Odyssean Malaria Outbreak in Gauteng Province, September 2014

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Odyssean Malaria

• Acquired in a non-malaria-endemic area; has a high mortality rate
• For 2007-2013, Odyssean malaria in South Africa (SA) had 9.5\% case fatality rate (14 laboratory-proven and 7 probable cases of odyssean malaria and 2 deaths\(^1\))
• All malaria cases in non-endemic areas require investigation
• Malaria non-endemic areas include Mpumalanga, Limpopo and KwaZulu Natal
• SA has targeted elimination of malaria by 2018

The patient, a 7 year old presents to a local hospital with fever, headache, sore throat and body pain.

Discharged

Patient re-admitted and laboratory tests done

Patient dies at 4am

Laboratory confirmed malaria at 7am

NICD Outbreak response Unit informed

Outbreak investigation team visits the decedent’s home

September 2014
Objectives

• Identify risk factors associated with developing of malaria
• Conduct an environmental health assessment of the area
• Determine the possible origin of the malaria vector and breeding sites in the vicinity
Methods
Epidemiological Study

• Odyssean malaria case definition: any person in a malaria non-endemic area with a positive laboratory malaria test and no travel history, with no recent blood transfusion, injection or needlestick injury
• Case Investigation: family interviewed
• Clinical records review
• Clinicians interviewed
Methods

Environmental Study Inspection

- Decedent’s home and immediate surrounds
- Local swimming pool facility
- Proximity of decedent’s home to the N17 highway and nearby industrial areas
Methods
Entomological Study

• Inspected the decedent’s house *Anopheles* species mosquitoes.

• Examined and sampled stagnant water from leaking municipal supplies and river water for mosquito larvae.
Epidemiological Findings

• **Travel History** - The decedent and her relatives-no travel to malaria endemic areas in the past six months

• **Health History** - No blood transfusions, injections or needle stick injuries in the past six months

• **Laboratory findings**
  – Platelet count was $17 \times 10^9$/L (normal range: $180-440 \times 10^9$/L)
  – The blood smear showed malaria parasites and the rapid malaria antigen test for *P. falciparum* was positive (on 25/09/14; 3 days after initial visit to hospital)
Aerial photography of residence and surroundings

Key
A. Residence of malaria case
B. River
C. N17 highway
D. Industrial premises
Entomological Findings

- No malaria transmitting mosquito was found in the sleeping area of the decedent.
- Only one female *Culex* sp. (non-malaria transmitting) mosquito was collected from the living room of the decedent’s house.
- Six *Culex* spp. larvae were collected from open water pools approximately 100 m from the decedent’s house.
Discussion

• Decedent acquired malaria via an infected female *Anopheles* species mosquito

• Delayed suspicion/diagnosis resulted in worsening health condition and eventual death

• Missed malaria diagnosis in non-endemic areas leads to a high case-fatality
Limitations

• The probability of finding odyssean mosquitoes is low, but it is important to check for temporary local breeding sites
• Identifying sources of infective mosquitoes is speculative, but in many cases, busy highways are nearby, suggesting that passing traffic is a possible source of vectors
Recommendations

• Health communication to sensitize public and health care providers during malaria season in non-endemic areas

• Test for malaria in patients showing malaria-like symptoms and with low platelets

• Malaria rapid tests in non-endemic areas

• Fumigation of all vehicles coming from endemic areas
Acknowledgements

- Gauteng District Environmental Health Practitioners
- Outbreak Response Unit, NICD
- Entomology Unit, NICD
- SAFETP
- The decedent’s family
Thank you

Questions?
MALARIA RISK MAP FOR SOUTH AFRICA

To significantly reduce your risk, take precautionary measures against mosquito bites throughout the year in ALL RISK areas where malaria chemoprophylaxis is indicated, mefloquine or atovaquone-proguanil or doxycycline should be used.

- **Low Risk**
  - Only non-drug measures to prevent mosquito bites are recommended.

- **Moderate Risk**
  - Antimalarial drugs are recommended from September to May for all travellers.

Malaria risk does exist in neighbouring countries. For further information, please consult the WHO travel health guidelines at [http://www.who.int/ith/en/](http://www.who.int/ith/en/).

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Game Reserve Key

1. Nwanedi Nature Reserve
2. Hans Merensky Nature Reserve
3. Letaba Ranch Game Reserve
4. Klaserie Private Nature Reserve
5. Kruger National Park
6. Thornybush Game Reserve
7. Sable Sand Game Reserve
8. Blyde River Canyon
9. Ndumo Game Reserve
10. Tembe National Elephant Park
11. Umlangaliso St Lucia Wetland Park
12. Hluhluwe Game Reserve
13. Umgazi Game Reserve
14. Ithala Game Reserve
15. Pongola Game Reserve
16. Maputo Elephant Reserve
17. Limpopo Transfrontier Park
18. Bahnine National Park
19. Malolotja National Park
20. Hlane Wildlife Sanctuary
21. Mkhaya Nature Reserve

Map produced by the Health GIS Centre, Malaria Research Unit, South African Medical Research Council.

Data Sources: Malaria Control Programmes of KwaZulu-Natal, Limpopo and Mpumalanga, South African Medical Research Council, Statistics South Africa, Municipal Demarcation Board.