SMART DIAGNOSTICS TO TRANSFORM GLOBAL DISEASES DIAGNOSIS, CONTROL AND SURVEILLANCE

Global Challenges like malaria, COVID-19, and antimicrobial resistance, have made diagnostics more important than ever.

Imperial College London

MALARIA

A deadly disease caused by parasites and spread by mosquitoes

229M
cases in 2019

409K
Malaria Deaths

94%
of global cases and deaths occur in Africa

BIOLOGICAL THREATS

- Parasites and mosquitoes can evade our best control strategies
- Parasite can become invisible to some diagnostic tests
- Parasite can become resistant to antimalarial drugs
- Mosquitoes can become resistant to insecticides

"

The choice for us is clear. If we continue with a 'business as usual' approach – employing the same level of resources and the same interventions – we will face near-certain increases in malaria cases and deaths

Dr Tedros Ghebreyesus, The Director-General of WHO

DIGITAL DIAGNOSTICS:
MOLECULAR ACCURACY AT THE POINT OF CARE

> "
>
> **The malaria community needs to acknowledge the strength and limitations of the tools and strategies available today. We should be able to diagnose and treat all malaria cases**
>
> *Pedro L. Alonso, WHO Global Malaria Programme, Director, in Nature Medicine, 2021*

SCAN ME

SMALL ELECTRONIC DEVICE
Digital Diagnostics bring the accuracy of an advanced diagnostics laboratory to the point-of-care of the patient, all contained in a small handheld electronic device

SAMPLE IN
The sample is easily inserted into the device

SAMPLE PROCESSING
The sample is prepared for analysis within the device

ANALYSIS OF RESULTS
Analysis of the sample is performed on the surface of a microchip (e.g. detect presence of parasites and resistance to antimalarials)

DATA TRANSFER
Realtime data transfer

ANSWER OUT
The diagnosis or treatment recommendation can be displayed on the diagnostic device or another user interface such as smartphone

DECISION SUPPORT
The results are turned into a diagnosis and/or recommendations for treatments

INTEGRATION OF RESULTS
Results from several different measurements can be combined within the device

LAB-ON-A-CHIP TECHNOLOGY

Immediate transmission of diagnostic data will transform disease surveillance and targeting of interventions.

Real-time connectivity

Ease of specimen collection

Deliverable to end-users

Sensitive

Specific

User-friendly

Rapid and robust

Equipment free

Affordable

> "
> **Although there are some promising new tools to fight malaria in the pipeline, no transformative products have reached the market, and thus the world continues to rely on moderately effective prevention tools, further threatened by the risk of parasite and insecticide resistance**
>
> *WHO, Global Technical Strategy for Malaria 2016-2030 | 2021 Update*

THE DIGITAL DIAGNOSTICS FOR AFRICA NETWORK

The Digital Diagnostics for Africa Network is an international and interdisciplinary community of experts with a strong interest in developing innovative digital diagnostics approaches to tackle diseases that primarily affect the African continent.

The Network members share a vision that digital diagnostics can transform healthcare in Africa.

Funded by a UKRI Global Health Research Challenge Fund in 2020 and led by a group of researchers at Imperial College London, the Network brings together appropriate expertise to develop a strategy for implementing innovative digital diagnostics that address health needs specific to the different regions of the African continent.

🐦 **@DiDi4Africa**

digitaldiagnostics4africa.org