

REVIEW OF THE MULTILATERAL INITIATIVE ON MALARIA (MIM)



FINAL REPORT

*Monday through Friday, September 30th – October 4th, 2002
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MIM is seen by many interviewees as having been an important force over the last five years in directing resources toward malaria research. Interviewees credited MIM for having actually mobilized additional resources to develop capacity for scientific research in Africa, and for bringing broader public attention to the malaria research agenda. With experience now on its side, MIM can make concrete plans for how to proceed over its next half-decade.

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October 28, 2002

Gerald Keusch
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Dear Jerry,

I am pleased to send you the final copy of the MIM Review Report, professionally edited and published, so it can be used and discussed at the 3rd Pan-African Malaria conference November 17-22. The report reflects the findings and recommendations of the MIM Review Panel made during our one-week review of the MIM program at the NIH earlier this month.

The panel and I are pleased about the accomplishments of the program and optimistic about its future. I hope this is reflected in the report as I understand you will use material from the report for your presentations at the 3rd MIM Pan-African Malaria conference. I am delighted that implementation of the recommendations will be discussed at the conference's meeting of the partners and sponsors. It is rare that one goes from recommendation to discussion and implementation in so short a time. Such prompt response is a reflection of your leadership and your staff's skills.

Reflecting the strong support for MIM that we found during our many discussions and interviews, as part of the review I look forward to following the future accomplishments of this program as it continues its mission to build African research capacity in Malaria. I hope that the recommendations in the report will help ensure the success of this very important program.

I must tell you that I really enjoyed the opportunity to chair the MIM review. Panel members were exceptional in their knowledge, experience, and interest in Malaria and in their dedication to achieving a purposeful review. I know that some of the review panel members will attend the upcoming MIM conference. This is an excellent opportunity to draw on their expertise as they will each have a unique perspective to add to the conference. I will be interested in talking with you following the meeting to learn about the discussions and decisions that will have taken place.

I want to extend my deep appreciation to Linda Kupfer, Ph.D., Jessica Viola, and Victoria McGovern, Ph.D., who worked hard to support the panel in producing this report.

Best regards,

A handwritten signature in black ink that reads "Enriqueta Bond". The signature is written in a cursive, flowing style.

Enriqueta C. Bond, Ph.D.
President
Burroughs Wellcome Fund
Enclosure (1)

cc: MIM Review Panel

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I. Executive Summary

The Multilateral Initiative on Malaria (MIM), an international effort against African malaria, was conceived in 1996 and launched in 1997 at the First MIM Pan-African Conference in Dakar, Senegal. In September 2002, a Review Panel of seven scientists from around the world gathered to review the Initiative's progress after its first five years, with an eye toward planning for the next five.

Individual voices were crucial to the review. The Panel heard from African researchers; administrators of large malaria activities worldwide; workers from development agencies; staff from major funders; and the personnel who managed the first MIM Secretariat at the Wellcome Trust. The Panel talked to researchers supported by MIM and researchers whose applications for support the program has turned down. They talked to energetic supporters and thoughtful critics of the Initiative, as well.

In these interviews MIM's central focus—improving the malaria research capacity of African scientists so that Africa can itself address this crushing disease—was resoundingly described as critical. As the world's major effort in service of this goal, MIM is seen as important, valued, and timely. One interviewee put it well: MIM is an effort that “cannot be allowed to falter.”

At the review, MIM was found to be a healthy, growing group of four component organizations—an administrative arm (the Secretariat), a funding arm (MIM/TDR), an electronic-communications arm (MIMCom), and a research-materials arm (M4), all described in detail in the report. The component organizations' work has already been impressive, especially in bringing African scientists together through improving communication and building science-focused institutional networks.

The 1997 operational and strategic plans, which were based in hope and theory, have grounded MIM's early success. But if MIM's first five years can be de-

scribed as its infancy, its next five years will mark its coming of age. Among the challenges facing the maturing Initiative is that of revisiting the operational and scientific strategic plans set in 1997 to see what changes may be needed for the years ahead. With experience now on its side, MIM can make concrete plans for how to proceed over its next half-decade.

In the MIM Review Panel's view, there are two stars to follow. The first is: developing MIM's operational systems and organizational capacity so they are solidly built and smoothly functioning. Achieving this will help the Secretariat eventually achieve its ultimate aim: to rotate permanently among African institutions. The second is: furthering the development of African research capacity over the same time, so that African science can become a full partner, and collaborator in research and control efforts focused on malaria.

To follow those stars, the MIM Review Panel offers four major recommendations, discussed in detail in Sections IV–VII of this report:

Recommendation 1. Refine and clarify MIM's vision, goals and objectives for the next five years, and develop a strategic plan to fulfill them.

Despite notable progress by MIM's four components the Review Panel's interviews and discussions revealed an important potential stumbling block: MIM's lack of a *single overarching* set of goals and a strategic plan to guide its spectrum of activities and to secure the needed funding to achieve them. The Review Panel *recommends that MIM refine and clarify its mission and objectives* for the future and that *MIM develop a strategic plan to carry out this mission*. The Panel believes this recommendation to be of such importance that it urges *every effort be made to begin this process of refining and strengthening MIM's strategic priorities at MIM's upcoming Third Pan-African Malaria Conference* to be held in Arusha, Tanzania, in November 2002.

Recommendation 2. Enhance communication and coordination between MIM's four component organizations.

The Panel feels it is essential that *MIM's overall strategic plan should be designed and adopted by all MIM's components*. Moreover, *the components' individual working goals and plans should be revisited to ensure they serve MIM's overarching mission and objectives*. The review Panel believes a round of thoughtfully communicated strategic planning at all levels is necessary for bringing all MIM components into a productive, self-reinforcing union. The task at hand is to strengthen the components' activities by building better ties between them. The Panel also believes that the development and communication of a co-

herent, well-articulated strategic plan will be crucial for MIM to attract donor-funding organizations—including large national and international programs—and to maintain their support.

Recommendation 3. Strengthen MIM’s organizational structure by creating an Advisory Board, increasing the tenure of MIM’s Secretariat, and planning for transferring the Secretariat responsibilities to African institutions.

The Panel makes several operational suggestions for MIM. *A small but powerful Advisory Board with a strong African voice should be formed to guide MIM.* The Advisory Board should provide technical expertise, involve itself in fundraising, help open doors in the public policy arena, and help leverage advocacy for African science. It should also provide much needed oversight and continuity of care for MIM, thereby helping overcome a number of existing and potential weaknesses in MIM’s current decentralized structure. The Panel recommends *extending the term of the Secretariat to a longer, standardized tenure of at least four years* to alleviate difficulties in “learning the ropes,” scheduling conferences, and fundraising created by too-frequent transfers. The Panel also recommends that the Secretariat *focus on strengthening MIM’s operations and funding base and working with interested African entities to build necessary organizational capacity so that a successful Secretariat can exist in Africa in the future.*

Recommendation 4. Plan strategically to augment and secure MIM’s long-term resources and funding.

MIM’s current funding approach is to identify critical issues for focus, then identify funding bodies with related interests—an approach that provides a tried and true formula for partnership investments. Such an opportunistic strategy will continue to play an important role in supporting MIM activities. But such a piecemeal funding approach detracts from MIM’s ability to approach overarching strategic goals such as building African scientific capacity for malaria research. The Panel feels that *with the development of a stronger, more coherent strategic vision and plan for MIM, potential focal activities will be clarified as parts of a whole, and funding for “the Big Picture” may be more easily solicited.*

The Panel commends the excellent staff of the MIM component organizations, and thanks them and the many researchers, administrators, and partners who participated in this review.



II. Background on the Multilateral Initiative on Malaria (MIM)

A. History of MIM's Formation

In 1995 and 1996, a group of international, regional and national funding bodies, research organizations, development organizations, and African scientists gathered to discuss strategies for developing collaborative, cooperative approaches to coordinate and amplify scientific efforts addressing health problems of Africa.

The intransigent infectious disease malaria, which has crippled Africa's people and economies for centuries, was selected as a critically important problem on which to focus. Harold Varmus, then Director of the U.S. National Institutes of Health (NIH), voiced the need for new action to complement the anti-malarial work already going on. He called for a collective effort to enact a grand strategy for research relevant to malaria treatment and control. Excitement about the possibilities followed, and several major funding bodies became involved in the new effort. While the original bold vision to attract substantial funds into a shared "bank account" for capacity development in Africa experienced a difficult birth, agreement was reached to move ahead with an initiative on a more limited scale. The coordinated effort eventually became known as the Multilateral Initiative on Malaria (MIM).

In January 1997, the First MIM Pan-African conference was held in Dakar, Senegal. The meeting brought more than 150 malaria researchers from Africa, Europe and the United States together with representatives from several funding organizations. They identified key scientific questions related to controlling malaria in Africa. An organizing office charged with coordinating MIM activities—the MIM Secretariat—was established at the Wellcome Trust in London, which agreed to fill the office for 18 months.

A few months later, representatives of the funding organiza-

tions met again to discuss practical mechanisms for supporting the research priorities laid out at the Dakar meeting. A multilateral fund supported by several donors was established at The Special Programme for Research and Training in Tropical Diseases (TDR) of the World Health Organization (WHO) in Geneva, Switzerland. Known as MIM/TDR and housed with TDR in Geneva, this multilateral fund was to act as MIM's arm for funding malaria research in Africa. The fund's initial supporters comprised the NIH, the World Bank, The World Health Organization's Africa Regional Office (WHO/AFRO), the government of Norway, TDR itself, and the Rockefeller Foundation. Today its supporters number the NIH, WHO/AFRO, TDR, Rockefeller Foundation, Japan, Roll Back Malaria, and the World Bank. MIM/TDR dispenses funds via a competitive peer-reviewed grant program.

Later in 1997, the United States' NIH National Library of Medicine (NLM) launched a third activity, MIMCom, aimed at setting up Internet and World Wide Web access to medical journals and improving electronic communications among malaria researchers in Africa. As such, MIMCom became the first electronic research network dedicated to malaria. In November 1997, a planning meeting was held at the U.S. NIH National Institute of Allergy and Infectious Disease (NIAID) to lay the groundwork establishing a Malaria Research and Reference Reagent Resource (MR4). The MR4 arm of MIM was charged with developing and distributing standardized research protocols and commonly used chemical reagents to those conducting malaria research worldwide. MR4, located at the American Type Culture Collection (ATCC) in Manassas, Virginia, was formally established in 1998.

Thus, within a year of the Dakar conference, with the formation of the MIM Secretariat, MIM/TDR, MIMCom, and M4, all four operational components of MIM had been established and had begun work.

Within a year of the 1997 Dakar conference, all four arms of MIM had been established and had begun work

Box 1. MIM Goals and Objectives in 1997

- To establish an effective process for communication and advocacy on the public health importance of malaria, an area to be developed through the Malaria Foundation.
- To sequence the malaria genome and ensure that the knowledge arising from the genome is applied to the discovery of new drugs and vaccines. This will enforce existing collaborations between the global research and funding community.
- To enhance the interaction between African scientists and their access to the global scientific community via the Internet; this program is being advanced through the National Institutes of Health and National Libraries of Medicine of the USA.
- To support a working group to explore ways of maximizing creative interaction between the communities involved in malaria research and malaria control in order to optimize the use of available methods for control and treatment of malaria, including the scientific and economic evaluation of intervention trials.
- To provide support for an annual African malaria conference to bring together African public health and research workers.
- To create an inventory of the infrastructure which exists within African malaria research centers to assess the capacity for activities relating to research and control with the objective of maximizing and improving the technical and human resource within centers.
- To create a working group to address issues relating to policy on the use of antimalarial drugs and on mechanisms for surveillance of resistance of those drugs within Africa, this working group to be established in collaboration with the World Health Organization.
- To create a group to work with the World Health Organization and related organizations in setting targets for reduction in the morbidity and mortality associated with malaria.
- To establish an MIM Contact Group to coordinate the further progress of these separate initiatives and the general aims of MIM. The Wellcome Trust will serve this coordinating role for the first year.

In March 1999, the Second MIM Pan-African Conference was held in Durban, South Africa. Its primary objectives included further defining research priorities to support malaria control programs. Later that year, responsibility for the MIM Secretariat was passed from the Wellcome Trust to the Fogarty International Center (FIC) of the NIH, where it has remained for three years.

The Third MIM Pan-African Conference is scheduled for November 2002 in Arusha, Tanzania. There, again, malaria research scientists and control groups from Africa as well as the rest of the world will convene to share information, define new research needs, form new collaborations, and strengthen existing partnerships. In January 2003, responsibility for the MIM Secretariat will pass from FIC to a Swedish group comprising representatives from the Stockholm University, Karolinska Institute, and the Swedish Institute for Infectious Disease Control.

B. Evolution of MIM's Core Goals and Objectives

MIM was established with the overarching goal "to strengthen and sustain, through collaborative research and training, the capability of malaria endemic countries in Africa to carry out research required to develop and improve tools for malaria control."¹ A list of more specific and fo-

cused goals and objectives was framed at the first MIM Pan-African Meeting in Dakar in 1997 (Box 1).

By 1998, several of these goals had led to the launch of the four component organizations of MIM. The remaining goals were refined, reflecting the nascent Initiative's ongoing re- definition of its focus (Box 2). Coordination of isolated research activities was recognized to be insufficient to ensure that research findings yield practical health benefits, so the remit of the MIM was broadened to encompass strengthening of the knowledge transfer between malaria research and malaria control efforts.

When the MIM Secretariat passed from the Wellcome Trust to the FIC, MIM's goals were further refined,² reflecting more a tightening of MIM's language than further evolution of MIM's outlook. These remain MIM's goals today:

- ⇒ To promote international communication, collaboration and cooperation to maximize the impact of research resources and to avoid duplication of effort;
- ⇒ To support research by investigators in malaria- endemic countries that will lead to new and sustain-

1 *Final Report of the International Conference on Malaria In Africa: Challenges and opportunities for Cooperation January 6-9, 1997, Dakar, Senegal.* Page 2.

2 Presentation by Andrea Egan to MIM Review Panel, September 30, 2002.

Box 2. MIM Goals in 1998

- To raise international public awareness of the problem of malaria in order to mobilize necessary resources and action.
- To promote global communication and cooperation between organizations and individuals concerned with malaria, with the aim of maximizing the impact of resources and avoiding duplication of effort.
- To develop sustainable malaria research capacity in Africa through international scientific partnerships. Further development of human resources and institutional capacity in Africa is essential to enhance the ability of African countries to address their own health problems. To publicize existing training opportunities and develop research capacity further by facilitating scientific partnerships across Africa, and between African researchers and international colleagues.
- To ensure research findings are applied to malaria treatment and control, and to translate practical problems into manageable research questions. To stimulate and facilitate dialogues among scientists, public health professionals, policy makers, and industry.

able methods of malaria control;

- ⇒ To strengthen and sustain African malaria research capacity through international scientific partnerships and training;
- ⇒ To ensure that research findings are applied to malaria treatment, control, and health policies.

B. MIM Component Organizations

Activities of the MIM are conducted within MIM's four major component organizations: the MIM Secretariat (the administrative arm), MIM/TDR (the funding arm), MIMCom (the electronic-communications arm), and MR4 (the research-materials arm). Each component of MIM has its own set of goals and objectives.

MIM Secretariat

The MIM Secretariat supports all objectives and initiatives under the MIM umbrella through a number of critical activities, and serves as a resource for all MIM components, part-

ners (listed in Table 1 in Section IV), and participants.

Major duties of the Secretariat include:

- ⇒ Increasing the dissemination of information to the malaria research community through conferences, workshops, publications, Web dissemination, a quarterly newsletter, and maintenance of a global listserv;
- ⇒ Organizing MIM Pan-African conferences, which enable scientists from across Africa and the world to discuss research issues and to form collaborations and research networks, building African research capacity. The conferences serve as an opportunity for scientists and control personnel to discuss research underpinning malaria-control activities;
- ⇒ Coordinating MIM support among partner groups;
- ⇒ Strengthening malaria research capacity in endemic regions by organizing workshops and training opportunities on topics including grant writing, peer review, writing scientific papers, making presentations, and developing leadership skills;
- ⇒ Identifying research gaps and addressing them.

The Secretariat maintains an email/fax list that periodically serves 1,600 people "News and Opportunities" of relevance to the MIM community. Many persons have been sponsored to attend workshops and conferences, and obtained research funding and jobs through announcements posted on this listserv.

MIM/TDR

As the multilateral funding arm of MIM, MIM/TDR provides grants to strengthen malaria research capacity in Africa. Its objectives are:

- ⇒ To generate new knowledge and tools for understanding the occurrence, distribution, prevention and control of malaria in Africa;
- ⇒ To develop human resources through research partnerships;
- ⇒ To produce a critical mass of African scientists, investigators and control managers engaged in the process of discovery, development and implementation of new tools and integration into policy.

MIM/TDR grants aim to promote partnerships, collaboration, technology transfer, and, perhaps most importantly, training opportunities through large, multi-country collaborative research projects and networks. Grants are coordinated and submitted by African scientists working in research groups in Africa.

MIM/TDR coordinates the MIM/TDR Task Force, which reviews proposals for research to strengthen African research groups. The Task Force comprises African scientists who are engaged in basic and/or applied science, investigators in developed countries, and the funder stakeholders (TDR, NIAID, WHO/AFRO, Rockefeller Foundation, the World Bank, and WHO Roll Back Malaria). Strategic priorities for the Task Force include both supporting research projects and training new African capacity for basic science and public health applications in several defined areas:

- ⇒ Functional genomics of parasite and vectors;
- ⇒ Health policy, systems and services research;
- ⇒ Pathogenesis of severe malaria and malaria in pregnancy;
- ⇒ Drug resistance, chemotherapy, chemo prophylaxis, and drug policy;
- ⇒ Epidemiology of transmission, immune response, morbidity, and mortality;
- ⇒ Socio-economic and behavioral research associated with malaria and health care;
- ⇒ Evaluation of community-based large scale preventive and therapeutic interventions;
- ⇒ Vector population, insecticide resistance, and alternative insecticides for Insecticide Treated Materials.

Investigators are encouraged to propose projects in partnership with other research groups in Africa, Asia, South America and advanced non-endemic countries and to include capacity building efforts through formal academic training.

MIMCom

The mission of MIMCom—MIM’s electronic communications component—is: “To support African Scientists in their ability to connect with one another and sources of informa-

tion through full access to the internet and the resources of the World Wide Web, as well as create new collaborations and partnerships.”³

MIMCom is a partnership between the NIH’s NLM and organizations in Africa, Europe, the United Kingdom, and the United States. It offers researchers help with telecommunications infrastructure, information access, and acquisition of new communications tools for research, training, and evaluation. It provides African researchers full access to the Internet and resources of the World Wide Web, as well as access to current medical literature. Technical training in electronic communications as well as other technical subjects is also provided to users and potential users in the African community (Box 3; also see Table 2, p. 23).

Box 3. Examples of MIM-Affiliated Workshops

- Workshop on Malarial Anemia (United States, 2000)
- Antimalarial Drug Resistance Network Workshop on Communication and Team Building (Scotland, 2000)
- Handling and Managing Biological Material (Burkina Faso, 2000)
- Workshop on Assays for Molecular Markers of Drug Resistance (Mali, 2000)
- Symposium on Insecticide Resistance (Zimbabwe, 2001)
- Malaria Bioinformatics Workshops (USA, Brazil, 2000, 2001, 2002)
- *Vivax* Conference (Thailand, 2002)
- Workshop on how to write research papers and how to give effective oral presentation (Zimbabwe, 2001; Tanzania, 2002)
- Workshop on Diagnosis of Placental Malaria (Cameroon, 2002)
- African Malaria Research Leaders Workshop in Leadership and Management (Tanzania, 2002)
- Sys-Ops Training Workshop (Scotland, 2000; Kenya, 2002)
- Bioinformatics Workshops, (Thailand, 2002; South Africa, 2002)
- Workshop: Transfection of Malaria Parasites (India, 2002)

3 Presentation by Julia Royall to MIM Review Panel, September 30, 2002

MR4

MR4 serves the malaria research community by providing standardized chemical reagents and by coordinating training. The objectives of MR4 are highlighted in the NIAID contract establishing the Resource at ATCC.⁴ MR4's objectives are to:

- ⇒ Improve global access of research tools;
- ⇒ Standardize certain reagents and protocols;
- ⇒ Serve as an information resource;
- ⇒ Provide workshops and training in critical areas.

Since 1998, with funding from NIAID, the ATTC in Virginia has operated MR4. A separate mosquito resource maintained at the Centers for Disease Control and Prevention (CDC) is also part of and managed by MR4.

MR4's collection of well-characterized research materials (Box 4) is available to researchers around the world on specific request for defined research projects. MR4 sponsors and conducts workshops and training opportunities that promote technology transfer. It also maintains a printed newsletter, a printed catalog of all reagents, and an online "cookbook" of malaria protocols.

MR4 has established a strong international Scientific Advi-

Box 4. MR4 Reagents, Products, and Services

- Reagents, including parasites, mosquitoes, antibodies, cell lines, genomic and plasmid DNAs, gene libraries, RNAs, proteins and microarrays.
- Special collections including parasites of defined genetic background, primate malaria parasites, drug resistant rodent parasites, genetically modified *P. falciparum*.
- Vector mosquito stock support, including stock maintenance, stock definition, authentication/quality control, acquisition, shipping, reagent preparation, product information sheet development, methods improvement, information dissemination to MR4/ATCC and others.
- Service examples include: Support of Workshops: Assays for molecular markers of anti-malarial drug resistance (January, 2002); Transfection of malaria parasites (April, 2002); laboratory methods for studying placental malaria (July, 2002); In vitro susceptibility testing of anti-malarial drugs (August, 2002).

sory Board that includes participation by African scientists. Members of the MR4 Scientific Advisory Board, which meets twice a year to give MR4's staff advice and direction, serve 3-year terms.

⁴ Presentation by Yimin Wu to MIM Review Panel, September 30, 2002.



III. Review Methodology

The qualitative review of the Multilateral Initiative on Malaria, initiated by the MIM Secretariat five years after MIM's launch, took place at the National Institutes of Health in Washington, D.C. from September 30 through October 4, 2002. The goal of the review was to provide a perspective to the current MIM Secretariat (the Fogarty International Center), to the incoming Secretariat (a Swedish group with representation from Stockholm University, the Karolinska Institute, and the Swedish Institute for Infectious Disease Control), and to MIM partners on the activities and coordination of MIM's component organizations as they plan for the next five years and beyond.

The review was to report on MIM's progress made from 1997 to now, to sample community opinions about MIM, and to provide some insight to MIM administration and funders regarding future opportunities. An expert group was impaneled to review program materials, engage in discussions with MIM-affiliated persons, and formulate a series of recommendations to program administrators (the text of the Charge to the MIM Review Panel can be found in Appendix 1). Each panelist had experience in one or more of the following areas: malaria, health research, health administration, evaluation, and international health science organizations and policy (members of the Review Panel and their affiliation are listed in Appendix 2).

The review began with presentations summarizing MIM's major goals, objectives, and accomplishments (an agenda of

the presentations appears as Appendix 3). The Panel heard from representatives of the four current MIM components: the MIM Secretariat housed at the FIC, NIH; MIM/TDR, the Initiative's funding arm, which sponsors research and research capability strengthening and is currently housed at the UNDP/World Bank/WHO Special Program for Research and Training in Tropical Diseases (TDR); the African communications initiative MIMCom, managed by the US National Library of Medicine (NLM); and the Malaria Research and

Reference Reagent Resource, (MR4), currently housed at the American Type Tissue Collection (ATCC).

More than 40 interviews were conducted during the five-day review. Interviewees included MIM funded scientists, program administrators involved with MIM activities and programs, representatives of funding organizations, and organizers and staff of other malaria related initiatives, and administrators and researchers that members of the review Panel suggested might provide valuable perspective (Appendix 4). To guide the Panel in its discussions, an interview protocol was developed based on questions provided by MIM leadership (the interview review protocol appears as Appendix 5).

Findings of the review and subsequent recommendations are presented in this document. The results of this review will also be presented formally at the Third MIM Pan-African Conference in November 2002 in Arusha, Tanzania.

The review's goal was to offer perspective on the activities and coordination of MIM's component organizations as they plan for the future



IV. Strategic Planning for MIM

A. Achievements

MIM's initial goals and objectives, laid out in Dakar in 1997 and subsequently modified, have played critical roles in shaping the Initiative's first five years. A remarkable number of the original objectives have been realized, as the following examples demonstrate:

- ⇒ The creation of MIMCom has provided isolated scientists with tools that bring the whole world closer. Reliable communication with collaborators and vastly improved access to the scientific literature have both increased the reach of African scientists and facilitated their participation in the broader scientific world, especially by improving their ability to publish in world-class journals, a key part of being a mainstream scientist.
- ⇒ Increased competency of African scientists over the past five years has been achieved through capacity building efforts, as demonstrated by, for example, the ability of MIM trained researchers to attract international funding (e.g. research groups in Noguchi, Ghana and Ifakara, Tanzania).
- ⇒ South-to-South collaborations have been greatly enhanced, for example, like those between the International Center of Insect Physiology and Ecology in Kenya which trains researchers from Uganda, Tanzania and Ethiopia in bioprospecting.
- ⇒ The creation of MR4 provides access to reagents and standardized protocols to scientists throughout most of Africa.

- ⇒ The Pan-African Conferences have provided an ongoing forum for African scientists to network and interact.
- ⇒ The inventory of infrastructure for African malaria research centers done by the first Secretariat, the Wellcome Trust, has encouraged better use of resources already in place in Africa.
- ⇒ The creation of the MIM Secretariat provides a vehicle to coordinate all the activities of MIM and serves the entire African Malaria community.

B. Planning Recommendations

Despite the notable progress by all of MIM's component organizations, much work needs to be done. Based on the Panel's interviews and discussions, it appears that an important potential stumbling block is MIM's lack of a *single overarching* set of goals and a strategic plan to guide its whole spectrum of activities and to secure the needed funding to achieve them.

The Panel heard many different sets of goals and objectives articulated for MIM and its components. While many interviewees grasped parts of MIM's mission, goals and objectives, other parts were unclear. Funding partners showed as much confusion about MIM's goals as did researchers. Even those involved directly in staffing MIM components did not have a common understanding of MIM's big picture. (It is important to note, though, that some *parts* of the big picture are almost universally understood.)

MIM's refined strategic plan should address scientific capacity-building, funding gaps, fundraising, and program tracking

Thus, the Panel believes that development of *one* clear, unifying mission, set of goals and objectives for MIM will provide great benefit to the overall program, its operations, and its ability to acquire resources.

The review Panel *recommends that MIM refine and clarify its mission and objectives* and that *MIM develop a strategic plan to carry out this mission*. MIM objectives should remain focused on the production of high quality research, on the development of African research capacity, and on the translation of research into policy.

This overall strategic plan should be designed and adopted by all MIM components; moreover, the components' individual working goals and plans should be made in service of MIM's overarching mission. The review Panel believes a round of thoughtfully communicated strategic planning at all levels is necessary for bringing all MIM components into a productive, self-reinforcing union. The Panel also believes that the development and communication of a coherent, well-articulated strategic plan will be crucial for MIM to attract donor-funding organizations, including large national and international programs, and to maintain their support.

The Panel believes this recommendation to be of such importance that it urges *every effort be made to begin this process of refining and strengthening strategic priorities at the upcoming MIM Pan-African Conference in Arusha* in November 2002. Input from the Pan-African Meeting's participants and ongoing discussion during the meeting can contribute to development of a stronger vision for MIM. In particular, a substantial group of stakeholders should be pulled aside during the meeting and pressed into service as a focus group to inform the strategic planning process. It is fundamentally important that this focus group include adequate representation from African scientists, and that to the greatest extent possible, researchers familiar with working in each of Africa's regions should be included.

Strategic Issues in Building African Malaria Research Capacity

MIM's refined strategic plan should address several critical issues currently facing the Initiative. These include scientific and geographic gaps in funding (scientific gaps are further discussed in Section VI), the role of MIM in capacity building, the role of MIM among potential partners and collaborators initiatives, general fundraising issues, and program tracking/monitoring elements. Each of these is discussed in turn below.

At present, there are significant gaps in the range of science

supported by MIM. Among the approaches left out are socio-economic and behavioral science, as well as health policy and systems research. The strategic plan should look at capacity building in these areas as well as in basic and applied health science, and include some thought on how and when these gaps may be addressed.

The interviews convinced the Panel that MIM's niche is in strengthening research capacity in Africa

It is recommended that the term "research capacity building" be well defined within the MIM strategic plan. During its review, the panel found that individual interviewees understood

this term to mean very different things. It would benefit MIM to define capacity building in terms of:

- ⇒ Research project support and training;
- ⇒ Development of excellent individual scientists;
- ⇒ Access to standardized protocols and reagents;
- ⇒ Development and access to communications and networking resources including improvement of connectivity between scientists;
- ⇒ Institutional capacity building and creation or enhancement of centers of excellence;
- ⇒ Mentorship;
- ⇒ Establishment of scientific networks;
- ⇒ Promotion of better research management and leadership development.

Developing a strategic plan for capacity development is essential. MIM, working with its new Advisory Board, should be able to identify the specific role that each current component of MIM will take in building research capacity in Africa. A number of approaches for capacity building exist. The Science Institutes Group, coordinated by institutions in Brazil, India, South Korea and the US, provides an excellent model. This group is working from well-established centers of excellence in different parts of the world and may be willing to work with MIM or at least share insights gained from their experiences.

Regarding the science, investing in the human capital for research represents the key to the future of malaria research and control in Africa and as such demands a credible mission statement and plan of action to achieve this. This plan of action must reflect the needs and aspirations of the malaria research community in Africa. The vision needs to be power-

Type of Organizations	Partners with the Multilateral Initiative on Malaria (MIM)
Governments, Ministries of Foreign Affairs	Japan; Netherlands; Norway
Research Institutes	In malaria endemic countries and in the North
Research Funding and Capacity Building Agencies	U.S. National Institute of Allergy and Infections Diseases (NIAID); U.S. National Library of Medicine (NLM) and the Fogarty International Center (FIC) of the National Institutes of Health (NIH); U.S. National Institute of Environmental Health Sciences (NIEHS); U.S. Centers for Disease Control and Prevention (CDC); American Society for Hematology (ASH); Howard Hughes Medical Institute (HHMI); German Federal Ministry of Education and Research (BMBF); Malaria Vaccine Initiative (MVI); UK Medical Research Council (MRC); Institut Pasteur; French Ministry of Research
Foundations	Wellcome Trust; Rockefeller Foundation; Burroughs Wellcome Fund; Malaria Foundation International; U.N. Foundation; Ellison Medical Foundation; Bill and Melinda Gates Foundation
United Nations	World Bank; World Health Organization/Control of Tropical Diseases (WHO/CTD); WHO Africa Regional Office (WHO/AFRO); United National Development Programme/World Bank/WHO Special Programme for Research and Training in Tropical Diseases (TDR); WHO Roll Bank Malaria
Control Agencies	U.S. Agency for International Development (USAID); U.K. Department for International Development (DFID); French Institute of Research for Development (IRD); Danish International Development Agency (DANIDA); Swedish International Development Agency (SIDA); Swiss Development Corporation (SDC)
Industry	Bayer; GlaxoSmithKline; Sanofi-Synthelabo; Syngenta

Table 1.

ful enough to ensure that the inequities in North-South malaria research divide are minimized over time, ideally by 2015, recognizing that capacity development must be a long term process requiring decades to achieve. The development of a scientific plan is further discussed in Section VI.

In addition to scientific gaps, strategic planning must address regional gaps in MIM funding in Africa. MIM should serve all malaria endemic areas of Africa. However, its activities are presently concentrated in a number of countries in West, East and Southern Africa where some capacity already exists. There are no activities in Central Africa. Though in places this reflects social and political problems that MIM cannot solve, strategic planning must look at methods of strengthening capacity in areas where there are currently no MIM activities. Development of South-South collaborations linking strong institutions with weaker ones is one way of strengthening still-isolated institutions in underserved parts of Africa.

Strategic Issues in Partnerships and Collaborations

Increased visibility of the diseases of the developing world has helped generate the will and the resources to establish several new disease-focused efforts. These efforts center on control, drug development, vaccine development and other large-scale issues related to lessening the impact of the major infectious diseases of the developing world. For a few exam-

ples, the Global Forum on Health Research has been created to provide advocacy, coordination and support for activities that are targeted to increasing research capacity. The Global Fund has been created to support control activities. The Malaria Vaccine Initiative is pushing vaccine development, while the Medicines for Malaria Venture seeks to develop new drugs for malaria treatment.

The number and variety of potential partners for MIM have multiplied dramatically in the few years since MIM was launched. Given these changes, there is a need for careful definition of MIM’s vision and strategy. Its plan of action for moving forward, the roles that different components and partners might play and especially the consideration of how to develop capacity in Africa must all carefully consider the possible impacts of these other efforts.

The Panel recommends in the strongest possible terms that MIM NOT expand its mandate at this time to malaria work beyond Africa

The panel recommends that MIM’s strategic plan include strategies for promoting partnerships and collaboration for MIM itself. MIM needs to position itself relative to other initiatives such as the Global Fund, WHO’s Roll Back Malaria program, Gates Foundation programs and others. If it is to remain competitive for funds, MIM must define its niche and thus distinguish itself from other malaria or capacity building efforts. The interviews convinced the Panel that MIM’s niche is strengthening research capacity in Africa. It recommends in the strongest possible terms that MIM **NOT** expand its mandate at this time to malaria work beyond Africa, specifically because of the

limited availability of resources. Should additional resources become available in the future, MIM should revisit its strategic plan to consider how to expand rationally into new areas or new activities.

New types of partnerships have been developed by all the current MIM components. The current Secretariat's recruiting the American Hematological Society to support activities that connect hematologists with scientists studying malaria-associated anemia is an example of one of these new partnerships. This effort has provided a new opportunity for the Society to serve its own mission and benefit its members, while also making way for new connections that will greatly enhance research on malaria anemia, providing fertile ground for African research in this area.

Though strong partnerships are highly valued and well worth the time it takes to develop them, seeding, growing, and funding new activities—especially ones that involve partners—take considerable staff time. This should be remembered when defining MIM's future staffing and financial needs, especially at the Secretariat.

Strategic Issues in Fundraising

The strategic plan should include new and efficient strategies for fundraising. Clearly, fundraising will only become more important to MIM as time goes on. Fundraising efforts will take up an increasing amount of MIM staff time. Building a MIM Advisory board (see Section V) may be a key part of this strategy for moving forward, since one role of this panel would necessarily include helping generate funds for MIM, assisting with or leading fundraising efforts.

To understand the level of fundraising needed, one must consider the balance of resources going for research on malaria in Africa, compared to the cost of controlling the disease. According to Tanzanian Prime Minister Frederick Sumaye, "The annual direct economic cost of malaria across Africa... will exceed \$3.5bn (in 2000), twice what it was in 1995". A possible benchmark might be to consider what should be spent on malaria research in Africa is the ratio of resources that the pharmaceutical industry allocates for its R&D. In the drug industry, research ranges from 8-18% of the total budget. Setting a conservative goal of investing 10% of the cost of African malaria in research suggests that at least \$350 million should be funding work to understand malaria and its control. Ideally, at least 10% of this \$350 million, \$35 million, should be directed through MIM to support activities in research capacity building. The Panel recognizes that such a dramatic increase in funding is not realistic. For the time being, however, a more realistic goal would be to double the

current total funds spent on MIM, from approximately \$8 million to \$16 million. Every effort should be made to achieve, at the very least, this level of growth.

There are tensions between the research capacity mandate of MIM and the control agenda for treatment and prevention of disease. The growing numbers of organizations, including those aimed at malaria and those with other foci, will set up a struggle for the available resources. MIM must carefully identify and define its niche. The recently created Global Fund will be a potent fundraiser that may shift dollars from research to control. There will be a strong need for research to guide and monitor these control efforts if there is to be a way to know which efforts to prevent and treat malaria will be successful. This is only one of the many possible opportunities and challenges facing MIM in the coming few years.

Using MIM to support control activities as well as research and capacity development means that MIM must pay careful attention to what roles it *could* play to leverage other resources for MIM from the large control-oriented efforts like the Global Fund. MIM's balance between research and control, and how to choose a control niche should be discussed at the upcoming MIM Pan-African meeting in Arusha, to which the MIM Secretariat has invited representatives of many of these groups.

Strategic Issues for MIM's Components

While MIM itself is engaging in new planning, its components MIM Secretariat, MIMCom, MR4, and MIM/TDR should also refine and clarify their strategic priorities.

MIM Secretariat

The MIM Secretariat has played different roles in its first two iterations. While under FIC's leadership it has focused on promoting partnerships, identifying research gaps, coordinating meetings and workshops, and setting up the Web site, newsletter and the listserve.

The MIM Secretariat has organized an effective, democratic mechanism for succession of the Secretariat. The process involves the outgoing Secretariat requesting proposals from MIM partners interested in assuming responsibility for the Secretariat, and then allowing the community of partners to vote for the best proposal.

The list of partners has grown dramatically since MIM was established, however, so the Panel recommends that the new MIM Secretariat—perhaps in conjunction with a new Advi-

sory Board (see Section V below) and the other MIM components—review its definition of “partnership” in light of the long list of partners now making various levels of contributions to MIM and the important decisions that the partners must make. Guidelines for the responsibilities of partners and for partner accountability should be established. It is important that an organization’s partnership have both “buy in” components and “serve-in” mechanisms so that poorer organizations that are critical partners will not be marginalized because of an inability to contribute funds, and so that cash-only contributors otherwise uninvolved in MIM’s ongoing function will not come to overwhelm the Initiative’s democratic pool.

The Panel recommends that MIM/TDR develop the MIM/TDR Task Force into a more strategic advisory group

In the course of strategic planning, it will be important for the new MIM Secretariat to define not just its own role, but also to shape the role of future Secretariats. Future Secretariats will assume some of the same functions established by the first two, but should clarify the practical ongoing issues of how to coordinate a mature MIM without crossing the line to governing it. Responsibilities of the first two Secretariats included shepherding the MIM through its early days, seeking new partners, and instituting important MIM communications resources like the newsletter, website, fax/email list. An organizational chart of MIM (Figure 1) first designed for this review, should be reviewed. This type of chart could help delineate the roles of MIM components in the future.

While MIM has been able to mobilize many resources, the Secretariat’s lack of status as a legally chartered organization has made it especially difficult to secure funds from some organizations, especially non-governmental organizations (NGOs) whose rules require that they deal only with legally chartered entities. Further, housing the first two Secretariats within large funders, first the Wellcome Trust and then NIH, created additional constraints on receiving funds from NGOs and other entities. There may also have been a tendency to let these large funders assume the burden of providing the Secretariat’s funding rather than developing new funding streams, so substantial fundraising may be a new task for the Secretariat when the office rotates to Sweden.

The future Secretariat should participate fully in the recommended strategic planning and focus specifically on its own goals for the next few years. While some goals will follow past efforts, new efforts—such as working closely with African partners who may become the next Secretariat and fundraising for MIM sustainability—should be considered.

MIM/TDR

The World Health Organization’s TDR plays a critical role as it provides some of the research funding for the MIM program. However, increased earmarking and donor-driven in-

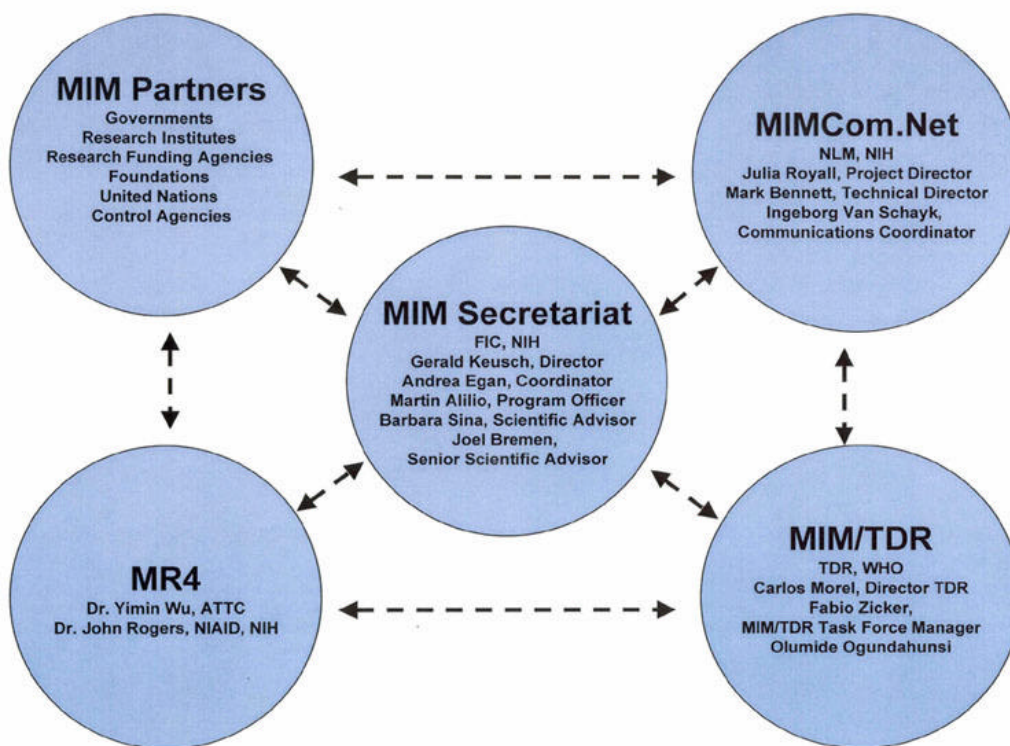


Figure 1

terests have severely limited TDR's ability to direct funds broadly to support its agenda.

WHO's TDR has a strategic vision of its own,⁵ especially with regard to tool development for malaria control. MIM/TDR works in the broader context of TDR, which focuses much of its efforts on tool development against diseases of the tropics. It is unclear, however, what role MIM/TDR plays in the malaria portfolio of TDR, which encompasses more than just MIM. TDR has budgeted approximately \$27 million for malaria in the 2002-2003 budget.⁶

Whether MIM can play a role in determining the overall malaria science agenda within TDR is unclear. Through its interviews, the Panel learned that TDR, through its Scientific Working Group will be holding a malaria priority-setting meeting in the next few months which, as far as the Panel has been able to determine, will include no specific representation from MIM, although some scientists working on MIM projects may be involved. The Panel recommends that TDR consider involving MIM in their malaria-priority-setting meeting.

The Panel recommends that MR4 should revisit the idea of regional centers

The Panel recommends that MIM/TDR consider developing the MIM/TDR Task Force—which now serves only as a reviewing body for grant proposals submitted to the program—into a more strategic advisory group that will provide input not only to MIM/TDR but also to MIMCom and the rest of MIM. The Panel further recommends that bridges be built from MIM to TDR to increase African participation in TDR malaria activities beyond MIM.

MIMCom

MIMCom's activities so far have been largely opportunistic, and its staff has been very creative in finding opportunities to enhance communications in Africa.

Profound needs still exist for establishing communications in Africa, but with the groundwork now well laid, the Panel suggests that a more strategic approach should be developed

for moving forward. MIMCom is encouraged to identify systematic ways to increase connectivity throughout the whole African region so that appropriate potential funders and partners for a large ongoing effort can be identified and recruited.

MR4

MR4 has made much progress developing and distributing standardized protocols and reagents and has supported many workshops and conferences. For the future however, more is needed to help African scientists gain hands-on involvement in world-class scientific research done in Africa. Dependence on a single funder (NIAID) has so far limited scientist's access to MR4 in some parts of Africa.⁷

The Panel recommends that as MR4 considers its future and its role in MIM, it should revisit the idea of regional centers, described in MR4's earliest plans. As a world resource, MR4 should evolve in such a way that scientists in *all* of Africa can become more closely involved in developing and sharing malaria reagents. The Panel makes this recommendation with the understanding that NIH has limitations in funding this type of activity. MR4 will have to put considerable effort into identifying new funders as it moves forward. The technical issues involved in setting up the regional centers will also be significant. MR4's strategic plan should, therefore, assign appropriate time and resources for such critical new developmental work.

Strategic Issues in Monitoring MIM's Progress

As the strategic plan develops, MIM should also include elements for monitoring, evaluating and reviewing its progress and that of its constituent activities. MIM activities should be launched with full consideration of the need for proper scientific measurement of outputs, outcomes, and impacts, both to understand the activities' effectiveness and to help inform future planning. Efforts should include a review of finances in order to track resource flows into and out of MIM.

5 *Research Capacity Strengthening: STRATEGY (2002-2005)*, UNDP/World Bank/WHO Special Programme For Research and Training in Tropical Diseases (TDR).

6 <http://www.who.int/tdr/publications/publications/pdf/budget.pdf>

7 See footnote 1.



V. Managing MIM and its Component Organizations

A. Achievements

MIM is seen by many interviewees as having been an important force directing resources toward malaria research and the need to develop capacity for scientific research in Africa. Interviewees also credited MIM for having actually mobilized additional resources to build scientific capacity in Africa, and for bringing broader public attention to the malaria research agenda.

The Review Panel found that the Secretariat's information disseminating function is highly valued by the community. During interviews with funders, the "relentless" receipt of email from the MIM Secretariat was frequently mentioned. The funders felt that the frequent e-mail updates kept them informed and aware of MIM activities and of opportunities.

According to interviewees, big meetings such as the Pan-African MIM conferences are valuable because they provide fora for African researchers to get together— fora that otherwise would not exist. Indeed, many view the 1997 First MIM Pan-African meeting at Dakar as a defining moment for malaria research and control. Interviewees pointed out that major conferences help a far wider community than just African scientists. According to pharmaceutical company scientists interviewed for this review, the upcoming Pan-African MIM conference in Arusha will be useful in part because it will foster connections between industry scientists and African researchers, giving both sides a chance to seek out colleagues for work on vaccine and drug development.

The Panel heard through interviews that smaller conferences, workshops and training activities conducted by the MIM Secretariat, MIM/TDR, MIMCom and MR4 are also enthusiastically attended and make enormous contributions to strengthening the research and control environment by connecting scientists and policy makers.

Between 1998–2000, MIM/TDR supported 23 multi-center projects involving 24 African countries, 7 European countries and the United States (see Appendix 7). These projects supported 20 Ph.D. students and 17 students working toward Masters degrees.⁸ In addition, MIM/TDR holds training workshops for grantees, collaborators and students from malaria-endemic countries.

The Panel found that interviewees feel MR4 provides a central focus of Standard Operating Procedures and training across many laboratory needs. MR4 sees itself as "more than a collection": the community-based approach to sharing and standardizing reagents fosters cooperation among researchers

⁸ MIM Review Panel Briefing Book, Section on MIM/TDR.



Figure 2

for the use of these research tools in effective, coordinated studies.

Regarding MIMCom, the almost universal opinion of the interviewees and Review Panel is that high-speed Internet connection to the WWW and email has created an almost entirely new set of opportunities for the scientists located at participating malaria research sites. To date, thirteen research sites benefiting more than 1000 malaria-endemic country scientists, many of which have satellite connections through MIMCom and its technical partner Redwing in the United Kingdom (Table 2 and Figure 3). Some sites on the network operate a wireless connection to a local Internet Service Provider (ISP) or to another MIMCom.Net site nearby. The African research sites selected as MIMCom’s communication hubs are of recognized high quality. Each of the sites established in MIMCom’s first five years required improved communications to pursue ongoing research, and had the necessary resources to purchase equipment and sustain the system.

Many of the sites feel that they would no longer be able to function without this facility and regard the enhancement of connectivity as a significant step toward reducing the inequities of research advantages in the North compared to the South. Indeed it was also noted by one of the Panelists that accessing on-line PDF copies of malaria literature through the MIM website free of charge in Nairobi was easier than trying through the bureaucracies and inadequacies of digital library access at Harvard University!

“We’re not so far away, any more,” said one researcher. “We’re finally *‘here’*.” Increasing the connectivity of African scientists, both with each other and with scientists in the rest of the world is a role that MIMCom has played well. Electronic access to journals and a new ability to communicate easily with other scientists, together with MIM-provided opportunities for face-to-face meetings at workshops and conferences, has greatly facilitated African capacity development. The Panel encourages MIMCom to continue enhancing institutional capacities for accessing library material, on-line training courses, telephone and videoconferences.

B. Management Recommendations

MIM is currently a loose-knit group of related organizations coordinated by a Secretariat. The Secretariat does not govern the activities that are a part of MIM, and those running MIM activities do not administer the Secretariat. Coordination of the MIM program, accomplished through the Secretariat, has

MIMCom.Net Sites and Connection Dates	
Kistan, Kenya	July, 1999
Kilifi, Kenya	July, 1999
Noguchi, Ghana	December, 1999
Navrongo, Ghana	December, 1999
Nairobi, Kenya	March, 2000
Ifakara, Tanzania	September, 2000
Amani, Tanzania	September, 2000
Dar Es Salaam, Tanzania	September, 2000
Mbita, Kenya	July, 2001
Entebbe, Uganda	August, 2001
Blantyre, Malawi	April, 2002
Kampala, Uganda	May, 2002
Yaounde, Cameroon	September, 2002

Table 2.

contributed to its overall value and importance, according to those interviewed by the panel.

Management Issues in Continuity

The panel views the current lack of an advisory board to oversee all the MIM components as a central organizational flaw that could be readily remedied. Establishing a MIM Advisory Board could provide much needed oversight and continuity of care for MIM, and could help overcome a number of existing and potential weaknesses generated by MIM’s current decentralized structure.

The Panel recommends that a small but powerful Advisory Board with a strong African voice—comprised of experts on research needs and capacity development, and with entrée in policy arenas—should be formed by the new Secretariat in conjunction with the entire MIM, to advise the entirety of MIM. Further it is recommended that individual advisory groups for the MIM components should continue their work and be represented on MIM’s overall Advisory Board. These advisory groups should have at least a 50% representation from African partners. Staff and close advisors to these groups should communicate regularly with each other and with the MIM Secretariat.

‘We’re not so far away any more,’ said one researcher of the effect of MIMCom’s connecting of African scientists with each other and with the rest of the world. ‘We’re finally “here”.’

Emerging MIM/TDR research networks

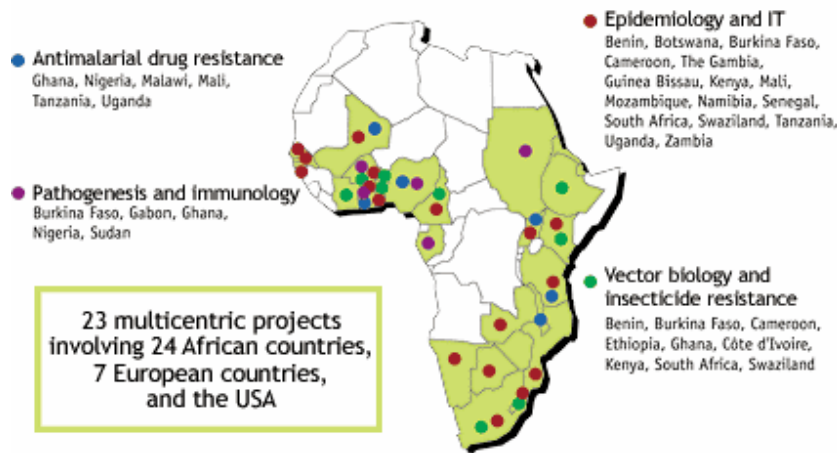


Figure 3

Management Issues in Internal Communications

There appear to be some difficulties in maintaining good internal communications among MIM's various component organizations. For example, there seems to have been some difficulty in some MIM components' staff staying in touch and informing each other of upcoming conferences, workshops and other activities. Elements of the problem may include basic issues like distance, workload, personalities or cultural differences. However, good linkage and effective communications are critically important for MIM's future. This problem must be addressed and remedied if MIM is to succeed.

The Panel recommends that staff and active advisors of all components of MIM should gather regularly to inform each other about their various activities and to coordinate plans. Technology has made this easier and more convenient than ever before. They can interact by conference call, in person or by electronic or videoconference. The Panel feels strongly that a continuous effort to communicate must be made by all components of MIM. These internal communications efforts should be led by the MIM Secretariat and monitored by the MIM Advisory Board, but promoting good communications should also be a formal part of the responsibilities of the managers of each of the MIM components.

The MIM components should each continue their good work facilitating workshops, conferences, and other convening activities (see Box 3 in Section II for examples of these activities). These workshops and conferences should be linked to MIM's overall strategic plan as well as to the plans of the individual components involved. Each component of MIM should keep the others informed about their schedule for

The Panel feels strongly that all components of MIM must inform one another regularly about activities and plans

conferences and workshops. Although MIM is not moving toward expansion beyond Africa, links to researchers and control colleagues working on similar operational/health services research projects in other developing countries in Asia and Latin America are useful sources of ideas and information for African scientists and control officers working on malaria. The MIM Secretariat should help establish these relationships.

The new Secretariat is encouraged to expand the Secretariat's Internet presence and to develop an overarching Internet identity for MIM itself. In addition, monitoring and evaluation of MIM Internet sites should be built into planning to allow the Secretariat and managers of the MIM components to make informed decisions on how to proceed with Internet communications in the future.

Management Issues Involving Partnerships

At the organizational level, substantial numbers of new partners have been mobilized to promote support for MIM activities. The new MIM Secretariat has the opportunity to take advantage of new partnership models that have been generated by the current Secretariat in the course of forming MIM's current links. It can use these models to define the roles, benefits, opportunities, expectations and obligations of its different partners.

It is recommended that MIM's strategic plan detail how it will maintain existing partnerships and cultivating new partner relationships (see Section IV). Partnerships should be considered in the context of scientific discovery, research capacity development and policy implementation as well as fund raising needs. As mentioned in the Planning section, MIM needs to refine its definition of "partner" so that all parties are aware of the responsibilities and rewards of MIM partnership.

Management Issues With a Rotating Secretariat

There are benefits to frequently rotating the Secretariat. These include sharing the burden of work, bringing new energy and new thinking to the coordinating body, and decreasing the resource burden borne by any one MIM partner.

There are serious drawbacks to frequent rotation, however. The Secretariat loses its momentum each time it moves, and this momentum must be restored, often at the cost of considerable staff time. A new group of staff must "learn the ropes" each time the Secretariat rotates. Many of the workshops and conferences held by the current MIM Secretariat have taken

place only in the last year of the Secretariat's tenure. The learning curve and then preparation time for activities leave MIM with a Secretariat that is rotating just as its staff is coming into its own. Frequent rotation makes fundraising more difficult, as well.

For these reasons, while preserving the valued democratic nature of the Secretariat's succession, the Panel recommends increasing the stability of the Secretariat by extending the term of the Secretariat to at least four years.

The Panel recommends increasing the stability of the Secretariat by extending its term to at least four years

Most people interviewed during the review said that in the long run, they would like to see the MIM Secretariat in Africa. For now, though, thought might be given to solidifying MIM's operations and finding stable funding to sustain the effort. The next MIM Secretariat should become a mentor for potential African partners who would like someday to take on this role, and should work closely with them to begin laying groundwork for moving the Secretariat to Africa in the not-too-distant future.



VI. Improving the Environment for African Malarial Science

A. Achievements

MIM's ultimate aim is to help create well-run, well-equipped, well-funded African institutes with good opportunities for collaborative high quality research. The Initiative has provided an enabling environment for research in Africa through meetings, networks, workshops and by fostering development of MIMCom. Enormous progress has been made through a number of MIM initiatives, including MIM sponsored development of meetings, networks, and workshops. All components of MIM have taken part in providing this enabling environment.

The 1997 First MIM Pan-African Conference in Dakar was probably the most significant malaria-specific meeting in Africa since 1950. It provided a forum where broad issues related to research capacity building were articulated alongside a consensus built research agenda relevant to discovering new tools and improving delivery of old ones. The inclusion of research partners from Africa in this process fostered a sense of the value and worth of the continued African contribution to malaria research and control.

MIM/TDR coordinates MIM's investment in scientific research. Between 1998 and 2002 the MIM/TDR Task Force reviewed 135 proposals. Thirty-six proposals, all driven by African principal investigators, have so far received support. Proposals were selected for funding using a simple profile:

- ⇒ The principal investigator must be an African national scientist working in Africa;
- ⇒ The project must have at least one African research partner institution and at least one non-African partner;

- ⇒ Funded work must be a single collaborative project of a research program involving partnerships in different regions or between researchers with different areas of expertise;
- ⇒ There must be one strong African partner and one weaker African partner;
- ⇒ There must be scientific and capacity building outcomes.

Funding for MIM/TDR projects is for up to three years, with annual budgets ranging from \$20,000 to \$600,000. MIM/TDR currently has invested in research fields ranging from socio-economic science to vector control (see Appendix 7).

The sheer number and geographical extent of collaborative personal and institutional networks is a testament to MIM's success since 1997

In response to the 1997 Dakar conference, MIM/TDR has emphasized several specific goals for research it funds. Specifically the research projects (either individually or as a network) should improve research capacity and leadership in Africa, or define a strategic research area for malaria, or increase opportunities for North-South and South-South partnerships, or it optimize the incorporation of research results into malaria control policy and practices.

There have been a number of significant outcomes from the first rounds of MIM/TDR projects. Several South-South collaborations have been established around important and pragmatic control themes including insecticide resistance, antimalarial drug resistance, and geographical mapping of malaria risks. North-South and South-South partnerships have resulted in the development of technology transfer in Geographical Information Systems (GIS), molecular and vector biology, and in pharmacological and clinical skills. Partnerships formed by these projects can be viewed by looking at the collaborators for the first 23 projects MIM/

TDR funded through 2000. Twenty-three programs have trained 20 young researchers to the Ph.D. level and 17 students to Masters levels. Annual principal-investigator meetings have created supra-disciplinary linkages between malaria scientists on the African continent.

Several personal and institutional networks have evolved as a result of the MIM/TDR funded centers. In fact, network development represents a major, novel advance in capacity building. The sheer number and geographical extent of these networks is a testament to MIM's success since 1997. Interviewees reported that networks had enabled their science to be developed within a more diverse set of African conditions, fostered contacts that they would not have otherwise had a chance to make, bridged the East-West divide, allowed for the transfer of skills and created long term relationships (See Box 5 and Figure 2).

The research agenda set at the Dakar meeting in 1997 was inevitably broad, reaching from molecular science to health systems research. It is beyond the scope of the present review to enumerate how MIM-associated research output has met the priorities identified at Dakar. However, the panel recommends that *scientific* strategic planning begin in parallel with an operational strategic plan. This process is discussed below.

B. Recommendations for Scientific Development

During the very week the MIM Review Panel met, both the journals *Nature* and *Science* published genome sequences of the most dangerous malaria parasite, *Plasmodium falciparum*⁹ and its insect vector, *Anopheles gambiae*.¹⁰ A symposium that week celebrating the completion of these genomes reinforced the need to capitalize on these new tools for malaria research initiatives aimed at vaccine and drug development and at vector control.

New genomic and molecular tools are creating new opportunities for basic science. Yet MIM/TDR does not yet support much work with these tools in Africa. It is important to assure that African scientists will have access to these new tools and to the infrastructure needed to use them. At the genome symposium, Fred Binka, Director of the Navrongo Health Research Center in Ghana and chair of the MIM/TDR Task Force, eloquently noted the need for scientific capacity development in

9 M.J. Gardner *et al.*, *Nature*, **419**, 498 (2002).
10 R.A. Holt *et al.*, *Science*, **298**, 129 (2002).

Box 6. Malaria-Focused Networks in Africa

Networks formed as a direct consequence of support from MIM/TDR:

- Mapping Risk of Malaria In Africa (MARA)
- Antimalarial Drug Resistance
- Malaria Transmission Intensity and Mortality Burden Across Africa (MTIMBA)
- WARDA (Influence of rice cultivations on malaria transmission and morbidity in Ivory Coast)
- Insecticide Resistance
- Parthenogenesis

Networks not receiving direct MIM support, but indirectly affected:

- Severe Malaria in the African Child (SMAC)
- Pregnancy Malaria and Anemia (PREMA)
- East African Network for Monitoring Anti-malarial Treatment (EANMAT)

Africa, stating, "We must avoid creating a genomic divide."

The research agenda established at Dakar has not been revisited since 1997. The Panel recommends a new audit of the current malaria research effort—both work funded by MIM and by other funders—and output be commissioned to measure progress since Dakar. The audit should identify areas that are adequately supported and have well developed human capacity, as well as areas that remain under-funded and have little effective human resource. For example, there is a gray area between support for the operational aspects of monitoring and surveillance and support for using these systems to enable hypothesis-driven research. Opportunities for both research and control exist at this interface, which is ripe for exploration.

As MIM's research agenda established at Dakar has not been revisited since 1997, the Panel recommends commissioning a new audit of malaria efforts in Africa to identify new opportunities

The MIM Secretariat's role should include updating the consensus-built research priorities for malaria through a collaborative and inclusive process, as typified by the Dakar conference, to guarantee adequate African representation from both the research and control communities. The Panel recommends that the process to begin this continuing updating of goals should be discussed at the meeting in Arusha, to encourage scientific strategic planning in parallel with the operational strategic planning described in a previous section.

MIM's priorities could be expanded to reflect newly emerging operational research questions around national government and WHO/Roll Back Malaria (RBM) priorities for

combination therapy, treatment of malaria in pregnancy, deployment of insecticide treated nets and the control of malaria in areas prone to epidemics. These areas already are strengths of TDR, and so may be accessible to MIM/TDR.

In the future, MIM/TDR should strive to develop capacity in West and Central Africa and to invest more funds in social and health services projects especially if these are again identified as a priority in the malaria science agenda which the Review Panel has suggested be revisited and updated by consensus among the scientific community and the partners. Support from MIM/TDR has largely been directed toward centers of excellence and scientific leaders with proven track records and capacity in malaria research. This has been important during the nascent stages of MIM, but the Panel recommends that MIM/TDR develop a vision to allow expansion to emerging institutions with time.

The Panel feels that it is important, at this time and with the current amount of funding, to retain MIM's focus on malaria *in Africa* and that any extension of MIM outside of Africa would divert resources, and thus demand careful discussion and consensus.

Mentorship, from both northern and southern institutions, was identified as a component of capacity building that must be better supported and promoted. This may require development of guidelines and training opportunities for mentors and a commitment that mentorship relationships developed would continue beyond initial funding of projects.

In addition, it was suggested to the Panel that retired professors from the North should be encouraged to take on academic mentorship in Africa through schemes promoted by US foundations, the British Council or equivalents elsewhere in Europe. Mentorship from funders is valuable, as well: for applicants' scientific development, those failing to gain support from MIM-sponsored grant programs should be given substantial feedback, when possible, to help them improve their proposals' chances of being funded elsewhere or in later rounds of funding.

During the interviews, the Panel heard that researchers trained in Northern institutions and strong Southern institutions become demoralized and isolated when they return to weak institutions. The Panel recommends that significant efforts be made to build infrastructure at emerging institutions and to provide returning trainees with resources so that after returning to work at weaker centers, they can maintain linkages with their strong partners.

By staying better connected, these researchers will retain the ability to stay in touch with MIM's broader capacity building

opportunities, as well as with the Initiative's helpful workshops and its substantial scientific meetings. Because MIM's networks are having such an immediate impact on African scientists, they should be reviewed to examine their comparative strengths and weaknesses, and "lessons learned" should be disseminated.

MIMCom's communications hardware efforts have been impressively valuable, so members of the Panel were surprised that this effort is not better funded. For further development of African scientists' research capacity, the Panel recommends strategic expansion of MIMCom's investment in hardware and extending connectivity to emerging institutions, particularly those with young scientists returning from training at strong institutions.

Salary enhancements were described by interviewees as major advances toward creating stable, effective working conditions for scientists in receipt of MIM/TDR awards. The Panel suggests that these enhancements continue and that MIM/TDR's system of performance merit awards should be reviewed more exhaustively so that future MIM support to African scientists can be maintained by mechanisms that fit their needs.

The Wellcome Trust's 1999 report on the inventory of research capacity for Malaria in Africa¹¹ should be used as a template for an updated, more detailed appraisal of Pan-African centers of malaria research. The Panel proposes that an audit should be conducted to identify research strengths across different disciplines; potential mentors and their capacity and willingness to absorb more trainees; broad indicators of the quality of research environments (laboratory support, connectivity, libraries, time allowed for research, etc.); and each research center's visions for trainees' future career development and support.

Building substantial, effective research capacity requires African research leadership. Proposals for building leadership capacity have been made, but they have received only limited financial support. It is recommended that a broader strategic vision for critical top-level capacity development be defined under the stewardship of the next MIM secretariat. It is imperative that this vision be defined early and in accordance with the goals/purpose of the MIM initiative.

Lastly, the translation of MIM/TDR funded research into health policy and practice is difficult to quantify, but efforts should be made to identify ways it can be better defined and supported in the future.

Mentorship is a component of capacity-building that must be better supported and promoted

¹¹ *Strengthening Health Research in the Developing World: Malaria Research Capacity in Africa*. The Wellcome Trust. 1999.



VII. Further Discussion of Recommendations

Recommendation 1. Refine and clarify MIM's vision, goals and objectives for the next five years, and develop a strategic plan to fulfill them.

Over time, MIM has described its objectives in slightly different ways. The Panel believes it essential that the Secretariat refine and clarify the mission and objectives of the MIM. The objectives should remain focused on the production of high quality research and on the promotion of successful translation of research into policy through sustainable development of African research capacity.¹²

There is a compelling need to define and coalesce all components and MIM partners around a common shared MIM mission to develop scientific capacity in Africa. Heavy involvement of African scientists in defining this vision is essential. *The Panel recommends that the upcoming MIM meeting in Arusha be used to begin to define its vision and mission. Further, a group of partners should convene to create a strategic plan for MIM for the next five years.* Capacity development requires a sustained, long-term effort to succeed. It is a vision that will not be achieved overnight, but will require patient and persistent efforts and the mobilization of sufficient funds, as well as periodic frank reviews of progress toward goals large and small.

In particular, the Panel recommends that efforts beyond generating a shared mission must be directed toward development of a coherent long-range plan with measurable and specific objectives that define how capacity development will be engaged. Components of such a plan might include establishment of Centers of Excellence with African scientists at their core; increasing connectivity of endemic country scientists to world literature and other items necessary for the production of high quality scientific research; promoting scien-

tific exchange; making tools and opportunities available to build collaboration among colleagues around the world; and developing research management training and expertise in Africa. Promotion of mentorship and development of improved networks between researchers are also priorities.

Expectations about the scope and activities of these components should be defined in the plan. A plan to develop Centers of Excellence, for example, might be expected to include plans to maintain a critical mass of researchers in residence, provide researchers local access to world-class equipment, facilities, and communications, establish research management training to sustain the ongoing development of their researchers; and notably, extend their expertise in outreach to surrounding institutions.

New developments, organizations, projects and partnerships created to address diseases such as tuberculosis, AIDS and malaria have mobilized new resources, especially for disease control. Among the potential partners (and competitors) that have emerged since the founding of MIM are the Global Fund, the Global Forum for Health Research, the Roll Back Malaria program, the Science Institutes Group, various Gates Foundation initiatives, and others. *The Panel recommends that MIM define its position in the landscape of these new developments and outline clearly its role within the context of these new and emerging efforts.*

The Panel also recommends refining the strategic plans of MIMCom, MR4, MIM/TDR and the MIM Secretariat. To date, MIMCom activities have taken advantage of resources where they arise. Now that significant groundwork has been laid, a more strategic approach must be developed. MIMCom is encouraged to identify systematic ways in which connectivity for malaria researchers throughout the whole of the African region can be increased. The MR4 has made great progress in developing and distributing standardized protocols and reagents. These materials and MR4's training activities (See Boxes 3 and 4) have been especially valuable to researchers in Africa. Extending these activities would be of

¹² The Review Panel did not resolve the issue of how to balance basic, applied and policy translation under the MIM umbrella. This is something that remains unresolved and will require the efforts of the next secretariat to explore further.

great value. But more is needed to help African scientists become more involved in developing world-class research capacity in Africa. *The Panel recommends MR4 consider exploring new sources of funding and establish regional centers—as described in MR4’s initial planning—so that scientists in all of Africa¹³ can become more closely involved in development of shared malaria resources.*

During interviews, the Panel heard from a number of individuals that there are significant issues interfering with smooth coordination between the MIM Secretariat and the MIM/TDR Task Force. In light of these discussions, the Panel proposes several suggestions to improve the interaction between the MIM/TDR Task Force and MIM as a whole. *Only individuals who can and will attend all meetings should occupy positions on the MIM/TDR Task Force. At least 50% of the MIM/TDR Task Force’s membership should be African, and there should be specified term limits for service so that all member spots will be rotated over time, improving diversity of participation and influence.*

The MIM/TDR Task Force, which exists to review MIM/TDR’s competitive grants, is not currently a strategic body steering MIM’s research investment in development of African scientific capacity. *It is recommended, therefore, that MIM/TDR look for opportunities to increase its input into TDR malaria policy, and that a more strategic use be made of the current MIM/TDR Task Force.*

Recommendation 2. Enhance communication and coordination between MIM’s four component organizations.

Each of the MIM components and the Secretariat has a specific role to play in capacity development. *Therefore, the Panel recommends that the overall MIM strategic plan should be developed in concert with each of these four groups, which will at the same time be independently developing their own plans. This will not be easy, but it is crucial for MIM’s success.*

Each group is already organizing well-run, successful activities, as well as networking meetings and conferences. The Panel unanimously applauds the four organizations and their activities, and recommends they continue. The task at hand is to strengthen these activities by building better ties between them. To encourage this, all MIM components should be kept apprised of each other’s activities. Frequent meetings (monthly) between staff, sharing of work plans, and having

13 Because of U.S. restrictions on export of materials to Sudan, MR4 as currently funded and operated cannot fulfill Sudanese requests for malaria-related materials. See *Nature* **411**, 510 (2001).

members of staffs from *all* MIM components participate in each organization’s planning cycles will help MIM activities become better connected. *The Panel recommends all of these ways of enhancing and stimulating interactions between the MIM component activities.*

In addition, the Panel advises that MIM should be represented at critical decision-making TDR meetings involving malaria, not just those touching on the MIM/TDR activity, and TDR should be kept informed of and involved in MIM activities.

Recommendation 3. Strengthen MIM’s organizational structure by creating an Advisory Board, increasing the tenure of MIM’s Secretariat, and planning for transferring the Secretariat responsibilities to African institutions.

The Panel makes several operational suggestions for MIM:

First, *a small but powerful Advisory Board should be formed to guide MIM.* This group should provide technical expertise, involve itself in fundraising, help open doors in the public policy arena, and help leverage advocacy for African science.

Second, *the committee recommends that a longer, standardized tenure for the Secretariat may be appropriate.*

Third, *the Secretariat should focus on strengthening MIM’s operations and funding base, before moving to Africa.*

Finally, the Panel suggests that *the new Secretariat should work with interested African entities to provide proper preparation and help build necessary organizational capacity so that a successful Secretariat can exist in Africa in the future.*

Recommendation 4. Plan strategically to augment and secure MIM’s long-term resources and funding.

MIM’s activities and projects so far have leveraged and augmented investments in capacity development. The Initiative’s current funding approach is to identify critical issues for focus, then identify funders with related interests. This funding approach provides a tried and true formula for partnership investments and such a strategy will continue to play a very important role in supporting MIM activities. But this piecemeal funding approach detracts from MIM’s ability to approach overarching strategic goals like promoting capacity

building for African science. *The Panel feels that with the development of a stronger, more coherent strategic vision and plan for MIM, potential focal activities will be clarified as parts of a whole, and funding for “the Big Picture” may be more easily solicited.*

New large-scale disease-focused initiatives—potentially collaborators, but also competitors—continue to evolve. The Panel notes that it will be critical for MIM to clarify its role and demonstrate its importance if it is to capture major funding.

The long-term goal of capacity development in Africa is generation of an excellent research environment with adequate, sustainable funding. The yearly cost of malaria control in

Africa is more than \$3.5 billion per year. Using the pharmaceutical industry’s benchmark of spending 8-18% of budget on research, a conservative \$350 million per year should be spent on research against African malaria. Ideally, at least 10% of this \$350 million, \$35 million, should be directed through MIM to support activities in research capacity building. MIM is funded at about 1/4 that level. The Panel recognizes that a dramatic increase in funding—from the current approximately \$8 million to an ideal \$35+ million, is not realistic. A more realistic goal would be doubling the current total funds spent on MIM annually, from approximately \$8 million to \$16 million, over the next 2-3 years. *The Panel recommends that given the need to substantially increase MIM’s funding that fundraising be built into MIM’s future strategic plans.*



VIII. Conclusion

Five years in, the progress of the Multilateral Initiative on Malaria is viewed as impressive. The Panel's report focuses on three areas: planning for the future development of MIM and its components, management and achievements of the overarching MIM and secretariat, and improving the environment for African malarial science. The report makes recommendations to be considered in each of these areas. It is the Panel's hope that these recommendations will contribute to strengthening MIM so that it can continue to improve its progress toward meeting its vision.

This review also provides some operational insight for the new Secretariat to consider in the years ahead. Notably, it raises a number of issues to be discussed by MIM's partners and its constituents—active research and control scientists focusing on malaria in Africa—at the Arusha conference.

The Panel hopes its recommendations will lay the foundation for stimulating discussion at the Third MIM Pan-African meeting in Arusha, Tanzania, and that MIM's second five years is as filled with impressive achievements as its first.

Appendix 1

Charge Letter to the Chair of the MIM Review Panel



DEPARTMENT OF HEALTH & HUMAN SERVICES

National Institutes of Health

Fogarty International Center
Bethesda, Maryland 20892-2220

August 19, 2002

Enriqueta C. Bond, President
Burrroughs Wellcome Fund
Post Office Box 13901
Research Triangle Park, NC 27709-3901

SUBJECT: Charge letter to MIM Review Panel

Dear Queta:

Thank you for agreeing to chair a panel that will conduct an independent review of the Multilateral Initiative on Malaria (MIM). The members of your committee include Moses Bockarie, Susan Mutambu, Thomas Nchinda, Mario Rodriguez, Robert Snow, and Isabella Quakyi. Moses Bockarie is the head of Vector Borne Diseases Unit, Institute of Medical Research, Madang, Papua New Guinea; Susan Matumbu is the Acting Chief Medical Research Officer and Head of Malaria Reference Laboratory at the Blair Research Institute, Zimbabwe; Thomas Nchinda was involved with the formation of MIM and currently works as the Senior Public Health Specialist at the Global Forum for Health Research in Geneva; Mario Rodriguez is a researcher currently working at the Institute of Public Health in Cuernavaca, Mexico; Robert Snow is a researcher at the Centre for Tropical Medicine, Oxford University, currently working at the Wellcome Trust/ KEMRI Programme, Kilifi, Kenya; and Isabella Quakyi is a malaria researcher currently working at the Noguchi Memorial Institute, University of Ghana. Added to your strong scientific and organizational background, this is a wonderfully rich team with enormous capacity to review the MIM.

The goal of this review is to provide perspective to program leadership and to the new MIM Secretariat on the activities and coordination of the various MIM activities. Given the limited time frame and resources to conduct this review we do not expect this will be an in-depth review, nor is it intended to guide informed mid-course corrections in the program. Rather, we are looking for a broad based review and qualitative assessment to provide an overview of how MIM is addressing the needs of the malaria research community in Africa, not an operations audit. The summary report of the review panel findings, which should be submitted to me for adoption and circulation, will be most useful in advance of the MIM Conference in Arusha, November 2002.

In order to facilitate your analysis, the Fogarty International Center (FIC) has assigned the FIC Evaluation Officer as well as the MIM Secretariat Staff to work with you. Their role is to provide documents and resource materials as well as assist in logistics of setting up your meetings. A draft outline of the review, including the format and questions to be answered, is attached to this letter. It is anticipated that during your meetings, there will be opportunities for you to meet in "open session" with any FIC/ MIM staff, colleagues from the MR4 reagent resource, MIMCom, the connectivity activity, and with Carlos Morel from TDR. We will do our best to schedule these meetings for you. The report that you produce should represent the findings of your independent review and analysis. If any difficulties arise during your review or you need any additional resources please contact me so we can make any necessary changes or arrangements to ensure the integrity of the process.

Sincerely,

Gerald Keusch, MD
Director, Fogarty International Center
Director, MIM Secretariat

Appendix 2

MIM Review Panel

Moses Bocharie, Ph.D.

Principal Research Fellow
Papua New Guinea Institute of Medical Research
P.O. Box 378, Madang
Papua New Guinea

Enriqueta Bond, Ph.D., Chair MIM Review Panel

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Robert Snow, Ph.D.

Visiting Scholar, Center for International Development
Harvard University
79 JFK Street
Cambridge, MA 02318

Appendix 3

Review Panel Meeting Agenda

REVIEW OF THE MULTILATERAL INITIATIVE ON MALARIA (MIM)

REVIEW PANEL MEETING

AGENDA

*Monday through Friday, September 30th-October 4th, 2002
Fogarty International Center
Stone House – Building 16
National Institutes of Health
Bethesda, MD*

Monday, September 30th, 2002

Welcome and Introductions

*Sharon Hrynkow, Fogarty International Center (FIC)
Welcome and History of MIM* 8:30 – 8:50

Louis Miller, National Institute of Allergy and Infectious Diseases (NIAID)
Historical Perspective 8:50 – 9:10

Presentations

*Michael Gottlieb, NIAID
MIM and Its Partner Organizations: Advancing Malaria Research* 9:10 – 9:40

*Andrea Egan, MIM Secretariat Coordinator, NIH/FIC
Overview of MIM, MIM Secretariat, Operations, Accomplishments and Opportunities* 9:40 – 10:10

Break 10:10 – 10:30

*Yimin Wu, American Type Culture Collection, (MR4)
MR4 – Operations, Achievements, Opportunities* 10:30 – 11:00

*Julia Royall, National Library of Medicine (NLM)
Project Director (MIMCOM)
MIM COM – Operations, Achievements, Opportunities* 11:00 – 11:30

*Fabio Zicker, World Health Organization (WHO) (MIM/TDR)
MIM/TDR – Operations, Achievement and Opportunities* 11:30 – 12:00

Gerald Keusch, MIM Secretariat Director
Charge to MIM Review Panel 12:00 – 12:10

Appendix 3

Panel Lunch, discussions including all above presenters 12:10 – 1:10

Interviews

Incoming MIM Secretariat 1:10 – 2:00

Andreas Hedding, Karolinska Institutet

Ingrid Faye, Stockholms Universitet

Marita Troye-Blomberg, Stockholms Universitet

Mats Wahlgren, Karolinska Institutet

Fabio Zicker, MIM/TDR Task Force Manager) 1:10 – 2:00

Sambe Duale, MIM, Scientific Advisor 1:10 – 2:00

Interviews

Yimin Wu, ATCC/MR4 2:00 – 3:00

Julia Royall, NLM Project Director, MIMCOM 2:00 – 3:00

Andrea Egan, MIM Secretariat Coordinator 2:00 – 3:00

Break 3:00 – 3:15

Informal Panel Discussion 3:15 – 5:00

**Tuesday, Wednesday, Thursday
October 1,2,3, 2002**

Interviews 8:30 – 11:00

Break 11:00 – 11:15

Panel Discussion 11:15 – Noon

Lunch Noon – 1:00

Interviews 1:00 – 3:45

Break 3:45 – 4:10

Panel Discussion 4:10 – 6:00

Friday, October 4, 2002

Finalize Report – Review Debrief 8:00 – 11:00

Debriefing with *Sharon Hrynkow* 11:00- 12:00

Lunch 12:00 – 1:00

Symposium on Anopheles and Plasmodium Genomes - NIH

Lipsett Auditorium – Building 10

1:00 – 5:30

Appendix 4

List of Interviewees

Planning and Administration

Martin Alilio, MIM Secretariat Program Officer, FIC, NIH, Washington, DC, USA
David Alnwick, Roll Back Malaria/WHO, Geneva, Switzerland
Fred Binka, Chair of the MIM/TDR Task Force, Accra, Ghana
Catherine Davies, Wellcome Trust, United Kingdom
Andrea Egan, MIM Secretariat Coordinator, FIC, NIH, Washington, DC, USA
Andrew Githeko, African Scientist and MIMCom.Net partner, Kenya
Brian Greenwood, DMP/LSHTM, United Kingdom
Olumide Ogundahunsi, UNDP/World Bank/WHO TDR, Geneva, Switzerland
Regina Rabinovich, Malaria Vaccine Initiative, Rockville, Maryland, USA
Richard Steketee, US Centers for Disease Control, Atlanta, Georgia, USA
Yimin Wu, MR4, ATCC, Manassas, Virginia, USA

Management and Partnerships

Joseph Cohen, GlaxoSmithKline Bio, Belgium
Jill Conway, Howard Hughes Medical Institute, USA
Mary Ettl, USAID, Washington, DC, USA
Timothy Evans, Rockefeller Foundation, USA
Ingrid Faye, Stockholms Universitet, Sweden
Walter Fust, Swiss Development Corporation, Switzerland
Michael Gottlieb, NIAID, NIH, Washington, DC, USA
Andreas Heddini, Karolinska Institutet, Sweden
Sharon Hrynokow, Fogarty International Center, NIH, Washington, DC, USA
Stephanie James, Ellison Foundation, Washington, DC, USA
Gerald Keusch, Director FIC, Director MIM Secretariat, NIH, Washington, DC, USA
Louis Miller, NIAID, NIH, Washington, DC, USA
Carlos Morel, UNDP/World Bank/WHO TDR, Geneva, Switzerland
Ok Pannenberg, The World Bank, Washington, DC, USA
Michel Pletschette, European Union, Brussels, Belgium
Marita Troy-Blomberg, Stockholms Universitet, Sweden
Harold Varmus, President, Sloan-Kettering Cancer Center, New York, USA
Mats Wahlgren, Karolinska Institutet, Sweden

Research and Science

Hamza Babiker, Malaria Scientist, United Kingdom
Bartholomew Akanmori, Malaria Scientist, University of Ghana, Ghana
Joel Breman, MIM Secretariat Senior Scientific Advisor, FIC, NIH, Washington, DC, USA
Timothy Egan, Malaria Scientist, South Africa
Maureen Coetzee, Malaria Scientist, South Africa
Sambe Duale, MIM Scientific Advisor, USAID, Washington, DC, USA
Ahmed Hassanali, MIM Grantee, Kenya
Wen Kilama, Malaria Vaccine Testing Network, Tanzania
Julia Royall, MIMCom.Net, National Library of Medicine, Washington, DC, USA
Barbara Sina, MIM Secretariat Scientific Advisor, FIC, NIH, Washington, DC, USA
Brian Sharp, Director, Malaria Research Program, Medical Research Council, Durban, South Africa
Yeya Toure, WHO, Geneva, Switzerland
John Vulule, MIM Grantee, Kenya
Fabio Zicker, MIM/TDR Task Force, Geneva, Switzerland

Appendix 5

Interview Protocol

Questions for Program Planners and Administrators:

Program Goals / Objectives: (are the goals clear/achievable?)

- How would you describe the goals/mission of the MIM (or MR4/ MIMTDR/MIMCOM)?
 - o Do these seem appropriate/effective (too narrow or broad in scope)?
 - o Have current plans and activities deviated from MIM's original goals? How and why?
- How does your particular group address the issues of planning and setting strategic priorities?
 - o Do you use a strategic plan? Who develops it? Who participates in the development? How often is it revisited?
- What mechanisms are set in place to ensure that progress is being made, and goals are being met? What is needed?
- What do you see as priority areas for malaria research/capacity building? Does MIM address these?

Program Activities

- What is the community/constituency served by MIM?
 - o What geographic areas are served by MIM—are such efforts balanced? Where is more intervention required?
 - o What has MIM done to address its goal to apply research to treatment and control? How could these activities be strengthened/improved?
- What efforts are in place to raise public awareness of the problem of malaria?
- What has MIM done to achieve capacity building? What are other strategies or opportunities that might help MIM reach its goal of developing sustainable research capacity?
- What mechanisms are in place to promote global communication and cooperation?
- How does MIM compare or contrast to other efforts or initiatives of similar size/scope?
 - o How does MIM, as a model compare to other programs?
 - o What are some other models ?

Program Outputs:

- How has MIM raised public awareness? Your group in particular?
- Does MIM prevent duplication of effort? —what does your group in particular do to reach this goal? Provide examples.
- How has MIM maximized the impact of resources—your group in particular? Provide examples.
- What key discoveries and partnerships has MIM enabled? Provide examples.

Program Outcomes:

- How would you characterize MIM's most important contributions? Provide examples.
- How has MIM addressed malaria research/capacity building?
- Has the nature and direction of malaria research changed since MIM's inception?
- What is the extent to which MIM has placed itself in a changing research environment?
- How has MIM positioned itself amongst other networks (such as SAMC, etc.)?
- Has MIM been effective in translating research into priorities? Provide examples.
- What would progress in malaria research and capacity building efforts be like without the influence of MIM? In other words, what has MIM made possible that might not otherwise be possible?

Questions for Program Management and Partnerships

Program Goals / Objectives:

- What is the nature of your partnership/interaction with MIM? Provide examples.
- What is your understanding of MIM's goals? What is the role of your group in helping MIM to achieve its goals (which goals are they addressing) ?
- What is the relationship to MIM within your larger organization? Is it given a high priority? Provide examples.
- How often and in what capacity do you interact with coordinators/leaders from other institutions and agencies within the MIM? Are improvements needed to this process (if so, what might be done?)?
- How aware are you of what is happening within the other component parts of MIM?
- Does the Secretariat provide adequate coordination and support to allow your group to achieve its goals?
- What are the challenges to program management for your particular group? For the MIM as a whole?
- Who is your user community? Do you develop a strategic plan? How often is it revisited? Who is involved in the development process?

Program Activities:

- What systems are in place to track and monitor MIM's progress, achievements, and finances? Who administers the system? What is needed?
- How is the MIM program advertised by your group? What else could be done?
- Is the current grant proposal and selection process adequate/effective? Who is involved? Is the best talent being attracted and how do you know?
- What is the quality of proposals submitted to the MIM?

Program Outputs / Outcomes:

- What have been the key achievements of the two secretariats, thus far, from your perspective?
- How are the products of the collaborative efforts of the groups within the MIM greater than what might be otherwise possible from each individual group? i.e., is it a truly collaborative effort or does each group operate independently?
- How does the MIM compare to other organizations of similar size and scope? What can MIM learn from these other groups?
- How has MIM addressed malaria research/ capacity building?
- What have been some examples of effective management practices?
- What advice might you give to the new secretariat?
- What are some opportunities which MIM could take advantage? What are some examples of opportunities which MIM already has taken advantage?

Questions for Partners:

Program Goals / Objectives:

- How did you come to know MIM and its work?
- Describe your relationship to MIM? What is the role of your partnership within MIM?
- How often and in what capacity do you interact with MIM program management? Are you included in MIM planning and priority setting?
- In your own words, what do you believe are the goals of MIM?
- How would you classify the role of partnerships in allowing MIM to achieve its goals?

Program Activities:

- Why did you choose to partner with MIM? (or why did you choose not to partner with MIM?) What has the partnership achieved for your organization? Provide examples. Would achieving these same objectives have been possible without collaboration with MIM?

Appendix 5

- Are there areas where more support is needed that might benefit from increased partnerships? Describe.
- Do you promote or communicate information about MIM to others? How? (will help us to understand whether partnerships help “spread the word” about MIM)

Program Outputs / Outcomes:

- What specific outcomes have resulted from your partnership with MIM?
- To what extent do you believe that the research process and results involve the malaria control communities in the countries and regions where the work is carried out?
- How has MIM addressed malaria research/capacity building?

Questions for Researchers/Grantees:

Program Goals / Objectives:

- How did you come to know MIM?
- What is your understanding of the purpose and goals of MIM?
- Do you feel you had/have a part in setting the MIM agenda (goals and objectives)?

Program Outputs / Outcomes:

- What do you think about the MIM/TDR grant review process?
- How does it compare to other grant processes?
- Is appropriate feedback provided on proposal submissions?
- Are guidelines for submission and other requirements clear?
- How do you receive funding for your research? What other granting agencies fund your research? Would you apply to MIM again?
- Aside from funding, are there ways in which you think you can gain benefit from MIM?
- Are there things MIM can do to help you achieve your goals? Or researchers like yourself?
- How would your research or ability to do research be different without MIM?
- What factors other than the quality of research itself affected the outcomes/impacts of your own work? Are these barriers that could be addressed by MIM?
- Which aspects of MIM do you believe provide the greatest value?
- Have interactions with counterparts at other locations/partners produced new knowledge? How?
- What do you believe are the key contributions/results/discoveries that MIM has enabled? Provide examples. How would the malaria ‘network’ be different without MIM?
- How has MIM increased research capacity? Do you see its effects? Provide examples.
- What has been the impact of MIM on training researchers and students from your perspective? How has MIM affected you? Provide examples.
- What is the extent to which MIM has placed itself in a changing research environment?
- Are there changes in MIM you would like to see implemented? Opportunities?

Questions for researchers who did not receive funding:

- How did you first hear about MIM?
- What do you think are MIM’s goals – in your own words?
- What is your understanding of the MIM/TDR review process?
- Is appropriate feedback provided on proposal submissions?
- Are guidelines for submission and other requirements clear?
- How do you receive funding for your research? Would you apply to MIM again?
- Aside from funding, are there ways in which you think you can gain benefit from MIM?
- Are there things MIM can do to help you achieve your goals? Or researchers like yourself?

Appendix 6

Glossary of Acronyms

ATCC	American Type Culture Collection, Manassas, Virginia
CDC	Centers for Disease Control and Prevention, Atlanta, Georgia
FIC	Fogarty International Center of the NIH
MIM	Multilateral Initiative on Malaria
MIMCom	MIM's electronic-communications arm
MIM/TDR	MIM's branch in WHO's TDR that functions as MIM's funding arm
MR4	Malaria Research and Reference Reagent Resource, MIM's research-materials arm
NIAID	National Institute of Allergy and Infectious Disease in NIH
NIH	U.S. National Institutes of Health
NLM	National Library of Medicine in NIH
RBM	Roll Back Malaria program of WHO
TDR	Special Programme for Research and Training in Tropical Diseases in WHO
UNDP	United Nations Development Programme
WHO	World Health Organization
WHO/AFRO	World Health Organization's Africa Regional Office

Appendix 7

MIM/TDR-Funded Projects (2002-1998)

Project ID	Institution / Country	Project Title	Partners
Achidi	University of Buea, Buea, Cameroon	Antibodies, Cytokines & Gene Polymorphisms in the Pathogenesis of Severe Malaria	University of Ghana
A11034			Noguchi Memorial Institute for Medical Research, Accra, Ghana
			Dept. of Immunology, Stockholm University, Stockholm, Sweden
			London School of Tropical Medicine & Hygiene, London, UK
			School of Biological Science, University of Manchester, UK
Akanmori	University of Ghana, Noguchi Memorial Institute for Medical Research, Legon, Ghana	Workshops, training and capacity building in support of malaria immunology & pathogenesis consortium in Africa	University of Buea, Buea, Cameroon
A10622			University of Ibadan, Ibadan, Nigeria
			Hopital Albert Schweitzer, Lambarene, Gabon
			University of Sudan, Khartoum, Sudan
Akogbeto	OCCGE, Cotonou, Benin	Network for the study of factors conditioning the evaluation of pyrethroid resistance in <i>Anopheles gambiae</i> s.l. in Africa	Liverpool School of Tropical Medicine, Liverpool, UK
A10625			Institut de Recherche pour le Developpment, Montpellier, France
Gbadegesin	University of Ibadan, College of Medicine, Ibadan, Oyo State, Nigeria	The role of host-parasite genetic variability in the pathogenesis of severe malaria	Manchester Institute of Nephrology and transplantation, Manchester Royal Infirmary, Manchester, UK
A10627			Hopital Albert Schweitzer, Lambarene, Gabon
Hassanali	International Centre of Insect Physiology & Ecology (ICIPE), Nairobi, Kenya	Consolidating R&D partnership in Bioprospecting for mosquito repellent & insecticidal botanicals with focus on applicati	Jomo Kenyatta University of Agriculture and technology, Nairobi, Kenya
A10638			Makerere University, Kampala, Uganda
			Kenya Medical Research Institute, Nairobi, Kenya
			NIMR, Amani Research centre, Amani, Tanzania
			Addis Ababa University, Addis Ababa, Ethiopia
Mombouli	Laboratoire National de Santé Publique, Brazzaville, Congo	Molecular epidemiology of endothelin-1 and pathogenesis of severe malaria	Universite Louis Pasteur, Strasbourg, France
A10576			

Nwuba	University of Ibadan, Ibadan, Nigeria	Charact. & dynamics of antibodies to merozoites surface protein-1 of <i>P. falciparum</i> in human naturally exposed to malaria	University of Science and Technology of Musuku, Franceville, Gabon
A10581			
Koram	Noguchi Memorial Institute for Medical Research, University of Ghana, Legon, Ghana	MIM/TDR Antimalarial Drug Resistance Network in Ghana	Universite du Mali, Faculte de Medecine, Pharmacie & Ondotostomat, Bamako Mali
A20237			Malaria Research Laboratories, PIMRAT, College of Medicine, University of Ibadan, Ibadan, Nigeria
			Ifakara Health Research and Development Center, Ifakara, Tanzania
			National Library of Medicine, US
			National Institute of Allergy and Infectious Diseases, US
			Malaria Research & reference Reagent Resource Center, Virginia, US
Djimde	Molecular Epidemiology and Drug Resistance Unit, Malaria Research and Training Center, Department of Epidemiology of Parasitic Diseases, Faculty of Medicine, Pharmacy and d'Odonto-Stomatologie, University of Mali, Bamako, Mali	MIM/TDR Antimalarial Drug Resistance Network in Mali	Malaria Research Laboratories, PIMRAT, College of Medicine, University of Ibadan, Ibadan, Nigeria
A20238			University of Ghana, Noguchi Memorial Institute for Medical Research, Accra, Ghana
			Ifakara Health Research and Development Center, Ifakara, Tanzania
			National Library of Medicine, US
			National Institute of Allergy and Infectious Diseases, US
			Malaria Research & reference Reagent Resource Center, Virginia, US

Gbotosho	Malaria Research Laboratories, Postgraduate Institute for Medical Research and Training (PIMRAT), College of Medicine, University College Hospital, Ibadan, Nigeria	MIM/TDR Antimalarial Drug Resistance Network in Nigeria	Universite du Mali, Faculte de Medecine, Pharmacie & Ondotostomat, Bamako Mali	
A20239			University of Ghana, Noguchi Memorial Institute for Medical Research, Accra, Ghana	
			Ifakara Health Research and Development Center, Ifakara, Tanzania	
			National Library of Medicine, US	
			National Institute of Allergy and Infectious Diseases, US	
			Malaria Research & reference Reagent Resource Center, Virginia, US	
Mshinda	Ifakara Health Research and Development Center, Ifakara, Dar es Salaam, Tanzania	MIM/TDR Antimalarial Drug Resistance Network in Tanzania	Universite du Mali, Faculte de Medecine, Pharmacie & Ondotostomat, Bamako Mali	
A20240			Malaria Research Laboratories, PIMRAT, College of Medicine, University of Ibadan, Ibadan, Nigeria	
			University of Ghana, Noguchi Memorial Institute for Medical Research, Accra, Ghana	
			National Library of Medicine, US	
			National Institute of Allergy and Infectious Diseases, US	
			Malaria Research & reference Reagent Resource Center, Virginia, US	
Akogun	Federal University of Technology, Yola, Nigeria	Malaria illness experience & socio-political determinants of service utilization in Northeastern Nigeria		
A10626				
Chipeta	University Teaching Hospital, Lusaka, Zambia	The impact of HIV infection on acquisition and maintenance of immunity to Plasmodium falciparum malaria		
A10631				

2000				
Project ID	Institution / Country	Project Title	Partners	Status
Elbashir	University of Khartoum, Faculty of Medicine	Description of Clinical Features and Immunopathology of Severe Malaria in Areas of Unstable Malaria Transmission in Sudan	Tropical Medicine Research Institute, Khartoum, (Sudan)	Active
A00003	Sudan		Blue Nile research & Training Institute, Wad Medani, (Sudan)	
			Children Emergency Hospital, Khartoum (Sudan)	
			Khartoum Teaching Hospital (Sudan)	
			New Halfa Hospital (Sudan)	
			National Malaria Administration, (Sudan)	
			Center for Medical parasitology, (Denmark)	
			Department of Immunology, Stockholm University (Sweden).	
Thompson	Centro de Investigacao en Saude de Manhica	Malaria transmission Intensity and Mortality Burden Across Africa (MTIMBA)	Navrongo Health Research Center (Ghana)	Active
A00005	Maputo		Centre National de Recherche et de Formation sur le Paludisme – CNRFP. (Burkina Faso)	
	Mozambique		Ifakara Health Research and Development Center (Tanzania)	
Egwang	Med Biotech Laboratories, Kampala, Uganda	Capacity Building in Molecular, in vitro and clinical surveillance of antimalarial drug resistance in Uganda	Ministry of Health (Uganda)	Active
A00028			Kenya Medical Research Institute (Kenya)	
			Department of Medicine, Makerere University (Uganda)	
			University of Glasgow (United Kingdom)	
			University of California, San Francisco (USA)	
		London School of Hygiene and Tropical Medicine (United Kingdom)		

1999				
Project ID	Institution / Country	Project Title	Partners	Status
Akogbeto	Organisation de Coordination de la Cooperation pour la Lutte contre les Grandes Endemies (OCCGE)	Network to study factors conditioning evolution of pyrethroid resistance in <i>Anopheles gambiae</i> s.l.	Centre Muraz (Burkina Faso)	Completed
990078	Benin		IPR (Cote d'Ivoire)	
			Blair Research Institute (Zimbabwe)	
			IRD (France)	
			University of Wales (UK)	
Hassanali	International Centre of Insect Physiology and Ecology	R&D partnership in bio-prospecting for anti-malarial, mosquito repellent & insecticide plants in East Africa	Makerere University (Uganda)	Completed
990056	Kenya		KEMRI (Kenya)	
			KETRI (Kenya)	
			National Institute of Medical Research (Tanzania)	
			University of Dar es Salaam (Tanzania) Kenyatta University (Kenya)	
Meda	Organisation de Coordination de la Cooperation pour la Lutte contre les Grandes Endemies OCCGE, Centre Muraz	Bioequivalence of 2 quinine formulations to treat childhood malaria: intravenous versus intrarectal administration	Centre Muraz (Burkina Faso)	Completed
990087	Burkina Faso		IMEA Hopital (France)	
			CIRMF (Gabon)	
			Paediatric Hospital (Madagascar)	
			Paediatric Hopital (Burkina Faso)	
Oketch-Rabah	University of Nairobi	Research and development of new botanical antimalarial drugs in East Africa	Kenyatta University (Kenya)	Active
990096	Department of Pharmacology and Pharmacognosy Kenya		Makerere University (Uganda)	
			Muhimbili University (Tanzania)	
			Royal Danish School of Pharmacy (Denmark)	
			Wellcome Trust (UK)	
Sanogo	Centre National de Lutte Contre le Paludisme (CNLP)	Relation between malaria transmission intensity and clinical malaria, immune response and plasmodic index	Ecole Medicin et Pharmacie (Mali)	Completed
990112	Burkina Faso		London School of Hygiene and Tropical Medicine (UK)	
			University of Rome "La Sapienza" (Italy)	

1998				
Project ID	Institution / Country	Project Title	Partners	Status
Adeniyi	University of Ibadan	Incorporating socio-cultural/economic characteristics of mothers / caregivers in home management of childhood malaria	Johns Hopkins University (USA)	Completed
980048	College of Medicine		Obafemi Awolowo University (Nigeria)	
	Nigeria			
Ajaiyeoba	University of Ibadan	Identification and clinical evaluation of potential anti-malarial components from Nigerian phytomedicine compendium	University of Mississippi (USA)	Active
980046	Department of Pharmacognosy		University of Port Harcourt (Nigeria)	
	Nigeria			
Akanmori	University of Ghana	Immunopathology of severe anaemia in <i>Plasmodium falciparum</i> infected children	WRAIR - Walter Reed Army Institute of Research (USA)	Completed
980037	Noguchi Memorial Institute for Medical Research		CNLP - Centre National de lutte contre le Paludisme (Burkina Faso)	
	Ghana		University of Copenhagen (Denmark)	
Mnzava	Medical Research Council	Mapping malaria risk in Africa (MARA)	Swiss Tropical Institute, Basel (Switzerland)	Completed
980057	National Malaria Research Programme		Navrongo Health Research Centre (Ghana)	
	South Africa		Malaria Research Centre (Mali)	
			OCEAC (Cameroon)	
			KEMRI / Wellcome Trust Laboratories (Kenya)	
			National Institute for Medical Research (Tanzania)	
Doussou-Yovo	OCCGE	Influence of environment modification for rice cultivation on malaria transmission and morbidity in rural IVC forests	CEMV - Centre de formation en Entomologie, Université D' Abidjan	Completed
980056	Institut Pierre Richet		Ministerie de la Sante de Cote d'Ivoire	
	Cote d'Ivoire		CNRS - Centre National de Recherche Scientifique (Ivory Coast)	
			Laboratoire de Lutte contre les Insectes Nuisibles, Montpellier (France)	
Doumbo	Universite du Mali	Surveillance and control of drug-resistant malaria	Faculte de Medecine (Benin)	Completed
980152	Ecole Nationale de Medecine et de Pharmacie		Centre Regional pour le Developpement et la Sante (Benin)	
	Mali		Faculte de Sciences et Technique (Benin)	
			CHU, Pediatric (Guinea)	
			University of Maryland (USA)	
			NIH - National Institutes of Health (USA)	

Kokwaro	University of Nairobi	Integrated training/ research programme on clinical pharmacology of key drugs used to treat and manage falciparum malaria	Makerere University (Uganda)	Completed
980074	College of Health Sciences		University of Dar es Salaam (Tanzania)	
	Kenya		KEMRI/Wellcome Trust Unit, Kilifi (Kenya)	
			University of Liverpool (UK)	
			University of Oxford (UK)	
Koram	University of Ghana	Mapping response of Plas- modium falciparum to chloroquine and other antimalarial drugs in Ghana	Centre for Tropical Clinical Pharmacology and Thera- peutics (Ghana)	Completed
980034	Noguchi Memorial Institute for Medical Research		Navrongo Health Research Center (Ghana)	
	Ghana		Institut de Med.Tropicale du Service de Sante des Ar- mees, Marseille (France)	
Macheso	Ministry of Health and Popula- tion - Community Health Sci- ences Unit	Optimal anti -malaria drug policies in Malawi: monitor- ing and limiting evolution of resistance to widely used drugs	University of Malawi (Malawi)	Completed
980041	Malawi		Wellcome Trust (UK)	
Mshinda	National Institute for Medical Research	Molecular epidemiology and modelling the spread of anti -malaria drug resis- tance	Ministry of Health (Tanzania)	Completed
980042	Tanzania		Muhimbili University (Tanzania)	
			Swiss Tropical Institute (Switzerland)	
			University of Maryland (USA)	
			National Institute of Medical Research (Tanzania)	
Ntoumi	International Center for Medical Research (CIRMF)	Relationship between complexity of infections/ disease/transmission & human red blood polymor- phisms in two African countries	National University of Benin (Benin)	Completed
980072	Gabon		University of Tuebingen (Germany)	
			Institute Pasteur, Paris (France)	
			Imperial College (UK)	
Nwagwu	University of Ibadan	Antibodies that inhibit malaria merozoite surface protein-1 processing and erythrocyte invasion	National Institute for Medi- cal Research, MRC (UK)	Completed
980050	Department of Zoology		National Institute for Medi- cal Research, Yaba (Nigeria)	
	Nigeria		Abia State University (Nigeria)	

Oladepo	University of Ibadan	Intersectoral model for management, control and policy formulation on drug resistant malaria in Nigeria	Oregon Health Sciences University (USA)	Completed
980080	College of Medicine, Department of Preventive and Social Medicine		WRAIR - Walter Reed Army Institute of Research (USA)	
	Nigeria			
Sharp	Medical Research Council	Develop/implement a molecular and biochemical capability for insecticide resistance monitoring and management in South Africa	University of Wales (UK)	Completed
980061	National Malaria Research Programme		South African Institute of Medical Research (South Africa)	
	South Africa		Tropical Diseases Research Centre (Zambia)	
			National Institute of Health (Mozambique)	
			Blair Research Institute (Zimbabwe)	
			London School of Hygiene and Tropical Medicine (UK)	
			Ministry of Health (Swaziland)	
			Community Health Services (Botswana)	
			Ministry of Health (Namibia)	
Vulule	Kenya Medical Research Institute (KEMRI)		Population structure of <i>Anopheles gambiae</i> and <i>Anopheles funestus</i> in Kenya and West Africa	
9800101	Vector Biology and Control Research Centre	University of Notre Dame (USA)		
	Kenya	ORSTOM Institut Francais de Recherche Scientifique pour le Developpement en Cooperation (Senegal)		

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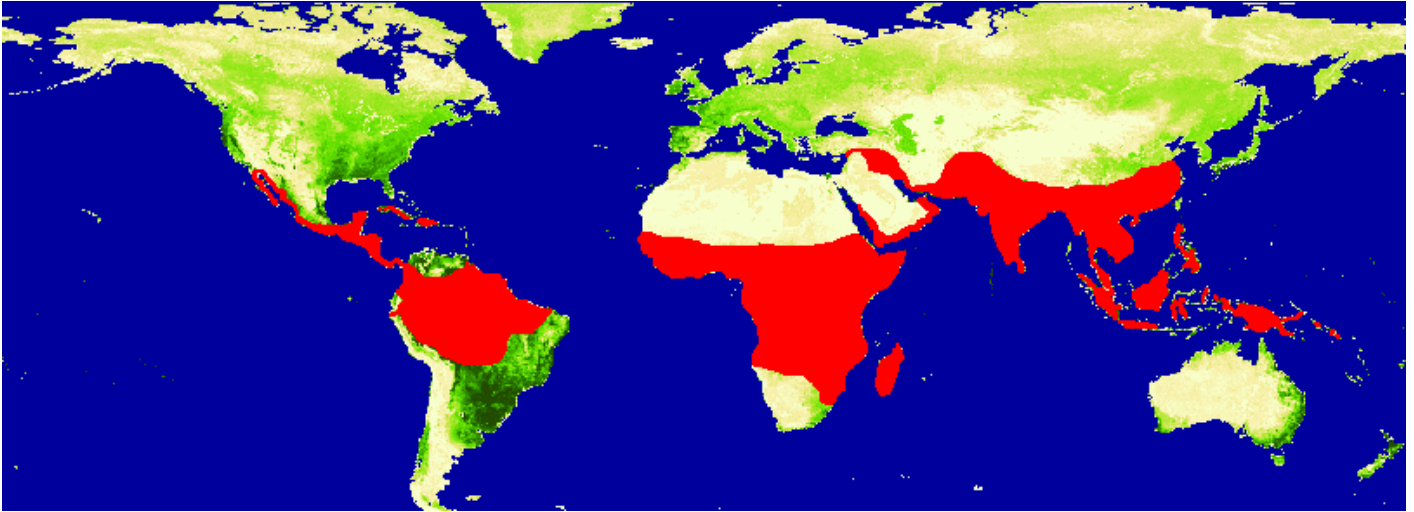
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The Challenge of Malaria in Africa



Malaria is found in the tropics worldwide affecting 300 to 500 million people. Most of Africa's population is concentrated where the malaria risk is classified as either epidemic (areas prone to distinct inter-annual variation, in some years with no transmission taking place at all) or endemic (areas with significant annual transmission, be it seasonal or perennial).

Source: <http://geo.arc.nasa.gov/sge/health/sensor/diseases/malaria.html>,
World Health Organization, National Aeronautics and Space Administration