



**A Field Report of Uganda's Efforts to Build a Comprehensive
Malaria Control Program**

**Africa Fighting Malaria Working Paper
September, 2007**

Executive Summary

Malaria is the leading cause of illness and death in Uganda. AFM visited the country in February, 2007 to conduct interviews and gauge progress in fighting the disease. With the help of the Global Fund to Fight AIDS, TB and Malaria, the World Bank, the US Agency for International Development, the UK Department for International Development and other donors, the national government is scaling up existing treatment and prevention efforts while also developing a country-wide indoor residual spraying program. Uganda's meager surveillance capacity, however, makes it difficult if not impossible to measure the true impact of these interventions. Donors and the national government have set malaria rate reduction targets without ensuring accurate baselines of measurement. Poor infrastructure poses problems for all aspects of malaria control, but particularly the decentralized administration of Artemisinin-based combination therapy drugs, anti-malarial drug resistance management, and the government's intention to use DDT with indoor residual spraying. Exporters are concerned that limited oversight will lead to residues on agricultural produce, jeopardizing trade with Europe, Japan and the United States. Donors are improving coordination and helping to forge solutions to these problems.

Background

In 1950, the World Health Organization (WHO) convened top scientists for a meeting in Kampala to plan a malaria eradication program across Africa. Though exhortations to lift Africa out of poverty dominated discussions, many argued for more data before deploying new technologies, namely DDT¹. Instead of widespread spraying programs, pilot projects with DDT were developed across the continent. These included the Pare-Taveta Scheme (1954-1959) on the border of Kenya and Tanzania (1954-1959) and a stand-alone project in modern-day Kanungu in western Uganda (1958-1963)². Though these efforts proved to be effective, a lack of infrastructure and financing ultimately prevented the continent from joining the WHO's Global Malaria Eradication Campaign from 1955 to 1969. During this period much of the developed world eradicated the disease with windows screens, DDT spraying and chloroquine. Today, nearly seven decades later, malaria is practically non-existent in the West while killing more children in Africa than any other infectious disease.

Uganda's brutal dictatorships inhibited post-colonial development. In 2005, average income per capita was US\$280, life expectancy was 49 years, and population growth (3.5 percent) was among the highest in the world³. Malaria cases have been rising for the past decade. According to the National Malaria Control Program (NMCP) Manager, Dr. J. B.

¹ Dobson MJ, Malowany M, Snow RW, (2000) Malaria Control in East Africa: the Kampala Conference and the Pare-Taveta Scheme: a meeting of common and high ground. *Parassitologia* 42: 149-166.

² J. De Zulueta et al., 1961. The Results of the First Year of a Malaria Eradication Pilot Project in Northern Kigezi (Uganda). *East African Journal of Medicine*, Vol. 38, No. 1.

³ World Bank Uganda Country Brief, Available: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/UGANDAEXTN/0,,menuPK:374947~pagePK:141132~piPK:141107~theSitePK:374864,00.html> [Accessed March 21, 2007]

Rwakimari, malaria kills over 300 Ugandans on average every day, most of which are children under age five⁴. Uganda's hot, humid climate increases its capacity for mosquitoes and the transmission of malaria⁵. Apac, a northern lowland district, is one of the highest transmission zones on the planet. One study showed that people living there are bitten by malaria-carrying mosquitoes 1,564 times a year; this rate varies but to put the volume into perspective, this averages out to more than four infective bites per night⁶. 95% of the country has relatively constant malaria transmission throughout the year. The other five percent has seasonal peaks of malaria transmission.

Although the country has benefited from democratic reforms under President Yoweri Museveni, modest economic growth through the 1990s and increased spending on health, Uganda's basic infrastructure is limited and public health efforts are incommensurate with need. Only about half of the 28 million residents live within five kilometers of a health facility⁷. Roads are poor and limit access to healthcare in rural areas. Most of the population outside cities and towns relies on subsistence farming and self-medication to survive. Uganda has only recently begun to mount an effective response to malaria with substantial new resources from the Global Fund to Fight AIDS, TB and Malaria, as well as the US President's Malaria Initiative (PMI)⁸. The Ministry of Health recently finalized its National Malaria Control Plan 2005/6-2010/11, prioritizing indoor residual spraying (IRS) and the provision of insecticide-treated nets (ITNs), Artemisinin-based Combination Therapies (ACTs) and Intermittent Presumptive Therapy for pregnant women.

Decentralizing Case Management

Uganda's annual reported malaria cases rose from 2.3 million in 1997 to 12.3 million in 2003⁹. This dramatic rise is partially attributable to increasing population and reporting sites, improved record keeping, and more health facilities with higher general attendance; however the remaining increase in actual cases of malaria is largely among children under age five and likely due to parasitic resistance to chloroquine and sulphadoxine-

⁴ "More help needed to fight malaria in Africa," Reuters Foundation AlertNet, January 16, 2007. Available: <http://www.alertnet.org/thenews/newsdesk/B539983.htm> [Accessed April 9, 2007] These figures are based on calculations made by Dr. Albert Killian in 1998 of 70-100,000 deaths in children under five from malaria every year in Uganda. He estimates the updated, corrected figure is probably closer to 30-40,000 per year. Personal communication, Albert Kilian, Malaria Consortium, May 14, 2007.

⁵ Higher temperatures increase the longevity and biting frequency of malaria-carrying mosquitoes, as well as population density by shortening the time needed to reproduce.

⁶ Yeka A, Banek K, Bakyaite N, Staedke SG, Kanya MR, et al. (2005) Artemisinin versus Nonartemisinin Combination Therapy for Uncomplicated Malaria: Randomized Clinical Trials from Four Sites in Uganda. *PLoS Med* 2(7): e190. Available: [doi:10.1371/journal.pmed.0020190](https://doi.org/10.1371/journal.pmed.0020190) [Accessed April 9, 2007]

⁷ Fapohunda, Bolaji M. et al., 2004. Home-Based Management of Fever Strategy in Uganda: A Report of the 2003 Survey. Arlington, Virginia, USA: MOH, WHO and BASICS II. Available: <http://www.health.go.ug/mcp/hbmf4.pdf> [Accessed April 9, 2007]

⁸ The PMI is a partnership between the US Agency for International Development and the Centers for Disease Control and Prevention. See: <http://fightingmalaria.gov/> [Accessed May 01]

⁹ World Health Organization and UNICEF. *World Malaria Report 2005*. 2005. Available: <http://www.rbm.who.int/wmr2005/> [Accessed April 9, 2007]

pyrimethamine¹⁰. In response, Uganda changed its first line anti-malaria treatment to a chloroquine/sulphadoxine-pyrimethamine (CQ/SP) combination in 2000 and then to artemether/lumefantrine combination (branded Coartem[®]) in 2004. A Round Four Global Fund grant provided the bulk of 15.5 million doses of Coartem[®] in 2006, and is expected to provide another 22 million doses this year. The PMI will provide an additional 3 million doses to meet the targeted need of 25 million doses for 2007.

Local suppliers of Artemisinin include East African Botanicals Ltd., which partners with Novartis A.G. to produce Coartem[®], and Afro Alpine Pharma Ltd., which is developing an Artemisinin-extraction plant in Kabale¹¹ and will partner with Cipla Ltd. to produce a copy version of Coartem[®] in Uganda. Producers should ensure that Uganda's 2007 demand for ACTs is met or exceeded. Getting these treatments out to target groups – children under age five, pregnant women and people living with HIV/AIDS – in rural communities will continue to pose a challenge.

Uganda's limited infrastructure puts health facilities out of most citizens' reach. Laboratory facilities to test for and confirm malaria cases are also scarce. Roughly two-thirds of caretakers (parents and guardians) in Uganda treat themselves and those in their care for malaria¹². In 2002, the NMCP developed and implemented a policy of Home-Based Management of Fever to distribute CQ/SP combination therapy through Community Medicine Distributors. These volunteers serve as focal points for the provision of Homapak[®], as the CQ/SP package is branded. They also offer basic advice and record information on usage and efficacy, which is reported to district and national health officials. By and large, Home-Based Management of Fever is viewed as a success. It is credited with increasing the proportion of children under age five receiving anti-malarial treatment within 24 hours of the onset of symptoms in nine districts from 7.3% in 2001 to 66% in April 2005¹³.

Yet increasing the number of children receiving treatment does not necessarily mean reducing malaria. Fever in children is malaria's most recognizable symptom, but it also accompanies pneumonia, measles and other viral and bacterial infections. Treatment guidelines are confusing and sometimes contradictory. For example, the WHO's "Pocket Book of Hospital Care for Children"¹⁴ explains that a child presenting with fever should only be treated for malaria if signs of either anemia or an enlarged spleen are present. A

¹⁰ Personal communication, Albert Kilian, Malaria Consortium, May 14, 2007.

¹¹ According to the New Vision, the plant will be up and running in May and begin with an initial production capacity of 15 tons of leaves and 40 kg of Artemisinin processed daily. "\$4m anti-malaria drugs factory opens in Kabale," New Vision, April 2, 2007. Available: <http://www.newvision.co.ug/D/8/220/557575> [Accessed April 9, 2007] CIPLA will use this to make a generic version of Coartem[®], which will be purchased by the Ugandan government.

¹² PMI Uganda Malaria Operational Plan FY2007. Available: http://www.fightingmalaria.gov/countries/uganda_mop-fy07.pdf [Accessed: April 9, 2007]

¹³ Ibid., reference: Fapohunda, BM et al., 2004. Home-Based Management of Fever Strategy in Uganda: A Report of the 2003 Survey. Arlington, Virginia, USA: MOH, WHO and BASICS II. Available: <http://www.health.go.ug/mcp/hbmf4.pdf> [Accessed April 9, 2007]

¹⁴ Pocket book of hospital care for children: Guidelines for the management of common illnesses with limited resources. 2005, World Health Organization. Available: http://www.who.int/child-adolescent-health/publications/CHILD_HEALTH/PB.htm [Accessed April 9, 2007]

note on the diagnosis and treatment of non-severe malaria later reads, “If a child in a malarious area has fever, but it is not possible to confirm with a blood film, treat the child as for malaria.”¹⁵ As 95% of Uganda is considered malaria-endemic, doctors without lab equipment or a rapid diagnostic test would almost inevitably administer an anti-malarial drug.

The WHO’s Integrated Management of Childhood Illness seeks to simplify this process and train health facility workers in identifying secondary symptoms for various diseases. It provides hospitals and health facilities with booklets¹⁶ and simplified checklists¹⁷. Nevertheless, malaria is likely over-diagnosed in low to medium transmission areas in Uganda^{18,19}. Mistaking another illness for malaria misses the opportunity to treat a child with simple antibiotics. It likely also builds resistance to the anti-malarial drug administered, which can then spread from the individual to the surrounding population. Though the selective pressures that drive the emergence and spread of parasitic resistance are not fully understood, this concern figured prominently in the NMCP’s decision to change first-line anti-malarial treatment policy to ACTs.

To support the new policy implementation, the Ministry of Health and National Drug Authority opted to use SP monotherapy as a prophylaxis for pregnant women (Intermittent Presumptive Therapy) and phase out chloroquine monotherapy altogether²⁰. Over 30,000 health facility workers, 2,000 private practitioners and another 2,000 Community Medicine Distributors have now been trained on the new ACT policy²¹. Yet according to the PMI, “stock-outs of ACT in health facilities have plagued the private and public system.”²² Rational Pharmaceuticals Management Plus, a US Agency for International Development (USAID) contractor, has been working to improve coordination among the National Medical Stores, the Joint Medical Stores, the Ministry of Health and various other partners in the distribution chain to make the ordering and reporting of stocks more routine and accurate. In addition to convening quarterly meetings, it facilitates ongoing communication with district-level health facilities on the

¹⁵ Ibid., Section 6.2.2

¹⁶ Available at: http://www.who.int/child-adolescent-health/New_Publications/IMCI/Chartbooklet.pdf [Accessed May 23, 2007]

¹⁷ Available at:

http://www.health.go.ug/malaria/downloadnow.php?id=cm&f=IMCI_c_mgt.pdf&Page=d&n=IMCI_cane_management_checklist [Accessed April 9, 2007]

¹⁸ Njama-Meya, D et al., 2007. Treatment of malaria restricted to laboratory-confirmed cases: a prospective cohort study in Ugandan children. *Malaria Journal*, 2007: 6:7. Available:

<http://malariajournal.com/content/6/1/7> [Accessed April 9, 2007]

¹⁹ Ndyomugenyi, R et al., 2007. Diagnosis and treatment of malaria in peripheral health facilities in Uganda: findings from an area of low transmission in south-western Uganda. *Malaria Journal*, 2007: 6:39. Available:

<http://www.malariajournal.com/content/6/1/39> [Accessed April 9, 2007] This is a similar problem in Tanzania and other East African countries. See for example: Reyburn, H et al., 2004.

Overdiagnosis of malaria in patients with severe febrile illness in Tanzania: a prospective study. *British Medical Journal* 2004, 329:1212.

²⁰ Report of the Workshop on Strategies for Implementation of the New Anti-Malarial Drug Policy, October 4-5, 2006.

²¹ Presentation of the National Malaria Control Program Manager to the Inter-Agency Coordinating Committee, February 16, 2007.

²² PMI Uganda Malaria Operational Plan FY2007.

new ACT policy, and is currently adapting a management tool for routine collection of Coartem[®] consumption data by age group²³.

The vast majority of ACTs is currently administered by health facilities, as Home-Based Management of Fever with Coartem[®] is only in the pilot phase. Pending community acceptance, it will likely be rolled out countrywide. While improving access to effective treatment, this will make future supply chain management of ACTs more complex. Although ACTs have no registered parasitic resistance to date, accurate diagnoses and the judicious administration of ACTs will be critical to maintaining their effectiveness in the years to come²⁴, as will strengthening and retaining Community Medicine Distributors²⁵.

Uganda is piloting the use of rapid diagnostic tests at the district level to facilitate these efforts. A workshop was held recently by the Malaria Consortium and the Ministry of Health discussed the challenges and opportunities for using these tools country-wide, including in conjunction with Home-Based Management of Fever²⁶. Though rapid diagnostic tests have become increasingly popular and widely used in lieu of laboratory facilities, their reliability and a lack of confidence hinders appropriate diagnosis and treatment throughout East Africa. Anecdotal evidence from Kenya suggests that some doctors are treating for malaria even with a negative rapid diagnostic test result due to a lack of trust in the new tool. This also seems to be the case in Tanzania²⁷ and Zambia²⁸.

Strengthening Epidemiological, Drug Efficacy and Pharmacovigilance Data

Drug efficacy data collected by sentinel sites since 1998²⁹ formed the basis for Uganda's national treatment policy changes in 2000 and 2004. The Uganda Malaria Surveillance Project (UMSP), created in 2002 with funding from the Centers for Disease Control and Prevention (CDC) among others, has strengthened data collection, processing and analysis at these sites and added new ones. The UMSP currently comprises the Makerere University Infectious Disease Institute, the University of California San Francisco, the Malaria Consortium, and the CDC. Most of these sites are what the Ugandan

²³ Rational Pharmaceuticals Management Plus Monthly Report for Malaria, January 2007.

²⁴ See for example Checchi F et al., 2006. Supervised versus unsupervised antimalarial treatment with six-dose artemether-lumefantrine: pharmacokinetic and dosage-related findings from a clinical trial in Uganda. *Malaria Journal* 2006, 5:59. Available: <http://malariajournal.com/content/5/1/59> [Accessed April 9, 2007]

²⁵ According to a study cited by the Ugandan NMCP in his aforementioned Presentation of the National Malaria Control Program Manager to the Inter-Agency Coordinating Committee, February 16, 2007, attrition rates for these volunteers are around 25 percent, owing to inadequate health worker supervision.

²⁶ "Government Considers Malaria Self-Test Kits", New Vision, March 7, 2007.

²⁷ Reyburn, H. et al., Rapid diagnostic tests compared with malaria microscopy for guiding outpatient treatment of febrile illness in Tanzania: randomised trial. *British Medical Journal*. 2007;334:403.

²⁸ Hamer, D. H. et al., Improved Diagnostic Testing and Malaria Treatment Practices in Zambia. *Journal of the American Medical Association*. 2007;297:2227-2231.

²⁹ The East African Network for Monitoring Anti-malaria Treatment (EANMAT) collects this data regionally and classifies it according to World Health Organization guidelines: <http://eanmat.org/Newsletters/EANMAT%20DATABASE.xls> [Accessed April 2007]

government calls Health Center Fours³⁰, which means they have microscopes, laboratory technicians and trained doctors and nurses. In practice these facilities may be understaffed and lack equipment and sometimes lack a consistent power source.

Epidemiological experts from the UMSP travel to sentinel sites to train doctors, nurses and laboratory technicians on WHO protocol for malaria diagnosis – emphasizing laboratory confirmation of malaria cases – appropriate treatment and data collection. They also enroll patients, collect data and conduct ongoing studies, training health workers in the process. There are no electronic records, however, which means UMSP staff must travel to retrieve data. The project has only one pickup truck with roughly 150,000 miles on it with which to perform this function, rendering data retrieval and analysis infrequent and unsynchronized.

In 2006, the PMI provided supplemental funding to build upon existing efforts and expand these sites into demographic surveillance sites. To improve drug efficacy and pharmacovigilance surveillance at the national level, the PMI also purchased laboratory equipment for the National Drug Authority. With training from US Pharmacopeia, a non-profit US-based drug quality and standards assurance organization, the National Drug Authority can run post-production quality assurance tests on all drugs (not just anti-malarials) and ITNs to ensure accuracy in formulation and quality.

There is currently no post-marketing surveillance, but US Pharmacopeia will help to develop four “minilabs” for this purpose later this year³¹. This will support simple tests on post-market drugs for all diseases to determine bio-availability; all drugs determined to be fake and 10% of effective drugs will be sent to the National Drug Authority for confirmation. Additionally, the PMI is currently reviewing applications for a cooperative agreement to strengthen diagnostic capacity across all countries involved in the initiative. A contract will be awarded by the end of June 2007, presumably to start in FY2008.

These program priorities reflect a positive outcome of the PMI’s partnership between USAID and the CDC. Both agencies are increasing efforts to measure the epidemiological impact of its spending on malaria control, and so increase accountability. Yet the data remains insufficient to establish both baseline rates for malaria cases and malaria-related deaths at the district and national level. Currently there are only eight sentinel sites and two demographic surveillance sites in Rakai and Iganga to estimate disease burden for a population of over 28 million people. Without a significant increase in priority funding for data collection, analysis and interpretation, it will be nearly impossible to determine whether the PMI has met its stated mission of halving malaria deaths by 2010.

The PMI is attempting to resolve this with a validation study of verbal autopsies to approximate a baseline for malaria-related deaths in 2006. Verbal autopsy studies

³⁰ A detailed description of all Health Center levels in Uganda is available at: http://www.health.go.ug/health_units.htm [Accessed April 9, 2007]

³¹ Personal communication, Natalya Davydova, Program Manager, Drug Quality Control & Laboratory Training, US Pharmacopeia, May 1, 2007.

depend on interviews with caretakers to establish cause of death. While they can provide some relative insight into disease trends, validation studies have shown that verbal autopsies may miss true malaria deaths and incorrectly classify non-malaria deaths as malaria³².

Balancing Public and Private Insecticide-Treated Nets

Between 1998 and 2003, Uganda's commercial market distribution of nets overtook public sector efforts. During this period, the government waived import taxes and tariffs on mosquito nets and netting materials, and USAID funded a Commercial Marketing Services project with Population Services International and other partners to develop effective social marketing programs for ITNs³³. In 2003, USAID scaled down social marketing and with the Academy for Educational Development initiated NetMark, a partnership geared to create commercially sustainable ITN markets. It has worked to accomplish this by matching private investments for marketing and expanded distribution, facilitating branding and communications by local businesses for appropriate net use, and through generic nation-wide promotions of ITN use.

The number of nets distributed in Uganda jumped from 280,295 in 2003 to about 1.7 million in 2005³⁴. Although Uganda still lacks domestic net manufacturing capacity³⁵, NetMark and other groups' efforts have resulted in five ITN distributors and 1,747 outlets where nets are sold compared to only five in Kampala in 2002³⁶. According to the 2006 Uganda Demographic Health Survey Preliminary Report, household net ownership has increased substantially from 13% in 2000 to 34% in 2006³⁷. A 2006 NetMark survey found that 78% of nets owned were purchased from commercial sources, with 17 brands confirmed in households compared to two in 2000³⁸. The same survey however shows that ITN use is increasing but still trails ownership: only around 13-14% of children under age five and pregnant women slept under an ITN the night prior to the survey³⁹.

³² Alexander K. Rowe. Letters to the Editor: Should verbal autopsy results for malaria be adjusted to improve validity? *International Journal of Epidemiology* 2005 34(3):712-713. Available: <http://ije.oxfordjournals.org/cgi/content/extract/34/3/712> [Accessed April 9, 2007]

³³ The Development of the Uganda ITN Market and Distribution, 1999-2005, Albert Killian.

³⁴ Personal Communication, Albert Kilian, Malaria Consortium, May 14, 2007. This dramatic increase is likely the result of more accurate reporting as well as more distributors.

³⁵ Cooper Uganda Ltd. has since developed a small factory in Kampala, employing about 25 women.

³⁶ Netmark Country Brief: Uganda. January, 2007.

³⁷ 2006 Uganda Demographic and Health Survey Preliminary Report. Available: <http://www.ubos.org/UDHS2006Preliminaryreport.pdf>. [Accessed April 9, 2007] The finalized report will be available later this year.

³⁸ Netmark 2006 Survey on Insecticide-Treated Nets in Uganda – Key Findings. Note: the survey comprises 5 sites, covering 5 urban and 17 rural districts, and excludes northern districts affected by conflict. These areas have been heavily targeted by free ITN distribution projects, and the results are evident in the 2006 Preliminary UDHS Report. The percentage of households in sub-regions with Internally Displaced Persons is 41.8 compared with 22.9 in the Kampala region.

³⁹ Ibid.

Taking national survey data into account, these figures average out to 21-23% in urban districts and 8-9% in rural districts⁴⁰.

Multiple public sector distribution efforts, currently underway in Uganda, will increase household ownership and may increase use. In April 2004, Uganda secured a Round Two Global Fund grant, the majority of which was intended for the purchase and distribution of 1.8 million nets. The Ministry of Health decided that these and all future donor nets should be given away for free to ensure that they reached vulnerable groups; commercial distribution would be focused instead only on populations that could afford nets. This decision proved costly. The Global Fund grant was delayed by mismanagement of the money by the Project Management Unit in the Ministry of Finance, and the ITNs did not begin arriving to Uganda until February 2007⁴¹. By April 2007, all 1.8 million nets had arrived and about two-thirds had been distributed to districts⁴²; but to put this delay into perspective, in the time elapsed since the Global Fund grant start date in March 2004, NetMark retail audits reflect that the private sector provided roughly three million nets to Uganda⁴³.

An additional 650,000-700,000 are expected to be distributed this year through the public sector⁴⁴. Including mass net re-treatment campaigns, a total of 4.8 million ITNs are expected to be in Uganda by the end of 2007⁴⁵. This number needs to be roughly doubled in order to reach the NMCP's coverage goal of 85% of households owning two ITNs. There is an ongoing debate as to whether the private sector can close this gap in rural areas, as well as ensure that nets are used regularly and appropriately.

According to data gathered by the Malaria Consortium on its net distribution and education projects in Kitgum, 90% of ITNs given to pregnant women through antenatal clinics were retained after six months; of those, 70% were used, up from 48% in 2004⁴⁶. These statistics demonstrate that targeted education efforts can foster net use among vulnerable groups in Uganda's northern conflict areas. The challenge to donors and the Ministry of Health is to sustain these figures over time.

Uganda's commercial sector development for nets and ITNs would benefit from more competitors. The WHO Pesticide Evaluation Scheme (WHOPES), which reviews and

⁴⁰ 2006 Uganda Demographic and Health Survey Preliminary Report. Available: <http://www.ubos.org/UDHS2006Preliminaryreport.pdf>. [Accessed April 9, 2007]

⁴¹ The NMCP had previously piloted a successful net distribution project using targeted subsidies. Opting for this distribution model might have avoided the GFATM procurement delays.

⁴² According to Charles Akora of the Malaria Consortium and a PSI progress report, 500,000 ITNs were delivered by the Malaria Consortium and 863,000 were distributed by PSI.

⁴³ This information comes from bimonthly retail audits conducted by Research International and sales reports verified by NetMark, according to personal communications with Juan Urrita, Deputy Director, USAID/ Netmark Africa Regional Malaria Program, June 23, 2007.

⁴⁴ Presentation of the National Malaria Control Program Manager to the Inter-Agency Coordinating Committee, February 16, 2007. This includes 550,000 ITNs to be purchased by Malaria No More and delivered to 13 districts in April 2007.

⁴⁵ PMI Uganda Malaria Operational Plan FY2007.

⁴⁶ Personal communication, Kate Kolaczinski, Vector Control and Emergencies Specialist, Malaria Consortium, March 13, 2007.

recommends the use of new pesticide technologies, has unintentionally acted as a barrier to ITN competition. WHOPEs only meets once a year to recommend new “long-lasting insecticidal nets”, which are expected to last several years longer than conventionally-treated ITNs. It has taken recent applicants two years on average to receive WHOPEs “interim recommendation”⁴⁷. For a variety of reasons, WHOPEs recommendations have evolved into a “gold standard” among donors and Ministries of Health. Public sector tenders for nets have increasingly specified “WHOPEs recommended LNs”. Between 2001 and 2006, WHOPEs only recommended two long-lasting insecticidal nets, and in 2006 nearly all bilateral and multilateral donor contracts for ITNs went to either Sumitomo Chemicals Co., Ltd., which makes Olyset Net[®], or Vestergaard-Frandsen S.A., which makes PermaNet[®].

The 1.8 million nets procured under the Round Two GFATM grant were all Olysets[®] and PermaNets[®]. The PMI has recently broken with this trend in Uganda by relaxing its specifications and procuring Dawa Plus[®] nets, expected to receive WHOPEs interim recommendation in January 2008, for a bilateral distribution effort. NetMark procured the nets at great savings to USAID, delivering 132,000 Dawa Plus[®] nets for free distribution to five districts for \$4.93⁴⁸. According to USAID, “With the consent of the Ugandan host government, the Dawa Plus[®] long-lasting insecticidal nets were procured using PMI funds through an open and competitive process that ensured that the nets met or exceeded WHOPEs standards and used WHO-approved independent laboratories for testing.”⁴⁹

Restricting competition has limited choice, kept prices and distribution costs high and limited the production of qualified and potentially life-saving ITNs⁴⁵. Because Uganda and other countries lack the regulatory capacity needed to verify the safety and effectiveness of all ITNs coming into the country⁵⁰, WHOPEs recommendations are extremely valuable. Its reviews need to be fast-tracked or supplemented by an independent body that can do quality control and post-marketing surveillance of ITNs and long-lasting insecticidal nets.

Building an Indoor Residual Spraying Program

IRS is a highly effective means of controlling malaria involving the spraying of small amounts of insecticide inside homes and dwellings once or twice a year. This intervention is particularly effective when coupled with effective drugs, as was demonstrated during the successful eradication programs of the 1950s and 60s, and more

⁴⁷ Coticelli, P., 2007. WHOPEs and Its Impact on Long-Lasting Insecticidal Net Availability, Africa Fighting Malaria Occasional Paper. Both the paper and ensuing discussion with the WHO and manufacturers can be found at: <http://fightingmalaria.org/research.aspx?id=773> Accessed [May 1, 2007]

⁴⁸ Contract on file with author.

⁴⁹ Personal communication, Richard Greene, Director, Office of Health, Infectious Diseases and Nutrition, Bureau for Global Health, USAID, April 19, 2007.

⁵⁰ According to NetMark, about half of the nets coming into Uganda are bought through disreputable sellers and may be both unsafe and of poor quality.

recently in various southern African countries⁵¹. Uganda briefly piloted a spraying program in present-day Kanungu district from 1958-63. Small and sporadic spraying has been done around the country since then, most recently in 2005 in public institutions within refugee camps in northern districts. This was coordinated by the Malaria Consortium and supported with funds from the UK's Department for International Development (DFID)⁵². In 2006, the PMI's resources and renewed commitment to IRS enabled the Ugandan government to undertake a district-wide pilot IRS project, for the first time with the realistic expectation of developing a national program.

The NMCP chose the southwestern highland Kabale District to pilot an IRS round in 2006 and build capacity for future epidemic surveillance there. Under a cooperative agreement, Research Triangle Institute (RTI) was contracted through the PMI to undertake environmental and entomological surveys, procure all the necessary insecticides and equipment, coordinate community education and implement spraying programs across the district. From April to May 2006, RTI trained nearly 50 supervisors, team leaders and other health officials and over 300 spray operators⁵³. IRS was carried out between June and August 2006 and post-spraying surveys were conducted in September 2006.

In total over 103,000 households were sprayed, constituting 96% of those targeted. Few adverse events were reported and preliminary parasite prevalence data from the Kabale district hospital indicates a drop in malaria cases⁵⁴. Based on the successful implementation in Uganda in 2006, as well as Angola and Tanzania, RTI secured an indefinite quantity contract to spearhead all of the PMI's spraying programs, with a US\$150 million ceiling over the next five years⁵⁵. Plans for 2007 in Uganda include focal spraying in Kabale and neighboring Kanungu districts, and Apac, Pader, Gulu and Kitgum districts in the north.

On February 16 and 17, 2007, AFM met with RTI's IRS Program Manager in Kabale, Dr. John Bahana, visited an equipment washing station, and accompanied several spray teams on daily operations in two villages in the Kabale district. Our field interviews reflected well-coordinated, well-informed spray teams operating within specified guidelines, and nearly universal acceptance rates for IRS. This is a particular challenge in Kabale and Kanungu due to poorly maintained and unpaved roads, hilly terrain and restricted access to rural villages and homes. Considering the size and scope of the project, sustainability was a vital concern. Contractors by their nature are focused on short-term goals and the rapid mobilization of interventions and results. In order for an

⁵¹ Sharp, B et al., 2007. Seven Years of Regional Malaria Control Collaboration – Mozambique, South Africa, and Swaziland. *Am. J. Trop. Med. Hyg.*, 76(1), 2007, pp. 42-47. Available: <http://www.ajtmh.org/cgi/content/abstract/76/1/42> [Accessed April 9, 2007]

⁵² Personal communication, Graham Root, Director, Malaria Consortium, February 15, 2007.

⁵³ President's Malaria Initiative Uganda Complete Activity Description, 2006. The ensuing figures are variable across reports provided by RTI, the PMI and Ministry of Health.

⁵⁴ According to the February 16, 2007 NMCP presentation to the ICCM, "After 1st round of IRS in Kabale, malaria slide positivity rate reduced from 30 percent to 3 percent (UMSP study: Jan.2007)." This data was confirmed with Dr. Adoke Yeka at UMSP but has not been published.

⁵⁵ Available: http://fightingmalaria.gov/funding/irs_iqc.pdf [Accessed: April 9, 2007]

IRS program to be sustainable and maximally effective, national capacity to analyze, plan and manage the program must be developed over time.

While the project was heavily dependent on RTI's coordination and oversight, the Ministry of Health's role had clearly been enlarged since 2006 from the national through to the district level. For the second round of IRS in Kabale, spray teams only required one week of re-training (as opposed to two weeks in 2006) before they were ready to implement. District and sub-district health officials employed jointly by RTI and the Ministry of Health were also largely retained and required abbreviated re-training. They are responsible for village-level communications ahead of spraying⁵⁶, supervision and follow-up of houses sprayed, and reporting on team progress to RTI as well as to local councils and the Director of District Health Services. Moreover, last year the CDC and the Uganda Virus Research Institute trained vector control officers in entomological techniques and measuring vector resistance. RTI together with the NMCP Senior Entomologist trained central and district vector control officers and other IRS supervisors in Kabale district for IRS planning, management and monitoring.

To its credit, RTI has made shrewd budgetary decisions to keep the eventual transfer of the program to the Ministry of Health in sight. This includes resisting repeated pleas by spraymen to increase pay allowances and insisting that vehicles be rented for the few weeks of the year they are used to execute IRS instead of buying them for the Ministry of Health outright⁵⁷.

RTI also adequately addressed the few problems that arose during the campaign, redeploying spray teams as necessary to keep on schedule. It responded rapidly to a few cases of overexposure to Icon WP[®], the insecticide currently used, such as an instance where a sprayman colluded with a villager to store some insecticide in a milk container. His wife later unwittingly drank from the container, the incident was reported and the woman was treated locally and unharmed. Charges were laid against those involved and the sprayman was dismissed. Another issue of concern was inaccurate numbers of Icon WP[®] packets shipped from Syngenta; each box was labeled as containing 148 packets, but contents ranged 144 to 160 packets. RTI's staff was required to recheck every shipment to ensure that extra packets of insecticide were not stolen or misused.

Preliminary reports suggest IRS operations in neighboring Kanungu, which followed Kabale district spraying, were also rapidly mobilized and executed. Kabale and Kanungu IRS operations will be scaled down for 2008 to maintain capacity for epidemic response, while district wide house-to-house spraying will be carried out in higher transmission

⁵⁶ Teams ride around one or several parishes in pick-up trucks the day before IRS will take place with bullhorns, informing households that they should remove their personal belongings from the house the following day and prepare water for spray men to use in conducting IRS to kill malaria-carrying mosquitoes.

⁵⁷ 32 vehicles were used to conduct spray operations in Kabale this year. Storing these vehicles for the majority of the year when IRS is inactive poses logistical problems and leaves them vulnerable to abuse.

districts⁵⁸. Rolling the program out will nevertheless be very expensive; finding resources in addition to and beyond the PMI is a priority for the Ministry of Health.

The DDT Controversy

Spraying rounds in 2006 and thus far in 2007 have been done with Icon WP[®], or lambda-cyhalothrin. For several years, the Ministry of Health has endeavored to use DDT with its IRS programs. As we describe below, this has been a controversial issue in Uganda. However in December 2006 the National Environmental Management Authority granted approval for the use of DDT on the condition of strict adherence to Stockholm Convention rules and regulations⁵⁹. The Ministry of Health hopes to use DDT in its IRS programs in the Apac district in 2007. RTI and USAID are now conducting a Pesticide Evaluation Report and Safe Use Action Plan to ensure this will be possible.

Though DDT has a long record of safe and effective use, additional resources for testing and education will be needed to facilitate its use. The European Union, US and Japanese government's have made it clear in the Ugandan media and to agricultural exporters that they will strictly enforce minimum residue limits for DDT on any imports⁶⁰, and reject shipments where they are transgressed. Although to date this has not been an issue for produce for other countries using DDT to control malaria, such as Mozambique, South Africa, Swaziland and Zambia, exporters argue that its reliance on small holdings agriculture distinguishes Uganda and makes DDT residues likely to end up on produce.

Coffee beans, for example, are Uganda's main export. They are often dried on the earth near homes and stored indoors in burlap sacks. In Uganda, people regularly and fastidiously sweep dirt floors of homes out into the yard, where coffee beans are usually dried. Exporters argue that should DDT residues flake off walls and be swept outside, the beans may pick up residue. There is also a concern among agricultural exporters that burlap sacks filled with coffee beans may also pick up residual insecticide if stored against indoor sprayed walls. It should be noted here that Uganda's exporters are not against the use of DDT, and some recognize that it is safe for humans and for the environment when used in IRS programs⁶¹. The exporters are more concerned with European Union consumer perceptions of DDT's adverse health effects than, for example, with the health of Ugandan farmers coming into contact with DDT. The CDC

⁵⁸ Kabale was selected for district-wide IRS in 2006 in spite of its low malaria burden. When the Ministry of Health announced this year that it would only need to spray about 50 percent of households, district leaders unanimously protested, insisting that 100 percent be sprayed. This was unnecessary and would have wasted funds. This situation might have been avoided by the initial selection of a district with higher malaria burden.

⁵⁹ These are onerous: <http://www.malaria.org/DDTPOPstreatyannexB.html> [Accessed May 23, 2007]

⁶⁰ The EU's minimum residue levels for DDT are especially strict, ranging from 1 part per million for meat to 5 parts per billion for fruits and vegetables.

⁶¹ Minutes of the Consultative Meeting with Exporters, March 5, 2007, WHO Country Office, Kampala.

is currently working with these groups to conduct a study of DDT air levels, dust levels and determine the potential for leeching of DDT into organic products⁶².

The WHO has been clear to point out that its decision last year to endorse DDT for IRS programs⁶³ was based on the thorough and ongoing review of all available scientific literature on the subject. Yet this qualification is relentlessly undermined in Uganda by subversive politicians and a vibrant media that gives voice to strong opinions on both sides of the debate. Ken Lukyamuzi, a former Minister of Parliament who was barred from standing for re-election for failure to declare his wealth⁶⁴, has made opposition to DDT a platform issue in his opposition to the Ugandan government. On February 18, 2007, AFM attended an opposition rally in Kampala where Mr. Lukyamuzi addressed people in Lugandan, a local language, on the issue of DDT. Among other false and incendiary claims broadcast by Mr. Lukyamuzi, he told the crowd that DDT caused blindness and kidney failure, that DDT was responsible for children born with deformities in Vietnam, that Museveni's government was mixing DDT with ethanol and kerosene before spraying, making it deadly⁶⁵, and that citizens should exercise their "constitutional right to protect themselves" by using spears, pangas and sticks against spraymen that try to enter their homes.

Uganda's academics, environmentalists and popular newspapers also mislead the public. "DDT: Survival Weapon or Threat?"⁶⁶ is a typical example of authority figures scare-mongering based on nothing more than DDT's persistent nature. Dr. Vincent Muwanika of the Makerere University Institute of Environment and Natural Resources erroneously claims that DDT will be sprayed on semi-permanent dwellings in urban slums, leading to residues reaching the surrounding environment. He cites a 2005 research study that found traces of DDT in soils where spraying was done in 1959, ironically neglecting the conclusion reached by the study authors themselves that DDT was safe for Uganda to use against malaria. He asserts that with DDT use, agricultural exports to the European Union will inevitably suffer, as will birds, butterflies and bees thereby condemning fruits and other medicinal plants to the same fate. Finally, he concludes that DDT spraying "takes us in exactly the wrong direction." Both Mr. Lukyamuzi and Dr. Muwanika's claims are based on indulgent speculation and unfounded leaps in logic. Far from leading us in the right direction, the result among Uganda's citizens is fear and confusion about the real enemy, malaria.

⁶² Personal communication, Linda Quick, President's Malaria Initiative Country Adviser for the Centers for Disease Control and Prevention, March 31, 2007.

⁶³ WHO's announcement on the subject states: "WHO actively promoted indoor residual spraying for malaria control until the early 1980s when increased health and environmental concerns surrounding DDT caused the organization to stop promoting its use and to focus instead on other means of prevention. Extensive research and testing has since demonstrated that well-managed indoor residual spraying programmes using DDT pose no harm to wildlife or to humans." Available: <http://www.who.int/mediacentre/news/releases/2006/pr50/en/> [Accessed April 9, 2007]

⁶⁴ "Lukyamuzi sues govt," New Vision, February 8, 2006. Available: <http://newvision.co.ug/D/8/13/480681/Lukyamuzi> [Accessed April 9, 2007]

⁶⁵ DDT was mixed with kerosene in the 1940s, but is mixed with water today.

⁶⁶ The Monitor, March 13, 2007, Emmanuel Kihale.

Public Sector Transparency and Coordination

Although tens of donors and about a thousand non-governmental organizations work on development issues in Uganda (e.g. poverty reduction, increasing education and literacy, strengthening healthcare), only a few of them contribute substantial amounts of funding or activity to malaria control. These include the PMI (USAID and the CDC) and its contractors (AFFORD, the Uganda Program for Human and Holistic Development, RTI, AED/NetMark, etc.), DFID and the Malaria Consortium (which accounts for most of the agency's direct malaria control funding), and the Global Fund, the WHO, and Population Services International. Making malaria control activities more transparent and cohesive is critical to holding these groups to account.

Since 2002, Uganda has convened an Interagency Coordinating Committee for Malaria, comprising the major donor agencies, government representatives and non-governmental organizations working on malaria control. It meets quarterly and divides activity areas into working groups. Because there is so much activity, however, there is a tendency for these meetings to be dominated by donor and government presentations with little opportunity for feedback from non-governmental organizations in the field. The Malaria and Childhood Illness NGO Secretariat is attempting to fill this gap by registering organizations and detailed information on their activities. Though this information is not yet online, the list will eventually be posted on the Ministry of Health's website and updated every six months⁶⁷.

The Global Fund is the forerunner of more transparent malaria control funding. Since its inception in 2002, it has posted grants, progress reports and evaluations publicly on its website. An equivalent bilateral donor effort was not made until 2006 with the creation of the PMI. The PMI now posts many (but not all) contracts from its operations across Africa on its website⁶⁸ along with other key documents, such as needs assessments and budgeted operational plans. While DFID does not post contracts, evaluations and limited budgetary information are available for country-level programs. In contrast to the PMI, which uses its entire budget for malaria-specific implementation and technical support activities, DFID channels half of its total Uganda budget (UK£70 million) into the country's Poverty Eradication Action Plan⁶⁹. It also works jointly with the World Bank and other bilateral European donors on the Uganda Joint Assistance Strategy⁷⁰, and focuses implementation funding on humanitarian projects in the northern conflict areas.

Yet even the Global Fund, for all its efforts, lacks in transparency⁷¹ and continues to suffer setbacks. Its priorities and funding are determined and managed by country-

⁶⁷ Personal communication, Enid Wamani, Coordinator, Malaria and Childhood Illness NGO Secretariat, February 14, 2007.

⁶⁸ Available: www.fightingmalaria.gov [Accessed: March 27, 2007]

⁶⁹ Available: <http://www.finance.go.ug/peap/index.php> [Accessed April 9, 2007]

⁷⁰ Ibid.

⁷¹ See for example, Bate, R., On the Trail of a Cure: Reality and Rhetoric on Treating Malaria, American Enterprise Institute Health Policy Outlook, March 22, 2007. Available: http://www.aei.org/publications/pubID.25834.filter.all/pub_detail.asp [Accessed: May 23, 2007]

coordinating mechanisms. Though these bodies usually comprise a diverse group of stakeholders, money tends to be channeled through Ministries of Finance and Health before leaving the country again to secure commodities and technical assistance. Public sector mismanagement in Uganda has led to delays in procuring ITNs and ACTs and the retraction of funding for malaria (\$14.7 million, including funding for IRS in northern refugee camps) and Tuberculosis (\$1.1 million).

Procurement delays, corruption and grant mismanagement harm all donor programs⁷². Contracts that have bypassed government ministries have been managed better and more expediently. The PMI/RTI was able to rapidly procure sprays and pumps for IRS in northern camps in northern districts in spite of the lost Global Fund money; the WHO's procurement of ACTs for Global Fund Round Four kept the planned national policy change roughly on schedule through 2006⁷³. The 22 million doses expected to be purchased with the remaining Global Fund money in 2007 are also likely to bypass the Ministry of Health. Since this problem is increasingly common, Direct Financing Mechanisms that bypass Ministries of Health and Finance are likely to be more widely used in grants awarded for the upcoming Global Fund Round Seven.

Donors and non-governmental organizations are increasingly integrating malaria control with other disease control initiatives. One example is Population Services International working in conjunction with the CDC since 2004 to provide to people living with HIV/AIDS free packages containing two long-lasting ITNs and condoms. To date they have moved 110,000 to communities with the help of The AIDS Support Organization, and hope to continue this program through 2009. Limited resources make comprehensive and more fundamental public health work challenging. Among bilateral donors, the US government has invested by far the most substantial resources in Uganda over the past several years through the President's Emergency Plan for AIDS Relief and the PMI.

Discussion

ITNs continue to dominate strategic focus among Uganda's donors and development partners. They are getting cheaper, easier to distribute and, in principle, extend protection for longer periods of time. Long-lasting insecticidal nets, which are expected to remain effective for three years with practical use, are a welcome advancement, but persistent gaps between net ownership and net use need to be addressed. Much more education and research are needed to understand and account for problems with net use in the field. NetMark and other groups have made significant progress in ramping up Uganda's commercial sector for ITNs. Here too, more education needs to be done to ensure that consumers recognize the advantages of ITNs over untreated nets, which are still widely sold in the markets. Vouchers would improve the tracking of nets both within

⁷² According to a brief sheet for the "Presidential Initiative on Fighting Malaria in Africa," July, 2005, "Uganda was selected based on the following criteria...Global Fund grant for malaria and grant performance; Potential for other donor involvement."

⁷³ Personal communication with Dr. J. B. Rwakimari, Uganda National Control Program Manager, April 6, 2007.

and between countries, which is critical to cost-effective targeting of vulnerable populations and an inevitable problem with free distribution.

Free distribution efforts can be effective in getting nets to vulnerable populations, but they depend on donor priorities, and have both positive and negative secondary effects on the private sector. Increasing the number of nets along with awareness and education on proper use stimulates demand, but some of these nets are resold in markets⁷⁴, distorting usage data while lowering the price of commercial nets. NetMark's 2006 survey suggests the existence of this trend in Uganda. Soroti, a northeastern district located closer to northern refugee camps than other surveyed districts, reports substantially higher household ownership of nets (70.6%) and ITNs (49.4%), as well as lower median price of any nets (US\$ 5,000 compared with US\$ 6,000 in all other districts). A detailed NetMark report will be coming out later in 2007 that may provide further explanation for this effect.

The European Union's media-broadcast warning about DDT's impact on agricultural exports polarized the debate on DDT and ultimately served to undermine support for IRS as a viable complement to ITN distribution efforts. It has not since offered any commensurate solution, nor in light of the government's intention to use the chemical for malaria control endeavored to realign the public perception of DDT with scientific evidence in the European Union. Uganda's exporters rightly worry that even if shipments are not found to have residues, the mere use of DDT will cost market value. Utz Kapeh, for example, is a standards-setting organization making international shipments of coffee more traceable in order to ensure good quality. Its certifications indicate the village where the beans were grown and stored, and may specify whether those homes were sprayed with DDT. This information would be made available to distributors and could result in decisions not to import particular shipments.

Uganda's local production of Artemisin and intention to buy Cipla Ltd.'s generic artemether-lumefantrine product raises some broader concerns about treatment⁷⁵. First, this product has been submitted for regulatory approval but not yet approved⁷⁶. Cipla Ltd. manufactures and sells other anti-malarial generics – Artesunate-amodiaquine, Artesunate-SP – that have not yet been submitted for regulatory approval. This means Cipla Ltd.'s drug quality and bio-equivalence are indeterminate. If its products have suboptimal levels of active ingredient or are otherwise compromised, the result could be clinical failure, increased resistance to one or both of the drugs, and ultimately patient death. With PMI-purchased lab equipment, the National Drug Authority intends to run quality tests on all ACTs being used in the country. While this may help remove substandard copies from circulation, the increasing numbers of fake drugs in circulation

⁷⁴ And according to anecdotal reports, in some cases directly back to the provider (non-governmental organizations and donors) across borders.

⁷⁵ Personal communication, Charles Mbire, Chairman, Afro Alpine Pharma. February 14, 2007.

⁷⁶ Global Fund Compliance List for Single and Limited Source Pharmaceutical Products. Edition: Version 23, March 2, 2007. Available: http://www.theglobalfund.org/pdf/guidelines/Compliance_list_MALARIA.pdf [Accessed March 27, 2007]

may be an intractable problem⁷⁷. Second, the stated intention of Afro Alpine Pharma Ltd. in building this plant was to halve the price of ACTs⁷⁸. Yet inaccurate forecasts of demand for Coartem[®] resulted in shortages in 2004 and excess inventory in 2005 and 2006⁷⁹. Considering that Novartis A.G. was producing these drugs at cost and donors were subsidizing and procuring them, price seems to be less a problem than supply management and a country's ability to absorb the new drugs.

Uganda's current supply chain management problems will likely get worse before getting better, once ACTs begin to be used in combination with Home-Based Management of Fever and distributed country-wide through Community Medicine Distributors. The PMI and its contractors, such as Rational Pharmaceutical Managements, in Uganda were generous with information and frank in discussing supply chain problems. From such a disorganized starting point, it is difficult to evaluate the organization's efforts to date. Increasing transparency further will help evaluate whether contractors are making the progress they claim in the coming years⁸⁰.

DFID provides budgetary support for sector-wide approaches and joint risk programs, both of which make it very difficult, if not impossible to understand and assess what DFID is spending and what its impact is on malaria control. DFID's representative in Kampala declined to meet with AFM to discuss the organization's activities in more detail. According to a 2005-2006 DFID case study report made by independent consultants on its program evaluation practices, poor communications and a lack of accountability are not problems unique to DFID's Uganda office. Country Programme Evaluations of Malawi, Mozambique, Ghana, Rwanda and Bangladesh reflected that:

Communications – an area that DFID acknowledges as important – have not been managed consistently. The common weakness is in ensuring that programming choices and policy changes are properly communicated to government and, as indicated above, other development partners.⁸¹

Too much emphasis was placed on “general publications about DFID programmes and not enough towards generating understanding of DFID's work in-country.”⁸²

The potential for mismanagement of public funds also makes this a risky strategy. In Uganda it has not paid off. DFID explains on its website that its country budget for Uganda has not increased as planned due to concerns about governance and public

⁷⁷ See Donald G. McNeil Jr., “In the World of Life-Saving Drugs, a Growing Epidemic of Deadly Fakes,” New York Times, February 21, 2007.

⁷⁸ Personal communication, Charles Mbire, Chairman, Afro Alpine Pharma. February 14, 2007.

⁷⁹ “Consultation Report of the Global Health Forecasting Working Group,” Center for Global Development, February, 2007. Available: http://blogs.cgdev.org/globalhealth/archive/demand_forecasting/ [Accessed March 26, 2007]

⁸⁰ For an analysis of transparency efforts to date, see AFM's Malaria Donor Scorecard: <http://fightingmalaria.org/research.aspx?id=772> [Accessed May 25, 2007]

⁸¹ DFID Country Program Evaluations: Synthesis of 2005/2006 Evaluations, Julian Barr and Chris Barnett, ITAD. Available: <http://www.dfid.gov.uk/aboutdfid/performance/files/ev671.pdf> [Accessed March 26, 2007]

⁸² Ibid.

administration expenditures⁸³. In contrast, the World Bank's response to Global Fund grant mismanagement was to provide US\$70 million for a public sector reform project to "transform the public service, making it affordable, efficient and accountable in the use of public resources and service delivery."⁸⁴ It is not clear at all how more money will make a corrupt system more accountable, unless it is used to launch supporting investigations and prosecutions. Apparently this will be part of a US\$10.4 million US Millennium Challenge Corporation Threshold Program assistance package recently signed for Uganda⁸⁵. It bears noting that this package is over half of what the PMI's Uganda budget for 2007. Time will tell if these investments are worthwhile.

More innovative solutions are needed to address Uganda's malaria problem, and some are forthcoming from the PMI. It will conduct a study of the upcoming IRS program in Apac where ITNs are also provided to determine the impact and cost-effectiveness of providing both interventions simultaneously in a high transmission area. It is also funding research for tailoring IRS strategies to specific areas. In some northern districts, wattle and daub homes are regularly re-plastered (i.e. the interior walls are packed with fresh mud every two weeks), a practice which will limit the residual effectiveness of insecticide sprayed there. For 2008, the PMI is researching the possibility of using insecticide-treated mud to protect families from malaria.

Uganda's NMCP is grossly understaffed to handle the volume of malaria control work underway in the country. For example, the IRS officer currently doubles as the malaria emergency response officer, a situation that might create a conflict if emergency response management is needed while regular spraying rounds are underway. USAID and other agencies understandably refuse to pay Ministry salaries, and World Bank/International Monetary Fund structural adjustment policies make it difficult to increase public sector staff⁸⁶. Yet it seems there should be some suggestive scaling of new staff hired or computers purchased, e.g. for every US\$5 million going to malaria control.

New technologies can help to make better use of limited resources. Netmark and other groups have employed wireless mobile computer and phone technology to rapidly collect household survey data from remote locations in Uganda. The creative use of similar technology could save on vehicle purchases, petrol costs and countless labor hours consumed by trips around the country to collect and analyze epidemiological data from sentinel sites. A joint project run by the Academy for Educational Development and the Satellife's Center for Health Information and Technology is currently piloting wireless

⁸³ Available: <http://www.dfid.gov.uk/countries/africa/uganda.asp> [Accessed April 9, 2007]

⁸⁴ "Uganda Signs US\$70 Million Agreement for the Public Service Performance Enhancement Project," World Bank Media Release, December 18, 2006. Available: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/UGANDAEXTN/0,,contentMDK:21166062~menuPK:50003484~pagePK:2865066~piPK:2865079~theSitePK:374864,00.html> [Accessed March 27, 2007]

⁸⁵ "Millennium Challenge Corporation Board Approves Funding for Initiatives to Combat Corruption in Kenya, Uganda," Millennium Challenge Corporation Media Release, February 14, 2007. Available: <http://www.mcc.gov/press/releases/2007/release-021407-boardapproveskenya-ugandathresholds.php> [Accessed March 27, 2007]

⁸⁶ Structural adjustment policies favor limiting potentially redundant public sector administration.

technology in Uganda's health sector in several districts⁸⁷. These groups are working with the Ministry of Health to expand.

Ultimately the best way to make use of existing resources is to hold donors accountable for the millions of dollars already being spent on malaria control. The surest way to do this is to set accurate baseline rates for malaria cases and deaths. The Roll Back Malaria Partnership was launched nearly a decade ago with the stated goal of halving malaria cases and deaths by 2010. Yet in Uganda, a country where constituent Roll Back Malaria partners USAID, the World Bank, UNICEF, DFID, other bilateral donors and countless non-governmental organizations have been operating extensively ever since, there is still severely limited data to inform baseline rates of malaria cases and related deaths⁸⁸. Uganda's data collection capacity is typical of other countries where the PMI is operating in 2007, and much better than some, such as Angola.

RBM partners, including the PMI, spend tremendous resources distributing and teaching people the merits of sleeping under ITNs and ACTs, but invest comparatively little in measuring the impact of these tools on malaria. Program measurement and evaluation is still a function of coverage data from household surveys, yet epidemiological targets are set and reset. For all of its commendable efforts, there is little point in creating disease-specific initiatives, as USAID and the CDC have done with the PMI, based on halving malaria deaths without making epidemiological data collection and analysis a higher priority. There is evidence that CDC is having this impact on the PMI, but across the donor spectrum in Uganda it looks like business as usual.

Conclusion

Too often, the tendency among donors is for everyone to take responsibility for success and no one accept blame for failures. Donors insist they support country-driven objectives, so if a country does not prioritize data collection and analysis, it is not the donor's role to force priorities upon it. Yet the inevitable result of such malaise will either be to fudge data when targets are due or risk losing programs that might be genuinely beneficial. With three years left to reach these targets, a shift in donor focus is long overdue. All stakeholders need to refocus accountability on disease impact. Substantive evidence-based policies will only be possible with more and better epidemiological data. Better epidemiological data will only come from building country capacity to accurately diagnose and measure malaria. This should be a provision for every organization spending public money.

AFM commends the Ugandan Ministry of Health and the PMI for developing an IRS program and taking a truly integrated approach to malaria control. We were surprised to find so much political resistance to DDT and so little understanding of its intended use

⁸⁷ More detail on this projects is available at: <http://pda.healthnet.org/> [Accessed April 9, 2007]

⁸⁸ This lack of baseline information has the same implication for the Millennium Development Goals. See Bate, R & Boateng K, 2007. Africa Malaria Day 2007: Time For A Checkup, Africa Fighting Malaria Working Paper. Available: <http://fightingmalaria.org/research.aspx?id=774> [Accessed May 25, 2007]

and real health benefits versus speculative health harms. Among agricultural exporters and various other groups we consulted, however, we were not surprised that DDT's negative effects were understood to be overblown or fabricated, with real fears centering on the perceptions of developed world markets and rejection of exports. Public health has never been and never will be apolitical, but this confusion in Uganda attests to the lasting harm the European Union has done by publicly undermining the Ugandan government's efforts to use DDT in 2005.

The WHO, having marginalized DDT and IRS programs around the world over the past three decades, has a responsibility to reinforce at every level its determination that DDT used in IRS programs continues to do far more good than harm. It can and should work with other UN agencies, donor governments, civil society groups and the media to reinforce its decision to support IRS for malaria control – and with DDT where appropriate. WHO country offices should also facilitate discussions between government ministries and agricultural exporters as early as possible after DDT is even considered for use with IRS. Giving the groups a voice in the planning phase is the surest way to minimize destructive political opposition to building capacity for malaria control. This was not done in Uganda and the victims will ultimately be those suffering from malaria. Additionally, the WHO needs to revise its IRS policy to reflect the fact that IRS can be successfully conducted in areas other than unstable transmission, as is being planned in Uganda, and that IRS does not necessarily need to be conducted district-wide to be effective.

In Uganda, more testing and oversight needs to be done where DDT is used for IRS. USAID's pesticide evaluation report will make recommendations to the Ministry of Health soon, but DDT might only be used in districts with good compliance or where there are not substantial agricultural holdings. In considering alternatives, Syngenta is currently testing Icon-CS[®], an insecticide estimated to last for nine months, in the Wakiso district. AFM welcomes this new research and encourages more. Syngenta, however, needs to ensure that future shipments of insecticide to districts will be efficiently monitored. Its inaccurate shipments to Kabale required unbudgeted man hours to recount, of which RTI has precious few, and created opportunities for theft and misuse.

Regulatory capacity for insecticides, nets and drugs needs to be scaled up. The risk of substandard products undermining malaria control is real, and the lack of regulatory capacity makes countries dependant on insufficient mechanisms like WHOPEs. As the PMI has demonstrated in its work with US Pharmacopeia, gas chromatographers and other laboratory equipment can be used to test a range of chemicals across various diseases and interventions.

There should be stronger consequences for mismanagement of Global Fund grants and other donor money. Following the Ogoola Commission Report, the Ugandan government has now referred three former health ministers and various accomplices to

the police for further investigation⁸⁹. Prosecutions are expected, but the process has been slow and cumbersome.

New ideas and existing programs all require more resources, increased education and project supervision at the village level. Community Medicine Distributors provide anti-malarial drugs to caretakers, populate spray teams for IRS, and distribute ITNs. These focal points for health development can be accompanied, supported and reinforced by the innumerable faith-based groups working with communities throughout Uganda. These groups have been used extensively in Uganda to work against HIV/AIDS, but they are largely an untapped resource to date for malaria. The White House has recently picked up on the valuable role these groups can play in malaria control, making US\$30 million available this year to support faith-based initiatives against malaria⁹⁰. More resources and better coordination at the local level will come with greater engagement from the private sector and faith-based organizations. Coordinating subsidized and commercial approaches to malaria control is critical to ensuring that the capacity developed can be sustained in the coming years to fight malaria.

⁸⁹ “Govt takes action on Global Fund probe,” New Vision, April 10, 2007. Available: <http://www.newvision.co.ug/D/8/12/559048> [Accessed April 11, 2007]

⁹⁰ Mrs. Bush's Remarks in a Compassion in Action Roundtable to Discuss Controlling Malaria in Africa. White House Media Release, February 15, 2007. Available: <http://www.whitehouse.gov/news/releases/2007/02/20070215-2.html> [Accessed March 27, 2007]