

Vuka! Let's unite towards a TB-free world!

9th SA
TB
Conference
8 - 11 June 2026



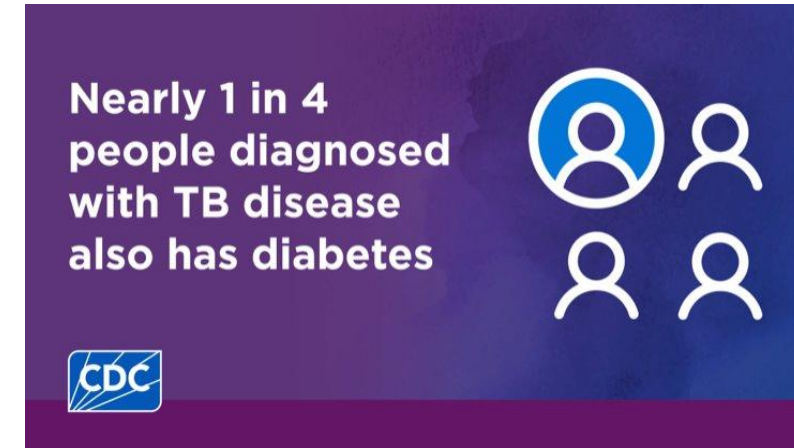
Laboratory confirmed TB in patients
with and without diabetes mellitus
(DM) in the TUTTPlus Study.

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Background



- Diabetes Mellitus (DM) with Tuberculosis (TB) comorbidity varies by geographical region:
- Globally, DM associated with
 - **3-fold increase in TB incidence**
 - **worse TB treatment outcomes**
- In South Africa - both are SEPERATELY leading causes of mortality
 - DM Prevalence in adults ≥ 15 yrs: 10.8% (many undiagnosed)¹
 - TB Incidence: ≥ 468 per 100,000²
- **TUTT increasingly implemented in South Africa**
 - **PLWH, close contacts, recent TB**
 - **Sputum-tested irrespective of symptoms**
- ✓ Bi-directional screening for DM and TB²



1. Sifunda S et al. Prevalence and Psychosocial Correlates of Diabetes Mellitus in South Africa: Results from the South African National Health and Nutrition Examination Survey (SANHANES-1). Int J Environ Res Public Health. 2023 May 12;20(10):5798.

2. National TB Recovery Plan 4.0 April 2025 – March 2026, <https://www.citizen-news.org/2012/10/tb-and-diabetes-linkage-calls-for.html?m=1>

Problem Statement and Objective

Problem Statement

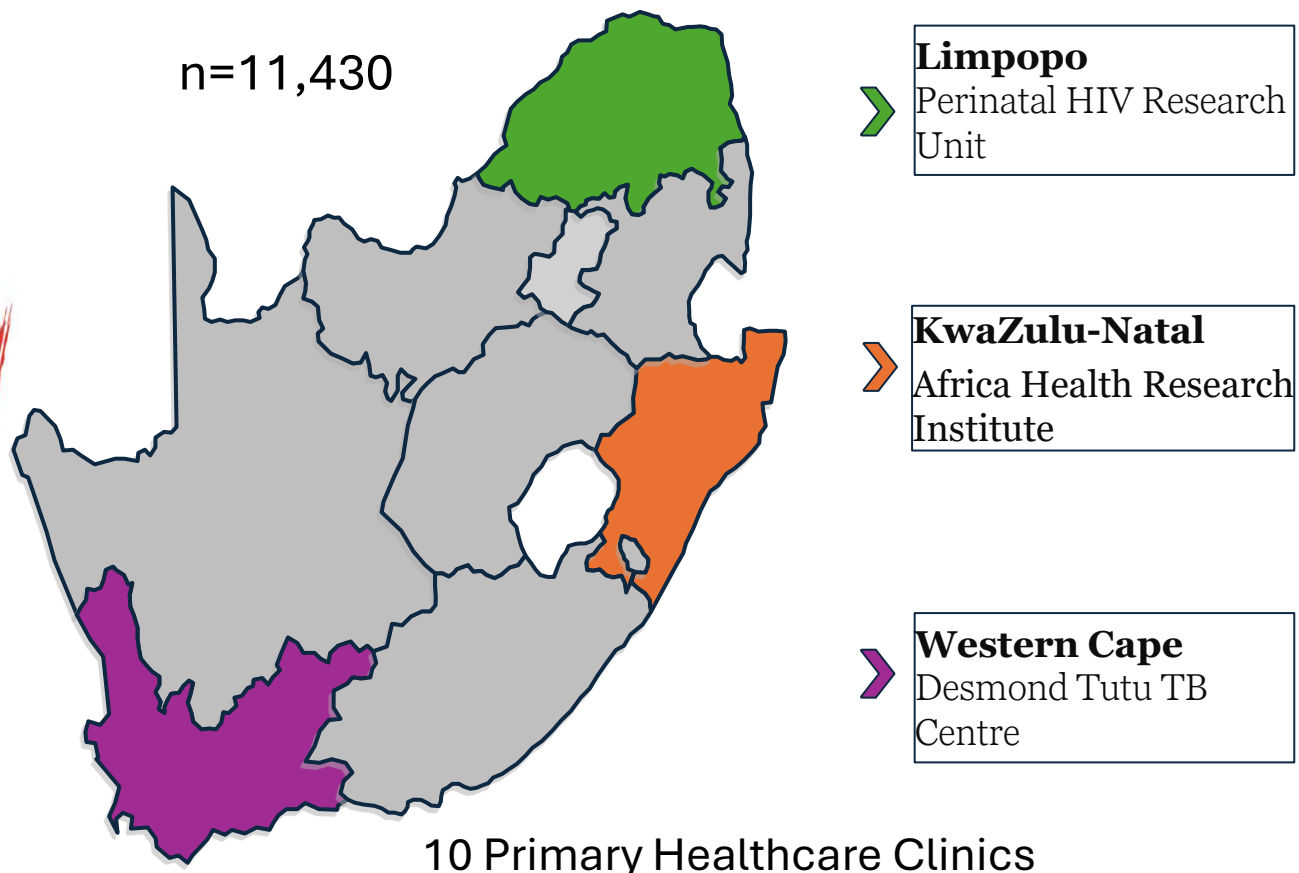
- Add DM as a TUTT risk factor??
- What is the value/utility of screening for DM in TUTT groups????

Objectives

- To assess co-prevalence of DM +/- TB in TUTT people
- To compare TB risk in DM TUTT people, who all have ≥ 1 other risk factor for TB
- To ascertain risk factors for
 - ✓ DM
 - ✓ TBin the TUTT group

DIABETES
B

TUTTPlus Study | Parent study | 2024 - 2025



TUTT Target Population –TB high risk

- People living with HIV
- Prior TB history
- Close TB contacts (irrespective of TB symptoms)

Data collection

- Sociodemographic
- Clinical history and W4SS
- Weight, height, BMI, MUAC, BP & RBG

Specimens & Testing

- Sputum → Xpert Ultra/BD Max/ Roche Cobas (NHLS)
- Tongue swab → Xpert Ultra (WDIH)

Methods

- **Diabetes Identification:**

Known DM: Interview: Self-report being told have DM³

Undiagnosed DM : Random fingerprick glucose: above 11.0 mmol/L⁴

- **Outcome**

Microbiologically confirmed TB stratified by DM status

- Convenience sampling

- Cross-sectional analysis

- ✓ Compared TB rates between individuals with and without diabetes
- ✓ Assessed risk factors by logistic regression of entire group
- ✓ Quasi separation (age) – Matched control TB (Ratio 1:2)



3. Gwira JA, Fryar CD, Gu Q. Prevalence of Total, Diagnosed, and Undiagnosed Diabetes in Adults: United States, August 2021–August 2023. 2024 Nov. In: NCHS Data Briefs [Internet]. Hyattsville (MD): National Center for Health Statistics (US); 2024 Jul-. No. 516.

4. Claypool, K. T., Chung, M. K., Deonarine, A., Gregg, E. W., & Patel, C. J. (2020). Characteristics of undiagnosed diabetes in men and women under the age of 50 years in the Indian subcontinent: the National Family Health Survey (NFHS-4)/Demographic Health Survey 2015-2016. *BMJ open diabetes research & care*, 8(1), e000965.

Overall

	Overall TUTT people n=10,945	No Diabetes n=10,610	Diabetes in TUTT people n=335 (3%)
Age (Median, IQR)	40.0 (32.0, 48.0)	39.0 (31.0, 48.0)	51.0 (43.0, 61.0)
Male %	29%	28%	34%
PLWH %	79%	79%	64%
Close TB Contacts %	24%	23%	39%
Prior TB %	12%	12%	14%
W4SS Pos %	17%	17%	29%
BMI (Median, IQR)	26.7 (22.8, 31.2)	26.6 (22.7, 31.2)	29.3 (24.6, 33.7)

Diabetes Mellitus – Interview Self Report

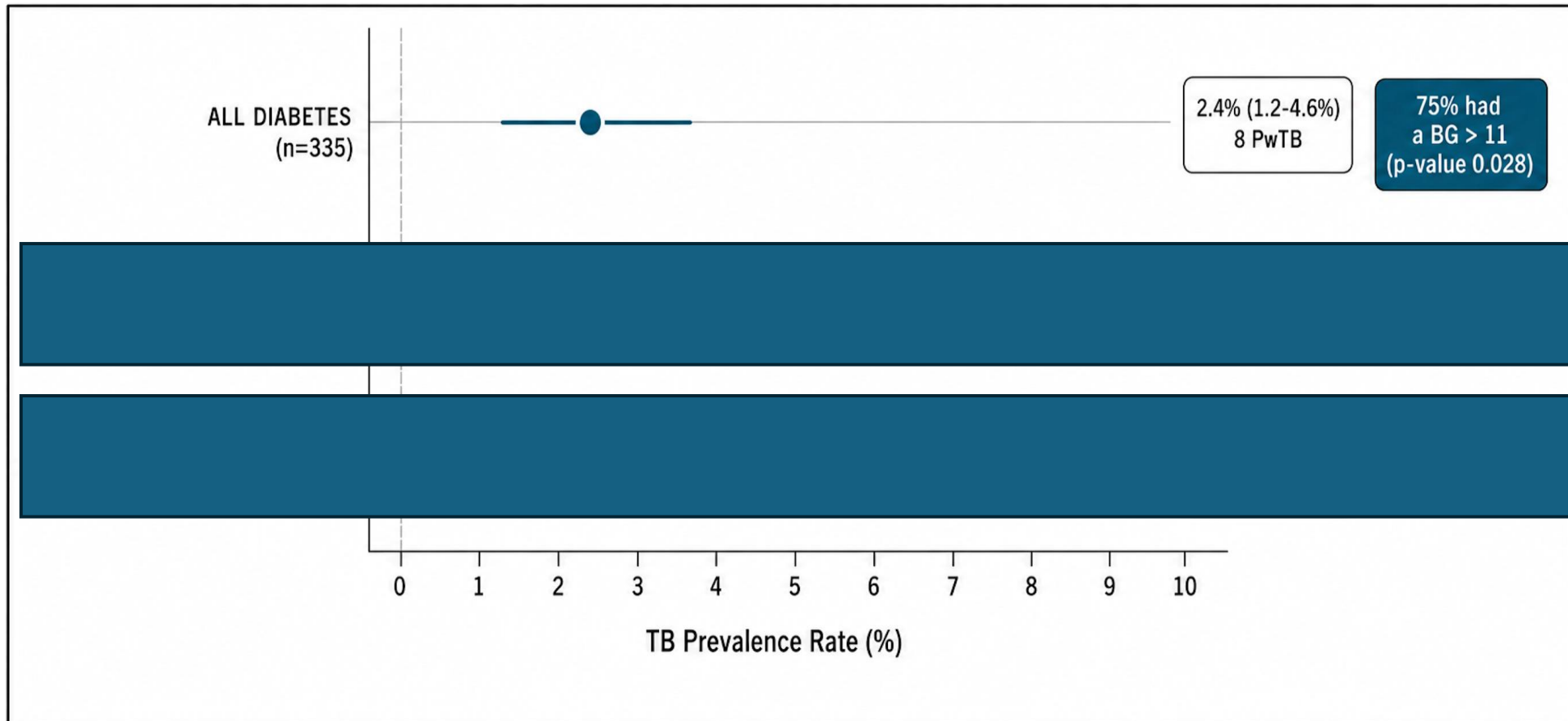
Characteristics	Diabetes n=335	Diabetes self report n=295 (88%)
Age (Median, IQR)	51.0 (43.0, 61.0)	52.0 (43.0, 61.0)
Male %	34%	34%
HIV+ %	64%	63%
Close TB Contacts %	39%	40%
Prior TB %	14%	13%
W4SS Pos %	32%	31%
BMI (Median, IQR)	29.3 (24.6, 33.7)	29.2 (24.6, 33.7)
RBG above 11 mmol/l %	36%	27%

Diabetes Mellitus – Undiagnosed

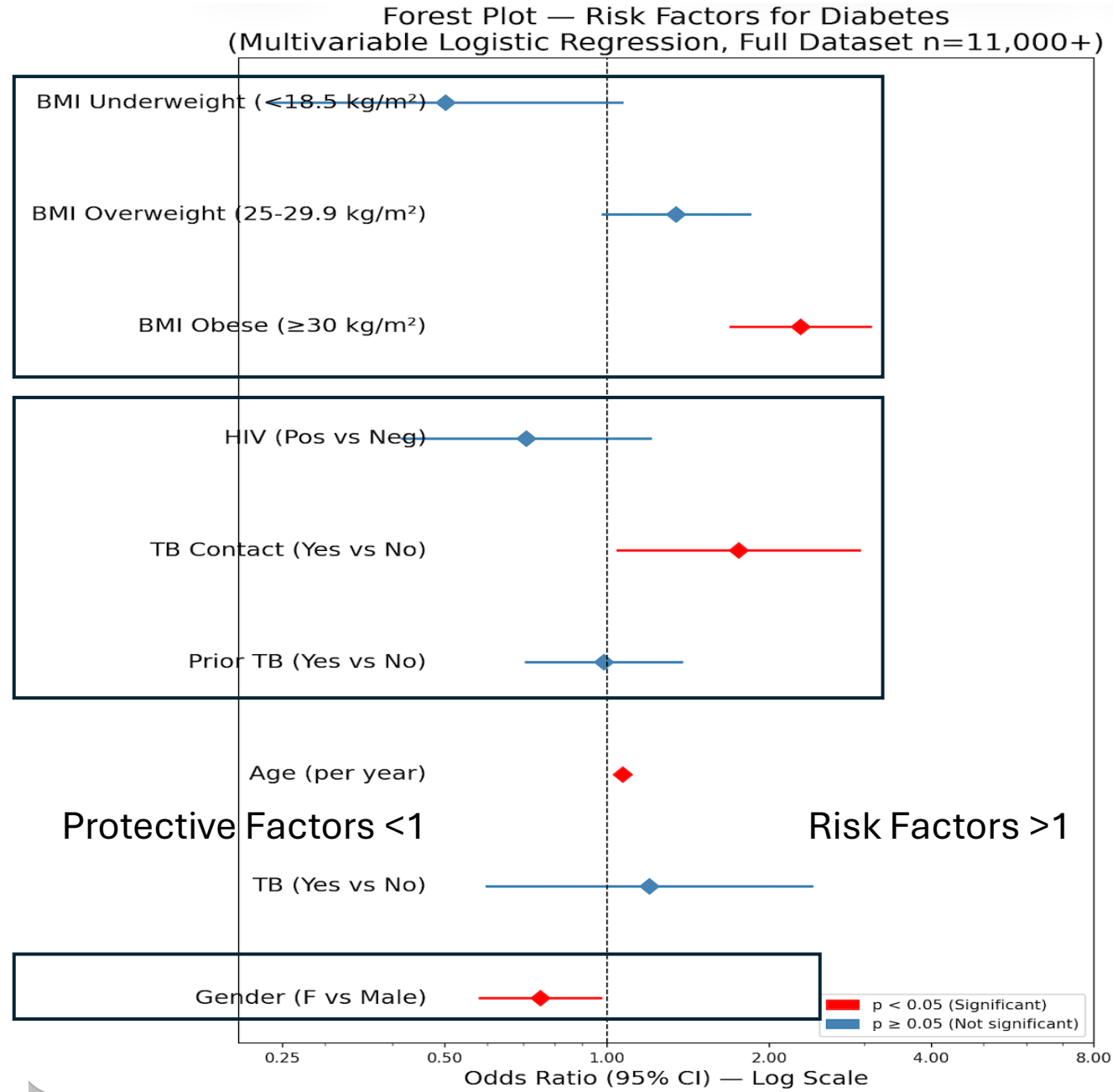
Characteristics	Diabetes n=335	Diabetes self report n=295 (88%)	Undiagnosed DM n=40 (12%)
Age (Median, IQR)	51.0 (43.0, 61.0)	52.0 (43.0, 61.0)	43.0 (33.0, 55.5)
Male %	34%	34%	38%
HIV+ %	64%	63%	75%
Close TB Contacts %	39%	40%	25%
Prior TB %	14%	13%	18%
W4SS Pos %	32%	31%	45%
BMI (Median, IQR)	29.3 (24.6, 33.7)	29.2 (24.6, 33.7)	30.1 (24.5, 33.2)
RBG above 11 mmol/l %	36%	27%	100%

TB in people with no-DM and DM

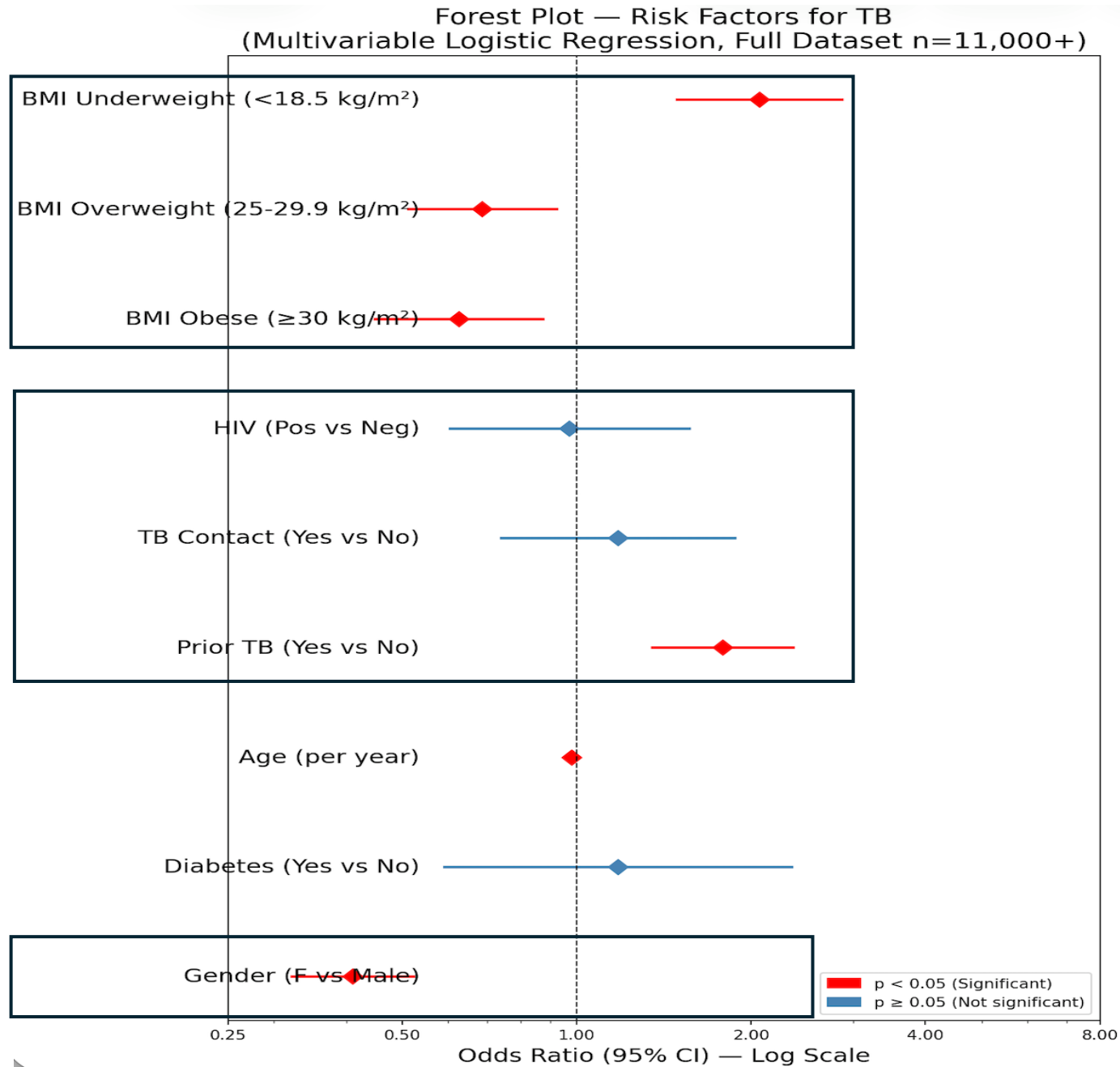
Characteristics	Overall n=10,945	No Diabetes n=10,610	Diabetes n=335
Sputum NAAT or culture %	3.1%	3.1%	2.4%
TS NAAT %	2.0%	2.1%	1.5%



Risk Factors for Diabetes – Overall in TUTT Group

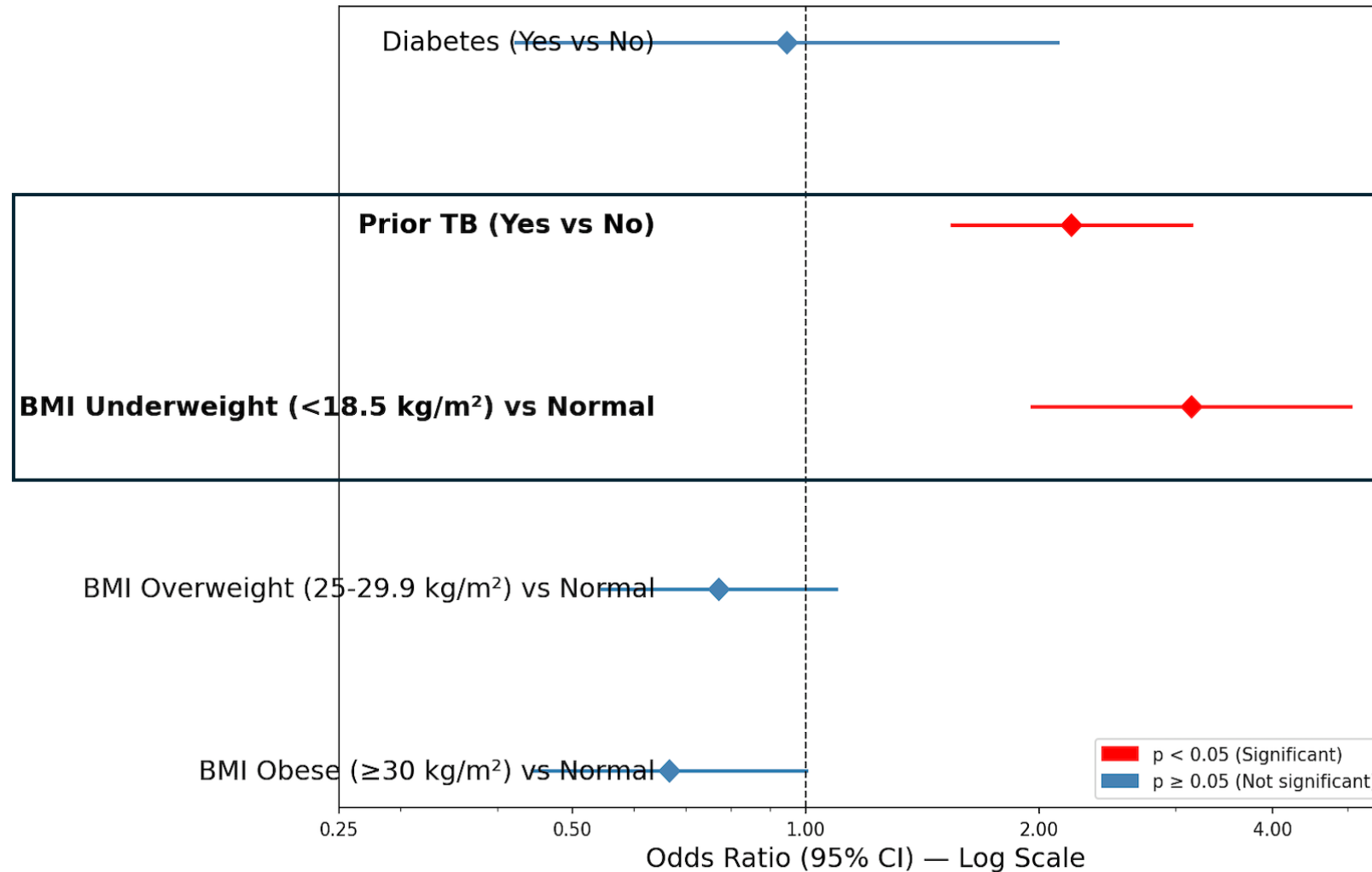


Risk Factors for TB – Overall in TUTT Group



Risk Factors for TB - Match Controlled in TUTT Group

Forest Plot — Risk Factors for TB Positive
(Conditional Logistic Regression, Matched on Gender, Age ± 5 , HIV)



Conclusion

- Proportion with TB in individuals with DM was similar to those without DM overall TUTT group (2.4% vs 3.1%). No apparent increased risk for TB in DMs
- $\frac{3}{4}$ diabetics with TB had glucose above 11
- Obesity is a risk factor for DM, but obesity has been shown to be a protective factor for TB⁵
- Matched controlled for TB risk factors, underweight remained the strongest risk factor
 - ✓ 3 x the odd for TB compared to normal weight individuals
 - ✓ TB and underweight - Bi-directional relationship

Take-home message

Individuals with a TUTT risk factor, DM did not confer to an increased risk for TB

CLINICAL IMPLICATIONS

TUTT GROUP

- * FOUND TB IN THE UNDIAGNOSED AND UNCONTROLLED DIABETES GROUP

LIMITATIONS

ONLY TUTT GROUP

- * NOT GENERALIZABLE
- * CROSS SECTIONAL STUDY

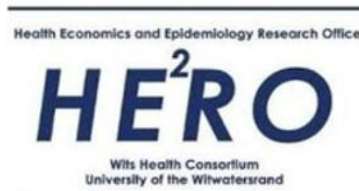
RECOMMENDATION

TUTT GROUP

- * UNCLEAR IF FINGERPRICK SCREENING FOR DM IN TUTT WILL BE WORTHWHILE?

Acknowledgements

Gates Foundation



BETTER TOGETHER.



forward together
sonke siya phambili
saam vorentoe

TUTTPlus Presentations at the 9th SA TB Conference

Abstract Nr	Titles of other presentations and Poster
118	Evaluation of the role of tongue swabs to optimize TUTT implementation - An observational study (TUTTPlus) - Kwa Zulu Natal Data
263	Pooling sputum specimens of people at high risk of TB reduces costs of Xpert Ultra TB testing: Results from the TUTTPlus study in South Africa.
287	Beyond Sputum: Perceptions of Emerging TB Diagnostics in South Africa through the TUTTPlus study
295	Rethinking Sputum Quality: Diagnostic Yield of “Salivary” Specimens Collected After Forced Cough Effort for TB Nucleic Acid Amplification Testing
307	Clinic referral cards, contact tracing investigations for tuberculosis screening in South Africa – A TUTTPlus Substudy - Poster
308	Pooling sputum specimens of people at high-risk of TB reduces testing burden without compromising diagnostic concordance. The TUTTPlus Study
342	Evaluation of the role of tongue swabs to optimize TUTT implementation - an observational study (TUTTPlus) - Overall