ENVIRONMENTAL HEALTH PROJECT

ACTIVITY REPORT

No. 55

Design and Implementation of a Rapid Assessment for the Malaria Control Initiative, Community Partners for Health, Lagos, Nigeria

January 1999

Jointly prepared for the USAID Mission to Nigeria
by BASICS and EHP.
(EHP Activity No. 440-CC)

by

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and
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ABOUT THE AUTHORS

Haruna Rashid Sesay served as Field Project Manager for the rapid assessment. He is a U.S.-based consultant who has worked for two years with the World Bank and USAID-funded projects. Dr. Sesay has a master's degree (from Glasgow Unviersity) in medical entomology and a Ph.D. (from Johns Hopkins University) in immunology and infectious diseases. From 1972 to 1995, he had various responsibilities in the Ministry of Health and Sanitation in Sierra Leone, culminating in the position as Head of the Medical Entomology Division. He has participated in national and international-level bodies on various topics including vector-borne disease, trypanosomiasis, onchocerciasis, and malaria. He has extensive experience in program management, policy formulation, and epidemiology.

Pandu Wijeyaratne served as overall activity manager for the rapid assessment program. He is EHP's Program Director for Tropical Disease Prevention. In this capacity, he has managed or participated in many USAID-funded activities related to malaria and other tropical diseases. Dr. Wijeyaratne joined EHP in the summer of 1994, having been principal program officer (Health, Society, and Environment) with IDRC in Ottawa, Canada, from 1984 to 1994. Throughout his career, he has focused on medical ecology, entomology, epidemiology, and the control and prevention of vector-borne diseasess. He has extensive publications and experience globally in at least 35 countries, with work experience in the U.S., Canada, Sri Lanka, and Nigeria, inluding teaching and research.

INTRODUCTION

The BASICS Urban Private Health Sector Project in Nigeria focuses on improving child health services and home health practices in underserved, high-risk urban communities. The goal of this three-year project, funded by USAID, is to improve the maternal and child health practices in six neighborhoods in Lagos with relatively low socioeconomic status and high public health needs. By strengthening the quality, outreach, and management of urban nonprofit health services, the project aims to increase the number of private sector organizations delivering low-cost, high-quality health care to low-income families. This community-based project aims to mobilize a variety of commercial and nonprofit health facilities in partnership with existing religious, social, and occupational organizations. Key results to date have been the establishment of partnerships, called "Community Partnerships for Health" (CPHs); the identification of each community's health priority problems and baseline data; and the preparation of community interventions.

Prior to the implementation of activities, BASICS completed a country activity plan and submitted a proposal to USAID/Nigeria for the Lagos Private Sector Child Survival Project. BASICS also conducted an "Urban Private Sector Inventory" to identify the existence of private sector resources—potential Lagos health facilities and community-based organizations that could serve as partners to BASICS for the implementation of child survival activities. In addition, BASICS also developed a national integrated health baseline survey which was administered by USAID. The data collected provide baseline information on health practices in the home and service utilization patterns for care sought outside the home.

The formation of partnerships with community-based organizations, referred to as CPHs, has encouraged well established, local organizations that do not ordinarily provide health services to mobilize to improve the health status of their community's children. Immediately upon formation of the partnerships, community action programs have been initiated in target neighborhoods. One example is establishment of preventive measures against malaria, perceived as an important problem in the area. CPH members used environmental sanitation days in their neighborhoods to clean up raw sewage, which they presumed to be a breeding area for mosquitoes and, by extension, a cause of the "malaria" they believed existed in their communities.

No systematic effort had been made to define or describe the malaria problem in the community, i.e., if the problem truly was malaria and, if it was, whether it was *indigenous* (contracted locally) or *imported* (contracted when urban people visited rural areas). Nor had there been a systematic effort to survey malaria vectors and associated environmental factors in the communities. Thus, the CPHs could not develop appropriate malaria control strategies, or indeed know if a strategy was even feasible or required. (Cleaning up bodies of water that contain raw sewage is beneficial in efforts to reduce diarrheal diseases, but these polluted water areas are probably not breeding sites for malaria vectors, and so the effort would have little impact on malaria prevalence.) Because of the scarcity of data, BASICS, in collaboration with EHP, drew up a work plan to assist the CPHs in collecting and interpreting information needed to choose appropriate malaria control efforts.

BASICS called on the Environmental Health Project to assist in the design of a rapid assessment to gather the needed data. A rapid assessment for malaria is an approach used to examine certain aspects or conditions, such as environmental factors (e.g., swampy areas, streams), sociological/anthropological patterns (e.g., household size, beliefs, and practices), and entomological issues (e.g., types of vectors, breeding sites, biting patterns) that contribute to malaria transmission and that should be considered in planning for control. A noteworthy characteristic of the approach is that the assessment is conducted quickly, not carried out over a

period of years, as are many assessments and studies. EHP first used the approach in Kitwe, Zambia, and then adapted it for use in Lagos.

The goal of the activity described in this report was to design and conduct a rapid asessment to help focus the CHP program for malaria control in three communities in Lagos. The principal products would be a baseline profile of the survey area, including localization of malaria and environmental factors associated with transmission, and an integrated plan of action for malaria prevention/control based on the above.

This activity was envisioned to assess the overall prevalence, distribution, and associated socio-behavioral, demographic, and environmental factors related to malaria and its transmission in urban Lagos. The study team (experts gathered to assist in the rapid assessment) and the CPHs would then use this information to formulate an appropriate malaria prevention and control strategy within the context of BASICS's overall child health improvement programs in the community. This report describes the design and implementation of the rapid assessment. It is presented in two sections. Part I describes the design of the assessment, and Part II reports on the implementation, findings, and recommendations.

Part I—Planning the Assessment

In January/February 1998, Dr. Pandu Wijeyaratne, EHP Program Director for Tropical Disease Prevention visited Lagos for a preliminary survey of the sites and meetings with personnel and organizations that might play a part in the assessment. (Dr. Wijeyaratne is referred to in this report as the "Activity Manager," since he has had managerial responsibility for the entire program.) The work plan which was developed for the assessment is the topic of Part I. It includes scopes of work for three investigative areas—demography and mapping, sociological and anthropological elements, and entomology and parasitology. Also found in Part I are materials which illustrate the location of the three areas in Lagos, population data, and outline of the implementation plan.

Part II—Implementing the Assessment

Part II is a report of the implementation of the rapid assessment. It is written by Dr. Haruna Rashid Sesay, a U.S.-based specialist in immunology and infectious disease. (He is referred to in the report as the "external consultant" of the Field Program Manager, as he directed and coordinated the rapid assessment team in Lagos from March to May 1998.) Part II contains the findings of the assessment, recommendations, and a preliminary draft of the work plan for CPHs.

Part I

Work Plan for the Rapid Assessment of Urban Malaria in Lagos, Nigeria: "Community Partnerships for Health"

February 1998

by

Pandu Wijeyaratne

Part I was originally published as a report by BASICS.
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OVERVIEW

The work plan which was developed for the rapid assessment is the topic of Part I. It was developed by Dr. Wijeyaratne, the overall activity manager for this effort. He visited Lagos in late January 1998. The steps he went through to develop the work plan are as follows:

A. Review background materials related to the overall activity.

B. Discuss overall health care partnership strategies in Lagos and BASICS/USAID expectations with BASICS/Headquarters and Nigeria staff, the USAID Mission in Lagos, and the existing local project team.

C. Hold team planning meetings and meet with the relevant partners, institutions, and individuals to establish an initial understanding of the overall environment, including population distribution, community and commercial characteristics, and available cartographic maps, as well as GIS and other databases, including environmental- and health-related data.

D. Establish personnel requirements within the context of availability in the BASICS team and identify short-term local consultants, which may include a malaria proficient parasitologist with epidemiology training, an entomologist or field entomological assistants, a social scientist with anthropological skills, a nursing/public health/environmental health professional, and a data analysis and statistical person with computer skills in mapping/GIS.

E. Adapt the rapid assessment process to the Lagos context.

F. Conduct a preliminary survey of the project area and develop an overall survey design and health profile of the population to include the target population; create a sampling scheme (with a sampling frame, sample size, and age distribution).

G. Establish a detailed work plan with time frame, levels of effort, and a project design with objectives, expected outcomes, and indicators.

The three pages which follow this overview give a graphic picture of the whole work plan design. The overall framework for the malaria rapid assessment (Figure 1) illustrates the outcome of the steps listed above (A-G). It shows the grouping of assignments under three technical teams. The framework also shows the approximate timing and the sequence of decision making. (Initials or names in parentheses refer to individuals who will be included in specific steps or processes.) The overall study design (Figure 2) lists the CPHs from which the three technical areas were selected for the malaria rapid assessment. Following that is the summary timeframe for sequencing the investigation (Figure 3).

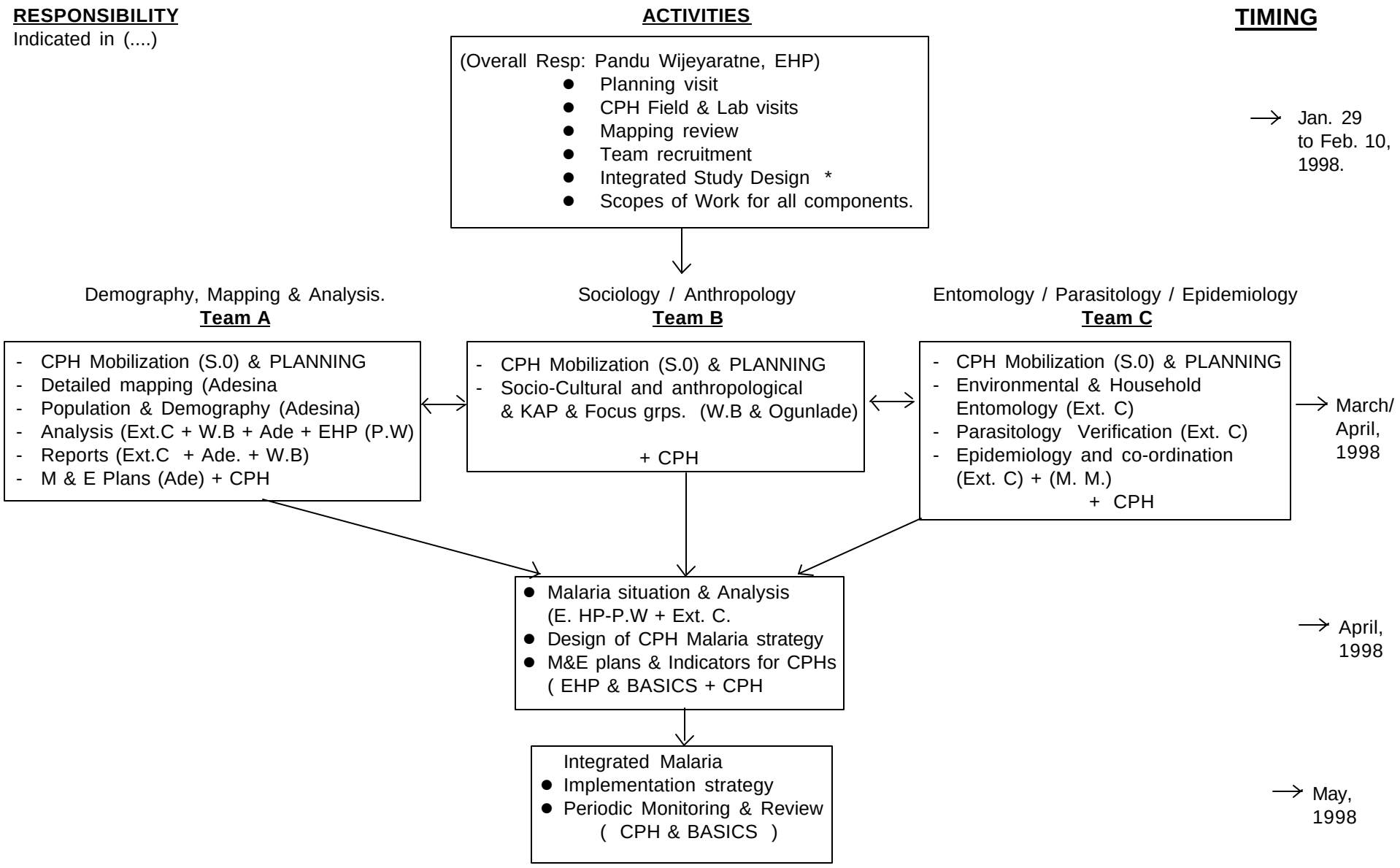
The next pages are maps of the geographic area in which the program will take place. The six BASICS CPH areas are indicated on Maps 1 and 2. Map 3 indicates the location of shops, mosques, schools, etc. This layering of local information on a commercial street map or city map was accomplished using geographic information system (GIS) computer-based mapping programs. Figure 4 lists some demographic information for the six CPH areas.

Following the maps are three scopes of work. These describe the staffing needs, qualifications, and assignments of each technical team. In the work plan, specific tasks are assigned in three technical areas: demography and mapping, sociology and anthropology, and entomology and parasitology. A U.S.-based external consultant with expertise in entomology and infectious disease, Dr. Haruna Rashid Sesay, was hired to coordinate the work of the three teams with local clinics, health workers, and BASICS. He himself undertook a significant portion of the health data collection.

A summary page concludes this section. It lists all personnel and resource needs to conduct the rapid assessment.

As an appendix to Part I, a bibliography of materials used for preparation of the work plan is given. In addition, three other bibliographies with abstracts are provided on Urban Malaria in Nigeria, Culex Species in Nigeria, and West Nile, Yellow Fever, and Dengue in Nigeria.

FIGURE 1:
OVERALL FRAMEWORK
MALARIA RAPID ASSESSMENT: LAGOS COMMUNITY PARTNERS FOR HEALTH (CPH)



* See attached page for details.

Figure 2

LAGOS COMMUNITY PARTNERS FOR HEALTH: MALARIA RAPID ASSESSMENT (MRA)

Overall Study Design

A. SELECTION OF MRA AREAS

SIX (6) COMMUNITIES

1. CONSIDER → THREE (3) ENVIRONMENTAL STRATA.

- WATER-FRONT AREA
  - Makoko
  - Lagos Island
- INLAND SWAMPY AREA
  - Amukoko
  - Ajegunle
- INLAND NON-SWAMPY AREA
  - Mushin
  - Lawanson

2. CONSIDER

Principal Criteria for Selection

- Malaria burden & relevance level of assessment.
- CPH factors e.g. demand; capacity; track record;
- Population and demographics e.g. density; sampling.
- Diagnostic facility e.g. Laboratory; quality control etc.
- Logistics e.g. accessibility; space availability etc.
- Other critical success factors.
- Technical resources and time available.

3. BASED ON ABOVE CRITERIA SELECT → THREE (3) Areas I, II & III

B. MRA MEASUREMENTS IN ALL THREE AREAS I, II, III :-

What	Where
● Anopheline breeding and evironment assessment	- total area.
● Mapping of relevant variables	- total area.
● Community Assessment:- Adults & School Children	- Focus groups.
● Market insecticide Survey	- sample.
● Household Mosquito assessment	- sample.
- Anopheline mosquito density & species.	
- Indoor & Outdoor biting assessments.	
● CPH health facility: sample:	- Exit interviews.
● Laboratory verification of diagnosis and parasitemia:	-sample.

Figure 3
Lagos Community Partners for Health: Malaria Rapid Assessment (MRA)

Summary Time Frame for CPHs.

1. March 9th 1998: Full day start up Workshop: All 3 areas.

2. March 10 -23, 1998: Area I - 11 days.

   March 24 - April 3, 1998: Area II - 9 days.

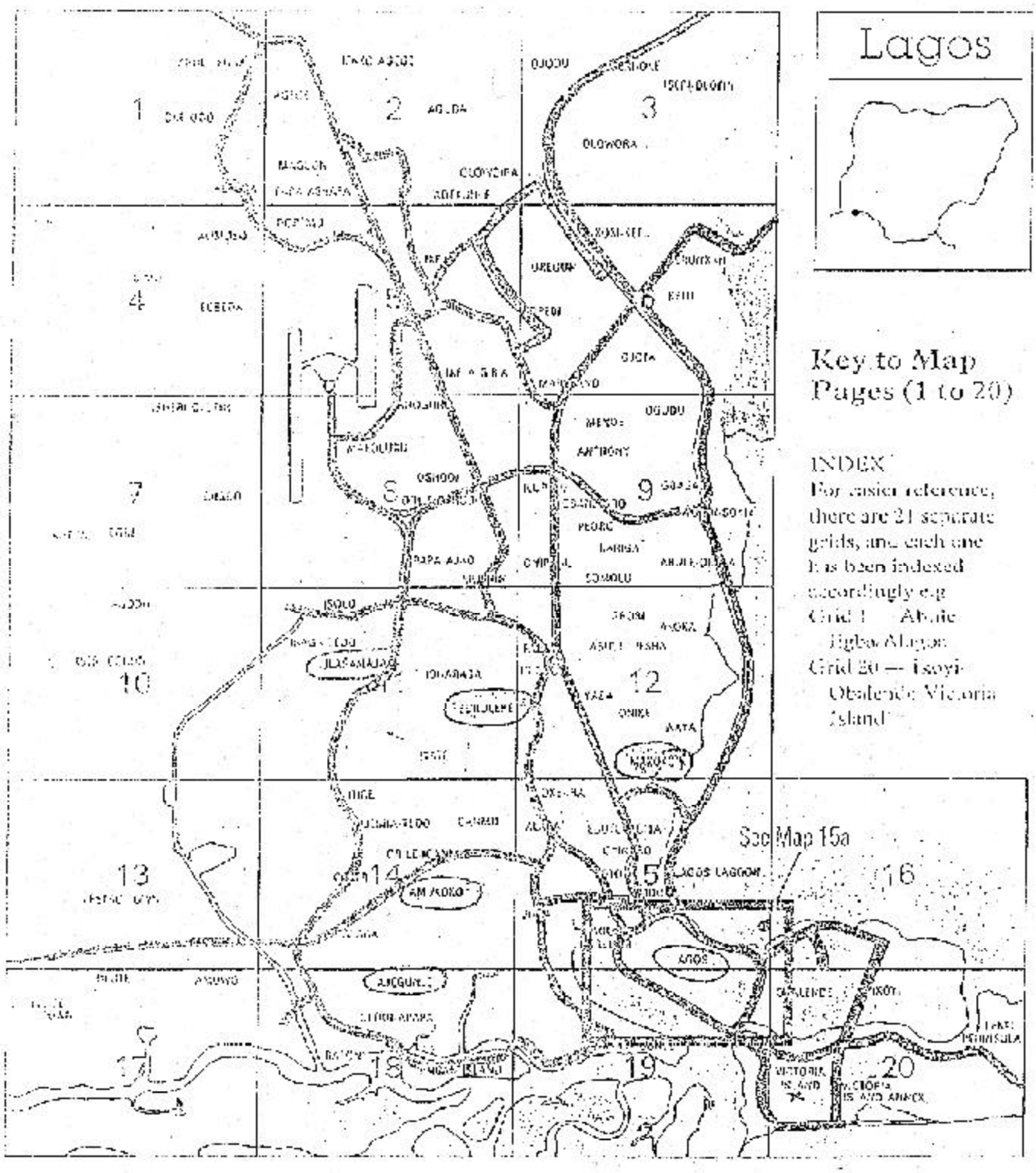
   April 7 - April 17, 1998: Area III - 9 days.

3. April 20 - 27: Consolidation of results; Preparation of Draft Malaria Action Plan (MAP) by small group; Reporting.

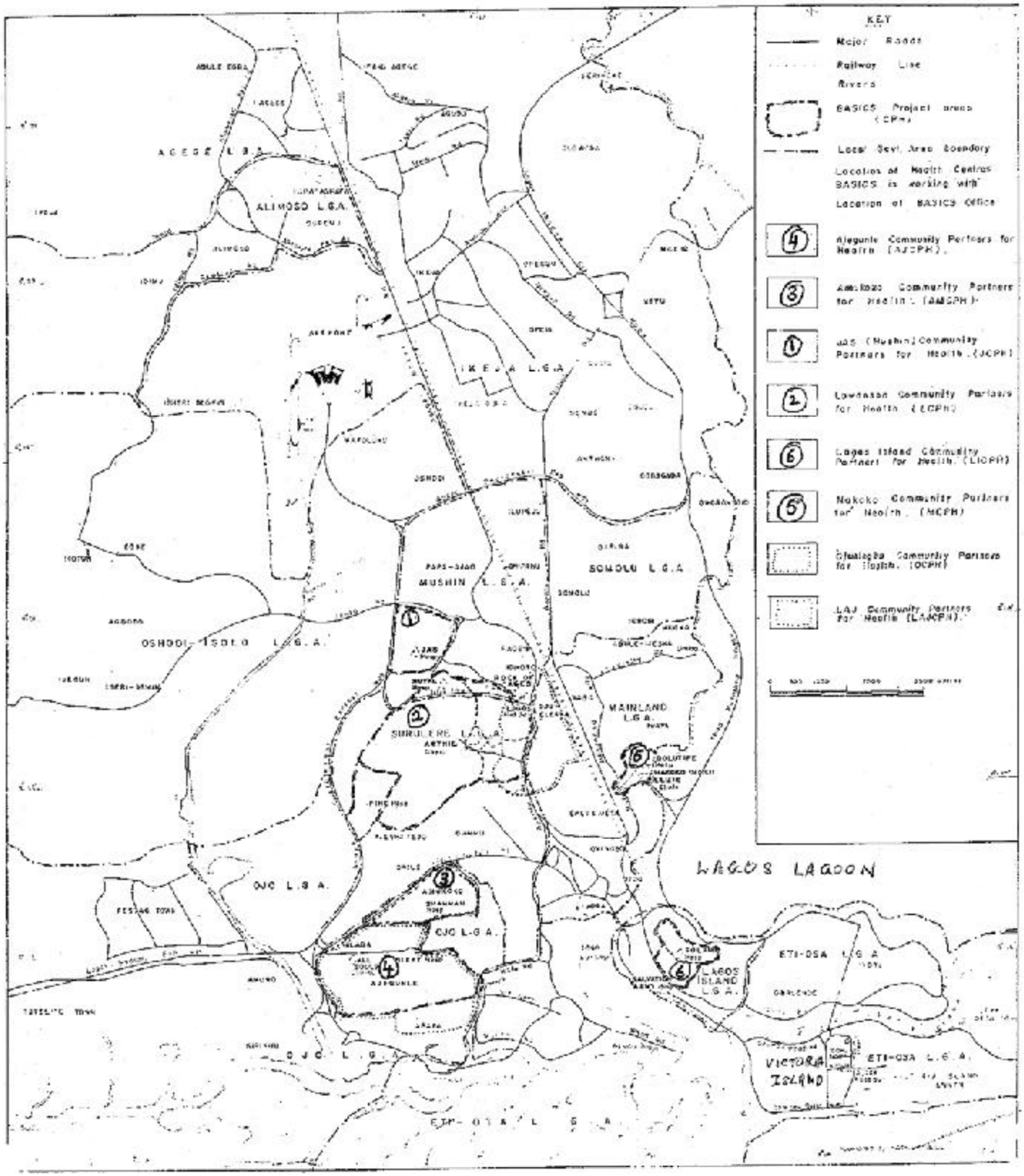
4. April 27th Presentation of MAP to all CPHs and finalization of implementation plans.

5. May 4th 1998 - Launching of MAP !

Map 1
Map of Lagos Showing BASICS CPHs



Map 2
Map of Lagos Showing the Community Partners for Health



Map 3
Map Generated for Mushin Area CPHs

JAS Community Partners for Health

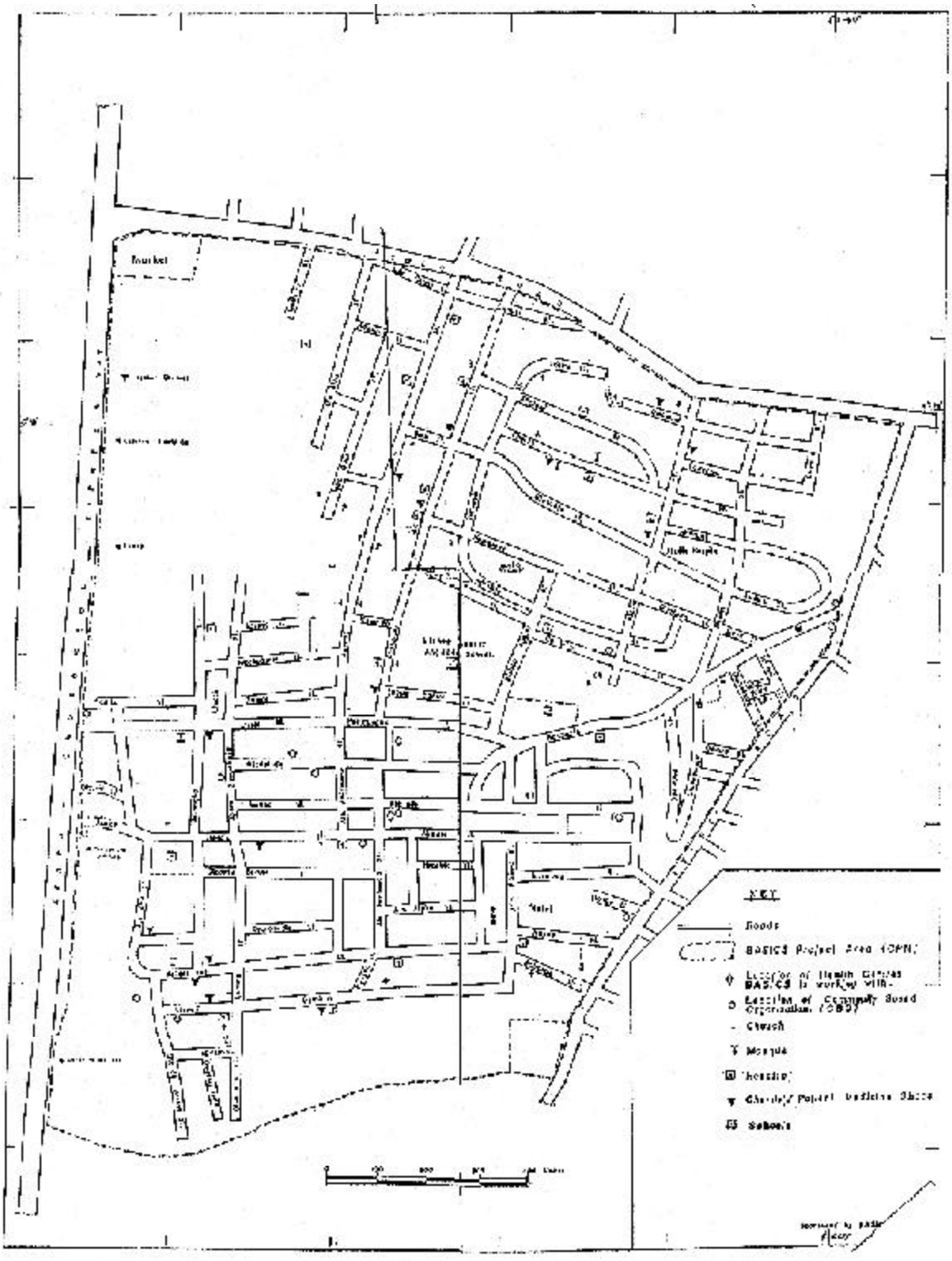


Figure 4
(B) ESTIMATED POPULATION OF CPHs - Lagos. (Census Estimate for 1992)

Calculation done using the population figures and the proportion of land occupied by each of the CPHs. (1992)

CPHs	OLD LGA	Total LGA Population	CPH/LGA Proportion	CPH total Proportion	CPH Density/ sq.km.	Under One Population	Under 5's Pop	Women 15-44
JASCPH	Mushin	1,016,452	20%	203,290	46,000	8,376	41,878	46,061
AJCPH	Ojo	1,042,162	14.5%	151,114	36,000	6,226	31,129	34,242
AMCPH	Ojo	1,042,152	2.47%	25,741	37,000	1,061	5,303	5,833
LCPH	Mainland	895,689	22.46%	201,261	29,000	8,292	41,460	45,606
LICPH	Lagos Island	169,283	23.0%	38,935	37,000	1,604	8,021	8,823
MCPH	Mainland	895,689	2.24%	20,063	29,000	827	4,133	4,546
TOTAL		5,061,437	Average= 14.1 Range=2. 24-23.0	440,404		26,386	131,924	145,111

1 SCOPE OF WORK A: DEMOGRAPHY AND MAPPING

1.1 Purpose of this Activity

In order to determine accurately the association between the distribution of malaria-carrying mosquitoes and environmental variables, and in order to determine a link between endemicity of the disease and the quality of the environment, detailed mapping of each CPH area will have to be carried out.

1.2 Personnel and Overall Skills Required

(A) A qualified cartographer/town planner will be responsible for the detailed survey and updating of those maps already drawn. He will have an assistant who is a geographer, familiar with town planning.
(B) A specialist in Geographic Information Systems (GIS) will be responsible for digitizing all the maps produced by the cartographer/town planner.

1.3 Tasks

The cartographer and his assistant will do the following:

1. Carry out a detailed survey of the project CPA areas
   a. noting and recording all swamps, lakes, streams, rivers, and other water areas
   b. noting and recording all markets, health facilities, and the diagnostic laboratories
   c. sketching all the housing areas, open areas, and road networks
2. Mapping all the entomological information produced by the other teams
3. The GIS specialist will be responsible for linking all the data with the GIS

1.4 Products/Deliverables

Their assignments will be to produce maps of the following:

1. Distribution of all swamps, streams, rivers, and other water surfaces in all the project's CPA areas.
2. Distribution of markets, health facilities, and all laboratories in the affected CPA areas
3. Housing areas, open or undeveloped areas, and road networks
4. GIS maps of 1-3 above.

All these activities will be coordinated by BASICS' M&EPO, and all consultants will work under his supervision.

1.5 Level of Effort

1. An experienced cartographer/town planner for 20 working days. (Mr. Ogunleye J.F., a senior lecturer in The Polytechnic, Ibadan, Nigeria)
2. An assistant field mapper; a geographer/town planner for 15 days (local hire)
3. A specialist in GIS who will digitize all maps, for 20 days (local hire)

1.6 Supplies and Resources

1. Tracing paper, copying, and printing
2. Cartographic equipment
3. Digitizer (en route)
4. Updated computer for all GIS software

2 SCOPE OF WORK B: SOCIOLOGY/ ANTHROPOLOGY

2.1 Purpose of this Activity

The formation of CPHs has encouraged well established community-based organizations, which do not ordinarily provide health services, to mobilize to improve the health status of their community's children. Immediately upon their formation, community action programs were initiated in target neighbourhoods. One example is the establishment of preventive measures against malaria, perceived as an important problem in the area. CPH members use environmental sanitation days in their neighbourhoods to clean up raw sewage B what they presumed to be a breeding area for mosquitoes, and by extension, a cause of the "malaria" they perceive their communities. No systematic effort has been instituted to define or describe the malaria problem in the community, i.e. if it truly is malaria, and if it is *indigenous*, (contracted locally) or *imported* (contracted when people visit rural areas) Nor has there been a systematic effort to survey malaria vectors and associated environmental factors in these communities.

Each CPH developed a work plan which included this objective:

> *Reduce the number of children and pregnant mothers getting sick from malaria (in the community, and/or among the organizational members of the CPH) and reduce the number dying despite contact with partner health facilities.*

One of the interventions used by the CPHs against malaria has been environmental sanitation, especially the clearing of gutters in the neighbourhoods. BASICS provided a set of equipment to each CPH to undertake this activity. CPHs have engaged in environmental clean-up both as a special campaign activity as well as a regularly scheduled intervention. Admittedly, cleaning of refuse from the streets and backed-up open gutters along these streets is not likely to address the problem of the breeding of anopheline mosquitoes. The effort may have little impact on the transmission of malaria, although other mosquitoes may be affected. This activity underscores the fact that local people, and even local health workers, may not distinguish among the types of mosquitoes and among the types of fevers that their children suffer.

From the foregoing, a need becomes evident, that assuming malaria is a major cause of urban child morbidity, it is not only necessary to learn about the breeding of mosquitoes from an entomological perspective and the prevalence of malaria from a parasitological viewpoint, but also to understand how the communities perceive both the vectors and the disease. The social/anthropological component of this rapid assessment will gather information about local beliefs, perceptions and behaviours that can form the basis of community, particularly CPH, efforts at designing and implementing culturally and environmentally appropriate health education and community action against malaria.

2.2 Personnel

1. Senior and middle level social scientist/health educators with experience in social and intervention research in malaria and/or other tropical diseases and in the use of rapid and qualitative methods.
2. Research assistants with training in social and related sciences and experience in conducting field studies, especially in the conduct of focus group discussions (FGDs).
3. Selected members of CPHs in order that they gain knowledge and skills needed to gather information needed to understand malaria in their own communities and to plan for appropriate malaria control activities.

2.3 Activities/Tasks

1. General There are three general tasks for the social/anthropological component of the Malaria Rapid Assessment (MRA) in Lagos.

(a) to identify community beliefs, perceptions and behaviours concerning the recognition of malaria and its vector and community responses to these,

(b) Jointly with the Parasitology/Entomology team, to determine travel history and mobility patterns and disease perceptions associated with the parasitological findings of the overall study, and

(c) to utilise these findings to aid the CPHs in developing more appropriate educational and environmental interventions against malaria.

2. Specific Tasks

A. Community Perceptions and Behaviours

1) Focus Group Discussions will be organised in each of the selected CPH communities in each of the three ecological zones to be studied. FGDs will be stratified by gender and major resident ethnic group for adults, with two FGDs being conducted for each gender/ethnic combination in each CPH, yielding a minimum of 8 adult FGDs per community. In addition there will be two FGDs per CPH held among secondary school students who live and attend school in the community. FGDs will identify local beliefs, perceptions, and other factors affecting human behaviour regarding malaria recognition, treatment and prevention. Particular focus will be on perceptions about mosquito breeding, including recognition of mosquito larvae and ideas about human activities (environmental, travel) that may influence malaria transmission).

2) Observational Studies will be conducted in each of the selected communities to determine what vector control products are available for sale (nets, sprays, etc.), their prices, and positioning in the shops. CPH members will play a major role in data collection in order to pass on skills to the community.

B. Mobility and Disease Perception

Integrated into the parasitological investigations will be a few basic interview questions that are aimed at determining the recent travel (within 2 weeks) behaviour of persons who complained of fever and whose blood film examination was positive. All persons examined will be asked (or the mothers for small children) to name the type of fever that they believe is affecting them and how they distinguished this from other locally (culturally) known fevers. Staff conducting the parasitological investigations will be

trained in interviewing techniques to enable them to ask these questions in a non-threatening way.

C. Health Education and Action Planning

Selected CPH members will participate as assistant FGD recorders in order that they learn how FGDs are conducted and so that they have first-hand access to the information generated from and about their communities. They will assist in the revision of written notes taken during the FGDs and also develop a simple results summary for future use in planning. Subsequent to the FGDs in each CPH, the CPH recorders as a group will meet together and compare their summary data sheets and discuss the implications for planning appropriate health education and action programmes in their areas.

2.4 Resources

FGDs - lists of participating organizations in each CPH are already available for use in selecting FGD participants. Meeting locations will be provided by the CPHs, such as halls belonging to CPH member organizations. Additional materials that should be purchased or assigned include:

48 note pads
4 tape recorders
60 90-minute blank cassette tapes
96 batteries
1 box of pens
12 file folders

Observations - Street maps with busy shopping/market intersections denoted will be used to start off observations. Checklists will be printed - approximate sample size of approximately 80 stores per CPH.

2.5 Level of Effort

- 1 senior level social scientist/health educator for 20 working days **(Dr. W. Brieger based in Ibadan, Nigeria.)**
- 1 middle level social scientist (local hire) for 30 working days **(Dr. Ogunlade of University of Lagos working in a private capacity.)**
- 8 research assistants (local hire) for 15 days each

2.6 Products

1. Instruments and methodologies for use in future MRAs in the CPH communities include a FGD Guide, an observation checklist and a brief survey on mobility included with parasitological examination.
2. Planning process guidelines for CPHs to utilise FGD and observational data to plan educational and action programmes.

3 SCOPE OF WORK C: ENTOMOLOGY AND PARASITOLOGY

3.1 Purpose of this activity

While the overall activity will address the prevalence, distribution and associated socio-behavioral, and environmental factors related to malaria in the CPH areas, the specific focus of this activity will be on determining the *Anopheles* mosquito vectors and their distribution and habits as well as the prevalence and history of diagnosed malaria cases and Plasmodium Parasitemia in selected CPH areas.

3.2 Personnel and overall skills required

1. Middle level/senior entomologists/entomological assistants with malaria field experience and training and community survey skills
2. Medical laboratory scientists with special experience in malaria diagnosis and survey methods
3. An environmental biologist with survey and data recording skills
4. Selected members of CPHs who will be trained and will then form part of the team

3.3 Activities/Tasks

General

(A) A qualified and experienced team leader (external consultant) will be responsible for the planning and coordination of all entomological and parasitological tasks. The field and laboratory teams will be under the overall oversight of the EHP activity manager, Dr. Pandu Wijeyaratne.

(B) CPH-designated persons will work closely with both the entomological and parasitological teams after an initial period of training in the basic methods that will be used in the assessments. Building capacity in the CPHs for continuation of these tasks will be an integral function of the overall activity.

Specific Tasks: [To be conducted in a pre-determined sampling framework].

A. Entomological Assessments

1. Vector breeding habitats will be mapped and surveys in the area will be carried out. Species identification will be established anc characterized to breeding situations, on a sampling basis, through standard malariometric survey methods.
2. Adult mosquito and human contact assessments will be done in the community to determine anopheline potential vector presence and densities in households and their human contact times. Wherever possible non-intrusive methods, e.g., mechanical light traps and outdoor and indoor biting assessments, will be carried out.

B. Parasitological verification

1. CPH laboratory technicians will work closely with the specialized malaria laboratory scientists to carry out parasitemia assessments in all children under five and pregnant women diagnosed as malaria in the health facilities.
2. Parasite species, parasite density and gametocytaemia will be recorded.
3. Jointly with the socioanthropoligical team, A two-week travel history and mobility assessment will be done in all malaria diagnosed cases to determine whether infection was likely acquired within or outside the Lagos area of residence.

3.4 Level of Effort

1. Entomological Team 3 persons + designated CPH members - 30 working days
2. Laboratory Parasitology Team + CPH technicians + trainees - 20-35 working days
3. External Consultant/Senior Entomologist/Parasitologist - 40 working days in Lagos including planning of activities, analysis report-writing time.

3.5 Timeframe and Coverage

- Overall duration - 40 working days
- Overall field coverage - 3 CPH areas in 3 Ecological/Environmental strata e.g. lagoon water front area; inland non-swampy area; inland swampy area.

3.6 Schedule

1. February 1	-	Detailed Mapping activities continue
2. February 27/28	-	External Consultant arrives
3. March 2 - 4	-	Orientation and preparation for TPM
4. March 4-5	-	Team planning meeting - venue TBD
5. March 9th	-	Start up workshop with CPHs
6. March 10	-	Area I Entomological training surveys begin
	-	Sociological training assessments begin
	-	Laboratory and Health facility training and assessment begin - simultaneous
7. March 17	-	Area I Midterm Review and monitoring workshop
8. March 23	-	Review of Area I results
9. March 24	-	Area II planning workshop and activities begin
10. March 25 - April 3	-	Area II field activities
11. April 6	-	Area II review of results
12. April 7-16	-	Area III field activities
13. April 17	-	Review of Area III results
14. April 20 - 27	-	Consolidation of results and preparation of draft report
15. April 23-24	-	Preparation of draft Malaria Action Plan
16. April 24 a.m.	-	Presentation of findings and action plan to CPHs and discussion and feed back
17. April 24 a.m.	-	Briefing of USAID
18. April 25/26	-	External Consultant departs

3.7 Deliverables

A. Entomology and Parasitology components.

1. Documentation on methods, techniques and instruments, for future use by CPHs
2. Anopheline (potential) vector breeding and density site maps of the area with delineated ecological characteristics of each situation and amenability to specific sustainable environmental methods of control through CPH involvement.
3. Anopheline mosquito biting pattern inside and outside households and an assessment of the optimal methods of protection of the community from biting contact.
4. Assessment of current situation of malaria in the community through presumptive diagnosis at health facilities and the proportion of parasitemia Plasmodium species prevalence and gametocytaemia levels.
5. An assessment of malaria laboratory diagnostic practices and verification of positivity levels in CPH participating laboratories.
6. Travel and mobility patterns among malaria cases (particularly children under five and pregnant women) and an interpretation of local acquisition of malaria infection.
7. Identification of pointers to CPH. Malaria prevention/control strategy.

4 NEEDED LOCAL PERSONNEL/RESOURCES AND LEVEL OF EFFORT

Three (3) overall Teams:

(A) Demography, Mapping and Data Analysis
(B) Socio-Anthropology and community mobilization
(C) Environmental/Entomology/Parasitology

4.1 Team A—Demography, Mapping and Data Analysis

Personnel:

(1) Cartographer - 20 days
(2) Assistant yield mapper/geographer - 15 days
(3) GIS oriented digitizer for field data - 20 days

Supplies and Resources:

(1) Tracing paper and copying and printing costs
(2) Cartographic equipment
(3) Digitizer (en route?)
(4) Upgraded computer for Atlas GIS software

4.2 Team B—Socio-Anthropology and Community Mobilization

Personnel:

(1) Local Sociologist - 30 days **(Dr. Ogunlade)**
(2) Research Assistant (8) - 15 days **(TBD)**
(3) Research Assistant (1) - 20 days **(Ms. F. Akerele)**

Supplies and Resources:

(1) 48 note pads
(2) 4 tape recorders
(3) 60 90-minute blank cassette tapes
(4) 96 batteries
(5) 1 box of pens
(6) 12 file folders

4.3 Team C—Environmental/Entomology/Parasitology and Epidemiology

Personnel:

(1) Epidemiologist/Coordinator (1)	-	15 days **(Dr. M. E. Mosanya)**
(2) Parasitologists (2)	-	35 days **(Messers R.N.Chiedu & M.A. Aro)**
(3) Field Entomologists (2)	-	35 days **(Messers D.A.Ordu & H.O. Omoigiafu)**
(4) Environmental Health Assistant (1)	-	20 days **(Ms. F. Akerele)**
(5) Laboratory Assistant (1)	-	35 days **(Mr. B. Abduraman)**

Equipment and Supplies:

(1) Dissecting microscopes (2) *
(2) Microscopes (2) *
(3) Mosquito larva dippers *
(4) Malaria diagnostic charts *
(5) Taxonomic keys
(6) Health Education materials - to be developed/modified
(7) Para-sight F kits ? *
(8) Slide marking pens
(9) Tissues
(10) Buffer
(11) Giemsa; Oil emersion liquid
(12) Battery aspirator
(13) Torches
(14) Paper cups

* To be purchased in U.S.A via BASICS.

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BIBLIOGRAPHY ON URBAN MALARIA IN NIGERIA

Interaction between acute diarrhoea and falciparurn malaria in Nigerian children.
by Sodeinde O; Adeyemo AA; Gbadegesin RA; Olaleye BO; Ajayi-Obe KE; Adernowo OG
Department of Paediatrics, University College Hospital, P.M.B., Ibadan, Nigeria.
J Diarrhoeal Dis Res (BANGLADESH) Dec 1996, 14 (4) p269-73, ISSN

Although both malaria and diarrhoea are major public health problems in developing countries, and separately each has been the subject of intense research, few studies have investigated the interaction between these two conditions. The interaction between diarrhoea and malaria among children aged 4 months to 12 years in two tertiary health-care facilities, University College Hospital, lbadan, and Lagos University Teaching Hospital, Lagos, Nigeria was studied. In lbadan, the prevalence of diarrhoea among the cerebral malaria patients on admission as 11. 7% (7/60) compared to 9.3% (215/2312) among other admissions in 1990 (chi square 0. 16; p = 0.6913). Similarly, no significant difference in the prevalence of diarrhoea was found between the cerebral malaria patients (14.3%) and other patients (16. 1%) seen in Lagos in 1992 (chi square = 0.06, p = 0.81). Thus, cerebral malaria does not seem to be associated with an increased or decreased prevalence of diarrhoea when compared with other conditions. The prevalence of malarial parasitaernia among the 554 diarrhoea patients studied in Ibadan during 1993-1994 was 13.6% compared with 17.9% among the 347 controls (chi square = 3.75, p = 0.053). However, of the children with diarrhoea, malarial parasitaernia was more common among the dehydrated patients (25.4%) than among the well-hydrated patients (11.6%) (chi square = 8.11, p = 0.004). These data suggest that diarrhoea is merely coincidental in severe malaria and conversely, malarial parasitaernia is similarly coincidental in children with acute diarrhoea, although it may be more frequent among dehydrated diarrhoea patients than well-hydrated ones.

Malaria in pregnancy: efficacy of a low dose of mefloquine in an area holoendemic for multi-drug resistant Plasmodium falciparum.
Okeyeh JN; Lege-Oguntoye L; Ernembolu JO; Agbo M
Department of Pharmacology and Clinical Pharmacy, Ahmadu Bello University, Zaria, Nigeria.
Ann Trop Med Parasitol (ENGLAND) Jun 1996, 90 (3) p265-8, ISSN

Thirty-three pregnant women with pure P. falciparurn parasitaernias (> or 10(3) parasites/microliters blood), were each treated with a single, oral dose (12.5 mg/kg body weight) of mefloquine base (MQ), at Ahmadu Bello University Teaching Hospital, Zaria urban area, Nigeria. All 33 women were aparasitaernic by day 6 post-treatment and none became parasitaemic during the remaining 21 days of observation. Minimal side-effects were reported by the patients. The mean (S.D.) fever- and parasite-clearance times were 48 (17) and 50 (26) h, respectively. In standard microtests in vitro, schizont maturation was inhibited with MQ at 16 pmol/well (3.2 pmol/microliters). These findings indicate that, at least in the study area, semi-immune, pregnant women have high tolerability to relatively low doses of MQ and that such doses are fully effective against the local P. falciparum isolates.

In vivo efficacy of chloroquine, halofantrine, pyrimethairnine-sulfadoxine and qinghaosu (artesunate) in the treatment of malaria in Calabar, Nigeria.
Ezedinachi E
Department of Medicine, University of Calabar, Nigeria.
Cent Afr J Med (ZIMBABWE) Apr 1996, 42 (4) p109-1 1, ISSN 0008-9176

We used the WHO in vivo seven day test, extended to 14 day follow up to evaluate the efficacy of the alternative antimalarial drugs in Nigeria (1992), where chloroquine resistant P. falciparum (CRPD) has been confirmed. One thousand and four patients were screened. Those fulfilling recruitment criteria were randomly treated with chloroquine (CQ), n = 50, halofantrine (H), n = 53, pyrimethamine-sulfadoxine (P-S), n = 52 and qinghaosu (Q), n = 53. Parasitological treatment failures were found with all drugs i.e. CQ-53.6pc, H-9.5pc, P-S-28.5pc and Q-2.Opc. H and Q were significantly more efficacious than CQ and P-S, $p < 0.003$ and $p < 0.006$, respectively. similarly symptom clearance after 48 hours by H and Q, was 76.3pc and 94pc respectively, better than CQ. P-S was not significantly better than CQ, 64.4pc and 63.3pc, respectively, $p > 0.05$. The symptom clearance rate of CQ has markedly reduced from 97.7pc to 67.7pc, and in increased proportion of RIII, from 5.9pc to 14.3pc, are signs of increase in chloroquine resistant Plasmodiurn falciparum. Drug resistant P. falciparurn in Nigeria constitutes a serious problem to malaria chemotherapy.

Leukocyte counts in falciparurn malaria in African children from an endemic area.
Sowunmi A; Akindele JA; Balogun MA
Department of Pharmacology, University of Ibadan, Nigeria.
Afr J Med Med Sci (NIGERIA) Jun 1995, 24 (2) p145-9, ISSN 0309-3913

Total leukocyte counts were done in 180 apparently healthy rural school children aged 6-12 years in a malaria endemic area in southwestern Nigeria. Total leukocyte counts and their distribution in aparasitaernic and asymptornatic parasitaernic children were similar. Total leukocyte counts, and the relationship between the density of parasitaemic and total leukocyte counts were studied in 55 consecutive children presenting with acute symptomatic falciparum. malaria. Children without parasitaernia were older and had lower total leukocyte counts when compared with children with parasitaernia (7.61 +/- 4.11 x 10(9)/L Vs 9.04 +/- 5.0 x 10(9)/L), but the difference was not statistically significant ($P > 0.05$). In non-hyperparasitaernic children and in hyperparasitaemic children with percentage infected red cells < 10%, there was poor correlation between density of parasitaemia and total leukocyte counts. However, at > or = 10% parasitaernia, there was a positive correlation ($r = 0.55$; $P = 0.032$) between increasing parasitaernia and leuk-ocytosis. Combination of hyperparasitaemia (> 5% parasitaemia) and leukocytosis (> 12 x 10(9)/L) occurred in 15% of the children and was not a poor prognostic index in the absence of other evidence of severe or complicated disease, as response to oral mefloquine was prompt. This would suggest that in African children from an endemic area, this combination is not a reliable indicator of severity or poor prognosis in falciparurn malaria.

Towards malaria control in Nigeria: a qualitative study on the population of mosquitoes.
Wagbatsoma VA; Ogbeide O
Dept of Community Health, University of Benin, Nigeria.
J R Soc Health (ENGLAND) Dec 1995, 115 (6) p363-5, ISSN 0264-0325

Malaria is still highly prevalent in many tropical countries and this disease can only survive in areas where mosquitoes and infected human populations are high. Relevant information on the species of mosquitoes, their habitats and their population are important in planning preventative strategies in the control of malaria, hence this study. Mosquito species and their habitats were investigated in both high and low density areas of Benin City, Edo State, Nigeria. The results showed that Culex pipiens fatigans, Aedes aegypti, Aedes albopictus, Anopheles gambiae and Culex trigripes were the commonest mosquitoes found in Benin City. Among the habitats studied, containers and gutters had the highest population of mosquitoes. The serious public health implications of these various species of mosquitoes is the possibility of outbreaks of infectious diseases like yellow fever, dengue, which some of these mosquitoes are known to transmit. Malaria, though endemic, is also important because of its associated high morbidity and mortality rates. This study provides some useful information on the habitats and species of mosquitoes found in Benin City. Follow-up studies are being carried out by the authors on quantitative studies on the population of these species of mosquitoes, the dissolved elements present in the different habitats that could promote or inhibit the breeding of mosquitoes, and KAP surveys on mosquitoes and malaria among the Benin populace. It is hoped that such comprehensive data would be very useful in planning effective preventative strategies in the control of malaria in Benin City.

Antimalarial drug response of Plasmodium falciparum. from Zaria, Nigeria.
Adagu IS; Warhurst DC; Ogala WN; Abdu-Aguye I; Audu LI; Bamgbola FO; Ovwigho UB
Department of Medical Parasitology, London School of Hygiene and Tropical Medicine, UK.
Trans R Soc Trop Med Hyg (ENGLAND) Jul-Aug 1995, 89 (4) p422-5, ISSN

The sensitivity of Zaria strains of Plasmodium falciparum to chloroquine, mefloquine, quinine and sulphadoxine/pyrimethamine was investigated 5 years after the appearance of in vivo/in vitro chloroquine resistance in urban Zaria. Infections in 36/43 children (83.7%) treated with chloroquine were sensitive while those in 7 (16.3%) were resistant. 8/13 isolates cultured (61.5%) were sensitive in vitro to chloroquine and 5 (38.5%) were resistant. Of the cultured isolates, 13/13 (100%), 12/13 (92.3%) and 5/7 (71.4%) showed mefloquine, quinine and sulphadoxine/pyrimethamine sensitivity, respectively. The results confirmed chloroquine and sulphadoxine/pyrimetharnine resistance in urban Zaria and revealed emerging quinine resistance. Resistance to chloroquine and sulphadoxine/pyrimetharnine is at RI level and chloroquine should continue to be the first-line drug for the treatment and prevention of P. falciparum infection in the Zaria area of northern Nigeria. We suggest that, while quinine serves as second-line drug, mefloquine should be reserved for infections resistant to chloroquine, quinine and sulphadoxine/pyrimethamine.

Prevalence of asymptornatic parasitaemia in an urban and rural community in south western Nigeria.
Adernowo OG; Falusi AG; Mewoyeka OO
Postgraduate Institute for Medical Research and Training, College of Medicine, University of Ibadan, Nigeria.
Cent Afr J Med (ZIMBABWE) Jan 1995, 41 (1) p18-21, ISSN 0008-9176

The prevalence of malaria parasitaernia was investigated among secondary school students in Ibadan city and a neighbouring rural community in Nigeria. Of 343 urban and 249 rural seemingly healthy subjects examined, 8 pc and 27 pc respectively were found positive for malaria

parasitaernia. This showed a significantly higher parasite rate in the rural area as compared to the urban areas ($p < 0.05$). Only P. falciparum was found in the urban subjects while 7.4 pc of the rural infection was due to P. malariae. All the different erythrocytic stages both sexual and asexual forms of P. falciparum were seen in the rural samples whereas no schizont was seen in the urban samples. The haernoglobin genotype did not affect the prevalence of parasitaemia. in the two populations studied. However, a lower parasite rate was observed among G6PD deficient subjects in both populations. There was also a significantly lower parasite infection rate among those with the B-antigen in the two populations studied.

[A case of Plasmodium falciparum. malaria successfully treated with halofantrine]
Obana M; Oda T; Matsuoka Y; Irimajiri S; Kano S; Suzuki M
Department of Internal Medicine, Kawasaki Municipal Hospital.
Kansenshogaku, Zasshi (JAPAN) Mar 1994, 68 (3) p399-402, ISSN

A 44-year-old male, who had been to Lagos, Nigeria, was admitted to our hospital because of a high grade fever on July 20, 1993. On admission, Plasmodium falciparum was detected in his blood smears and the antibody titers against P. falciparurn and Plasmodium vivax antigens were 1:256 and < 1:4 respectively by the indirect fluorescent antibody test. Therefore, he was diagnosed as having P. falciparum. malaria. He was treated with halofantrine (Halfan: Smith Kline Beecham Pharmaceuticals, England), two tablets at six-hourly intervals, a total of six tablets (1500 mg). Parasites were cleared rapidly and remission was achieved without any adverse reactions. Halofantrine can therefore be recommended for the treatment of imported P. falciparurn malaria.

A study of malaria parasitaemia in pregnant women, placentae, cord blood and newborn babies in Lagos, Nigeria.
Lamikanra OT
Institute of Child Health and Primary Care, College of Medicine, University of Lagos, Surulere.
West Afr J Med (NIGERIA) Oct-Dec 1993, 12 (4) p213-7, ISSN 0189-160X

The peripheral blood of 10 1 pregnant women at delivery, their 105 new bom babies and the corresponding placental, and cord blood smears were examined cross sectionally for malaria parasites, during a 3 month period (May-July, 1986). The average maternal age was 26.3 years. Positive parasitaemia was found in 2.97% of maternal peripheral thick blood films; in 2.94% of placental smears, and in 0.95% of cord blood films. Congenital malaria did not occur in the babies.

Rising incidence of cerebral malaria in Lagos, Nigeria: a postmoterm study.
Elesha SO; Adepoju FB; Banjo AA
Department of Morbid Anatomy, College of Medicine, University of Lagos, Nigeria.
East Afr Med J (KENYA) May 1993, 70 (5) p302-6, ISSN 0012-835X

One hundred and forty seven cases of acute malaria were diagnosed at autopsy between 1988 and 1991 at the Lagos University Teaching Hospital (LUTH). In 67 (46.5%) cases death was attributed to cerebral malaria (CM). There was a gradual increase in the incidence of CM during the period under review. Both sexes were affected equally but more children than adults succumbed. The highest death rate was recorded in the age group 1-5 years with a peak in the 2nd and 3rd year. There were seven adults out of which one was intenerant white lady. Only one of the six adult Nigerians had travelled outside Africa and stayed away for about four years. The commonest presenting symptoms were: fever only, fever with convulsions and/or coma and

fever.with gastrointestinal symptoms such as vomiting and diarrhoea. The majority of the adults were comatose (five out of seven) without fever on admission. A review of the English literature on the diagnosis, pathogenesis and management of CM is also presented. The possible reasons of the rising incidence of CM in a holoendemic region such as Nigeria are discussed.

Problems of. chloroquine-resistant P. falciparum. in Nigeria: one antimalaria drugs' utilisation in metropolitan Calabar.
Ezedinachi EN; Ejezie GC; Emeribe AO
Department of Medicine, University of Calabar, Nigeria.
Cent Afr J Med (ZIMBABWE) Jan 1991, 37 (1) p16-20, ISSN 0008-9176

We studied the antimalarial drugs utilisati.on pattern in urban Calabar, with a view to determining what drugs people take when they have malaria attack and who diagnoses and prescribes the drugs. We used a standard questionnaire data sheet to record the results of the interview carried out by the authors. Malaria symptoms and the drugs consumed were diagnosed and prescribed respectively by self (54pc), qualified medical doctor (32pc) and others including paramedical staff (2pc). The rest (12pc) took traditional remedies. The antimalarial drugs (chloroquine, fansidar, camouqin) were chosen because of their efficacy/popularity (21pc), cheapness (43pc) and availability (34pc). Among those interviewed, only 21.2pc took the adequate curative dose of 25 mg/kg chloroquine for 3 days according to WHO recommendations. Majority of the consumers took their drugs orally, but some (17pc) had chloroquine injections, administered, in some cases, by ill-qualified patient medicine dealer. The results show that there is an association between the level of education and the pattern of remedy sought by the respondents (p less than 0.05). Self-medication was practised significantly more by those with formal education than by those without (p less than 0.05). The trend of consulting patent medicine dealers for prescription decreased with acquisition of more formal education. Conversely, significantly more of the respondents with higher education consulted qualified medical doctors or paramedical staff (P less than 0.05). Two aspects of drug abuse observed here, i.e. the utilisation of sub-curative doses of chloroquine and monotherapy are believed to be two of the factors that lead to the several chloroquine treatment failures which have been recently reported in Calabar, and other areas of Nigeria.

Resistance of Plasmodiurn falciparum to sulfadoxine-pyrimethamine combination in semi-immune children in Zaria, northern Nigeria.
Lege-Oguntoye L; Adagu SI; Werblinska B; Ogala WN; Slotboom AB
Department of Pharmacology, Ahmadu Bello University, Zaria, Nigeria.
Trans R Soc Trop Med Hyg (ENGLAND) Jul-Aug 1990, 84 (4) p505-6, ISSN

The World Health Organization (WHO) extended field test was employed to assess the in vivo sensitivity of Plasmodium falciparum. to sulfadoxine-pyrimethamine combination in 44 children in Zaria urban area. 36 children (82%) were fully sensitive to the drug and 8 (18%) were resistant at the RI level. 8 parasite isolates were obtained from the children and successfully cultured in vitro using the WHO microtest (mark II) system. 'Me 8 isolates underwent schizogony at concentrations of 10,000 pmol sulfadoxine/125 pmol pyrimethamine per well, indicating in vitro resistance.

Malaria in Nigeria: a revisit.
Salako LA; Ajayi FO; Sowunmi A; Walker O
Clinical Pharmacology Unit, University College Hospital, Ibadan, Nigeria. Ann Trop Med Parasitol (ENGLAND) Oct 1990, 84 (5) p435-45, ISSN

The frequency of asymptornatic malaria parasitaemia was investigated in rural and urban school-children aged six to 12 years in southwestern Nigeria between January 1987 and October 1988. Asymptornatic parasitaernia was detected in the rural school-children all year round with the lowest parasite rate in January and the highest in July, corresponding to the mid-dry and wet seasons respectively. Asymptornatic parasitaemia was also common amongst urban school-children, but the frequency was lower than in the rural children. Parasite density was less than or equal to 1000 microliters-1 in 42% of parasite-positive asymptornatic children and was greater than 10,000 microliters-1 in only 20% of them. Mass treatment with chloroquine, to which the parasites were fully sensitive, was followed by the same rate of re-infection in the parasite-positive and parasite-negative groups. Of 7713 patients clinically diagnosed as having malaria 4425 were found to have parasitologically-proven malaria, and of these 4239 had pure Plasmodiurn falciparum malaria. Of the patients with falciparum. malaria only 4.6% were below the age of one year. In 47% the parasite count was less than or equal to 1000 microliters-1, and it was over 10,000 microliters-1 in 37% and over 25 0,000 microliters-1 in 16%. There was no significant difference between the asymptornatic children and the acutely ill patients in the percentage with parasite densities less than or equal to 1000 microliters-1, but the percentage with parasite densities greater than 10,000 microliters-1 was significantly greater in the acute malaria patients than in those with asymptornatic parasitaernia.

Neurological disorders in Nigerian Africans: a community-based study.
Osuntokun BO; Adeuja AO; Schoenberg BS; Bademosi 0; Nottidge VA; Olumide AO; Ige O; Yaria F; Bolis CL
ActaNeurol Scand (DENMARK) Jan 1987, 75 (1) p13-21, ISSN 0001-6314

In a Nigerian town with a stable population of 20,000, a door-to-door survey was conducted, using a questionnaire involving a complete census and a simple neurological evaluation which had previously showed a 95% sensitivity and an 80% specificity for detecting neurological disease. Positive responders were evaluated and categorised, using agreed criteria for diagnoses. Nearly 100% cooperation was obtained. Life prevalence ratio for at least one episode of headache was 51 /1000. Crude point prevalence ratio for migrainous, headache was 5.3/100, and peak age-specific ratio was in the first decade. Prevalence ratio for epilepsy was 533/100,000 and peak age-specific prevalence ratio occurred in the 5-14 years age groups. The prevalence ratio for peripheral nerve disorders was 268/100,000, and age-specific prevalence ratio for tropical neuropathy increased with age. Prevalence ratio for stroke was rather low at 58/100,000, but was probably due to the people's attitude to the disabled elderly and high mortality of stroke which showed annual mortality rate of 70/100,000 which increased with age to 1519/100,000 per year in the eighth decade. Crude prevalence ratios (cases per 100,000) for others are 112 for neurological complications (including sciatica) of spondylosis, 15 each for poliomyelitis, motor neurone disease, development speech disorders, 10 each for syncope, hereditary neuropathies. Parkinson's

disease, benign essential tremor, primary cerebellar degeneration, cerebral palsy, mental retardation, organic psychosis (probable intracranial tumor) and 5 each for muscular dystrophy, pyomyositis, spina bifida occulta, alcohol dependence and cerebral malaria. The implications of the findings are important for development of community neurological services in the developing countries.

Chloroquine resistance of Plasmodiurn falciparum in semi-immune children in Zaria, northern Nigeria.
Lege-Oguntoye L; Abua JU; Werblinska B; Ogala WN; Slotboom AB; Olurinola PF
Department of Pharmacology, Ahmadu Bello University, Zaria, Nigeria.
Trans R Soc Trop Med Hyg (ENGLAND) Sep-Oct 1989, 83 (5) p599-601,

Fifty-nine children with Plasmodium falciparum. malaria were subjected to the World Health Organization (WHO) extended field test to assess the in vivo sensitivity of the parasite to chloroquine in Zaria urban area, Nigeria. The parasites in 53 children (90%) were positive but those in 6 (10%) were resistant at the RI-RII level. 36 isolates from the patients were successfully cultured in vitro for the WHO standard microtest. 13 (37%) of the isolates under-went schizogony at chloroquine concentrations of 1.6 microM/litre and above. Probit analysis showed that the chloroquine concentrations producing 50% (EC50), 90% (EC90) and 99% (EC99) schizont inhibition were 0.4, 1.6 and 4.9 microM/litre, respectively. The results indicate a rapid decline in the sensitivity of P. falciparurn to chloroquine in the study area during the past 3 years.

Child health and child care in Okelele: an indigenous area of the city of Ilorin, Nigeria.
Adedoyin MA; Watts SJ
Department of Child Health, Faculty of Health Sciences, University of Ilorin, Nigeria.
Soc Sci Med (ENGLAND) 1989, 29 (12) p1333-41, ISSN 0277-9536

This paper provides a detailed analysis of the survival rates and health problems of a cohort of children born during a 5-yr period in part of the city of Ilorin, Nigera. The findings are linked to a demographic and environmental study which indicates that the study area was relatively stable in tenns of family structure and population turnover. Most people work in the informal sector, in trading, small scale crafts and service industries. At the time the survey began, in 1979, the provision of piped water supplies to the area was unreliable and sanitation provisions rudimentary. Most of the people had little or no formal education and were very poor. The study indicated that health status had improved over the 5-yr period, compared to a baseline study conducted in 1979. Common causes of child mortality and morbidity included diarrhea, acute respiratory infections, measles, and malaria. The infant mortality rate was 41.5/1000. The availability of clinic care at nominal cost, and the attendance of others at the clinic for checkups and immunization, resulted in a higher level of health for their children than otherwise would have been possible. Some problems of primary health care in the area are mentioned, in the light of Nigeria's current budgetary problems, and the utilization of existing strong social support networks to improve health care and environmental sanitation and water supply is suggested.

In-vivo sensitivity of Plasmodium falciparum. to chloroquine in Zaria, Nigeria.
Midala TA; Lege-Oguntoye L; Werblinska B; Bhatt GC
Department of Pharmacology, Ahmadu Bello University, Zaria, Nigeria.
J Trop Med Hyg (ENGLAND) Feb 1988, 91 (1) p9-11, ISSN 0022-5304

In 33 children with confirmed Plasmodium falciparurn malaria, the WHO Extended Field Test was employed to test the sensitivity of the parasite to chloroquine in Zaria urban area. No evidence of resistance to the drug was found. In 82% of the patients parasitaemia had disappeared within 3 days, while the remaining 18% were parasite negative on day 4 or 5. The mean parasite clearance time was calculated as 3.45 +/- 1.23 days. The results suggest that chloroquine sensitivity of P. falciparum may be decreased in this part of Nigeria.

BIBLIOGRAPHY ON CULEX SPECIES IN NIGERIA

Towards malaria control in Nigeria: a qualitative study on the population of mosquitoes.
Wagbatsoma. VA; Ogbeide O
Dept of Community Health, University of Benin, Nigeria.
J R Soc Health (ENGLAND) Dec 1995, 115 (6) p363-5, ISSN 0264-0325

Malaria is still highly prevalent in many tropical countries and this disease can only survive in areas where mosquitoes and infected human populations are high. Relevant information on the species of mosquitoes, their habitats and their population are important in planning preventative strategies in the control of malaria, hence this study. Mosquito species and their habitats were investigated in both high and low density areas of Benin City, Edo State, Nigeria. The results showed that Culex pipiens fatigans, Aedes aegypti, Aedes albopictus, Anopheles gambiae and Culex trigripes were the commonest mosquitoes found in Benin City. Among the habitats studied, containers and gutters had the highest population of mosquitoes. The serious public health implications of these various species of mosquitoes is the possibility of outbreaks of infectious diseases like yellow fever, dengue, which some of these mosquitoes are known to transmit. Malaria, though endemic, is also important because of its associated high morbidity and mortality rates. This study provides some useful information on the habitats and species of mosquitoes found in Benin City. Follow-up studies are being carried out by the authors on quantitative studies on the population of these species of mosquitoes, the dissolved elements present in the different habitats that could promote or inhibit the breeding of mosquitoes, and KAP surveys on mosquitoes and malaria among the Benin populace. It is hoped that such comprehensive data would be very useful in planning effective preventative strategies in the control of malaria in Benin City.

Sustainable urban development and human health: septic tank as a major breeding habitat of mosquito vectors of human diseases in south-eastern Nigeria.
Nwoke BE; Nduka FO; Okereke OM; Ehighibe OC
Medical Entomology & Parasitology Unit, School of Biological Sciences,
Abia (former Imo) State University, Okigwe, Nigeria.
Appl Parasitol (GERMANY) Feb 1993, 34 (1) pl-10, ISSN 0943-0938

Septic tank mosquitoes in Abia State Unive rsity Okigwe, south-eastern Nigeria were studied using exit traps between November 1988 and April 1989. The results were revealing and striking. Apart from the common septic tank mosquitoes, Culex p. quinquefasciatus, Cu. cinereus and Aedes aegypti, which have been previously commonly found breeding in ammonia and nitrate-rich waters of latrines and septic tanks, the other species, Cu. horridus, Cu. tigripes and Aedes vittatus, have not been commonly reported as colonizing septic tanks in Nigeria. Three out of these six mosquito species observed are vectors of human diseases: Aedes aegypti and Aedes vittatus are vectors of Yellow fever and Cu. p. quinquefasciatus is a potential vector of Bancroftian filariasis and a world-wide vector of various arboviruses. The fact that these mosquito vectors are able to breed in highly polluted waters of septic tanks during the harsh dry months when most surface water bodies are dry is epidemiologically important. The breeding of these mosquito vectors of human diseases around human dwellings indicates an intense man-vector contact creating a high

level risk to the crowded urban population. The public health implications of this urbanization/modernization problem and solutions are discussed.

Experimental Wuchereria bancrofti infection of Culex quinquefasciatus and Aedes aegypti.
Anosike JC; Onwuliri CO
Medical Entomology and Parasitology Research Laboratory Department of Zoology, University of Jos, Nigeria.
Angew Parasitol (GERMANY) Aug 1992, 33 (3) p139-42, ISSN 0003-3162

Laboratory-derived females of Culex quinquefasciatus and Aedes aegypti were experimentally infected with Wuchereria bancrofti by allowing the insects to feed on infected volunteers of known microfilariae density between 24.00 and 2.00 hours. Of the 240 mosquitoes used for the experiments only 67 (55.8%) of C. quinquefasciatus and 83 (69.2%) of the Ae.aegypti actually fed on the volunteers' blood. After 16 days post-infection period, 50 (74.62%) of the engorged C. quinquefasciatus harboured infective L3 larval stages of W. bancrofti, while 16 (23.9%) and 1 (1.49%) harboured L2 and Ll pre-infective larval stages, respectively. On the other hand, no development to the L3 infective stage was observed in the engorged Ae.aegypti though 34 (40.96%) harboured Ll pre-infective stages of the parasite. Our results suggest that C.quinquefasciatus could be actively involved in the transmission of urban bancroftian filariasis in Nigeria.

Isolation and characterization of four new strains of Bacillus sphaericus from central Nigeria highly toxic to mosquito larvae.
Orduz-Peralta S; Diaz T; Restrepo N; Rojas W; Yousten AA Biological Control Section, H.P.T.U., Medellin, Colombia. J Invertebr Pathol (UNITED STATES) Jul 1992, 60 (1) p107-8, ISSN

Septic tank mosquitoes: competition between species in central Nigeria.
Irving-Bell RJ; Okoli EI; Diyelong DY; Lyimo EO; Onyia OC
Department of Zoology, University of Jos, Nigeria.
Med Vet Entomol (ENGLAND) Jul 1987, 1 (3) p243-50, ISSN 0269-283X

Exit traps, placed over the air vents of septic tanks, were used to examine species diversity and relative abundance of mosquitoes breeding in ammonia-rich waters of septic tanks. Of the six species found, Culex decens Theobald and Culex cinereus Theobald appeared to be competing successfully with Culex quinquefasciatus Say during the wet season but not during the long dry season. The seasonal timing of their displacement by Cx quinquefasciatus was variable and did not correlate well with climatic factors. The three other species present, generally during the wet season and early dry season, were Culex tigripes G. & C., Culex horridus Edwards and Aedes aegypt (L.). Experimental bucket ovitraps were used to assess preference towards covered (dark) septic tank water in comparison with sunlit septic tank water, covered and sunlit compost water. These were colonized by Cx quinquefasciatus, Cx decens, Ae. aegypti and Ae. vittatus Bigot. The covered septic tank water was more abundantly colonized by Cx quinquefasciatus and marginally so by the two Aedes species. Cx decens appeared to colonize the exposed compost water more readily in the dry season, but changed to the covered septic tank water in the wet season. The discussion centres around competition between these mosquitos species and concludes that it would be useful to know what environmental factors, or what aspects of competition, lead to severe natural reductions in the abundance of the major pest species Cx quinquefasciatus.

Bancroftian filariasis in the Igwun basin, Nigeria: an epidemiological, parasitological, and clinical study in relation to the transmission dynamics.

Udonsi X
Department of Zoology, Faculty of Science, University of Port Harcourt.

Folia Parasitol (Praha) (CZECHOSLOVAKIA) 1988, 35 (2) p147-55, ISSN

A 12-months study on bancroffian filariasis was carried out in the Igwun basin, Nigeria. A total of 1,418 individuals (768 males, and 650 females) were examined for microfilaremia and clinical filarial stigmata. There were 14.3% and 11.1% male and female point prevalence rates, respectively, and an overall prevalence of 12.8%. Prevalence rates and microfilarial density increased with age. The highest mff density of 35 mff/20 ml blood occurred in the 40-49 year old male individuals. Disease rates of 55.5 and 65.3% were recorded for males and females respectively. Chyluria (9.3% males, 16.7% females), hydrocele (17.8%), elephantiasis (15.9% males, 29.2% females), and enlarged groin glands (16.4% males, 19.4% females) were the major clinical signs, all associated with microfilaremia. Anopheles gambiae and Cules pipiens were the principal vectors. The estimated mean daily, weekly, and monthly per capita biting densities were 26, 16 1, and 753 respectively. The overall infection rate of mosquitoes was 22.3%, with a mean mff density of approximately 5 mff/mosquito. These vector parameters were indicative of active transmission in the area, and may be responsible for the high prevalence of infection, the diversity of clinical signs, and high morbidity rates.

Bancroftian filariasis in the Igwun Basin, Nigeria. An epidemiological, parasitological, and clinical study in relation to the transmission dynamics.

Udonsi X
Department of Zoology, Faculty of Science, University of Port Harcourt, Nigeria.

Acta Trop (SWITZERLAND) Jun 1988, 45 (2) p171-9, ISSN 0001-706X

A 12-month field and laboratory study was carried out to determine the epidemiology, clinical features, and transmission dynamics of bancroftian filariasis in the Igwun Basin, Nigeria. A total of 1,418 individuals (768 males, and 650 females) were examined for clinical signs of filariasis. 690 day provocative blood samples (DPS), and 728 night blood samples (NBS) were examined for microfilaremia. 14.3 % of males and 11.1 % of females were mf positive. 5.8% of DPS, and 19.5% of the NBS were mf positive. An overall microfilaria rate of 12.8% was recorded in the basin. Prevalence and microfilarial density increased with age. The highest average density of 35 mf/20 ml NBS occurred in the 40-59-year-old male individuals. The mean microfilarial density in DPS and NBS were 7.9 and 28.0 per 20 ml blood in males, respectively, and 6.2 and 20.0 per 20 ml DPS and NBS in females, respectively. Disease rates of 55.5% were recorded for males, and 68. 1 % for females. The clinical signs observed were: Chyluria (9. 1 % for males, 16.7% for females); hydrocele (15.5%); elephantiasis (15.5% in males, 29.2% in females); and enlarged groin glands (15.5% in males, 22.2% in females). All clinical signs were associated with microfilariae. Anopheles gambiae s.I., and Culex pipiens s.I. were the two mosquito vectors identified. The estimated mean annual biting rates were 5508 and 10448 for A. gambiae s.I. and C. pipiens s.I., respectively. Their respective mean infection rates were 21.7% for A. gambiae s.l. and 22.7% for C. pipiens s.I.; with microfilarial densities of 4.1 and 6.6.(ABSTRACT TRUNCATED AT 250 WORDS)

New mosquito in Africa [letter]
Grist NR
Lancet (ENGLAND) May 30 1992, 339 (8805) p1363, ISSN 0140-6736

Experimental Wuchereria bancrofti infection of Culex quinquefasciatus and Aedes aegypti.
Anosike JC; Onwuliri CO
Medical Entomology and Parasitology Research Laboratory Department of Zoology, University of Jos, Nigeria.
Angew Parasitol (GERMANY) Aug 1992, 33 (3) p139-42, ISSN 0003-3162

Laboratory-derived females of Culex quinquefasciatus and Aedes aegypti were experimentally infected with Wuchereria bancrofti by allowing the insects to feed on infected volunteers of known microfilariae density between 24.00 and 2.00 hours. Of the 240 mosquitoes used for the experiments only 67 (55.8%) of C. quinquefasciatus and 83 (69.2%) of the Ae.aegypti actually fed on the volunteers' blood. After 16 days post-infection period, 50 (74.62%) of the engorged C. quinquefasciatus harboured infective L3 larval stages of W. bancrofti, while 16 (23.9%) and 1 (1.49%) harboured L2 and Ll pre-infective larval stages, respectively. On the other hand, no development to the L3 infective stage was observed in the engorged Ae.aegypti though 34 (40.96%) harboured L1 pre-infective stages of the parasite. Our results suggest that C.quinquefasciatus could be actively involved in the transmission of urban bancroftian filariasis in Nigeria.

BIBLIOGRAPHY ON WEST NILE, YELLOW FEVER, DENGUE IN NIGERIA

[Problems posed by the spread of Aedes albopictus]
Problemes poses par l'expansion d'Aedes albopictus.
Rodhain F
Unite d'ecologie des systemes vectoriels, Institut Pasteur, Paris.
Bull Soc Pathol Exot (FRANCE) 1996, 89 (2) p137-40; discussion 140-1,

Ae. albopictus is originated from Asia, and is known as a natural vector of dengue in South-East Asia. Since about 10 years, Ae. albopictus has spread all around the world. It was introduced into the Americas: United States, Mexico, Brazil, Barbados and the dominican Republic; into some Pacific islands as Solomons, Fidji and Australia; into Africa in Nigeria; and finally into Europe: in Italy and Albany. These introductions were made primarily through imported tyres containing eggs and/or larvae of Ae. albopictus. The tyre international trade plays a significant role in the expansion of Ae. albopictus. Furthermore, this mosquito species has a broad ecological spectrum and found suitable conditions either into tropical and temperate countries. In some situations in the Americas, Ae. albopictus has displaced Ae. aegypti. The spread of Ae. albopictus is of great concern because it can experimentally transmit several arboviruses and filarial worms. (0 Refs.)

Towards malaria control in Nigeria: a qualitative study on the population of mosquitoes.
Wagbatsoma. VA; Ogbeide O
Dept of Community Health, University of Benin, Nigeria.
J R Soc Health (ENGLAND) Dec 1995, 115 (6) p363-5, ISSN 0264-0325

Malaria is still highly prevalent in many tropical countries and this disease can only survive in areas where mosquitoes and infected human populations are high. Relevant information on the species of mosquitoes, their habitats and their population are important in planning preventative strategies in the control of malaria, hence this study. Mosquito species and their habitats were investigated in both high and low density areas of Benin City, Edo State, Nigeria. The results showed that Culex pipiens fatigans, Aedes aegypti, Aedes albopictus, Anopheles gambiae and Culex trigripes were the commonest mosquitoes found in Benin City. Among the habitats studied, containers and gutters had the highest population of mosquitoes. The serious public health implications of these various species of mosquitoes is the possibility of outbreaks of infectious diseases like yellow fever, dengue, which some of these mosquitoes are known to transmit. Malaria, though endemic, is~ also important because of its associated high morbidity and mortality rates. This study provides some useful information on the habitats and species of mosquitoes found in Benin City. Follow-up studies are being carried out by the authors on quantitative studies on the population of these species of mosquitoes, the dissolved elements present in the different habitats that could promote or inhibit the breeding of mosquitoes, and KAP surveys on mosquitoes and malaria among the Benin populace. It is hoped that such comprehensive data would be very useful in planning effective preventative strategies in the control of malaria in Benin City.

Wesselsbron virus antibody in domestic animals in Nigeria: retrospective and prospective studies.
Baba SS; Fagbami AH; Ojeh CK; Olaleye OD; Omilabu. SA
Department of Veterinary Microbiology and Parasitology, University of Maiduguri, Nigeria.
New Microbiol (ITALY) Apr 1995, 18 (2) p151-62, ISSN 1121-7138

Retrospective and prospective serological surveys to determine the prevalence of Wesslsbron (WSL) virus infections in animal populations were carried out in different vegetational zones in Nigeria. Sera from 1,492 animals comprising 292 camels, 81 horses, 4 donkeys, 320 cattle, 235 sheep, 260 goats, 114 pigs, 101 dogs and 85 domestic fowls were assayed by haemagglutination-inhibition (HI) test for presence of antibodies to WSL virus and other flavivirus antigens: Yellow Fever (YF), Potiskum. (POT), Banzi (BAN), Uganda S (UGS) and West Nile (WN) viruses. Four hundred and eighty one (32%) of the total sera tested were positive for the presence of flavivirus antibodies. The prevalence rates among animals varied with species and vegetational zones of the country. The highest prevalence was noted in animals from a swamp forest zone and was higher among camels, horses, donkeys and sheep when compared with goats, pigs and fowls in different zones. Although monotypic reactions with WSL virus antigen were observed in positive sera, the majority of the WSL virus positive sera cross-reacted with more than two other flavivirus antigens. Serological cross-reactions were most extensive in WSL virus positive horse sera. A ten month sentinel survey among 28 cattle, 68 sheep and 30 goats revealed considerable activity of WSL virus in Nigeria. Of these, 11 cattle and 12 sheep showed antibody conversion to WSL virus antigen. None of the goats seroconverted. Although, there are no records of outbreak of WSL disease in Nigeria, this study revealed that WSL virus is actively circulating among livestock populations in this environment. Flavivirus nucleotide data are needed for final determination of genetic relatedness in this group of viruses.

Yellow fever. Investigation of an epidemic in Imo State.
Wkly Epiderniol Rec (SWITZERLAND) Apr 14 1995, 70 (15) p 107-10, ISSN 0049-8114 Journal Code: AVX

Sustainable urban development and human health: septic tank as a major breeding habitat of mosquito vectors of human diseases in south-eastern Nigeria.
Nwoke BE; Nduka FO; Okereke OM; Ehighibe OC
Medical Entomology & Parasitology Unit, School of Biological Sciences, Abia (former Imo) State University, Okigwe, Nigeria.
Appl Parasitol (GERMANY) Feb 1993, 34 (1) pl-10, ISSN 0943-0938

Septic tank mosquitoes in Abia State University Okigwe, south-eastem Nigeria were studied using exit traps between November 1988 and April 1989. The results were revealing and striking. Apart from the common septic tank mosquitoes, Culex p. quinquefasciatus, Cu. cinereus and Aedes aegypti, which have been previously commonly found breeding in ammonia and nitrate-rich waters of latrines and septic tanks, the other species, Cu. horridus, Cu. tigripes and Aedes vittatus, have not been commonly reported as colonizing septic tanks in Nigeria. Three out of these six mosquito species observed are vectors of human diseases: Aedes aegypti and Aedes vittatus are vectors of Yellow fever and Cu. p. quinquefasciatus is a potential vector of Bancroftian filariasis and a world-wide vector of various arboviruses. The fact that these mosquito vectors are able to breed in highly polluted waters of septic tanks during the harsh dry months when most surface water bodies are dry is epidemiologically important. The breeding of these mosquito vectors of human

diseases around human dwellings indicates an intense man-vector contact creating a high level risk to the crowded urban population. The public health implications of this urbanization/modernization problem and solutions are discussed.

First record of breeding populations of Aedes albopictus in continental Africa: implications for arboviral transmission.
Savage HM; Ezike VI; Nwankwo AC; Spiegel R; Miller BR
Division of Vector-Borne Infectious Diseases, Centers for Disease Control, Ft. Collins, CO 80522.
J Am Mosq Control Assoc (UNITED STATES) Mar 1992, 8 (1) p101-3, ISSN

Eggs of Aedes albopictus were collected in oviposition cups from 3 forested areas of Delta State in south-central Nigeria during September 1991 as part of a post-yellow fever outbreak investigation. These eggs were shipped to the Centers for Disease Control in Colorado, where they were reared to the adult stage and identified. This is the first record of breeding populations of Ae. albopictus in continental Africa. Other taxa. reared from the same oviposition cups included Ae. aegypti, Ae. apicoargenteus, Ae. africanus, Ae. lilii and Ae. simpsoni subgroup. The introduction and establishment of Ae. albopictus in Africa may have important implications for transmission of indigenous arboviruses.

Genetic selection of a flavivirus-refractory strain of the yellow fever mosquito Aedes aegypti.
Miller BR; Mitchell CJ
Medical Entomology-Ecology Branch, Centers for Disease Control, Fort Collins, Colorado.
Am J Trop Med Hyg (UNITED STATES) Oct 1991, 45 (4) p399-407, ISSN

Two inbred (isofemale) Aedes aegypti mosquito lines were derived that manifested a resistant or susceptible phenotype following ingestion of yellow fever virus; lack of virus movement from the midgut defined the resistant phenotype. Other flaviviruses,'including dengue 1-4, Uganda S, and Zika, viruses behaved in a similar fashion in the two mosquito lines. Crosses between the two lines produced progeny that were of intermediate susceptibility, indicating codominance; F2 backcrosses to the parents yielded results consistent with a major controlling genetic locus and provide evidence of a second locus, capable of modulating the phenotype of the major gene. The rapid selection necessary to fix the susceptible and refractory phenotypes support the hypothesis of a single major controlling locus. Viral movement across the midgut is likely to be governed by a single major gene and modifying minor genes or a group of closely linked genes. These inbred mosquito lines will be useful in discovering the molecular basis for flavivirus resistance in Ae. aegypti.

Aedes albopictus introduction into continental Africa, 1991.
MMWR Morb Mortal Wkly Rep (UNITED STATES) Dec 6 1991, 40 (48) p836-8,

From April 15 through July 20, 199 1, an epidemic of yellow fever (YF) occurred in Delta State, Nigeria. In September 199 1, as part of a follow-up investigation, mosquito oviposition cups were deployed in four rural communities with YF, all within a 24-kilometer radius of the principal town of Agbor. Based on findings from the follow-up investigation, this report documents the first record of breeding populations of Ae. albopictus--a competent YF virus vector--in continental Africa.

[The epidemiology of yellow fever in Western Africa]
L'epidemiologie de la fievre jaune en Afrique de l'Ouest.
Cordellier R
Institut francais de Recherche scientifique pour le Developpernent en Cooperation (ORSTOM), Bouake, Cote d'Ivoire.
Bull World Health Organ (SWITZERLAND) 1991, 69 (1) p73-84, ISSN

Observations made during the epidemics in Cote d'Ivoire (1982), Burkina Faso (1983), Nigeria (1986 and 1987) and Mali (1987), together with studies conducted in the last 10 years, particularly in Cote d'Ivoire, now make it possible, without calling into question the dynamics of yellow fever virus circulation in space and time, to redefine some features of the pattern suggested in 1977 and refined on a number of occasions up to 1983. The endemicity area is still the region of epizootic and enzootic sylvatic circulation, and contains the natural focus and the endemic emergence zone. --The natural focus is no longer confined to the forest alone, now that transovarial transmission has been demonstrated. --The endemic emergence zone is tending to become conterminous with the endemicity area on account of increasing deforestation. Emergence in forest regions, due to Aedes africanus, is still few and isolated, unlike that observed in savanna regions where A. furcifer is the major vector. The different behaviour of these two vectors and their population dynamics determine the quality of the man-vector contact and are responsible for these two patterns of emergence. --The emergence front limits the endemicity area in the north. Its position varies and depends on annual rainfall patterns. The epidernicity area, where the virus does not circulate before an epidemic and where the immunity status of unvaccinated populations is low, is geographically heterogeneous. It consists of regions to the north of the emergence front and of towns anywhere. It is characterized by high potentials for the development of A. aegypti populations. Only man can introduce the virus into this area. Three types of epidemic are distinguished, depending on the vectors: --Urban epidemics resulting from transmission by a domestic vector. These epidemics always occur within the epidernicity area, either in dry savanna (rural subtype) or in towns (urban subtype). The virus is introduced into the ecosystem by man. Transmission is always strictly interhuman. --Intermediate epidemics consist of two successive phases: first of all there is a series of endemic emergences, followed by interhuman transmission involving A. aegypti. These epidemics can only occur in the endemicity area. --Sylvatic epidemics occur in villages, but only involve the sylvatic vectors. They result from a conjunction of a very large number of emergences for which A. furcifer is almost always mainly responsible, and occur in the endemicity area, usually close to the emergence front. Transmission is never strictly interhuman, as the same vector populations are responsible for epizootic and epidemic transmission.(ABSTRACT TRUNCATED AT 400 WORDS)

West Nile Complement Fixing antibodies in Nigerian domestic animals and humans.
Omilabu SA; Olaleye OD; Aina Y; Fagbami AH
Department of Virology, College of Medicine, University of Ibadan, Nigeria.
J Hyg Epidemiol Microbiol Immunol (CZECHOSLOVAKIA) 1990, 34 (4)

A survey for West Nile Complement Fixing (CF) antibody was carried out in humans and domestic animals in Nigeria. Human sera were obtained from two communities namely Ibadan and Ogbomoso but animal sera were collected from Ibadan and Maiduguri. The overall CF antibody to West Nile virus in the two localities surveyed was 65%. Of 170 persons tested, 53% and 75% were positive in Ibadan and Ogbomoso respectively. Antibody prevalence increased with age in both communities. Tests for antibody against other flaviviruses revealed that monotypic

complement fixation reactions were found frequently in young people, but broadly reacting sera were common among the older age groups. Sex distribution of West Nile CF antibody showed that 49/82 (60%) of females and 62/88 (75%) of males had West Nile CF antibody. Tests on animal sera showed that 3 3 % contained CF antibody to West Nile virus. Prevalence of CF antibody in different animal species was 62% in camels, 4% in cattle and 0% in goats.

Seroepidemiological survey for yellow fever antibodies in domestic animals.
Adu F; Esan J; Baba SS
Department of Virology, College of Medicine, University College Hospital, Ibadan, Nigeria.
Rev Rouin Virol (ROMANIA) Jul-Dec 1990, 41 (3-4) p147-50, ISSN

A total of 192 out of 300 serum samples from camel, cattle, sheep and goats tested for yellow fever virus antibody by the counterimmunoelectrophoresis were found positive. This test was confirmed by the single radial haemolysis and serum neutralization tests. Twenty-one and 36 sera were positive for specific yellow fever virus antibodies by the single radial haemolysis and serum neutralization tests respectively. The possible role of these animals in the epidemiology of yellow fever is discussed.

[Yellow fever in Western Africa, 1973-1987. Observed facts--studies realized, campaign, prevention and forecast]
La fievre jaune en Afrique occidentale, 1973-1987. Faits observes--etudes realisees, lutte, prevention et prevision.
Cordellier R
Institut francais de recherche scientifique pour le developpement en cooperation (ORSTOM), Bouake, Cote d'lvoire.
World Health Stat Q (SWITZERLAND) 1990, 43 (2) p52-67, ISSN 0379-8070

This global analysis of the situation is based on a review of notifications, observations and studies concerning yellow fever in 16 of 17 countries of the West African subregion (Algeria is not affected for the years 1973-1987). In view of this analysis and the epidemiological picture, the author proposes a plan of concerted action to confine yellow fever to its monkey-to-monkey cycle in the wild. Official notifications vary greatly from one country to the next. Any of five major causes could explain this: ecological and ethological conditions that favour circulation of the virus in the wild and man-to-man transmission to different extents; the immune status of the populations; the difficulty of diagnosing especially isolated cases; lack of means for investigation; and negligence. The quantity and gravity of human cases are systematically underestimated, sometimes to a great extent. Lack of resources and difficulty of diagnosis, but also in many instances the attitude of the population, can account for this. Modem means of investigation, faster intervention by specialists, and better knowledge of how the virus is transmitted, have shown recently an increasing gap between notifications and the actual situation. Research and monitoring programmes are particularly important. The programmes under way in Senegal and Cote d'Ivoire have already resulted in considerable improvement in the action against epidemics. Because of these programmes, our knowledge of the very complex pattern of viral circulation is improving, thereby helping us develop systems for prevention and enabling us to forecast epidemics. Priority areas for study and research are: (i) Basic programmes for detailed study of all the topotypes of the virus, and identification of the viral amplification cycles that recur over several years. Such studies are under way in Senegal and Cote dIvoire. They would be particularly useful in Ghana and in Nigeria, where the taxonomy and bioecology of A. africanus s.l. should also

be studied. (ii) Surveys of sylvatic vectors should show, for the endemic zones of each country, the type of contact between sylvatic vectors and man in both rural and wild biotopes. (iii) A complete map of the Stegomyia foci with an assessment of their potential epidemic risk (an analysis of the productivity of the sites depending on their type). (iv) Assessment of the immune status of the populations of the various ecosystems of each country, taking account of past or present vaccination strategies. There are several prevention strategies to choose from. The author advocates preparation of a scientifically based, subregional plan for optimum cost effectiveness.(ABSTRACT TRUNCATED AT 400 WORDS)

A survey for haemagglutination-inhibiting antibody to West Nile virus in human and animal sera in Nigeria.
Olaleye OD; Omilabu SA; Ilomechina EN; Fagbami AH
Department of Virology, College of Medicine, University of Ibadan, Nigeria.
Comp Immunol Microbiol Infect Dis (ENGLAND) 1990, 13 (1) p35-9, ISSN

A survey for West Nile Virus (WNV) haemagglutination-inhibition (HI) antibody was carried out in humans and domestic animals. Human sera were collected from lbadan, while the animal sera were collected from both Ibadan and Maiduguri. Out of 304 human sera tested, 123 were positive (40%). There was a higher prevalence of HI antibody in adults than children. Sex distribution of positive sera showed that 37% of males and 43% of females had WNV I-H antibody. There was no significant difference in the prevalence of HI antibody in both sexes. On the 123 WNV HI positive sera tested, 104 (85%) and 78 (75%) had yellow fever and Potiskum HI antibody respectively. Monotypic WNV virus reactions were frequently found in children while polytypic reactions were frequently found in adults. A total of 200 animal sera were examined, 50 camels, 50 goats, 49 cattle and 51 sheep. The highest prevalence of HI antibody was found in camels (26%), followed by sheep (20%). Percentage of positive sera in other species were: goat (18%) and cattle (6%). Of the 3 5 WNV HI positive animal sera, 26 and 20% reacted with Yellow fever and Potiskum virus antigens respectively.

Epidemic yellow fever caused by an incompetent mosquito vector.
Miller BR; Monath TP; Tabachnick WJ; Ezike VI
Division of Vector-Borne Viral Diseases, Centers for Disease Control, U.S. Department of Health and Human Services, Fort Collins, Colorado. Trop Med Parasitol (GERMANY, WEST) Dec 1989, 40 (4) p396-9, ISSN

Arbovirus epidemics in a geographic region are believed to depend on the presence of susceptible or “competent” arthropod vectors. We demonstrate that an urban, Aedes aegypti-borne, epidemic of yellow fever occurred in 1987 although the mosquito vector was relatively resistant to infection and transmitted the virus inefficiently. Twenty-six percent of the experimental mosquitoes from the epidemic area that ingested yellow fever virus became infected and only 7% of these transmitted the virus. In contrast, 80% of an exotic susceptible strain of Ae. aegypti became infected and 43% were able to transmit. We also show that no other potential vectors were active during the epidemic and that the local Ae. aegypti were present in extremely large numbers. These results document, for the first time, that, in the presence of high population density an incompetent mosquito vector can initiate and maintain virus transmission resulting in an epidemic.

Urban yellow fever epidemic in western Nigeria, 1987.
Nasidi A; Monath TP; DeCock K; Tomori O; Cordellier R; Olaleye OD; Harry TO; Adeniyi JA; Sorungbe AO; Ajose-Coker AO; et al
Federal Vaccine Production Laboratories, Yaba, Nigeria.
Trans R Soc Trop Med Hyg (ENGLAND) May-Jun 1989, 83 (3) p401-6, ISSN

A large epidemic of urban yellow fever occurred in April and May 1987 in Oyo State, western Nigeria. The principal vector was Aedes aegypti, breeding in domestic water containers. The 1987 outbreak followed an epidemic of sylvatic yellow f6ver in eastern Nigeria the previous year, and probably resulted from introduction of the virus by viraemic travellers. The outbreak in Oyo State ended in early July, by which time 805 cases and 416 deaths had been officially notified. However, surveys of 3 villages in the epicentre, a region with over 4 million inhabitants, indicated an infection rate of approximately 20%, a clinical attack rate of 2.9% and a mortality rate of 0.6%, suggesting that the true incidence of cases and deaths far exceeded the official reports. Yellow fever virus was isolated from persons with fully developed yellow fever as well as mild febrile illness. One virus isolate was made from blood of an individual with mild illness, who had received 17D vaccine 5 d earlier; monoclonal antibody analysis showed that the isolate was a wild-type virus. Larval indices of Ae. aegypti were very high; however, low vector competence of the Ae aegypti population may have provided a constraint on spread of the epidemic. In late 1987 a third epidemic appeared in Niger State, northern Nigeria, with 644 reported cases and 149 deaths. The vector(s) involved is (are) unknown.

Epidemic yellow fever in eastern Nigeria, 1986.
De Cock KM; Monath TP; Nasidi A; Tukei PM; Enriquez J; Lichfield P; Craven RB; Fabiyi A; Okafor BC; Ravaonjanahary C; et al
Division of Viral Diseases, Centers for Disease Control, Atlanta, Georgia.
Lancet (ENGLAND) Mar 19 1988, 1 (8586) p630-3, ISSN 0140-6736

An epidemic of yellow fever occurred in the eastern part of Nigeria during the second half of 1986. Oju, in Benue State, was the most heavily affected region, but yellow fever also occurred in surrounding areas, particularly Ogoja, in Cross River State. In Oju, the mean attack and mortality rates were 4.9% and 2.8%, respectively. Sex and age specific rates were highest in males and in the 20-29 yr age group. The overall case fatality rate was approximately 50%. Diagnosis was confirmed by IgM capture enzyme-linked immunosorbent assay (ELISA) and complement fixation (CF) tests. Entomological investigations implicated Aedes africanus; as the epidemic vector. Oju alone probably had about 9800 cases of yellow fever with jaundice, and some 5600 deaths. Outbreaks of this nature could be prevented by inclusion of yellow fever in the Expanded Programme on Immunisation, in areas subject to recurrent epidemics.

Part II

Implementation and Findings of the Rapid Assessment of Urban Malaria in Three Communities in Lagos, Nigeria

May 1998

by

Haruna Rahid Sesay

CONTENTS

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This report is the product of the collaboration of three technical teams: i) Cartographic team of Dr. Adesina; ii) Social/Anthropology and Community mobilization team of Dr. Brieger and Dr. Ogunlade; and iii) the Parasitology, Entomology and Epidemiology team of the external Consultant and Dr. Mosanya.

The laboratory parasitological investigations were done by Messrs. Chiedu, Aro, and Dada. The entomological investigations were done by Messrs. Ordu, Omiogiafu, and Abduraman. The diagnosis of fever, anemia, and acute respiratory infections were done by nurses from the health facilities of the three target Community Partners for Health.

The assessment core group/task force consisted of Sam, Dr. Adesina, Dr. Williams, Dr. Brieger, Dr. Mosanya and the external consultant, Dr. Sesay.

ACRONYMS

ARD	Adult Room Density
BASICS	Basic Support For Institutionalizing Child Survival
CBO	Community Based Organizations
CPH	Community Partners for Health
EHP	Environmental Health Project
FGD	Focus Group Discussion
LD	Larval Density
TPM	Team Planning Meeting
USAID	United States Agency for International development
WHO	World Health Organization

EXECUTIVE SUMMARY

In 1996, three target Community Partners for Heath (CPH), consisting of Lagos Island, Ajegunle, and Lawanson, committed themselves to the control of malaria which they perceived as a major cause of death and sickness among their children. The community-based organizations (CBOs) were educated to: i) embark upon environmental sanitation including the proper clearing and oiling of stagnant drains; ii) clearing grass overgrowth; iii) clearing of refuse and collaborating with appropriate Local Authorities on refuse disposal and area fumigation activities; and iv) educating mothers on the regular changing of water in storage containers or keeping them covered, and on the need to cover refuse bins. The communities were further educated on the use of insecticide aerosols one hour before bedtime. Households were encouraged to carry out home case management of fevers and to seek early medical care outside the home.

Between March and May 1998, a rapid assessment was conducted in the three communities in Lagos. The assessment was preceded by a January-February 1998 visit by the EHPActivity Manager to Lagos. During that visit, the design of the assessment was conceptualized, such that a sampling frame was identified, personnel needs and levels of effort identified, equipment needs were determined, and the overall timeframe for the assessment was set. It became apparent that an external consultant was needed to serve as Field Manager to coordinate the three technical teams which were identified for the rapid assessment.

Prior to the departure of the external consultant for Lagos, he attended a debriefing meeting, at BASICS/Arlington, during which the Activity Manager reported on his mission to Lagos. That meeting was followed by a team planning meeting (TPM) facilitated by the Environmental Health Project (EHP) in partnership with BASICS. An update of the activitiy was presented, objectives were defined, a scope of work was developed, and the expectations of BASICS, EHP, and the consultant were defined. An activity plan was developed, together with the end products/deliverables, to guide the program.

In Lagos, assessment data collection was preceded by a TPM which was attended by the of technical teams previously put in place by the Activity Manager. The TPM was followed by a participatory start-up workshop which was attended by the three technical teams and by representatives of the Lagos urban CPHs. At the workshop, the activity plan was reviewed and agreement was reached on the final version. The work plan defined roles and responsibilities during the assessment. The closing ceremonies of the workshop was given by the Program/Project Support officer of USAID/Nigeria. After the workshop laid the foundation for community participation in the assessment. At the end of the workshop, community representatives sensitized their members on the objectives and scope of work of the assessment as well as on expected community input.

A six-person core group was set up to serve as the task force for the assessment. The team met regularly to review, identify, and also address any needs for adjustment to the program plan. The team membership included three senior staff from BASICS/Nigeria, leaders of the assessment teams, and the external consultant.

The original assessment design, formulated by the Activity Manager, was finalized such that it could be carried out within the framework of the integrated health sector project of the Lagos CPHs. Data were collected by specialized teams that had been trained to become functionally integrated. Community participation was ensured, at all levels and at all times.

There were three technical teams:

- The cartographic team mapped information on water bodies, location of health facilities, and roads, including the mapping of epidemiological information from the parasitology, entomology, and epidemiology group.
- The social/anthropological team provided information about local perceptions and beliefs that can form the basis of community, particularly the CPHs efforts at designing and implementing culturally and environmentally appropriate health education and community action programs.
- The parasitology, entomology and epidemiology team collected data on the prevalence of fever, malaria parasites, anemia, acute respiratory tract infections and history of measles in participating children. The team also acquired data on the densities of adult mosquitoes in homes and larva in the breeding sites.

The study population consisted of all children who presented at the examination sites on the days of the assessment. The children were registered by the community mobilization personnel, recording the name, age, sex, address, travel history, and history of the use of antimalarial drugs or herbal infusions during the two weeks preceding the study. Each child was issued an identity card, bearing the assigned individual registration serial number and the registration information. The child was then directed for clinical diagnosis and the collection of blood films. Every effort was made to accommodate all the children who presented at the assessment sites.

Each child was diagnosed for the presence of fever, anemia and acute respiratory infections (ARI). The diagnosis was based on: body temperature above 37.5° C. for fever; pallor of conjunctiva, tongue, and palm for anemia; and cough, runny nose and chest in-drawing for acute respiratory tract infections. Information on the history of measles was provided by the child's mother or the relation accompanying the child.

The clinical diagnosis was done by State Registered Nurses who were also State Certified Midwives, and had experience in community pediatrics. They were identified by the community and their competence was verified by an experienced physician.

The blood films were collected, on microscope slides, by the same nurses who did the clinical diagnosis of fever, anemia and acute respiratory infections. The nurses had been trained to collect the blood, from each child, and prepare the films on the spot. The slides were transported to the central laboratory for parasite identification by the Laboratory Technologists.

For a rapid assessment exercise, in which information was required also on clinical presentations which could be satisfactorily identified by a competent nurse, it was adjudged realistic to integrate blood film collection into the tasks of the nurse within the framework of integrated health care intervention and in pursuit of the integrated diagnosis, treatment and clinical management of a child presenting at a health facility. The preparation of the blood films by the nurses freed up time for the laboratory personnel to concentrate on the staining and examination of the blood films, tasks which are both tedious and time consuming.

The Roland Hospital Laboratory of the Lagos Island CPHs was selected as the center for the processing and examination of all parasitological and entomological specimens collected during the assessment. Microscope slides, reagents, and glass wave were provided by BASICS for the assessment.

Three entomological assessment methods were used: a) mosquito larva collection and species identification; b) adult mosquito room density determination; and c) adult mosquito-man contact determination.

A total of 74 rooms were investigated for adult mosquito density determination. *Culex quinquefasciatus* was the most abundant and most ubiquitous. *Anopheles gambiae* complex did not occur. *Aedes aegypti* occurred in Lagos Island.

A total of 62 man hours of night landing adult mosquito collections/catches were done. *Culex quinquefasciatus* was the most abundant species and it occurred in all sampling sites. No *Anopheles gambiae* was found. *Aedes aegypti* occurred in Ajegunle; it was not caught in Lagos Island or in Lawanson.

Some 45 larval breeding sites were sampled for mosquitoes. *Culex quinquefasciatus* was found at all sites. *Anopheles gambiae* complex density was found in Lagos Island and in Ajegunle; it was not found in Lawanson. *Aedes aegypti* was found in Lagos Island but not in Ajegunle or Lawanson.

In the three target communities, up to 97%(180/186) of those reporting malaria/fever had sought treatment: 11.1% (21/186) took herbs, 1.1% (2/186) went to herbalists, 35.6% (66/186) bought drugs from shops, 22.2% (41/186) attended private clinics, and 28.9% (54/186) went to government clinics. The most expensive, based on mean cost of treatment for all illnesses, including malaria, is the private clinic, followed by government clinics. The chemist/drug shop is the least expensive.

Recommendations are made at the end of the report for social marketing of bednets, reduction of human contact with mosquitoes, the management of febrile illness and concurrent infections, and capacity-building and community awareness. Additionally, and most importantly, it was noted that the high use of antimalarial drugs is unwarranted and that the anti-mosquito measures used, while useful in reducing nuisance biting mosquitoes, are not serving necessarily as a malaria control measure. Recommended next steps include a rapid assessment of the malaria and mosquito situation in the three target CPHs at the end of the rainy season; finalization of the action plan and work plan; and baseline data collection for new areas earmarked for BASICS's support.

1 BACKGROUND

1.1 USAID/BASICS and the Lagos Community Partners for Health

The Basic Support for Institutionalizing Child Survival (BASICS) Project is a five-year, USAID-funded program that provides technical leadership for the development of practical field programs for the reduction of infant and child morbidity and mortality worldwide. BASICS/Nigeria provides technical assistance to the Lagos urban Community Partners for Health within the framework of this global mandate.

In recent years, Nigeria has experiences political upheaval and changes in governance which have resulted in a decline in public services, worsening economic conditions, increasing rural-urban migration and concomitant increases in urban poverty. The United States Government interrupted direct support for the ruling military regime in Nigeria. The need was therefore recognized for a strategic plan for the United States Agency for International Development (USAID) to focus its child survival development efforts in Nigeria on the private sector. USAID therefore specifically mandated BASICS to collaborate with the private sector to develop a model for the strengthening of the quality, outreach, and management of private non-governmental health services, while at the same time fostering increased community demand for those quality health services.

The BASICS Project seeks to develop strategies for the mobilization of the private, for-profit health care sector, as well as the commercial sector, for participation in community health care activities. The project is expected to improve access to health care, improve service and quality utilization, in pursuit of sustainable health care for the under-served segment of the community. The project is designed as an innovative, community-based partnership model for strengthening the quality, outreach, and management of private non-governmental organizations (NGOs), and the promotion of community participation in, and ownership of, local health care program planning, implementation, evaluation and monitoring. Such partnerships could address the deficiencies of declining public health services in urban local government areas.

1.2 Community Partnerships for Health

As part of this effort, BASICS promoted the development of the Lagos Urban Community Partnerships for Health (CPHs). These partnerships were designed and developed with a view of improving child health through a cost-effective and results-oriented community health initiative.

1.3 The problem of malaria and commitment to its control

In 1996, the three target CPHs of Lagos Island, Ajegunle and Lawanson perceived malaria as a major community health problem; being a cause of sickness and death among children. They set the objective of preventing children from dying of malaria and identified intervention activities for health facilities and community-based organizations. The Malaria Control Initiative in the three areas was thus undertaken.

Activities at the health-facility level included:

i) appropriate diagnosis and treatment;
ii) home case management, including the use of cold bath and paracetamol to control temperature, before bringing children to health facilities;
iii) prompt referral to higher health care facilities including General or Teaching hospitals;
iv) health education of the CBOs on the prevention of malaria.

The community-based organizations were educated to:

i) embark upon environmental sanitation including the proper clearing and oiling of stagnant drains;
ii) clear grass overgrowth;
iii) clear the refuse and collaborate with appropriate local authorities on refuse disposal and area fumigation activities;
iv) educate mothers on the regular changing of water in storage containers or keeping them covered, and on the need to cover refuse bins; and
v) teach communities to use mosquito nets, and to use insecticide aerosols one hour before bed time.
vi) carry out home case management and seek early medical care outside the home.

2 THE MALARIA RAPID ASSESSMENT

2.1 Planning

Between March and May 1998, a rapid assessment of the Lagos Urban Community Partnerships' Malaria Control Initiative was undertaken. The assessment was preceded by a February 1998 mission to Lagos by the Activity Manager. During that trip, design of the assessment was conceptualized, such that a sampling frame was identified, personnel needs and levels of effort were identified, the equipment needs were determined, and the overall time frame for the assessment was determined. It became evident that an external consultant was needed to serve as Field Manager to coordinate with the three technical teams identified for the assessment.

Prior to his departure for Lagos, the external consultant attended a debriefing meeting at BASICS/Arlington, during which the Activity Manager reported on his trip to Lagos. That meeting was followed by a project Team Planning Meeting (TPM) facilitated by the Environmental Health Project/Arlington(EHP) in partnership with BASICS/Arlington. An update of the project was presented, objectives were defined, a scope of work was developed, and the expectations of the mission from the stand points of BASICS, EHP, and the consultant were defined. An activity plan was developed, together with the end products/deliverables, to guide the mission. Literature was made available by both BASICS and EHP.

In Lagos, assessment data collection was preceded by a TPM which was attended by the membership of technical teams previously put in place by the Activity Manager. The TPM was followed by a participatory start-up workshop which was attended by the assessment technical teams and by representatives of the Lagos urban CPH. At the workshop, the original activity plan was reviewed and agreement was reached on a final version. The plan defined roles and responsibilities during the assessment. The closing courtesies at the workshop were given by Program/Project Support officer and USAID/Nigeria Country Advisor for USAID/Lagos. The workshop laid the foundation for community participation in the assessment which was essentially designed based on: the examination of children and interview of their parents, community focus group discussions, collection of information on community access to antimalarial drugs and mosquito control materials, night time collection of adult mosquitoes from homes, and of mosquito larvae from their milieu. At the end of the workshop, community representatives sensitized their memberships on the objectives and scope of work of the assessment as well as on expected community input.

A six-person core group was set up to serve as the task force for the malaria rapid assessment. The team met regularly to review, identify, and address any needs for adjustment to the program plan. The team membership included three senior staff from BASICS/Nigeria, leaders of the assessment teams, and the external consultant.

2.2 Overall purpose

The overall purpose of this activity was to determine the prevalence, distribution, and associated socio-behavioral and environmental factors related to malaria transmission, and the use of information to develop an appropriate community based malaria control plan within the context of the child health improvement program objectives of BASICS.

2.3 Overall goal

The overall goal of this activity was to determine the level of malaria parasite infection, including fever and associated clinical conditions, transmission, and the factors influencing their distribution in the three target CPH areas.

2.4 Objectives of the Activity

i) coordinate with three local teams to finalize the design of the malaria rapid assessment;
ii) collect demographic, anthropological, and parasitemia prevalence data;
iii) conduct a preliminary analysis of the data;
iv) present results of the assessment to CPHs; and
v) develop a Malaria Action Plan and associated work plan for the activity.

3 MATERIALS AND METHODS

3.1 Study design

The rapid assessment was designed such that it could be carried out within the framework of the integrated health sector project of the Lagos CPHs. Data were collected by specialized teams that had been trained to become functionally integrated. Community participation was ensured, at all levels and at all times, with the view to promote community ownership of the overall integrated child survival project.

3.2 Study population sampling frame

The following three target CPHs provided the sampling frame:

1) Lagos Island representing the water front area,
2) Lawanson representing the inland swamp area (in this assessment, Lawanson is synonymous with Surulere), and
3) Ajegunle representing the dry land area.

3.3 Study population

The study population consisted of all children who presented at the examination sites on the day of the assessment. Every effort was made to accommodate all of them.

3.4 The Technical Teams

There were three technical teams:

1) The cartographic team mapped information on water bodies, location of health facilities, and roads, including the mapping of epidemiological information from the parasitology, entomology, and epidemiology group.
2) The social/anthropological team provided information about local perceptions and beliefs that can form the basis of community particularly the CPHs efforts at designing and implementing culturally and environmentally appropriate health education and community action.
3) The parasitology, entomology and epidemiology team collected data on the prevalence of fever, malaria parasites, anemia, acute respiratory tract infections and history of measles in participating children; and also on the densities of adult mosquitoes in homes and in the breeding sites.

3.5 Data Collection

3.5.1 Community mobilization

Data collection was preceded by community mobilization by CPH members who also collaborated with the technical team groups.

3.5.2 Clinical and parasitological

a) Contact with participating children: The children were examined by the three target CPH health facilities used for the study. There were four sites in Lagos Island, four in Ajegunle and five in Lawanson.
b) Registration of participating children: The children were registered by the community mobilization personnel, who recorded the name, age, sex, address, recent travel history, and recent history of the use of antimalarial drug or herbal infusions during the two weeks preceding the study. Information was also collected on the history of measles. Each child was issued an identity card, bearing the assigned individual registration serial number and the registration information. The child was then directed to the nurses for clinical diagnosis and the collection of blood films. Every effort was made to accommodate all the children who presented at the assessment sites.
c) Clinical diagnosis: Each child was diagnosed for fever, anemia and acute respiratory infections (ARI). The diagnosis was based on: body temperature above 37.5° C. for fever; pallor of conjunctiva, tongue, and palm for anemia; and catarrh, runny nose and chest in-drawing for acute respiratory tract infections. Information on the history of measles was provided by the child's mother or the relation accompanying the child.

   The diagnoses were done by State Registered Nurses who were also State Certified Midwives, and had experience in community pediatrics. They were identified by the community and their competence was verified by an experienced physician.
d) Blood film preparation and malaria parasite diagnosis: The ventral part of the last segment of the middle finger of the left hand of the child was cleaned with cotton wool moistened in methylated spirit, and allowed to air dry. The segment was then gently palpated and smartly pricked in the center with a new sterile lancet. The first drop of blood was wiped off with dry surgical cotton wool. The next drop of blood was then touched smartly with a clean microscope slide to transfer the blood to two strategic spots on the slide. One of the blood spots was filmed thick and the other was spread out to form a thin film, so that both thin and thick films could be prepared on the same slide. Each slide was labeled using a fine pointed glass marker, with the serial number originally assigned to the child at registration. The films were allowed to air dry in slide racks which were packed in the box and transported to the central laboratory at the end of each day.

   The blood films were collected by the same nurses who did the clinical diagnosis of fever, anemia and acute respiratory infections, and also recorded the history of measles. The nurses had been trained to collect the blood from each child and prepare the films on the spot.
e) Laboratory diagnosis for malaria parasites: In the laboratory, the films were fixed in 70% ethanol, stained with phosphate buffered Giemsa, allowed to air dry, and then examined, under the high power magnification (X100) of a compound microscope for malaria parasite species identification. The serial number on each slide was transferred to the laboratory data sheet to ensure the consistent flow of the number previously assigned to each participating child.

For a rapid assessment exercise, in which information is required on clinical presentations which could be satisfactorily identified by a competent nurse, it was adjudged realistic to integrate blood film collection into the task of the nurse within the framework of integrated health care intervention, and in pursuit of the integrated diagnosis, treatment and clinical management of a child presenting at a health facility. Thus the preparation of the blood films by the nurses freed up time for the laboratory personnel to concentrate on the staining and examination of the blood films which by themselves are both tedious and time consuming.

f) Laboratory facilities: The Roland Hospital Laboratory, a member of the Lagos Island CPHs, was selected as the center for the processing and examination of all parasitological and entomological specimens collected during the assessment. Microscopic slides, reagents and glass wave were provided by BASICS for the assessment.
g) Exit Interview of parents of participating children: The parent of each participating child was interviewed on the child's use of antimalarial medication, including the use of herbal infusions and travel, as well as sleeping under mosquito bed nets during the week preceding the study.

3.5.3 Entomology

Three methods were used:

a) mosquito larva collection and species identification;
b) adult mosquito room density determination; and
c) adult mosquito-man contact determination.

a) Mosquito larval density: The surfaces of randomly selected stagnant bodies of water were scooped to collect mosquito larvae which were transferred to plastic cups and transported to the central laboratory where they were identified by species, had their numbers recorded and their average densities computed. The ecological conditions of the collection sites were also recorded.
b) Adult mosquito room density: This was determined in the mornings in rooms which were randomly selected in randomly selected houses in each of the three target communities. In each of the rooms, food items were temporarily removed, covered, or kept in the refrigerator where one existed. Drinking water, in pots or buckets was either temporarily removed or covered. The windows were closed and the floors, beds and all furniture items were covered with white cotton bed sheets. The room was briskly sprayed with locally procured, synthetic pyrethroid based insecticide aerosol from tins. The door was then quickly closed for up to ten minutes to allow the insecticide to knock down mosquitoes. The room was then opened and the sheets were gently folded, by bringing the ends together, and removed from the room. The sheets were examined and mosquitoes were sucked into aspirators and transferred to plastic cups which had been serially numbered. The mosquitoes were transported to the central laboratory where they were identified by species and sex. They were counted, and the average room densities computed.
c) Adult mosquito-human contact: This was determined indoors and also outdoors by two team members working in pairs, collecting mosquitoes that land on the exposed parts of their legs before the mosquitoes bite to take a blood meal. The mosquitoes were transferred to numbered paper cups which were transported to the laboratory where the mosquitoes were identified, counted, and their hourly landing densities computed.

3.5.4 Social/anthropology and community mobilization

It was the purpose of the socio-anthropological team to provide information about local beliefs, perceptions and behaviors that can form the basis of community efforts at designing and implementing culturally and environmentally appropriate health education and communication about malaria. They provided information through Focus Group Discussions (FGDs), exit interviews and observational studies for each of the three target CPHs.

a) Focus Group Discussions: The FGDs were organized in each target community. Particular emphasis was on the recognition of malaria, ideas of causation, perceptions about mosquito breeding (including the recognition of mosquito larva), knowledge of preventive measures and treatment.
b) Observational Studies: These were conducted to determine the availability of vector control products for sale (the prices and positioning in the shops of nets and sprays). Community representatives played a role in data collection in order to assure acceptance of the interviewers in the community. Street maps with busy shopping/market intersections denoted were used to start off observations. Approximate sample size was 30-40 shops for each of three intersections in each CPH.

3.5.5 Mobility, disease perception, and health seeking behavior

Integrated into the clinical and parasitology investigations were exit interview questions to determine the travel history of children. All mothers or other relations accompanying children were asked to distinguish between the types of fevers they knew.

3.5.6 Survey of Chemist/Drug shops, stores, market stalls, kiosks

A survey of the potential outlets for antimalarial drugs and mosquito control materials was carried out to determine community access to the items.

3.5.7 Cartography and data digitization

Assessment data were transferred to digitized wall maps in pursuit of a geographic information system (GIS).

4 RESULTS

4.1 Demographic

A total of 916 children of both genders (see Table 1, Figures 1 and 2, Appendix B) were examined in the three target CPHs. The girls accounted for 45% (418/916) and the boys for 54.4% (498/916) (see Figures 1 and 2). The children were grouped into age intervals of five months for subsequent data analysis.

4.2 Clinical

The distribution of the 916 children by age and body temperature is presented for the three CPHs of Lagos Island in Table 2, for Ajegunle in Table 3, and for Lawanson in Table 4.

4.2.1 Fever

Fever defined for the study as body temperature above 37.5° C, occurred in 7.0% (64/916) of the children which represent overall prevalence. The CPH specific crude prevalence ranged 10.4 (31/299) in Lagos Island (Table 5 and Figure 3) to 5.4% (13/241) in Ajegunle, (Table 6 and Figure 4) and 6.4% (24/376) in Lawanson (Table 7 and Figure 5).

Prevalence, in Lagos Island, was maximal in the 12-23 months age group decreasing with increasing age through 4-59 months. In Ajegunle, prevalence was maximal in the 06-11 months age group or cohort decreasing with increasing age through the 48-59 months age group in all except in the 36-47 months group. In Lawanson prevalence was higher in the 06-11 months cohort than in all the others, decreasing with increasing age through 24-35 months. The second peak of prevalence occurred in the 36-47 months age group.

The prevalence of fever or malaria as the main complaint among illness episodes recalled during the two weeks preceding the study, is presented in Table 10 and Figure 7 for 289 respondents from Lagos Island, 239 from Ajegunle and 389 from Lawanson. Illness episodes had a higher prevalence in Ajegunle 37% (88/239), than in Lagos Island 54% (157/289) or in Lawanson 34.7% (135/389). The prevalence of fever as the main complaint ranged from 51% (45/88) in Ajegunle to 48% (76/157) in Lagos Island and 48% (65/135) in Lawanson.

4.2.2 Parasite Prevalence

The parasite prevalence is shown in Table 8 and Figure 6 for the three target Community Partnerships for Health. The crude prevalence was 0.9% (8/916) by microscopy but 1.4 (1/70), by immunodiagnosis using the Parasight-F Test®. *Plasmodium falciparum* was the only malaria parasite species found, being the only specifically diagnosed by the immunodiagnostic test. Prevalence by microscopic was 1.3% (4/229) in Lagos Island, 1.1% (4/376) in Lawanson. None of the tests were positive in Ajegunle. The Parasight-F Test® was positive only in Lawanson 0.3% (1/30).

More people recognized severe fever, which they presumed to be malaria, in Lawanson 21.6% (39/180) than in Ajegunle 11.1% (20/180), or in Lagos Island 6.6% (12/180). About 2.8% (5/180) of the respondents in Lagos Island attributed their fevers to typhoid, 2.2% (4/180) did so in Ajegunle and none in Lawanson.

4.2.3 Anemia

Table 8 shows the crude prevalence was 22.7% (207/916). Prevalence ranged from 38.8% (116/299) in Lagos Island to 15.2% (57/376) in Lawanson and 14.1 (34/241) in Ajegunle. In Lagos Island, (Figure 3) prevalence was maximal in the 12-23 months cohort, increasing with age from 24-35 months group through 48 -59 group months. In Ajegunle, (Figure 4) prevalence increased with increasing age from 12-23 months group. In Lawanson, (Figure 5) prevalence was maximal in the 36-47 months cohort followed respectively by the 48-59 months group and the 12-23 months group.

4.2.4 Acute respiratory tract infections (ARI)

Table 8 shows the crude prevalence acute respiratory tract infections to be 29.5% ranging from 32.2%, in Lawanson to 29.8% (89/299) in Lagos Island and 24.8% (60/241) in Ajegunle.

In Lagos Island (Table 5, Figure 3) there were two peaks, one in the 12-23 months age group and the other in the 48-59 months age group. It increased with the increasing age interval from 24-35 months through 48-59 months.

In Ajegunle, prevalence was maximal in the 12-23 months age followed respectively by 24-35 months age group and the 48-59 months age group (Table 6 and Figure 4). It was minimal in the 6-11 months group.

In Lawanson, a single peak occurred in the 12-23 months age group (Table 7 and Figure 5). Prevalence was less in the 6-11 months cohort than in the others, tending to increase with age from 24-35 months through 48-59 months.

4.2.5 Modern antimalarial

Up to 24% (220/916) of all the children had taken modern antimalarial drugs of some kind during the two weeks preceding the study. The proportion of children who took the drugs was higher in Lawanson [34% (128/376)], than in Ajegunle (72/241) or Lagos Island [7% (21/299)].

4.2.6 The Herbal infusion "Agbo"

The overall or crude prevalence of the use was 24% (220/916), being higher in Lagos Island [34% (102/299)] than in Ajegunle [20% (48/241)] or in Lawanson [19% (71/376)].

4.2.7 History of measles

Only 9% (27/299) of the children had history of measles in Lagos Island; 15.8% (38/241) in Ajegunle; and 22.1% (83/376) in Lawanson (Tables 5-7).

4.3 Mosquito density

4.3.1 Adult room

A total of 74 rooms were investigated for adult mosquito density determination (Table 9): 34% (25) of the rooms were in Lagos Island, 30% (22) in Ajegunle and 37% (27) in Lawanson. *Culex quinquefasciatus* was the most abundant and most ubiquitous, occurring at room densities of 4.6 in Lagos Island (Figure 8) 5.5 in Ajegunle, (Figure 9) and 9.4 in Lawanson (Figure 10). *Anopheles gambiae* complex did not occur. *Aedes aegypti* occurred in Lagos Island at a room density of 0.5.

4.3.2 Night landing density

A total of 62 person-hours of night landing adult mosquito collections/catches were done: 36% (22) in Lagos Island 32% (20) in Ajegunle, and 32% (20) in Lawanson. *Culex quinquefasciatus* was the most abundant species and it occurred in all sampling sites. Its density was 10.3 in Lagos Island, 3.3 in Ajegunle; and 1.8 in Lawanson. No *Anopheles gambiae* was found. *Aedes aegypti* occurred at a density of 0.5 in Lawanson and 3.0 in Ajegunle. It was not caught in Lawanson.

4.3.3 Larval density

Some 45 larval sites were sampled for mosquitoes: 49% (22) in Lagos Island; 27% (12) and 24% (22) in Lawanson. *Culex quinquefasciatus* was found at all sites; occurring at densities of 35.7 in Lagos Island, 3.3 in Ajegunle , and 10.4 in Lawanson. *Anopheles gambiae* complex density was 0.7 in Lagos Island and 0.2 in Ajegunle; it was not found in Lawanson. *Aedes aegypti* had a density of 0.9 in Lagos Island and none in Ajegunle or in Lawanson.

4.4 Outlets for antimalarial drugs and mosquito control products

4.4.1 Types of shop

A total of 347 shops were visited: 33.4% (116) were in Lagos Island, 32.3% (112) in Ajegunle, and 34.3% (119) in Surulere. Super markets (32.9%) and chemist shop (29.1%) accounted for the majority of the shops visited, with small kiosks accounting for an additional 26.2%; 10.7% of the remaining shops visited were stalls. Four shops were connected with petrol stations. The only product found in these stations were insecticides sprays. These shops are excluded from further analysis. Just over one-third (36.7%) of the remaining shops sold mosquito coils. Table 15 shows that coils were found most often in kiosks (80.2%) and least in chemist shops (6.9%). Few shops (6.4%) sold repellent lotion/creams; these were found primarily in chemist shops (15.8%). Excluding the petrol stations (Table 15) insecticide sprays were sold in 261 (76.1%) shops. Sprays were shops in the majority of each category of shops except for the kiosks (only 47.3%). *Also available in a several shops was a locally produced product called* Ota-pia-pia, which was a concentrated liquid insecticide sold in small bottles.

4.5 Illness Episodes

A total of 917 mothers/caretakers were interviewed after their clinical examinations. Lagos Island accounted for 289 (31.5%), Ajegunle for 239 (26.2%) and Surulere/Lawanson for 389 (42.4%). The quality of information was affected by the large number of children brought by persons other

than their mother. Overall, 41.2% (378) of children were reported to have had an illness episode in the two weeks prior to the interview. Of these, nearly half (48.9%) reported that illness was fever/malaria. Only 58 (6.3%) of the children had slept under a mosquito bed net. Finally, only 61 (6.6%) of children were said to have traveled outside of Lagos in the previous two weeks. Most did not go very far as the median distance in time was two hours. Frequently the travel was to other urban areas such as Ibadan, Ilorin and Ijebu-Ode.

4.6 Antimalarial drugs

Table 12 shows that Antimalarial drugs were sold in 86.3% (303/351) of the shops in the three CPHs: 79.3% (92/116) in Lagos Island, 90.4% (103/114) in Ajegunle and 89.3% (108/121) in Lawanson.

It is important to distinguish between what the shopkeepers believe and call antimalarial drugs and what are pharmacologically antimalarial medications. Actual antimalarials that were found are presented in Table 13, and they include Chloroquine, Nivaquine, Halfan, Paludrine, Fansidar, Capquine and Maloxine. As many as 28% (32/116) of the shops had 5 or more different types of medicines which the storekeepers sold to treat malaria. In 8% (9/116) of the shops, there were at least ten different types.

4.7 Analgesics

The proportion of the 916 children who were examined and who took analgesic paracetamol during the two weeks preceding the study, varied from 76% (227/299) in Lagos Island, to 51% (123/241), in Ajegunle, through 50% (189/376) in Lawanson. Up to 60% (550/916) of all the children had taken paracetamol during the two weeks preceding the study.

Common analgesics found during exit interviews (Table 14) included Paracetamol, Panadol, Cafenol, as well as those popularly called “Alabukun”, “Laila”, “Daga”, and “After Five”. Analgesics were found in 13.7% (48/351) of shops in the three target communities: 20.7% (24/116) in Lagos Island, 9.6% (11/114) in Ajegunle and 10.7% (13/121) in Lawanson.

4.8 Mosquito control products

4.8.1 Mosquito repellents

Mosquito repellents were seen in only 5% (6/116) of the shops: 5% (5/116) of Chemists/Drug shops, and 1% (1/116) of supermarkets/convenience stores. The three brands included “Antimos”, “Vaseline”, and “Off.”

4.8.2 Insecticide sprays

The sprays were seen in 75% (86/116) of the shops: 27% (32/116) of chemists/drugs stores, 14% (16/116) of super markets/convenience stores, 19% (22/116) of market stalls, 11% (13/116) of kiosks, and 3% (3/116) of petrol stations. Common brands included Mobil, Raid, Baygon, Shelltox, Killit, and Rambo. Some 27% (31/116) of the shops carried four or more different brands. Prices ranged from seventy Naira (N 70) to one hundred and fifty Naira (N 150) for a regular size can.

4.8.3 Mosquito coils

These were found in 31% (36/116) of the stores: 25% (29/116) of kiosks, 3% (3/116) of super markets/convenience stores, 2% (2/116) of chemist/Drug stores, 2% (2/116) of market stalls and none in petrol stations. They cost five Naira (N 5) on average.

4.9 Management of febrile illness and malaria

In the three target communities, malaria and other febrile illnesses are managed at home and in the health facilities. Table 17 and Figure 17 show the treatment of febrile illnesses and the treatment as indicated by the mothers or relations of the 916 children examined during the study.

4.10 Health service utilization for antimalarial treatment

Table 21 and Figure 18 show the pattern of behavior of 180 respondents from the three target communities in their quest for treatment. Some 41% (76/186) of the respondents were residents of Lagos Island, 24% (45/186) of Ajegunle, and 35% (65/186) of Lawanson. Up to 97% (180/186) of those reporting malaria/fever had sought treatment: 11.1% (21/186) took herbs, 1.1% (2/186) went to herbalists, 35.6% (66/186) bought drugs from shops, 22.2% (41/186) attended private clinics, and 28.9% (54/186) went to government clinics. Nearly all reported that the child had at least one form of treatment.

4.11 Household expenditure on fever/malaria

The expenditure includes fees paid to health facilities and money spent on the procurement of drugs from commercial houses.

4.11.1 Relative cost of treatment

The relative costs of treatment, by source of service, are presented in Table 18 and Figure 16. The most expensive, based on mean cost of treatment for all illnesses, including malaria, is the private clinic, followed by government clinics. The chemist/drug shop is the least expensive.

4.11.2 Cost of malaria control products

Table 19 and Figure 15 present the proceeds from one week's sale, to the three target communities, of malaria and fever treatment drugs by 116 shops in Lagos Island,112 in Ajegunle and 119 in Lawanson. A total of 3461 treatment packages of antimalarial drugs and 726 of analgesics were sold for three hundred and seventy seven thousand five hundred and twenty one Naira (N 377,521). The antimalarials cost three hundred and seventy one thousand seven hundred and sixty Naira (N 371,760) while the analgesics cost five thousand seven hundred and sixty one Naira (N 5,761). The distributions were: i) Lagos Island 48.5% (N 183,080) of the antimalarials and 52.9% (N 3,050) of the analgesics; ii) Ajegunle 18.9% (N 71,200) of the antimalarials and 10.2% (N 590) of the analgesics; and iii) Lawanson 31.1% (N 117,480) of the antimalarials and 36.8% (N 2,121) of the analgesics.

Table 20 and Figure 14 show proceeds from one week's sale of mosquito control products(mosquito coils, insect sprays, and insect repellents) through 347 outlets: 33.8% (N 113,260) in Lagos Island; 23.9% (N 79,921) in Ajegunle; and 42.1% (N 140,825) in Lawanson.

The sales were as follows: 523 mosquito coils (for N 2,615); 2917 tins of insect sprays (for N 329,621), and 37 tins of insect repellents (for N 2,516).

Chloroquine products were usually the cheapest, ranging between forty Naira (N 40) and fifty Naira (N 50) per packet. Fansidar and Metakelfin cost between seventy Naira (N 70) and eighty five Naira (N 85), Halfan between four hundred and fifty Naira (N 450) to five hundred Naira (N 500), while Paludrine cost between eight hundred Naira (N 800) and one thousand one hundred Naira (N 1,100). Daraprim was also available and seemingly sold for both preventive and treatment purposes.

The computed annual per capita expenditure was eleven thousand two hundred and nine Naira (N 11,209) for antimalarial drugs, nine hundred and seven Naira (N 907) for analgesics, sixteen thousand four hundred and eighty one Naira (N 16,481) for insect sprays, six hundred and ninety Naira (N 690) for mosquito coils, and eight hundred and fifty one Naira (N 851) for insect repellents.

4.12 Cartography

A geographic information system has been developed for the assessment data. It is attached as Appendix C.

4.13 Action Plan

A final participatory workshop was held to present the findings of the rapid assessment. At that workshop, a preliminary draft Action Plan was developed for each CPH. (The draft plans are presented in Appendix D.) The preliminary plans give a list of activities and organizations that may be involved. This initial plan will be the basis for developing plans for future action.

5 CONCLUSIONS

1. Actual prevalence of malaria and the vector mosquito at this time of year was far lower than perceived by the community.

2. The overall/crude prevalence of fever (7.4%) was higher than that of malaria parasitemia (0.9%), indicating that all incidence of febrile illnesses in the CPHs could not entirely be attributed to malaria. Conversely, not all children who were positive for malaria parasites had fever (defined as body temperature above 37.5° C).

3. Observed malaria parasite/crude prevalences by microscopy and immunodiagnosis were low (0.7% and 0.3% respectively).

4. There have been comprehensive, systematic, integrated and sustained anti-malaria activities in the three target CPHs since their commitment in 1996 to control malaria, perceived as the cause of illness and mortality for the children. Every available antimalarial drug and mosquito control agent has been used in the fight against malaria.

5. A large amount of money was spent on antimalarial treatment and mosquito control products (up to approximately N 377,000 (~ $4,450) for antimalarials, and N 334,000 (~ $3,950) for mosquito control products) during the week preceding the assessment.

6. The local herbal infusion "Agbo" enjoyed considerable patronage in the CPHs indicating its importance in the treatment of Febrile illness and malaria.

7. As of January 1997, government health facilities provided free treatment for all those who presented with fever.

8. Prevalence of febrile illness based on recall was considerably high.

9. The levels of prevalence of anemia and acute respiratory tract infection probably create concern because of their recognized etiologic significance in child health and child survival.

10. Only a small proportion of the children who participated in the study had traveled outside Lagos during the two weeks preceding the assessment. Children who had traveled were neither febrile nor parasitemic.

11. As directed by WHO guidelines for the African region, both health workers and the communities primarily and presumptively treated all fever cases as malaria.

12. Within the target communities, people refer to several different kinds of illnesses as malaria, and they also subsequently treat these diseases as malaria.

13. Only a small proportion of people in the communities use mosquito bednets for their small children. Although some of them complain of heat and poor ventilation under the nets, others say they enjoy mosquito-free peaceful sleep under them.

14. Many people prefer to buy insecticide sprays, but three tins of spray cost the same aount as an average bednet.

15. The environmental sanitation equipment provided by BASICS has been effectively utilized by the three CPHs.

16. The education of mothers on the use of Paracetamol/and tepid sponging as front line interventions for the home management of febrile illness is effective. The overall prevalence of use of Paracetamol was similar to the target communities.

17. The high cost of health care from the private clinics probably accounts for their low level of patronage, as compared with government clinics.

18. Since the level of prevalence of malaria parasites before the control interventions is not known, the amount of change due to the interventions cannot be computed.

6 RECOMMENDATIONS

1. Reduction of human contact with mosquitoes.
   A. The use of bednets to protect children from the bites of all mosquitoes, irrespective of species, is desirable. This would ensure peaceful sleep and improve their health status in pursuit of their survival. It would therefore be necessary for BASICS to provide technical assistance for the development of a strategic plan for the social marketing (for instance, partnerships with the commercial sector) of mosquito bednets within the framework of the CPHs. At the action planning workshop which followed the malaria rapid assessment, participants agreed to embark immediately upon the promotion of the use of mosquito bed nets within their communities.
   B. Environmental management activities, including elimination of mosquito breeding sites and the appropriate disposal of refuse, should be encouraged. This would control the breeding of all species of mosquitoes and also forestall the transmission of bacteria and viruses that cause diarrheal diseases.

2. Management of febrile illness
   A. Since most of the febrile illness in these communities is not malaria, the skills of care providers on the recognition of the basic danger signs of malaria, including the provision of "malaria risk information", is considered desirable.
   B. The rational use of antimalarial drugs in particular, from all sources, should be promoted.
   C. Client/community education on appropriate and inappropriate medication with the attendant risks, must be pursued.

3. Management of concurrent infections
   A. The skills of care providers on the recognition of the basic danger signs of childhood infections (such as anemia and acute respiratory infections) that complicate malaria, is considered realistic. The need for early referral must be underscored at all levels, and the specificity of diagnosis must be improved.
   B. Anemia and acute respiratory infections deserve more attention.

4. Capacity building
   A. The laboratory facilities of the health facilities of the CPHs, are in dire need of improvement in terms of equipment and "seed" reagents.
   B. The headquarters of the CPHs need to be strengthened for the collection, compilation, and analysis of data. This would enhance project evaluation, monitoring and reporting.

5. Community awareness
   A. It is considered necessary to give increased attention to community education on vector borne diseases and concurrent infections.

7 NEXT STEPS

1. Further develop an action plan and work plan.

   The action plan and the work plan for malaria and concurrent infections were addressed soon after the malaria rapid assessment. (A preliminary draft plan is presented with this report.)

2. Conduct a rapid assessment at the end of the rainy season

   It is important to repeat elements of this rapid assessment of the malaria situation soon after the rainy season when new mosquito breeding sites may be created. This would present a picture of the wet season situation.

3. Baseline epidemiological data for new intervention areas

   A lesson learned from the assessment is that it is necessary to collect pre-intervention (baseline) data for all BASICS- supported project interventions. Such data would provide a base from which to measure change or progress related to programs and to evaluate the interventions.

APPENDIX A: REFERENCES

1. BASICS 1995. Urban Private Sector Inventory (UPSI) of the Lagos Urban Community.

2. Lagos Urban Community Partners for Health, 1997. Memorandum of Understanding between the Community partners for Health and the Dyads

3. USAID [EHP (Enviornmental Health Project)]. WASH Reprint: Technical Report No.32, November,1985. Facilitator Guide for conducting a Team Planning Meeting; Wilma Gormley and Fred rosenweig

4. USAID [EHP (Enviornmental Health Project)]. WASH Reprint: Technical Report No.41, March 1998. Facilitator Guide for conducting a Team Planning Meeting; Daniel B. Edwards, John J, Petit.

5. WHO Geneva, 1996. Malaria: A manual for Community Health Workers

APPENDIX B: TABLES AND FIGURES

TABLE 1

Distribution of 916 Children by age and gender in the Lagos Island, Ajegunle and Lawanson Community Partnerships for Health

AGE GROUP	LAGOS ISLAND		AJEGUNLE		LAWANSON	
	MALES	FEMALES	MALES	FEMALES	MALES	FEMALES
06-11	22 (7.4 %)	23 (7.7%)	11 (4.6%)	10 (4.1%)	24 (6.4%)	18 (4.8%)
12-23	31 (10.4%)	36 (12.0%)	24 (10.0%)	19 (7.9%)	40 (10.6%)	40 (10.6%)
24-35	31 (10.4%)	22(7.4%)	30 (12.4%)	36 (14.9%)	32 (8.5%)	35 (9.3%)
36-47	31 (10.4%)	26 (8.7%)	34 (14.1%)	18 (7.5%)	58 (15.4%)	29 (7.7%)
48-59	44 (14.7%)	33 (11.0%)	35 (14.5%)	24 (10.0%)	51 (13.6%)	49 (13.0%)
TOTAL	159(53.2%)	140 (46.8%)	134 (55.6%)	107 (44.4%)	205 (54.5%)	171 (45.5%)

TABLE 2

Distribution of 299 Children of both genders by age and body temperature in the Lagos Island Community Partnership for Health

	AGE GROUP					
BODY TEMP	06-11	12-23	24-35	36-47	48-59	**TOTAL**
35.6-36.0	3 12.0% 6.7%	6 24.0% 9.0%	2 8.0% 3.8%	6 24.0% 10.5%	8 32.0% 10.4%	25 8.4%
36.1-36.5	10 10.4% 22.2%	21 21.9% 31.3%	19 19.8% 35.8%	18 18.8% 31.6%	28 29.2% 36.4%	96 32.1%
36.6-37.0	19 15.6% 42.2%	22 18.0% 32.8%	22 18.0% 41.5%	26 21.3% 45.6%	33 27.0% 42.9%	122 40.8%
37.6-37.5	6 24.0% 13.3%	7 28.0% 10.4%	4 16.0% 7.5%	3 12.0% 5.3%	5 20.0% 6.5%	25 8.4%
37.6-38.0	7 25.0% 15.6%	11 39.3% 16.4%	5 17.9% 9.4%	3 10.7% 5.3%	2 7.1% 2.6%	28 9.4%
38.1-38.5	0 0.0% 0.0%	0 0.0% 0.0%	1 50.0% 1.9%	0 0.0% 0.0%	1 50.0% 1.3%	2 0.7%
39.1-39.5	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 100.0% 1.8%	0 0.0% 0.0%	1 0.3%
TOTAL	45 15.1%	67 22.4%	53 17.7%	57 19.1%	77 25.8%	299

TABLE 3

Distribution of 241 Children on both genders by age and body temperature in the Ajegunle Community Partnership for Health

	AGE GROUP					
BODY TEMP.	06-11	12-23	24-35	36-47	48-59	Total
35.6-36.0	1 2.0% 4.8%	9 18.0% 20.9%	14 28.0% 21.2%	14 28.0% 26.9%	12 24.0% 20.3%	50 20.7%
36.1-36.5	6 8.0% 28.6%	15 20.0% 34.9%	24 32.0% 36.4%	12 16.0% 23.1%	18 24.0% 30.5%	75 31.1%
36.6-37.0	8 9.5% 38.1%	15 17.9% 34.9%	19 22.6% 28.8%	19 22.6% 36.5%	23 27.4% 39.0%	84 34.9%
37.1-37.5	2 10.5% 9.5%	1 5.3% 2.3%	7 36.8% 10.6%	4 21.1% 7.7%	5 26.3% 8.5%	19 7.9%
37.6-38.0	1 20.0% 4.8%	2 40.0% 4.7%	1 20.0% 1.5%	1 20.0% 1.9%	0 0.0% 0.0%	5 2.1%
38.1-38.5	1 25.0% 4.8%	0 0.0% 0.0%	1 25.0% 1.5%	1 25.0% 1.9%	1 25.0% 1.7%	4 1.7%
38.6-39.0	1 100.0% 4.8%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 0.4%
39.1-39.5	1 100.0% 4.8%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	0 0.0% 0.0%	1 0.4%
39.6-40.0	0 0.0% 0.0%	1 50.0% 2.3%	0 0.0% 0.0%	1 50.0% 1.9%	0 0.0% 0.0%	2 0.8%
TOTAL	21 8.7%	43 17.8%	66 27.4%	52 21.4%	59 24.5%	241

TABLE 4

Distribution of 376 Children of both genders by age and body temperature in the Lawanson Community Partnership for Health

	AGE GROUP					
BODY TEMP	06-11	12-23	24-35	36-47	48-59	TOTAL
35.6-36.0	5 (1.3%)	10 (2.7%)	21 (5.6%)	13 (14.9%)	18 (4.8%)	67 (17.8%)
36.1-36.5	10 (2.7%)	27 (7.2%)	20 (5.3%)	24 (6.4%)	25 (6.6%)	106 (28.2%)
36.6-37.0	14 (3.7%)	29 (7.2%)	22 (5.9%)	35 (9.3%)	43 (11.4%)	143 (38.0%)
37.1-37.5	6 (1.6%)	8 (2.1%)	3 (0.8%)	9 (2.4%)	12 (3.2%)	38 (10.1%)
37.6-38.0	6 (1.6%)	4 (1.1%)	1 (0.3%)	5 (1.3%)	1 (0.3%)	17 (4.5%)
38.1-38.5	0 (0.0%)	1 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.3%)
38.6-39.0	1 (0.3%)	1 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.5%)
39.1-39.5	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.3%)	1 (0.3%)	2 (0.5%)
TOTAL	42 (11.2%)	80 (21.3%)	67 (17.8%)	87 (23.1%)	100 (26.6%)	376

TABLE 5A

Age specific prevalence of anaemia, acute respiratory infections (ARI), history of measles, travel history, use of antimalaria drugs, use of herbal infusion, and use of paracetamol, for both genders of 299 children in Lagos Island Community Partnership for Health

AGE GROUP	FEVER	ANEMIA	ARI	MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO	PARACETAMOL
06-11	7 (2.3%)	18 (6.0%)	11 (3.7%)	2 (0.7%)	2 (0.7%)	2 (0.7%)	17 (5.7%)	41 (13.7%)
12-23	11 (3.7%)	31 (10.4%)	22 (7.4%)	7 (2.3%)	3 (1.0%)	5 (1.7%)	28 (9.4%)	57 (19.1%)
24-35	6 (2.0%)	17 (5.7%)	14 (4.7%)	1 (0.3%)	4 (1.3%)	3 (1.0%)	15 (5.0%)	39 (13.0%)
36-47	4 (1.3%)	23 (7.7%)	18 (6.0%)	11 (3.7%)	2 (0.7%)	7 (2.3%)	14 (4.7%)	40 (13.4%)
48-59	3 (1.0%)	27 (9.0%)	24 (8.0%)	6 (2.0%)	1 (0.3%)	5 (1.7%)	23 (7.7%)	51 (17.1%)
TOTAL	31 (10.4%)	116 (38.8%)	89 (29.8%)	27 (9.0%)	12 (4.0%)	22 (7.4%)	97(32.4%)	228(76.3%)

TABLE 5B

Body temperature specific prevalence of anaemia, acute respiratory infections (ARI), history of measles, travel history, use of antimalarial drugs, use of herbal infusion, and use of paracetamol, for both genders of 299 children the Lagos Island Community Partnership for Health

Body Temp.	Anemia	ARI	Measles	Travel History	Drug Item	Agbo	Paracetamol
35.6-36.0	10 (3.3%)	5 (1.7%)	3 (1.0%)	0 (0.0%)	1 (0.3%)	5 (1.7%)	17 (5.7%)
36.1-36.5	33 (11.0%)	26 (8.7%)	6 (2.0%)	7 (2.3%)	9 (3.0%)	26 (8.7%)	71 (23.7%)
36.6-37.0	50 (16.7%)	36 (12.0%)	11 (3.7%)	4 (1.3%)	6 (2.0%)	45 (15.1%)	93 (31.1%)
37.1-37.5	9 (3.0%)	10 (3.3%)	5 (1.7%)	0 (0.0%)	2 (0.7%)	9 (3.0%)	21 (7.0%)
37.6-38.0	14 (4.7%)	11 (3.7%)	1 (0.3%)	1 (0.3%)	3 (1.0%)	12 (4.0%)	23 (7.7%)
38.1-38.5	0 (0.0%)	0 (0.0%)	1 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	2 (0.7%)
38.6-39.0	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
39.1-39.5	0 (0.0%)	1 (0.3%)	0 (0.0%)	0 (0.0%)	1 (0.3%)	0 (0.0%)	1 (0.3%)
39.6-40.0	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
TOTAL	116 (38.8%)	89 (29.8%)	27 (9.0%)	12 (4.0%)	22 (7.4%)	97 (32.4%)	228 (76.3%)

TABLE 6A

Age specific prevalence of anaemia, acute respiratory infections (ARI), history of measles, travel history, use of antimalaria drugs, use of herbal infusion, and use of paracetamol, for both genders of 241 children in Ajegunle Community Partnership for Health

AGE GROUP	FEVER	ANEMIA	ARI	MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO	PARACE-TAMOL
06-11	4 (1.7%)	5 (2.1%)	3 (1.2%)	6 (2.4%)	3 (1.2%)	10 (4.1%)	3 (1.2%)	11 (4.6%)
12-23	3 (1.2%)	3 (1.2%)	13 (5.4%)	10 (4.1%)	6 (2.5%)	16 (6.6%)	9 (3.7%)	24 (10.0%)
24-35	2 (0.8%)	8 (3.3%)	21 (8.7%)	8 (3.3%)	6 (2.5%)	21 (8.7%)	11 (4.6%)	39 (16.2%)
36-47	3 (1.2%)	11 (4.6%)	7 (2.9%)	8 (3.3%)	3 (1.2%)	13 (5.4%)	16 (6.6%)	25 (10.4%)
48-59	1 (0.4%)	7 (2.9%)	16 (6.6%)	6 (2.4%)	1 (0.4%)	12 (5.0%)	9 (3.7%)	23 (9.5%)
TOTAL	13(5.4%)	34(14.1%)	60(24.8%)	38(15.8%)	19(7.9%)	72 (29.9%)	48(19.9%)	122(50.6%)

TABLE 6B

Body temperature specific prevalence of anaemia, acute respiratory infections (ARI), history of measles, travel history, use of antimalarial drugs, use of herbal infusion, and use of paracetamol, for both genders of 241 children in the Ajegunle Community Partnership for Health

Body Temp.	Anemia	ARI	Measles	Travel History	Drug Item	Agbo	Paracetamol
35.6-36.0	6	12	44	5	14	7	23
36.1-36.5	7	15	65	7	30	18	41
36.6-37.0	13	23	59	6	15	18	39
37.1-37-5	4	4	15	1	9	5	13
37.6-38.0	1	2	3	0	1	0	2
38.1-38.5	3	1	1	0	1	0	2
38.6-39.0	0	1	0	0	0	0	0
39-1-39.5	0	0	0	0	1	0	1
39.6-40.0	0	2	1	0	1	0	1
TOTAL	34 (14.1%)	60 (24.9%)	189 (24.9%)	19 (7.9%)	72 (29.9%)	48 (19.9%)	122 (50.6%)

TABLE 7A

Age specific prevalence of anaemia, acute respiratory infections (ARI), history of measles, travel history, use of anitimalaria drugs, use of herbal infusion, and use of paracetamol, for both genders of 376 children in the Lawanson Community Partnership for Health

AGE GROUP	FEVER	ANEMIA	ARI	MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO	PARACE-TAMOL
06-11	9 (2.4%)	5 (1.3%)	15 (4.0%)	6 (1.6%)	4 (1.1%)	16 (4.3%)	11 (2.9%)	28 (7.4%)
12-23	6 (1.6%)	14 (3.7%)	31 (8.2%)	18 (4.8%)	7 (1.9%)	30 (7.8%)	15 (4.0%)	41 (10.9%)
24-35	1 (0.3%)	6 (1.6%)	24 (6.4%)	15 (4.0%)	4 (1.1%)	24 (6.4%)	12 (3.2%)	37 (9.8%)
36-47	6 (1.6%)	17 (4.5%)	25 (6.6%)	22 (5.8%)	2 (0.5%)	31 (8.2%)	16 (4.3%)	47 (12.5%)
48-59	2 (0.5%)	15 (4.0%)	26 (6.9%)	22 (5.8%)	2 (0.5%)	26 (6.9%)	19 (5.1%)	36 (9.6%)
TOTAL	24(6.4%)	57(15.2%)	121(32.2%)	83(22.1%)	19(5.1%)	127(33.8%)	73(19.4%)	189(50.3%)

TABLE 7B

Body temperature specific prevalence of anaemia, acute respiratory infections (ARI), history of measles, travel history, use of antimalarial drugs, use of herbal infusion, and use of paracetamol, for both genders of 376 children in the Lawanson Community Partnership for Health

Body Temp.	Anemia	ARI	Measles	Travel Hist	Drug Item	Agbo	Paracetomol
35.6-36.0	3 (0.8%)	25 (6.6%)	20 (5.3%)	6 (1.6%)	20 (5.3%)	15 (4.0%)	33 (8.8%)
36.1-36.5	14 (3.7%)	31 (8.2%)	16 (4.3%)	4 (1.1%)	35 (9.3%)	18 (4.8%	52 (13.8%)
36.6-37.0	22 (5.9%)	39 (10.4%)	35 (9.3%)	5 (1.3%)	47 (12.5%)	31 (8.2%)	74 (19.7%)
37.1-37.5	16 (4.3%)	15 (4.0%)	5 (1.3%)	1 (0.3%)	13 (3.5%)	8 (2.1%)	15 (4.0%)
37.6-38.0	2 (0.5%)	7 (1.9%)	4 (1.1%)	1 (0.3%)	10 (2.7%)	1 (0.3%)	13 (3.5%)
38.1-38.5	0 (0.0%)	1 (0.3%)	1 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
38.6-39.0	0 (0.0%)	2 (0.5%)	1 (0.3%)	2 (0.5%)	0 (0.0%)	0 (0.0%)	1 (0.3%)
39.1-39.5	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
<35.6	0 (0.0%)	1 (0.3%)	1 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.3%)
TOTAL	57 (15.2%)	121 (32.2%)	83 (22.1%)	19 (5.1%)	127 (33.8%)	73 (19.4%)	189 (50.3%)

TABLE 8A

Prevalence of fever, anemia, acute respiratory tract infections, malaria parasites and also the history of measles in the Lagos Island, Ajegunle and Lawanson Community Partnerships for Health

CPH	FEVER	ANEMIA	ARI	PARASITES	PaF	HISTORY OF MEASLES	TRAVEL HISTORY
LAGOS ISLAND (299)	10.4%	38.8%	29.8%	1.3%	0.0%	9.0%	4.0%
AJEGUNLE (241)	5.4%	14.1%	24.8%	0.0%	0.0%	15.8%	7.9%
LAWANSON (376)	6.4%	15.2%	32.2%	1.1%	0.3%	22.1%	5.1%
TOTAL	7.4%	22.7%	29.5%	0.9%	1.4%	16.2%	5.7%

TABLE 8B

Body temperature specific prevalence of anaemia, acute respiratory tract infections (ARI), history of measles, travel history, use of antimalarial drugs and herbal and infusions for 140 girls in Lagos Island

BODY TEMP	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO
35.6-36.0	3 (5.2%)	2 (5.1%)	2 (14.3%)	0 (0.0%)	0	2 (4.3%)
36.1-35.5	16 (27.6)	11 (28.2%)	3 (21.4%)	3 (21.4%)	5 (50.0%)	14 (30.4%)
36.6-37.0	28 (48.3%)	19 (48.7%)	7 (50.0%)	0 (0.0%)	3 (30.0%)	21 (45.7%)
37.1-37.5	4 (6.9%)	2 (5.1%)	1 (7.1%)	0 (0.0%)	2 (18.2%)	3 (6.4%)
37.6-38.0	7 (12.1%)	5 (12.8%)	1 (7.1%)	1 (7.1)	1 (10.0%)	7 (15.2%)
38.1-38.5	0 (0.0%)	0 (0.0%)	1 (1.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
39.1-39.5	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
39.6-40.0	0 (0.0%)	1 (3.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
TOTAL	58 (41.4%)	39 (27.9%)	14 (10%)	4 (2.9%)	11 (7.9%)	47 (33.6%)

TABLE 8C

Body temperature specific prevalence of anaemia, acute respiratory tract infections (ARI), history of measles, travel history, use of antimalarial drugs and herbal concoction for 159 boys in Lagos Island

BODY TEMP	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO (HERBAL)
35.6-36.0	7 (12.3%)	3 (6.0%)	1 (7.7%)	0 (0.0%)	1 (6.7%)	3 (5.6%)
36.1-36.5	16 (28.1%)	15 (30.0%)	3 (23.1%)	4 (50.0%)	6 (40.0%)	14 (25.9%)
36.6-37.0	22 (36.6%)	17 (34.0%)	4 (30.8%)	4 (50.0%)	4 (26.7%)	25 (46.3%)
37.1-37.5	5 (8.8%)	8 (16.0%)	4 (30.8%)	0 (0.0%)	1 (6.7%)	7 (13.0%)
37.6-38.0	7 (12.3%)	6 (12.0%)	0 (0.0%)	0 (0.0%)	2 (13.3%)	5 (9.3%)
38.1-39.5	0 (0.0%)	0 (0.0%)	1 (0.0%)	0 (0.0%)	0 (0.1%)	0 (0.0%)
39.1-39.5	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (6.7%)	0 (0.0%)
39.1-39.5	0 (0.0%)	1 (2.0%)	0 (0.0%)	0 (0.0%)	0 (0.1%)	0 (0.0%)
TOTAL	57 (35.4%)	50 (31.1%)	13 (8.1%)	8 (5.0%)	15 (9.3%)	54 (33.5%)

TABLE 8D

Age specific prevalence of anaemia, acute respiratory tract infections (ARI), history of measles, travel history, use of antimalarial drugs and herbal infusions for 140 girls in Lagos Island

AGE	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUM ITEM	AGBO HERBAL INFUSION
6 - 11	10 (17.2%)	4 (17.4%)	0	0	1 (10.0%)	8 (17.4%)
12 - 23	21 (36.2%)	13 (33.3%)	6 (42.9%)	2 (50%)	2 (20.0%)	14 (30.0%)
24 - 35	9 (15.5%)	7 (17.9%)	0	0	0	6 (13.0%)
36 - 47	8 (13.8%)	6 (15.4%)	5 (35.7%)	1 (25.0%)	4 (40.0%)	7 (15.2%)
48 - 59	10 (17.2%)	9 (23.1%)	3 (21.4%)	1 (25.0%)	4 (40.0%)	12 (25.5%)
TOTAL	58 (41.4%)	39 (27.9%)	14 (10%)	4 (2.9%)	11 (7.9%)	47 (33.6%)

TABLE 8E

Age specific prevalence of anaemia, acute respiratory tract infections (ARI), history of measles, travel history, use of antimalarial drugs and herbal concoctions for 159 boys in Lagos Island

AGE	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO HERBAL INFUSION
6 - 11	8 (14.0%)	7 (9.7%)	2 (3.9%)	2 (3.9%)	1 (16.2%)	9 (4.0%)
12 - 23	10 (17.5%)	9 (16.1%)	1 (19.4%)	1 (19.4%)	4 (27.0%)	14 (20%)
24 - 35	8 (18.8%)	7 (22.6%)	7 (22.6%)	1 (23.3%)	3 (13.5%)	10 (8.0%)
36 - 47	14 (43.8%)	12 (19.4%)	12 (19.4%)	6 (26.2%)	5 (27.0%)	8 (40%)
48 - 59	17 (25%)	15 (32.3%)	15 (32.3%)	3 (27.2%)	2 (16.2%)	12 (28%)
TOTAL	16 (11.9%)	50 (23.15%)	50 (23.1%)	103 (81.1%)	37 (27.6%)	25 (18.7%)

TABLE 8F

Body temperature specific prevalence of anaemia, acute respiratory tract infections (ARI), history of measles, travel history, use of antimalarial drugs and herbal concoctions for 107 girls in Ajegunle

BODY TEMP (F)	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO
35.6 - 36.0	1 (5.6%)	7 (24.1%)	17 (20.0%)	1 (14.3%)	4 (11.4%)	3 (13.0%)
36.1 - 36.5	5 (27.8%)	6 (20.7%)	31 (36.5%)	2 (28.6%)	16 (45.7%)	8 (34.8%)
36.3 - 37.0	7 (38.9%)	10 (34.5%)	21 (24.7%)	3 (42.9%)	5 (14.3%)	9 (39.1%)
37.1 - 37.5	3 (16.7%)	3 (10.3%)	12 (4.1%)	0	7 (20.0%)	3 (13.0%)
37.6 - 38.0	1 (5.6%)	2 (6.9%)	3 (3.5%)	0	1 (2.9%)	0
38.1 - 38.5	1 (5.6%)	0 (0.0%)	1 (1.2%)	0	1 (2.9%)	0
39.1 - 39.5	0	0	0	0	0	0
39.6 - 40.0	0	1 (3.4%)	0	0	1 (2.9%)	0
TOTAL	18 (16.8%)	29 (27.1%)	85 (79.4%)	7 (6.5%)	35 (32.7%)	23 (21.5%)

TABLE 8G

Body temperature specific prevalence of anaemia, acute respiratory tract infections (ARI), history of measles, travel history, use of antimalarial drugs and herbal concoctions for 134 boys in Ajegunle

BODY TEMP	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO HERBAL
35.6 - 36.0	5 (31.3%)	5 (16.1%)	27 (26.2%)	4 (33.3%)	10 (27.0%)	4 (16.0%)
36.1 - 36.5	2 (12.5%)	9 (29.0%)	33 (32.0%)	5 (41.7%)	15 (40.5%)	10 (40.0%)
37.1 - 37.0	6 (37.5%)	13 (41.9%)	38 (36.9%)	3 (25.0%)	10 (27.0%)	9 (36.0%)
37.1 - 37.5	1 (6.3%)	1 (3.2%)	3 (2.9%)	0	1 (2.7%)	2 (8.0%)
38.1 - 38.5	2 (12.5%)	1 (3.2%)	1 (1.0%)	0	1 (2.7%)	0
38.6 - 39.0	0	1 (3.2%)	0 (0.0%)	0	0	0
39.6 - 40.0	0	1 (3.2%)	1 (1.0%)	0	0	0
TOTAL	16 (11.9%)	31 (23.1%)	103 (81.1%)	12 (9.0%)	37 (27.6%)	25 (18.7%)

TABLE 8H

Age specific prevalence of anaemia, acute respiratory tract infections (ARI), history of measles, travel history, use of antimalarial drugs and herbal concoctions for 107 girls in Ajegunle

AGE	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO HERBAL INFUSION
6 - 11	4 (22.2%)	0 (0.0%)	3 (3.5%)	2 (28.6%)	4 (11.4%)	2 (8.7%)
12 - 23	2 (11.1%)	8 (2.11%)	11 (12.9%)	3 (42.9%)		4 (17.4%)
24 - 35	5 (27.8%)	5 (27.8%)	33 (38.8%)	1 (14.3%)	16 (45.7%)	9 (39.1%)
36 - 47	4 (22.7%)	4 (22.7%)	16 (16.8%)	1 (14.3%)	3 (8.6%)	6 (26.1%)
48 - 59	3 (16.7%)	3 (16.7%)	22 (25.9%)	0	6 (17.1%)	2 (8.7%)
TOTAL	18 (16.8%)	29 (27.1%)	85 (79.4%)	7 (6.5%)	35 (32.7%)	23 (21.5%)

TABLE 8I

Body temperature specific prevalence of anaemia acute respiratory tract infections (ARI), history of measles and travels, use of antimalarial drugs and herbal concoctions for 171 girls in Lawanson

BODY TEMP	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO HERBAL INFUSION
35.6 - 36.0	1 (0.6%)	16 (9.3%)	11 (6.4%)	2 (1.2%)	10 (5.8%)	6 (3.5%)
36.1 - 36.5	6 (3.5%)	10 (5.8%)	6 (3.5%)	4 (2.3%)	15 (8.8%)	7 (4.1%)
36.6 - 37.0	11 (6.4%)	19 (1.1%)	15 (8.8%)	3 (1.8%)	22 (12.9%)	13 (7.6%)
37.1 - 37.5	9 (5.3%)	6 (3.5%)	1 (0.6%)	0 (0.0%)	4 (2.3%)	4 (2.3%)
37.6 - 38.0	0 (0.0%)	4 (2.3%)	0 (0.0%)	0 (0.0%)	4 (2.3%)	0 (0.0%)
38.1 - 38.5	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.6%)	0 (0.0%)
38.6 - 39.0	0 (0.0%)	1 (0.6%)	0 (0.0%)	1 (0.6%)	0 (0.0%)	0 (0.0%)
39.1 - 39.5	0 (0.0%)	1 (0.6%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
TOTAL	27 (15.8%)	56 (32.7%)	33 (19.3%)	10 (5.8%)	56 (32.7%)	30 (17.5%)

TABLE 8J

Body temperature specific prevalence of anaemia, acute respiratory tract infections (ARI), history of measles, travel history, use of antimalarial drugs and herbal concoctions for 205 boys in Lawanson

BODY TEMP	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO HERBAL INFUSION
35.6 - 36.0	2 (1.0%)	10 (4.9%)	10 (4.9%)	4 (2.0%)	10 (4.9%)	9 (4.4%)
36.1 - 36.5	8 (3.9%)	21 (10.2%)	10 (4.9%)	0 (0.0%)	20 (9.8%)	11 (5.4%)
36.6 - 37.0	11 (5.4%)	20 (9.8%)	20 (9.8%)	2 (1.0%)	25 (12.2%)	18 (8.8%)
37.1 - 37.5	7 (3.4%)	9 (4.4%)	4 (2.6%)	1 (0.5%)	9 (4.4%)	4 (2.0%)
37.6 - 38.0	2 (1.0%)	3 (1.5%)	4 (2.0%)	1 (0.5%)	6 (2.9%)	1 (0.5%)
38.1 - 38.5	0 (0.0%)	1 (0.5%)	1 (1.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
38.6 - 39.0	0 (0.0%)	1 (0.5%)	1 (1.0%)	1 (0.5%)	1 (0.5%)	0 (0.0%)
39.1 - 39.5	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
TOTAL	30 (14.6%)	65 (31.7%)	50 (24.4%)	10 (4.9%)	71 (34.6%)	43 (21.0%)

TABLE 8K

Age specific prevalence of anaemia, acute respiratory tract infections (ARI), history of measles, travel history, use of antimalarial drugs and herbal concoctions for 171 girls in Lawanson

AGE	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO HERBAL
6 - 11	1 (0.6%)	100 (58.5%)	2 (1.2%)	2 (1.2%)	5 (2.9%)	5 (2.9%)
12 - 23	7 (4.1%)	13 (7.6%)	4 (2.3%)	3 (1.8%)	16 (9.3%)	6 (3.5%)
24 - 35	4 (2.3%)	15 (8.8%)	9 (5.3%)	3 (1.8%)	8 (4.7%)	7 (4.1%)
36 - 47	7 (4.1%)	7 (4.1%)	7 (4.1%)	1 (0.6%)	12 (7.0%)	5 (2.9%)
48 - 59	8 (4.7%)	11 (6.4%)	11 (6.4%)	1 (0.6%)	15 (8.8%)	7 (4.1%)
TOTAL	27 (15.8%)	56 (32.7%)	33 (19.2%)	10 (5.4%)	56 (32.7%)	30 (17.5%)

TABLE 8L

Age specific prevalence of anaemia, acute respiratory tract infections (ARI), history of measles, travel history, use of antimalarial drugs and herbal concoctions for 205 boys in Lawanson

AGE	ANEMIA	ARI	HISTORY OF MEASLES	TRAVEL HISTORY	DRUG ITEM	AGBO HERBAL INFUSION
6 - 11	4 (2.0%)	5 (2.4%)	4 (2.0%)	2 (1.0%)	11 (5.4%)	6 (2.9%)
12 - 23	7 (3.4%)	18 (8.8%)	14 (6.8%)	4 (2.0%)	14 (6.8%)	9 (4.4%)
24 - 35	2 (1.0%)	9 (4.4%)	6 (2.9%)	1 (0.5%)	16 (7.8%)	5 (2.4%)
36 - 47	10 (4.9%)	18 (8.8%)	15 (7.3%)	1 (0.5%)	19 (9.3%)	11 (5.4%)
48 - 59	7 (3.4%)	15 (7.3%)	11 (5.4%)	1 (0.5%)	11 (5.4%)	12 (5.8%)
TOTAL	30 (14.6%)	65 (31.7%)	50 (24.4%)	10 (4.9%)	71 (34.6%)	43 (21.05%)

TABLE 9

Adult room density, Night landing density and larval density of mosquitoes species in Lagos Island, Ajegunle and Lawanson Community Partnerships for Health

Mosquito Species	Lagos Island			Ajegunle			Lawanson		
	ARD	NLD	LD	ARD	NLD	LD	ARD	NLD	LD
Culex quiquefasciatus	4.6	10.3	35.7	5.5	1.4	3.3	9.4	1.8	10.4
Anopheles gambiae Complex	0.0	0.0	0.7	0.0	0.2	0.0	0.0	0.0	0.0
Aedes aegypti	0.5	0.0	0.9	0.0	3.0	0.0	0.0	0.0	0.0

Legend

ARD=Adult Room Density
NLD=Night Landing Density
LD=Larval Density

TABLE 10

Travel history, mosquito bed net use, illness episodes and malaria or fever

	Community Partners for Health			TOTAL
	Lagos Island	**Ajegunle**	**Lawanson**	
Number Interviewed	289	239	389	917
Number Travelled	14 (4.8%)	23 (9.6%)	24 (6.2%)	61 (6.6%)
Median Travel Distance in Hours	2.0	2.0	2.0	2.0
Number Have Bed Net	23 (8.0%)	15 (6.3%)	20 (5.1%)	58 (6.3%)
Number Know Price Bed Net	6	9	10	25
Median Price for Bed Net	N400	N250	N300	N300
Number III past 2 weeks	157 (54.2%)	88 (36.8%)	135 (34.7%)	378 (41.2%)
Number Malaria or Fever as Main Complaint	48.4% (76/157)	51.1% (45/88)	48.1% (65/135)	49.2 (186/378)

TABLE 11

Types of Shops Found in the Community Partners for Health

Type of Shop	Community Partners for health			Total
	Lagos Island	Ajegunle	Surulere	
Chemist	38 (32.8)	29 (25.9)	34 (28.6)	101 (29.1)
Small Super Market	17 (14.7)	46 (41.1)	51 (42.9)	114 (32.9)
Market Stall	22 (19.0)	9 (8.0)	6 (5.0)	37 (10.7)
Kiosk	36 (31.0)	28 (25.0)	27 (22.7)	91 (26.2)
Petrol Station	3 (2.6)	0	1 (0.8)	4 (1.2)
TOTAL	**116**	**112**	**119**	**347**

TABLE 12

Malaria and Fever Treatment drugs sold per Week

Product	Community Partners for health			Total
	Lagos Island	Ajegunle	Surulere	
Number of Shops Selling Anti -Malaria Drugs	92 (79.3%)	103 (90.4%)	108 (89.3%)	303 (86.3%)
Number Anti-Malarial Drugs Sold Past Week (Packet/doses)	1592 (46.0%)	890 (25.7%)	979 (28.3%)	3461
Mean/Median Price of Anti-Malaria Drugs	N 115/N50	N 80/N50	N 120/N50	N 106/N50
Number Shops Selling Analgesics Report Sold Past Week (doses)	305 (42.0%)	118 (16.3%)	303 (41.7%)	726
Mean/Median Price of Analgelsic	N 10/N5	N 5/N5	N 7/N5	N 8/N5
TOTAL Number Shops Selling Anti-malarial Products	116	114	121	351
Some Most Expensive Anti-Malarial Products	Halfan (N 450)	Paludrin (N 900)	Paluta (N 2550)	
Some lease Expensive Anti-Malarial (Median price)	Maladrin (N 42)	Maloxine (N 50)	Fansidar (N 80)	

TABLE 13

Common Anti-Malarial Drugs Found in Shops

Name of Anti-Malarial Drug	Number of Shops	Average Price N
Fansidar	88	83
Chloroquine	81	43
Maloxine	74	51
Metakelfin	73	96
Nivaquine	72	55
Capquine	67	47
Halfan	56	460
Maladrin	39	45
Daraprim	38	49
Camoquine	27	75
Malareich	24	46
Resochin	14	57
Fastaquine	11	48
Fansinef	8	429
Maxiquine	9	56
Pfizerquine	6	57
Paludrin	5	920

TABLE 14

Common Analgesic Drugs Found in Shops and Used to Treat Malaria/Fever

Name of Analgesic Dug Used for Malaria/Fever	Number of Shops	Average Price N
Alabukun	37	6.81
Laila	30	7.67
After Five	29	6.07
Daga	19	6.26
Paracetamol	18	17.39
Panadol	12	7.92
Phensic	4	4.50

TABLE 15

Type of Anti-Mosquito products Sold in Each Type of Shop

Product	Type of Shop (in percents)				Total
	Chemist	Super Mkt	Mkt Stall	Kiosk	
Coil	6.9	32.5	24.3	80.2	36.7
Repellent	15.8	2.6	0	0	6.4
Sprays	79.2	86.8	94.6	47.3	76.7
Number	101 (29.5%)	114 (33.3%)	37 (10.8%)	91 (26.5%)	343

TABLE 16

MOSQUITO CONTROL PRODUCTS PER WEEK

Product	CPH			Total
	Lagos	Ajegunle	Surulere	
Number Shops Selling Coil	36 (31.0%)	47 (42.0%)	44 (37.0%)	127(36.6%)
Number Coil Reported Sold Past Week	182 (34.8%)	190 (36.3%)	151(28.9%)	523
Median Price of Coil	N5	N5	N5	N5
Number of Shops Selling Spray Insecticide	86 (74.1%)	74 (64.9%)	105 (86.8%)	265 (76.4%)
Number Cans Spray Reported Sold Past Week	960 (32.9%)	727 (24.9%)	1230 (42.2%)	2917
Mean Price of Can Spray	N116	N108	N113	N113*
Number of Shops Selling Repellent	5 (4.3%)	5 (4.4%)	9 (7.4%)	19 (5.5%)
Number Repellents Reported Sold Past Week	15 (40.5%)	7 (18.9%)	15 (40.5%)	37
Mean price Repellent	N66	N64	N72	N68
TOTAL NUMBER SHOPS SELLING ANTI-MOSQUITO PRODUCTS	116	112	119	347

TABLE 17

Preferences in the treatment of malaria/fever in the Lagos Island, Ajegunle and Lawanson Community Partnerships for Health

Community Partners for Health	TREATMENT		
	Antimalarial	Herbal (Agbo)	Paracetamol
LAGOS ISLAND (299)	7.4%	34.4%	75.9%
AJEGUNLE (241)	29.9%	19.9%	50.6%
LAWANSON (376)	33.5%	19.4%	50.3%
TOTAL (916)	**24.0%**	**24.1%**	**60%**

TABLE 18

Relative Cost in Naira Different Sources of Treatment

Source of Care	All Illnesses		Fever Malaria illnesses	
	Mean Cost	Median Cost	Mean Cost	Median Cost
Chemist/Drug Shop	174	135	158	120
Government Clinic	326	227	344	300
Private Clinic	538	350	365	208

TABLE 19

One Week Household Expenditure on Malaria And Fever Treatment in The Lagos Island, Ajegunle And Lawanson Community Partnerships For Health

	Lagos Island			**Ajegunle**			**Lawanson**			**Overall**	
Item	Qty Sold	Mean Cost	Total Cost	Qty Sold	Mean Cost	Total Cost	Qty Sold	Mean Cost	Total Cost	Qty	Total
Antimalarials	1,592	N115	N183,080	890	N80	N71,200	979	N120	N117,480	3,461	371,760
Analgesies	305	N10	N3,050	118	N5	N590	303	N7	N2,121	726	5,761
Total			**N186,130**			**N71,790**			**N119,601**		**377,521**

TABLE 20

One Week Household Expenditure on Mosquito Control Products in The Lagos Island, Ajegunle And Lawanson Community Partnerships For Health

Item	Lagos Island		Ajegunle			Lawanson				Overall	
	Qty Sold	Mean Cost	Total Cost	Qty Sold	Mean Cost	Total Cost	Qty	Mean Cost	Total Cost	Qty	Total
Coils	182	N5	N910	190	N5	N950	151	N5	N755	523	2,615
Insecticide Spray	960	N116	N111,360	727	N108	N78,516	1230	N113	N138,990	2917	329,621
Repellents	15	N66	N990	7	N65	N455	15	N72	N1,080	37	2516
Total			**N 113,260**			**N 79,921**			**N 140,825**		**334,752**

TABLE 21

Malaria Fever Classification and treatment

	Community Partners for Health			TOTAL
	Lagos Island	**Ajegunle**	**Surulere**	
Number Malaria or Fever Main Complaint	76 (40.9%)	45 (24.2%)	65 (35%)	186
Type of malaria % Ordinary/Mild	65.8	42.2	49.2	54.3
Severe	6.6	11.1	21.5	12.9
Hot	1.3	13.3	3.1	4.8
Yellow	1.3	6.7	1.5	2.7
Typhoid	2.6	2.2	0.0	1.6
Don't Know	22.4	37.8		
No Giving Treatment	71 (93%)	44 (97.8%)	65 (100%)	180 (96.8%)
Type of Treatment % Herbs at Home	13.0	9.1	10.8	11.1
Herbalist	3.0	0.0	0.0	1.1
Chemist/Shop	38.0	45.5	26.2	35.6
Private Clinic	18.0	27.2	23.1	22.2
Gov. Clinic	38.0	15.9	27.7	28.9
Other*	9.8	18.2	20.0	15.6
Number Know Cost	54 (76%)	31 (70.5%)	52 (80%)	137 (76.1%)
Median Cost	N 200	N 130	N 115	N 150

Figures 1-18 from Part II are
not available electronically.
For a hard copy of these figures,
please contact EHP.

APPENDIX C: SITE MAPS

Appendix C is not available electronically.
Please contact EHP for a hard copy
of the site maps.

APPENDIX D: PRELIMINARY DRAFT ACTION PLANS DEVELOPED BY COMMUNITY PARTNERS FOR HEALTH

DRAFT

LAGOS URBAN COMMUNITY INTEGRATED HEALTH SECTOR PROJECT

INTEGRATED MALARIA ACTION PLAN

FOR

LAGOS ISLAND COMMUNITY PARTNERS FOR HEALTH

BASIC SUPPORT FOR INSTITUTIONALIZING CHILD SURVIVAL

(BASICS)

MAY 1998

Program Component: MALARIA AND CONCURRENT ILLNESSES

S/N	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
1a	Awareness: Health talks in public places e.g. markets, churches, mosques etc.	Health Facilities - All CBOs - Village Health Workers e.g. T.B.A. - Women Organization e.g. market women , women in churches, mosques	- Community - churches - mosques -CBO meeting - Trade Union Meeting - Town Union Meeting	June to September 1998	N15,000	More people became aware of incidencies of malaria and concurrent illness in the community
1b	Counselling in all clinic, such as family planning, children welfare, and Antenatal clinic	Women organizations	Town Union Meeting	June to September 1998	N42,000	No of registered positive change in peoples' behaviour to health in the community members
1c	Health education using IEC materials such as posters, hand bills, fliers, souvenirs, stickers, handouts, banners, flip charts	NGOs in health related issues e.g. WEC				
1d	Home visitation				N39,000	
1e	Advocacy with Govet. Such liasing with the local govet. In health matters				N15,000	

S/N	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
1f	Mass media e.g. TV talks, shows, Radio gingles				N50,000	
1g	Focus Group Discussion				N50,000	

Program Component: MALARIA AND CONCURENT ILLNESSES

	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
2a	Preventive activities - cleaning of bushes and surrounding.	Health Facilites ALL CBOs - women in the Community Health Workers	-At homes - in the community - and village	All year round	N2,200	Community members now practice preventive method learned during activity period - More people use nets, coils
2b	- mosquito nets on doors and windows				N60.000	
2c	Use of bed Nets.					
2d	Destruction of breeding sites e.g. pouring oilon stagnatn pools drining of stagnant pool of water.					
2e	Burning of broken bottle and cans. Iiason with LAWMA on site				N3,450	
2g	Use of aerosol insecticides noted to cause increased incidence of ARI					
2h	Use of repellants e.g. cream, coils					

Program Component: MALARIA AND CONCURRENT ILLNESSES

	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
3a	<u>Curative activities</u> Proper diagnosis by health facilities	- Health facilities - Laboratory scientist - Trainied health assistants e.g. social welfare workers. - Nurses , Social Workers - TBA	Hospital - Clinics - Health centres - Dispensaries Town hall, Palace, Kings Square	24 - 72 Hours	N10,000	- less incidence of report to health facility - less complication from fever - Low IMR - Less spending - healthy children in the community
3b	Prompt treatment of fever cases and other disease symptoms e.g. ARI, Diarhoea, anaemia, Otittis, Media, pneumonia, .					
3c	Encourage revisits for follow up. community				N25,500	
3d	Early referals for complicated cases of e.g. cerebral malaria with coma which cannot be handled with your facility					
					GRAND TOTAL = N301,250	

Program Component: RESOURCE MOBILIZATION

	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
4a	Monthly Awareness	CBO Members	CPH/Dyad Secretarial	Monthly Basis	-	Amount of money realized
4b	Seeking Financial Assistance from other NGO	Finance Committee and Governing Board	CPH/Dyad Secretariat	When Need arises	N1,000-N2,000 (Range)	Amount realize and positive response
4c	Launching of the Action Plan	Fund Raising Committee	Community Hall	When Necessary	N20,000 to N30,000	Amount realized and positive response
4d	Raffle Draw and Drama Presentation	Youth From the CBO	Community hall, School, Market	Annual Events	N5,000	No. of response and the amount realized

I PROGRAMME COMPONENTS

1. Control of human contact with mosquitoes (malaria transmitting and non-malaria transmitting)

S/N	OBJECTIVE	STRATEGY	INDICATOR
1.	Reduce mosquito bites	a) Spray room with safe insecticide aerosol before bed time. b) Promote window screening c) Promote use of mosquito nets and where possible the use of pyrethoid treatment	a) Proportion of houses with mosquito screen on windows d) Proportion of people spraying rooms every night c) Proportion of houses with mosquito nets d) Proportion of nets appropriately treated with insecticide
2.	To reduce overall mosquito populations through environmental sanitation	a) i.Fill in or drain off stagnant water in pools and puddles ii.regularly clear blocked stagnant drains iii.bury, eliminate or prevent from getting filled with rain water "non-essential" water containers such as old tires, tins cans and barrels, and broken pottery c) Drainage of canals and stagnant water d) Disposal of refuse and solid water	a) Reduction of pupa and larva which eventually leads to reduction in the number of mosquito (Adult) b) Reduction in breeding sites as judged through monthly mosquito surveys.

2. Management of Febrile Illness

S/N	OBJECTIVE	STRATEGY	INDICATOR
1.	To improve home recognition and management of Febrile illness To improve clinical and laboratory diagnosis of malaria in both public and private health care facilities Improve Rational use of Medications purchased through the private drug sellers and private practitioners as well as those dispensed at government clinics and hospitals	a) Recognize the basic signs and symptoms of malaria and manage fever promptly b) Inform caretakers to recognize the basic signs and symptoms of febrile illness, including malaria, and manage fever promptly. To recognize danger signs and to seek care at the nearest health facility. c) Provide "malaria risk" information to clinicians and drug sellers making the diagnosis. d) Provide training for improved clinical diagnosis of malaria (possibly through IMCI) Review laboratory services. e) Health facility (both public and private should prescribe and administer appropriate and malaria drugs. Information should be provided to the consumer on appropriate and in appropriate medication. f) Ensure appropriate use and compliance with a full course of prescribed drugs.	a) Proportion of care-takers with appropriate knowledge of home management of fever b) Proportion of health facilities (both public and private) providing appropriate fever diagnosis and treatment

S/N	OBJECTIVE	STRATEGY	INDICATOR
2.	To Manage and treat concurrent infections (Anaemia and acute respiratory tract infections).	a) Recognize the basic signs and symptoms of anaemia and acute respiratory tract infections and manage promptly. b) Recognize danger signs and bring to health facility; continue breast feeding. c) As with malaria, both public and private health facilities should prescribe and administer appropriate and anaemia and acute respiratory tract infections drugs and therapies.	a) No. of children presenting with fever, acute respiratory tract infections and anaemia at the health facilities monthly who are correctly treated.
3.	To reduce the incidence of Anaemia	a) Health Education at: - Well Baby Clinic - Prenatal Clinic, etc b) Conduct deworming exercises. d) Treatment and follow-up	a) Proportion of people with knowledge on the prevention of anaemia b) Percentage of people engaging in deworming exercise c) Proportion of anaemic cases at CPH health facilities
4.	To Reduce the prevalence of ARI	a) Environmental Sanitation conducted monthly c) Treatment and follow-up	a) Proportion of people with appropriate knowledge on the prevention of ARI

3. Community Mobilization

S/N	OBJECTIVE	STRATEGY	INDICATOR
1.	Increase community awareness of illness associated with their environment, especially vector borne diseases.	a) Health Education of the community on the importance of their environment and vectors malaria and the concurrent infections	a) Proportion of Health Education campaigns undertaken b) Follow-up on uptake of education campaign topics
2.	a) To promote community health by screening for malaria. b) Mobilize Community Partners for health and community resources for the integrated environmental health and malaria program	a) Meeting with community leaders b) Collaboration with other interests groups or stakeholders including business communities c) Collaboration with government authorities d) Promote neighborhood environmental health activities e) Screening method will be affordable, accessible and suitable - Bringing the .. To their door steps.	a) Number of activities that take place, both with regard to environmental sanitation and mosquito source reduction and to improve recognition and management of malaria, ARI, anemia and related illnesses.
3.	a) Mobilize external resources for integrated environmental health and malaria program b) Access the community beliefs and perception	a) Identification of funding sources and external collaborators b) Development of proposals for funding and collaboration c) Execution of funded projects d) Conduct Focal Group Discussion and Observational Studies	a) Amount of grants and collaborators acquired b) Number of proposals written and sent out c) Number of project executed d) Proportion of CPHs participating in the exercise
4.	To promote increase participation in commercial activities	a) Via incentives like T-Shirts, Face-caps etc	a) Proportion of CBOs participating

4. Resource mobilization

S/N	OBJECTIVE	STRATEGY	INDICATORS
1.	Mobilize Community Partners for health and community resources for the integrated environmental health and malaria control program	a) Meeting with Community Leaders b) Collaboration with other interest groups or stakeholder including business community c) Collaboration with government authorities	a) Proportion of meetings held b) Amount and type of resources accessed
2.	To know the numbers of Doctors and other health Workers, Nurses and knowledgeable medical health personnel in the CBOs/Community (Human Resources) Mobilize external resources for integrated environmental health and malaria control	a) Identification of funding sources b) Development of proposals for funding c) Execution of funded projects d) Accessing the numbers by creating awareness.	a) Amount of grants acquired b) Amount and type of resources accessed. c) Proportion of positive response received (i.e. Number of positive response from the human resource available)
3.	To have the knowledge of CBO spaces available, number of Health Facilities (Material Resources)	a) Workers from CBOs/Community are to access these facilities	a) Readiness of the community to make available these material resources.
4.	To generate fund (Financial Resources)	a) Monthly dues from CBOs b) Raffle draws c) Donation from international organizations and other agencies d) Donation from other NGOs	a) Number of positive response

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LAGOS URBAN COMMUNITY
INTEGRATED HEALTH SECTOR PROJECT

INTEGRATED MALARIA ACTION PLAN

FOR

AJEGUNLE COMMUNITY PARTNERS FOR HEALTH

BASIC SUPPORT FOR INSTITUTIONALIZING CHILD SURVIVAL

(BASICS)

MAY 1998

Program Component: TO PREVENT MOSQUITO BITE

S/N	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
1a	Health Education	Health Workers from Community Based Organization and Health Facilities	Community Hall/Space provided by the CBO Members	June 98 to May 99	N10,000	No. of Participants
1b	Procurement of Insecticide (Bulk Purchasing)	Sanitation Committee	CPH Secretariat	On going process	N15,000	No of Registered Members
1c	Bulk Purchase of mosquito Nets	WEC Planning Committee all CBO Members	CPH & DYAD levy	On going Process	N30,000 (Expensive)	No of Members that buy
1d	Environmental Sanitation	CBO Members	Within the Community	Monthly	-	Length of Area covered

Program Component: TREATMENT AND MANAGEMENT OF MALARIA

	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
2a	Health Education on Home Management and concurrent invention	Health Workers and Community Health Workers	CPH, Dyad and Community Hall	On going Process	N10,000	No. of Participants
2b	Proper examination and investigation	Medical Practitioner/health Workers	Hospital and Laboratories	On going process	N150. Per parent	No. of Patients
2c	Bulk Purchase of essential anti-Malarial drugs	Health Committee	Health Facilities	On going Process	N200,000	No. of Patients treated
2d	Treatment of Concurrent infections	Health Workers	Health Facilities	On-going process	Ranges from N2,000 - N3,000	No. of Patients treated

Program Component: COMMUNITY MOBILIZATION

	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
3a	Public Awareness Campaign	All CBO, Youth and others	Door to Door and Market Square, Community Hall	3 Months Intervals	N20,000 to N25,000 (Range)	No. of people who responded to the campaign
3b	Mobilization of the Community Leaders, Market Women	All CBO, Youth	Town hall, Palace, Kings Square	6 Months Intervals	N10,000t	No. of people that attended the meeting
3c	Communicating to other Resource people outside of the community	CPH, Governing Board	CPH	2 Weeks	N5,000	No. of people who responded

Program Component: RESOURCE MOBILIZATION

	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
4a	Monthly Awareness	CBO Members	CPH/Dyad Secretarial	monthly Basis	-	Amount of money realized
4b	Seeking Financial Assistance from other NGO	Finance Committee and Governing Board	CPH/Dyad Secretariat	When Need arises	N1,000-N2,000 (Range)	Amount realized and positive response
4c	Launching of the Action Plan	Fund Raising Committee	Community Hall	When Necessary	N20,000 to N30,000	Amount realized and positive response
4d	Raffle Draw and Drama Presentation	Youth From the CBO	Community hall, School, Market	Annual Events	N5,000	No. of responses and amount realized

I.. PROGRAM COMPONENTS

1. Reduce Human Contact with mosquitoes

OBJECTIVE	STRATEGY	INDICATORS
1. Reduce mosquito bites	a) Promote window screening b) Promote use of mosquito nets, and where possible, the use of pyrethoid treatment. c) Spray room with safe insecticide aerosol before bed time. d) Use of mosquito nets such as bed net, windows & door nets. d) Use of repellents like Coil, Petroleum jelly	a) Proportion of houses with mosquito screens on windows b) Proportion of houses with mosquito nets c) Proportion of nets appropriately treated with insecticide d) Proportion of CBOs spraying rooms every night. e) Proportion of CBOs using different types of repellents
2. To reduce overall mosquito populations through environmental sanitation	a) Cutting of overgrown weeds; b) Refuse disposal c) Clearing of drainage, ponds etc.	a) Frequency of environmental sanitation b) Proportion of CBOs participating in environmental sanitation exercise. c) Proportion of CBOs with appropriate knowledge, attitude and practice of people toward environmental sanitation d) Proportion of community members pouring oil on stagnant water.

2. Management of Febrile Illness

S/N	OBJECTIVE	STRATEGY	INDICATOR
1.	To improve home recognition and management of febrile illness To improve clinical and laboratory diagnosis of malaria in both public and private health care facilities Improve Rational use of Medications purchased through the private drug sellers and private practitioners as well as those dispensed at government clinics and hospitals .	a) Recognize the basic signs and symptoms of malaria and manage fever promptly b) Inform caretakers to recognize the basic signs and symptoms of febrile illness, including malaria, and manage fever promptly. To recognize danger signs and to seek care at the nearest health facility. c) Provide "malaria risk" information to clinicians and drug sellers making the diagnosis. d) Provide training for improved clinical diagnosis of malaria (possibly through IMCI). Review laboratory services. e) Health facility (both public and private should prescribe and administer appropriate and malaria drugs. Information should be provided to the consumer on appropriate and inappropriate medication. f) Ensure appropriate use and compliance with a full course of prescribed drugs.	a) Proportion of care-takers with appropriate knowledge of home management of fever b) Proportion of health facilities (both public and private) providing appropriate fever diagnosis and treatment

S/N	OBJECTIVE	STRATEGY	INDICATOR
2.	To Manage and treat concurrent infections (Anaemia and acute respiratory tract infections).	a) Recognize the basic signs and symptoms of anaemia and acute respiratory tract infections and manage promptly. b) Recognize danger signs and bring to health facility; continue breast feeding. c) As with malaria, both public and private health facilities should prescribe and administer appropriate and anaemia and acute respiratory tract infections drugs and therapies.	a) No. of children presenting with fever, acute respiratory tract infections and anaemia at the health facilities monthly who are correctly treated.
3.	To reduce the incidence of Anaemia	a) Health Education at: - Well Baby Clinic - Prenatal Clinic, etc b) Conduct deworming exercises. d) Treatment and follow-up	a) Proportion of people with knowledge on the prevention of anaemia b) Percentage of people engaging in deworming exercise c) Proportion of anaemic cases at Partners health facilities
4.	To Reduce the prevalence of ARI	a) Environmental Sanitation conducted monthly c) Treatment and follow-up	a) Proportion of people with appropriate knowledge on the prevention of ARI

3. Community mobilization

S/N	OBJECTIVE	STRATEGY	INDICATOR
1.	Increase community awareness of illness associated with their environment, especially vector borne diseases	a) Health education of the community on the importance of their environment and vectors malaria and the concurrent infections. b) Regular meetings with the information sharing at the grassroots level	a) Follow-up on uptake of education campaign topics b) Frequency of meetings held b) Percentage of community members who have the knowledge, attitude and practice of the project
2.	a)To increase networking capacity Mobilize Community Partners for Health	a) Advocacy workshops b) Visits to L.A. on a constant basis c) Seminars, meetings and dialogues at regular basis d) Information sharing.	a) Number of network established with other agencies
3.	To strengthen relationship between the community and health providers	a) Inaugurating committees comprising health workers and community members: - planning, implementing, monitoring and evaluation by partners. b) Assigning responsibilities to community members	a) Number of community representation on committees
4.	To strengthen Capacity for self-management	a) Involve community members in planning b) Involve community members in resource generating activities.	a) Proportion of community representation on planning committee. b) Proportion of community members who fulfil their financial obligation.

4. Resource mobilization

S/N	OBJECTIVE	STRATEGY	INDICATORS
1.	Mobilize Community Partners for health and community resources for the integrated environmental health and malaria control program	a) Meeting with Community Leaders b) Collaboration with other interest groups or stakeholder including business community c) Collaboration with government authorities	a) Proportion of meetings held
2.	Mobilize external resources for integrated environmental health and malaria control	a) Identification of funding sources b) Development of proposals for funding c) Execution of funded projects	a) Amount of grants acquired b) Amount and type of resources accessed.

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LAGOS URBAN COMMUNITY
INTEGRATED HEALTH SECTOR PROJECT

INTEGRATED MALARIA ACTION PLAN

FOR

LAWANSON COMMUNITY PARTNERS FOR HEALTH

BASIC SUPPORT FOR INSTITUTIONALIZING CHILD SURVIVAL

(BASICS)

MAY 1998

Programme Component: REDUCE HUMAN CONTACT WITH MOSQUITOES

	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
1.	Procurement of insecticides & Spraying	Housewife	Home	Ongoing/Monthly	N300.00	2 cans bought and delivered
2.	Procurement of bed and door nets	Breadwinner	Home	Ongoing/Daily	N400.00	No. of people seen with the nets
3.	Procurement of nets, woods and nails and labour	Breadwinner/Carpenter	Home	8 Hours/Day	N850.00 per window and door	The visible nets on windows and doors
4.	Cutting and disposal of grasses	Household members	Home Environment, Market	Monthly	N200.00 per head.	The grasses have been cut.
5.	Drain off stagnant water in pools, puddles and drainage	Community members	Community Environment	Ongoing/Weekly	N250.00 per head	The drainage has been cleared
6.	Procurement of fuel oil	Community members	Community Environment	Ongoing/Weekly	N150.00 per gallon	The drainage has been oiled
7.	Application of the fuel oil on drains stagnant water	Community member	Community environment	Ongoing/Weekly	N50.00 per head	The drainage has been oiled

Programme Component: TREATMENT & MANAGEMENT OF MALARIA AND CONCURRENT INFECTIONS

	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
1.	Invite household members to the Hospital for health education	Doctors and Health Workers	Hospital	1 Hour	N10.00 per head	The household member has been educated
2.	Procurement of materials for ORS treatment	Caretakers	Home	24 Hours	N20.00 per bottle	Patient has been adminis- tered ORS
3.	Clinical diagnosis	Doctors	Hospital	24 Hours	N50.00	Doctors has attended to the patient
4.	Laboratory diagnosis for MP/HP/Sputum	Lab. Technician or Scientist	Laboratory	3 Days	N500.00	Patient has been attended to
5.	Nursing	Nurses	Hospital	24 hours	N20.00 per head	The Patient has been treated
6.	Medication	Doctor/Nurses and Pharmacist	Hospital	24 Hours	N150.00	Patient has been treated
7.	Chest X-Ray	Radiographer	X-Ray Center	30 Minutes	N600.00 per case	Patient has been x-rayed
8.	Stool Culture	Lab. Technician	Laboratory	3 Days	N250.00 Per case	Patient has been treated
9.	Follow-up	Doctors/Nurses	hospital	1 Hour	N25.00 per head	Patient has been treated

Programme Component: COMMUNITY MOBILIZATION

	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
1.	Printing of letter headed papers	Secretary and Printer	Community	6 hours	N1,000.00 per ream	The letterhead paper has been printed
2.	Procurement of Stationeries and Consumables	Secretary/PRO	Community	2 Hours	N1,500.00	Materials have been bought
3.	Processing of invitation letters	Typist	Community	3 hours	N500.00	Letter has been typed
4.	Rentage of Hall	P.R.O.	Community	6 Hours	N2,000.00	The Rentage has been undertaken
5.	Rentage of Public Address System	P.R.O.	Community	2 Hours	N2,000.00	The Rentage has been done
6.	Refreshment & Allowances	Secretary/PRO	Community	6 Hours	N150.00 per head	Refreshment have been bought and allowances given to participants
7.	Visits to Leaders of the Community, Interest Groups, Government and Business Community	CPH Chair-person and Representatives	Community	3 Hours	N3,500.00 per visit	The various leaders and group are met
8.	Send proposal to Donor Agencies	Committee on proposal Writing	CPH Secretariat	Two Weeks	N5,000.00	All proposals have been received

	ACTIVITY	RESPONSIBLE GROUP/PERSON(S)	LOCATION OF ACTIVITY	TIME FRAME	COST	INDICATOR
9.	Follow-up on progress	Secretary	CPH Secretariat	1 month	N100.00	The various Donor Agencies seen
10.	Inaugurate Committee on Project Execution	Project Co-ordination	Community Hall	2 hours	N2,500.00	The Committee is inaugurated
11.	Rentage of Hall	P.R.O.	Community	4 Hours	N3,000.00	The rentage of the Hall
12.	Refreshment	PRO/Secretary	Community	4 hours	N150.00 per head	Refreshment given to invitee
13	Rentage of Public Address System	PRO	Community Hall	2 Hours	N2,000.00	The Rentage of the Hall has been done
14.	Gifts to invitee	PRO	Community Hall	2 Hours	N200.00 per head	All invitee given the gifts

I. PROGRAMME COMPONENTS

1. Control of Human Contact with mosquitoes (including potential disease vectors and nuisance mosquitoes)

OBJECTIVE	STRATEGY	INDICATORS
1. To reduce mosquito bites	a) Use of mosquito nets of Screen Door and windows. b) Promote window screening promote use of mosquito nets, and where possible the use of pyrethoid treatment d) Spray room with safe insecticide aerosol before bed time.	a) Proportion of houses with Mosquito screens on windows b) Proportion of houses with mosquito nets c) Proportion of nets appropriately treated with insecticide. d) Proportion of people spraying rooms every night.
2. To reduce overall mosquito population through environmental sanitation	a) Fill in or drain off stagnant water in pools and puddles b) Regularly clear blocked stagnant drains c) Bury, eliminate or prevent from getting filled with rain water “non-essential” water containers such as old tires, tins cans and barrels, and broken pottery d) Cut overgrown weeds e) Properly disposal of domestic refuse.	a) Frequency of environmental sanitation b) Number of people participating in environmental sanitation exercise c) Proportion of CBOs with appropriate knowledge, attitude and practice of people toward environmental sanitation d) Proportion of community members pouring oil on stagnant water e) Reduction in breeding sites as judged through monthly mosquito larval surveys.

2. Management of Febrile Illness

S/N	OBJECTIVE	STRATEGY	INDICATOR
1.	To improve home recognition and management of febrile illness. Improve Rational use of Medications purchased through the private drug sellers and private practitioners as well as those dispensed at government clinics and hospitals	a) Health education on Home management. e.g. Tepid sponge, fanning or exposure.	a) Proportion of care-takers with appropriate knowledge of home management of fever
2.	To improve clinical and laboratory diagnosis of malaria in both public and private health care facilities	a) Provide "malaria risk" information to clinicians and drug sellers making the diagnosis. b) Provide training for improved clinical diagnosis of malaria (possibly through IMCI). Review laboratory services.	a) Proportion of health facilities (both public and private) providing appropriate fever diagnosis and treatment
3.	To Manage and treat concurrent infections (Anaemia and acute respiratory tract infections).	a) Health Education at - Well Baby Clinics - Prenatal Clinics and other her clinics b) Investigate anaemia in the communities c) Conduct Dewoming exercise. d) Treat and follow-up children.	a) Proportion of people with knowledge on the prevention of anaemia b) Percentage of people engaging in deworming exercise c) Number of anaemia cases at partners health facilities

3. Community Mobilization

S/N	OBJECTIVE	STRATEGY	INDICATOR
1.	Increase community awareness of illness associated with their environment, especially vector borne diseases	a) Health education of the community on the importance of their environment and vectors malaria and the concurrent infections. b) Regular meetings with the information sharing at the grassroots.	a) Follow-up on uptake of education campaign topics b) Frequency of meetings held b) Percentage of community members who have the knowledge, attitude and practice of the project
2.	a) To increase net-working capacity b) Mobilize Community Partners for Health and community resources for the integrated environmental health and malaria program	a) Meeting with community leaders b) Collaboration with other interests groups or stakeholders including business communities. c) Collaboration with government authorities d) Promote neighborhood environmental health activities e) Advocacy workshops f) Visits to Local Authorities g) Seminars h) Meetings i) Dialogues at regular basis h) Information sharing.	a) Number of activities that take place, both with regard to environmental sanitation and mosquito source reduction and management of malaria, ARI, anaemia and related illnesses. b) Number of network established with other agencies

S/N	OBJECTIVE	STRATEGY	INDICATOR
3.	To strengthen relationship between the community and health providers	a) Identification of funding sources and external collaborators b) Development of proposals for funding and collaboration c) Execution of funded projects d) Establish committees comprising Health Workers and community members. - Planning, implementing, monitoring and evaluation by partners. - planning, implementing, monitoring and evaluation by partners. b) Assigning responsibilities to community members	a) Number of community representation on committees.
4.	a) Mobilize external resources for integrated environmental health and malaria program b) To strengthen capacity for self-management	a) Identification of funding sources and external collaborators b) Development of proposals for funding and collaboration c) Execution of funded projects. d) Involve community members in planning. e) Involve community members in resource generating activities.	a) Amount of grants and collaborators acquired. b) Number of proposals written and sent out. c) Number of projects executed. d) Proportion of representation on the planning committees e) Number of community members who fulfil their financial obligations.

2. Treatment and management of malaria and concurrent infections

S/N	OBJECTIVE	STRATEGY	INDICATOR
1.	To promote home management of fever	a) Recognize the basic signs and manage fever promptly b) Return Child to Hospital c) Health Education on home management e.g. Tepid sponge, fanning or exposure	a) Proportion of care takers appropriate knowledge of home management of fever
2.	Promotion of High quality and affordable drugs and partnership HFS	a) Bulk purchasing of Drugs b) Drug Revolving Scheme	a) Percentage of people patronizing Hospitals against PMV and Agbo
3.	To reduce the incidence of diarrhoea	a) Health Education - ORS usage - Personal hygiene b) Public Campaign c) Provision of portable water	a) Proportion of people using ORS and drinking portable water.
4.	To reduce incidence of Anaemia	a) Health Education Well Baby clinic, pre-natal Clinic etc b) Blood Test c) Deworming Exercise d) Treatment & Follow-up	a) Proportion of people with knowledge on the prevention of anaemia b) Percentage of people engaging in deworming exercise c) Number of anaemic cases at Partners Health facilities.
5.	To Reduce the prevalence of ARI	a) Health Education b) Environmental Sanitation c) Treatment and follow-up	a) Proportion of patients response to treatment

3. Community Mobilization

S/N	OBJECTIVE	STRATEGY	INDICATOR
1.	Increase community awareness of malaria and complicating concurrent infections	a) Health Education of the community on the importance of malaria and the concurrent infections b) Regular meetings with the information sharing at the grassroots.	a) Number of mass Health Education campaigns undertaken. b) Frequency of meetings c) Percentage of community members who have the knowledge, attitude and practice of the project.
2.	To increase networking capability.	a) Advocacy Workshop b) Visits to L.A. c) Seminars d) Meetings e) Dialogue f) Information sharing.	a) Number of network established with other Agencies.
3.	To strengthen relationship between the community and health providers	a) Committees comprising Health Workers and community members - Planning, implementing, monitoring and evaluating by partners	a) Number of community representation of the committees
4.	To strengthen capacity for self-management	- Involve community members in planning - Involve community members in generating activities.	a) Number of community representation on the planning committees b) Number of community members who fulfil their financial obligations.

4. Resource Mobilization

S/N	OBJECTIVE	STRATEGY	INDICATORS
1.	Mobilize Community Partners for healths and community resource for the integrated malaria control program	a) Meeting with community leaders b) Collaboration with other interests groups or stake-holders including business community c) Collaboration with government authorities d) Meeting with stake-holders e) Participate in Co-operative and micro-credit Schemes f) Collaboration with Govt., NGOs and funding agencies g) Development of Rolling Plan spanning between 2 - 5 years.	a) Number of meetings held. b) Amount and type of resources accessed c) Number of financial members of the Co-operative scheme c) Number of linkages or supports from Govt. and other NGOs and funding Agencies.
2.	Mobilize external resources for integrated environmental health and malaria control	a) Identification of funding sources. b) Development of proposals for funding c) Execution of funded projects	a) Amount of grants acquired b) Number of proposals written and sent out. c) Number of projects executed