

# My Elective:

## Improving the Detection of Tuberculosis in South Africa

17<sup>th</sup> November – 09<sup>th</sup> December 2018

Paul Bird

Trainee Clinical Scientist – Microbiology

Leicester Royal infirmary/University of Leicester

07/01/2019

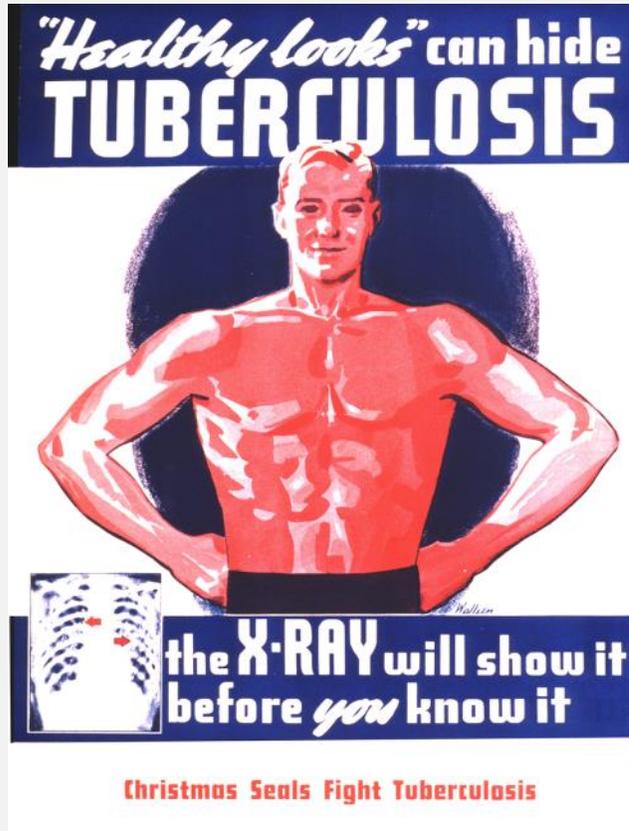


# Acknowledgements

- Professor Mike Barer and Dr Caroline Williams – University of Leicester
- Professor Anton Stoltz - University of Pretoria and Steve Biko Hospital
- Microbiology Department – Leicester Royal Infirmary
- National School of Healthcare Science
- The ACB

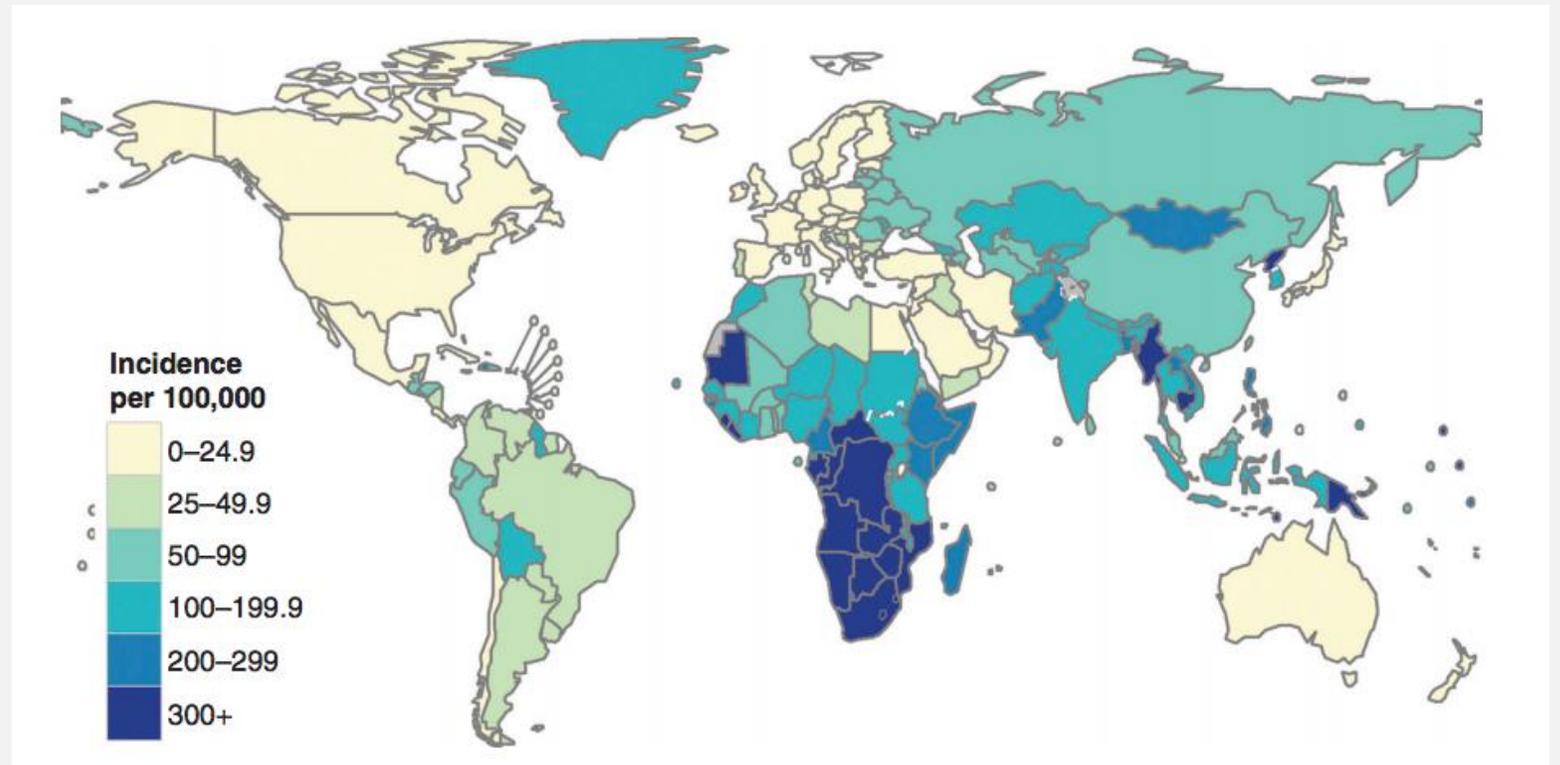


## Background – What is Tuberculosis?



# Epidemiology of Tuberculosis

- 10 million cases in 2017
- 1.6 million deaths
- Occurs worldwide
  - 25% in Africa
- 87% of cases occur in just 7 countries
  - Of which South Africa is one



## South Africa – Public Health Crisis

- 834 cases of TB per 100,000 population
- 12.6% of the population in SA have HIV
  - 7.06 million people
- Highest HIV/TB co-infection rate in the world
  - Estimated 258,000 people



## Public Health in Pretoria

- 85% with no health insurance
  - (91% are black Africans)
- Government figures claim a 83.4% treatment rate
- 66.7% cure rate
- 4.8% lost to follow up rate



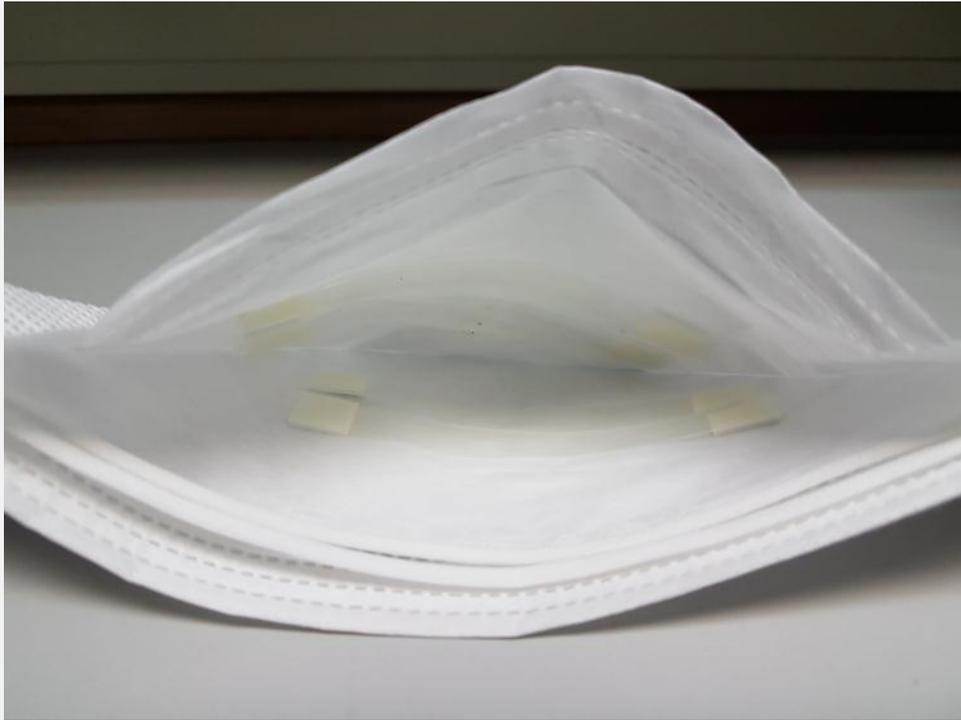
What can we do about it?



# Mask Aerosol Sampling System - MASS



MASS



# MASS



+



+



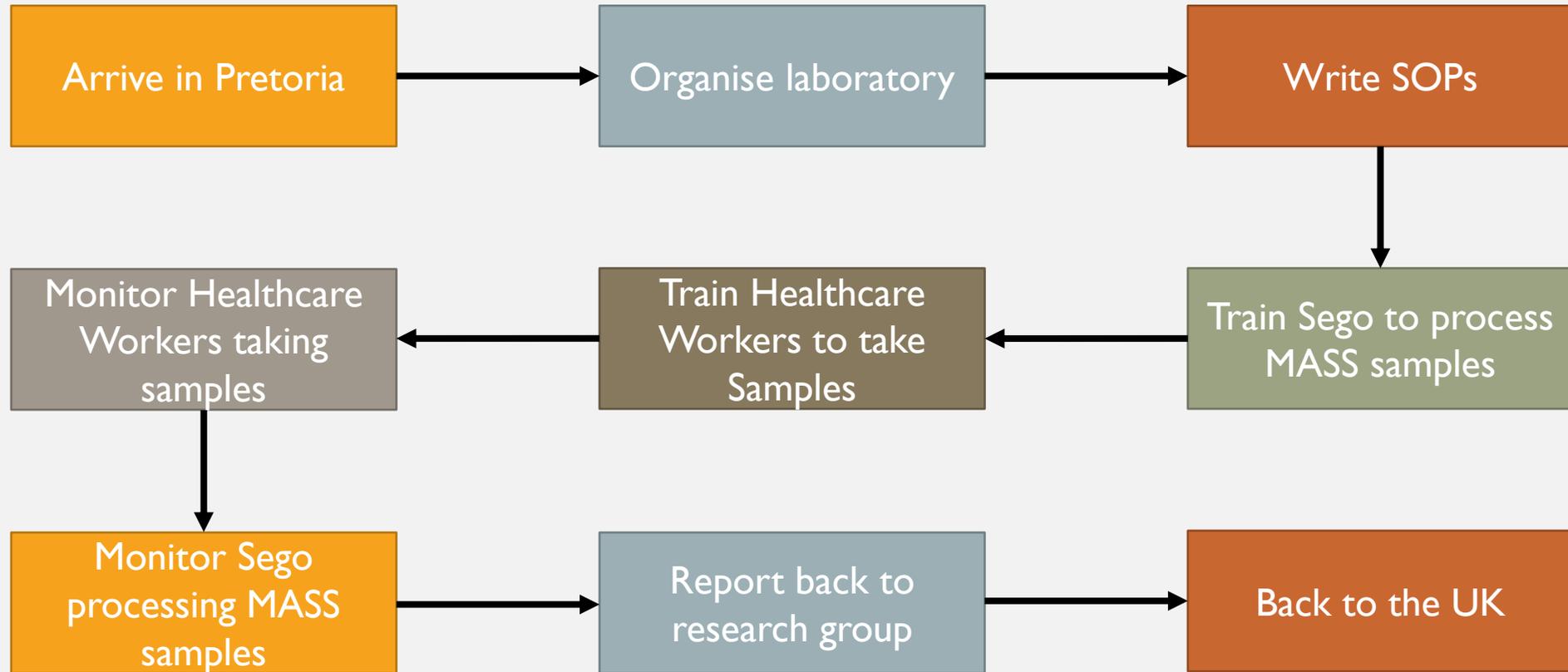
=



## Elective Aims

- Set up laboratory to process MASS
- Train laboratory staff to process MASS samples
- Train community healthcare workers (CHW) to use MASS
- Test CHW for TB
- Monitor CHW taking samples
- Make links within the community to engage with MASS study

# The Plan



## Arriving in Johannesburg



# Steve Biko Hospital



# Laboratory: Before



# Laboratory After



# Training Laboratory Staff



# MRC Pretoria - Security



# Training the Health Care Workers



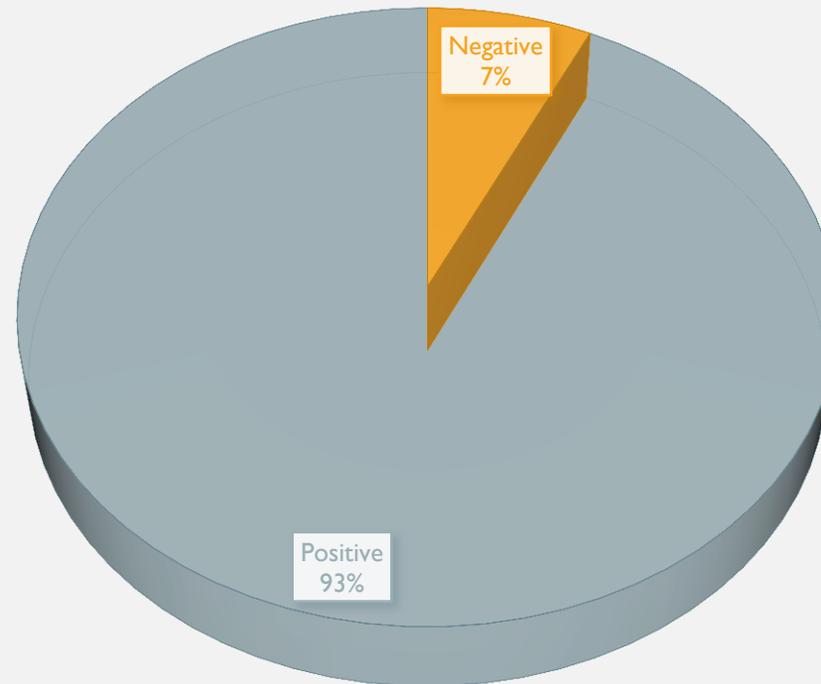
# Testing the Health Care Workers



## Health Care Worker: Results

- 35 HCW tested
- First 14 were processed with a negative control and NTC
- **13/14** patient samples negative control were positive
- NTC was negative

HCW RESULTS



# Potential Contamination

Cause of contamination

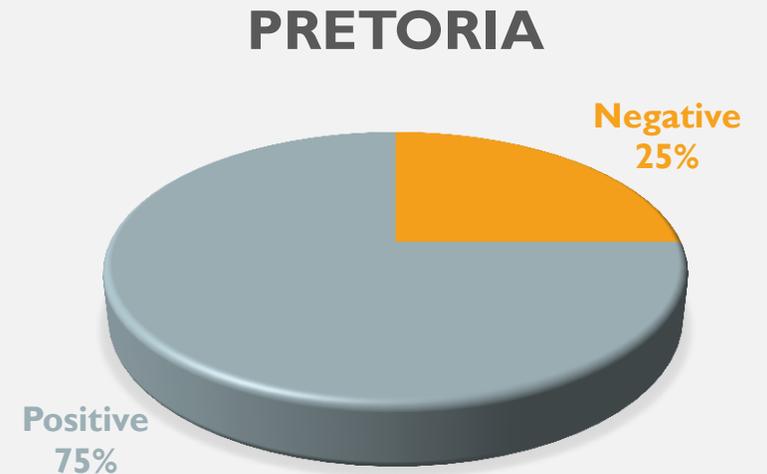
Spray bottles?

Masks?

Filters?

## Finding the Problem

- I tested 16 randomly selected masks that had been prepared in Leicester and 16 that were prepared in Pretoria.
- 9/16 prepared in Leicester were positive and 12/16 prepared in Pretoria were positive



# Potential Contamination

Cause of contamination

Spray bottles?

Masks?

Filters?

## Fixing the Problem

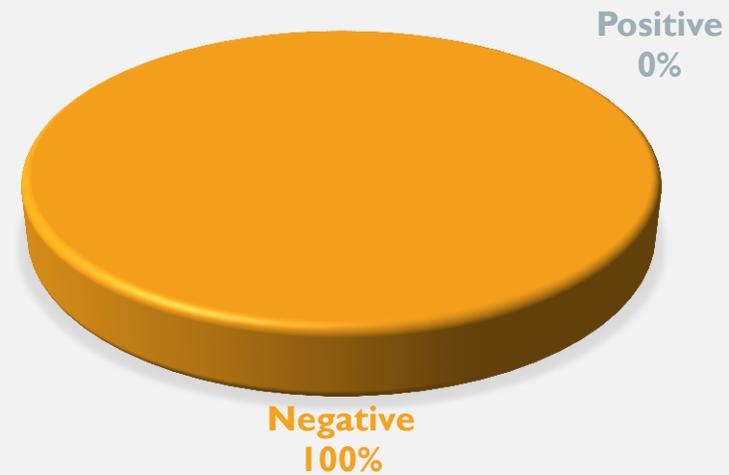


Success!

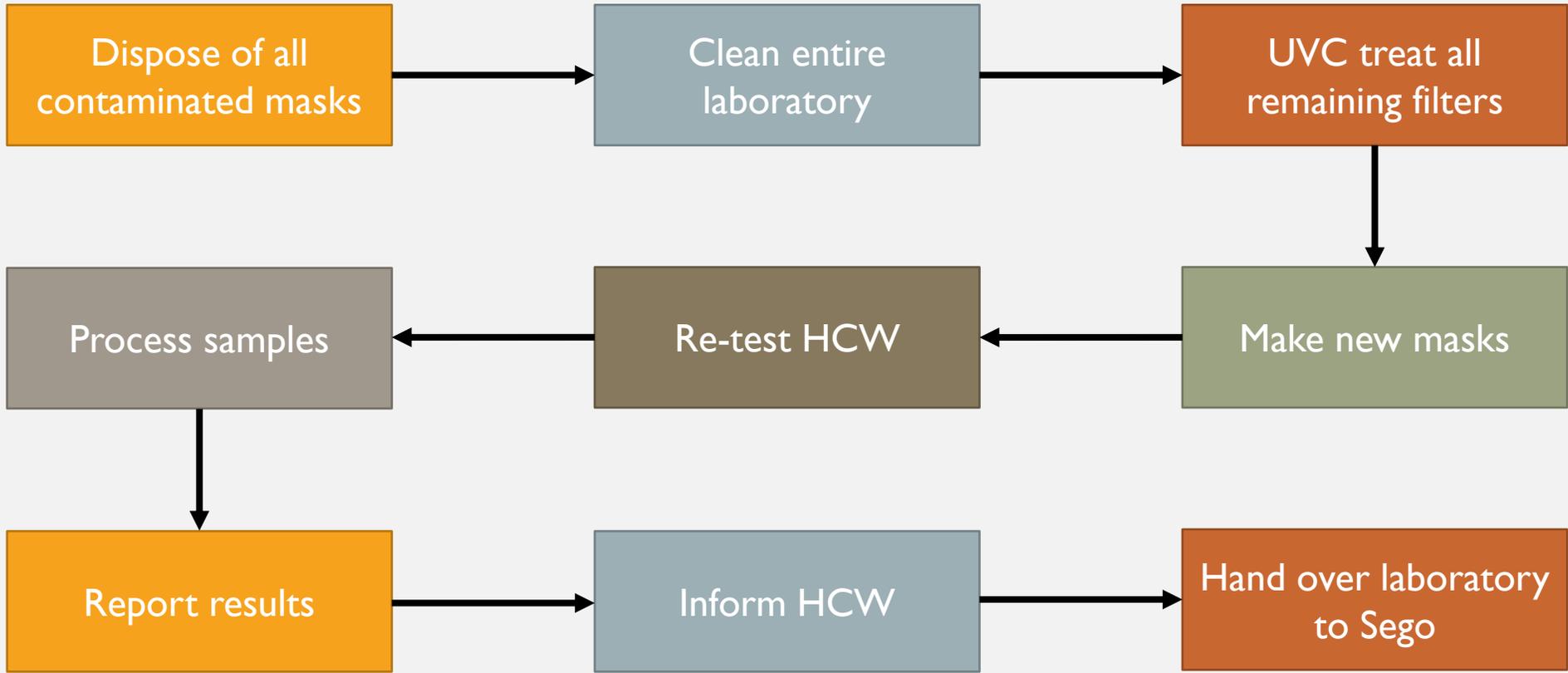
64 filters (16 masks) were UVC treated for 24 hours (12 hours on each side) and tested using the GeneXpert.

All 16 were negative for TB DNA.

### UVC Treated Filters



# New Plan



# Retesting the Health Care Workers



## Retesting the Health Care Workers Problem

- Of the 35 original HCW only 28 returned
- Of the 28 that returned only 10 wanted to be retested

### **Reasons for refusing to be retested:**

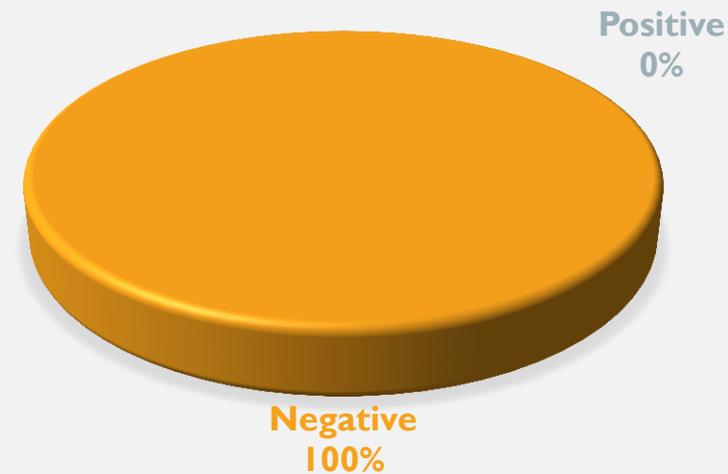
1. Loss of feeling in lips for 7 days
2. Loss of taste for 7 days
3. Nose bleeds for 3 days
4. Was unable to breathe while wearing the mask

All HCW with symptoms did not seek any medical assistance.

## Health Care Workers: Results 2

- All HCW tested were negative for TB
- Likely that those who refused may have been symptomatic and feared losing their jobs.

### HCW Results for TB



## Leaving South Africa



## Future for the Project

- Return in the New Year to:
  - Re-train HCW
  - Get into the community
  - Ramp up production and testing



## Did we meet our aims?

- Set up laboratory to process MASS 
- Train laboratory staff to process MASS samples 
- Train community healthcare workers (CHW) to use MASS 
- Test CHW for TB 
- Monitor CHW taking samples 
- Make links within the community to engage with MASS study 

# Thank you for listening

## Are there any questions?



## References

- Delogu, G., Sali, M., & Fadda, G. 2013. The Biology of Mycobacterium Tuberculosis Infection. Mediterranean Journal of Hematology and Infectious Disease. 5(1) p. 1-8.
- Kharsany, A & Karim, Q. 2017. HIV Infection and AIDS in Sub-Saharan Africa: Current Status, Challenges and Opportunities. The Open AIDS Journal. 10 p. 34-48.
- Mayosi, B., Lawn, J., Niekerk, A., Bradshaw, D., Karim, S., & Coovadia, H. 2012. Healthcare in South Africa: Changes and Challenges Since 2009. The Lancet. 380 p. 2029-2043.
- Naidoo, P., Theron, G., Rangaka, M.X., Chihota, V.N., Vaughan, L., Brey, Z., & Pillay, Y. 2017. The South African Tuberculosis Care Cascade: Estimated Losses and Methodological Challenges. 7 p. 702-713.