



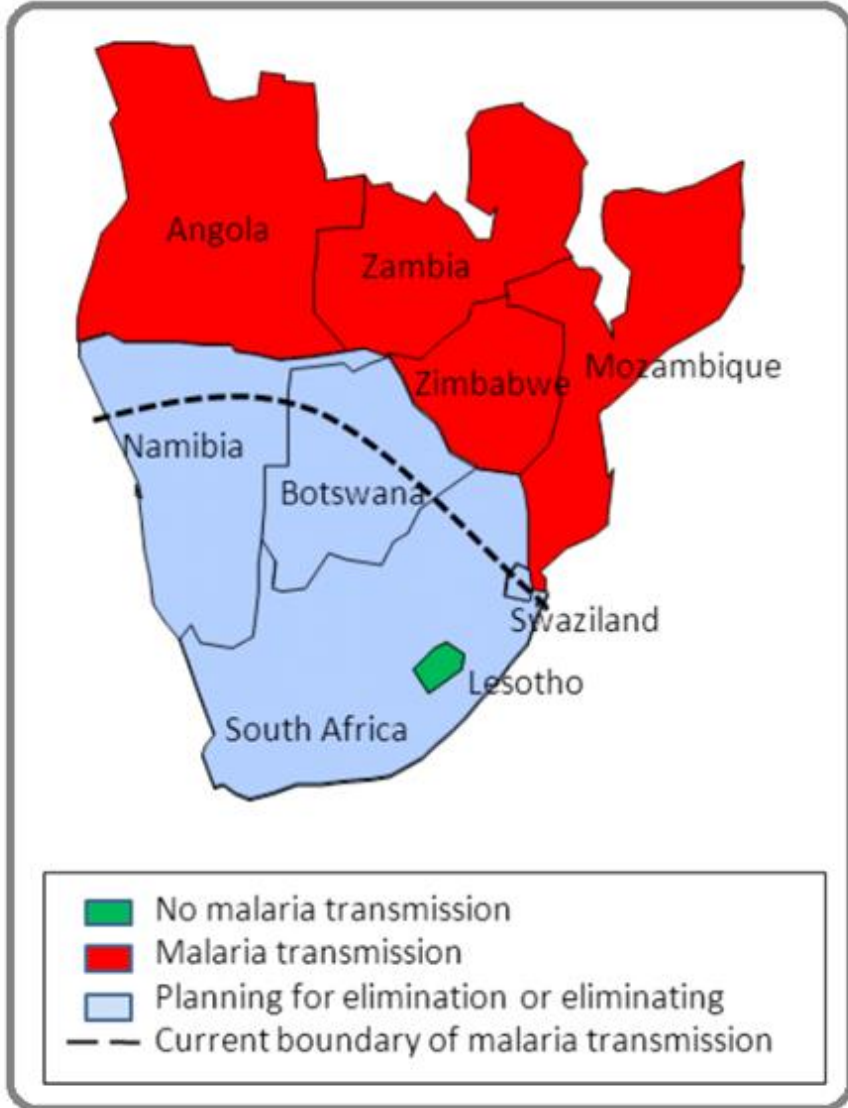
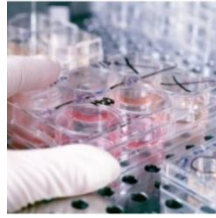
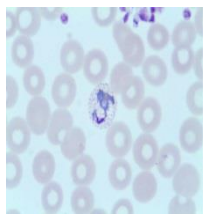
Monitoring Drug Resistance and Tracking Parasite Relatedness

Dr Jaishree Raman

Laboratory for Antimalarial Resistance Monitoring and Malaria Operational Research
Centre for Emerging, Zoonotic and Parasitic Diseases
National Institute for Communicable Diseases

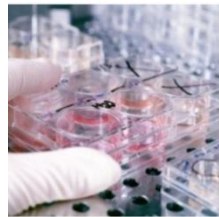
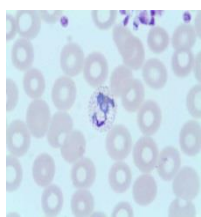
jaishreer@nicd.ac.za

5th April 2019



- 4 southern Africa countries - called Frontline 4 (Botswana, Eswatini, Namibia and South Africa) targeting elimination by 2023
- Reduced immunity, increased treatment seeking, **increased drug pressure**
- Ecology similar to SE Asia





- To accelerate the front-line 4 towards elimination novel tools are required:

➤ to locate and track all cases



➤ to track the drug resistance



➤ identify source and sink areas



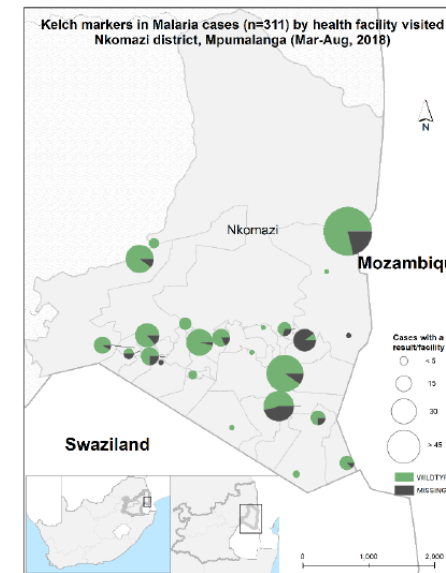
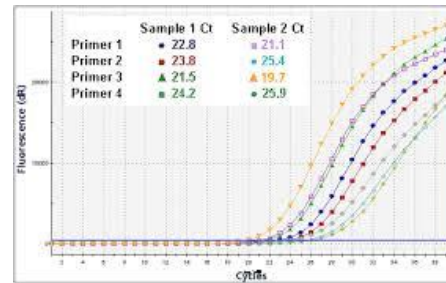
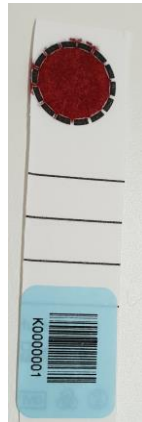
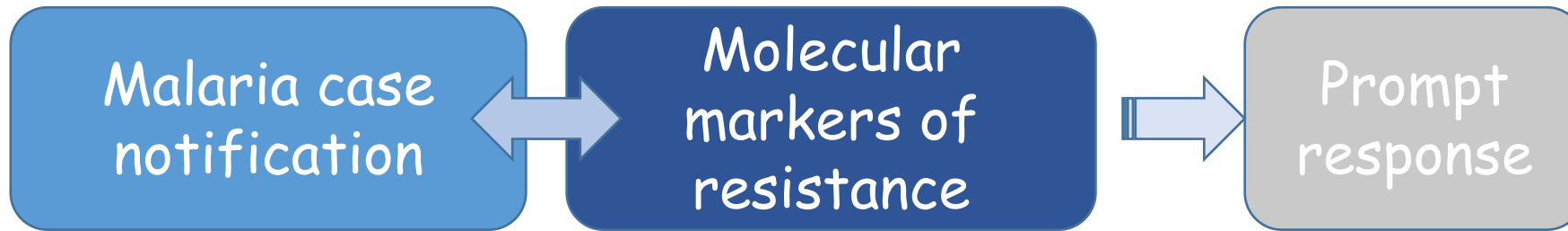
➤ hotspots of sustained transmission





Smart Surveillance for Malaria Elimination (SS4ME)

Objective: To enhance malaria surveillance by linking individual malaria case notification and molecular markers of resistance



Map 6: Artemisinin resistance markers by health facility





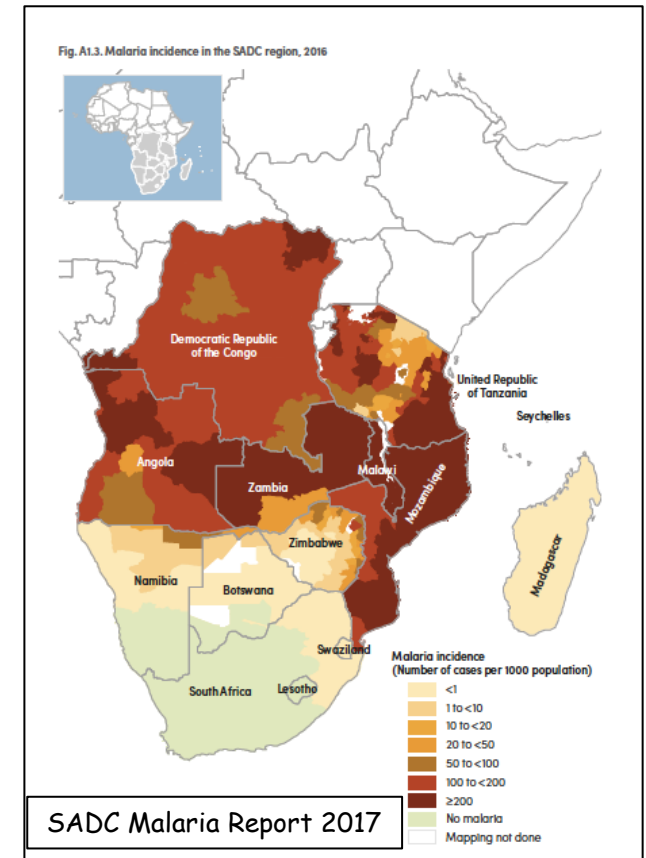
➤ identify source and sink areas

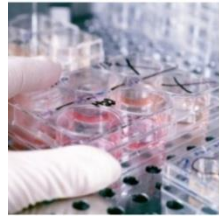
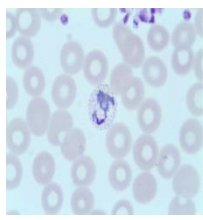


➤ hotspots of sustained transmission



- Malaria control programmes in SE Asia are using current next generation sequencing technologies to monitor parasite flow and relatedness
- Needed in southern Africa, given high parasite movement across borders
- Inform targeting of elimination interventions



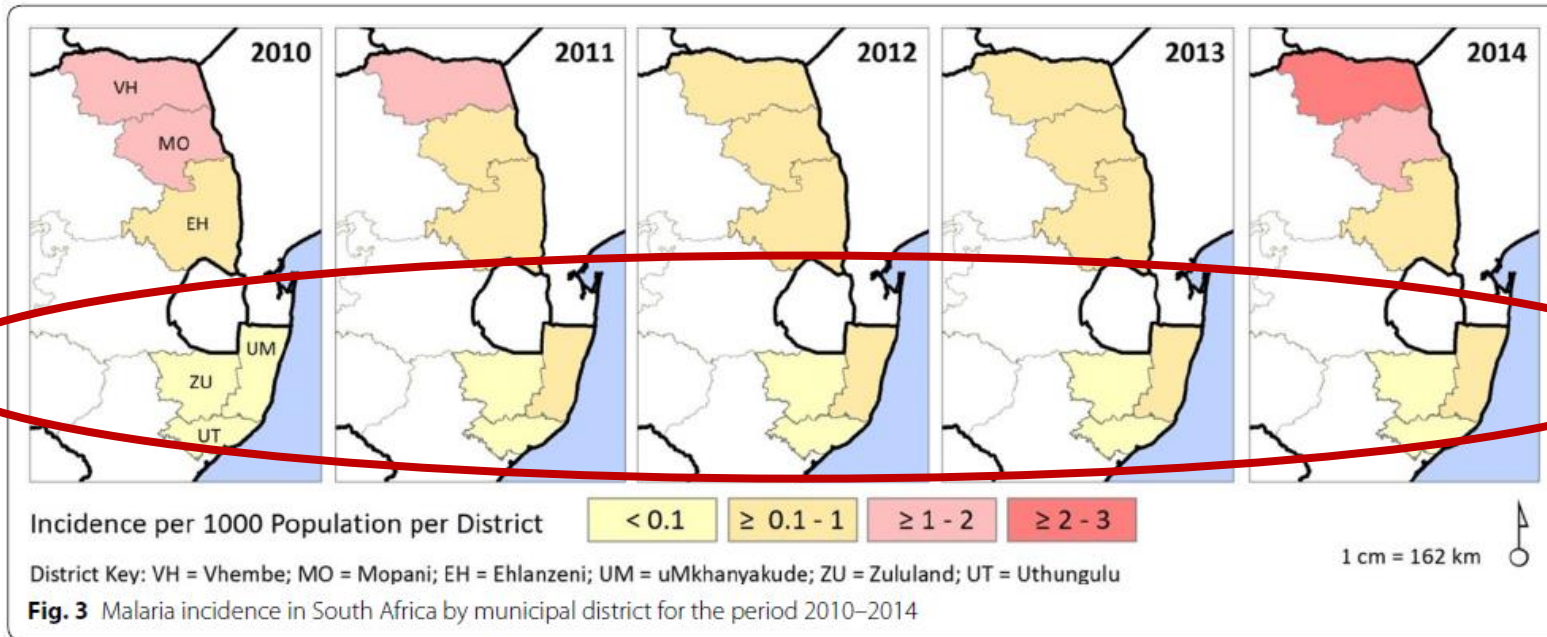
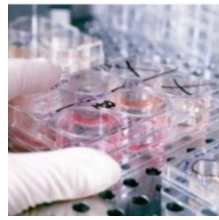
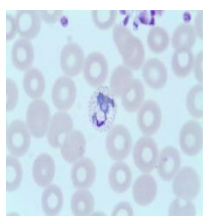


TITLE: High genetic diversity of *Plasmodium falciparum* in the low transmission setting of the Kingdom of Eswatini

AUTHORS: Michelle E. Roh^{1,2*}, Sofonias K. Tessema^{3*}, Maxwell Murphy³, Nomcebo Nhlabathi⁴, Nomcebo Mkhonta⁴, Sibonakaliso Vilakati⁴, Nyasatu Ntshalintshali⁵, Manik Saini⁵, Gugu Maphalala⁶, Anna Chen³, Jordan Wilhelm³, Lisa Prach¹, Roly Gosling^{1,2}, Simon Kunene⁶, Michelle Hsiang^{1,7,8†}, Bryan Greenhouse^{3,9†}

- A recent study in Eswatini using microsatellite markers at 26 different loci along the *P. falciparum* genome found a high level of diversity
- Suggesting limited local transmission
- Analysis of parasites of neighbouring countries in progress to identify “source” country

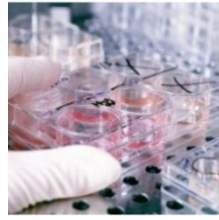
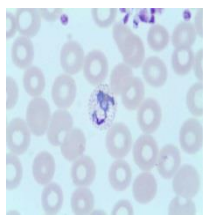




Raman et al Malar J 2016

- Malaria distribution in South Africa very heterogeneous
- KwaZulu-Natal very close to elimination with over 80% of its cases reported as imported
- Prevalence survey in 2018 confirmed limited local transmission
- Travel histories suggest majority of the imported cases are from Mozambique
- Molecular confirmation needed





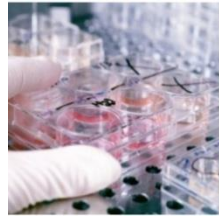
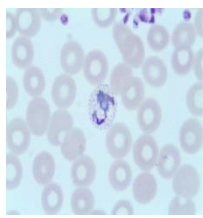
Major Challenges:

- Limited sharing of data between countries with the SADC region
- Malaria control programmes viewing molecular analyses as research
- Limited resources (infrastructure, skilled personnel and financing)

Possible Solutions:

- Re-establish the southern Africa drug resistance and drug efficacy network
- Advocacy with national programmes through the network
- Leverage funding and resources to build capacity to become a regional hub





Leaders worldwide have pledged to eliminate malaria.
How will we reach this goal?

This is what malaria elimination looks like:



ZERO
MALARIA
TRANSMISSION



ZERO
MALARIA
INFECTIONS



ZERO
MALARIA
DEATHS

