

# Contribution of key populations to tuberculosis epidemic in South Africa

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5<sup>th</sup> SA TB Conference, Durban

Symposium

12/June/2018

10h00-10h20



## Outline

- 90-(90)-90 targets
- Key populations in SA
- Contribution of key populations to TB epidemic
  - Methodology
  - TB risk in key populations
  - Proportion of TB cases
  - Population attributable fraction (PAF)
  - TB yield
- Additional considerations for TB management in key population
- Conclusions
- Next steps



## 90-(90)-90 targets

- The Global Plan to End TB 2016-2020 focuses on the need to engage key populations (KP).
  - Identify key populations in SA.
  - Find out how much they contribute to TB epidemic in SA.
  - Outline some additional considerations for TB management in these populations.
  - Build evidence base for key populations.

Reach at least

**90%**  
OF ALL PEOPLE  
WITH TB

and place all of them on appropriate therapy—first-line, second-line and preventive therapy as required

As a part of this approach, reach at least

**(90)%**  
OF THE KEY  
POPULATIONS

the most vulnerable, underserved, at-risk populations

Achieve at least

**90%**  
TREATMENT  
SUCCESS

for all people diagnosed with TB through affordable treatment services, adherence to complete and correct treatment, and social support.

Source: Stop TB Partnership, 2015



## Justification for focussing on key populations

- TB epidemic is characterised by distinct sub-epidemics that are geographical and among key populations.
- TB cases frequently missed by health systems
- With this understanding, efforts need to be focussed;
  - on where the burden of disease is and
  - on what needs to be done to bring about change.



## Key populations in South Africa

Key populations according to the SA NSP 2017-2022 are:

1. People living with HIV (PLHIV)
2. Household contacts of TB patients
3. Healthcare workers
4. Mineworkers and peri-mining areas
5. Inmates of correctional facilities
6. Pregnant women
7. Children under five years
8. Diabetics
9. Residents of informal settlements



## Methodology: Systematic review and meta-analysis

### Literature search

- Identify the **key populations**
- Peer- reviewed and grey literature from **2000-2016** in **South Africa**
- Two researchers **screened titles and abstracts** independently, English language articles included
- Articles with **TB prevalence and incidence** were included in the review

### Selection of estimates

- **Prevalence and incidence estimates** extracted from articles
- **Population size of key populations** extracted from national and international reports
- **Estimated number of TB cases in 2016** was extracted from the WHO Global TB Report for 2016

### Extrapolation of estimates

- **Relative risk** – Dividing TB prevalence in key by the overall prevalence in the general population
- **Number needed to screen** – Inverting the TB prevalence in each key population
- Number of TB cases – Multiplying the population by the TB incidence in each key population
- **Population attributable fraction** - proportion of TB cases prevented if TB control efforts are directed to a specific key population (PAF) =  $p(RR-1)/p(RR-1)+1$

### Meta analysis

- Calculate associated **standard errors** for reported TB incidence
- Assess **heterogeneity** of studies included in meta-analysis

## Limitations of the methodology

- Most studies were conducted in **four** provinces in South Africa.
- Limited studies were conducted in some key populations e.g. diabetics.
- Differences in the studies were not investigated.
- Estimated cases may not be overestimated.
- Estimates depend on HIV status



## TB risk

Key population	Estimated population size	Relative risk
Children under 5 years	5 900 000	0.9
Pregnant women	1 200 000	1.3
Diabetics	2 300 000	1.8
Miners	510 000	1.9
Healthcare workers	231 111	2.0
Inmates	162 000	3.0
People living with HIV	5 510 000	4.3
Informal settlements	3 306 697	4.5
Household TB contacts	1 621 296	4.5
General population	56 000 000	1.0



## Contribution of key populations to TB epidemic in SA

Key population	Estimated number of cases reported in 2016	PAF (%)
Children under 5 years	22 022	-
Pregnant women	13 500	1%
Diabetics	28 520	2%
Healthcare workers	3 397	3%
Miners	15 300	5%
Inmates	6 318	9%
HIV infected	231 420	20%
Household TB Contacts	21 077	21%
Informal settlements	148 500	22%
General population	437 360	-



## Number needed to screen (NNS)

- Usually cost-effective in populations with higher TB prevalence
- Influences the feasibility of a screening program during active case finding
- Informs the type of diagnostic method;
  - High risk groups (extensive diagnostics such as X-rays and GeneXpert or culture)
  - Low-risk groups (basic diagnostic approaches such as symptoms screening)



## Number needed to screen in different key populations

Key population	Number needed to screen to identify on TB patient
Informal settlements	32
Household TB contacts	32
HIV infected	33
Inmates	48
Healthcare workers	71
Miners	77
Diabetics	81
Pregnant women	114
General population	144
Children under 5 years	151



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## Additional considerations for active case finding in key populations

Key population	Additional considerations
Healthcare workers	Stigma HCW populations are dispersed throughout the country
Miners	Migration Stigma Confidentiality of test results (fear of being laid off)
Household contacts	Poor coordination with WBOTS Stigma Resource intensive Access to remote and rural areas difficult Earlier TB disease may not be diagnosed on GeneXpert

## Additional considerations for active case finding in key populations

Key population	Additional considerations
Inmates	Delayed case detection Stigma Linkage to care post release or transfer Limited accessibility due to logistical considerations
HIV infected	Overestimation with symptoms screening Low sensitivity of GeneXpert
Diabetics	Integration of TB/diabetic services not implemented
Informal settlements	Access to households
Children under 5 years	Diagnosis of TB in children difficult Underreporting leading to underestimation of TB burden

## Conclusions

- In resource strained settings, it is important to find missing TB patients by using available resources.
- The use of population attributable fraction, number needed to screen and relative risk are important in identifying where to target interventions.
- Active case finding is one strategy that can ensure the missing TB patients are found, diagnosed and treated.
- Current literature does not give enough information that allows for accurate estimates and therefore further research is required.
- There is need to consider additional challenges while rolling out interventions in these key populations.



## Next steps

Focus towards building a strong evidence base for TB in key populations by:

- Conducting more epidemiological and interventional research e.g. diabetics to provide accurate estimates.
- Evaluating current interventions implemented to find missing cases.
- Using appropriate diagnostic tests for active TB during active case finding.
- Evaluating cost-effective measures to detect TB before any screening is implemented.



## References

- WHO (2016) Global Tuberculosis report
- South African National Aids Council (SANAC) (2017) National Strategic Plan on HIV, STIs and TB 2017–2022.
- Global plan to End TB ; The paradigm shift 2016-2020
- Kerrigan et al 2017 Improving active case finding for tuberculosis in South Africa: informing innovative implementation approaches in the context of the Kharitode trial through formative research. *Health Research Policy and Systems* 2017;15:42





## Acknowledgements

- Global TB program, WHO
- Dr. Priya Shete (WHO)
- Dr. Christian Lienhardt (WHO)
- Dr. Nishila Moodley (Aurum)
- Prof. Salome Charalambous (Aurum)
- Prof. Gavin Churchyard (Aurum)



## Questions

