

FINAL MONITORING AND EVALUATION REPORT
FOR THE
CHURCHES MEDICAL ASSOCIATION OF ZAMBIA

***Introduction of
Treated Mosquito Net-Based
Malaria Control Programme***

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Abbreviations

CMAZ	Churches Medical Association of Zambia
DFID	Department for International Development (UK)
EC	Emulsified Concentrate
EHT	Environmental Health Technician (“Public Health Officer”)
E.U.	European Union
IEC	Information, Education, and Communication
ITNs	Insecticide-Treated Mosquito Nets
NORAD	Royal Norwegian Embassy (International Cooperation)
PATH Canada	Programme for Appropriate Technology in Health (Canada)
PHC	Primary Health Care
PSI	Population Services International
SC	Suspension Concentrate
SIDA	Swedish International Development Aid
TDRC	Tropical Diseases Research Centre (Ndola)
UNICEF	United Nations Children’s Fund
USAID	United States Agency for International Development
VAT	Value Added Tax
WHO	World Health Organization

Executive Summary

Malaria accounts for a substantial proportion of morbidity and mortality with an estimated yearly global incidence of 300-500 million cases of acute illness with 1 to 2 million deaths.

Approximately 90% of those deaths occur in subSaharan African children, making malaria one of the most important public health priorities. Consequently, the Churches Medical Association of Zambia (CMAZ) has implemented a malaria control strategy since February 1997, based on the introduction of insecticide-treated mosquito nets (ITNs) in rural Zambia.

CMAZ ITN activities have been funded primarily by NORAD and the Canada Fund, though since early 1998 support for technical advice has also been received from PATH Canada (CIDA) especially for (though not limited to) the development of pragmatic monitoring and evaluation strategies. The following report reviews the development and assesses the progress of ITN activities within CMAZ, including details of the evolution of strategic plans and monitoring guides for all levels of this pilot project as well as a summary of results achieved. This is intended to set the results of the monitoring and evaluation exercise within the context of CMAZ Secretariat and participating pilot project hospital activities.

Despite limited resources for malaria control programmes, excessive administrative burdens, and prohibitive import tariffs, CMAZ has achieved significant milestones since programme inception:

- 1) A survey of CMAZ-affiliated hospital preventive and curative malaria management practices in 1996-97 with subsequent selection of three pilot sites for operational research on the introduction of ITNs into rural Zambian populations.
- 2) A community (household) baseline needs assessment in catchment populations of three mission hospitals (Mbereshi, Mtendere, and Macha Mission Hospitals).
- 3) Development of aims and objectives toward a monitoring and evaluation strategy by CMAZ including a list of ITN programme process/outcome indicators and a monitoring and evaluation workplan. Within this strategy, two community household ITN availability and use monitoring assessments were performed in catchment populations of two of three pilot CMAZ hospitals (Mtendere and Macha Mission Hospitals).
- 4) The first CMAZ National ITN Workshop held from March 8-11, 1998 in Lusaka to train 20 health care workers and administrators in malaria control strategies, introducing the use of ITNs within those strategies. A subsequent CMAZ National Infectious Diseases Workshop held from February 22-24, 1999 in Lusaka also featured an update on malaria control ITN strategies for an additional 30 health care workers.
- 5) Procurement and subsidized sale and distribution of more than 6000 white conical polyester mosquito nets and over 60 litres of insecticide (deltamethrin) between November 1997 and February 1999.
- 6) ITN promotional activities initiated in October 1997 with the subsequent production of an

educational 1999 CMAZ calendar.

- 7) ITN project activities have taken place at the three pilot CMAZ-affiliated hospitals including community surveys, training of health workers, use of ITNs for inpatients, education of communities, procurement and sale of nets and insecticide, integration of ITNs activities with PHC programmes, and the monitoring of outcome and process indicators.

Recommendations for future strategies at CMAZ include:

- 1) Marketing and promotion of ITNs should receive higher priority and evolve into more specific and targeted messages consistent with household survey findings.
- 2) Although alternative sources of funding for mosquito nets and insecticide should be sought from other donors including SIDA, DFID, and the E.U., full cost recovery schemes will be essential to ensure a viable and sustainable mosquito net and insecticide programme.
- 3) Aggressive lobbying with legal assistance should be sought, with assistance from local partner NGOs, to rationalized taxes and tariffs applied to netting, mosquito nets, and insecticide to greater enhance their affordability and accessibility in Zambia.
- 4) Improve information management, record keeping, data analysis, and reporting capacity at the CMAZ Secretariat.
- 5) Provide technical expertise and supervision from the CMAZ Secretariat to assist sentinel hospital monitoring sites with the performance of random cluster household surveys.
- 6) Future expansion of activities should draw lessons learned from the strategic planning exercises by both CMAZ and the partner hospitals. These exercises proved very useful in guiding activities and provided a frame of reference for project assessment.

Hospital-specific recommendations include:

- 1) Increase treated mosquito net coverage of hospital beds, increase community promotion and sale of nets and insecticide, and develop a sustainable net retreatment strategy at Mbereshi Hospital.
- 2) Improve outcomes and process monitoring of mosquito net acquisition and usage, and develop a sustainable net retreatment strategy at Mtendere Hospital.
- 3) Develop partnerships with local partners to increase net and insecticide availability and to develop a sustainable net retreatment strategy at Macha Hospital.

Despite the magnitude of the task, CMAZ has made good progress in the introduction of ITN technology into rural Zambia. CMAZ should be encouraged to press forward with their malaria

control programme strategic plan, with the anticipated eventual expansion of their three ITN projects to a CMAZ network-wide ITN programme.

INTRODUCTION

The Churches Medical Association of Zambia (CMAZ), an umbrella administrative organization for over 90 church-related health institutions, has instituted a strategy for malaria control based on the promotion and distribution of insecticide-treated mosquito nets (ITNs) in rural Zambia.

The CMAZ Primary Health Care (PHC) Programme has in the past focused on potable water and sanitation, expanded immunization programmes, maternal child health, and nutritional support programmes during droughts. In February 1997, the CMAZ Health Programmes developed a resolve and a strategy to intensify national malaria control efforts in Zambia because of the resurgence of malaria with increasingly resistant parasites (Appendix I).

Malaria accounts for a substantial proportion of morbidity and mortality with an estimated yearly global incidence of 300-500 million cases of acute illness and 1 to 2 million deaths. Approximately 90% of those deaths occur in subSaharan African children, making malaria one of the most important public health problems on the continent. Consequently, the Zambian Central Board of Health, created as part of radical health reforms, identified malaria as one of the top six major health threats to Zambia. In a document, *Integrated Technical Guidelines for Frontline Healthworkers*, published by the Central Board in May 1997, promotive, preventive, and curative guidelines were presented in an attempt to enhance the delivery of cost-effective health services. The document outlined the introduction of ITNs as integral to malaria control strategies in Zambia. In keeping with the national health policy, CMAZ embarked upon an integrated malaria control programme within the jurisdiction of existing Primary Health Care Programmes.

INSTITUTIONAL CAPACITY OF CMAZ

CMAZ's Primary Health Care Programme falls under the umbrella of Health Programmes directed by Dr. Simon Mphuka, Health Programmes Manager. Mrs. Rose Kabwe, Health Programmes Project Officer, is primarily responsible for day-to-day management of PHC activities including malaria control. An administrative secretary is available to assist with data management and there is access to a pharmacist at the CMAZ Secretariat. In 1998, the CMAZ developed a strategic plan (Appendix 1) for malaria control in rural Zambia with the creation of a Malaria Control Programme in February 1997.

Since early 1997, CMAZ has developed collaborative interactions with the Tropical Diseases Research Centre in Ndola which was given the mandate of coordinating the Zambian National Malaria Control Programme. Dr. Mphuka sits as a member of the National Malaria Advisory Committee which reports to the Central Health Board of the Ministry of Health. The National Malaria Advisory Committee is responsible for promoting and facilitating the introduction of ITNs into Zambia. Several activities to meet this goal were held in 1997 including national ITN workshops to develop malaria policy and treatment guidelines as well as to plan a strategy for ITN promotion and marketing. To date, the committee has unsuccessfully lobbied Ministry of Finance to secure VAT and customs duty exemptions for mosquito nets and insecticide. CMAZ's role is seen as central to this lobbying process with its historical success in obtaining

tax exemptions for similar products. CMAZ is also recognized as a potential key bulk-purchasing and distributing agent for mosquito nets and insecticide throughout rural Zambia.

Initial fundraising efforts by CMAZ in 1997-98 generated interest from NORAD and Canada Fund. NORAD provided US\$80,000 in May 1997 assisting with initial formative evaluation and bulk acquisition of mosquito nets and insecticide to the end of March 1998. An additional US\$32,000 was provided by NORAD for 1998-99 activities. Canada Fund provided \$15,000 (Canadian) to fund the first CMAZ National ITN Workshop in March 1998. In March 1998, PATH Canada also provided \$14,699 (Canadian) to assist with programme evaluative activities until March 31, 1999. With these funds a budget was created for 1997-98 programme activities (Appendix I). NORAD recently extended funding with an additional US\$60,000 for 1999-2000 programme activities. CMAZ also plans to request funding for malaria control from SIDA, DFID, the E.U., the French embassy, and the Netherlands embassy.

CMAZ is still searching for a reliable competitive local source of mosquito nets. In November 1997, CMAZ obtained mosquito nets in Lusaka from a local distributor, P & G Agriculture Limited, who provided high-quality Zimbabwean conical white polyester nets (Emnet) for approximately US\$10.00 for a single and US\$12.00 for a double net. These prices were clearly unaffordable for most rural Zambians. As a result, CMAZ had to subsidize these nets, selling to hospitals for US\$2.00 and US\$3.50, respectively at a significant loss. Subsequently, a source of Tanzanian conical white polyester nets (Sun Flag) was found at a cost of US\$7.00-7.50 for single nets. Only single nets have been procured from this distributor thus far. CMAZ is currently investigating another Tanzanian source of nets (A-Z Textile Mills Limited) that sell single and double nets in the US\$5.00-6.00 range.

Insecticide (deltamethrin 2.5% SC) is available in 1-litre containers from Macmed Health Care Zambia Limited (formerly Africa Health Services Zambia Limited) in Lusaka at a cost of approximately US\$30.00-40.00 per litre (approximately US\$0.20-0.40 per net depending on size of net). Local "single dose" sources of permethrin 25% EC and 55% EC sachets in 10-15 ml quantities cost US\$1.00-1.50 and US\$2.00-3.00, respectively.

A large warehouse facility exists at the CMAZ Secretariat, facilitating storage and distribution of nets and insecticide for CMAZ health institutions.

CMAZ MALARIA CONTROL PROGRAMME ACTIVITIES

Preliminary CMAZ Malaria Control Programme activities commenced in 1996 with a survey of CMAZ hospital preventive and curative malaria management practices. Following this survey, formal programme objectives were formulated including:

- 1) To develop health education strategies aimed at the control of malaria in catchment populations of all member institutions.
- 2) To integrate malaria control activities into existing Primary Health Care Programmes and Home Based Care Programmes.
- 3) To develop training resources in various skills needed for marketing, distributing, and impregnating ITNs.
- 4) To prevent hospital transmission of malaria by immediate institution of the use of ITNs in all hospital wards.
- 5) To institute active national malaria surveillance.
- 6) To evaluate the operational aspects of the introduction of ITNs into CMAZ institutions and into CMAZ catchment populations.

Following formulation of specific programme objectives in February 1997, fundraising efforts secured support from NORAD and Canada Fund in May 1997. In July 1997, formal formative evaluation initiatives began with development and pretesting of a household survey questionnaire. Despite limited resources, excessive administrative burdens, and prohibitive import barriers, CMAZ has achieved significant milestones [*linked to respective programme objectives*] since programme inception:

CMAZ Introduction to ITN Promotion (1996-March 1998)

- 1) A survey of hospital preventive and curative malaria management practices was performed in 61 of 91 CMAZ health institutions in 1996-97. This survey, organized by Dr. Karen Maclean from Loloma Mission Hospital and the University of Saskatchewan, established current ITN use within hospitals and was designed to promote the introduction of ITN use on pediatric and maternity wards. Based on the survey results, several CMAZ hospitals expressing a strong commitment to ITNs were approached as potential pilot sites to study operational aspects of the introduction of ITNs into rural Zambian populations [*Objectives 4 and 6*].
- 2) A community baseline needs assessment was performed in catchment populations of three pilot CMAZ hospitals (Mbereshi, Mtendere, and Macha Mission Hospitals). The survey tool was developed and pretested in July and August 1997. On September 18-19, 1997, November 17-20, 1997, and January 14-27, 1999, 704 households were surveyed in 59 villages surrounding Mtendere, Macha, and Mbereshi Hospitals, respectively. Random cluster surveying techniques were to be utilized, but may have only been followed at one institution (Macha). Data was transferred to Epi Info software, collated, and analyzed in February 1998 and March 1999 (Appendix II). Results were presented at the first CMAZ ITN National Workshop in March 1998 and the CMAZ National Infectious Diseases Workshop in February 1999. Survey conclusions will also be used to

formulate educational and promotional messages and materials as well as net and insecticide procurement and distribution strategies [*Objective 6*].

- 3) Procurement and distribution of mosquito nets was initiated in November 1997. Nets were initially obtained from a local distributor in Lusaka (P & G Agriculture Limited) who provided a high-quality polyester net from Harare (Emnet). Two thousand (2000) white conical double nets at a cost of US\$12.00 each and 2000 white conical single nets costing US\$10.00 each (net prices inclusive of VAT, import tax, and customs duty) were purchased. At that time, the only other net supplier in Lusaka, Chemdol, provided quotations for bulk purchasing of South African-made Emnets ranging from US\$11.00-12.00 for rectangular single and double nets, respectively to US\$17.00-18.00 for conical single and double nets, respectively. Obviously, Chemdol's nets were unaffordable. According to available records, all 4000 Emnets were sold to Mbereshi (300 doubles, although they claim they only received 100), Mtendere (1000 doubles and 500 singles), and Macha (1200 doubles and 1000 singles) Hospitals at a highly subsidized unit price of US\$3.50 and US\$2.00 for double and single nets, respectively for Macha and Mtendere Hospitals in November 1997 and US\$7.50 for the double nets sent to Mbereshi in July 1998. The discordance between CMAZ records (ie, acquisition of 2000 double and 2000 single Emnets) and individual hospital records (ie, receipt of 2500 double and 1500 single Emnets) could not be reconciled after review of stores records [*Objective 4*].
- 4) Procurement and distribution of insecticide was simultaneously initiated with that of mosquito nets in November 1997. Forty litres of deltamethrin 2.5% SC was initially obtained in 1-litre containers from a local agent in Lusaka (Africa Health Services Zambia Limited) at a cost of US\$56.50 per litre (approximately US\$0.40 and US\$0.57 per single and double net treated, respectively). Thirty-two litres of insecticide were sold to Macha and Mtendere Hospitals in late 1997 for US\$0.33 per net treated (approximately US\$33.00 to US\$46.20 per litre) and the hospitals were encouraged to initiate mosquito net dipping activities prior to the start of the rainy season (November 1997). Additionally, 100 15-ml sachets of permethrin 55% EC were purchased from AgrEvo at a cost of US\$3.00 per sachet, but this choice proved too costly and inefficient with only a 6-month duration of efficacy and intolerance to net washing practices [*Objective 4*].
- 5) ITN promotional activities were initiated in October 1997 with the initial objective of developing educational posters and leaflets. Expertise in social marketing is available in Lusaka through Mr. Brad Lucas and Mr. Chris Mukkuli at the Society for Family Health in Zambia which has also undertaken the introduction of ITNs in Eastern Province through a Population Services International pilot project. With a very limited CMAZ budget of US\$5000 for ITN promotion, a 1999 calendar promoting the use of ITNs was produced and distributed to several CMAZ health institutions [*Objective 1*].

CMAZ National ITN Workshop (March 1998)

- 6) The first CMAZ National ITN Workshop was held March 8-11, 1998 in Lusaka. This workshop was designed to train health care workers and administrators in malaria control

strategies, introducing the use of ITNs into those strategies. Twenty individuals participated representing 16 health institutions. The primary goal of the workshop was to produce health care workers able to promote and implement the introduction of ITNs as a key malaria control strategy within catchment populations of their respective health care institutions. Participants developed and/or revised goals and objectives for their malaria control programmes, formulated strategic plans for the introduction of ITNs into their institutions and into their catchment populations, and developed monitoring and evaluation strategies. They were also encouraged to initiate follow-up ITN training activities in their districts. Approximately half a dozen participants subsequently implemented an ITN-based strategy at their respective institutions [*Objectives 2 & 3*].

Post Workshop (March 1998-March 1999)

- 7) The CMAZ Health Programmes management team has developed a monitoring and evaluation strategy including a list of ITN availability and use process/outcome indicators (Appendix III) and a CMAZ Malaria Control Programme monitoring and evaluation workplan for 1998-1999. Within this strategy, two community household ITN availability and use monitoring assessments were performed in catchment populations of two of three pilot CMAZ hospitals (Mtendere and Macha Mission Hospitals). The survey tool was a greatly simplified version of the baseline needs assessment questionnaire. 420 households were surveyed in 49 villages surrounding Mtendere Hospital on December 3, 1998 and Macha Hospital between October 27-November 11, 1998 and February 12-14, 1999. Random cluster surveying techniques were followed only at Macha Hospital. Data was transferred to Epi Info software, collated, and analyzed in March 1999 (Appendix II). Results were presented at a CMAZ National Infectious Diseases Workshop held from February 22-24, 1999 in Lusaka which featured a half-day update on malaria control ITN strategies for an additional 30 health care workers. Follow-up survey conclusions will be used to modify educational and promotional messages as well as net and insecticide procurement and distribution strategies [*Objectives 2, 3, 5, & 6*].
- 8) Between August 1998 and February 1999, 1800 white conical single nets from Tanzania (Sun Flag) purchased by CMAZ at a unit cost of US\$7.50-8.50 were sold for US\$3.00-3.50 to Mbereshi (1000 nets), Mtendere (400 nets), and Macha (400 nets). In addition, 475 Sun Flag conical single nets have been sold to 6 additional CMAZ hospitals and 2 rural health centres between November 1998 and March 1999 at a cost ranging from US\$3.30 per net in November 1998 to a full cost-recovery unit price of US\$7.60 starting in January 1999. Therefore, since the inception of ITN activities at CMAZ, 6275 mosquito nets were procured and distributed at a subsidized cost over 15 months [*Objective 4*].
- 9) Since late 1998/early 1999, deltamethrin has been available from Macmed Health Care Zambia Limited (formerly Africa Health Services Zambia Limited) at a reduced cost of US\$32.00 per litre (approximately US\$0.20-0.35 per net depending on size of net). Twenty more litres of deltamethrin were purchased and sold to all three hospitals at cost. Less than 30 nets and a few sachets of permethrin are currently in storage at the CMAZ warehouse [*Objective 4*].

- 10) Several ITN project activities have been initiated and continued at the three pilot CMAZ-affiliated hospitals including baseline and follow-up community ITN knowledge, attitude, and practices surveys, training of hospital and community health workers in ITN technology, use of ITNs for inpatients, education of communities in the use of ITNs, procurement and sale of nets and insecticide to catchment populations, integration of ITNs activities with existing PHC programmes, and the monitoring of outcome and process indicators (Appendix IV) [*Objectives 1 through 6*].

CMAZ ITN PROGRAMME MONITORING STRATEGY

The strategy of introducing ITNs into rural Zambia through existing institutional and programmatic structures at the CMAZ Secretariat is an ambitious and challenging undertaking. Although the ultimate goal of reducing the incidence of and mortality due to malaria in Zambia is a most desired outcome, it may not be readily measured through existing surveillance activities in the country. Proper and timely assessment of process indicators (ie. “The percentage of a target group sleeping under an [adequately] treated net”) through which this outcome is hopefully achieved will be essential.

Several indicators have been considered to measure various facets of the introduction of ITNs including outcome, availability, usage, and coverage indicators (Appendix III).

Outcome: Despite the inaccuracy of incidence and mortality data, certain CMAZ hospitals collect blood smear-confirmed malaria statistics in their admitted patient population who are among those suffering the greatest morbidity and mortality. The CMAZ Secretariat could therefore establish sentinel malaria-reporting institutions that could monitor severe consequences of malaria in catchment populations before and after the introduction of ITNs, realizing that benefits may not be easily recognized for several years. As well, surveillance data will not be easily interpretable as there as no national standard case definitions and no methods of identifying and monitoring confounding variables such as yearly seasonal changes in rainfall patterns.

Availability: The cost of mosquito nets will be one of the most significant impediments to successful implementation of sustainable ITN distribution networks in Zambia. Mosquito net and insecticide acquisition and distribution will need to be monitored by the stores officer at the CMAZ Secretariat warehouse. Inventory records should keep track of net and insecticide costs as well as cost recovery success. Net and insecticide procurement and distribution records should be added to the CMAZ Malaria Control Programme Evaluation Workplan (see Appendix III).

Usage: Indicators including client mosquito net ownership and impregnation practices can be monitored using hospital and random household surveys. Hospital net usage, washing, and impregnation practices can be monitored through simple

surveys of all CMAZ-affiliated institutions attending the Annual Council held in June.

Community practices will be more difficult to monitor and will require the involvement of individual hospital community-based PHC teams. Random cluster household surveys can be conducted yearly to record net ownership, washing practices, and retreatment practices using simple survey questionnaires (see Appendix V).

Coverage: Short of random night-time household spot surveys, it will be difficult to monitor the percentage of high-risk populations (ie. children under 5 years and pregnant women) sleeping under treated nets. Using the random cluster household survey method, coverage data can be collect using simple survey questionnaires (Appendix V).

These indicators were also reassessed with CMAZ Secretariat staff one year after programme initiation, with some minor modifications recommended based on outcomes achieved. Additional indicators which CMAZ should consider monitoring were suggested including:

The number of health care workers trained in ITN promotion and implementation

The type and quantity of IEC materials on ITNs developed/distributed by CMAZ.

CMAZ Malaria Control Programme constraints were identified during the review and reassessment of the programme monitoring workplan.

CMAZ MALARIA CONTROL PROGRAMME CONSTRAINTS

- 1) Marketing and promotion of ITNs requires further development. Minimal funds have been allocated for IEC activities to date. Although a strong demand has been generated for mosquito nets in some CMAZ-affiliated hospital catchment populations, insecticides are either unknown or feared by potential consumers. Strategies for promotion of insecticide retreatment of nets need to be developed to prevent the already distributed ITNs from largely becoming untreated mosquito nets. Marketing and promotional messages will need to be consistent with household survey needs assessment findings such as net preferences, net washing practices, economic indicators of net ownership, current use and cost of malaria prevention methods, and insecticide knowledge. CMAZ may want to seek social marketing expertise from Population Services International to assist with development of this aspect of their ITN-based malaria control activities.
- 2) Shortage of funds and donor reluctance to provide large quantities of subsidized mosquito nets will continue to pose significant challenges to ITN programme implementation. NORAD continues to be a strong supporter of CMAZ's ITN initiatives with a recent commitment of another US\$60,000 for 1999, in addition to the previous disbursements of US\$80,000 in 1997 and US\$32,000 in 1998. Although CMAZ plans to approach more donors to assist with the procurement of nets and insecticide (ie, DFID, SIDA, the Netherlands embassy, the French embassy, and the E.U.), full cost recovery schemes will be essential to ensure a viable and sustainable programme.
- 3) The cost of mosquito nets throughout Zambia continues to be prohibitive due to a combination of taxes and

profit margins on the base price of US\$7-12 for imported nets (from Zimbabwe and South Africa). Over 40% markups occur as a result of VAT, import taxes, and customs duty combined. Market monopolies have also favoured higher prices for some imported goods in Zambia. The combination of taxes and large markups generated by middle agents have maintained the cost of a double net above US\$12 until recently. Street vendors in Lusaka, who were importing South African white conical polyester nets (allegedly illegally bypassing taxes), were able to sell double nets for US\$10 in 1998. Most recently, competition from Tanzania has entered Zambia with two companies anxious to sell reasonably good quality nets for under US\$5. However, these slight reductions in the price of nets will not sufficiently improve affordability until prohibitive taxes are removed. CMAZ has repeatedly lobbied the Ministries of Health and Finance for universal tax exemption on mosquito nets with no results to show for their efforts to date. Removal of tariff barriers against nets will be essential for the successful dissemination of ITNs throughout Zambia.

- 4) Information management capacity is limited at the CMAZ Secretariat. Some computers are outdated and maintenance is difficult due to harsh environmental conditions and shortage of local trouble shooting expertise. Although there are a few Pentium computers at the Secretariat, hard drive capacities are almost exhausted and memory is insufficient for the more sophisticated data management software. There is only one administrative secretary at the CMAZ Secretariat possessing sufficient computer skills to perform basic data management. However, more complicated data processing including use of statistical software are beyond the capability of this individual. Record keeping and reporting capacity is also limited by excessive workloads. The paper trail for acquisition and distribution of nets and insecticide is difficult to follow and, at times, inconsistent with pilot hospital records.

PROJECT (SENTINEL) HOSPITAL SITE VISITS
(Dr. Pierre Plourde, Mrs. Rose Kabwe, and Ms. Catherine Reed)

The three project (sentinel) CMAZ-affiliated hospital sites were visited in March 1998 by Dr. Plourde and Mrs. Kabwe and in March 1999 by Dr. Plourde, Mrs. Kabwe (Mtendere only), and Ms. Reed. All three institutions are similar with respect to services rendered and catchment populations (see Appendix VI).

Mbereshi Mission Hospital Site Visit (March 2-4, 1999)

ITNs were introduced to hospital staff in May 1998, shortly after the first CMAZ National ITN Workshop in March 1998. A clinical officer and MCH nurse were assigned with the responsibility of administering the introduction of ITNs at Mbereshi Hospital and two general hospital workers were recruited to assist with implementation. Since ITNs had never been previously used for patients, nor in hospital staff homes or the community, startup activities consumed at least 2 days per week over several months for both the clinical officer and nurse. One hundred (100) double nets and 1 litre of deltamethrin were consigned to Mbereshi Hospital by CMAZ in July 1998, with the expectation that US\$7.00-7.50 would be paid to CMAZ for every net sold. In December 1998 and February 1999, a further 1000 single nets were sent from CMAZ, with the expectation of a reimbursement of US\$3.00-3.50. Although no nets were seen hanging on the hospital wards, the plan was to cover all hospital beds with treated mosquito nets by May 1999 (the hospital administration has already purchased 100 nets for use on hospital beds). Nets are treated with deltamethrin by the purchaser at the time of sale at a calculated dose of 25 mg/m² (9-10 ml 2.5% deltamethrin for 9-10 m² double net and 5-6 ml for 5-6 m² single net). One free retreatment is being offered as insecticide (2 treatments) and transportation costs are incorporated into the initial purchase of both single and double nets for the same price of US\$7.00-7.50. There is a rapidly growing demand for double nets within the hospital catchment population, and as single nets are the same price as doubles, they are not selling well with 850 single nets remaining in storage at the hospital after 2-3 months of sales during the rains. There are also five 1-litre bottles of deltamethrin in storage, enough to treat 1000 single nets.

Although Mbereshi Hospital does not have a formal malaria control programme, the clinical officer and MCH nurse developed malaria control programme objectives, a workplan based upon the introduction of ITNs, and a monitoring strategy to evaluate their introduction of ITNs, with the assistance of CMAZ (Appendix IV). Hospital administration is currently very supportive of malaria control efforts. The greatest constraints to implementation and monitoring will be a mismatch between nets supplied by CMAZ and population preferences, the prohibitive cost

of nets, the use of nets for fishing (there is a demand for mosquito nets by fishermen), the need for a net retreatment strategy in the longer term, and the improvement of household random cluster survey practices. Additional programme monitoring objectives were recommended including details of net and insecticide procurement and sale, as well as net retreatment practices (Appendix IV).

Mtendere Mission Hospital (March 16-17, 1998 and March 8-9, 1999)

ITNs were introduced into the hospital in March 1998 directly as a result of the first CMAZ National ITN Workshop. They had never been previously used for patients, nor in hospital staff homes. One thousand (1000) double nets, 500 single nets, and 12 litres of deltamethrin were consigned to Mtendere Hospital by CMAZ in October 1997, with the expectation that US\$2.00 and US\$3.50 would be paid to CMAZ for every single and double net sold, respectively, as well as US\$0.33 per net treated with insecticide. In March 1998, all 7 maternity beds were covered with ITNs. The 22 paediatric beds were covered at a later time due to temporary relocation of paediatric patients during hospital construction of new wards. Initially, nets were bulk treated in October 1997 with deltamethrin at the hospital at a calculated dose of 27 mg/m² for double nets (10 ml 2.5% deltamethrin for 9 m² net) and 35 mg/m² for single nets (10 ml 2.5% deltamethrin for 7 m² net). These dosage errors were subsequently rectified, reducing insecticide concentrations to 25 mg/m². In November 1998, a further 400 single nets were sent from CMAZ, with the expectation of a reimbursement of US\$3.00-3.50. These nets were sold to mothers in the MCH clinic for US\$4.75, including the price of the insecticide for initial treatment and one retreatment. One thousand nets have also been treated by community health workers at 6 Village Health Posts on prearranged "dipping days" in October 1997 and sold to the community for US\$3.50 and US\$6.00 for single and double nets, respectively. An attempt is being made to return to villages to encourage retreatment, but no records are being kept to document this. However, record keeping concerning the distribution and sale of nets has been impeccable. There is a rapidly growing demand for ITNs within the hospital catchment population. Mtendere Hospital was sold out of 1000 ITNs within a few "dipping days" over a one month period in 1998 and there are currently no nets in storage at the hospital. Only 1 litre of deltamethrin remains in storage, enough to retreat 100-150 nets, depending on net size.

Although a formal malaria control programme does not exist at Mtendere Hospital and hospital administration has been moderately supportive of community outreach disease prevention efforts, administrative staff have recently become more sympathetic toward malaria control efforts. A PHC Environmental Health Technician (Public Health "Officer") attended the CMAZ National ITN Workshop in March 1998 where he was involved in formulating draft malaria control programme objectives, a workplan based upon the introduction of ITNs, and a monitoring strategy to evaluate the introduction of ITNs into his hospital and catchment population (Appendix IV). After over one year of programme implementation, the greatest constraints to implementation identified by the EHT are an inability to meet the demand for mosquito nets, a shortage of cash in the villages (the EHT would like to explore exchange of nets for farming products like maize which can be used by the hospital kitchen for inpatients), difficulty with the use of nets on the wards with interference with ceiling fans and inability to use nets on a congested paediatric ward where two to three patients may occupy one bed, and the need for a net retreatment strategy in the longer term. Careful planning and integration with other PHC programmes under the EHT's jurisdiction will continue to be necessary to ensure efficient use of limited resources. Additional programme monitoring objectives not currently found within Mtendere's strategic plan were recommended including net and insecticide usage and coverage within catchment community populations (an attempt to monitor this indicator has already been made, but it is not listed among the objectives), as well as net retreatment practices (Appendix IV).

Macha Mission Hospital (March 12-15, 1998 and March 10-12, 1999)

ITNs were introduced into the hospital in November 1997 directly as a result of recruitment by CMAZ to participate in the introduction of ITNs into rural Zambia. They had never been previously used for patients and had been used only occasionally in hospital staff homes. One thousand (1000) single nets, 1000 double nets, and 20 litres of deltamethrin were consigned to Macha Hospital by CMAZ in November 1997, with the expectation that US\$2.00 and US\$3.50 would be returned to CMAZ for every single and double net sold, respectively as well as US\$0.33 per net treated with insecticide. Since November 1997, all 36 maternity beds and over 90% of 51 paediatric beds have been covered with ITNs. Nets were bulk treated with deltamethrin at a calculated dose of 25 mg/m² (9 ml 2.5% deltamethrin for 9 m² double net and 7 ml for 7 m² single net). Hospital nets are washed once every 4-6 months and were retreated in February 1999. Compliance with mosquito net usage on maternity and paediatric wards has been high as reported by night duty nurses. Patients on other wards have been requesting nets as well. ITNs were also

mass treated by hospital staff and sold to the community at acquisition costs of US\$2.00 and US\$3.50 for single and double nets, respectively. Clients did not initially participate in net treatment and were not charged for the insecticide. Due to high demand, Macha Hospital was sold out of almost 2000 ITNs within a few days. In January 1999, a further 400 single nets and 4 litres of deltamethrin were sent from CMAZ, with the expectation of a reimbursement of US\$3.00-3.50. These nets are being sold to mothers in the PHC department for US\$5.00, including the price of the insecticide for one initial treatment. Retreatment is offered for US\$0.25. An attempt has been made to return to villages on a monthly basis, under the auspices of PHC programmes with the assistance of senior headmen, to encourage retreatment but little success has been achieved. Record keeping concerning the acquisition of nets has been the responsibility of hospital accounts and the recording of distribution and sale of nets has been managed by the EHT responsible for ITNs. Income generated from nets and insecticide sales is directly submitted to general hospital accounts. There continues to be a rapidly growing demand for ITNs within the hospital catchment population with only 100 single conical nets currently in storage at the hospital. Only 3½ litres of deltamethrin remains in storage, enough to treat the 100 remaining nets plus the retreatment of 450-600 nets, depending on net size.

A local merchant (Gideon) who manages a small convenience store was selling mosquito nets until mid-1998 and was somewhat ambivalent with the success of Macha Hospital's ITN initiative, as he was both pleased to see a large number of mosquito nets introduced into his community and discouraged that the highly subsidized nets had "killed (his) business". However, despite this disappointment, he is interested in getting involved again with both mosquito net and insecticide marketing and sales, as long as his product can compete in the local market.

Although a formal malaria control programme does not exist at Macha Hospital, a team of three health care workers including the Deputy Director of the Malaria Research Institute, a PHC Environmental Health Technician (Public Health "Officer"), and a ward nurse attended the first CMAZ National ITN Workshop in March 1998 where they formulated malaria control programme objectives, a workplan based upon the introduction of ITNs, and a monitoring strategy to evaluate their introduction of ITNs (Appendix IV). After over one year of programme implementation, they have identified their greatest constraints to implementation to be an inability to meet the ever-increasing demand for mosquito nets, a shortage of cash in the villages (the EHT is investigating the feasibility of exchanging nets and insecticide for maize which can be used by the hospital kitchen for inpatients; there is apparently a precedent for this activity in the water and sanitation project of Macha Hospital), lack of IEC materials for teaching communities concerning ITNs, inefficient use of the EHT's time spent on selling and dipping tents (the EHT feels his time would be better used for promotion, marketing, and developing retreatment strategies), the high cost of nets necessitating excessive subsidies, the stealing of nets from hospital wards, and the need for a net retreatment strategy in the longer term. Careful planning and continued integration with other PHC programmes under the EHT's jurisdiction will be necessary to ensure efficient use of limited resources. There will also be a need to improve linkages with the private sector (local small business entrepreneurs). In addition to the programme monitoring objectives currently found within Macha's strategic plan, a recommendation was made that net retreatment practices be added to the list (Appendix IV).

Summary of Site Visits

The main achievements realized by the pilot (sentinel) CMAZ-affiliated hospitals include:

- 1) Development and implementation of a strategic plan to introduce ITNs as part of renewed malaria control efforts.
- 2) Baseline community surveys pertaining to malaria prevention and ITNs in particular.
- 3) The education and training of hospital and community health workers in ITN technology.
- 4) The introduction of ITNs as a malaria control strategy for inpatients.
- 5) The education of catchment populations in the utility and use of ITNs.
- 6) The procurement and sale of nets and insecticide to catchment populations.
- 7) The integration of ITN activities within existing PHC programmes.

- 8) The monitoring of ITN-related outcome and process indicators.

The primary constraints to successful programme implementation at the hospital level include:

- 1) Net and insecticide demand far exceeding supply.
- 2) The prohibitive cost of nets.
- 3) Technical difficulties with community ITN usage and coverage monitoring surveys.
- 4) The need for increasing integration with other PHC programmes.
- 5) The need for IEC materials for promotion and social marketing of ITNs.
- 6) The need to develop effective net retreatment strategies.

PROJECT (SENTINEL) HOSPITAL BASELINE AND ONE-YEAR FOLLOW-UP SURVEYS

Baseline knowledge, attitude, and practices household surveys were performed at all three sentinel hospital sites in September 1997 (Mtendere Hospital) and November 1997 (Macha Hospital) before the rainy season, and in January 1999 (Mbereshi Hospital) in the middle of the rainy season (after the introduction of ITNs). The population demographics were consistent between hospital catchment populations and with national census records (Appendix II - Table 1). The average number of persons per household was between 6 and 7. Household heads or their representative were interviewed using a pretested questionnaire. Selection of households was performed using random cluster techniques. However, monitoring visits disclosed that only one of the three sites (Macha Hospital) may have used a truly random selection process. Therefore, systematic biases cannot be excluded from the baseline and follow-up surveillance data from the other two institutions.

Malaria was identified as the #1 health problem in the community by 539 of 668 respondents (80.7%) with respiratory diseases (10.4%), diarrheal diseases (8.7%), and AIDS (7%) as the next most common responses. The knowledge of malaria was good in the catchment communities with 45.4% and 25.6% of the population identifying malaria or mosquitoes, respectively as the most common causes of fever. However, 21.6% of the population did not know the most common cause of fever and 4.3% identified changing weather patterns, 2.1% answered poor hygiene, and 0.3% answered each of diarrhea, bewitching, and eating unripe fruits as most common causes of fever. 68.9% knew that malaria was spread by mosquitoes, whereas 15.5% were not sure of the mode of transmission. Clinical signs of malaria were identified as fever (80.2%), vomiting (36.2%), headache (33.0%), shaking chills (19.9%), myalgias (12.6%), generalized weakness (12.0%), jaundice (11.2%), and diarrhea (9.7%). Very few (0.4%) identified seizures as a presenting sign of malaria. When asked about sources of malaria knowledge 58.8% answered the hospital or clinic, 18.6% stated that their own personal experiences with malaria was their primary source of knowledge, 5.1% said they learned about malaria at school, 2.4% claimed their knowledge was acquired from mass media (newspapers, magazines, radio, television), and 5.4% did not know how they had acquired their knowledge. When questioned about diseases caused by mosquitoes, 91.9% identified malaria as the most common disease caused, 10.6% identified fever, 4.6% diarrhea, 4.1% headache, 1.0% yellow fever, 0.7% AIDS, 0.1% filariasis, and 1.5% did not know. Finally, when asked who suffers the most mortality from malaria within their communities, respondents answered 1 to 5 year old children (63.7%), 6 to 14 year old children (16.2%), and under 1 year old infants (11.3%).

Concerning malaria prevention practices, mosquito net ownership was low but among the most common methods of prevention used (Appendix II - Table 4). In the two baseline surveys performed prior to the introduction of ITNs into the community (Mtendere and Macha), 12-16% of households reportedly owned mosquito nets. None were reported as treated with insecticide. Other methods of malaria control reported in all three surveys included mosquito coils (8%), insecticide sprays (8%), burning leaves and other traditional methods (9%), and early diagnosis and management of malaria usually with chloroquine as the first line agent followed by Fansidar if necessary (19%). Despite a large number of respondents knowing that malaria can be prevented (78%), only a minority attempted to

use prevention measures. Mosquito net ownership was strongly correlated with economic indicators (Appendix II - Tables 2 and 3). Ownership of a tin roof and a radio were among the strongest indicators of net ownership in univariate analysis (Appendix II - Table 3). Households not owning a net reported the prohibitive cost of nets as the most likely reason for not having a net (92.6%). Other reasons given were the unavailability of nets (2.8%), not interested in having a net (1.8%), lack of nuisance mosquito bites (1.6%), and lack of knowledge in how to use a net (0.5%).

Baseline mosquito net usage practices were quite revealing (Appendix II - Table 5). Historical previous use of mosquito nets in hotels, boarding schools, army camps, relatives' homes, etc, were reported by 37% of respondents. There may therefore be a baseline culture of mosquito net usage within communities. The number of at risk individuals (especially children under 5 years) sleeping under a mosquito net was very low during baseline assessment. In net-owning households, the coverage of under 5 year old children was 36%, which translated to only 6% of all children under 5 in the total population surveyed. One-year follow-up data from Macha Hospital documented an increase in coverage of under 5 year olds to 52% in net-owning households and 24% in the surveyed population (Appendix II - Table 8). The baseline surveys also included a needs assessment of net and insecticide requirements and preferences (Appendix II - Table 6). 80% of households were willing to purchase mosquito nets if they were more affordable. There was a large preference for large (double size) nets. Color preference was white (60%) and other colors (40% - primarily green or blue). There was an even split between rectangular and conical shape preferences. An average of 3 to 4 mosquito nets were requested per household surveyed. The prices that respondents were willing to pay for mosquito nets were well below current market values of nets (Appendix II - Table 6). However, the same respondents had reportedly paid an average of US\$1.00-2.00 more than their quoted desired amounts per net when purchasing nets which they already owned (Appendix II - Table 5). Finally, insecticide knowledge was low, but willingness to treat nets with insecticide was high during the baseline surveys (Appendix II - Table 5).

Follow-up ITN practices household surveys were performed at two of three sentinel hospital sites in December 1998 (Mtendere Hospital) and November 1998/February 1999 (Macha Hospital), one year after the introduction of ITNs. The population demographics were similar to baseline survey statistics (Appendix II - Table 7). The average number of persons per household was 8. Household heads or their representative were interviewed using a greatly simplified version of the pretested baseline questionnaire. Selection of households was performed using random cluster techniques. However, monitoring visits disclosed that only one site (Macha Hospital) used a truly random selection process consisting of using lists of villages and households available from 3 senior headmen in Macha Hospital's catchment area. In effect, these village lists provided convenient clusters and the list of households facilitated random selection. Follow-up survey results from Mtendere Hospital are difficult to interpret as random selection did not occur and data collection was incomplete.

Follow-up results reveal that prices paid for mosquito nets had decreased substantially, in keeping with the large subsidies placed on nets by the mission hospitals. Household net ownership increased from 12% to 49% (at Macha Hospital), with coverage of under 5 year old children increasing from 34% to 52% in net-owning households and 5% to 24% in the total under 5 population (Appendix II - Table 8). Children of this age frequently sleep with parents or grandparents, possibly accounting for similar coverage rates in adults. Although the denominators are small, coverage of pregnant women was also high at 73% of those in net-owning households and 36% of all reportedly pregnant women in the population surveyed. These are likely overestimates as verbal reporting of pregnancy may be unreliable. Net washing frequencies were favourable in Mtendere Hospital catchment respondents with 73% of households washing nets with a frequency that would allow for 12 months of deltamethrin potency. However, in Macha Hospital catchment respondents, only 41% washed nets with a frequency that would not require a second retreatment within 12 months. Finally, the number of retreated nets was extremely low with only 1-5% of mosquito nets retreated after one year of ITN introduction. Therefore, in effect, the originally introduced ITNs have now become untreated nets.

RECOMMENDATIONS

Recommendations for future strategies at CMAZ include:

- 1) NORAD has been a consistent supporter of CMAZ's ITN introductory initiative. However, more donors will be needed to move the current enterprise from a small 3-site pilot project to a CMAZ network-wide net and insecticide marketing, promotion, and distribution programme. To date, a one-time Canada Fund grant and a monitoring and evaluation grant from PATH Canada have assisted as well. NORAD has recently extended their support with an additional US\$60,000 for 1999-2000 ITN activities. Other potential interested donors including USAID, SIDA, DFID, the E.U., the Netherlands embassy, and the French embassy should also be approached by CMAZ.

Net and insecticide subsidies should be discouraged in favour of complete cost recovery, which CMAZ is more recently well on its way to achieving. The practice of providing hospitals with net and insecticide consignments on credit is proving effective to date, and should support cost-recovery schemes. Procurement and distribution of nets could be improved (as demand rises) by providing a variety of products in stock (different colors, shapes, and sizes) throughout the year with a larger supply available before and during the rainy season (October through March). Results of the baseline surveys plus a CMAZ-wide needs assessment (by mailed questionnaires and/or during the Annual Council in June 1999) should be used to estimate quality and quantities of product needed.

The tentative budget for the US\$60,000 from NORAD for 1999-2000 was discussed with CMAZ Health Programmes staff in March 1999 and breaks down as follows:

Development/Distribution of IEC materials	US\$10,000
Provincial Training of Trainers Workshops	US\$8,000
Legal Lobby for Tax Exemptions	US\$3,000
Purchase of Mosquito Nets	US\$60,000
Purchase of Insecticide	US\$15,000
Conference Attendances	US\$10,000
Monitoring and Evaluation	US\$7,000
Honoraria	US\$12,000
Administration/Materials/Inflation/Contingency	US\$10,000
Subtotal	US\$135,000
Cost Recovery from Net and Insecticide Sales	US\$75,000
Total	US\$60,000

- 2) CMAZ will have great difficulty achieving total cost recovery of nets at current market prices. Cost recovery of insecticide is already being achieved. Plans to ultimately achieve self-sufficiency over the long term with full cost recovery of nets should be continued. The crucial step of obtaining tax exemption status from the Ministry of Finance should be intensified. Recently, in Tanzania, it was discovered that a proper interpretation of existing tax laws meant that the application of taxes on nets and insecticide were illegal. This led to a subsequent removal of net and insecticide taxes. CMAZ may therefore want to consider hiring a legal firm to review Zambian tax laws, with the eventual goal of achieving universal tax exemption for netting, nets, and insecticide. Other NGOs may also be interested in assisting with this lobby including World Vision, who has shown interest in promoting and distributing ITNs in Zambia.

- 3) Marketing and promotion of ITNs is not sufficiently funded, especially if radio and television advertising are considered. Radio marketing is a very powerful educational tool in rural Zambia. More thought needs to be given to social marketing of insecticide. As the baseline survey revealed, mosquito net knowledge and past experience was relatively high, but this was not the case for insecticide. The three sentinel hospitals are already experiencing serious difficulties in getting populations to retreat nets and, in this regard, are requesting IEC materials from CMAZ. People may purchase a net for US\$5.00, but will not pay US\$0.25 for retreatment. Local expertise available through the Society for Family Health in Zambia/PSI should be sought to provide assistance in increasing the demand for nets and insecticide. If CMAZ does not feel it has the capacity to develop IEC materials on its own, it could consult WHO, PATH Canada, or net and insecticide manufacturers and distributors for assistance.
- 4) Record keeping with the Stores Officer at the CMAZ Secretariat is sporadic and could be improved. A standard record keeping form detailing net and insecticide procurement and distribution data should be developed. It was difficult to get access to complete records of net and insecticide acquisition and distribution since the onset of the programme in 1997, and inconsistencies between CMAZ Stores records and sentinel hospital records were irreconcilable at the time of the site visit. Data collection and data entry capabilities at the CMAZ Secretariat are adequate but human resources are stretched to capacity. As well, data analysis capacity is weak and may require continued external assistance. The currently available and affordable data analysis tool is Epi Info. Although very inexpensive (it can be downloaded at no cost from CDC's website), it is not user-friendly and requires significant technical expertise. Either the CMAZ administrative secretary responsible for data management will require more training to master Epi Info or another more user friendly software package will be required (likely at substantial cost). Reporting capacity is good as a quarterly newsletter (The Balm) is circulated to all CMAZ health institutions and can serve as an information dissemination tool.
- 5) Random cluster household survey methodology needs to be reviewed by the CMAZ Secretariat with all sentinel sites performing surveillance. Technical expertise to properly perform such surveys is inadequate at most mission hospitals as prior experience with EPI monitoring is absent. Therefore, CMAZ Secretariat Health Programmes staff will need to provide technical assistance to institutions to ensure that surveys are properly conducted. Materials available from the WHO outlining random cluster survey approaches to EPI monitoring should be sought for reference (The EPI Coverage Survey, WHO; WHO/EPI/MLM/91.10 Revised 1991). As well, Macha Hospital used a variation of random cluster surveillance using existing clusters (historically established by senior headmen) and lists of households from which a random selection was taken. This methodology should be explored further to see if it can be validated against traditional WHO methods and if it can be used in other catchment populations in rural Zambia.
- 6) The strategic planning by both CMAZ Secretariat staff and the partner hospitals proved very useful in guiding activities and provided a frame of reference for project assessment. Any future expansion of activities should draw lessons learned from this exercise, with the eventual development of realistic and achievable objectives and a means of assessing them.

Hospital-specific recommendations include:

- 1) Mbereshi Mission Hospital
 - a) Mbereshi Hospital currently has a vertical ITN initiative with two very enthusiastic individuals (one clinical officer and a MCH nurse) performing most of the promoting, selling, and dipping of nets and insecticide. Greater integration within existing PHC programmes using existing staff and resources to promote and distribute nets and insecticide will need to occur.
 - b) Because of its remote location, Mbereshi Hospital is selling nets for unaffordable prices, in an attempt to recover transportation costs. However, their single nets are not selling with 850 remaining in storage. Small subsidies may be worth considering for the most vulnerable population (ie, mothers with children under 5 years and primigravida women).

- c) Hospital staff are also currently waiting for clients to come to them to purchase nets. It may be more fruitful if PHC staff move out into villages and fishing camps (in concert with other PHC activities) to promote and sell nets and insecticide. Other opportunities to sell single nets in particular may be found in neighbouring hospitals, rural health centres, and boarding schools.
- d) The hospital administration has purchased 100 nets but has not yet instituted their use due to renovation of wards. These nets should be treated and hung as soon as possible, since there are no other effective malaria control activities within the hospital setting at this time.
- e) The clinical officer responsible for malaria control will need some technical assistance from CMAZ in monitoring community ITN usage and coverage.
- f) Finally, a net retreatment strategy needs to be developed as the demand for nets currently far exceeds knowledge of and demand for insecticide.

2) Mtendere Mission Hospital

- a) Mtendere Hospital has limited capacity in terms of human resources and transportation for PHC programmes in a very large catchment area. Nevertheless, enthusiastic institution of an income-generating revolving fund coupled with interest generated in the community through popular village Community Health Post “dipping days” in late 1997 and early 1998 created a large demand for treated nets. The EHT responsible for ITNs has never had any difficulty selling nets at a small profit. The challenge has come with trying to encourage retreatment of nets one year after introduction of ITNs. The EHT has made concerted efforts to provide retreatment in the villages but with limited success, despite offering the first retreatment at no cost. Although net sale and distribution records are impeccable, retreatment records are not being kept. It may be useful to use the original net ownership registers to more aggressively seek out nets requiring retreatment. As with the other sentinel hospitals, a net retreatment strategy will need to be developed.
- b) Mtendere Hospital has had difficulty covering their high-risk hospitalized patients with ITNs as the hospital has ceiling fans which interfere with hanging nets. As well, the hospital has well-screened windows and walls are occasionally sprayed with insecticide. Therefore, the need for ITNs at this hospital may not be so critical and need not be aggressively pursued.
- c) The EHT responsible for malaria control will need some technical assistance from CMAZ in monitoring community ITN usage and coverage.

3) Macha Mission Hospital

- a) Macha Hospital has the capacity to provide hospital-wide and community-wide ITN coverage in high-risk populations. Although Tonga villages are spread out over huge areas, the feasibility of village “dipping days” (at Community Health Posts) as opposed to selling and treating nets solely at the hospital needs to be considered. Clients are unlikely to bring their nets to hospital for retreatment and therefore malaria control staff will need to be very visible and possibly aggressive (as they have been with immunization campaigns in the past, with very successful results) within their catchment communities. Macha Hospital has achieved the highest childhood vaccination rates in Zambia and could likely also reach the same heights of achievement with respect to ITN coverage in children under 5 years. Community involvement in retreatment practices will be crucial to ITN success and sustainability. Just as older mothers are currently compelling younger mothers to have their children vaccinated, these women can also become promotional agents for retreatment of nets.
- b) Of the three sentinel sites, Macha Hospital has been placing the heaviest subsidies on nets. Full cost recovery will need to be achieved (and has recently been adopted at Macha Hospital) as heavy subsidies are not sustainable and will continue to prevent the local private sector from collaborating with net and insecticide promotion and distribution.

c) Within the hospital, there is a strong demand by patients and some hospital staff for complete coverage of all hospital beds. As the hospital does not have screened windows or fans, this recommendation should be strongly encouraged.

d) Hospital accounts have been actively involved in monitoring net and insecticide procurement and sales. This is a model that should be emulated by others as it frees the health care staff from having to worry about accountability and other financial details. The receipt book records name of purchaser, price payed, and date of purchase of net and/or insecticide. The simple addition of a village code would also allow for monitoring of coverage in specific catchment villages.

e) The EHT responsible for malaria control has felt that too much of his time has been spent on selling and treating nets, a task which could easily be taught to and performed by any general hospital or community health worker. This is a reasonable concern as his time would most likely be more efficiently spent in developing IEC materials, promoting and marketing ITNs, and developing retreatment strategies.

f) Macha's approach to random cluster surveillance should be explored further, recorded, and tested to compare it with traditional EPI methodology as, if valid, it appears to be much simpler than the EPI approach and uses pre-existing clusters (ie, locally available appropriate technology).

CONCLUSION

Despite the magnitude of the challenge, CMAZ has made good progress with the introduction of ITN technology into rural Zambia. Within 15 months over 6000 nets have been treated and distributed in 3 sentinel plus a few other interested institutions. They have created a demand which they currently cannot meet, which has both positive and negative implications. The supply will have to rapidly catch up to the demand if sustainable efforts are to be realized, before the momentum dies down.

The results contained in this report have drawn on information from several sources including surveys, stores records, receipts, training logs, verbal reports, sales registers, counting nets, etc. All have proved valuable but accuracy and consistency will need to be improved in some key areas. Data collection methodologies including household surveys will need to be standardized to improve future monitoring capabilities. Records of procurement, inventory, and sales of nets and insecticide will need to improve as well. The importance of good record keeping and accounting should not be forgotten.

The data in this report has been drawn together by 2 individuals who had a designated time and a mission to evaluate the CMAZ ITN initiative. This exercise was not only necessary according to the terms of reference of the PATH Canada intervention, but it was welcomed by the CMAZ Secretariat and project (sentinel) hospitals as it provided an overview of programme activities and constructive advice for improving future programme planning and implementation. The importance of periodic assessment and feedback to the different levels involved in this expanding programme cannot be stressed enough. It may not be possible nor necessary for independent evaluators to assess the programme every year, as long as CMAZ personnel formalize the continual collection, periodic collation and critical assessment of programme monitoring and evaluation data. It is recommended that in any future programme enhancement, that monitoring and evaluation be appropriately funded to ensure time for these essential activities.

It is also hoped that the monitoring of existing activities will assist CMAZ procure further funding to support their malaria control activities. The coverage indicator of percentage of children under 5 years old sleeping under a treated net is increasingly being used as the key indicator to ITN programme monitoring. CMAZ has started to demonstrate the utility of monitoring this indicator. As CMAZ is seen as a reference centre within Zambia and the region, their role as a promoter of malaria control through the use of ITNs is expected to expand, and it is anticipated that along with it will go the lessons that they have learned (and are learning) with respect to strategic planning and monitoring and evaluation.

These lessons are being disseminated in a number of ways: 1) within the CMAZ organization through technical support personnel, newsletters (*The Balm*), and at annual and other meetings, 2) at a planned presentation at the International ITN Conference in Tanzania in October 1999, 3) in peer-reviewed journal publications (in preparation), and 4) through the PATH Canada newsletter (*Malaria Matters: featuring Netting News*). The site visits at all three hospitals were punctuated by excursions into catchment villages where net-owning mothers and fathers were extolling the benefits of ITNs, attributing recent improved health of their children to the use of treated nets. For some, the rainy season(s) which have occurred since their acquisition of ITNs have been the first to feature malaria-free children in their families. Although this is only preliminary anecdotal evidence of success, one can assume that a significant reduction in childhood mortality has already been achieved. CMAZ should be congratulated on their efforts thus far, with the expectation that significant benefits will continue to be realized, much as has occurred with universal childhood immunization programs over the past 15-20 years. CMAZ should be encouraged to press forward with their malaria control initiatives, with the anticipated eventual expansion of their three ITN projects to a CMAZ network-wide ITN programme.

Appendix I

CMAZ Health Programmes Action Plan 1998

1. Background

The challenge of assisting member institutions in planning, implementing and evaluating the curative and preventive health activities and programmes of the CMAZ health institutions is expected to be very daunting in the year 1998. The Health Reform process has brought about a lot of anxiety not only on the continued existence and sustainability of the church health institutions but also the security of health workers in the country. Issues of funding to the health institutions and staff delinkage are perceived as critical issues to be addressed. There is growing concern and anxiety that these reforms at the moment are purely academic and they do not address real health issues. A lot of time and energy is being spent on addressing and clarifying issues on decentralization of health services.

These events are taking place in an environment where the country's economy continues to decline. There is growth in poverty with employment and incomes declining drastically. The environment is made even worse by the following health challenges:

The AIDS epidemic, now in its second decade, continues to affect the development of communities with which we work. Currently, these impacts are felt most severely among the under-privileged and marginalised populations. It challenges not only the socio-economic fabric of those societies but also the sustainability of the present development efforts.

The World Health Organization has released data on Malaria, which reveals 500 million cases and 1.5-2.7 million deaths occur per year with Africa accounting for 90% of cases and the great majority of deaths. Zambia, Malawi, Tanzania and Kenya have the greatest incidence of cases with 501/100,000 population.

The picture is also not encouraging regarding maternal deaths and infant mortality. Zambia has one of the highest maternal mortality rates in eastern and southern Africa (202 per 100,000 live births). Thirteen percent of all deaths in Zambian women are pregnancy related. The infant mortality rate is 113/1,000 live births.

As activity plans for 1998 are made, one hopes they will not end up in the archives or die in utero or succumb soon after birth to the east wind of financial stringency (Dr. J.F.C. Haslam, Director of Medical Services HDS 1945).

Critical Areas in 1998

The Health Programmes Department will continue to assist and provide support to church health institutions in the design, implementation, monitoring and evaluation of the health programmes. This will be done within the context of the health reform process and the six major health thrusts. Critical areas of emphasis for 1998 will be as follows:

Malaria Control

A recent resurgence of malaria cases has resulted in subsequent resolve to develop special malaria control efforts by CMAZ at the national level. The aim is to develop and promote effective community based distribution and utilization of insecticide treated bednets. This project has commenced with two pilot areas. Additional funds permitting two other CMAZ institutions will be involved this year.

The focus this year will be on building capacity at institutional and community levels in ITN

promotion and utilization. Special emphasis will also be placed on designing a monitoring and evaluation framework for the CMAZ ITN Project.

Reproductive Health

Particular emphasis will be placed on ensuring that appropriate IEC materials on reproduction and sexuality are produced and promoting the integration of maternal and child health/safe motherhood with family planning programmes.

Capacity Building of Health Workers

Special efforts will also be made to ensure that health workers are equipped with necessary skills in counseling, STD Management and Community Based Approaches in Home Based Care programmes.

HIV/AIDS/STD Programme

A. Training

In order to improve standards in the delivery of health care in Zambia, training of existing health care workers is crucial. Training of health workers at all levels of health care is a necessity for the purpose of upgrading their skills and/or building capacity to improve management of diseases and programs. We plan to continue with training in 1998 in the areas of counseling, STD Case Management and in home care for both health workers and family and community care givers. Training will be done both at national and district levels through in-services and/or on-the-job. We are intending to carry out the following training programmes.

1. Counseling Training

Counseling has for over 7 years been used as a strategy for HIV/AIDS prevention and care, to provide psychological support and to influence behavioural change to both the infected and affected persons in a variety of settings: hospitals and rural health centres, schools, in homes and communities. Counseling for the purpose of helping clients understand their illness, take medication correctly to avoid re-infection and empower women to protect themselves needs a more structured training. To this end, counseling training was prioritized at CMAZ for 1996 to strengthen HIV prevention strategies at member institutions. To date 60 health workers have received training. There is need to have more people trained in counseling as numbers of those infected and affected by the AIDS epidemic increase. We hope to train 20 health workers in counseling in 1998 alone. Training will take place in July 1998.

2. STD Management Courses

STD Control is well recognized as a vital element in slowing down HIV transmission. Not only do STDs and HIV share common routes of transmission, ulcerative STDs are known to facilitate transmission of HIV infection from one person to another. Activities of STD Control initiatives

as an integral part of the CMAZ AIDS Prevention and Care Program mainly include *training* of health care workers in STD diagnosis and case management. Although CMAZ has trained 150 health workers in STD Management over a period of 4 years not all of them are still working in mission health facilities. Only about **50%** of the 90 member institutions have had somebody trained in STD management. Training therefore, will need to be continued to reach all mission institutions. One training session in Syndromic Approach to STD Management is planned for 1998. This course is scheduled for September. We hope to train 15 clinicians by to end of the year.

3. Training in community based approaches - with emphasis on decentralizing Programs

The development of home based care has been a key element of the CMAZ AIDS Care and Prevention Program. The emphasis for the last five years has been to consolidate home care and use it as a basis for facilitating care and prevention of HIV/AIDS, provision of support to people infected and affected including orphans, and for the control of TB and STD. In the past home care programs in CMAZ have tended to be institutional/hospital driven. This approach has proved to be very expensive. It is necessary that the implementation of home care becomes more and more decentralized from hospitals and rural health centres to communities. This will not only reduce transportation and other costs as communities will be nearer to the clients, but will also encourage ownership of HBC programs by communities themselves. Health facilities will then play a supervisory role and offer technical support including training. In an effort to promote decentralization of HBC programs at institutions with home care programs, we will be training field officers from selected institutions in community based approaches to AIDS Care and Prevention. A process of decentralization that was started in 1997 through training will continue in 1998. Already, personnel from Katondwe, Mukinge, Kalene and Chikuni have received this training. This training is done in collaboration with Family AIDS Care Trust (FACT) of Mutare, Zimbabwe. We hope to train an additional 10 institutions in 1998.

AIDS Management Training

CMAZ will encourage and facilitate the training of personnel at the Chikankata AIDS Management Seminars quarterly. We are targeting training 20 health and community health workers in home care through Chikankata.

B. Programme Monitoring

Field Trips

These will be done for the purpose of monitoring and evaluating projects and to provide professional and technical support. Projects needing more attention will be visited quarterly.

C. Development of Micro-Credit-Schemes for Poverty Alleviation and Social Support for persons infected and affected with AIDS including orphans

The AIDS Program will in 1998, be introducing a micro-credit-scheme pilot project as an integral part of the AIDS Care and Prevention Program in the four target hospital/districts supported by DCA (Katondwe for *Luangwa*; Mukinge for *Kasempa*; Mbereshi for *Kazembe* and Kalene for *Mwinilunga*). The scheme will primarily be allocated to already established Neighbourhood Committees, consisting primarily of women and community volunteers (CV). The schemes will be established under direct supervision of the local field officer (AFO), who will report to CMAZ and also assume responsibility for organizing the necessary administrative and technical training of selected CBGs.

Micro-credit-schemes strategy for poverty alleviation as developed by Grameen Bank in Bangladesh, is now an acknowledged concept in many countries and has attracted much interest in Zambia. This strategy is evidently no panacea for social development in extremely resource-poor environments, but offers possibilities for sustainable economic and social development for groups in society, who have made their own decision to improve their own social conditions and that of particularly vulnerable groups in their neighbourhood.

An initial input of moderate funds will be needed in the establishment of micro-credit-schemes. The funds will be administered by small community based groups (CBG) under the supervision of AIDS field officers at the four target hospitals. The input of funds will be a one-time event, as the scheme is based on the principle of interest-free, revolving loans for members of selected CBG. Loans will be used for establishment of income-generating activities and profits generated will be earmarked for the individual members' and their families' own social support. It is hoped that the participants in the micro-credit-scheme, accumulating a certain proportion of the surplus from the established income generating activities will develop a *merry-go-round-scheme*. Funds from this "merry-go-round" account will be earmarked for support for specific purposes such as orphan-based households and/or caring for persons with AIDS (PWA) with no other means of supporting themselves.

Accountability to the initial donor (in this case DCA/CMAZ) will be a responsibility of the AIDS field officer at the institution.

D. Information, Education and Communication

Emphasis on IEC to create AIDS awareness in the general population served by member institutions is on going. This is done through financial and material support to institutions for seminars, workshops, drama, talks, and video shows and literature distribution on AIDS/STD including 1) procuring IEC education materials sensitive to CMAZ concerns and needs of adolescents and the youth, and 2) production of the CMAZ Balm news letter to develop and update knowledge and skills of health workers.

E. Promote Networking

Networking will be promoted by:

- Informing members on issues that relate to NGO AIDS National Network,
- Encouraging institutions to network and collaborate with others working on AIDS in

their districts,
Active participation in the affairs of the National AIDS network.

F. Orphan Support

Orphan support will continue to be by request only. Budget lines for orphan support will be restricted to payment of school fees, uniforms and other needs related to schooling.

HIV/AIDS/STD Programme
Activity Plan, January to December 1998

<i>Activity</i>	<i>Number of Events</i>	<i>Proposed Time</i>	<i>Responsible Person</i>	<i>Progress Indicators</i>	<i>Outcomes</i>
Counseling Course	One	July	HPM Counseling unit CBOH	One course held and report produced	20 Health workers trained in counseling skills
STD Management Training	Two	September	HPM	Report produced on one courses held	Clinicians in STD management
Community based AIDS training	Three	March August November	PO	Course and attachments organized	7 AIDS Field Officers trained
Introduction of Microcredit Schemes	-	-	AIDS Field Officers	Schemes established	Poverty alleviated in some communities
Production and procurement of IEC materials	-	-	HPM/PO	News letter produced quarterly IEC materials produced AIDS education support to institutions	AIDS awareness created Health workers updated
Orphan Support	-	-	PO	Financial report on orphans assisted	Educational support to orphans
AIDS Management Training in HBC at Chikankata	Three	-	PO	Reports produced	20 health workers trained in HBC

**HIV/AIDS/ STD Programme
Summary Budget (US\$)**

Activity	Cost	Donor	Status
Counseling course	19,500.00	DCA	Approved
STD Management Training	14,640.00	DCA	Proposal
Community Based AIDS Training	4,400.00	DCA	Approved
Micro-Credit Scheme	20,000.00	DCA	Request
Orphan Support	10,000.00	DCA/PCI	Approved (5, 000)
Support Visits	4,000.00	DCA	Approved
AIDS Education	30,000.00	DCA	Approved
TOTAL	102,540.00		

A. Training

Counseling course July 1998

US\$

Accommodation and meals (20 participant/course)

20 @ \$50 per person x 15 days 15,000.00

Transport 1,500.00

Pocket allowance

- 20 @ \$4 per person x 15 days 1,200.00

Honoraria (facilitators) 1,000.00

Administrative expenses 800.00

19,500.00

STD Management April and September 1998-01-10

Accommodation and meals (15 participants/course)

- 15 @ \$50 per person x 14 10,500.00

Transport 1,000.00

Pocket allowance

- 15 @ \$4 x per person x 14 840.00

Honoraria (facilitators) 800.00

Administrative expenses 500.00

14,640.00

Home Based Care

Community Approaches (6 participants)

- 6 @ \$500 per person 3,000.00

Chikankata AIDS Management (20 persons)

- 20 @ \$ 70 per person 1,400.00

4,400.00

TOTAL TRAINING 38,540.00

B. Information Education Communication

Programme support 10,000.00

IEC material 17,500.00

Balm newsletter 2,500.00

C. Micro-Credit-Scheme (4 institutions)

- 4 @ \$ 5,000.00 each 20,000.00

D. Orphan Support 10,000.00

E. Support Visits

- 4 @ \$1,000.00/visit 4,000.00

Primary Health Care

During the year particular emphasis will be laid on the following:

Specific Objectives are as follows:

Malaria Control:

To consolidate Insecticide Treated Bednet (ITN) commenced in two institutions and expand malaria control activities to involve two other institutions.

Reproductive health:

To produce and distribute educational materials on reproduction and sexuality for adolescents.

To promote Natural Family planning as an added method of family planning.

To promote the integration of maternal and child health/safe motherhood with family planning services.

To expand Access to Family Planning through Non-clinical Delivery systems.

Support Community Income Generating Projects for Nutrition Programmes:

To support income generating activities to sustain nutrition activities at health institutions.

Activities to be undertaken are as follows:

A. Malaria control

intervention activities is limited. The present level of national resources allocated to malaria control programmes by endemic countries does not match with the programme needs and thus is inadequate for undertaking effective and sustainable measures.

However, last year CMAZ initiated efforts in the control of malaria in two districts. This comes from the fact that the use of insecticide treated bednets has been shown to be effective in reducing malaria related morbidity and mortality. Two (2) pilot areas for community based distribution and utilization of insecticide treated bednets were established. This programme is functioning in collaboration with the respective District Health Management Teams and is consistent with the goals and objectives of the Zambia National Malaria Control Programme. The project activities for this year will include:

Introductory National Malaria Workshop

The CMAZ Malaria Control Programme will be introduced at a CMAZ workshop in March 1998. The major objectives of this workshop will include:

The introduction of ITNs as an effective strategy for malaria control

Integration of malaria prevention into existing primary health care and home based care programmes with a specific focus on ITNs.

Discussions on various approaches to the procurement and delivery of ITNs

The generation of disease surveillance and programme operational monitoring tools and,

The acquisition of teaching skills to improve transfer of knowledge, skills, and attitudes to other health workers and to community leaders.

Regional Seminars at the Pilot CMAZ Hospital

The national meeting will be followed by regional seminars at each of the pilot hospitals to consolidate concepts introduced at the national meeting and to further develop local expertise in ITN aspects of control. Some objectives will include:

The development of malaria ITN health education messages

ITN promotion within vulnerable groups

Discussion on possibilities regarding local manufacture and marketing of bednets and insecticide.

Expansion of the programme to two other institutions

Development of IEC materials

B. Reproductive Health

Production of Information, Education and Communication materials for Family planning and adolescent health

There is a dearth of IEC materials on family planning and adolescent health. IEC materials on family planning methods, the benefits of family planning and their role in reproductive health are scarce. Adolescent IEC will be designed to provide adequate and accurate knowledge about human sexuality in its biological, psychological, socio-cultural and moral dimensions.

To promote the integration of maternal and child health/safe motherhood with family planning services

As part of the strategy to reduce maternal and infant mortality and morbidity integrated family planning with maternal and child health services will provide many benefits including improving quality of care by making services more convenient and accessible to users, avoiding duplication of efforts and maximizing cost effectiveness.

In order to achieve this CMAZ hopes to build the capacity of staff that are involved in the training and supervision of MCH health workers, so that they can emphasize issues on integrated maternal and child health/safe motherhood, with a focus on Post-natal and new born care in their training areas.

The Objectives of the training programme will cover the following aspects:

- The magnitude of the problem of maternal and neonatal mortality and morbidity.

- Post natal and neonatal services

- Integration of services

- General counseling issues

- Educational methodology

This training will help health care providers to improve their levels of competence in counseling, examination of mothers and ultimately improve the quality of care provided. One training course involving 15 health providers is planned for October 1998.

Expanding access to family planning through Non-clinical Delivery systems

Community based services for distribution of contraceptives are an effective means of increasing access to family planning information and services especially to those in peri-urban and rural areas who are far from health services or who cannot reach them for economic, social or cultural reasons. Community based distribution (CBD) services are

services and with the involvement of the community in the provision and support of its own health care services.

Community Based Family Planning Distribution Programme was initiated at Chipembi Rural Health Center in July 1998. So far 13 CBDs have been trained. An additional 7 CBDs will be trained in February 1998. A refresher course first group is planned for July 1998.

PHC Budget 1998

Activity	Cost	Donor	Status
MALARIA CONTROL			
ITN W/Shop	10,250.00	CIDA Canada	Approved
Regional W/Shop	7,000.00	CIDA Canada	Approved
Bednet and Insecticide	88,000.00	NORAD	Request
IEC Materials	10,000.00	NORAD	Approved
Monitoring and Evaluation tools	30,000.00	PATH Canada	Request
TOTAL MALARIA	145,250.00		
REPRODUCTIVE HEALTH			
IEC	20,000.00	UNFPA	Request
Natural FP Training	9,760.00	UNFPA	Request
Integrated Postnatal and new born care training	14,040.00	UNICEF	Request
Training of CBDs	5,340.00	USAID	Approved
CBD Refresher Training	10,000.00	USAID	Approved
TOTAL REPRODUCTIVE HEALTH	59,140.00		
INCOME GENERATING	20,000.00	NORAD	Request
SUPPORT VISITS	4,000.00	UNICEF	Request
TOTAL PHC	228,390.00		

**GRAND TOTAL
HEALTH PROGRAMMES**

373,770.00 US\$

A. Malaria Control

1)	National Malaria ITN Workshop (March 1998)		<u>US\$</u>
	Accommodation and meals (30 participants)		
	- 30@ \$50 per person x 5 days	7,500.00	
	Pocket allowance		
	- 30 @ \$4 per person x 5 days	600.00	
	Honoraria (facilitators)	500.00	
	Transport	1,150.00	
	Administrative expenses	500.00	
		TOTAL	10,250.00
2)	Regional Malaria ITN Seminars (Sep-Nov 1998)		
	Accommodation and meals (20 participants/seminar)		
	- 20@ \$20 per person x 5 days	2,000.00	
	Pocket allowance		
	- 20 @ \$3 per person x 5 days	300.00	
	Honoraria (facilitators)	300.00	
	Transport	500.00	
	Administrative Expenses	400.00	
		TOTAL for 2 Seminars	7,000.00
3)	Bednet and Insecticide for 2 pilot CMAZ Hospitals (Year two)		
	Bednets (2 x 2000 x US\$9)	36,000.00	
	Insecticide (2 x 2000 x \$1 x 2 applications)	8,000.00	
		TOTAL	44,000.00
4)	Bednets and insecticide for two new CMAZ Hospitals		
	Bednets (2 x 2000 x US\$9)	36,000.00	
	Insecticide (2 x 2000 x \$1 x 2 applications)	8,000.00	
		TOTAL	44,000.00
5)	Production of IEC Materials	10,000.00	
6)	Monitoring and surveillance	30,000.00	

1)	Production of IEC materials	20,000.00		
2)	Training in integrated postnatal and new born care, October 1998			
	Accommodation and meals (15 participants)			
	- 15 @ \$50 per person x14	10,500.00		
	Transport	1,000.00		
	Honoraria (facilitators)	1,000.00		
	Pocket allowance			
	- 15 @ \$4 per person x14	840.00		
	Administrative Expenses	700.00		
			TOTAL	14,040.00
3)	Training of CBDs, Feb 1998			
	Accommodation and meals (7 participants)			
	- 7@ \$50 per person x14	4,900.00		
	Transport	240.00		
	Administrative expenses	200.00		
			TOTAL	5,340.00
4)	CBD Refresher Training			
	Accommodation and meals (13 participants)			
	- 13@ \$50 per person x14	9,100.00		
	Transport	500.00		
	Administrative expenses	400.00		
			TOTAL	10,000.00
			TOTAL TRAINING	29,380.00

**Primary Health Care
A: Malaria Control
Activity Plan, January to December 1998**

Activity	Proposed Time	Responsible Person	Progress Indicators	Outcomes
National Malaria ITN Workshop	March	HPM	Report Produced	ITN initiatives launched
Production of IEC materials	-	PO	Appropriate materials produced	IEC materials available to communities
Procurement and Distribution of Bednet and insecticide	-	PO/PHM	Bednets and Insecticide available	Community distribution mechanism in place
Development of Monitoring and Evaluation Framework for ITN Project	March	Consultant	Tools developed and report produced	Monitoring system in place

**Health Programmes Department
Primary Health Care
B: Reproductive Health
Activity Plan, January to December 1998**

<i>Activity</i>	<i>Number of Event</i>	<i>Proposed Time</i>	<i>Responsible Person</i>	<i>Progress Indicator</i>	<i>Outcome</i>
Training in Natural Family Planning	One	May	HPMPO	Report produced	10 health workers trained in NFP
Integrated Post natal and N/born care training	One	October	HPM/PO	Report produced	15 participants trained
CBD Training	One	Feb	PO	Report produced	7 CBDs trained
CBD Refresher course	One	July	PO	Report produced	13 CBDs updated
Production and Distribution of IEC materials	-	-	Consultant	Materials produced	materials available to communities
Support Income generating activities	-	-	PO/HPM	Funds allocated to CBGs	CBGs contribute to nutrition promotion

Blindness is not only a highly disabling condition for the affected individual but is also a big challenge for the family in particular and the society as a whole.

Prevention of blindness therefore is not only better but also cheaper than cure. Fortunately, 75% to 80% of blindness in Zambia is preventable (WHO). The National prevalence of blindness according to Luapula Eye disease survey done in 1985 stands at 1.26%. However, in certain areas of Zambia, it can rise above 1.26%. Major causes are cataracts, trachoma, glaucoma, xerophthalmia due to measles and malnutrition and injuries.

Contributing factors to Blindness

- Lack or little knowledge of causes of blindness in the community
- Lack of or few-trained human resources as opposed to the demand
- Lack of equipment and inadequate drugs and supplies
- Inappropriate Information, Education and Communication strategies to create awareness of the availability and use of eye care services
- Lack of workshops/seminars to update the already trained staff
- Lack of supervision of already trained staff
- Inactive National Programmes for prevention of Blindness to give staff direction on the National Policy on prevention of blindness

Programme Goal

The overall goal of the programme is to make available essential eye care to all member institutions.

Specific Objectives

Deliver eye care services

- Increase cataract blind identification by training CHW
- Organize surgical eye camps for cataract surgery
- Provide post operative follow up
- Improve management of other blinding diseases

Human Resource Development

- Conduct refresher courses for ophthalmic personnel
- Provide training in Primary Eye Care for nurses, clinical officers, CHWs, TBAs and Traditional Healers

Logistical Support

Activities to be undertaken

Primary Eye Care Workshop, August 1998

This is an education programme where experiences and current knowledge about eye care will be presented by experts and field workers. The target groups are clinical officers, nurses and doctors. Ophthalmologists will be the resource persons. Contributions will be expected from ophthalmic nurses and clinical officers. The programme is important to keep abreast with current ophthalmic knowledge. This activity will be undertaken in August 1998.

Cataract Surgery Eye Camp

Three surgery eye camps are planned at Mpanshya, Katondwe and Chipembi areas.

Support Visits

The institutions to be visited are Katondwe, Mpanshya, Monze, Nangoma and Chipembi.

Procurement and distribution of IEC materials

There are very few IEC materials available. Efforts will be made to obtain these through donations or by purchasing them and distributing as need arises.

Training for Assistant Ophthalmic course

Four health workers are targeted for sponsorship for the above course. The training will be done at Mwami Mission Hospital.

Activity	Time	Responsible Person	Progress Indicators	Outcome	Cost(US\$)
PEC Workshop	Aug	HP Manager PECC	Report produced	20 persons updated	8,000.00
Cataract Eye Camps		PECC, Eye specialist	Eye camps done	110 cataracts operated	2,000.00
IEC		PECC	Material procured	Materials distributed	2,000.00
Training		PECC	Report produced	4 trained	1,000.00
Support Visits		PECC	Report produced	Monitoring done	1,500.00
Grand Total					14,500.00

Baseline and One-year Follow-up Household Mosquito Net Survey Tables

Table 1 - Baseline Survey Population Demographics

	Mbereshi Hospital (Jan 99)	Mtendere Hospital (Sep 97)	Macha Hospital (Nov 97)	Totals
Total number of villages sampled	19	16	24	59
Total number of households surveyed	216	210	278	704
Total population in survey	1258	1212	2150	4620
Total children under 5 yrs (%)	276 (22)	234 (19)	481 (22)	991
Total children 5-14 yrs (%)	352 (28)	347 (29)	664 (31)	1363
Total adults 15-40 yrs (%)	489 (39)	504 (42)	747 (35)	1740
Total adults over 40 yrs (%)	141 (11)	127 (10)	258 (12)	526
Total pregnant women (%)	57 (4.5)	34 (3)	58 (3)	149
Average number of persons per household	5.82	5.77	7.73	6.56

Table 2 - Baseline Household Priorities

	Mbereshi Hospital	Mtendere Hospital	Macha Hospital	Totals
Total number of households surveyed	216	210	278	704
# of households owning a radio (%)	104 (48)	88 (42)	109 (39)	301
# of households owning a bicycle (%)	78 (36)	51 (24)	123 (44)	252
# of households owning a tin roof (%)	31 (14)	33 (16)	82 (29)	146
# of households owning a television (%)	11 (5)	15 (7)	23 (8)	49
Malaria seen as number one health concern	176 (83)	174 (83)	189 (68)	539
# of households owning mosquito net (%)	51 (24)	33 (16)	34 (12)	118

Table 3 - Baseline Mosquito Net Ownership Correlations

Mbereshi Hospital

	Net Owner (N=51)	Non-Owner (N=164)	Odds Ratio (95% CI)	p-value

Radio Owner	38	66	4.3 (2.1-9.5)	<0.001
Tin Roof Owner	13	18	2.8 (1.1-6.6)	0.02
Television Owner	4	7	1.9 (0.4-7.9)	NS

Mtendere Hospital

	Net Owner (N=34)	Non-Owner (N=170)	Odds Ratio (95% CI)	p-value
Bicycle Owner	12	38	1.9 (0.8-4.2)	NS
Radio Owner	26	60	5.9 (2.6-14.7)	<0.001
Tin Roof Owner	13	20	4.6 (2.0-10.7)	<0.001
Television Owner	9	6	9.7 (2.8-36)	<0.001

Macha Hospital

	Net Owner (N=34)	Non-Owner (N=244)	Odds Ratio (95% CI)	p-value
Bicycle Owner	21	102	2.3 (1.1-5.1)	0.04
Radio Owner	19	90	2.2 (1.0-4.5)	0.05
Tin Roof Owner	23	59	6.5 (3.0-14.6)	<0.001
Television Owner	10	13	7.3 (2.8-18.7)	<0.001

All Hospitals

	Net Owner (N=119)	Non-Owner (N=578)	Odds Ratio (95% CI)	p-value
Bicycle Owner	54	197	1.6 (1.1-2.4)	0.03
Radio Owner	83	216	3.9 (2.5-6.1)	<0.001
Tin Roof Owner	49	97	3.5 (2.2-5.4)	<0.001
Television Owner	23	26	5.1 (2.7-9.7)	<0.001

	Mbereshi Hospital (%)	Mtendere Hospital (%)	Macha Hospital (%)	Totals
Total number of households surveyed	216	210	278	704
Number of households answering “Yes” to the question, “Can malaria be prevented?”	199 (92)	148 (70)	204 (73)	551
Number of households using any form of malaria prevention	117 (54)	104 (50)	113 (41)	334
Number of households using mosquito coils	21 (10)	20 (10)	16 (6)	57
Number of households using insecticide sprays	32 (15)	20 (10)	6 (2)	58
Number of households using traditional methods	10 (5)	21 (10)	32 (12)	63
Number of households using mosquito nets	51 (24)	33 (16)	34 (12)	118
Number of households using early diagnosis and management of malaria case	35 (16)	37 (18)	60 (22)	132

Table 5 - Baseline Mosquito Net Usage

	Mbereshi Hospital	Mtendere Hospital	Macha Hospital	Totals
Total number of households surveyed	216	210	278	704
# of households with past use of mosquito nets (%)	53 (33)	91 (43)	119 (43)	263
# of households currently using mosquito net(s) (%)	51 (24)	33 (16)	34 (12)	118
Average cost payed per single net	US\$4.50	US\$1.50	US\$7.50	US\$3.65
Average cost payed per double net	US\$6.75	US\$7.50	US\$6.00	US\$5.90
Net washing frequency every 6-12 months	20/51	4/33	7/34	31/118
Net washing weekly to every 3 months	18/51	17/33	21/34	56/118
Number of children under 5 sleeping under mosquito net in households owning nets (%)	26/66 (39)	11/33 (33)	24/70 (34)	61/169 (36)
Number of children under 5 sleeping under mosquito net over all children under 5 in	26/276 (9)	11/234 (5)	24/481 (5)	61/991 (6)

Number of children 5-14 yrs sleeping under mosquito net in households owning nets (%)	22/102 (22)	12/39 (31)	7/80 (9)	41/221 (19)
Number of children 5-14 yrs sleeping under mosquito net over all children 5-14 yrs in surveyed households (%)	22/352 (6)	12/347 (3.5)	7/664 (1)	41/1363 (3)
Number of adults 15-40 yrs sleeping under mosquito net in households owning nets (%)	55/130 (42)	39/83 (47)	20/98 (20)	114/311 (37)
Number of adults 15-40 yrs sleeping under mosquito net over all adults 15-40 yrs in surveyed households (%)	55/489 (11)	39/504 (8)	20/747 (3)	114/1740 (7)
Number of adults >40 yrs sleeping under mosquito net in households owning nets (%)	27/37 (73)	2/7 (29)	10/22 (45)	39/66 (59)
Number of adults >40 yrs sleeping under mosquito net over all adults >40 yrs in surveyed households (%)	27/141 (19)	2/127 (1.5)	10/258 (4)	39/526 (7)

Table 6 - Baseline Mosquito Net Needs

	Mbereshi Hospital	Mtendere Hospital	Macha Hospital	Totals
Total number of households surveyed	216	210	278	704
Number of households willing to purchase mosquito net(s) (%)	148 (69)	175 (83)	237 (85)	560
Number of single nets requested	175	216	191	582
Number of double nets requested	432	381	492	1305
Average number of mosquito nets requested per household	4.10	3.41	2.88	3.37
Average price willing to pay for single net	US\$3.15	US\$2.15	US\$4.30	US\$3.00
Current market value of single net	US\$10.00	US\$10.00	US\$10.00	US\$10.00
Average price willing to pay for double net	US\$4.55	US\$3.20	US\$6.15	US\$4.00
Current market value of double net	US\$12.00	US\$12.00	US\$12.00	US\$12.00
Number of households familiar with ITNs (%)	155 (72)	57 (27)	36 (13)	248
Number of households willing to dip mosquito nets (%)	141 (65)	171 (81)	206 (74)	518

	Mtendere Hospital (Dec 98)	Macha Hospital (Nov 98/ Feb 99)	Totals
Total number of villages sampled	14	21	49
Total number of households surveyed	200	220	420
Total population in survey	N/A	1759	1759
Total children under 5 yrs (%)	N/A	329 (19)	329
Total children 5-14 yrs (%)	N/A	568 (32)	568
Total adults 15-40 yrs (%)	N/A	643 (37)	643
Total adults over 40 yrs (%)	N/A	220 (13)	220
Total pregnant women (%)	N/A	22 (1)	22
Average number of persons per household	N/A	8.00	8.00

Table 8 - One-Year Follow-up Mosquito Net Usage

	Mtendere Hospital	Macha Hospital	Totals
Total number of households surveyed	200	220	420
# of households currently using mosquito net(s) (%)	182 (91)	108 (49)	290
Average cost payed per single net	US\$2.55	US\$1.90	US\$2.30
Average cost payed per double net	US\$4.65	US\$3.20	US\$4.15
Net washing frequency every 4-12 months (%)	132 (73)	44 (41)	176
Net washing weekly to every 3 months (%)	26 (14)	53 (49)	79
Number of nets retreated with insecticide (%)	9 (5)	1 (0.9)	10
Number of children under 5 sleeping under mosquito net in households owning nets (%)	N/A	79/151 (52)	79/151 (52)
Number of children under 5 sleeping under mosquito net over all children under 5 in surveyed households (%)	N/A	79/329 (24)	79/329 (24)
Number of children 5-14 yrs sleeping under mosquito net in households owning nets (%)	N/A	69/286 (24)	69/286 (24)
Number of children 5-14 yrs sleeping under mosquito net over all children 5-14 yrs in surveyed households (%)	N/A	69/568 (12)	69/568 (12)

Number of adults 15-40 yrs sleeping under mosquito net over all adults 15-40 yrs in surveyed households (%)	N/A	155/643 (24)	155/643 (24)
Number of adults >40 yrs sleeping under mosquito net in households owning nets (%)	N/A	85/114 (75)	85/114 (75)
Number of adults >40 yrs sleeping under mosquito net over all adults >40 yrs in surveyed households (%)	N/A	85/220 (39)	85/220 (39)
Number of pregnant women sleeping under mosquito net in households owning nets (%)	N/A	8/11 (73)	8/11 (73)
Number of pregnant women sleeping under mosquito net over all pregnant women in surveyed households (%)	N/A	8/22 (36)	8/22 (36)

Appendix III

CMAZ Malaria Control Programme Evaluation Workplan Review

INDICATORS	MONITORING TOOLS	MAJOR ACTIVITIES	TARGET DATES	OUTCOME ACHIEVED
1) Reduction of smear positive malaria incidence and mortality by 25-50% (/1000 estimated population census) [outcome]	Hospital clinical and laboratory records	Hospital site visit survey of records	Nov 1998 April 1999	Hospital admissions, mortality, and outpatient attendances recorded for malaria at 3 sentinel hospitals; but data is not easily interpreted as there are no case definitions and no methods of identifying and monitoring confounding variables
2) Reduction of net and insecticide costs to attain 100% cost recovery [availability]	CMAZ procurement and distribution records	Lobby for VAT, import tax, and duty exemptions Selection of lowest bidders for high quality mosquito nets Review of CMAZ records	April 1998 May-June 1998 Quarterly	Efforts to eliminate tariff barriers are still ongoing Tanzania net manufacturers are becoming the most affordable option (US\$5/net) Although heavy net subsidies were initially imposed, 100% cost-recovery is now being achieved
3) Increase in number of CMAZ hospitals using and in number of hospital beds covered with ITNs to 100% [usage & coverage]	Hospital survey questionnaire	Hospital site visit surveys (Mbereshi, Mtendere, Macha) Distribution of questionnaires to other CMAZ hospitals	Nov 1998 April 1999 April 1999	10-12 hospitals and 2 RHCs (approx 15% of CMAZ institutions) are currently using ITNs; ward coverage of patients is not being monitored Pending
4) Increase proportion of households dipping and using ITNs to >50% [usage]	Household Survey Questionnaire	Random Cluster Village Household Surveys	Nov 1998 March 99	Despite difficulties with performing random cluster surveys, one-year follow-up data has been obtained from Macha and Mtendere;

				household net ownership is 25-50% but redipping practices are virtually nonexistent
5) Increase proportion of pregnant women and under 5's sleeping under ITNs in the community to >50% [coverage]	Household Survey Questionnaire	Random Cluster Village Household Surveys	Nov 1998 March 99	Only Macha managed to collect this data at one-year follow-up survey; within net-owning households, 50% of under 5's and 70% of pregnant women were reportedly sleeping under nets (however most likely not retreated)

Additional indicators which should be added to this list:

- 6) Number of health care workers trained in ITN promotion and implementation
- 7) Type and quantity of IEC materials on ITNs developed/distributed by CMAZ
- 8) Net procurement and distribution records
- 9) Insecticide procurement and distribution records

Appendix IV

Hospital-based Malaria Control Programme Strategic Plan Reviews

Mbereshi - Programme Objectives and Major Activities

OBJECTIVE	MAJOR ACTIVITY	TARGET DATE	OUTCOME ACHIEVED
1) To collect and analyse data on morbidity and mortality rates for malarial cases	To collect data from OPD and inpatient registers and returns To analyse data	Quarterly	Hospital admissions, mortality, and outpatient attendances are recorded but data is not easily interpreted as there are no case definitions and no methods of identifying and monitoring confounding variables
2) To identify beliefs and practices regarding malaria	To recruit 8 people in surveillance To brief participants on the questionnaire To conduct a survey in 5 villages To compile and analyse data	November 1998	Baseline household survey was performed by 10 individuals in 19 villages in January 1999, after the beginning of the sale of ITNs; therefore results showed artificially high household net coverage; as well, random cluster survey techniques were not strictly adhered to
3) To educate hospital staff on use of ITNs	To enlighten administration on ITN workshop To educate the hospital workers on importance of ITNs	June 1998	25 hospital staff were trained in ITNs (in English) and 30 general hospital workers were trained in ITNs (in Bemba) in July 1998
4) To sensitize patients on ITN use	To conduct health education in wards	June 1998	Ongoing nursing input is encouraged on the wards, but ITNs are not yet available for patients
5) To provide ITNs to the wards	To hang 50 nets in the wards (Maternity and Children's wards)	July 1998	The hospital has purchased 100 nets and plans to eventually cover all hospital beds with ITNs by May 1999

6) To train neighbourhood committees	To conduct training on ITNs with 7 neighbourhood committees	July 1998	7 neighbourhood committees received training in ITNs in August 1998
7) To conduct health education, purchase, and use of ITN and insecticide in the community	To organize transport To conduct health education in 8 villages To record the number and costs of 400 nets and insecticide purchased and sold by the hospital To assess the demand and usage of ITN to the coverage of 12.5% in the community To distribute IEC materials (CMAZ 1999 Calendar)	June-December 1998	Health education sessions were held in 8 villages between June-August 1998, but mosquito nets were not brought to sell to the community on those occasions; the baseline household survey was conducted in January 1999, 2 months later than originally scheduled; CMAZ ITN calendars have been distributed to a few rural health centres
8) To monitor and evaluate ITN activities [Objectives #1 and 7]	To monitor the use of ITN in the community To evaluate records on net availability and malaria cases and morbidity	Monthly	This activity is pending

Additional indicators which will require monitoring:

- 9) Net and insecticide procurement and sales
- 10) Net retreatment practices

Mtendere - Programme Objectives and Major Activities

OBJECTIVE	MAJOR ACTIVITY	TARGET DATE	OUTCOME ACHIEVED
1) To educate the community about the transmission, prevention and treatment of malaria	To conduct 10 health education sessions with 10 Neighbourhood Health Management Teams (NHMT)	April 1998	17 sessions were held with 15 NHMT between April-June 1998, with a further 10 sessions with 6 NHMT between Dec 1998-Feb 1999 totaling over 400 participants
2) To promote the buying and use of ITNs by the community for the prevention of malaria	To procure 2000 ITNs and 20 litres of deltamethrin To conduct demonstration sessions for dipping of bednets To sell bednets and insecticide at the hospital	Sept 1998 Oct 1998 Nov 1998	Only 400 Sunflag single nets were procured in August 1998 as CMAZ was unable to provide larger quantities; nets have been sold at the MCH clinic and a net treatment service has been provided at the point of net sale
3) To prevent the transmission of malaria within the hospital by introducing the use of ITNs for all hospital beds	To hang treated bednets on 100% of hospital beds	Oct 1998	23 paediatric beds, 8 isolation beds, and 6 maternity beds have been covered with nets; however, hospital staff and patients are not supportive of the nets as screened windows and ceiling fans appear to offer adequate protection and the fans interfere with the nets
4) To monitor health education sessions in the community [Objective #1]	To record the number of sessions held and the participants attending	April-May 1998	See above under #1 for details of education sessions which have been diligently monitored
5) To monitor availability and use of ITNs [Objective #2]	To monitor the availability of ITNs at the hospital (stores records, receipt books) To monitor the number of ITN demonstrations performed for the community (hospital records)	Sept 1998 Oct 1998	Hospital stores records have not adequately documented net and insecticide procurement and sales; this task has largely been the responsibility of the EHT
6) To monitor bednet availability and usage within the hospital [Objective #3]	To record the proportion of hospital beds equipped with hanging bednets To monitor nightly use of bednets by patients	Oct 1998 Ongoing (Nightly)	Due to logistical and physical constraints mentioned above under #3, net usage adherence has not been good in the hospital

Additional indicators which will require monitoring:

- 9) Net and insecticide usage and coverage within catchment community populations
- 10) Net retreatment practices

Macha - Programme Objectives and Major Activities

OBJECTIVE	MAJOR ACTIVITY	TARGET DATE	OUTCOME ACHIEVED
1) To provide 2000 bednets and 40 litres of deltamethrin to the community	To purchase 2000 bednets and 40 litres of deltamethrin from CMAZ	August 1998	Only 400 Sunflag single nets were procured in January 1999 as CMAZ was unable to provide larger quantities; nets are being sold in the PHC department and a net treatment service is provided at the point of net sale; monthly village PHC visits are made to promote and sell nets and insecticide
	To organize dipping demonstrations of ITNs in the community	Sept-Dec 1998	
	To sell bednets and insecticide to the community	Sept-Dec 1998	
2) To conduct health education and demonstration of ITNs for village health committees	To conduct 7 health education and ITN demonstration meetings for 7 village health committees	Oct-Dec 1998	Health education and ITN demonstrations have been performed for 7 village health committees as scheduled, but IEC materials are not available
	To distribute IEC materials to 7 village health committees	Oct-Dec 1998	
3) To integrate malaria control activities into community based programs (schools, HBC, etc)	To conduct health education sessions in villages	Mar-Dec 1998	Educational sessions have occurred in several villages and 4 local schools; Macha Secondary Girls School have purchased enough nets to cover all students
	To conduct health education sessions in schools	Mar-Dec 1998	
4) To disseminate national malaria treatment guidelines to catchment hospitals and rural health centres	To obtain copies of the national malaria treatment guidelines from CMAZ	May 1998	The national malaria treatment guidelines were never received and therefore have not been distributed; consequently knowledge of these guidelines is lacking at Macha Hospital's catchment health centres
	To reproduce malaria treatment guidelines for distribution	June 1998	
	To distribute malaria treatment guidelines to catchment health centres	June 1998	
5) To provide training in ITNs for healthcare workers in catchment health centres	To conduct 2 ITN workshops for 10 healthcare workers in catchment health centres	Sept 1998	These workshops were not conducted primarily because of limited financial resources
		Dec 1998	
6) To monitor distribution and use of ITNs [Objective #1]	To monitor the availability of ITNs at the hospital (stores records, receipt books)	Ongoing (Monthly)	A receipt book is kept by the EHT of all net and insecticide sales; as well, a register of net

	To monitor the use of ITNs in the general community (household surveys)	Yearly	owners was kept by the EHT until March 1998, but is no longer being completed; ITN use in the community is being monitored by CMAZ-generated household surveys which have been performed in November 1997 and January 1999; a variation of random cluster survey techniques were used
7) To monitor training of healthcare workers in catchment health centres [Objective #5]	To record attendance at workshops To evaluate health centre records on net availability and malaria clinical cases/mortality	Sept/Dec 1998 Ongoing (Monthly)	As these workshops did not take place, no monitoring has occurred
8) To monitor school health education sessions [Objective #3]	To conduct school visits to collect data on bednet availability and usage in boarders To conduct malaria knowledge pre- and post-tests in school students before and after health education sessions	Mar-Dec 1998 Mar-Dec 1998	Monitoring of ITN knowledge, availability, and usage in schools has not taken place

Additional indicators which will require monitoring:

9) Net retreatment practices

Mbereshi Mission Hospital

Mbereshi Hospital is a 128-bed (110 beds and 18 cots) rural health facility that serves an immediate catchment population of around 10,000 with an additional catchment of over 40,000 in the remaining surrounding districts in the remote Luapula Province of Zambia. The hospital's primary activities include outpatient and inpatient curative services, as well as community-based primary health care programmes (including nutritional support, food inspection, universal child immunization, vitamin A supplementation, family planning, and an anti-AIDS programme). The hospital serves as a referral centre for several rural health centres in its catchment and neighbouring health districts. Malaria is listed as the most common diagnosis in both outpatients (40.4%) and inpatients (31.3%) with overall mortalities due to malaria of 5.4%. Most mortality attributed to malaria (76%) is found in children under 12 months old. Malaria cases peak between December and March during the rainy season, with the lowest numbers recorded between June and September during the dry cooler season.

The hospital's catchment population belongs to the Bemba tribe, one of the largest ethnic groups in Zambia. Families live in small homesteads consisting of a few buildings housing one extended family including a husband and his wife/wives. The primary livelihood is subsistence farming and fishing [in the Luapula River bordering Zambia and the Democratic Republic of Congo (Zaire)]. Maize and cassava are grown as the dietary staples. Malnutrition is one of the most common causes of death in children, numbering among the top five causes including severe anemia (<5 g/L), pneumonia, gastroenteritis, and malaria.

Malaria control activities at the hospital have been minimal due to a lack of insecticides for spraying houses. However, use of chemoprophylaxis in pregnant women has been encouraged to reduce morbidity and mortality in primigravidas. Due to several other priorities, a malaria control programme has not featured prominently at the hospital with barely a mention of malaria control in the 1997 and 1998 annual reports.

Mtendere Mission Hospital

Mtendere Hospital is a 110-bed rural facility that serves an immediate catchment population of around 40,000 with an additional catchment of over 30,000 in the remaining districts of Siavonga and Kafue in the Southern Province of Zambia. The hospital's primary activities include outpatient and inpatient curative services, as well as community-based primary health care programmes (including nutritional support, food inspection, a water and sanitation programme involved with digging wells and pit latrines, universal child immunization, reproductive health, and school health services). The hospital serves as a referral centre for several rural health centres up to over 100 km away in neighbouring health districts. Mtendere Hospital responsibilities also extend to at least a dozen village Community Health Posts where community health workers and trained birth attendants are attending to basic health needs. Malaria is listed as the most common diagnosis in both outpatients and inpatients with overall mortalities due to malaria of 1.5-3.5%. Although official age-adjusted statistics are not available, most mortality attributed to malaria is felt to be in children under 5 years old. Malaria

representation of Shona-speaking Goba people in the region as the hospital is located in Chirundu on the border with Zimbabwe. Families live in small homesteads consisting of a few buildings housing one extended family. The primary livelihood is subsistence farming and fishing (on the Zambezi River) with maize grown as the dietary staple. Malnutrition is a common cause of death in children, second only to malaria.

Malaria control activities at the hospital have consisted of occasional spraying of staff houses, use of chemoprophylaxis in pregnant women, use of screened windows and ceiling fans throughout the hospital and in staff houses, and occasional use of mosquito nets by hospital staff. These activities tend to be sporadic without an established malaria control programme.

Macha Mission Hospital

Macha Hospital is a 208-bed rural facility serving a catchment population of around 70,000 in the Southern Province of Zambia. The hospital's primary activities include outpatient and inpatient curative services, community-based primary health care (including a nutrition centre, a water and sanitation programme involved with digging wells and pit latrines, primary eye care mobile clinics, and HIV home-based care programmes), a nurses training programme, and a malaria research programme (Macha Malaria Research Institute established in 1988-89). The hospital serves as a referral centre for at least a dozen rural health centres and two smaller hospitals. Macha Hospital responsibilities also extend to three small rural health centres under its jurisdiction and several village health centres where community health workers and trained birth attendants are hired. Malaria is listed at the most common diagnosis in both outpatients and inpatients with over 16,000 malaria blood smears performed in 1996, with over 45% being positive. Malaria is also the leading cause of mortality among admitted patients, especially in children under 5 years old. Malaria cases peak in April coinciding with the end of the rainy season, with the lowest numbers recorded in August during the cooler dry season.

Half of the overall Tonga tribe population in the hospital's catchment area is thought to be under the age of 12 years. Families live in small homesteads consisting of a few buildings housing one extended family. The primary livelihood is subsistence farming with maize grown as the dietary staple, supplemented with peanuts, sweet potatoes, and leafy green vegetables. Malnutrition defined as growth below the 5th percentile is found in over 20% of children, and in combination with malaria accounts for over two thirds of all childhood morbidity and mortality.

Macha Hospital houses a well-published malaria research institute, established in 1989 by an American missionary, Dr. Philip Thuma, the current director. Several clinical trials studying promising drugs for the treatment and prophylaxis of malaria have been initiated including arteether, artenesumine, curdillan sulphate, and others. The research institute is enthusiastically welcoming the opportunity to facilitate malaria prevention operational research efforts through the introduction of ITNs. The deputy director of the malaria research institute has been given the responsibility of overseeing the introduction of ITNs.

Existing malaria control activities at the hospital consist of occasional spraying of staff houses, use of chemoprophylaxis in high incidence villages, and occasional overlaying of oil over the

control programme per se.