K|RITH KWAZULU-NATAL RESEARCH INSTITUTE FOR TB-HIV

SPATIOTEMPORAL DISTRIBUTION OF PEDIATRIC TUBERCULOSIS IN CENTRAL DURBAN, SOUTH AFRICA

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Background

- Childhood tuberculosis (TB) indicates recent *Mycobacterium tuberculosis* infection
- Improved immune function due to antiretroviral therapy (ART) in people living with HIV decreases TB risk
- Staggered ART rolled out began in South Africa 2004/05

Aim

- To characterize the spatiotemporal distribution of TB in pediatric cases <5 years old before and after ART rollout

Hypothesis

- The introduction of antiretroviral therapy (ART) in a setting with high TB incidence would decrease the transmission of TB

Methods

Study design:
- Retrospective cohort study

Study site and population:
- Prince Cyril Zulu Communicable Diseases Clinic (PCZCDC, Durban Central)
  - Large, urban setting near transport hub
  - Focused TB care with ART gradually implemented starting in 2005 – comprehensive implementation on site in August, 2010
  - Approval from all sites and institutions involved
- Pediatric (<5 years) TB patients
- Seen at clinic from January 2000 through December 2012

Mapping:
- Routinely collected data used to map cases of pediatric TB in central Durban (6 suburbs)
- Address data enabled street level referencing
- Cases mapped by:
  - Era (pre-ART, 2000 – 2005 vs post-ART, 2006 – 2012)
  - HIV co-infection status

Results

Table 1. Characteristics of TB cases (<5 years old) by era

Era	2000 – 2005	2006 - 2012
Cases mapped (%)	217 (39)	340 (61)
Percentage of cases georeferenced	93	93
Addresses mapped	154	225
Addresses with multiple TB cases	36	62
Male sex (%)	110 (51)	196 (58)
HIV co-infected (%)*	21 (26)	59 (74)

Of those with available HIV status only

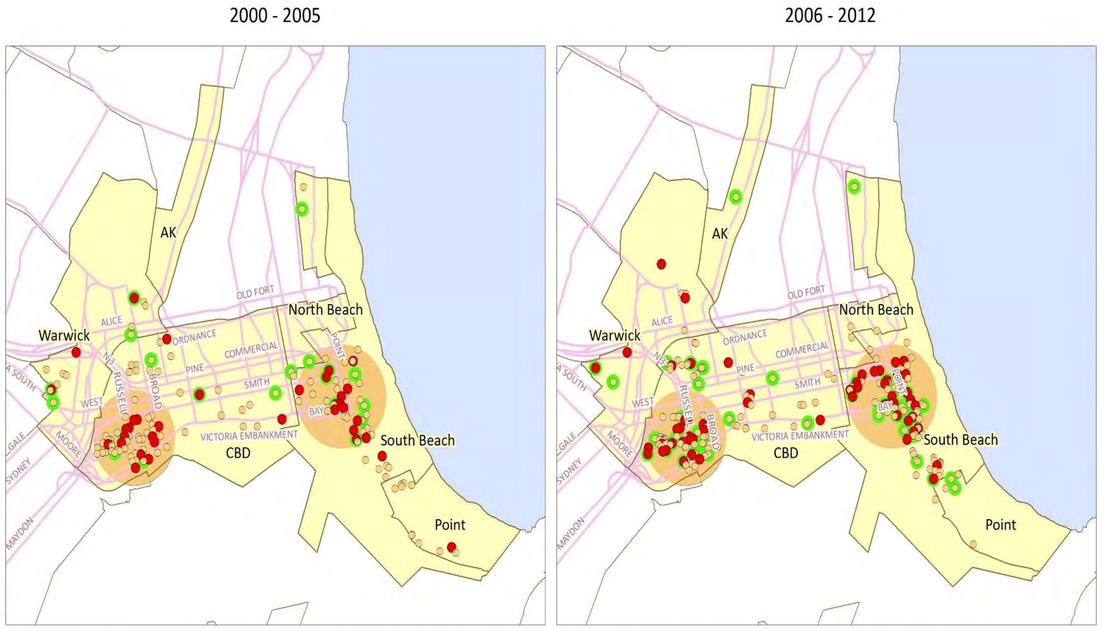


Figure 1. Durban Central: TB cases by street address by era

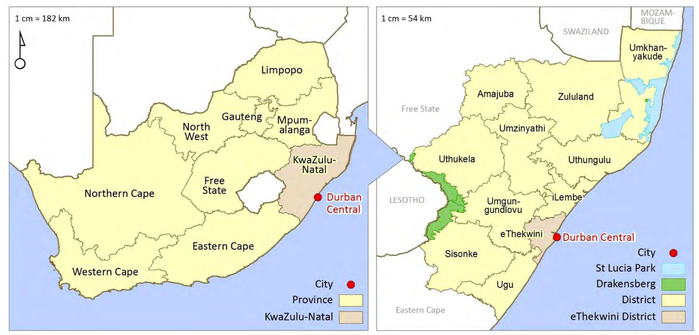


Figure 2a. South Africa by province

Figure 2b. KwaZulu-Natal province by district

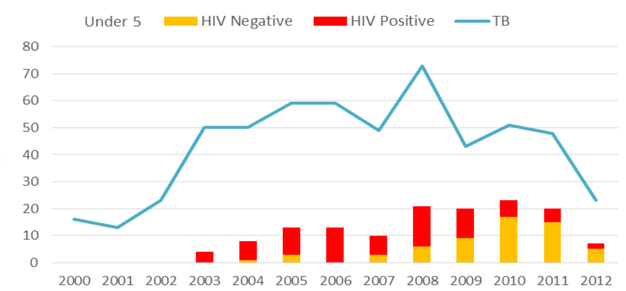


Figure 3. HIV/TB co-infection over time in pediatric cases <5 years old

HIV data only available for 28% of cases. Gap between TB curve and HIV status indicates missing data

Limitations

- Retrospective cohort; no isolates available for testing
- Clinical electronic medical record not originally designed for research purposes
- Limited HIV data prior to 2009
- Population data not currently available at the building level, preventing comprehensive understanding of elevated burden per address relative to other addresses in the study area

Conclusions

- Evidence of:
  1. Increased pediatric TB cases at specific geographic locations: high case concentration of cases in 2 sub-places. This was not consistent with our hypothesis
  2. Multiple cases of TB at single addresses representing the highest rates of TB transmission
- Understanding spatial distribution of TB can inform targeted interventions for TB control
- TB Localized to 2 urban areas, further statistical analysis is ongoing

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