

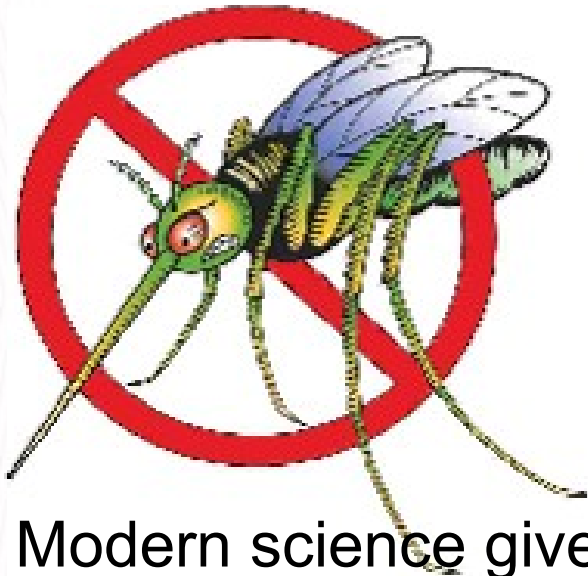
Integrated Malaria Management (IMM)

Integrating Mosquito and Malaria Control and Using Data to Drive Decisions

A health module of Community Analytics (CA)

Integrated Malaria Management

Integrating Mosquito and Malaria Control



The aim of integrating mosquito and malaria control is that very much more cost effective results can be achieved in any community through a multi-intervention approach than any single intervention approach. With IMM data are used to make plans and judge results.

Modern science gives us the tools to have rapid and low cost success ... but only if the program is driven by science and facts about the situation, and the performance of program interventions.

The goal is to reduce the negative impact of malaria in African communities ... rapidly and at lowest possible cost.

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Disrupting the Continuing Cycle of Re-infection



A critical parameter of success is reduction in the rate of re-infection.

No matter how good the malaria therapy, malaria will remain a socio-economic problem of major proportion as long as there is a continuing cycle of re-infection.

This is one of the reasons for the build up of resistance to drugs, and the reason that limited anti-malarial programs do not succeed.

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The IMMC Components

- Collect data (entomological data, environmental data, spatial data, medical data, cost data) and do thorough, rapid analysis to define and optimize interventions and program activities.
- Do environmental cleanup and get community involved.
- Use interior residual spraying (IRS) to control mosquitoes near human beings. Use best available insecticides, including DDT.
- Use larvicides to control (stop) the maturation of mosquitoes.
- Kill / control flying mosquito population using aerial and ground application of adulticides.
- Medical - malaria case management to improve health situation and reduce malaria parasite in the area.
- Use insecticide impregnated bednets to limit mosquito bites.

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Management Process

Collect data
Do analysis
Make operational decisions
Collect more data
Do more analysis
Revise operational decisions
Publish performance to all stakeholders

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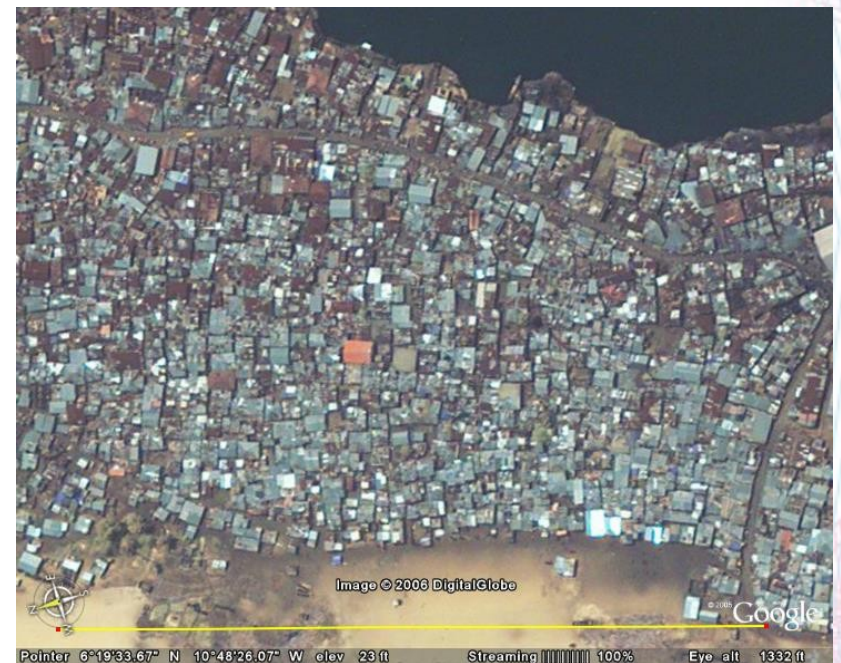
Collect Data: Entomology



Collect data – get it from the habitat. Not comfortable, but very important. Learn WHERE and what is going on with the mosquito: larva ... mosquito population ... prevalence of malaria in the mosquitoes ... etc.

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Collect Data: Geographical

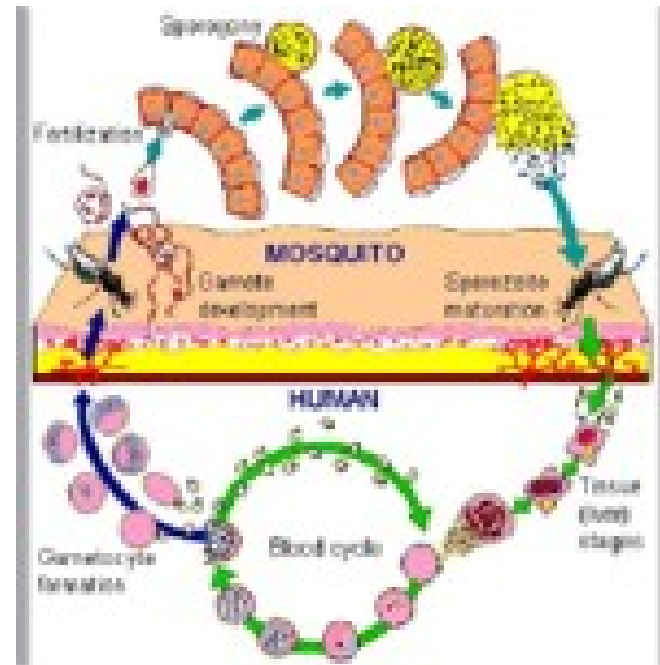


Left picture: A satellite image of Monrovia, Liberia, West Africa showing 15,000 acres of marsh within the main urban area (dark brown area)

Right picture: Aerial image of part of the urban area ... very congested and difficult to access by vehicle.

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Collect Data – Malariology



Keep score ... the goal is to reduce the prevalence of malaria, and to do it at least cost and in the most sustainable manner. Part of this requires knowledge of issues like resistance and the cost and effectiveness of various forms of therapy.

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Collect Data – about malaria and treatment

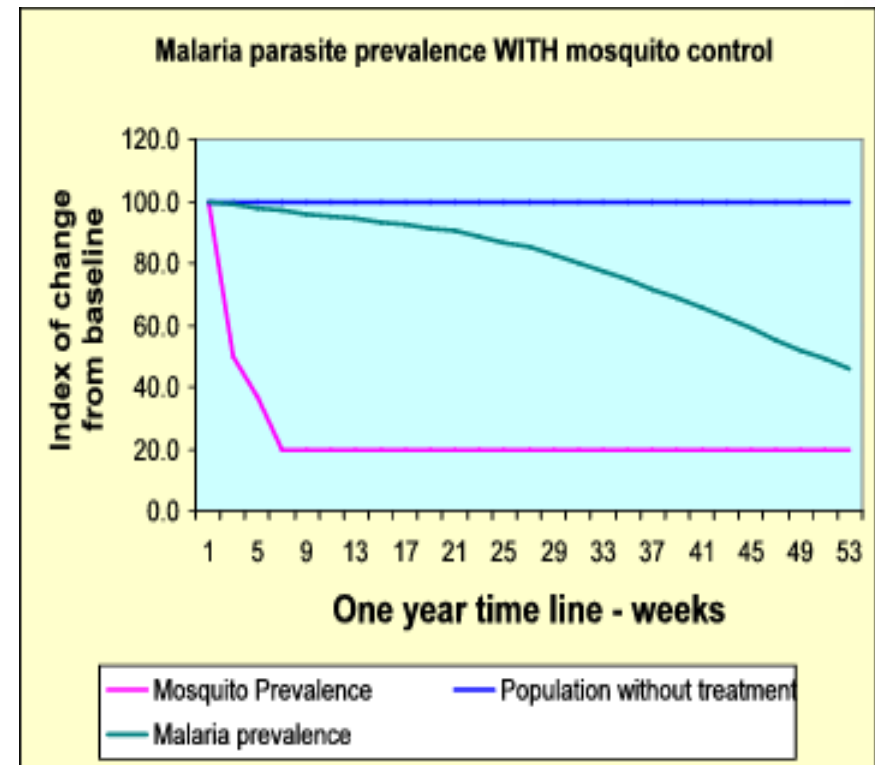
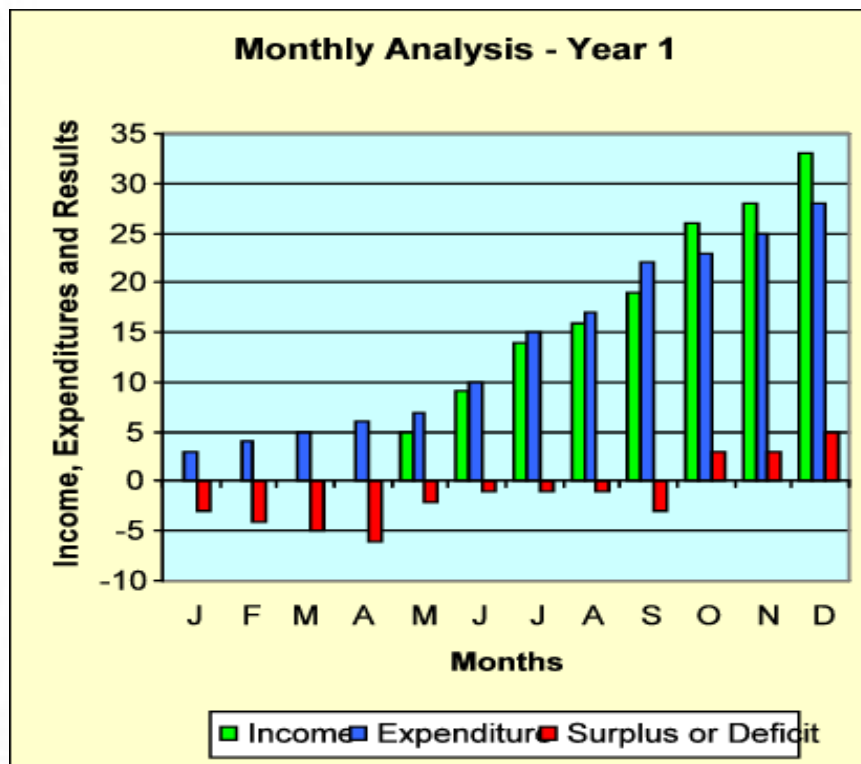


Everyone needs to have access to treatment ... it is important for two reasons: (1) the patients need treatment to get better and avoid getting worse; and (2) good public health policy requires that there is a lowering of malaria prevalence as fast as possible to give a sustainable outcome.

This child did not get adequate treatment ... this clinic did not have effective medications ... as reported in the New York Times in June 2006

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Data analysis, cost and value optimization



Data is used to determine what interventions are most likely to give rapid sustainable progress towards the ultimate goal of reducing malaria prevalence. A cost and operations model suggests that best practice using multiple interventions is several times more cost effective than any other approach.

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Operational Components

Environmental Cleanup

Interior Residual Spraying (IRS)

Larviciding

Exterior Spraying (Air ULV, Ground Fogging)

Medical Treatment

Bednets (ITN)

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Environmental Cleanup



Stagnant water facilitates mosquito breeding. Cleanup is something that people in all communities should undertake as a civic responsibility. It takes education, leadership and motivation. This can be organized through community groups like churches and mosques, youth groups, soccer teams, etc. This should be one of many IMMC interventions.

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Interior Residual Spraying (IRS)



Interior Residual Spraying (IRS) has been very effective in reducing the incidence of malaria ... and especially when DDT is used as the primary insecticide. IRS operates in three ways: (1) as a repellent that keeps mosquitoes outside the living space; (2) as an irritant that accelerates exit of mosquitoes; and, (3) toxicity that kills mosquitoes.

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Larviciding

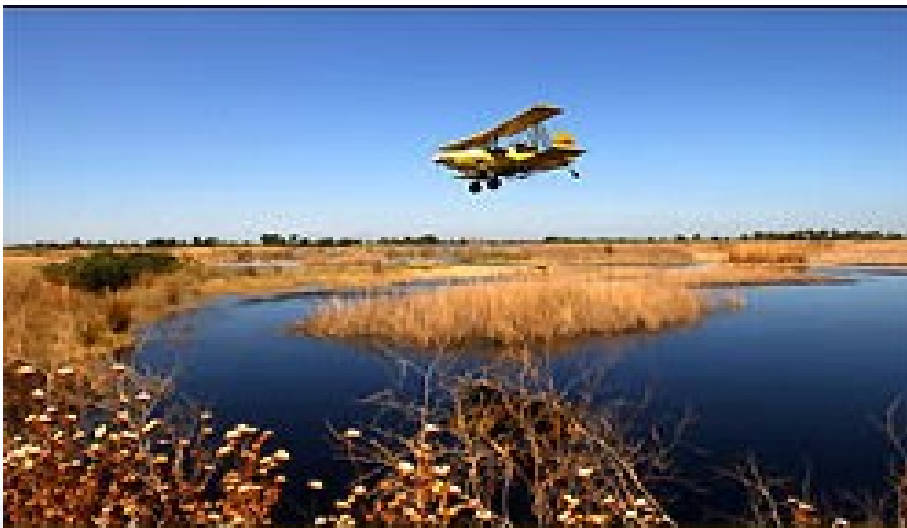


The best time to eliminate the mosquito vector is BEFORE the mosquito can fly. This can be done with knowledge about the environment and larviciding to kill larva before they become flying mosquitoes.

Various approaches to larviciding are possible ... manual, with mechanized support and, in some cases, using aerial application.

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Aerial Treatment – ULV, Adulticiding, Larviciding



- Aerial spraying makes rapid treatment of large and/or inaccessible areas possible.
- Aerial operations are expensive per hour, but LOW COST in terms of work done.
- Ultra Low Volume (ULV) spraying does NO environmental damage.
- Treatment strategy determined by entomological analysis.

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ULV Ground Fogging – mechanized and manual



Ultra Low Volume (ULV) and aerosol ground fogging is common practice in places where malaria has been controlled. It serves to reduce mosquito populations in areas reached by insecticide sprays and limit malaria transmission.

A variety of chemicals are used that are highly toxic to mosquitoes but safe for humans, animals and the environment. By varying the chemicals used build up of resistance is minimized.

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Treatment



The need for malaria treatment is enormous ... over 400 million cases a year in Africa. But most do not get effective treatment.

Public funding for programs is small, and most individuals do not have their own resources. Untreated malaria can be fatal.

Use effective drugs.

Avoid building up drug resistance.

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Insecticide Treated Bednets (ITN)



Insecticide treated bednets (ITN) help reduce malaria transmission. They reduce contact with malaria infected mosquitoes and reduce malaria among people using bednets.

But what about protection outside the house?

Widespread bednet use requires a lot of effort and bednets are expensive relative to local incomes. ITN is a valuable part of a total solution, but only a part. ITN cannot achieve full success on its own.

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Examples of success

Success in the early part of the 20th Century

The Panama Canal Zone around 1904.
Most of temperate Europe ended malaria largely by improved environment that reduced vector.

Immediate post WW2 era to around 1960 (heavy use of DDT)

USA eliminated endemic malaria
Japan almost totally reduced malaria
Italy and lastly Sardinia reduced malaria
India had major reduction in malaria prevalence
Considerable reduction in Caribbean locations
Considerable reduction in Latin America
Australia eliminated endemic malaria

Recent experience in Africa

South Africa, Swaziland and Mozambique used regional control and IRS (including use of DDT) to reduce malaria epidemic arising after about 10 years of no DDT use.

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Questions?