



**NIGERIAN
INSTITUTE OF
MEDICAL RESEARCH**

Annual
Report 2004

NIMR

NIGERIAN INSTITUTE OF
MEDICAL RESEARCH

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NIMR Annual Report
2004 Edition

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Annual report

2004

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SENIOR STAFF APPOINTMENT IN 2004

| <u>NAME</u> | <u>DESIGNATION</u> | <u>W.E.F</u> |
|--------------------|---------------------------|---------------------|
| Dr. C.O Ezechi | Chief Research Fellow | 01/07/04 |
| Mr. E.O Udofia | Principal Technical I | 24/08/04 |
| Mrs. M.A. Akhigbe | Internal Auditor II | 01/12/04 |

SENIOR STAFF THAT LEFT THE SERVICE IN 2004

| <u>NAME</u> | <u>DESIGNATION</u> | <u>REASON FOR LEAVING</u> | <u>W.E.F</u> |
|--------------------|---------------------------|----------------------------------|---------------------|
| Engr. O.K.C Obasi | Deputy Director (W & M) | Retr. on age limit | 30/01/04 |
| Dr. B. Afolabi | Chief Research Fellow | Voluntary Retirement | 31/08/04 |
| Dr. J.A. Ogunbanwo | Research FellowII | Withdrawal of Service | 19/08/04 |

RESEARCH PROGRAMME ACTIVITIES

DIVISIONAL REPORTS 2005

BIOCHEMISTRY AND NUTRITION DIVISION

Study: **THE USE OF CHLOROQUINE AND NON-CHLOROQUINE-BASED DRUGS IN MALARIA MANAGEMENT**

Investigators: Agomo PU., Aina OO, Egbuna KN, Olukosi Y, Okoh HI, Agomo CO, Akindele SK, Afolabi AS, Enya VN, Akinyele MO.

Objective:

The objective was to document and study the various chloroquine and non-chloroquine-based drugs used in the treatment of malaria in Nigeria.

Key Accomplishments:

Our investigations revealed quite a number of NAFDAC registered and unregistered antimalarial drugs. Part of the accomplishment was a publication of our findings on the use of non-chloroquine based drugs in malaria management (see publication section).

Future Development:

Documentation / creation of database and studies on antimalarial drugs. This will be a continuous process which will not cease as long as malaria infection persists and new drugs appear in the country. Therefore, collation of data and engagement in further studies with more collaborators are envisaged.

Study: **CLINICAL TRIAL OF ARTEQUIN® 600/750 LACTAB AND ARTEQUIN® 300/375 LACTAB IN THE TRATEMENT OF UNCOMPLICATED FALCIPARUM MALARIA IN IJEDE COMMUNITY, IKORODUC LGA, LAGOS STATE**

Investigators: Agomo PU, Mustapha RAS, Omoloye BG, Okechukwu AN, Mafe AG, Ijale SI, Egbuna KN, Olukosi Y, Okoh HI, Aina OO, Agomo CO, Akindele SK, Akinyele MO and Afolabi AS.

Introduction:

Artequin®, a new combination of Artesunate and Mefloquine has been reported to be effective against multidrug-resistant *Plasmodium falciparum* malaria in other countries but not in Nigeria.

Objective:

To evaluate the efficacy and safety of the pre-packaged 300/375 Lactab and 600/750 Lactab in the treatment of malaria in children weighing 15-29kg and in adults weighing ≥ 30 kg respectively.

Results:

A total of 1453 patients were screened, 120 patients met the enrolment criteria (and were enrolled) but 115 patients (58 adults and 57 children) completed the 28 days trial. Enrolled patients were treated on day 0 (D0) after screening, and subsequently on day 1 and 2. Results showed that in the 58 enrolled adults who did not drop out, geometric mean parasite density was reduced from 7,377.19 to 19.39 per μ l of blood the following day (i.e. D1) of treatment and completely cleared by day 3.

Artequine® was found to be effective on mixed infections and exhibited marked antigametocyte activity. A total of eight (8) patients (3 children and 5 adults) were positive for gametocyte. The gametocyte clearance time was 51 hours.

There were no major side effects or adverse reaction. The values of haematological and clinical chemistry indices of toxicity were within normal ranges and were not statistically different, pre and post treatment.

Conclusion:

We conclude that Artequin® is efficacious, safe and well tolerated. Its use in the treatment of malaria is therefore recommended.

Study: **COMPARATIVE EFFICACY STUDY OF CHLOROQUINE, DIHYDROARTEMISININ AND DIHYDROARTEMISININ PLUS MEFLUQUINE COMBINATION IN CHILDREN WITH ACUTE UNCOMPLICATED FALCIPARUM MALARIA.**

Investigators: AINA, O.O, Emeka PM, Akintonwa A, and Agomo PU (2005)

Objective:

To determine the efficacy of dihydroartemisinin, chloroquine and combination of dihydroartemisinin plus mefloquine in children with acute uncomplicated falciparum malaria.

Key accomplishment:

We were able to complete the study. Our result shows that the use of dihydroartemisinin alone and dihydroartemisinin plus mefloquine combination in treating children with acute uncomplicated falciparum malaria was better than using chloroquine.

Our study showed that dihydroartemisinin is the most effective of all the antimalarial drugs used in this study, followed by combination of dihydroartemisinin with mefloquine and finally chloroquine. Our result shows that chloroquine was the least effective of all the antimalarial drugs used in the study. With this result there is need for Policy makers in Nigeria to change their first-line drug for treating malaria to a more effective antimalarial drug.

Study: **THERAPEUTIC EFFICACY TEST ON GSUNATE KIT® (ARTESUNATE + AMODIAQUINE) USED IN THE TREATMENT OF UNCOMPLICATED FALCIPARUM MALARIA IN IJEDE COMMUNITY, IKORODU LGA LAGOS STATE, AND NIGERIA.**

Investigators: Agomo PU, Mustapha RAS, Omoloye BG, Ademulyi E, Okechukwu AN, Mafe AG, Enya VN, Ijale SI, Olukosi Y, Okoh HI, Aina OO, Agomo CO, Akindele SK, Akinyele MO and Afolabi AS.

Introduction:

GSUNATE KIT®, a new combination of Artesunate and Amodiaquine. Gsunate as a blister

pack was shown by the manufacturers to be effective against multi-drug resistant *Plasmodium falciparum* malaria but its efficacy and safety in high transmission areas in Nigeria was yet to be ascertained, hence this study.

Objective:

To evaluate the efficacy and safety of the co-packaged drug in the treatment of malaria in children weighing 5-<15kg and 15-<30kg and in adults weighing \geq 30kg.

The rapid parasite clearance was accompanied by fast clinical response. The temperature in 9 adults (with temperature \geq 37.5oc) dropped from a mean value of 38.32 ± 0.58 oc to 36.64 ± 0.39 oc by D1 (i.e within 24hrs) and remained stable till day 14. the mean fever clearance time in adults was estimated to be 10.0hrs. the temperature in 34 children (with temperature \geq 37.5oc) dropped from a mean value of 38.68 ± 0.82 oc to 36.27 ± 0.51 oc by day 1 i.e 24 hours. The fever clearance time in children was calculated to be 11.7hrs.

There were no major side effects or adverse reactions. The urinalysis results and values of haematological and biochemical indices of toxicity were within normal ranges and were not statistically different pre and post treatment.

Conclusion:

We conclude that GSUNATE KIT, a combination of artesunate and amodiaquine, is efficacious, relatively safe and well tolerated. Its use in the treatment of malaria is therefore recommended.

Future Development:

As in project Nos. 1 and 2.

Study: **COMPARATIVE EFFICACY STUDY OF DIHYDROARTEMISININ, CHLOROQUINE, AND COMBINATION OF DIHYDROARTEMISININ PLUS CHLOROQUINE OR MEFLOROQUINE IN MICE INFECTED WITH *PLASMODIUM BERGHEI*.**

Investigators: **AINA, O.O, Emeka PM, Akintonwa A, and Agomo PU (2005)**

Objective:

To evaluate the efficacy of dihydroartemisinin, chloroquine and the combination of dihydroartemisinin plus mefloquine or chloroquine in mice infected with *P. berghei*.

Method:

Seventy-five mice were randomly allocated into five groups of fifteen mice each. One group of infected mice was not treated and served as control Group I and was given 0.5ml of 0.9% normal saline (Placebo). The remaining 4 groups (II-V) of mice were treated with different doses of dihydroartemisinin Group II (4mg/kg on day 0 then 2mg/kg on days 1-6), Chloroquine Group III (10mg/kg on days 1&2 then 5mg/kg on day 3), combination of dihydroartemisinin (4mg/kg on day 0) plus Mefloquine Group IV (15mg/kg on day 1) and combination of dihydroartemisinin

(4mg/kg on day 0) plus Chloroquine Group V (10mg/kg on day 1, 5mg/kg on day 2). The drugs were dissolved in 0.9% normal saline and Dimethyl-sulfoxide (DMSO) then administered orally with oral canular.

Accomplishment:

Parasite clearance time was very short in mice treated with dihydroartemisinin alone mean \pm SD PCT was (1.64- \pm 0.50 days). This was followed by combination of dihydroartemisinin with mefloquine (2.73 \pm 0.47), Then combination of dihydroartemisinin with chloroquine (2.84 \pm 0.50). The mice that were treated with chloroquine alone had PCT of 4.0 \pm 2.32. There was significant difference between the dihydroartemisinin group and the chloroquine group (P<0.0002). There was also significant difference between the dihydroartemisinin group and combination of dihydroartemisinin plus mefloquine and also combination of dihydroartemisinin plus chloroquine (P<0.005). The combination therapy was more effective than when chloroquine was administered alone.

Discussion:

The result from this study showed that dihydroartemisinin was the most effective antimalaria drug of all the drugs used. It also showed the synergistic effect of dihydroartemisinin when combined with either mefloquine or chloroquine than when the chloroquine was used alone.

Future development/upcoming studies:

Monitoring of malaria parasite resistance to dihydroartemisinin alone and dihydroartemisinin plus mefloquine combination in children with acute uncomplicated falciparum malaria.

Study: **GAMETOCYTAEMIA IN SEVERELY ILL CHILDREN: IMPLICATIONS FOR MALARIA VECTOR INFECTIVITY AND TRANSMISSION IN NORTHERN NIGERIA.**

Investigators: **Samdi L.M, Oguche S, Molta N.B, Agomo P.U. and Watitla I.M. (2005)**

Introduction:

Background: Malaria is the most important vector borne disease in the tropics and sub-tropics. Transmission of the parasites responsible for this disease occurs all-year-round in most parts of Nigeria, but demonstrates strong seasonality especially in the dry Northern region.

Objectives:

This study was designed to examine the prevalence of sexual and asexual stage parasites among severely ill children and the possible implications for mosquito infectivity and malaria transmission in northeastern Nigeria.

Accomplishments:

In all 49 out of 143 severely ill patients were positive for asexual stages of malaria parasites during June-September, 2003 equivalent to the rainy season, while 63 out of 258 patients screened in

the cold dry season (October-January, 2004) were positive for the asexual stage of the parasites. Data on gametocyte indicated a different trend, 65 out of 153 patient were positive for gametocyte in the rainy season while 116 out of 258 patients were positive in the dry season with the highest gametocyte densities seen shortly after the rainy season. Difference in number of malaria positive cases and gametocytaemia between the two seasons did not reach significance ($p>0.05$). there was no significant difference ($p>0.05$) between age groups and sex with respect to gametocytaemia. Generally, more males and females were infected. Children aged 12-60 months had the highest rate of trophozoites (77.7%) and differed significantly from other age groups. On the other hand, there was no statistical difference between age groups with respect to gametocytes. In all, 99% of children had gametocytes of less than 100 gametocytes/ μ l of whole blood.

Conclusion:

The seasonality of malaria transmission is obvious from the results of this study. However, differences in actual malaria cases between the two seasons did not reach statistical significance. The results suggest that more children come down with malaria with higher asexual parasite densities in the rainy season. Gametocytaemias, although generally low, could lead to stable malaria with availability of the mosquito vectors.

Keywords: Gametocytaemia, Malaria, northeastern Nigeria

Study: **A COMPARATIVE LONGITUDINAL STUDY OF SEASONAL VARIATION OF MALARIA PARASITE AND VECTOR DENSITIES IN THE SAHEL, NORTHEASTERN NIGERIA**

Investigators: L.M. Samdi, S. Oguche, N.B Molta, M. K. Kalu, I. M. Watila, G.I.A. Anyanwu and P. U. Agomo.

Conclusion:

This study further confirms the marked seasonality of malaria in semi-arid Northeastern Nigeria, clearly showing the combination of meteorological indices that could lead to the increase in malaria vectors and subsequently the parasite in the Sahel and the likely months of concern. The results of this study can be used to design a strategic control measure.

Study: **ACQUISITION OF PFCRT T76 AND PFMDR-1Y86 ALLELES BY *P. FALCIPARUM* ISOLATES IS ASSOCIATED WITH REDUCED EFFICACY OF CQCP IN NIGERIAN CHILDREN WITH ACUTE MALARIA.**

Investigators: Olukosi YA, Iwalokun BA, Magbagbeola EO, Adewole TA,, Agomo PU and Awolola ST (2005)

Introduction:

Chlorpheniramine (cp) has been found effective in reversing chloroquine (cq) resistance in treatment failures due to either pfcrT76 or pfmdr-1Y86 in children with acute uncomplicated malaria. Effect of these mutant genes when jointly acquired on the pharmacokinetics of cq and efficacy of cq-cp in children with acute uncomplicated falciparum Malaria is poorly understood and has compromised strategies that may support optimization of cq as an antimalarial or its Replacement by alternative drugs.

Accomplishments:

Sixty-three (66.3%) of the 95 blood stage *P. falciparum* isolate harboured pfcrK76T/pfmdr-1N86Y alleles in children with pretreatment mean CQ concentration of 318.4+16.2 nmol/L and 6h post treatment level of 560-710 nmol/L. 22.1% and 11.6% of cases were due to pfcrK76T and pfmdr-1N86Y mutations in children with plasma CQ pre-and post-treatment profiles of 285.2 + 9.6nmol/L; 580.4-870 nmol/L and 218.2 + 17.3 nmol/L; 572-910 nmol/L (p<0.05), respectively. On day 14, CQ-CP cure rates in children infected with double, pfcrK76T and profile-1N86T mutant strains were of 15.8%, 71.4% and 72.7%, respectively. Msp2 and glurp analysis showed that treatment failures were due to days 3-7 recrudescence and less diverse parasite clonality in pfcrK76T or pfmdr-1N86Y infections in these children.

Conclusion:

Pf infection due to pfcrK76T and pfmdr-1N86Y parasitaemia is associated with greater clonal diversity and early recrudescence-mediated cq-cp treatment failure in Nigerian children with acute uncomplicated falciparum malaria.

Study:

MALARIA TREATMENT: PHYSICIANS' COMPLIANCE WITH NATIONAL TREATMENT GUIDELINES.

Investigators:

Harrison NE, Ijioma CK, Odunukwe NN, Agomo CO (2004)

Summary:

Introduction: Incorrect use of antimalarial drugs undermines therapeutic effectiveness and promotes emergence and spread of drug-resistant malaria. Strategies for improving compliance require accurate information about current practices. This study surveyed the attitudes and practices in the treatment of malaria among doctors practicing in Enugu urban.

Objective:

To determine the level of compliance with the National treatment guidelines for malaria by medical Doctors.

Method:

Standard questionnaire technique was used among 300 doctors practicing in Enugu urban. Chloroquine and sulfadoxine-pyrimethamine were the commonest drugs used for treating severe malaria.

Results:

More than 60% of the doctors prescribe intramuscular chloroquine in dosage of 5ml (~200mg) daily for 3 days for children. Recommended dosage of quinine was used by 41.8% of the doctors in treating children, and 50% of the doctors in treating adults. Only 40% of the doctors utilized the National guidelines for treatment of malaria. Comparison between duration of practice, or area of specialization with this incorrect prescription pattern of intramuscular chloroquine and intravenous quinine showed no significant difference with P values >0.05.

Conclusion:

It was concluded that incorrect use of parenteral antimalarial drugs at all levels and specialties of medical doctors practicing in Enugu.

Study: **FACTORS THAT FACILITATE INFANT SURVIVAL IN A LOW SOCIO-ECONOMIC COMMUNITY IN LAGOS STATE, NIGERIA.**

Investigators: Agomo CO, Idika N, Obomanu D, Agomo PU, Idigbe EO (2005)

Summary:

Objective: To identify factors which promote infant survival during illness episodes.

Introduction:

Infants are delicate, relying mostly on caregivers for their survival. Their survival is plagued by diseases, poverty, behavioural habits and cultural beliefs of the caregivers in the developing countries. For strategies to improve infant survival, the health seeking behaviour and home care practices of caregivers during infant illness episodes were studied.

Result:

Sixty-two (8.4%) of those interviewed lost their infants; 51.6% of children who died did so in hospitals; 35.5% at home and 12.9% at unspecified places. The notable causes of death were malaria (22.6%), acute respiratory infections (14.5%) and diarrhea (12.9%). Majority of the caregivers (60.0%) whose infants died did not seek external help until 24hrs or more after onset of illness signs. Infant's tendency to survive an illness episode was significantly dependent full term delivery, ($P<0.01$); birth weight ($P<0.01$); treatment sources ($P<0.05$) and infant feeding methods ($P<0.05$).

Conclusion:

Appropriate antenatal care and infant feeding practices including exclusive breast feeding, early recognition of danger signs and timely health seeking will significantly improve child survival in Nigeria.

Study: **KNOWLEDGE ATTITUDE AND PRACTICE OF CARE GIVERS ON ARI AND MALARIA INFECTIONS AT MASSEY STREET CHILDRENS HOSPITAL, LAGOS ISLAND, LAGOS.**

Investigators: Enya VNV, Ibeh IN, Wemambu SNC, Agomo PU, Idika N

Objectives:

To investigate current practices of child care givers with febrile children under 5 years of age and the extent of their knowledge of ARIs and Malaria Fever.

Materials and Methods:

A total of 200 care givers participated in the study. A consent form and questionnaire were administered to each mother / care giver completed questionnaires were analyzed using EPI INFO 2002 at $p=0.05$.

Activity and Key Accomplishment:

A total of 200 Care givers participated in the study and have the age range of 16 years to 52 years and average of 39 years. 12.4% have no education of any sort, 17.3% had primary education, 5.4% quoranic education, 37.6% secondary and tertiary education was indicated by 27.2%. A total of 71% of the care-givers resorted to home treatment first before seeking for medical treatment at hospitals when their wards took ill. The result showed that 34.0% patronized chemist shops, 20.1% used herbal treatment and 25.0% went straight to health facilities as soon as their wards were ill. About 9.0% like to use government health facilities only but 16 used private health facilities first before resorting to government owned ones. Then 47.7% treated their children within 1-2 days of illness. Only 29.2% of the Care givers were able to identify malaria fever correctly. Only 5.0% correctly identified ARI among their febrile wards. Invitro susceptibility patterns of frequently isolated bacteria from culture positive ARI cases in Lagos Nigeria.

Conclusion:

There is still the need for further enlightenment of care-givers on the current knowledge, attitude and practice as regards ARI.

Upcoming Studies:

KAP study on care-givers of children under 5yrs of age suffering from diahorrea in a rural area of Lagos State.

Study: **INVESTIGATION OF PLANT-DERIVED NATURAL PRODUCTS FOR INSECTICIDAL AND ANTIMALARIAL ACTIVITIES.**

Investigators: OKOH H.I., Don-Pedro KN and Agomo PU.

Objectives:

- 1) To carry out an ethno botanical survey in rural Nigeria, aimed at identifying plant species/plants which indigenes use for antimalarial and/or insecticidal purposes.
- 2) To identify the active insecticidal and antimalarial components of the plant parts for possible later development into commercial compound.

Preliminary result:

Result of the preliminary tests showed that out of eighteen (18) plants screened so far, three (3) showed promising insecticidal properties against the *Anopheles* mosquitoes larvae while 5 (five) showed antimalarial potential against the *Plasmodium berghei* in mice.

Discussion:

With regards to formulation, it was found that soaking the plant material in water or ethanol was more effective than extraction with the soxhlet apparatus especially when dealing with plants with suspected insecticidal properties. This is because most of these insecticidal compounds are volatile in nature. The medium of extraction plays a very important role in solvent extraction. It was also observed that the longer the soaking period, the more effective is the extract.

Key Accomplishments:

- 1) Ethno botanical survey of plant species which indigenes use for antimalarial and insecticidal purposes in rural Nigeria is almost completed.
- 2) Chemical evaluation of the insecticidal and antimalarial properties of some locally available plants is in progress.

Future Developments/Upcoming Studies:

- 1) Establishment of mammalian toxicity levels
- 2) Mode of action studies
- 3) Shelf life and rate of loss of biological activity by analysis and bioassays
- 4) Controlled field activity trials
- 5) Evaluation of possible role in integrated mosquito control programmes.

Study: **FOOD AND WATER CONSUMPTION HABITS OF PEOPLE LIVING WITH HIV/AIDS ATTENDING NIMR/PEPFAR CLINIC**

Investigators: **Anyanwu RC, Odunukwe NN, Agomo PU, Onwujekwe DI, Ezechi OC, Sowemimo-Coker OM, Okerekocha C, Igbokwe DU, Ajani A, Ricketts A, Kalu IK, Akinyele MO.**

Objective:

- 1) To assess the food and water consumption habits of all new HIV positive patients attending NIMR/PEPFAR Clinic, using a one-page structured questionnaire
- 2) To screen and document all diet-related symptoms and complaints presented on first

visit.3) To record the weight and height of the patient and determine the Body Mass Index (BMI) and wasting

4) To counsel the patient on proper diet for positive living

Discussions:

This is an ongoing project and has reached advanced stage. About 2,000 patients have been documented and by August 2006, we expect to start analyzing the data already collected.

Key Accomplishment:

Almost all patients attending the clinic, fill our questionnaire on their first visit. They are also counseled on proper nutrition and given dietary / counseling handouts the same day. We have observed that most patients have become aware of the importance of nutrition in the management of HIV/AIDS and common symptoms associated with HIV/AIDS. Most have introduced good nutrition in their ARV treatment.

Future Development:

To fully integrate Nutrition into the management and control of major infectious diseases like HIV, TB and others.

Study: **MONITORING AND EVALUATION OF NUTRITION INTERVENTION, COUNSELING AND MANAGEMENT OF PEOPLE LIVING WITH HIV/AIDS ATTENDING NIMR/PEPFAR CLINIC**

Investigators: **Anyanwu RC, Odunukwe NN, Agomo PU, Onwujekwe DI, Ezechi OC, Ezeobi P, Gbajabiamula T, Audu R, O.A Nwogbe, Musa AZ.**

Objective:

- 1) To monitor and evaluate the outcome of nutrition counseling and intervention in the nutrition behaviour modification and health improvement of HIV positive patients attending NIMR/PEPFAR clinic, using structured questionnaire and BMI.
- 2) To evaluate the outcome of nutrition intervention in the management of HIV-nutrition related problems like Lipid problems, Blood sugar problems, Liver problems, wasting and other common symptoms using three monthly laboratory investigation records, a nutrition focused physical examination and BMI-Tool.

Discussion:

This project is on going and results will soon be put together.

Key Accomplishments:

All patients who enrolled in the NIMR/PEPFAR project went for 3-monthly or 6-monthly

laboratory evaluations which includes clinical examination and counseling. CD4 counts, viral loads, lipid profile, blood sugars, and other necessary chemistry were evaluated. Based on the out-come of the laboratory result, patients were referred for dietary/nutrition intervention, management and follow-up for any nutrition related problems. Through the use of BMI and other physical examinations, preliminary results show that many clients who had excessive weight loss have regained back their weights. Also through the use of CD4 count and viral loads laboratory-evaluations, preliminary results show that patients that came in with low CD4 cell count, now had higher CD4 counts, even as they were yet to start ARV drugs.

Study: **MISCONCEPTIONS AND REALITIES OF EXCLUSIVE BREASTFEEDING OF INFANT BY MOTHERS INFECTED WITH HIV VIRUS, IN NIGERIA.**

Investigators: **Anyanwu RC, Ezechi OC, Njepuome N.**

Objectives:

- 1) To redefine the goals and objectives of exclusive breastfeeding in the Era of HIV /AIDS
- 2) To collate data that will help formulate the best feeding options for infants of HIV positive mothers in Nigeria
- 3) To remove misconceptions and strengthen educational best feeding practices for HIV positive mothers.
- 4) To help prevent mother to child transmission of HIV virus.

Discussion:

Project was done with a structured questionnaire administered to women of child bearing age (both HIV positive and none HIV-positive persons). A total of 1,000 women were interviewed. Data is being collated currently and result will be published in a scientific journal.

Study: **DEVELOPMENT OF CHLOROQUINE RESISTANCE BY CYCLICAL PASSAGING AND SUB-CURATIVE TREATMENT OF *PLASMODIUM BERGHEI* IN MICE.**

Investigator: **Afolabi A. S**

Objectives:

To determine if chloroquine resistance parasite can be developed through subcurative drug pressure during continuous cyclical transmission of *P.berghei* in mice.

Result:

Results showed that the onset of parasitaemia was variable in all the animals. The variations

may be due to immunity, genetics and other unknown factors. The onset of parasitaemia was varied between day 4-11 after the inoculation of parasites. The Group I parasitaemia increasing after the onset till the mice died since there was no drug intervention. The Group II cleared the parasitaemia after the oral administration of chloroquine showing parasite was formerly a chloroquine-sensitive strain. Group IV totally cleared the parasitaemia after the second dose but there was recrudescence by day 7 after treatment. In the third experiment module onset of parasitaemia from the parasites suspected to be resistant was delayed but parasite density was very high when parasitaemia was observed. Administration of full chloroquine dose seemed to clear the resistant parasite by day 3 after treatment but there was recrudescence by day 7 after the chemotherapy.

Discussion:

The results clearly demonstrate that exposure of parasites to sub-curative doses of chloroquine in the mouse model can lead to the development and selection of chloroquine-resistant parasite. The resistant parasite obtained in this study can be classified as R1 (this is the recrudescence that follows the total clearance of parasitaemia within 7 days or more). This study supports the review that the emergence of resistance to chloroquine is due to drug pressure as a result of sub-curative dose often administered. Full drug regimen is curative while sub-curative dose II clear the parasitaemia but can lead to selection of resistance. This study implies that the suppressive mass drug administration is imperfect and, the haphazard use of antimalaria drugs promotes the selection of resistant parasites. These should therefore be avoided. The efficacy of the current drug therefore needs to be maintained for as long as possible and our efforts should be directed at limiting the occurrence and spread of drug resistance.

Radical Curative treatment, which is the administration of drug doses effecting the complete elimination of the parasites, is probably the most reliable means of avoiding selective parasite survival.

Key accomplishment:

We were able to complete the study. Our results clearly demonstrate that exposure of parasites to sub-curative doses of chloroquine in the mouse model can lead to the development and selection of chloroquine-resistant parasite.

Study: EFFECT OF AQUEOUS EXTRACTS OF *ALLIUM SATIVUM* ON SOME PARAMETERS OF OXIDATIVE STRESS IN MICE BRAIN.

Investigators: Iwalokun B.A., Afolabi A.S

Objectives:

To determine the effect of *Allium sativum* L., Liliaceae, garlic on some markers of oxidative stress induced by hydroxyl radicals (OH[·]) generated by Fenton's reaction and potentiated by L-glutamate

Result:

The *Allium Sativum* (garlic) clove aqueous extract was found to dose dependently prevents reduction whole brain of nucleic acids and protein as well as oxidative stress marker enzymes :

catalase and acetyl cholinesterase in mice in vitro.

Discussion:

Hydroxyl radicals- induced oxidative stress plays a major pathophysiological role in several neurodegenerative diseases. The data obtained from this study indicated that hydroxyl radicals caused a significant reduction in catalase and acetylcholinesterase activity to suggest that it induces oxidative stress via depletion of anti-oxidant system in the brain.

Key Accomplishment:

We were able to complete the study and our results suggested that *Allium Sativum* possessed neuroprotective and anti-DNA damaging effects.

MICROBIOLOGY DIVISION

Study: **STUDY OF TETANUS AND MEASLES ANTIBODY STATUS AFTER TETANUS TOXOID VACCINATION IN PREGNANT WOMEN WITH HIV INFECTION.**

Investigators: **Adeiga AA, Salu M, Akintunde GA.**

Objective:

To determine the influence of HIV infection in the development of immune status against Measles and Tetanus following Tetanus Toxoid vaccination.

Key Accomplishment:

The study reveals that immunization of mothers with HIV against under the situation of HIV infection.

Study: **EVALUATION OF SEXUALLY TRANSMITTED INFECTION(STI) MANAGEMENT BY HEALTH CARE GIVERS IN KANO AND TARABA STATES OF NIGERIA.**

Investigators: **Adeiga AA, Smith SI, Idika N, Oyedeji KSO, Niemogha MT, Otuonye N, Ogunbanwo M, Ugbasi U, Mafe AG.**

Objective:

To quantitatively evaluate effect of syndromic management training provided by Family Health International (FHI) on the quality of STI services provided by health care providers in Kano and Taraba States.

Key Accomplishment:

The effect of the syndromic management training was evaluated in that 65% of the trained doctors (mostly in the private sector) and most of other health care providers (nurses and community health officers) especially those in rural areas have adopted the syndromic management of STI.

Study: **STUDY ON *HELICOBACTER PYLORI* INFECTION IN PATIENTS WITH UPPER GASTROINTESTINAL PATHOLOGY IN WESTERN NIGERIA.**

Investigators: **Oyedeji KSO, Smith SI, Coker AO, Arigbabu AO.**

Key accomplishments:

Peptic ulcer disease and gastritis which is a significant public health problem that exacts a high cost from society has now been found to be caused by infection with the bacterium *Helicobacter pylori* and complication from the use of non-steroidal anti-inflammatory drugs (NSAIDS). Thus removing the initial medical dogma 'no acid no ulcer'.

This *Helicobacter pylori* infection can be cured with appropriate anti-microbial therapy and the effects of NSAIDS use can be managed by discontinuing the agents and giving an anti-secretory drug to promote healing. This removes the initial believe that peptic ulcer or gastritis can only be managed and not cured since *H.pylori* eradication will eventually lead to resolution of the disease.

The study revealed that a combination of both invasive and non-invasive method of diagnosis is suitable to detect *H. pylori* infection in our environment. The study has shown that the use of clarithromycin and ciprofloxacin in combination with any proton pump inhibitors can be included in the armamentarium for *H.pylori* eradication in Western Nigeria. Unlike the initial practice of using amoxycillin, metronidazole and or tetracycline.

This study has highlighted the need for screening of our water sources for the presence of *H.pylori* like other indicator organisms, so as to disrupt the source of transmission of the organism.

Polymerase chain reaction has been shown by this study to be a suitable potential in the diagnosis as well as antibiotics susceptibility testing of *H.pylori* infections . The result is obtainable within 24hr unlike culture that requires a minimum of 72hr to achieve the same result.

Future Developments/Upcoming Studies:

Implementation of a more faster, sensitive and specific diagnostic method for *H.pylori* diagnosis. This is Urea Breath test (UBT). It is a non invasive test that requires only the patient's breath to detect the presence of *H.pylori* infection.

Developing a home made method of detecting *H.pylori* in potable water using easily accessible materials affordable to Nigerians.

CLINICAL SCIENCE

Study: **FERRITIN AND HAEMATOLOGICAL VALUES IN HEALTHY ELDERLY NIGERIAN**

Investigators: Odunukwe, NN; Imonugo, IO; Akanmu, AD; Nnodu, OE; Okany, CC; Akinsete, I; Ahmed, OA; Efiemokwu, C.

Activities

Two hundred Nigerians (65 years and above) were studied and compared with control (18-50 years) Haematocrit, Haemoglobin, mean corpuscular haemoglobin concentration, mean corpuscular haemoglobin, mean Corpuscular volume, platelets and ferritin were analyzed.

Key Achievement

Mean ferritin levels were $105 \pm 30 \mu\text{g/L}$ and $72 \pm 10 \mu\text{g/L}$ (males and females respectively). Mean MCV, MCH and MCHC were $94.6 \pm 9.0 \text{ fl}$, $93.6 \pm 9.0 \text{ fl}$, $31.5 \pm 3.0 \text{ pg}$, $31.4 \pm 4.4 \text{ pg}$, $348 \pm 30 \text{ g/L}$ and $347 \pm 42. \text{ g/L}$. Mean haematocrits were $37 \pm 4\%$, $36 \pm 4\%$, while mean haemoglobins levels were $32 \pm 24 \text{ g/L}$ and $129 \pm 1 \text{ g/L}$ and $129 \pm 1 \text{ g/L}$. RBC counts were $4.1 \pm 0.8 \times 10^{12}/\text{L}$, and $4.9 \pm 0.5 \times 10^{12}/\text{L}$. Mean total WBC counts were $6.4 \pm 1.5 \times 10^9/\text{L}$ and $6.3 \pm 0.7 \times 10^9/\text{L}$, mean platelets were $170 \pm 60 \times 10^9/\text{L}$. $184 \pm 5 \times 10^9/\text{L}$. All haematological parameters were similar in both aged males and females, except ferritin Haematocrit, RBC and haemoglobin, which were significantly higher in males ($p < 0.05$). Significant sex differences.

Exist in all the parameters of control except MCV and total WBC count. There were significant differences in all the haematological parameters between the controls and the age ($0 < 0.05$), and between the aged (65-84 years) and the very aged (85-105 years) ($p < 0.05$).

Future Development

Reference haematological range needs to be established for the elderly Nigerians.

Study: **MANAGEMENT OF HIV-1 INFECTION WITH A COMBINATION OF NEVIRAPINE, STAVUDINE AND LAMIVUDINE: A PRELIMINARY REPORT ON THE NIGERIAN ANTIRETROVIRAL PROGRAM**

Investigators: Idigbe, EO; Adewole, TA; Eisen, G; Kanki, P; Odunukwe, NN; Onwujekwe, DI; Audu, RA; Araoyinbo, ID; Onyewuche, JI; Salu, OB; Adedoyin, JA; Musa, AZ.

Activities

To evaluate treatment outcome in the first 12 months among HIV-positive patients managed with a combination of Nevirapine + Stavudine + Lamivudine under the current national antiretroviral (ARV) program in Nigerian.

Study Design

This was a prospective observational, cohort study on 50 ARV-naïve patients who met the inclusion criteria for the program and had given informed consent. All patients were in stage 2 or

stage 3 periods of infection based on World Health Organization clinical classification. The patients were treated with the generic brands of ARVs and treatment consisted of oral Nevirapine (Nevimal, Cipla), 40mg twice daily. Prior to initiation of treatment, the clinical history and baseline data for each patient were documented. The levels of plasma HIV-1 RNA, CD4 cell counts, frequency of opportunistic infections, and estimated body mass index were recorded at baseline and subsequently at intervals during treatment. Data obtained at the various sampling times for each parameter were compared against their baseline values.

Key Achievement

Data on the plasma HIV-1 RNA levels indicated that between baseline and week 48 the median viral load of the patients decreased by 1.79 log (10) copies/ml. Equally between baseline and week 48 the median CD4 cell counts increased by 186×10^6 cells/L, the frequency of opportunistic infections decreased by 82%, the median body mass index increased by 4.8 kg/m², and 36% experienced side effects, which were minor and transient. The most prevalent side effect recorded was skin rash associated with Nevirapine. Good adherence to this triple regimen was recorded in >85% of the patients.

Conclusion

The overall results within the 12-month treatment period indicated an effective suppression of viral replication, the reconstitution of the immune system, and improvement of the physical well-being of the study population. Though there may be differences in global distribution of the infecting HIV-1 subtypes, the clinical and biologic results of this study compared favorably to those documented in cohorts treated with branded and generic ARV drugs in some developed and developing countries. The cumulative data in this study further confirmed that the correct use of generic brands of ARVs is a feasible option in HIV care and support programs in resource-poor countries.

Study: CURRENT CLINICAL PRESENTATION OF MALARIA IN ENUGU, NIGERIA

Investigators: Harrison, NE Odunukwe, NN; Ijoma, CK; Mafe, AG.

Activities

This study examined the malaria situation in a malaria endemic area of Nigeria. Structured questionnaire was applied to 300 doctors practicing in Enugu urban, Nigeria and confirmation of the clinical diagnosis by laboratory technique was done using 568 patients.

Key Achievement

The result shows a high prevalence of Plasmodium falciparum infection (96.4% in children, 87.0% in adults). Malaria positivity rate was 51.9% in children and 42.8% in adults. Fever, vomiting and anorexia were the commonest malaria symptoms in children, while headache, fever, chills and rigors were the commonest malaria symptoms in adults. The diagnosis practice of the doctors was clinical. Fever, vomiting and cough were found to be more associated with malaria parasitaemia in children, while in adults fever was found to be more associated with

malaria parasitaemia. Chloroquine and sulphadoximine-pyrimethamine were the commonest drugs used for treating uncomplicated malaria, while quinine was the commonest drug used for treating severe malaria.

Study: **PREVALENCE OF HIV AMONG WOMEN WITH VAGINAL DISCHARGE IN A GYNAECOLOGICAL CLINIC.**

Investigators: Anorlu, R; Imosemi, D; Odunukwe, NN; Abudu, O; Otuonye, M

Activities

Vaginal discharge is a common complaint among women with sexually transmitted disease (STDs) in Nigeria. Given the association between STDs and HIV and the alarming rise in the prevalence of HIV in Nigeria, performed this study to determine the prevalence of HIV in patients with vaginal discharge.

Study Design

Between April and August 2000, women who attended the Lagos University Teaching Hospital and complained of vaginal discharge were adequately counselled for HIV serotest. High vaginal/ endocervical swabs and venous blood were taken for microbiological studies and HIV serotest, respectively.

Study: **SOME HAEMATOLOGICAL PARAMETERS IN THE CORD BLOOD OF APPARENTLY HEALTHY NIGERIAN NEONATES**

Investigators: Odunukwe, NN; Njoku, SO; Akinsete, I; Akanmu, AS.

Activities

In this study of some haematological parameters in the cord blood of apparently healthy Nigerian neonates, ten (10) preterm and ninety (90) term neonates were studied between August and October 1997 at Ayinke House, General Hospital, Ikeja. The gestational age, method of delivery, duration of labour and the family's social class were recorded.

Umbilical cord blood was collected at the time of delivery into EthyleneDiamine Tetra-Acetic acid (EDTA) tubes. The values of some haematological parameters (Packed cell Volume (PCV), total leucocytes count (WBC), platelet count, reticulocyte count and differential leucocytes count) were determined.

The parameters were estimated as described by Dacie and Lewis. The PCV was determined using the micro-haematocrit method. Total leucocytes and platelet counts were determined by the manual method. The reticulocyte count was determined by staining a thin film with new methylene blue, while the differential leucocytes count was done on a blood film stained with L:ishmania stain.

The PCV in the study population ranged between 0.42 and 0.521L/L with a mean of 0.49 +

0.03L/L. The total Leukocyte count was between $6.45 \times 10^9/L$ and $18.60 \times 10^9/L$ with a mean of $10.79 \pm 2.58 \times 10^9/L$. Reticulocytes in the study population comprised between 2.1 and 8.5 percent of the total nucleated cells. The differential leucocytes count showed a preponderance of neutrophils.

Key Achievement

The results show that the term and preterm neonates did not show any statistically significant differences in the values of their haematological parameters ($P > 0.05$). The duration of labour and the family's social class did not affect the haematological parameters in the neonates ($P > 0.05$ in both cases)

Study: **PREVALENCE AND PATTERN OF DOMESTIC VIOLENCE AGAINST PREGNANT NIGERIAN WOMEN**

Investigators: Ezechi, OC; Kalu, BK; Nwokoro, CA; Ndububa, VI; Okeke, GC.

Activities

Five hundred and twenty-two pregnant Nigerians attending the antenatal clinic in two private hospitals in Lagos between January and June 2003 were interviewed using a structured questionnaire about their experiences of domestic violence. One hundred and four women declined to participate; a response rate of 80.1% was obtained. Analysis of the completed questionnaire by 418 respondents showed that 197 (47.1%) women reported a history of abuse. Of the 197 women who reported abuse, 23 (11.7%) experienced abuse for the first time during the current pregnancy, 97 (49.2%) experienced abuse prior to and during the current pregnancy and in the remaining 77 (39.1%) abuse predate the current pregnancy. A total of 120 (28.7%) women experienced some form of abuse during current pregnancy. Although all social and ethnic groups were involved, no association could be established between prevalence and pattern of abuse and sociodemographic characteristics. Verbal abuse was the most common type of abuse reported (52.3%), followed by economic deprivation (30%), physical abuse (25%), threat of violence (10.8%) and forced sex in 14.2%. The perpetrators of the abuse were husband and boyfriend (78.7%), in-laws (31.5%) and other relations (6.1%). The majority of abused women (99.0%) were not ready to report the abuse to the police.

Future Development

The study showed that domestic violence is common in our environment and to protect women especially pregnant ones from further abuse health-care providers in the country should be trained on how to identify its clues in order to protect these women from further abuse. The present study is a hospital based study; its findings may not be generalisable and thus a population study should be planned to determine the actual incidence and its impact among Nigerian women.

Study: HAART TREATMENT OUTCOME IN NIGERIANS WITH LOW BASELINE CD4 COUNT

Investigators: DI Onwujekwe; NN Odunukwe; OC, Ezechi; J Aboweyere; PM Ezeobi; T Gbajabiamila; AZ Musa; EC Herbertson; RAAdu; OA Rabi; OE Idigbe; EE Ekong.

Activities

There has been concern on the benefits of HAART therapy in PLWHAS with low CD4 counts especially in resource poor setting like ours. Necessitating the exclusion of this category of patients from benefiting from the limited care. In this study we evaluate the treatment outcome in this category of patient aimed at resolving above concerns. A follow up study of all patients recruited into our ARV programme with CD4 count 100 or less between 26/02/2002 and 25/02/2004. Follow-up was until death or 25/02/2005. Of 326 patients on HAART during the period, 58 (17.8%) had baseline CD4 count of = 100cells/ml with a median of 60 cells/ml. The median follow up period was 23months with a range of 2 to 32 months. At presentation 81.3 % (39) of these patients had at least one opportunistic infection (OIs). The common OIs were skin rashes (10), oropharangeal candidiasis (9) and Pulmonary TB (5). The incidence of OIs reduced from 81.3% at presentation to 25.6% at the median follow up of 23 months. Only 3 patients developed fresh OIs after commencement of HAART. Six deaths occurred among these patients case fatality rate of 10.3% compared to 3.3% in our clinic (p = 01). While 63.6% of deaths occurred within 12 months, no death occurred after 21 months of HAART. The causes of death among this patient were TB (3), Migraine (2) and cerebral Malaria (1). Fifty (86.2%) patients attended at least one extra-visit appointment apart from the normal clinic visits, with the majority (72.0%) of the visit in the first six months of presentation. Equally 17(29.3%) patients were admitted as an inpatient at least once. The median CD4 count increased from 60 cells/ml at presentation to 110cells/ml at median follow up at 23 months. The median time to viral load <400copies/ml was 18months.

Future Development

This study has shown that though these categories of patients make heavy demand on the lean clinical resources, especially in the first few months after presentation, the survival rate of 89.7% with good immunological and virological responses justifies their inclusion into ARV treatment programmes.

Study: ASSESSMENT OF QUALITY OF CARE TO PREGNANT PLWHAS IN LAGOS

Investigators: Ezechi, OC; Adewole, TA; Odunukwe, NN; Onwujekwe, Dan; Ezeobi, PA; Gbajabiamila, T; Adu, R; Herbertson E.

Activities:

In this study we assessed the quality of care giving to pregnant women living with HIV in Lagos from the patient's perspective.

A cross sectional questionnaire study of all pregnant or recently delivered women living with HIV referred to the clinical research, NIMR, Yaba Lagos. Information on socio-demographic,

obstetric, place of referral and quality of care given at the referral centre were obtained. Information on the type of practice and category of health care personnel in the referral centres were obtained directly from the referral centre. A total of 51 pregnant or recently delivered women but within 6 weeks of delivery were referred. 39(76.5%) were currently pregnant and 12(23.5%) recently delivered. The places of referral were private hospital with (47.0%), general hospital (13.7), teaching hospital (3.9%), health/maternity centres (13.7%), non governmental organization (7.8%), private laboratory (9.8%) and self referral (3.9%). While only 14(27.5%) were aware of being screened for HIV, the majority 37(72.5%) were not aware. Of the 12 patients seen post delivery, 75% delivered vaginal and the remaining had caesarean delivery because of obstetric indications. Ten (83.3%) were breast feeding and none of the babies received any post exposure prophylaxis. Their assessment of the quality of care received at the referral centre ranged from satisfactory 1(2.0%), not satisfactory 39(76.5%) and disappointment in 11(21.6%). All the mothers were willing not breastfed and give their babies ARV prophylaxis if it was offered.

Future Development

This study has shown that the quality of care offered to pregnant HIV women is unsatisfactory, even in hospital with in-house obstetricians. Further studies are necessary to identify reasons for this.

PUBLIC HEALTH

Study: SOCIO-CULTURAL ASPECTS OF MASS DELIVERY OF PRAZIQUANTEL IN SCHISTOSOMIASIS CONTROL: THE ABEOKUTA EXPERIENCE

Investigators: Adeneye A.K., Akinwale O.P., Idowu E.T., Adewale B., Manafa O.U., Sulyman M.A., Omotola B.D., Akande D.O., Mafe MA., Appelt B.

Activities:

Schistosomiasis is a public health problem in Nigeria. Control programmes have shown the need to understand the socio-cultural aspects of the disease transmission, prevention and treatment in endemic communities before control efforts are undertaken. This study sought to identify socio-cultural factors that influence distribution process of praziquantel in mass treatment of schistosomiasis infection in endemic communities in Abeokuta. Data for the study were collected through focus group discussions held separately with adult males and females, male and female adolescents (13-19 years) and, male and female children (5-12 years). In-depth interviews were similarly held with the drug distributors involved in the mass treatment and community/opinion leaders of 6 hyper-endemic communities in Ogun State, South-West Nigeria

on the mass treatment using praziquantel. These FGDs and in-depth interviews were held both before and following the drug distribution.

Key Accomplishments:

The study identified socio-cultural factors as crucial determinants in the successful implementation of any health interventions. The results showed how socio-cultural factors such as patriarchal nature of the society, community buoyancy, community involvement/participation and socio-religious events such as the fasting period of different faiths are of importance in health intervention particularly in the mass distribution of praziquantel for schistosomiasis control.

Study: HEALTH CARE SEEKING-BEHAVIOUR OF PEOPLE IN SCHISTOSOMIASIS ENDEMIC COMMUNITIES OF OGUN AND NIGER STATES, NIGERIA

Investigators: Akinwale, O.P., Adeneye, A.K., Sulyman, M.A., Idowu, E.T., Adewale, B., Manafa, O.U., Mafe, M.A. And Apelt, B.

Activities:

A study of the dynamics of health-care seeking-behaviour of people living in communities endemic for schistosomiasis was carried out in Borgu and Shagunu Local Government areas of Niger State and Ewekoro, Odeda and Abeokuta North Local Government Areas of Ogun State, Nigeria. Questionnaires were administered, which was complimented with Focus Group Discussions (FGDs) and in-depth interviews. The study investigated the knowledge,

perceptions, beliefs and practices of the people with regard to the signs/symptoms, sources of the infection, actions taken in treating the infection and their preferred health care options.

Key Accomplishment:

This investigation showed that the people of the communities under this study were conversant with urinary schistosomiasis as they demonstrated a high level of awareness of the infection. This high awareness reflects the high endemicity of the infection in these communities and showed that education had no significant impact on their knowledge, perception and attitude towards the infection as about half of them have no formal education. About 59% preferred the orthodox method of treatment and 31.7% preferred both orthodox and traditional methods. The cost of treatment and health education had significant impact on the respondents' health care seeking-behaviour. Most of the respondents and those that participated in the FGDs and interviews identified orthodox treatment as the most effective way of treating the infection, as evidenced in their choice of treatment.

Study: **EFFECTIVENESS OF DIFFERENT APPROACHES TO MASS DELIVERY OF PRAZIQUANTEL AMONG SCHOOL-AGED CHILDREN IN RURAL COMMUNITIES IN NIGERIA**

Investigators: M.A. Mafe, B. Apelt, B. Adewale, E. T. Idowu, O. P. Akinwale, A.K. Adeneye, O. U. Manafa, M. A. Sulyman, O. D. Akande, B. D. Omotola

Activities:

Schistosomiasis is hyperendemic in Nigeria. The national policy on schistosomiasis control has adopted praziquantel as the main drug of use in the control strategy aimed at reducing morbidity. However, the best delivery channel for praziquantel in schistosomiasis control in Nigeria is yet to be determined. This study assessed different channels for praziquantel delivery in a mass treatment effort. Three groups, each of two communities, were assigned to one of the following three channels: health facility (HF), school, and community for mass delivery of praziquantel to school-aged children.

Key Accomplishments:

Distributors were trained on all aspects of praziquantel distribution and sufficient praziquantel tablets were provide for the drug distribution within 3 weeks following which an evaluation of the drug distribution by the different treatment channels was conducted. Overall, the community channel of delivery achieved the best coverage of 72.2% (range: 69-73%) compared to 44.3% (range: 39.5 -62%) and 28.5% (range: 26.3-74.5%) for the HF and school channels, respectively. Community channel of praziquantel delivery as shown in this study ensures good coverage of both in and out-of-school children.

Study: **Willingness to pay for praziquantel treatment in a hyperendemic community of Ogun State, Nigeria**

Investigators: A.K. Adeneye, M.A. Mafe, B. Appelt, E.T. Idowu and D.O. Akande
Activities:

The study examined the willingness of people in a hyperendemic community, to pay for treatment with praziquantel before and after provision of the drug, with a view to assess the feasibility of achieving widespread coverage. This is consequent to I or no information about the usage and social marketing of praziquantel, the only available drug for mass treatment in the control of schistosomiasis in endemic communities, and the people's willingness to pay for the drug in Nigeria. Data were collected through focus group discussions among household heads and other adult family members and through the use of a questionnaire in a household survey in Imala-Odo, a community hyperendemic for schistosomiasis, in southwest Nigeria.

Key Accomplishments:

The main outcome measure was the respondents' willingness to pay for schistosomiasis treatment. The results show that in contrast to the 92.3% of respondents who expressed willingness to buy the drug in the pre-intervention study, only 46.5% actually purchased the drug during intervention for the treatment of their infected household members. The respondents' level of education, occupation, and income influenced their actual willingness to pay ($P < 0.05$). Statistical tests showed that those willing to pay for treatment had a higher income score than those unwilling to do so. Most respondents preferred their community head and reliable persons chosen by the community as convenient outlets for drug distribution. The number of household members respondents were willing to treat increased from 4 to 6 at N320.00 (US \$2.52) in the pre-intervention and post-intervention phases, respectively. Gender factor was found to influence the respondents' perceived average treatment cost; the females wanted N300.00 (US \$2.36) against N100.00 (US \$0.79) among the males. The results generally showed the sustainable efforts need to be made to ensure that all families can afford praziquantel drug to achieve the ultimate goal of controlling the infection in endemic communities of Nigeria.

Upcoming Studies:

It is anticipated that similar study design is utilized in endemic communities of other geographic zones of the country.

Study: **MALARIA TREATMENT: PRACTICES AMONG RESIDENTS OF LAGOS METROPOLIS, NIGERIA**

Investigators: Otubanjo O.A., Mafe M.A., Idowu E.T., Adeneye AK.

Activities:

A cross-sectional descriptive study on health seeking behaviour, preferred antimalarias and compliance in malaria treatment was conducted between May and July 2003, using semi structured questionnaire. The study was carried out in some communities of selected Local Government Areas (LGAs) in Lagos State, Nigeria. A total of 1,593 care givers randomly selected were interviewed following due informed consent.

Key Accomplishments:

The results showed that hospital was preferred (66.6%) to home remedies (17.5%) and patient medicine sellers (9.4%). In contrast 56.5% used home remedies, 22.9% take drugs bought from PMS and 15.3% go to the hospital. Choice of source of treatment was influenced by distance, effectiveness and cost. Most respondents (49.3%) seek professional treatment as soon as symptoms appear while 20.2% and 13.4% respectively seek appropriate treatment when symptoms persist after 2 days, and illness becomes critical. Chloroquine is the preferred antimalarial (27.1%) followed by Mefloquine (16.0%) and, a combination of Pyrimethamine and Sulphadoxine (11.0%). Pattern of drug use showed that only 40.4% took prescribed drugs. 47.8% took correct dosage while 11.8% and 8.1% respectively took under and over dose. Incorrect dosage and non-compliance were factors contributing to the spread of resistance and treatment failures. This needs to be addressed for successful use of Artemisinin-based combination therapies (ACTs). Health education emphasizing compliance with correct dosage need to be put in place while intensified promotive activities are mandatory for successful implementation of the policy change on malaria treatment.

Upcoming Studies:

Study on perception among stakeholders on use of artemisinin-based combination therapy will be carried out.

Study: **ENDEMICITY OF ONCHOCERCIASIS IN SOME LOCAL GOVERNMENT AREAS OF NIGER STATE**

Investigators: E.T. Idowu, B. Adewale, M. A. Mafe, B. Appelt and A. Bamgbose

Activities:

The established method of justifying the need for ivermectin delivery to a community is the use of Rapid Assessment Method (RAM). This method involves the clinical examination of 50 adult males, who have been resident in the community for at least five years, for onchocercal nodules and leopard skin. The values obtained for these indices will guide the classification of such a community as being hypoendemic, mesoendemic or hyperendemic. Those that fall within mesoendemic and hyperendemic category onchocerciasis qualify for ivermectin delivery. This study was carried out to determine if 74 communities of 8 Local Government Areas (LGAs) in Niger State qualify for inclusion in the ongoing mass delivery of ivermectin in onchocerciasis control in the State. The communities were selected using the Geographical Information System (GIS) data and following the World Health Organization (WHO) guideline for RAM.

Key Accomplishments:

A total of 3000 subjects were examined comprising of 2395 (79.8%) males and 605 (20.2%) females. None of the LGAs, based on overall prevalence for nodules qualify for mass treatment with ivermectin. However the study identified communities within some of these LGAs that were mesoendemic for onchocerciasis and thus qualified for mass treatment with ivermectin.

Upcoming Studies:

Studies on epidemiological mapping of onchocerciasis using molecular markers will be carried out in the six ecological zones to determine the distribution of the blinding and non-blinding strains of *onchocerca volvulus*.

MOLECULAR BIOLOGY & BIOTECHNOLOGY

Study: **EVALUATION OF PARAMETERS FOR EFFECTIVE DIAGNOSIS OF TYPHOID FEVER: GENOTYPIC AND PHENOTYPIC TYPING OF *SALMONELLA TYPHI* FROM DIFFERENT SOURCES IN LAGOS, NIGERIA.**

Investigators:

Current Activities

Isolation and identification of *Salmonella typhi* and *S. paratyphi* from both stool, blood and drinking water of suspected patient(s).

Determination of the base line titre of typhoid fever using widal agglutination tests.

Evaluation of antimicrobial susceptibility patterns on *S. enterica* serovar *typhi* and *S. paratyphi* isolates

Determination the prevalence of multi-drug resistant *S. enterica* serovar *typhi* in Lagos, Nigeria.

Establishing the relationship between the antimicrobial resistance pattern and plasmid DNA profiles of the isolates.

Future Projection:

Carrying out molecular typing of *S. enterica* serovar *typhi* isolates using modern molecular techniques.

Key Accomplishments

Sixty-five patients were screened for *Salmonella typhi* by conventional techniques of culture and Widal test. In addition, the patients were screened for malaria parasite test and full blood counts. Fifty reported of febrile conditions, while 15 had no prior febrile condition and were used as the control population. Out of these 50, 13 (26%) were positive for *Salmonella typhi* while only one (7%) was positive for *S. typhi* amongst the control population. Generally, 36 (64.3%) patients were positive for malaria parasite, while 29 (35.7%) were negative. Those patients that had higher O antibody titre by Widal test ($=1:80$) were found to have taken tap water and pure water as their sources of drinking water. Majority of the isolates were from stool samples (57%), while the blood isolates were 43%. Nine of the isolates were also positive for malaria parasite, out of which 7 were in the trophozoite stage. The only control patient that had no febrile condition and a Widal O test of 1:20 was negative for malaria parasite test. The isolates were grouped into nine according to their antibiotic susceptibility patterns. The antibiotic susceptibility patterns showed the general pattern of resistance to be Ap^rCot^rChl^rAmx^rMet^r (78%).

When the isolates were typed using plasmid profiles and RAPD patterns, they gave about 4 and 5 groups respectively, Interestingly, the isolate from the negative control stood out on a different group from the others, from the plasmid profile, RAPD patterns, antibiotic susceptibility testing.

It is recommended that malaria parasite test, *S. typhi* culture from faecal samples and in addition Widal test should be done to properly diagnose typhoid fever patients in our environment.

Work is on-going to further identify other molecular methods for effective diagnosis of *Salmonella typhi*.

Future Projection :

Serological typing of local antisera for the typing of *S. typhi*

S. enterica serovar *typhi* will be detected directly from the blood and also isolates using PCR. The blood samples will be screened for widal, culture, malaria parasite, and other haematological parameters. Stool and water samples will be cultured and DNA will be extracted directly from the blood and isolates for PCR, PCR-RAPD, plasmid DNA. Questionnaires would be administered to the patients to determine amongst others their source of drinking water.

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NIGERIAN INSTITUTE OF MEDICAL RESEARCH

FINANCIAL STATEMENTS FOR THE ENDED
31-Dec-04

FINANCIAL HIGHLIGHTS

| | 2004 | 2003 |
|--|---------------|--------------|
| | N | N |
| ACCUMULATED RECURRENT ACCOUNT: | | |
| Accumulated Deficit as at December 31, 2004 | (104,434,567) | (93,173,274) |
| INVESTMENT INCOME: | | |
| Interest from Investments | 2,768,406 | 2,077,477 |
| RESULT FOR THE YEAR: | | |
| Surplus/(Deficit) of Income over Expenditure | (10,894,655) | 5,016,544 |
| ACQUISITION OF FIXED ASSETS: | | |
| Additions to fixed Assets in the year | 17,349,510 | 950,340 |
| CAPITAL WORK-IN-PROGRESS: | | |
| Additions in the year | 5,928,344 | 74,349 |
| NET WORTH: | | |
| Net Assets Employed | 137,598,834 | 89,465,506 |

NIGERIAN INSTITUTE OF MEDICAL RESEARCH
BALANCE SHEET FOR THE YEAR ENDED DECEMBER 31, 2004

| | | 2004 | | 2003 | |
|-------------------------------|-------|-------------------|--------------------|-------------------|--------------------|
| | NOTES | N | N | N | N |
| FIXED ASSETS | 1 | | 51,120,351 | | 38,214,430 |
| CAPITAL PROJECT | | | | | |
| IN PROGRESS: | 2 | | 14,153,979 | | 8,225,636 |
| UNESCO COUPON | 2.1 | | 2,000,000 | - | |
| CURRENT ASSETS: | | | | | |
| Investments | 3 | 4,000,000 | | 23,500,000 | |
| Debtors/Prepayments | 4 | 12,918,353 | | 13,804,224 | |
| Cash and Bank Balances | 5 | 55,564,890 | | 8,315,743 | |
| | | 72,483,243 | | 45,619,967 | |
| CURRENT LIABILITIES | | | | | |
| Creditors & Accruals | 6 | (2,158,739) | | (2,594,526) | |
| NET CURRENT ASSETS | | | 70,324,504 | | 43,025,441 |
| NET ASSETS | | | 137,598,834 | | 89,465,506 |
| FINANCE BY: | | | | | |
| Capital Grants | 7 | 229,283,401 | | 174,888,780 | |
| Research Grants | 8 | - | - | | |
| | | | 229,283,401 | | 174,888,780 |
| Accumulated recurrent Account | 9 | | (104,434,567) | | (93,173,274) |
| Motor Vehicle Revolving Fund | 10 | | 5,250,000 | | 3,250,000 |
| Housing Revolving Fund | 11 | | 7,500,000 | | 4,500,000 |
| | | | 137,598,834 | | 89,465,506 |

DIRECTOR-GENERAL

CHAIRMAN

NIGERIAN INSTITUTE OF MEDICAL RESEARCH
INCOME AND EXPENDITURE ACCOUNT
FOR THE YEAR ENDED DECEMBER 31, 2004

| INCOME: | NOTES | 2004 N | 2003 N |
|--|--------------|----------------------------|-------------------------|
| Recurrent Subventions | | 149,894,771 | 151,647,156 |
| Other Income | 11 | 25,085,095 | 20,783,615 |
| | | <u>174,979,866</u> | <u>172,430,771</u> |
| LESS EXPENDITURE: | | | |
| Staff Expenses | | | |
| Personnel Emoluments | | 152,612,789 | 13,722 |
| Staff Welfare & Training | | 2,002,336 | 855,307 |
| | | <u>154,615,125</u> | |
| Administrative Expenses: | | | |
| Subscriptions, Donations etc | | 269,200 | 127,120 |
| Office General Utilities | 12 | 4,955,963 | 5,942,177 |
| Entertainment | | 1,089,548 | 365,987 |
| Legal & Professional Charges | | 808,265 | 624,860 |
| Audit Fees - NIMR | | 330,000 | 330,000 |
| Electricity | | 1,388,224 | 1,626,308 |
| Insurance | | 712,217 | 1,016,074 |
| Advertisement & Publicity | | 284,156 | 80,146 |
| Travelling & Transport Expenses | | 4,455,301 | 2,101,226 |
| Governing Board Expenses | | 1,801,330 | 3,711,726 |
| Consultancy | | 266,670 | 722,000 |
| | | <u>16,360,874</u> | <u>16,647,624</u> |
| Maintenance & Repairs: | | | |
| Vehicle Running Cost | | 1,458,705 | 1,105,860 |
| Maintenance of Building | | 3,741,587 | 3,075,409 |
| Maintenance of Equipment | | 3,063,499 | 1,016,367 |
| Maintenance of Plant & Machinery | | 1,468,022 | - |
| | | <u>9,731,813</u> | <u>5,197,636</u> |
| Research Support Costs: | | | |
| Research Materials | | 505,220 | 695,866 |
| Research Expenses | | 217,900 | 511,660 |
| | | 723,120 | 1,207,526 |
| Depreciation | | 4,443,589 | 5,984,639 |
| | | 185,874,521 | 167,414,227 |
| (DEFICIT/SURPLUS OF INCOME OVER EXPENDITURE | | <u>(10,894,655)</u> | <u>5,016,544</u> |

NIGERIAN INSTITUTE OF MEDICAL RESEARCH
CASH FLOW STATEMENT
FOR THE YEAR ENDED DECEMBER 31, 2004

| | 2004 | 2003 |
|---|--------------------|---------------------|
| | N | N |
| CASH FLOW FROM OPERATING ACTIVITIES: | | |
| Operating (deficit) surplus | (10,894,655) | 5,016,544 |
| Adjustment for repreciation and other Items not Involving Movement of Funds | <u>4,443,589</u> | <u>5,984,639</u> |
| Operating surplus/(deficit) | <u>(6,451,066)</u> | <u>11,001,183</u> |
| | | |
| (Deficit)/Surplus before Changes in working capital | (6,451,066) | 11,001,183 |
| (Increase)/Decrease in debtors/Prepayments | 885,871 | (5,732,382) |
| Less Increase/(Decrease) in Creditors/Accruals | <u>(435,787)</u> | <u>(702,824)</u> |
| | | |
| Net Cash Flow from Operating Activities (A) | <u>(6,000,982)</u> | <u>4,565,977</u> |
| | | |
| CASH FLOW FROM INVESTING ACTIVITIES: | | |
| Acquisition of Fixed Assets | (17,349,510) | (950,340) |
| (acquisition)/Realization of short-term Investments/Coupon Capital Project in Progress Additions | <u>(5,928,344)</u> | <u>(74,349)</u> |
| (B) | <u>(1,777,854)</u> | <u>(13,200,689)</u> |
| | | |
| CASH FLOW FROM FINANCING ACTIVITIES: | | |
| Capital Grants (Net Receipts) Adjustments | 54,394,621 | (69,303) |
| P & G Accumulated Recurrent Account | <u>633,362</u> | <u>69,303</u> |
| (C) | <u>55,027,983</u> | <u>-</u> |
| | | |
| NET CASH FLOW IN CASH/CASH EQUIVALENTS: | | |
| Cash flows from (A) + (B) + (C) | 47,249,147 | (8,704,015) |
| Cash/Cash Equivalents at Jan.1,2004 | <u>8,315,743</u> | <u>17,019,758</u> |
| Cash/Cash Equivalents at Dec.31, 2004 | <u>55,564,890</u> | <u>8,315,743</u> |
| | | |
| Bank and Cash Balances (see note 5) | <u>55,564,890</u> | <u>8,315,743</u> |

LIBRARY

MAINTAINANCE DIVISION

MAINTENANCE AND CONSTRUCTION WORK IN 2004

Construction of 11 K.V. A. power line, a direct line from Olanrewaju Junction to NIMR to by pass old R.M.U. which source entered NIMR compound to resolve the perennial flood problem associated with existing channel.

Re-allocation of NIMR main store to a spacious accommodation.

The rehabilitation and conversion of existing Clinic structure to a 30 Bed Clinical Centre Phase 1.

Construction and actualization of Phase 1 drainage channelization, discharge and re-direction of flow of water from NIMR Compound across Edmond Crescent to link the main drain along Muritala Mohammed Way.

Drilling of 150 ft (45m) deep Borehole, Installation of public water supply scheme.

Renovation of Residential Quarters.

Face lift of the Experimental Animal House.

Fencing of NIMR 8.8 accres of triangular piece of land.

Sand filling of flood prone area in NIMR compound.

SEMINARS, TRAININGS & OTHER RESEARCH ACTIVITES

CONTRIBUTIONS TO SCIENTIFIC MEETINGS

| | | |
|--|------------------------|-------------|
| Management of Tuberculosis/HIV Co-infection in an Anti-Retroviral Therapy Centre Setting: Matters Arising. | Dr. Dan Onwujekwe | Sept. 2004 |
| Biochemical and Immunogenic properties of a recombinant plasmodium vivax Thrombospondin Related Adhesive Protein (PvTRAP): A MALARIA VACCINE CANDIDATE. | Dr. Jamiu A. Ogunbanwo | June 2004 |
| Haematological and biochemical response to treatment of HIV-1 infection with a combination of Nevirapine + Stavudine + Lamivudine in Lagos, Nigeria. | Dr. N. N. Odunukwe | July 2004 |
| Malaria Vector research and networking in Nigeria. | Dr. T. S. Awolola | August 2004 |
| Microbicide research and development: Concepts of C31G (Savvy) Phase 3 trial in Nigeria. | Dr. A. Adeiga | August 2004 |
| Application of the fluorescent in situ hybridization (FISH) for the detection of clarithromycin and tetracycline resistances in mice co-infected with H. pylori. SSI and X47. | Dr. S. I. Smith | Sept. 2004 |
| Willingness to seek voluntary HIV Counselling and testing among Pregnant women in Ogun State, Nigeria. | Mr. A. K. Adeneye | Oct. 2004 |
| Enhanced Efficacy of Chloroquine with Chloropheneramine and molecular Correlates of Drug Resistance in children with acute uncomplicated Falciparum Malaria in Lagos, Nigeria. | Mrs. Y. A. Olukosi | Nov. 2004 |