Innovation, education, communication and health promotion towards malaria elimination

Christiaan de Jager

4 February 2020

Make today matter
Outline

- Malaria elimination - SDGs

- Current status of Malaria
  - Global
  - South Africa

- Transdisciplinary research by the UP ISMC

- UP ISMC contributions as vehicle to address the SDGs
  - Innovation
  - Education
  - Communication
  - Health promotion
Interlinking SDGs towards health and well-being

- 17 Partnerships for the Goals
- 13 Climate Action

Influence All

4 Quality Education

5 Gender Equality

6 Clean Water and Sanitation

3 Good Health and Well-Being

2 Zero Hunger

1 No Poverty

8 Decent Work and Economic Growth

10 Reduced Inequalities

12 Responsible Consumption and Production

11 Sustainable Cities and Communities

9 Industry, Innovation and Infrastructure

15 Life on Land

14 Life Below Water

16 Peace, Justice and Strong Institutions

7 Affordable and Clean Energy

Adapted from Hall et al (2016)

Innovation, education, communication and health promotion towards malaria elimination – C. de Jager

FUTURE AFRICA
Global Cases & Deaths (2018)

**Global cases (millions)**

- 2010: 251
- 2017: 231
- 2018: 228

**Global deaths**

- 2010: 585000
- 2017: 416000
- 2018: 405000

**WHO 2019, World Malaria Report 2018**
Southern Africa Malaria (2018)

SOUTH AFRICAN MALARIA RISK MAP
November 2018

Final technical draft, awaiting approval

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 from September to May.

- **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/

---

Map produced by the Health GIS Centre, South African Medical Research Council.
Data Sources: Malaria Control Programmes of KwaZulu-Natal, Limpopo and Mpumalanga, Malaria Information System, South African Medical Research Council, Statistics South Africa, Municipal Demarcation Board.
South Africa Cases & Deaths (2018)

SA NDoH, unpubl.
UP ISMC: Strategic Framework

VISION

To become a nationally and internationally known multidisciplinary research centre making a substantial contribution towards the creation of a malaria-free Africa

BY

Employing sustainable & environmentally safe malaria control technologies

Establishing integrated vector management strategies

Ensuring effective malaria case management

Promoting health education in affected populations

GOAL 1:
Follow an INTEGRATED, TRANS-DISCIPLINARY APPROACH in generating new knowledge pertaining to safe malaria control in Africa through fundamental and applied research

SO 1: Promote research into safe and effective malaria control strategies

SO 2: Engage communities, promote awareness and conduct research that reflects issues and needs of vulnerable communities related to safe and sustainable malaria control

SO 3: Develop and implement valid decision making tools for malaria management

GOAL 2:
SUPPORT AND PROMOTE RESEARCH COLLABORATION within the UP and with relevant partners regionally, nationally and internationally

SO 4: Advise policy makers on sustainable options of effective malaria control

SO 5: Promote networks with relevant partners regionally, nationally and internationally

GOAL 3:
SUPPORT ACADEMIC EXCELLENCE AND HUMAN CAPITAL DEVELOPMENT in order to build a critical mass of people performing cutting edge malaria research

SO 6: Develop human capital through education and training as well as leading-edge research

SO 7: Provide a platform for large scale project funding and capacity development
Local communities must be considered and be involved, to some extent, in research and operations.
UP ISMC as vehicle to address the SDGs towards malaria elimination
Sustained investment in health and malaria unlocks the potential of human capital to generate growth.

A 10% reduction in malaria has been associated with a 0.3% rise in annual GDP.

At household level, reducing malaria protects household income from lost earnings and the costs of seeking care.
People who suffer less from malaria can work their fields more consistently, resulting in better harvests and improved food security.

Well-nourished people, especially children, are better able to fight malaria.

- Dietary and food intake questionnaires
- Food intake questionnaires:
  - Determine daily food intake
  - Determine adequate nutrient intake
WHO Member States have endorsed the bold vision of a world free of malaria, and set the ambitious new target of reducing the global malaria burden by 90% by **2030**.

Preventing malaria in pregnancy reduces maternal mortality and gives newborns a far healthier start in life.

---

**University of Pretoria Institute for Sustainable Malaria Control**

"It is now widely recognized that any attempt at malaria eradication must be a long-term commitment that involves multiple interventions, disciplines, strategies and organizations."

— Anthony Fauci

---

**World Health Organization**

**Global Technical Strategy for Malaria 2016–2030**

---

Innovation, education, communication and health promotion towards malaria elimination – C. de Jager
Reducing malaria enables children to **attend school regularly and learn more effectively**.

This significantly improves their school performance, and later wage-earning capacity.

- Reducing malaria enables children to **attend school regularly and learn more effectively**.
Educate and promote health through books

SIBO Fights Malaria

SIBO
Educate and promote health through drama
Educate and promote health through music and singing
THE A,B,C,D OF MALARIA PREVENTION

AWARENESS
Be AWARE of the risk and symptoms

BITE PREVENTION
Avoid being BITTEN by mosquitoes (from dusk till dawn)

CHEMOPROPHYLAXIS
Take CHEMOPROPHYLAXIS (antimalarial medication) if prescribed

DIAGNOSIS
Early DIAGNOSIS and Rapid Treatment

Infographics for easier ‘malaria’ communication

MILD/MODERATE SYMPTOMS

DO NOT IGNORE SYMPTOMS. GO STRAIGHT TO A DOCTOR

FEVER SWEATING HEADACHE MUSCLE ACHES FATIGUE SHAKING VOMITING DIARRHOEA FATAL IF NOT TREATED

EARLY DIAGNOSIS and RAPID TREATMENT prevent deaths

Adapted from International SOS, 2016
Freeing **women and school-age girls** from the burden of caring for family members when they fall sick from malaria, increases their likelihood of completing school, entering and remaining in the workforce.

**Empowering women as citizen scientists**
Cleaning trash from waterways such as streams and surrounding areas, clean water and sanitation leads to decreased mosquito breeding and a reduction in the rate of malaria transmission.

It also improves water quality, generating further health benefits.
Environmental Chemical Pollution and Health (ECPH) research unit

- To provide a platform for more effectively addressing issues related to endocrine disrupting chemicals (EDCs), that could assist and advise government on possible measures to manage exposure to potentially harmful EDCs and toxic waste/pollution management in general.
In resource-constrained malaria endemic areas, access to sustainable energy will improve access to **electrical lighting and cooling**, enabling people to spend **more time indoors** where vector control can be better employed.

**Innovation for research purposes**

**Malaria Micro-climate Module - Garimunia**

[South African Weather Service logo]
Reducing malaria creates healthier, more **productive workforces** which can help to attract trade and commerce.

When combined with pro-poor policies, these factors **drive job creation**, inclusive growth and shared prosperity.

Enterprises that invest in their workers reduce the cost of doing business, increase their competitiveness and enhance their reputation.

**Healthy, happy people**
**Job creation**
**Jobs = health and positive economic growth**
Major construction and development projects must not introduce or increase malaria transmission. **Well-planned infrastructure and improved housing** help reduce exposure to mosquitoes and facilitates greater access to health and malaria services.
Innovation ~ Safer alternatives

Past

Current

Future?
New collection and lure techniques

For monitoring and surveillance, vector control, and insecticide resistance research

Solar-powered traps
Developed by private sector entrepreneurs & UP ISMC testing in field

Semiochemical studies

Human landing catch (LC) vs Cattle LC collection
Novel & innovative vector control methods

Pseudo-azeotrope repellents

Protective clothing products

Wall linings as alternatives to IRS
Smart devices to ‘communicate’ malaria

‘Malaria Buddy’ app

- Mainly to inform tourists about malaria and indicate when entering a malaria area
- Some health practitioner information
- Scope for future malaria awareness (outbreak notices, updates on latest malaria control methods) in rural areas

Free to download

Innovation, education, communication and health promotion towards malaria elimination – C. de Jager
A targeted response to malaria actively improves health of the poorest, enabling vulnerable families to break the vicious cycle of disease and poverty, and helping to make sure that no one is left behind.

Investing in malaria reduction contributes to the creation of more cohesive, inclusive societies.
Given that climate change is predicted to increase the range and intensity of malaria transmission, plans to mitigate the effects of climate change are likely to include an increased commitment to controlling and eliminating malaria.

Predicting malaria cases using remotely sensed environmental variables in Nkomazi, South Africa

Abiodun Morakinyo Adeola,¹,² Joel Ondego Botai,¹,³,⁴ Jane Mukarugwiza Olwoch,³,⁵ Hannes C.J. de W. Rautenbach,¹,²,⁶ Omolola Mayowa Adisa,³ Christiaan de Jager,² Christina M. Botai,¹ Mabuza Aaron⁷
Remote Sensing for Malaria Control in Africa

- UP ISMC initiative
- Use remote sensing (satellite technology) in malaria control
  - Expansion of predictive malaria-risk maps
  - Investigate the impacts of climate variability and other factors on malaria
- South African, French, French National Space Agency (CNES) and other tertiary and research institutions involved
- All malaria aspects incl. climate change challenges

www.malaria.up.ac.za
Sustainable malaria control:
Follows an integrated and transdisciplinary approach for effective development of malaria control methods and strategies.

- Existing research platforms include:
  - UP Institute for Sustainable Malaria Control (UP ISMC) – 9 Fac & GIBS
  - SARChI Chair in Sustainable Malaria Control - NAS
  - CoP in Malaria Elimination - With SARChIs in Maths, Wits and UCT
  - MRC Collaborating Centre for Malaria Research – MRC, NDH
  - Goodbye Malaria Centre of Excellence for Mozambique – Moz Gov
  - NICD China

The many **multi-sectorial partnerships** in place to reduce and eliminate malaria have a positive collateral effect.
Transdisciplinary Approach
Postgraduate forum
Summary

- An integrated approach is needed towards malaria elimination
- Malaria education, awareness and health promotion should include the affected communities
- Local communities and travellers should be targeted to also address issues related to cross-border movement
- Research and/or control programme methods allow for people to:
  - make informed decisions about their personal well-being and
  - they can assist in the fight against malaria

Global issues
Such as health, environment, food security, energy, social stability and sustainability should be solved together through a concentrated research offering/solution.

Can contribute to the attainment of the Sustainable Development Goals but also leave a research wealth of wisdom to be transmitted to the next generation through education and training.
Thank You

UP End Malaria
@UPEndMalaria
UP ISMC
UP End Malaria

www.malaria.up.ac.za
Malaria Buddy app