

# Impact of Xpert MTB/RIF on diagnosis of TB in 7 African sites

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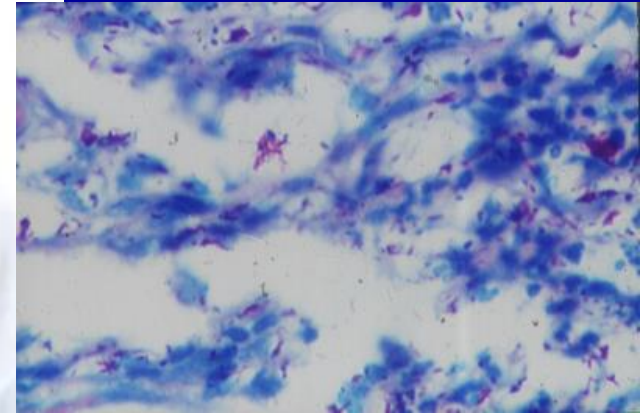
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# Background (1)

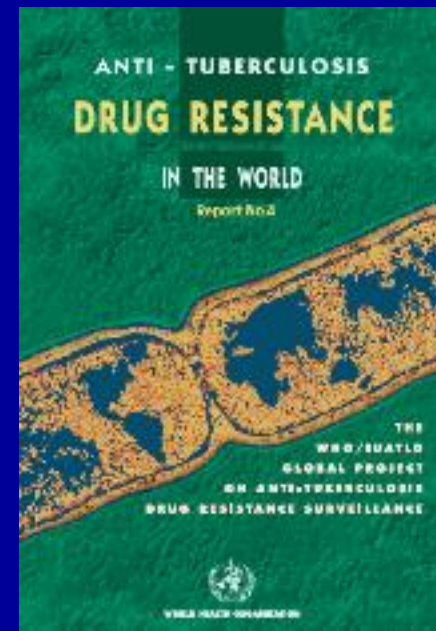
- Tuberculosis (TB) is the most common cause of morbidity and mortality in people living with HIV (PLHIV)
  - Sputum smear microscopy not sensitive enough
  - Delay in diagnosis of TB in PLHIV

Many high-burden settings rely solely on smear microscopy (130 years old)



## Background (2)

- Multidrug-resistant TB (MDR-TB) is an increasing public health threat in many countries
- ~500,000 cases emerged in 2006
- Global proportion of resistance among all TB cases = 4.6%





# Xpert MTB/RIF (“GeneXpert”)

- New TB diagnostic
- Molecular method (detects DNA)
- In <2 hours, able to detect:
  - Mycobacterium TB (MTB)
  - Resistance to rifampicin (RIF)
- Almost fully automated (cartridges)
- Increased sensitivity: One test able to detect TB in 72.5% of ‘smear-negative, culture-positive’ cases

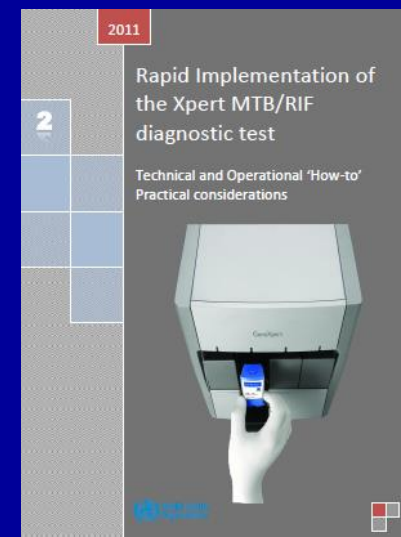
# Introduced in 2011 in 7 sites supported by MSF OCB

- Zimbabwe
  - Birchenough Bridge Hospital
  - Murambinda Mission Hospital
- Mozambique
  - Moatize Health Centre, Tete
  - PdM HC, Mavalane
- Kenya
  - Kibera
- South Africa
  - Eshowe, KZN
  - Mbongolwane, KZN



# Recommended by WHO

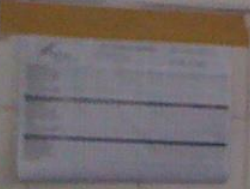
- The World Health Organization has recommended that the new molecular TB diagnostic Xpert MTB/RIF be “*used as the initial diagnostic test in individuals suspected of having MDR-TB or HIV-associated TB*”.
- December 2010





# Methods

- Logistical preparations
  - Stable electrical power supply
  - Air conditioning (temp  $<30^{\circ}\text{C}$ )
- Training
  - Lab technicians
  - Clinicians



# Results

- A total of 4169 Xpert MTB/RIF tests were performed between April and October 2011 in the 7 sites.
  - 53.5% from female TB suspects
  - 5.6% from paediatric TB suspects
- Initial rates of ‘inconclusive results’ were  $\geq 7\%$  in 5 of the sites.

4169 tests performed in the 7 sites  
between April-Oct 2011

TB suspects tested with Xpert MTB/RIF  
4169

Inconclusive results  
3.6 - 26.2%

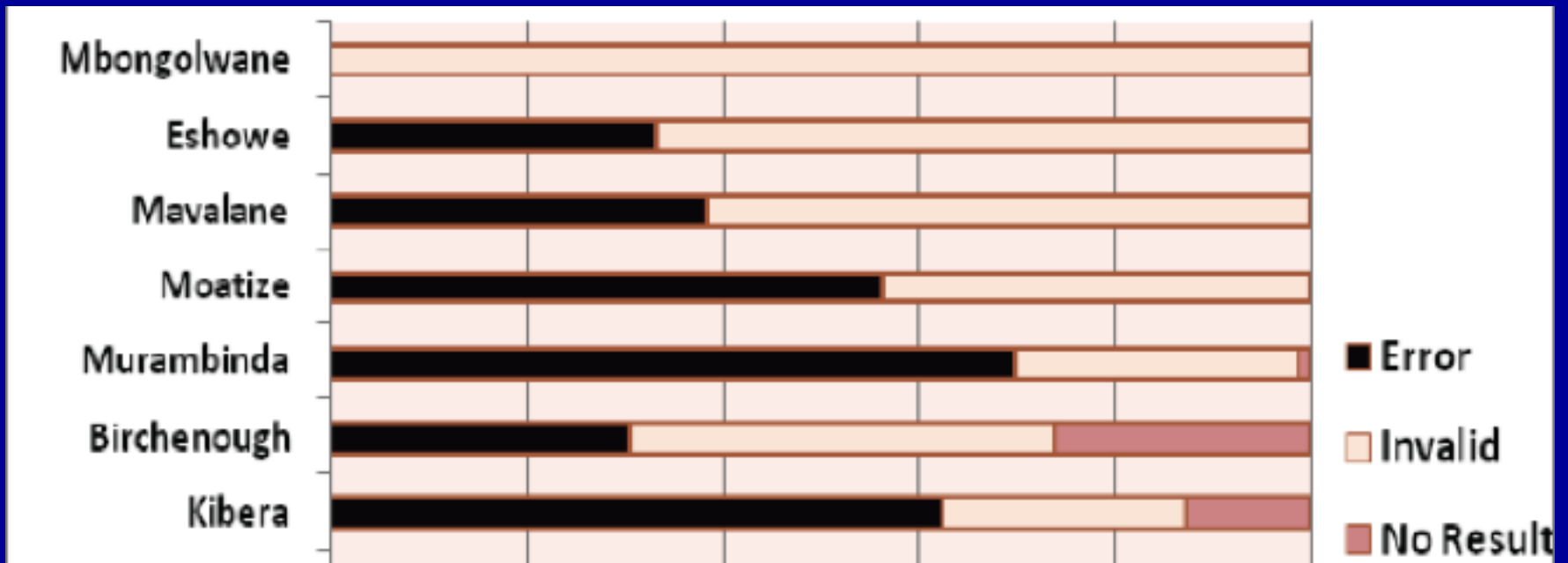
MTB+/RIF-  
~23%

MTB+RIF+  
~2%

MTB-  
~75%

# Inconclusive results

- Error > Invalid > No result
- Rate varies among the 7 sites
  - 3.6 - 26.2% of all tests (up to 31 May)
- Proportion also varies by site:



# Results of Parallel Testing (n=719)

719 samples were Xpert MTB+

449 smear-positive

270 smear-negative\*

\* N.B. Number of smears performed was often only one

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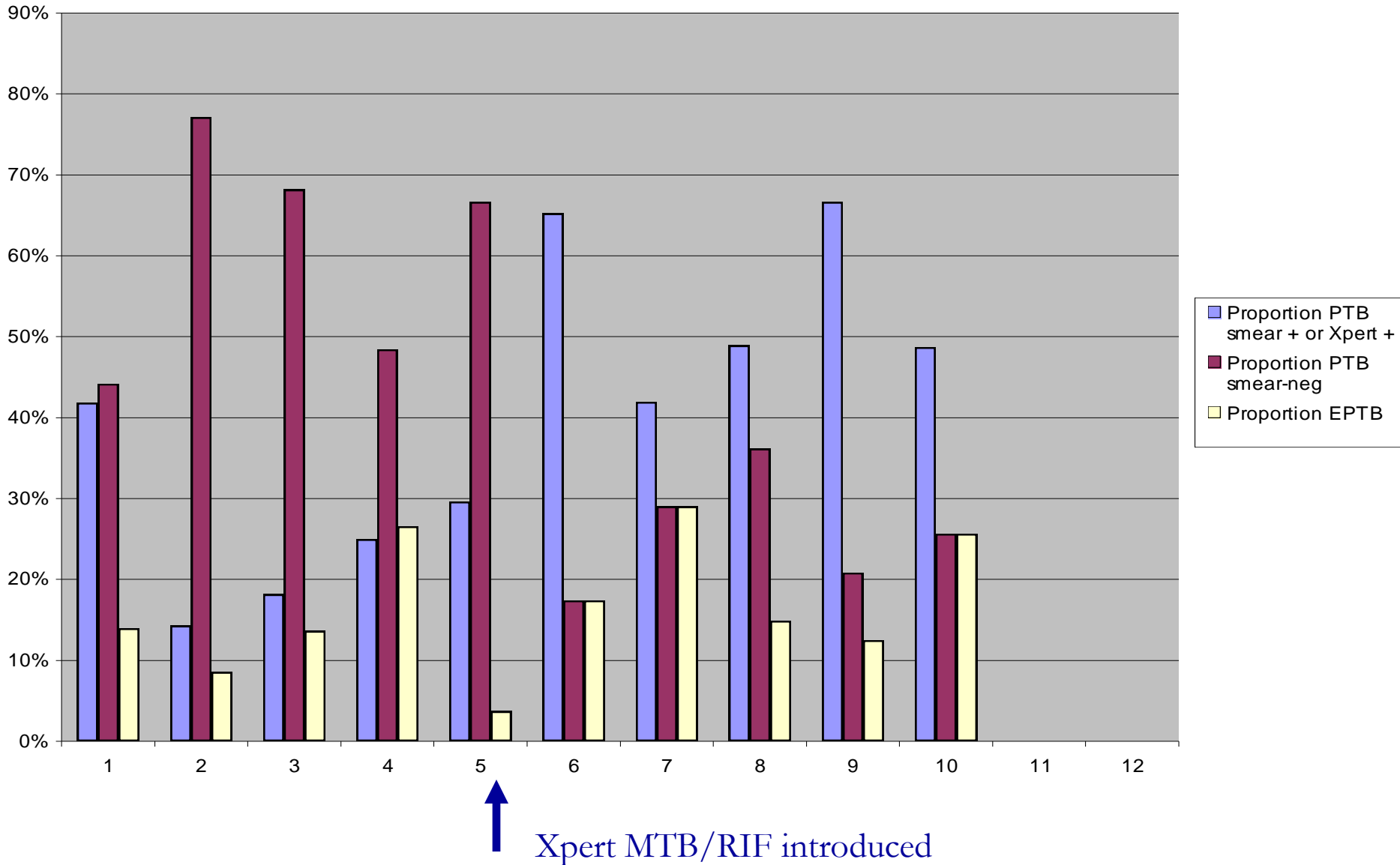
⇒ Lab confirmation of TB increased by an average of ~60% among the 7 sites (range: 22.4 - 127%)

⇒ Less empiric diagnosis of TB

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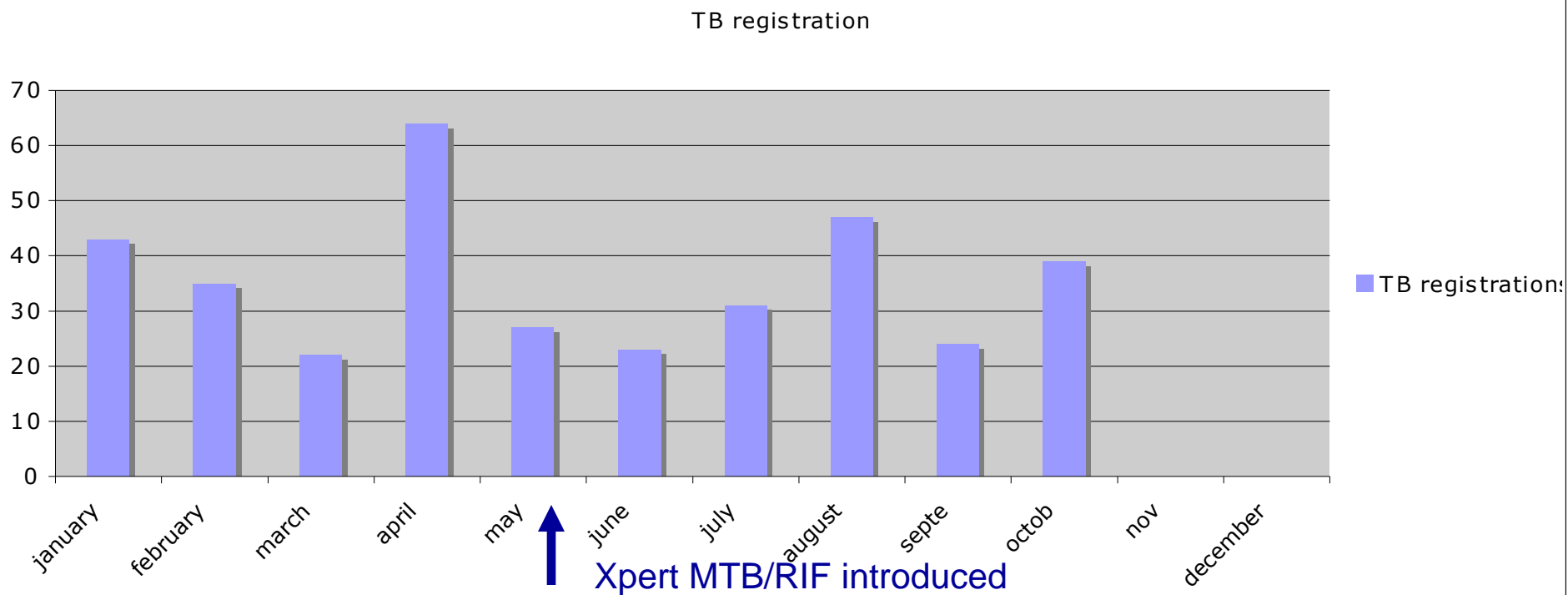


# More accurate diagnosis of TB in Mavalane, Moz



# Effect on TB case-finding

- Increase in number of new TB registrations in some sites (e.g. part of active case-finding strategy)
- No increase seen in Mavalane, Mozambique
- Less over-diagnosis and under-diagnosis of TB?



# Median time-to-initiation of TB treatment

- Rural Zimbabwe
- HIV-infected patients having sputum smear-negative TB
- Median time-to-initiation of TB treatment:
  - Decreased from 18.5 to 7 days at decentralized sites
  - But remained constant at hospital level

# Increase in detection of DR-TB

- Rifampicin resistance was detected in a total of 75 patients throughout the 7 sites.
  - Risk of 'false positive' Xpert RIF+ result
  - Requires confirmation
- The number of DR-TB cases is expected to approximately **quadruple**:
  - In **12 months** of 2010 at 5 sites, **12 cases** of DR-TB were diagnosed
  - In **~6 months** of 2011 at those same 5 sites, **29 TB patients** have had Xpert RIF+ results

# Conclusions (1)

1. The introduction of Xpert MTB/RIF resulted in an increase in laboratory confirmation of MTB.
2. This new TB diagnostic has the capacity to reduce the time-to-initiation of TB treatment in PLHIV at decentralized health facilities.
3. Both of these advantages support 'task-shifting' to lower levels of health care workers and integration of TB and HIV activities.

# Conclusions (2)

4. Disadvantages of introducing Xpert MTB/RIF included:
  - Large logistical investments
  - Cost per cartridge
  - High initial rates of ‘inconclusive results’ in most settings
5. Need to introduce the capacity for sputum induction in all sites so that children can also benefit.

# Acknowledgements

- Field teams in Zimbabwe, Mozambique, Kenya, and South Africa
- South African Medical Unit (SAMU)
- OCB laboratory and paediatric referents
- Logisticians!



# References

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- MSF's GeneXpert Subgroup, Report No. 1, Nov 2011
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