculous therapy (ATT). Despite an initial recurrence of the abscess, extended ATT resolved the infection. The patient completed a six-month ATT course and is scheduled for elective repair of a recurrent inguinal hernia.

Conclusion: This case underscores the importance of considering tuberculous pyomyositis in the differential diagnosis of soft tissue swellings in immunocompromised patients, even in the absence of systemic TB symptoms. Early diagnosis through surgical exploration and microbiological confirmation, followed by combined surgical and medical management, is crucial for optimal outcomes. This report contributes to the limited literature on atypical TB presentations in HIV-positive patients and highlights the need for vigilance in endemic settings.

138

Bi-directional Diagnosis of Tuberculosis (TB) Using MTB/RIF Xpert® Ultra and the Determine® Urine TB-LAM: Pathway Towards Establishing the True Prevalence of TB in Nigeria

Adeniyi D[1], Tongvwam P[1], Okonkwo P[1], Wekpe S[1], Owolagba F[1], Ofuche E[1], Onwuatuelo I[1], Samuels J[1], Okonkwo P[1]

[1]*APIN Public Health Initiatives Ltd/Gte, Jos, Nigeria*

Background: The endemic nature of Tuberculosis infection in Nigeria requires that the nation's TB diagnostic tools and algorithms be reassessed towards meeting the current global trends in Mycobacterium tuberculosis (Mtb) case-detection. This study aims to verify a parallel and bi-directional TB diagnostic methodology that can be used to establish the true prevalence of TB in Nigeria.

Materials and Methods: 365 presumptive TB clients in Plateau State, North-Central Nigeria participated in this cross-sectional study. Ethical approval for this study was obtained from the Plateau State Specialist Hospital (PSSH) Research and Ethics Committee; and this study took place between March and August 2024. Randomly presenting clients who consented were asked to produce sputum samples into sterile sputum containers. Same clients also simultaneously produced mid-stream urine samples into sterile urine containers. The sputum samples were processed and assayed for Mtb and Rifampicin (RIF) resistance detection on the GeneXpert® system. The urine samples were tested for the presence of Mtb Lipoarabinomannan (LAM) glycolipid using the Determine® Urine TB-LAM lateral flow kit. Obtained data were statistically analyzed using the student's t-test, Pearson's correlation coefficient, and simple percentages with the Excel data analysis ToolPak.

Results: 182 (49.9%) of the participants were males, while 183 (50.1%) were females. 31% (57/182) males had TB infection, while 30% (54/183) of the female participants had TB infection. 19% (70) of the participants were People Living with HIV (PLHIV); with 33% (23/70) Mtb detected. 81% (295) were none HIV clients; with 30% (88/295) Mtb detected. 8.4% (31/365) of the Mtb cases were detected by the MTB/RIF Xpert® Ultra method, while 22% (80/365) of the Mtb cases were detected by the Determine® Urine TB-LAM method. 2.2% (8/365) Mtb cases were co-detected by both methods. At 95% CI, the obtained p-value of 0.018104, and a calculated correlation coefficient (r=1) obtained shows a significant association and a perfect positive correlation between this parallel diagnostic methodology, and an increased Mtb cases detection.

Conclusion: 30.4% (111/365) of the study participants had Mtb infection, with all Mtb detected clients placed on TB treatment regimen. We hope that this parallel testing methodology would help facilitate the increasing detection of Mtb cases in Nigeria.

Key Word: Nigeria, Tuberculosis, PLHIV, Lipoarabinomannan (LAM), Urine TB-LAM, GeneXpert

139

Frequencies and Toxicity (Liver and Kidney) of HIV-HBV and COVID-19 Co-Infections in Patients With Pulmonary Tuberculosis at Jamot Hospital, Yaoundé, Cameroon

Kamdem Thiomo D[1,2], Djuidje Ngounoue M[1], Penlap Beng V[1,2]

[1]Universite De Yaounde 1, Yaounde, Cameroon, [2]Laboratory of Tuberculosis Research and Pharmacology, Yaounde, Biotechnology Center, Cameroon

Liver and kidney toxicities in tuberculosis patients are a major concern, particularly due to the drugs used in their treatment. This study aimed to investigate the frequencies and toxicities of HIV, HBV, and COVID-19 co-infections in individuals with pulmonary tuberculosis. A prospective cohort study was conducted from September 2022 to December 2023, involving the collection of blood and nasopharyngeal samples from 300 pulmonary tuberculosis patients recruited at Jamot Hospital in Yaoundé.

Serological analyses for HIV, COVID-19 antigen test and determination of HBV surface antigen were performed using the immunochromatography method. Biochemical parameters, including AST, ALT, ALP, total bilirubin, urea, and creatinine, were measured using kinetic and colorimetric methods, alongside an estimation of Glomerular Filtration Rate (GFR).

The results revealed a prevalence of 69.3% of mono-infected tuberculosis cases. The frequencies of TB/HIV, TB/HBV, TB/COVID-19, TB/HIV/HBV and TB/HIV/COVID-19 co-infections were 17.7%; 9.7%; 0.7%; 2.3% and 0.3%, respectively. The analysis of hepatitis and renal markers indicated a significant increase in ALT (95.86±53.53 U/L) and total bilirubin (18.70±23.77 mg/dl) in TB-HIV-HBV patients, and a notable rise in ALP (510.88±440.90 U/L) in TB-HIV-COVID-19 patients ($P< 0.05$). Comparative analyses of these markers among days 0, 90, and 180 showed a significant increase in ALT (80.01±24.14 U/L) at day 90 in TB/COVID-19 co-infected patients, a significant rise in ALP (431.81±278.30 U/L) at day 90 in TB/HBV co-infected patients, and a significant increase in Total Bilirubin (10.42±5.35 mg/dl) at day 90 in TB/HIV co-infected patients. Additionally, there was a significant elevation of Creatinine (3.90±1.87 mg/dl) at day 180 in TB/HBV co-infected patients, and a significant increase in GFR (243.38±143.39 ml/min/1.73m²) at day 180 in mono TB patients. These findings highlight the high prevalence of co-infections and their association with liver and kidney toxicities. The study underscores the need for better monitoring and management of co-infected TB patients and improve treatment outcomes.

Keywords: Pulmonary tuberculosis, co-infections (TB and HIV, COVID-19, HBV), Toxicity, Jamot Hospital, Cameroon

140

Trend in TB Notification: A 5-Year Review of the Global Fund TB Public-Private Mix Intervention in Nigeria

Adetiba T[1], Ugwoke U[1], Adebayo O[1], Bello Raji H[1], Adekunle A[1], Ojobor K[1], Vincent E[1], Pillatar B[1], Atoi U[1], Nzeadibe K[1], Okpokoro E[2], Olupitan O[1], Agbaje A[3], Mensah C[4], Dakum P[3], Ssekitooleko J[5], Kimeu J[5], Reilly A[5], Zamzu M[5]

[1]Institute of Human Virology Nigeria (IHVN), Abuja, Nigeria, [2]International Research Centre of Excellence (IRCE), Institute of Human Virology Nigeria , Abuja, Nigeria, [3]Institute of Human Virology Nigeria, Office of the CEO, Abuja, Nigeria. , Abuja, Nigeria, [4]Institute of Human Virology Nigeria, Office of the COO, Abuja, Nigeria. , Abuja, Nigeria, [5]The Global Fund to Fight AIDS,TB and Malaria, , Switzerland

Background: Nigeria bears the highest burden of TB in Africa and ranks among the top 10 countries globally affected by TB, DR-TB, and TB/HIV, and accounts for over 75% of missing TB cases globally. With the private sector responsible for approximately 60% of healthcare services, engaging the sector in the TB response efforts is crucial. To this end, the Global Fund Public Private Mix (GF PPM) intervention was implemented in 21 Nigerian States from 2019 to 2023. This paper analyzes the trends in TB case notifications and the contributions of the GF PPM intervention in Nigeria over the five-year implementation period.

Materials and Methods: This retrospective study of longitudinal program data and comparative analysis of pre- and post-intervention. Aggregated data sets were stratified and analyzed using version 25 SPSS. Proportions were compared and a Chi-square test was used to determine the association between TB case notification and GF PPM Intervention.

Results: Nationally, a total of 602,828 TB cases were notified within the 5 years of program implementation, with PPM contributing 204,503 cases (34%) from 21 states. Yearly contributions to TB case notification from the PPM were as follows: 12,083 (19%), 27,932 (36%), 46,477 (37%), 56,810 (33%), and 61,201 (37%). A significant increase in PPM's contribution to TB notifications was observed from a baseline of 17% in 2018 (n=9,791) to 37% in 2023 (n=61,201), with a p-value<0.01.

Conclusion: The public-private mix strategy is an effective approach to improving TB response in Nigeria, significantly enhancing TB case notifications. Sustaining funding and providing strategic technical support are essential to maintaining the gains. It is therefore necessary to continually strengthen the current service providers while expanding the network to include additional providers. This will contribute significantly to ending the TB epidemic.

141

"I Didn't Know That I Could Live Again": The Impact of Success Stories in Increasing Tuberculosis Case Notification in Southwest Nigeria

Onuoha J[1], Alege A[2], Nwofor U[3], Agbaje A[3], Daniel O[1], Uzoigwe C[1], Eneogu R[4], Obinna-Nnadi A[4]

[1]Institute Of Human Virology Nigeria, Lagos, Nigeria, [2]Society for Family Health , TB LON 3 project, Lagos, Nigeria, [3]Institute of Human virology Nigeria , Abuja, Nigeria, [4]United States Agency for International Development , Abuja, Nigeria

Background and Challenges to Implementation: Nigeria is a high burden country for TB with a TB treatment coverage of 59% in 2022. Misconceptions, stigma and cultural barriers limit their access to TB services. Addressing these barriers is one of the key strategic approaches of the TB-LON 3 project implemented by the Institute of Human Virology Nigeria (IHVN) in four South western states of Nigeria, Lagos, Ogun, Osun and Oyo. This study reviews the impact of success stories in increasing TB case notification.

Intervention or Response: The TB-LON 3 project routinely identifies successes from its innovative TB preventive, diagnostic, care and treatment services. It documents these successes, from a human-centered point of view, and publish them on IHVN's website and social media platforms. These inspiring stories are read by the populace, who become motivated by the experiences of the TB survivors to take positive steps to seek or remain in care.

Results/Impact: These has led to an increase in the number of persons reached with TB messages and engagements on TB-related issues on social media platforms. Persons who had encounters with these success stories reported being inspired and empowered to seek care. In the words of one of the beneficiaries, "I didn't know that I could live again", this echoes a triumph over despondency that transcends beyond the individual to the family and the community at large. The intervention has contributed significantly to the over 132,000 cases of TB that were notified by the project between June 2020 to January 2025.

Conclusion: This study shows that the populace learns from the experiences of others and imbibe good health seeking behaviors which breaks ethnoreligious and cultural barriers, challenges stigma, clears misconceptions and encourages demand creation as well as treatment adherence. It inspires positive change and contributes to a culture of excellence.