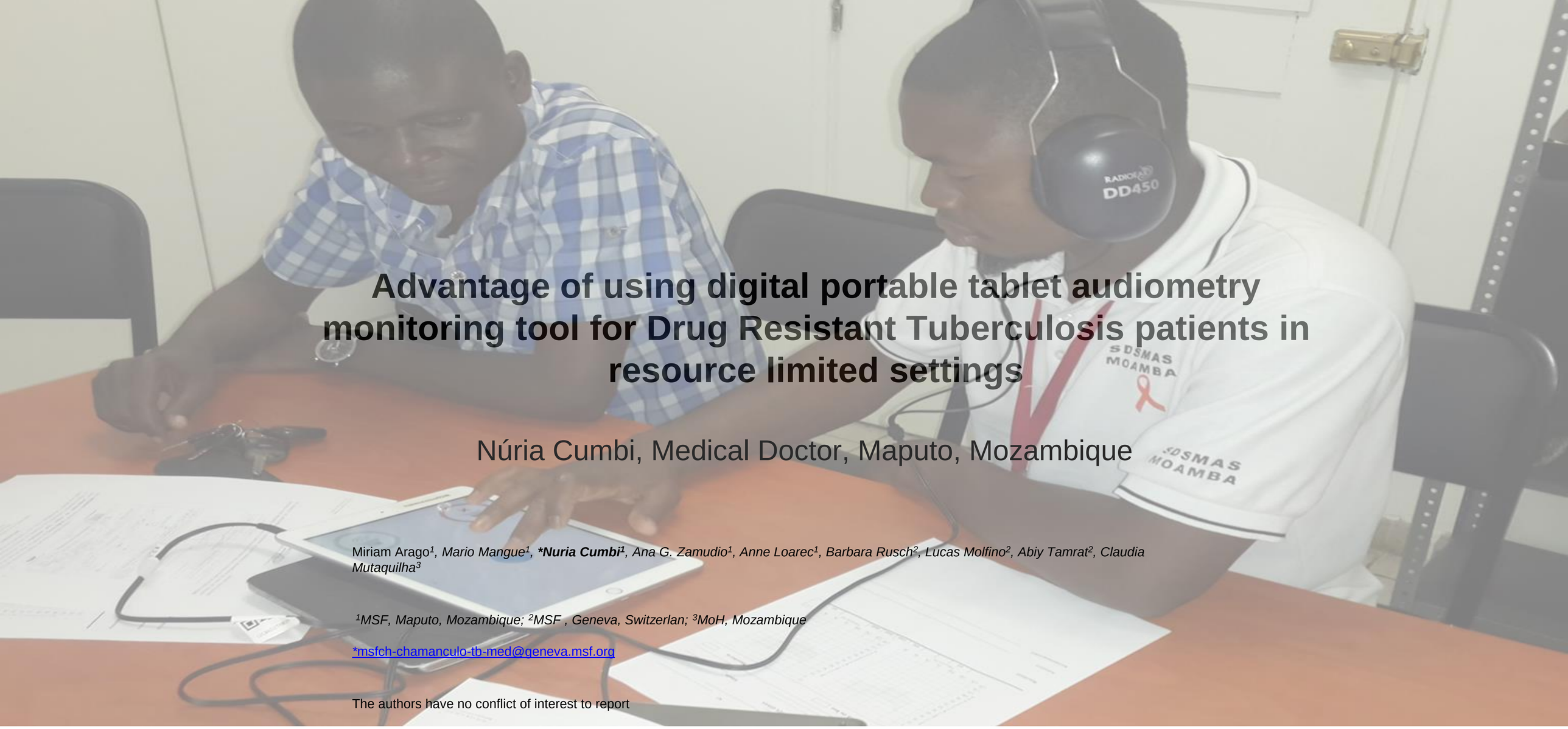

Advantage of using digital portable tablet audiometry monitoring tool for Drug Resistant Tuberculosis patients in resource limited settings

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Patient example

- DHM, 26 years old, female, student
- Diagnosed MDR TB and started treatment in September 2018 with short
- In Month 3: tinnitus in both ears
- Audiometry: mild hearing loss on the left ear/moderate hearing loss on the rigth ear
- Injectable was switched to Bedaquiline
- Finished treatment still with tinnitus but able to perform her daily activities

Photo © MSF / Nuria Cumbi

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1. MSF in Maputo

- MSF in Mozambique since 2001;
- Care for patients with Drug Resistant Tuberculosis (DRTB) in 6 Health Center (Maputo)
- High TB incidence - 361/100.000 habitants (2019) , with rate of HIV co-infection of 34%
- 150 new patients/year enrolled in DRTB treatment
- Almost all regimens contained injectables (end of 2019)
- Since 2020 the National protocol recommends all oral regimens
- Injectables still used for Salvage/Rescue therapy

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2. The problematic

- Limited access to audiometry to monitor ototoxicity due to the time and logistics involved to have the test done
- Ototoxicity is a side effect of second-line anti-TB injectables drugs (aminoglycosides and peptides)
- Aminoglycoside induced ototoxicity can occur from 25 to 60 % depending on method of measurement
- Patients treated with anti-TB injectables needed monthly audiological evaluations

Fig. Audiometry booth © MSF

1. Heysell SK, Ahmed S, Rahman MT, Akhanda MW, Gleason AT, Ebers A, et al. Hearing loss with kanamycin treatment for multidrug-resistant tuberculosis in Bangladesh [Internet]. Vol. 51, European Respiratory Journal. European Respiratory Society; 2018 [cited 2021 Apr 9]. Available from: https://doi.org/10.1183/13993003.01778-2017
2. Sharma V, Bhagat S, Verma B, Singh R, Singh S. Audiological Evaluation of Patients Taking Kanamycin for Multidrug Resistant Tuberculosis. Iran J Otorhinolaryngol [Internet]. 2016 May;28(86):203–8. Available from: https://pubmed.ncbi.nlm.nih.gov/27429949

3. An innovative opportunity

- In 2018, MSF acquired 3 kits of CE marked and FDA certified iOS-based audiometry kits from SHOEBOX® Audiometry systems

- Application-based digital audiometry assessment outside of sound-booth; accuracy (+-10dB) with 90% sensitivity and 89% specificity*

Image from https://www.shoebox.md/

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How it works

- Results were directly downloaded in a secured account created for the purpose

- A paper record was also taken in a standard form for the patient file.

Picture from: https://apps.apple.com/tr/app/shoebox-audiometry-standard/id873272921

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4. The implementation

- Training of MSF nurses and cough-officers
- The portable units were deployed in rotation in the HC
- Monthly tests
- Field evaluation - team feedback and field discussion
- In Parallel the medical follow-up of the patients used the audiometry results collected in TB database 6 (koch6)

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5. Some figures

- 108 tests for 86 patients
- 14 patients had their admission audiometry done by Shoebox
- At admissions, only one patient had an abnormal audiometry
- For the follow-up, 3 patients were detected with an abnormal audiometry

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6. Our experience

- User-friendly
- Does not need specialised setup
- Decentralized diagnosis
- Decreased logistic of patients
- Benefits for patient: early detection of ototoxicity
- Main challenge: Cost of License

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7. Conclusions

- Easy to use, helped decreasing the logistics and time to have the audiometry’s and improved access to the exam
- Allows early diagnosis and early management of the case
- Potentially Improves quality of care in low resources setting
- Referral center not vertical program

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8. Recommendations

- Needs further research to strengthen evidence in order to:

- have a better cost-benefits analysis
- better understand the need in MSF projects
- identify potential links to Ministry of Health
- know if, and if so how, we should engage in dialogue with manufacturer

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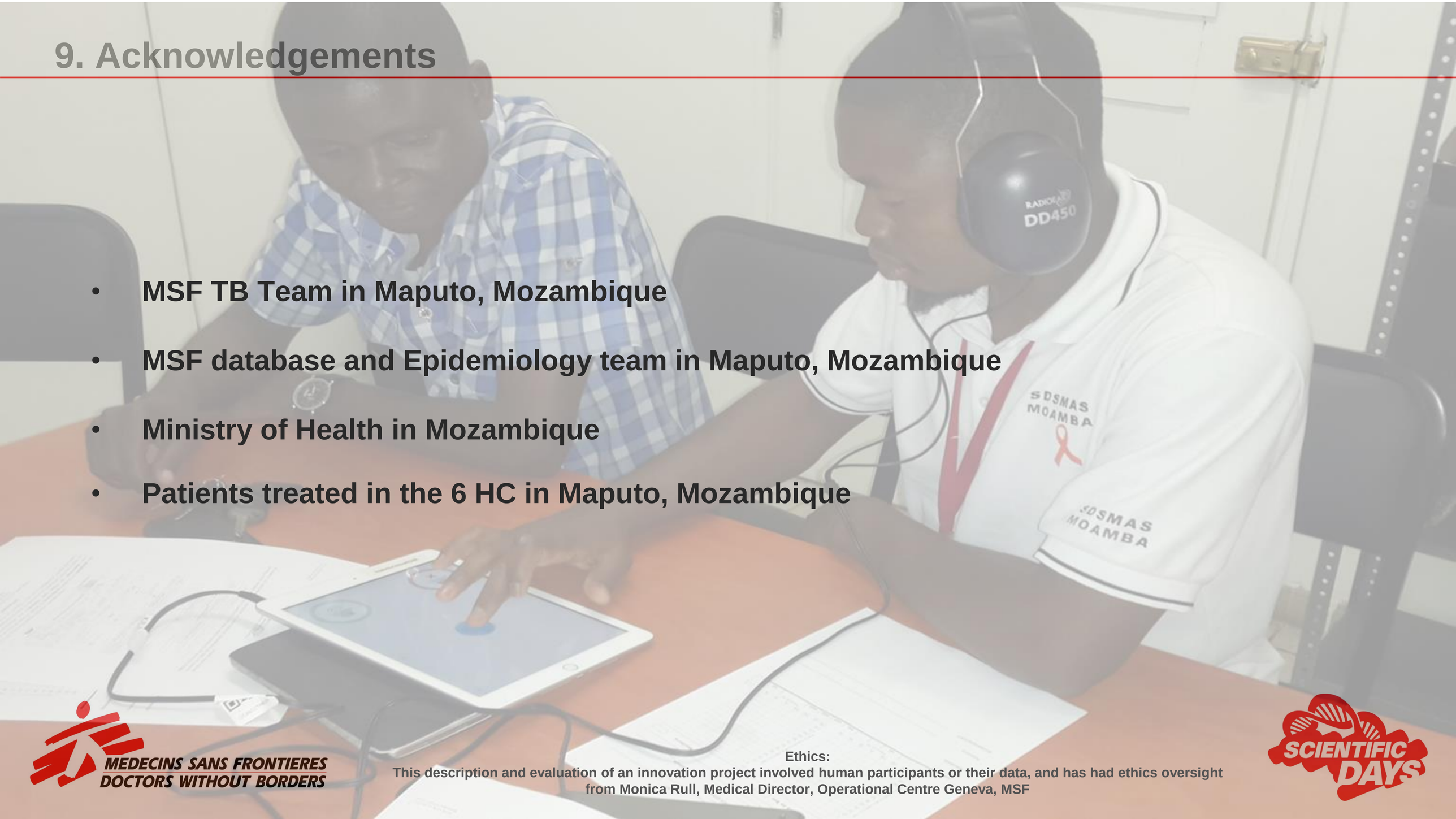
9. Acknowledgements



- MSF TB Team in Maputo, Mozambique
- MSF database and Epidemiology team in Maputo, Mozambique
- Ministry of Health in Mozambique
- Patients treated in the 6 HC in Maputo, Mozambique

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Ethics:
This description and evaluation of an innovation project involved human participants or their data, and has had ethics oversight from Monica Rull, Medical Director, Operational Centre Geneva, MSF

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