



health

Department:
Health
REPUBLIC OF SOUTH AFRICA

First National Tuberculosis Prevalence Survey South Africa 2018

5 February 2021

Survey Aim and Objectives

Aim

To enhance tuberculosis (TB) control in South Africa by informing the National TB Control Programme about the epidemiological situation of TB disease and offering insight on ways in which TB control can be improved

Objectives

- To estimate the prevalence of bacteriologically confirmed Xpert MTB/RIF Ultra and/or culture confirmed pulmonary TB disease among adults (≥ 15 years) in South Africa
- To identify the extent to which people with TB or with symptoms suggestive of Pulmonary TB seek care and if so, from which type of health provider

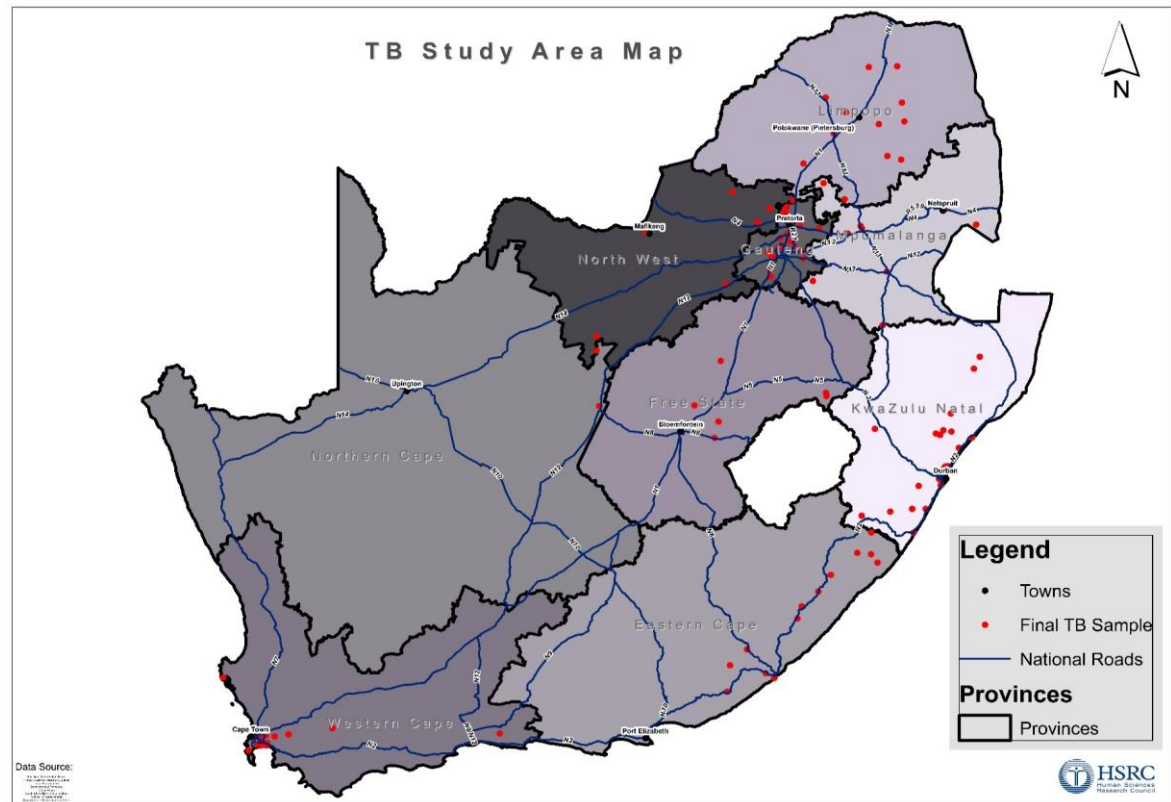
Methodology: Sampling & sample size

Multistage cluster sampling

110 clusters (distinct geographic areas)

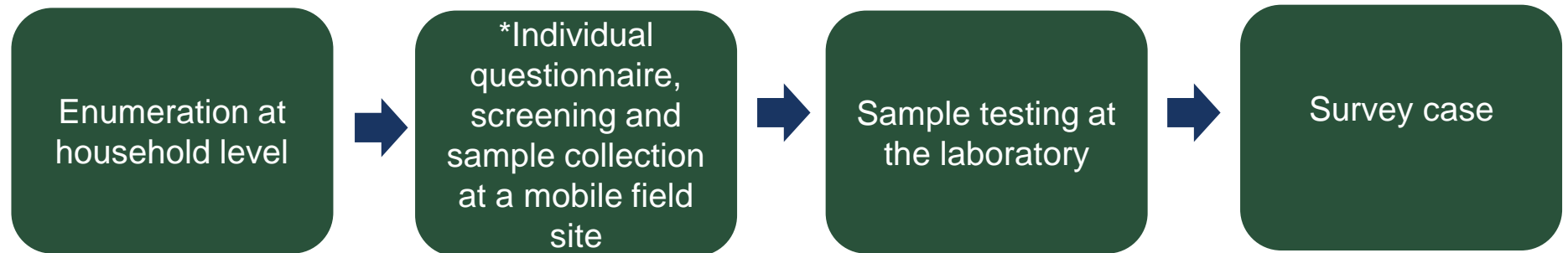
55 000 individuals ≥ 15 years old

All nine provinces



National TB prevalence survey: location and distribution of survey clusters

Methodology: Survey procedures



* ≥ 15 years old, slept in household for ≥ 10 nights in preceding two weeks & provided informed consent/assent & parental/guardian consent for minors

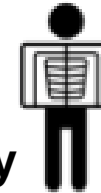
Methodology: Screening Algorithm & Testing

Symptoms



Cough of any duration
Unexplained weight loss
Drenching night sweats
Unexplained fever

Chest X-ray



(Radiological changes suggestive of TB)

2 Sputum specimens taken 1 hour apart



1 x Xpert Ultra



1 x Culture (MGIT)

Dry blood spot sample for HIV testing (optional)

All testing for TB and HIV was undertaken at the NICD

Survey TB case definition

- All culture positive samples
- **Plus**
 - samples that were Xpert Ultra positive, culture not positive for *Mycobacterium tuberculosis* (i.e. culture negative or contaminated, Non-Tuberculous Mycobacteria, culture not done)
 - without a history of TB (past/current)
 - Abnormal CXR suggestive of active TB as reviewed by an expert CXR reading panel

Statistical methods for estimating TB prevalence

- Prevalence was estimated based on the number of TB cases detected as defined above among participants
 - inverse probability weighting (IPW) with multiple value imputation (MI)
 - IPW with MI accounts for missing data and non-participation
 - the most robust option to derive the estimates.
 - recommended by WHO and generally used in other TB prevalence surveys

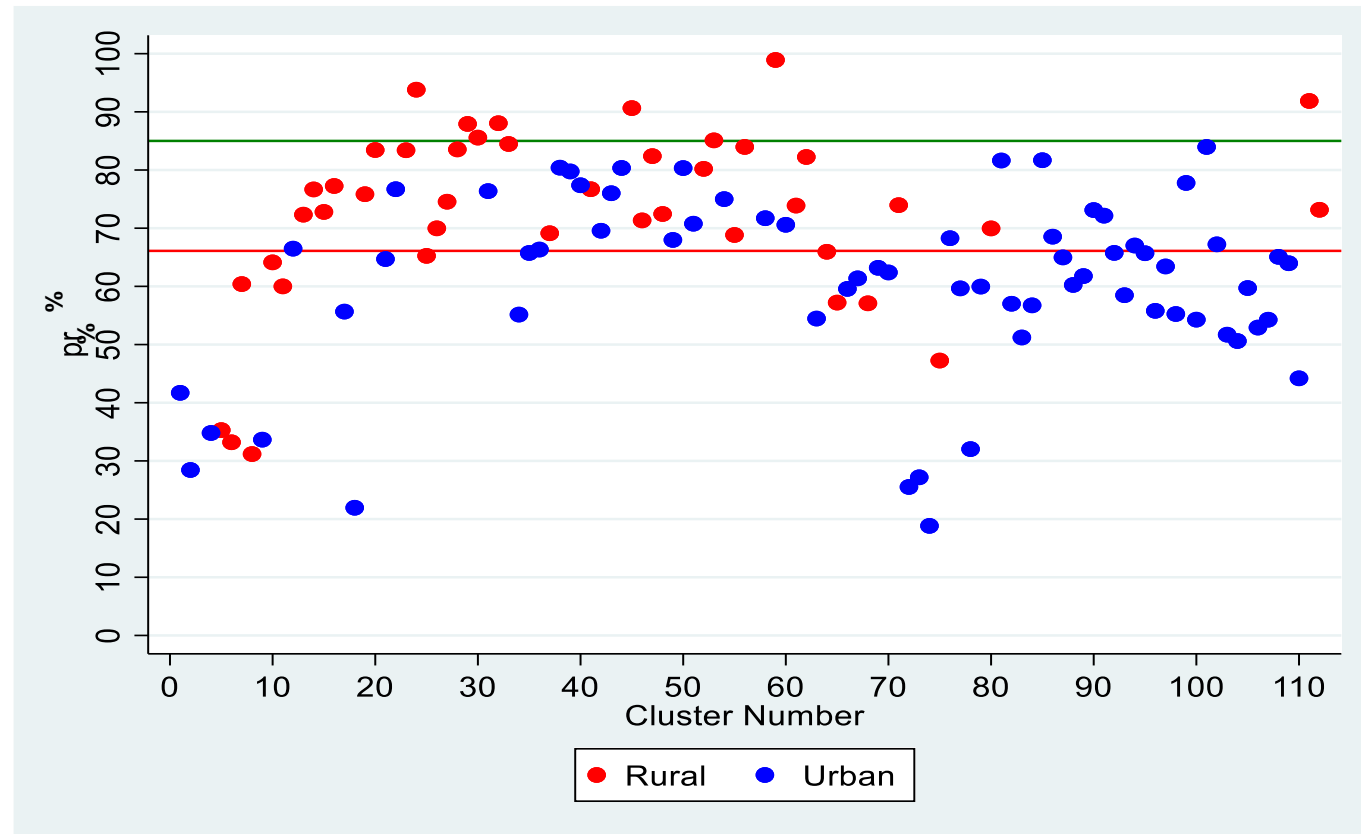
RESULTS

Flow diagram of survey participants

Total population enumerated at the household level	• 68 771
Individuals eligible to participate at household level	• 53 250 (77.4% of enumerated)
Eligible individuals who participated	• 35 191 (66.1% all eligible = participation rate)
Participants who screened positive (symptoms+/ or abnormal CXR)	• 9 066 (25.8% of participants) eligible for sputum collection & examination
Valid Xpert Ultra result	• 7 519 (82.9% of screened positive)
Valid culture result	• 7 305 (80.6% of screened positive)

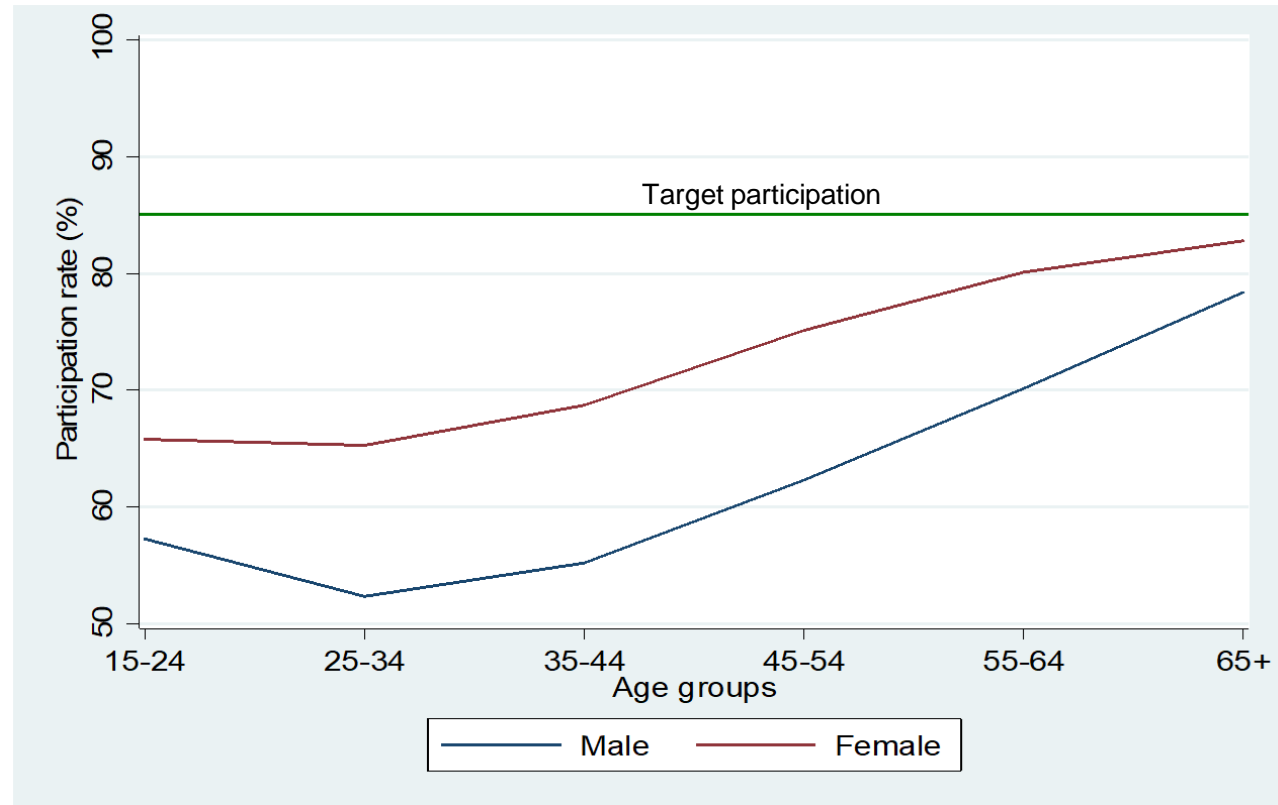
Participation Rate (pr) per cluster by geotype

- Target participation rate (green line: 85%)
- Average survey participation rate (red line 66.1%)
- Lower participation in urban clusters vs rural clusters



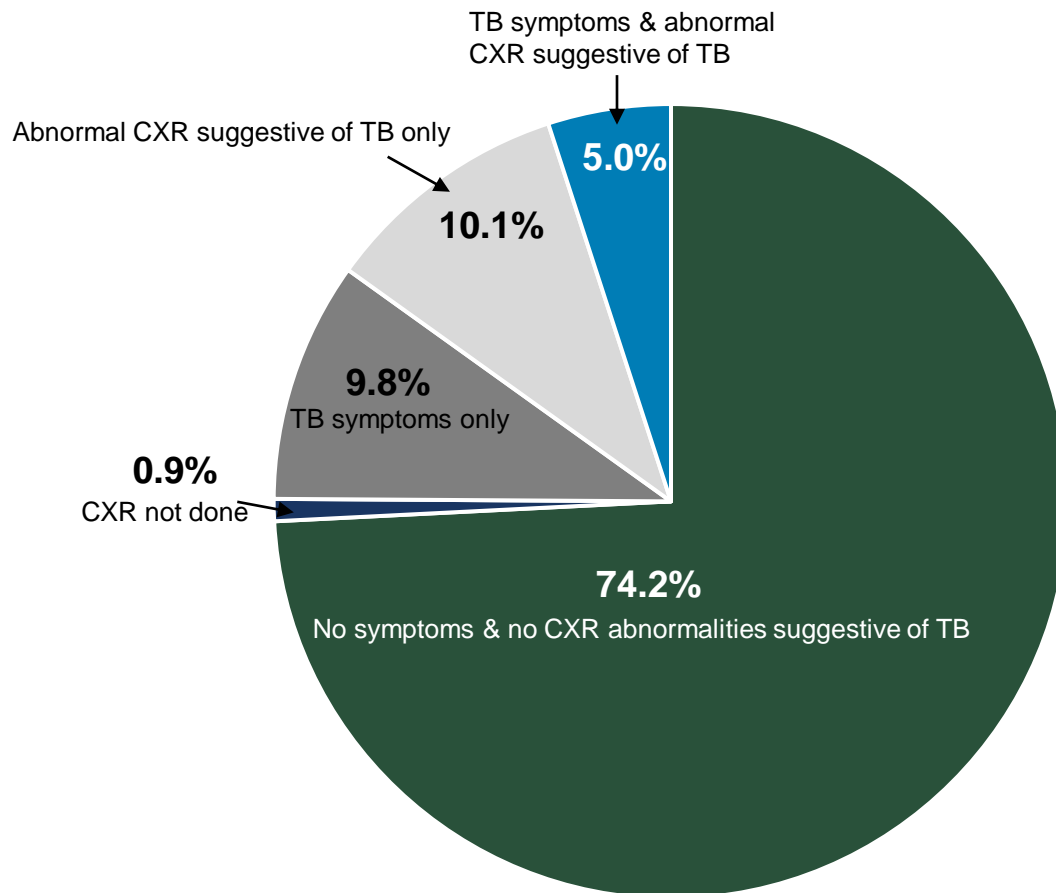
Participation by age and sex

- Lower participation among young people in both sexes and across age groups
- Men had lower participation rates



Symptom and CXR screening findings among survey participants

N = 35 191



The majority of participants were asymptomatic & had no CXR abnormalities suggestive of TB

CXR not done

- consent for CXR declined
- pregnancy
- disabilities that made it impossible to take the CXR
- bedridden & not able to attend the screening site

Culture and Xpert Ultra results among participants eligible for sputum examination

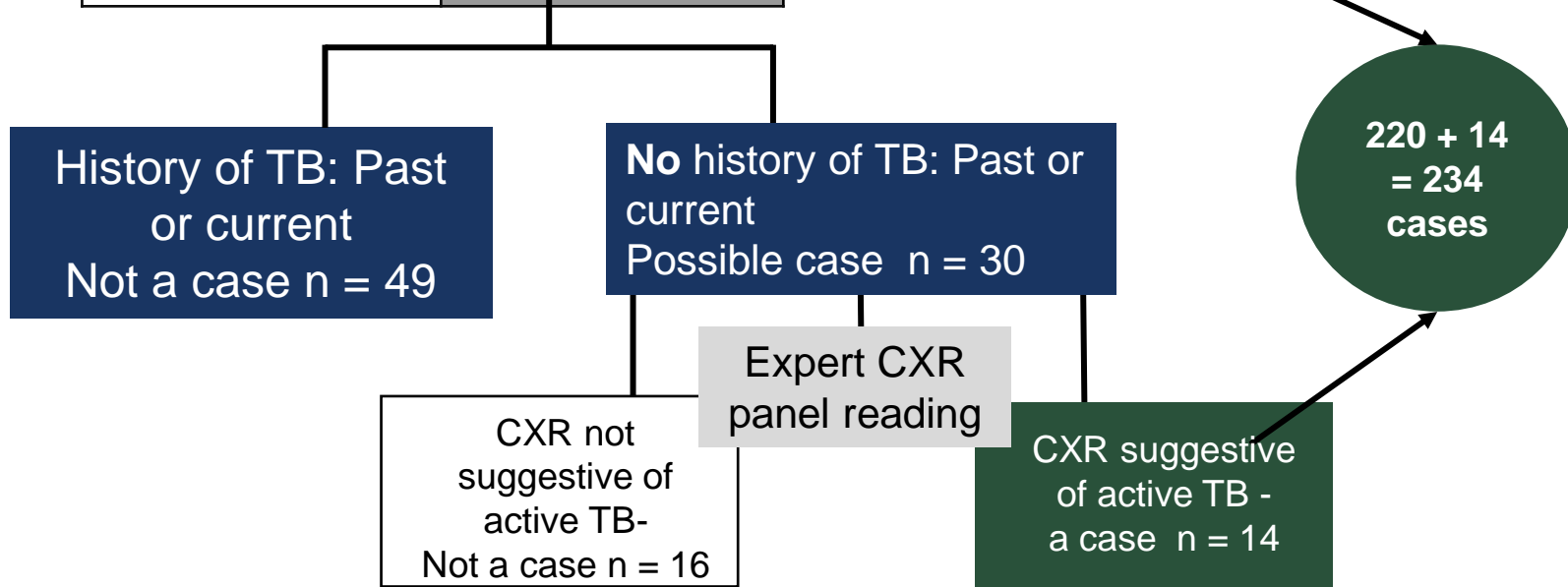
Culture result	Xpert Ultra result			Total
	Xpert positive	Xpert negative	*Not available	
Culture positive	144	74	2	220
Culture negative	66	6 460	60	6 586
**Culture Other	13	752	1 495	2 260
Total	223	7 286	1 557	9 066

*Xpert Ultra invalid results/ sample not processed for Ultra

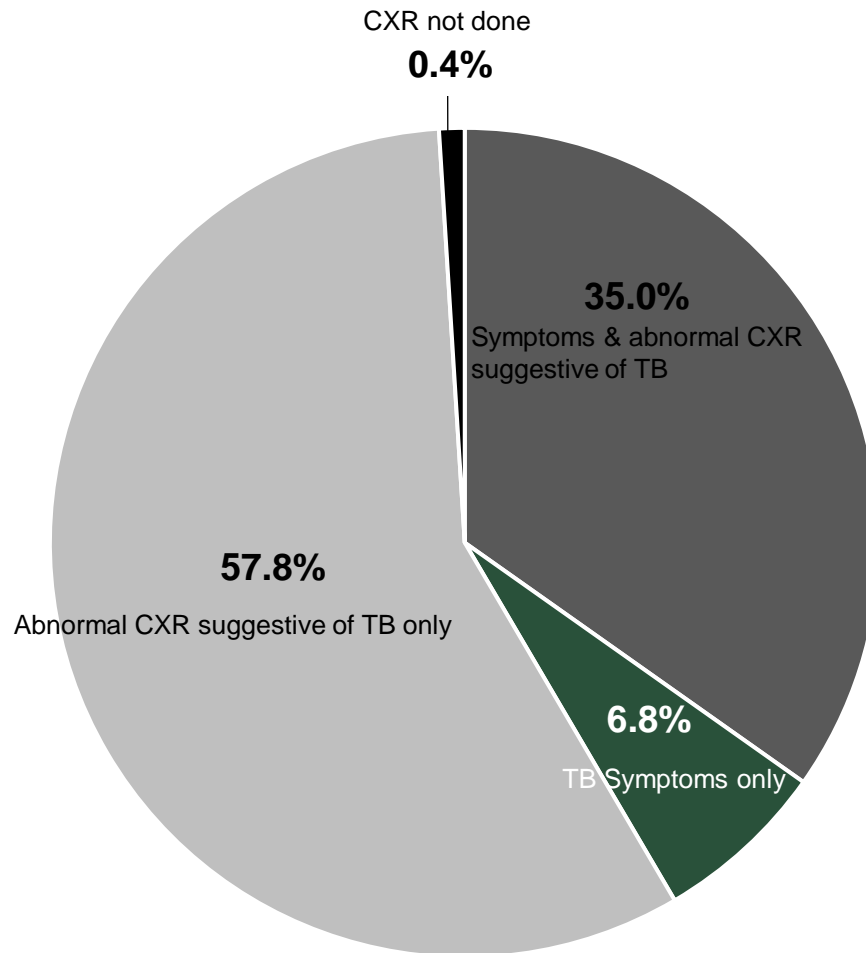
**Culture other: contaminated cultures, Non-tuberculous mycobacteria, not processed for culture

Survey TB cases by culture and Xpert Ultra results

Culture result	Xpert Ultra result		Total
	Positive	Negative/Not available	
Positive	144	76	220
Not Positive	79		



Symptoms and abnormal CXR findings among survey cases



More half of the cases had an abnormal CXR only

6.8% had TB symptoms only

HIV status among survey participants eligible for sputum examination, among survey TB cases & among Programme TB cases

Category	Participants with a known HIV status			HIV status among participants with a known HIV status		
	Total	Known HIV status	%	HIV Negative	HIV Positive	% HIV Positive
Participants eligible for sputum examination	9 066	7 061	77.8	5 414	1 647	23.3
Survey TB cases	234	191	81.6	136	55	28.8
*Programme TB cases	178	162	91.0	68	94	58.0

HIV status determined by a DBS result and in its absence the self-reported status.

HIV status unknown: no DBS result and no self-reported status.

**Programme TB cases: individuals already on treatment through the NTP prior to enrolment into the survey.*

Of the 107 survey cases without TB symptoms, and a known HIV status, 83 (77.6%) were HIV negative.

Estimated prevalence of bacteriologically confirmed pulmonary TB (≥ 15 years old) overall & by sex, South Africa, 2018

	Prevalence per 100,000	95% CI
Overall	852	679 - 1 026
Male	1 094	835 - 1 352
Female	675	494 - 855

Estimated prevalence of bacteriologically confirmed pulmonary TB (≥ 15 years old) by age group, South Africa, 2018

	Prevalence per 100,000	95% CI
Age group (years)		
15-24	432	232 - 632
25-34	902	583 - 1 221
35-44	1 107	703 - 1 511
45-54	1 063	682 - 1 443
55-64	845	505 - 1 186
65+	1 104	680 - 1 528

Estimated prevalence of TB (all ages)

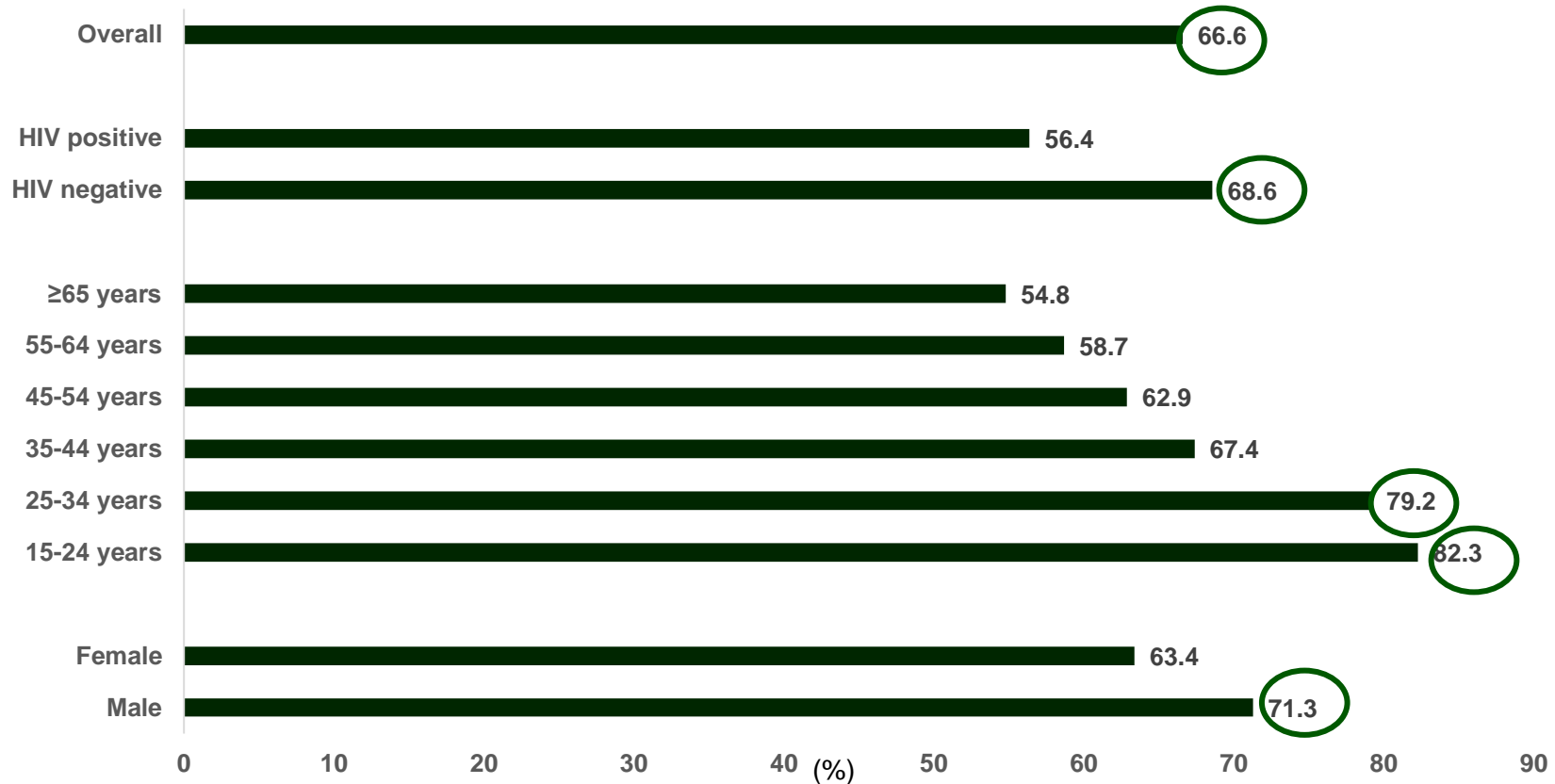
- Using the survey estimate, the prevalence of TB for all forms of TB and ages in South Africa was estimated at **737 (95% CI 580-890) per 100 000 population**
- Calculated
 - WHO using standard methods
 - adjusted for individuals less than 15 years old
 - accounts for the ratio of child to adult TB cases
 - accounts for the proportion of notified cases that are extra-pulmonary TB

Comparison of prevalent survey cases and notified cases, South Africa, 2018

- Estimated cases in 2018 - 390 000
- Notified cases in 2018 - 235 652
- Estimated missed TB patients 154 348

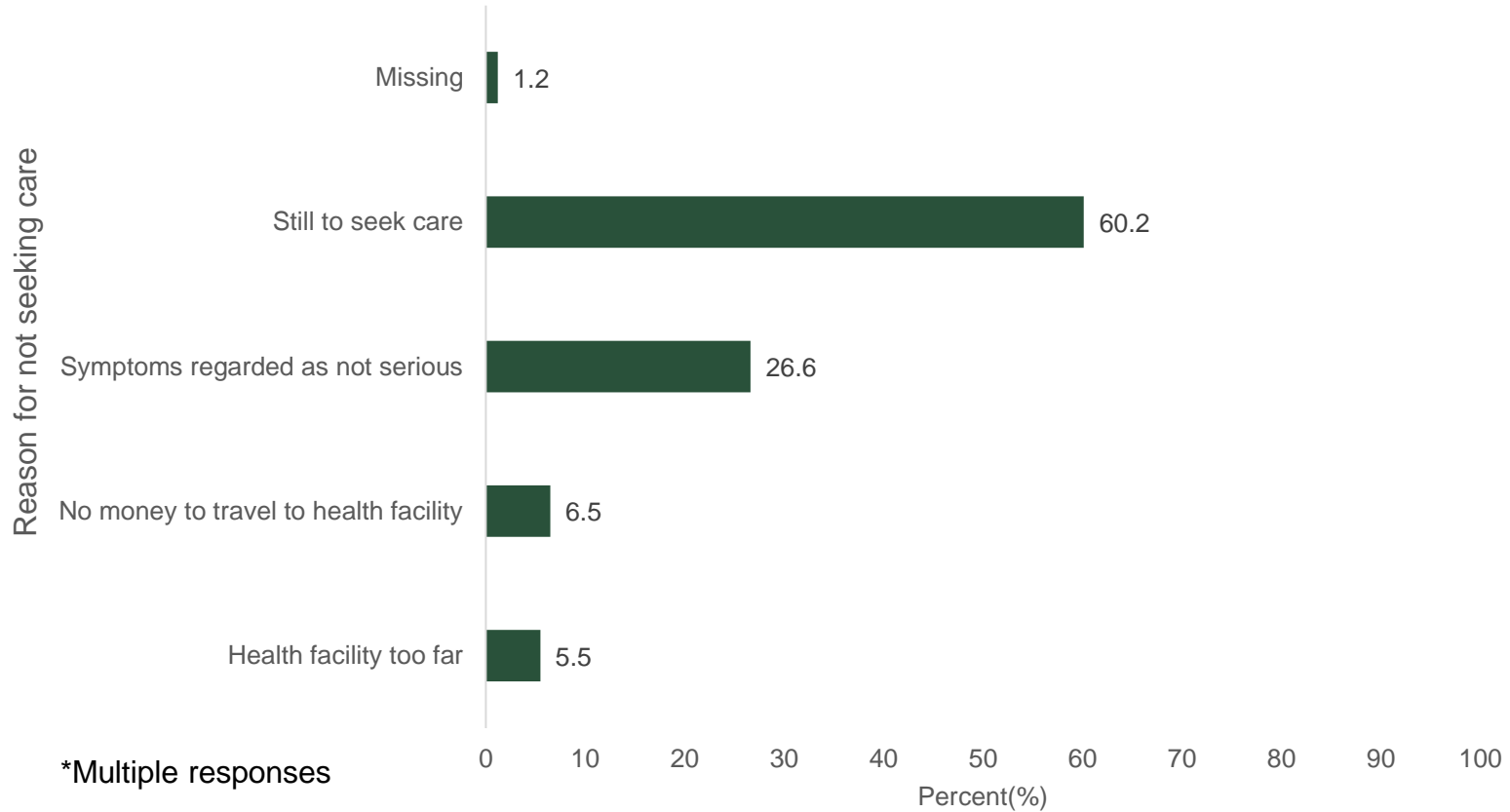
Category	P:N ratio
Total	1.75
Male	1.89
Female	1.70
15-24 years	2.91
25-34 years	1.61
35-44 years	1.55
45-54 years	1.66
55-64 years	1.63
≥65 years	2.88

Healthcare seeking among participants with symptoms of TB: % that did not seek care, South Africa, 2018



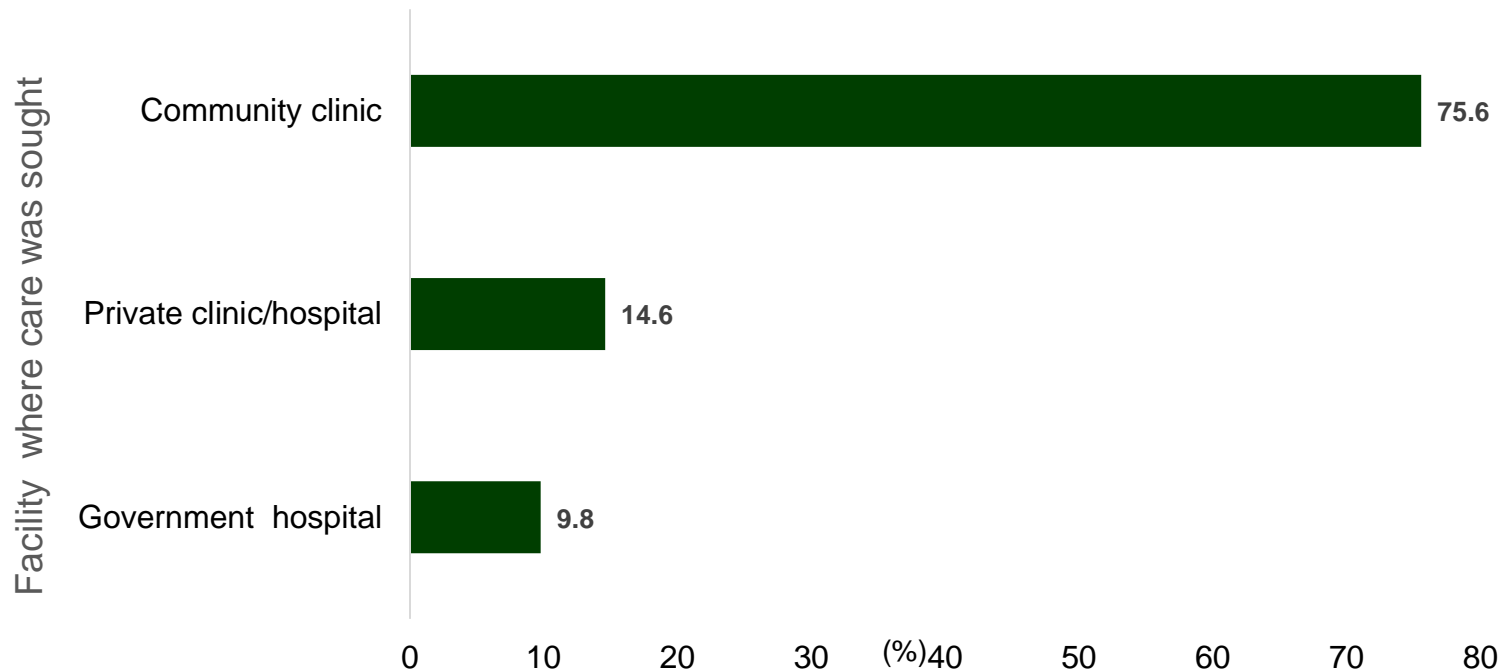
- Two thirds did not seek care
- Mostly younger people, males, & HIV negative

Reasons for not seeking care among symptomatic participants



Facility where care was sought by symptomatic survey TB cases, South Africa, 2018

41.8 % of those diagnosed with TB in the survey who had symptoms had sought care



Conclusions and recommendations (1)

- South Africa has a high TB burden including many people with undetected TB in the community
- The estimated number of TB cases was more than the cases notified with the prevalence notification gap especially high among those 15-24years old, those 65years older and in males
- Strategies to detect TB in young & older people are needed
 - Expanding youth friendly services and facilities, and leveraging on other programmes
 - Explore use of technology and mhealth solutions to widen reach and facilitate entry into cascade of care
 - Strengthen integration of TB diagnosis and care into that of chronic conditions including NCDs
 - Develop targeted interventions for the elderly

Conclusions and recommendations (2)

- There is a very high burden of TB in men
- TB prevalence is almost 1.6 times that of females
- Strategies to reach men are needed and these can include
 - Integrating TB screening into Men's Health programmes
 - Using social networks and other men's forums to reach men
 - Use of technology and mhealth solutions to widen reach and facilitate entry into care

Conclusions and recommendations (3)

- TB is under-diagnosed among HIV-negative individuals
- More than two thirds of HIV negative symptomatic participants had not sought care for their symptoms
- There is need for increased case detection also among HIV negative people
 - Systematic screening for TB among HIV negative as well as HIV positive people accessing health services
 - Encourage early care seeking when symptomatic

Conclusions and recommendations (4)

- Symptomatic individuals delay seeking care
- There is need to increase early care seeking for TB symptoms
 - Conduct in-depth behavioral assessments to determine and further understand reasons for delayed care seeking
 - Design targeted interventions to increase health care seeking for TB symptoms and increase knowledge and awareness of the significance of TB symptoms
 - Explore use of technology and mhealth solutions to widen reach and facilitate entry into care

Conclusions and recommendations (5)

- Sub-clinical TB is underestimated as a contribution to the TB burden
- Survey cases were detected through chest X-ray screening & through symptom screening
- Important in this survey was a very high proportion (57.8%) of cases without any TB symptoms and yet were bacteriologically confirmed
 - Further research into tools to detect sub-clinical TB and appropriate treatment and management
 - CXR played a key role in detecting TB cases in this survey and should be given greater consideration for use in case finding for TB

Limitations

- The participation rate of 66.1% was below the target level of 85%
- The HIV status for many participants was based on self-report
- The analysis used a conservative approach to derive the estimates, given the specificity of Xpert Ultra and the high rate of false-positive results for TB disease in low prevalence settings like the survey setting

Strengths

- This was the first nationally representative population-based survey providing a national estimate of the true burden of TB in South Africa
- The survey followed WHO standardized methodology for robust estimates that can be compared to those from other countries and regions and with any repeat surveys
- The survey used a WHO supranational reference laboratory
- It generated data of use in the country and globally to guide use of Xpert Ultra in active case finding settings

Overall conclusion

- The national TB prevalence survey, South Africa, 2018, identified a high TB burden (737 (95% CI 580-890) per 100 000 population), with prevalence higher in males than in females and highest in individuals aged 35-44 years and 65 years and older
- Many people have undetected TB in the community with the largest prevalence to notification gap in young people and the elderly
- A higher proportion of TB was detected among HIV-negative individuals, with most reporting no symptoms
- Sub-clinical TB emerged as another area that requires further research and will be important for long term control efforts
- Many people delay seeking care for TB symptoms

The survey was a collective effort



Study tour of South Africa: Botswana, Lesotho and Swaziland



Acknowledgements

Individuals and communities who participated



- The Steering Committee, all the field staff, Medical Officers, nurses, interviewers, radiographers, drivers, volunteers from the communities
- Provincial Departments of Health all other governmental and non-governmental structures

Thank you