

INTEGRATED MALARIA MANAGEMENT CONSORTIUM

Working to reduce the incidence of malaria, and other insect spread diseases.

IMMC



Discussion Draft About

**Data capture and data transmission
in connection with an Africa wide
development and deployment of
integrated malaria management (IMM).
Version 004**



IMMC

Integrated Malaria Management Consortium

An Introduction

IMMC has developed an approach to the global health crisis in malaria founded on making best possible use of good science, modern computational capacity and under-employed professional human resources in Africa.

About the Integrated Malaria Management Consortium (IMMC)

IMMC is a program of the University of Alabama, Birmingham (UBA) and the National Center for Supercomputing Applications (NCSA), two organizations that have world class credentials in malaria epidemiology and entomology and supercomputing applications.

IMMC also includes ADAPCO, a leading company with expertise in the use of pesticides and all aspects of vector control; West Coast Aerial Applicators with US and African experience in aerial operations and pesticide application, the Millennium Institute and the Transparency and Accountability Network (Tr-Ac-Net) with expertise in bio-economic modeling, cost accounting and management information.

An additional strength is IMMC's cooperation with Africa based organizations, including local telecenters, local non-governmental organizations (NGOs), local community based organizations (CBOs), local faith based organizations (FBOs), local scientific research institutions (such as ICIPE and KMRI in Kenya), local universities and other educational organizations, and local businesses.

The problem

The problem to be addressed is the failure of malaria control interventions over recent past years to reduce the burden of malaria in Africa. It is 100 years since Gorgas spearheaded a program that made it possible to build the Panama Canal in Central America, and the techniques used then, coupled with improved science should make it possible to have success now.

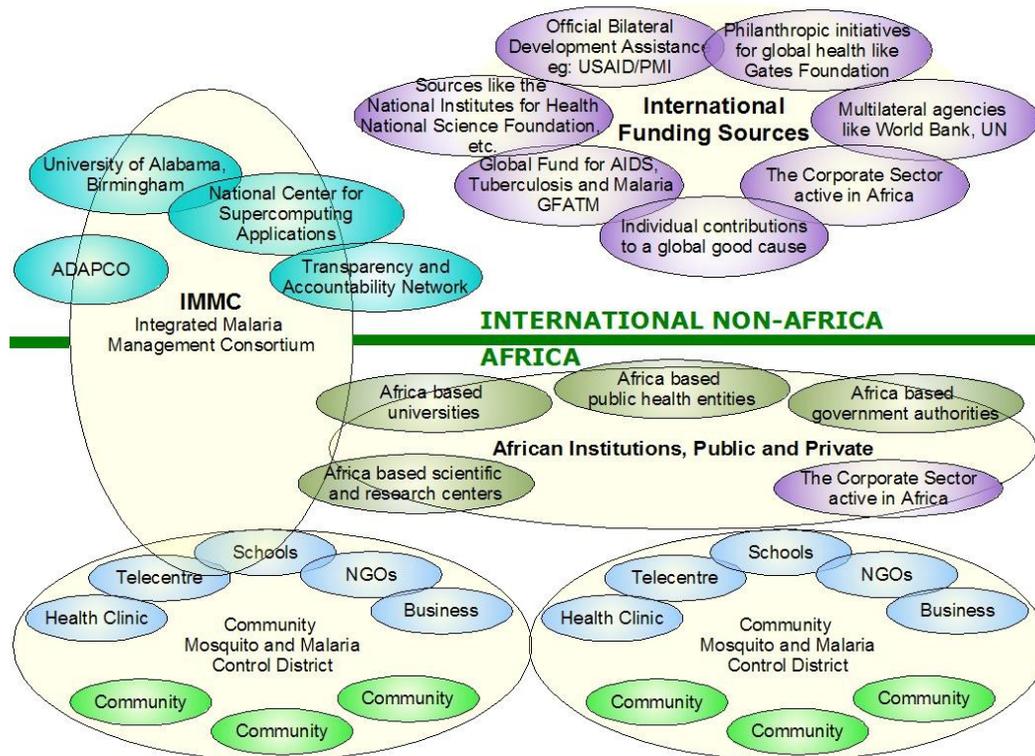
The international relief and development community (World Bank, UN, WHO, USAID, Global Fund and others) has increased the disbursements associated with malaria control substantially over the past five years, but the results are, as yet, inclusive. It is also unclear how the approach presently being used will be sustained without the perpetual support of the international relief and development community.

The structure of the mosquito and malaria control sector

The malaria subsector of the global health industry has grown substantially over the past few years. Almost \$1 billion will be disbursed annually in connection in the current international effort to reduce the burden of malaria in Africa. However, it is generally acknowledged that the data to provide improved scientific knowledge and performance information are inadequate.

The following graphic is a schematic of the structure of the mosquito and malaria control sector, and the position of IMMC in the structure.

Structure of the mosquito and malaria control sector



IMMC brings four critical components to address this:

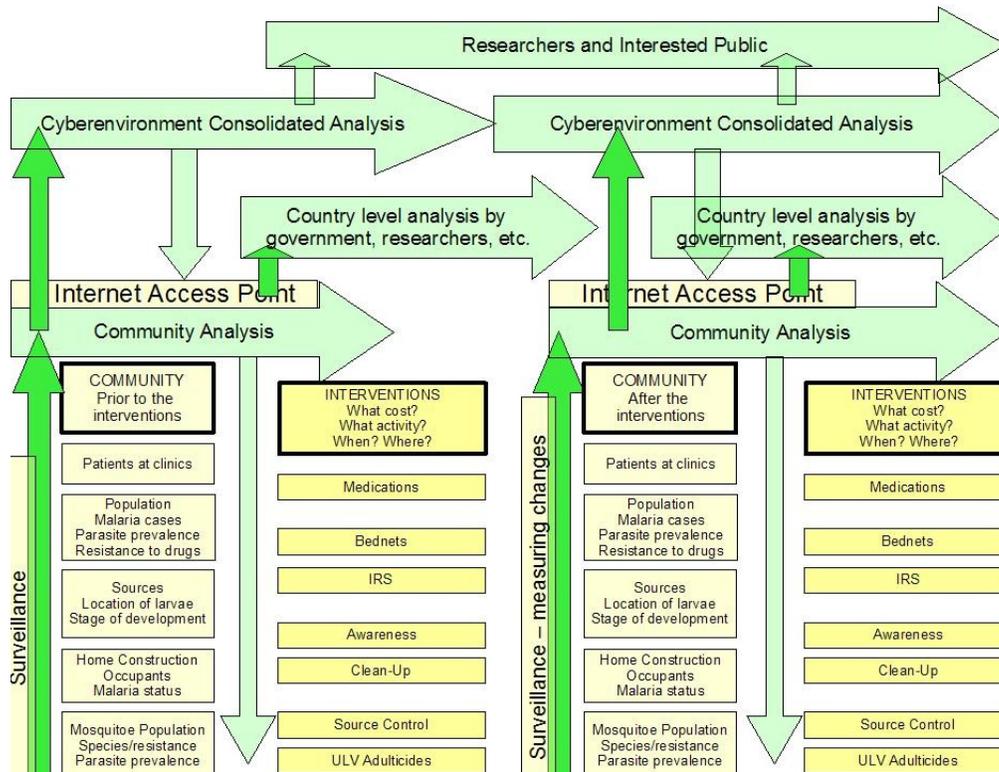
1. knowledge of the medical science,
2. knowledge of the entomological science,
3. knowledge of advanced scientific analysis,
4. knowledge of accounting and management accounting.

IMMC is also committed to the concept that the most effective and sustainable program is going to be one where the people of a community are engaged, and where the professional community in the affected countries are an integral part of the program.

Bringing this knowledge together has value when it is applied at the community level, and there are data flows both for immediate local reaction to the results of interventions and use of the data to further scientific understanding and the dynamic of the many variables present in the system.

The following schematic shows the data flows that are needed for the community and for the NCSA cyberenvironment for integrated mosquito and malaria management. (CE for IMM) and the data flow that is used for immediate community reaction.

Schematic of IMM Dataflows



The IMMC mosquito and malaria control program aims for sustainability, and that means that everything involved with mosquito and malaria control must be low cost and affordable in the context of the African economy, and be of substantial value to the communities.

The IMMC strategy is to use data to optimize the interventions so that the cost of the interventions is the least relative to the ultimate result of reducing the burden of malaria. There are indications that use of good timely management information could increase the cost effectiveness of the interventions by a factor of ten.

In order to do this there needs to be relevant data analysis and efficient data capture and data logistics.

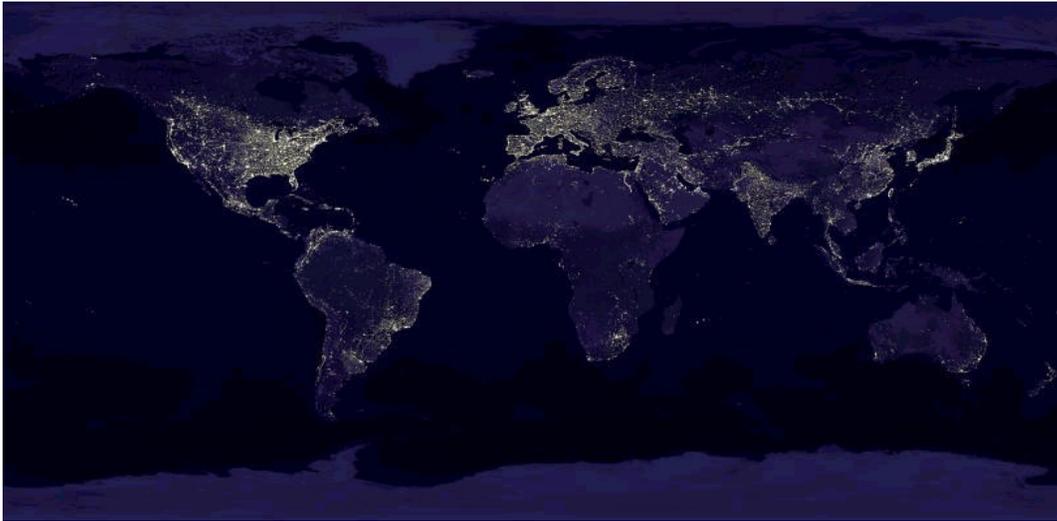
A cyberenvironment for integrated malaria management

IMMC is cooperating with the National Center for Supercomputer Applications (NCSA) to develop a cyberenvironment for integrated malaria management. NCSA has developed several cyberenvironments to analyze complex data about large scale systems (see annex for some examples). The field of health is an area of interest, and NCSA has been cooperating with the University of Alabama in developing a protocol for complex analysis of the mosquito, malaria, people, medical and entomological interventions, weather and spatial physical information. Some of this work was started several years ago, and some has been recently added.

The challenges of data capture, data logistics

The challenges of making data capture and data logistics efficient is not easy with the limited infrastructure and high costs for telecom and Internet access that are common in Africa.

The following image is a classic composite satellite picture that reminds that the areas of Africa that have endemic malaria are also areas that have infrastructure challenges. The lack of electricity and the lack of basic telecom connectivity is almost universal, even though there are some areas of progress. Access to telecom infrastructure is increasingly possible, but the costs are not affordable for most indigenous economic activities.



By making best use of the currently available technologies, however, it is now becoming possible to have improved data capture and data transmission. It is also becoming more and more possible to use spatial information in an optimum way.

There are two core questions:

1. People in a community are able to do surveillance ... how do they get their data back to the office and into a database?
2. People in a telecentre can do data entry into a database ... how does this database information get transmitted to the central NCSA cyberenvironment database?

The value of this information is significant, but only if it is used as part of an integrated system that is capable of making effective interventions.

This information can be compiled by hand, and used with a local wall map and colored pins to indicate key information.

This same information has, however, a much larger value when it is made a part of an analysis system that optimizes interventions in the complex mosquito/malaria/human system.

Conclusion

The deployment of efficient data flow technology that helps a community have data flow from the community to a local and an international destination has a huge potential social value. This value, however, will not be realized unless there is a comprehensive system that can turn the “talk” into the “walk” and carry out effective practical interventions.

There is a record amount of financial resources being allocated to malaria control initiatives. There is a need for good analytical information about how well these resources are being used, and the analysis of the scientific data so that the initiatives are both effective in the short term and do not pose long term hazards. The potential to improve the use of resources by as much as ten times does exist, but it requires analysis of a complex system involving mosquitoes, malaria, human beings, medical interventions, entomological interventions, weather and the physical conditions of the area.

There is the potential to use mobile phone technology to improve the process of data capture and for data logistics. The exact form that this may take is rapidly evolving.

There is the potential to use an “R” type architecture to improve the performance of telecentres so that they are better able to serve the immediate analysis needs of the community mosquito and malaria control district.

It is anticipated that understanding the specific interactions between the various aspects of mosquitoes, malaria and humans and the various possible interventions in specific locations will make it possible for models to optimize both the value of the interventions and the cost. The synergy of integrated comprehensive actions should make very substantial improvements in cost effectiveness possible. The proposed CE for IMM will serve not only the selected pilot locations but will also be capable for deployment into any geographic area.

Data Logistics

